Date: February 6, 2012 12:39 PM
Topic: aaaMay 18, 2012 12:39 PM

This information is compiled from a search of 19th century literature in googlebooks using the search term **charcoal fertilizer .** The text recognition software makes a lot of mistakes in rendering these old books and periodicals, so spelling can get pretty far out there. Unfortunately I have better things to do than spend my time correcting them. I have also posted on my blog a condensed version that makes for lighter (and more corrected) reading. If you need to use any of this information for reference or quotation, I highly recommend that you view the original references.

Steven Edholm
5/18/12

Date: February 8, 2012 4:27 PM
Topic: The American wheat culturist: a practical treatise on the culture of wheat ...

http://books.google.com/books?id=_C9EAAAAYAAJ&pg=PA229&dq=charcoal+fertilizer&output=text#c_top

The American wheat culturist: a practical treatise on the culture of wheat ...

Charcoal Dust As A Fertilizer.

Charcoal is composed almost entirely of pure carbon; and when small fragments are exposed to the influences of the weather, they undergo very little change during a long term of years. Still the roots of growing plants will lay hold of the small pieces of charcoal, and appropriate the substance contained in the coal to the growth and development of the stems, leaves, and seeds of grain, fruit, and vegetables.

Experienced chemists assure us, charcoal, and particularly charcoal dust, has the power of attracting and fixing large quantities of ammonia, a substance which enters largely into the formation of useful plants, and of retaining this fertilizing material when buried in the soil, until the fine fibres of the roots of growing plants require it for promoting their growth. Charcoal has the power of attracting and retaining other gaseous substances besides ammonia, which are highly beneficial to growing wheat plants, as well as grass, vines, trees, and shrubs.

Every observing farmer who has been accustomed to raise wheat cannot have failed to notice the luxuriant growth of cereal grain round about the places where charcoal has been burned, even more than thirty or forty years ago. The growing stems of wheat that are produced on such old charcoal-beds are seldom affected with rust; and besides this, the straw is always much stiffer than that which grows where there is not a dressing of charcoal. Before charcoal can promote the growth of plants of any kind, the particles must be thoroughly decomposed, and reduced to a liquid condition. For this reason, previous to the application of charcoal dust as a fertilizer to any kind of soil, the coal should be run through a mill that will reduce the small pieces to fine powder. And even when charcoal is thus finely comminuted by some mechanical means, the action of the fertilizing matter on vegetation will be

very slow.

It is said that charcoal possesses the power of absorbing ninety times its own weight of ammoniacal gases. This fact suggests that charcoal dust, which may be procured in large quantities, at simply the expense of carting, in and around many of our populous cities, should be scattered in the stables of domestic animals, after having been ground very fine, where it will absorb large quantities of the choicest fertilizing material, which, if mingled with the soil, would impart a rich store of pabulum to the roots of growing crops. But whether a farmer would be warranted in purchasing charcoal, grinding it to powder, scattering it in his stables, and applying it the soil, is a question that can be decided satisfactorily, only by well-conducted experiments. The probability, however, is that it would not pay, for the reason that the decomposition of the fragments of the coal would be so exceedingly slow, from year to year, that the beneficial effect would not be a fair equivalent for the expense incurred. Where a farmer can procure charcoal dust for the carting, he can well afford to haul it two or more miles for the purpose of applying it to certain kinds of soil.

Where the soil is deep, mellow, vegetable, black loam, or muck, it would not pay to cart charcoal dust to apply as a fertilizer, because there is an abundance of carbon- . aceous material already in the soil. But where the soil consists chiefly of a sandy loam, a gravelly loam, or is a heavy soil of any character, it will pay to cart charcoal dust to mingle with stable manure, to be applied to the soil where cereal grain, in particular, or grass, or any other crops, are to be produced.

As to the proper quantity of charcoal dust to be applied to an acre, there is no rule for determining how much may be used with profit. There is no danger, however, of applying too much. The larger the quantity the better. On those soils where charcoal dust will not be of any advantage to growing crops, a bountiful dressing will exert no injurious influence. The larger the quantity spread around all kinds of fruit trees, the smoother and fairer the fruit will be.

In many fields where cereal grain is grown, the old coal-pit beds should be carted and spread on those parts of the field that are not rich in carbonaceous material. Charcoal dust, finely pulverized, is an excellent material to mingle with the soil where fruit trees of any kind are being transplanted. From five to ten bushels per tree would be a liberal dressing. For an immediate fertilizing effect on the growing crops of almost any kind of soil, it would be more satisfactory to reduce the coal to ashes, and sow what remains, broadcast

over the field, while plants of grain or grass are young and tender, as wood ashes are an excellent material for grain and grass, trees and flowers, fruits and vegetables of all kinds.

R. Ranson, Ashtabula County, Ohio, writes, touching pulverized charcoal, as follows: "I tried another experiment in 1860. My lands are coarse or loose gravel of rather poor quality. I sowed an acre of winter wheat (the blue-stem) preparing my ground as follows:

"The field was sown with barley in the spring previous ; yield small (eighteen bushels per acre). I turned in the stubble the last week in August, harrowed it over, then took about eighteen bushels charcoal crushed fine, and top-dressed a strip through the middle of the acre over about one-third of its length; I then sowed on my wheat broadcast and harrowed it over twice. The result was, the heads when ripe were at least twice as long as where no coal was put on. I harvested all together; the yield was forty-three bushels. I think by applying about fifty bushels of coal to the acre as a top-dressing, made fine by grinding in a common bark mill, it would increase the yield at least four hundred per cent., if the soil is poor.

"He further states he used burned clay and ashes in the fall of 1860, at the rate of about one hundred bushels of burned clay, taken from a fallow where timber had been uprooted several years by heavy winds. The soil on which the timber grew was burned together with the old roots and clay entwined, and perhaps some muck; the whole, ashes, clay and muck, after being burned as above, were hauled off in a wagon and put upon the wheat field as a top-dressing, and harrowed in with the wheat. The land was poor quality of gravel; the yield was about five hundred per cent. over the remainder of the field where no clay was put. I think there is no fertilizer ahead of this as a top-dresser." See Mixing Soils, second volume of Young Farmer's Manual.

Date: February 10, 2012 7:02 PM
Topic: Cordon Training of Fruit Trees

http://books.google.com/books?id=F7kaAAAAYAAJ&pg=PA14&dq=Cordon+Training+of+Fruit+Trees+charcoal&hl=en&sa=X&ei=naWFT-r4LcKOiAKXpLX1BA&ved=0CEkQ6AEwAA#v=onepage&q&f=false

Cordon training of fruit trees: diagonal, vertical, spiral, horizontal ...

By Thomas Collings Bréhaut, Charles Mason Hovey

If the soil be too heavy in any case, powdered charcoal or burnt earth are the usual palliatives. (In reference to soils for planting pears.)

Date: March 30, 2012 5:58 AM
Topic: A dictionary of Modern Gardening

Read more: http://chestofbooks.com/gardening-horticulture/Dictionary/Charcoal.html#ixzz1qbXed2zx

This section is from the book "A Dictionary Of Modern Gardening", by George William Johnson, David Landreth.

Charcoal

Soot, a chief constituent of which is charcoal, has long been known as a very effective fertilizer; and burning has still longer been known as a mode of reducing stubborn soils to prompt productiveness. But both these sources of fertility might owe their efficiency to other causes than their affording carbon to plants; and it is only within these very few months that anything like a general knowledge has been diffused that mere charcoal is one of the best of manures. The fact has been known for many years to individuals, as, for example, to Mr. Barnes, of Bicton; but it is only very lately that gardeners generally have learned, and I am happy in being able to join my voice to that excellent cultivator's in announcing, that - charcoal is a most efficient manure to all cultivated plants, especially to those under glass. Heaths, rhododendrons, cucumbers, roses, orchidaceous plants, hydrangeas, camellias, melons, and pine apples, have been the subjects of extended and most successful experiments. The advocates are too well known to require more than naming, for among them are Dr. Lindley, Mr. Barnes, Mr. Maund, Mr. Snow of Swinton Gardens, Mr. Stewart of Stradsett Hall Gardens, and Mr. Rivers. I think no cultivated plant would be unbenefited by having charcoal applied to the soil in which it is rooted.

It should be broken into small pieces, about the size of a nut, and for potted plants may be mixed in the proportions of one part charcoal to twenty parts earth. If applied to the open ground, one-fourth of a bushel may be sown over a square rod, and dug in just before inserting the crop. The reason of charcoal being so useful as a manure is very apparent. MM. Sennebier, Ruckert, Saussure, and others, have demonstrated that plants are rendered much more luxuriant and productive, by having carbonic acid applied to their

roots, than other plants to whose roots no such application was made. Now charcoal kept moist, as when buried in the soil, slowly combines with oxygen, and emits carbonic acid - in fact, it slowly dissolves. I am sorry to differ from such an authority as Liebig, who broadly asserts that "Carbon never combines at common temperatures with oxygen, so as to form carbonic acid." This was long since shown to be otherwise by Count Rumford; and may easily be demonstrated to be incorrect, by confining a few ounces of fresh and moistened charcoal powder, mixed with earth, in a glass receiver full of oxygen, over lime water; carbonate of lime will form, showing the gradual evolution or carbonic acid.

The following communication from Mr. Barnes shows, that carbonized vegetables are a better manure for onions than even bone-dust.

"A piece of ground that was cropped with coleworts last autumn, (1843,) was cleared early, and the refuse trenched in during the winter. 95 feet in length and 10 feet in width, was planted with small onions on the 14th of February, which onions had been sown the second week of September in the previous autumn. They were planted in rows one foot apart, and six inches from plant to plant - with the intention of drawing every alternate one for use through the summer - but the whole nine rows did not get entirely thinned. The following is the weight when ripe for storing on the 1st of August.

"Five rows grown where 4 lbs. of bone-dust to each row had been sown in a drill drawn 3 inches deep and filled up, and the onions planted over it - producing 420 lbs. weight of onions - each row yielding from 82 to 88 lbs.

"The other 4 rows had applied to them of fresh dry charred refuse and ashes, made from the garden rubbish-heap, two common buckets full, weight 14 lbs. They produced 366 lbs. of onions, the rows weighing respectively 99, 89, 95, and 83 lbs. The last row being injured by a row of red cabbage growing near.

"Many of the foregoing onions, which were a mixture of the Globe, Deptford, and Reading, measured in circumference from 14 to 16.V inches, and weighed as many ounces. I weighed 12 together, that turned the scale at 12 lb. 9 oz. I can only fancy what a wonderful saving and benefit it would be to the country, to char the refuse of old tan, chips, sawdust, ditch scourings containing sods, weeds, bushes, and refuse. By keeping the surface of the earth well stirred, no crops appear to suffer by drought that are manured by charrings, but continue in the most vigorous health throughout the season, never suffering

materially by either drought or moisture".

On spring sown onions and on turnips, Mr. Barnes finds charred or carbonized vegetable refuse equally beneficial. Three rows, each 95 feet long, of the white globe onion, manured with bone-dust, weighed 251 lbs.; whilst three similar rows of the same variety, and grown under precisely similar circumstances, but manured with char-rings, weighed 289 lbs.

Date: March 30, 2012 6:39 AM
Topic: "The Horticulturist, And Journal Of Rural Art And Rural Taste"

http://books.google.com/books?id=-LbNAAAAMAAJ&pg=PA18&dq=may+be+beneficial+to+plants+by+affording+carbonic+acid+gas&hl=en&sa=X&ei=NaKFT-aMN-OiiQLJ4b31BA&ved=0CDoQ6AEwAQ#v=onepage&q=may%20be%20beneficial%20to%20plants%20by%20affording%20carbonic%20acid%20gas&f=false

Charcoal As A Manure

Manures may be beneficial to plants by affording carbonic acid gas to their roots. Animal and vegetable matters evolve this gas while putrifying; but we are not aware of any manure that absorbs it from the atmosphere, so as to be for that reason beneficial to vegetation. Lime attracts carbonic acid gas from the air rapidly, but combines with it so strongly, that it is useless to the plant until the carbonate of lime so formed is imbibed and elaborated by that plant.

It is to its power of gradually forming carbonic acid gas that charcoal partly owes its value as a manure. The chemical operation of charcoal, when employed for this purpose, is by no means so well understood as that of most other fertilizing additions to the land. That the carbon of the charcoal operates so beneficially upon plants, among other modes by a gradual combination with oxygen, hardly admits of a doubt. Liebig gives the results of a series of experiments by Lukas on the use of charcoal as a manure, which seem to corroborate his opinion. From the facts which these chemists, however, adduce, it is evident that the beneficial action of charcoal, as a fertilizer, depends upon the presence of other substances besides carbon. Liebig notes (Organic Chem., p. 62) that "plants thrive in powdered charcoal, and may be brought to blossom, and bear fruit, if exposed to the influence of the rain and the atmosphere. Plants do no not, however, attain maturity under ordinary circumstances in charcoal powder when they are moistened with pure distilled water instead of rain or river water.

Rain water must, therefore, contain within it one of the essentials of vegetable life; and it has been shown that this is the presence of a compound containing nitrogen; the exclusion of which entirely deprives humus and charcoal of their influence on vegetation. It is ammonia, to whose presence in rain water Professor Liebig thus refers, in whose valuable work (p. 207) the experiments

of Lukas will be found. From these we learn that in a division of a low hothouse, in the Botanic Garden at Munich, a bed was set apart for young tropical plants; but instead of being filled with tan, as is usually the case, it was filled with powdered charcoal, the large pieces of charcoal having been previously separated by means of a sieve. The heat was conducted by means of a tube of white iron into a hollow space in this bed, and distributed a gentle warmth, sufficient to have caused tan to enter into a state of fermentation. The plants placed in this bed of charcoal quickly vegetated and acquired a healthy appearance.

As always is the case in such beds, the roots of many of the plants penetrated through the holes in the bottom of the pots, and then spread themselves out; but these plants evidently surpassed in vigor and general luxuriance plants grown in the common way; for example, in tan.

M. Lukas then gives a list of several of the exotic plants upon which charcoal appears to have produced the most beneficial effects. It appeared also to promote the rapid germination of seeds. He then proceeded to try the effects of charcoal when mixed with vegetable mould, all of which answered very well. "The charcoal," continues M. Lukas, "used in these experiments was the dust-like powder of charcoal from Firs and Pines. It was found to have most effect when allowed to lie during the winter exposed to the action of the air. In order to ascertain the effects of different kinds of charcoal, experiments were also made upon that obtained from the hard woods and peat, and also upon animal charcoal; although I foresaw the probability that none of them could answer so well as that of Pine wood, both on account of its porosity and the ease with which it is decomposed. The action of charcoal consists primarily in its preserving the parts of plants with which it is in contact, whether they be roots, branches, leaves, Ac., unchanged in their vital power for a long space of time, so that the plant obtains time to develop the organs for its further support and propagation.

There can scarcely be a doubt, also, that the charcoal undergoes decomposition; for, after being used for five or six years, it becomes a coaly earth. It exercises likewise a favorable influence by absorbing and decomposing the matters excreted by the roots of plants, so as to keep the soil free from the putrifying substances, which are often the cause of the death of the spongioles. Every experiment,"concludes M. Lukas, " was crowned with success, although plants belonging to a great many different families were subjected to trial." - (Ibid., p. 211).

Professor J. F. Johnston (Elm. of Ag. Chem., p. 142) recognizes the good properties of charcoal as "a valuable mixture with 'liquid manure, night-soil, farm-yard manure, ammoniacal liquor, or other rich applications to the soil." And as he observes in another place, when speaking of the fertilizing portions of farm-yard drainage, (Trans. High, Soa, 1846, p. 190,) "The only substance at present known, by which the separation of all the valuable in gradients from liquid manure can be fully effected, is animal charcoal. A sufficient supply of this substance, when intimately mixed with the liquid manure, will take up nearly the whole of the saline and coloring matters it holds in solution, will carry down the substances it holds in suspension, and will leave the water nearly pure and colorless. The refuse of the prussiate of potash manufactories will have this effect, and what remains when ivory-black is digested in spirit of salt (muriatic acid) will do still better; but this kind of charcoal is neither cheap nor abundant, and, therefore, cannot be recommended for general use.

The refuse animal charcoal of our manufactories is now sold for manure at the price of several pounds a ton: either those who sell it, or those who use it, might render it still more valuable by causing fermenting liquid manure to filter through it before it is applied to the land.

" But other kinds of charcoal possess this property to a certain extent: wood charcoal, reduced to powder, charred sawdust, and charred peat, are all capable of being used with advantage in extracting the ammoniacal and other salts, which give its value to the liquid of our farm-yards. Experiment has shown that when filtered through a bed of such charcoal, the liquid escapes without color, and almost without taste, while the charred peat or sawdust is converted into fertilizing manure. A great portion of the loss now incurred may be prevented by the use of such kinds of charcoal; and the fertilizing substance may, through their means, be applied to our crops at seasons of the year for which, in their liquid form, they are not suited. It is even capable itself of yielding slow supplies of nourishment to plants; and it is said in many cases, even when unmixed, to be used with advantage as a top dressing. In moist charcoal the seeds of the gardener are found to sprout with remarkable quickness and certainty, but after they have sprouted they do not continue to grow well in charcoal alone." - (7. W. Johnson's Modern Agricultural Improvements.) - J., in Cottage Gardener.

Description

This section is from "The Horticulturist, And Journal Of Rural Art And Rural Taste", by P. Barry, A. J. Downing, J. Jay Smith, Peter B. Mead, F. W. Woodward, Henry T. Williams. Also available from Amazon: Horticulturist and Journal of Rural Art and Rural Taste.

Charcoal. A Deodorizer Of Animal Matter, And Not A Preservative Or Antiseptic

I am induced to make some remarks upon this subject, in consequence of a discussion which took place at a meeting of the Polytechnic Club of the American Institute, in reference to a quality attributed to this material, and until lately generally admitted, as a preservative of animal matter from putrefaction and decay, To fall into this error was very natural, when a piece of decaying or tainted beef, covered for a few hours with pulverized charcoal, could be taken out and found to be inodorous, and free from impure ingredients, as far as taste and smell were concerned. The inference seemed almost conclusive that charcoal would not only arrest putrefaction, but restore the animal fiber to all its peculiar and healthful properties as food. Here it can be seen how readily the plain, practical man of business, as well as eminently scientific men, can honestly endorse and sustain opinions which are plausibly upheld by appearances and ingenious experiments, which, on more thorough investigation, may be found to be erroneous.

In a communication of Professor Way, before the Royal Agricultural Society Of England, he sets forth that the noxious gases resulting from the putrefaction of animal matter generally, (consisting principally of sulphureted hydrogen and sul-phuret of ammonia,) each particular animal substance, excretion, or otherwise, had its peculiar odor. Although abundantly perceptible by the senses, and in many cases, as in musk, almost inexhaustible, yet it was inappreciable in weight.

The causes of the action of charcoal, and the difference in the effect of wood or animal charcoal, need not be considered now in explanation of the single question, Is charcoal a preservative of animal substances against decay and

putrefaction? Bearing directly upon this question, we have a paper from Dr. J. Stenhouse, of England, furnished to the Journal of the Society Of Arts, with an interesting ac-oount of experiments made with a view of testing this peculiar property attributed to charcoal. The bodies of two dogs were placed in a wooden box, on a layer of charcoal powder a few inches in depth, and covered with the same material, and the box left open in the laboratory of an eminent chemical manufacturer. No effluvia was ever perceptible; and on examination, at the end of six months, scarcely any thing remained except the bones. Experiments were subsequently made with a full-grown cat, and with two rats; the bodies soon became in a highly putrid state, without the slightest perceptible odor in the room.

These experiments can be readily made, and seem to establish the fact that, so far from arresting animal decomposition, it promotes putrefaction, by rapidly absorbing the gases which arise from it. Pulverized charcoal, then, favors putrefaction and decay, and stores away in its cells the pestilential gases which may destroy the living, when returning to earth that which, according to the laws of nature, belongs there.

Let us hereafter ascertain more fully the uses to which this cheap and perfect deodorizer can be applied. During the unhealthy seasons, can we bring down and store away for manure poisonous miasma, and purify the air 1 By the proper use of this material may we not seize upon that pestilence which "walketh in darkness," and, under the providence of God, strip it of half its terrors, and save many from death?

Let us experiment with this cheap material. Let us see that our stables and pens are well supplied, and all decompositions in the vicinity of our dwellings rendered inodorous; and then let us inquire if the manure we have gathered from our barn yards, and hog pens, and poultry houses, is not intrinsically worth as much as all the cost of the material, together with the labor of applying it. Indeed, that we may thus deodorize and store away in the most convenient manner, all animal and vegetable putrescences that we can collect upon our farms, to be conveniently and cheaply distributed upon our gardens and farms.

Powdered charcoal can be purchased at a very low rate; and as it possesses, more than any other substance, the power of attracting, condensing, and retaining ammonia within its cells, would it not be well to experiment upon the economy of a more general use of this material, and its more extensive

use in the compost heap?

The season is approaching when a consideration of this subject may elicit facts of value to farmers and gardeners, to whom it is often as important to call attention to established facts, as new theories, and ingenious and costly experiments.

[This subject is interesting and important enough to be thoroughly discussed. The valuable properties of charcoal as a deodorizer have long been known and used, and are not brought in question by Mr. Lawton and the Polytechnic Club. It seems to us, however, that they have assumed the whole question. There is nothing to be gained in discussing a question unless it is based upon some known basis, clearly stated. After reading Mr. Lawton's article, we can not perceive wherein the opinions of "plain, practical men of business," or "eminently scientific men," are proved to be erroneous. These men have made no such claims as are here ascribed to them. What scientific man has ever claimed that a covering of charcoal dust would preserve from decay the body of a dead dog? Let the claims of scientific and practical men be fairly stated before we proceed with an argument. They have made certain claims in behalf of charcoal dust, but we must deny that they are of the nature here ascribed to them. Let us get our premises fairly established, Mr. Lawton, and then the argument will follow with some hope of beneficial results.

What you say of charcoal as a deodorizer is good and valuable. - Ed].

Date: March 30, 2012 6:46 AM
Topic: "Wrinkles And Recipes, Compiled From The Scientific American"

Effect Of Charcoal, On Flowers

All red flowers are greatly benefited by covering the earth in their pots with about an inch of pulverized charcoal. The colors (both red and violet) are rendered extremely brilliant. Yellow flowers are not affected in any way by charcoal.

Read more: http://chestofbooks.com/crafts/scientific-american/Recipes/Poisonous-Sour-Milk-How-To-Fatten-Chickens.html#ixzz1qbjlUX6c

Date: March 31, 2012 9:50 PM
Topic: Working farmer, Volumes 1-2

http://books.google.com/books?id=_s1FAAAAYAAJ&pg=PA167&dq=charcoal+fertilizer&hl=en&sa=X&ei=YN53T-aIG8HjiAKIx6CnDg&ved=0CE0Q6AEwAg#v=onepage&q=charcoal%20fertilizer&f=false

Working farmer, Volumes 1-2

By James Jay Mapes

CHARCOAL AS A FERTILIZER.

If our readers aroe not already tired of the subject of charcoal as a fertilizer, they would do well to peruse the following paper by C. W. Johnson, Esq., F.lt.S. His views will be found to accord with those we have so often pressed upon our readers.—[Kn.

Several recently announced experiments with charcoal as a manure, show pretty clearly that its use is extending. It would, I think, be far more rapidly introduced as a profitable application to the soil, if it was not too often regarded as a manure only available in certain localities. This conclusion, however, correct in certain inland districts, such as on the centre portions of many large sand and chalk formations, is not so often the case as is generally believed.

The peat of the United Kingdom offers in many districts the means of an Inexhaustible supply. Other varieties of cheap organic matters adapted for being charred (not burnt) are found in many places. Where water-carriage is readily available, such matters may be procured from considerable distances. It must be ever borne in mind, in preparing such impure varieties of charcoal, that it is the charring of the vegetable matter that is the great object. The fire must be so regulated that it may be readily extinguished whenever the charring point is attained. From a neglect of this precaution, many an otherwise well planned trial has been rendered useless; since if the combustion is allowed to proceed unchecked, all the carbon is entirely consumed, the remaining ash consists only of the earthy and saline portion of the peat. The analysis of various peat-ashes prepared under different

circumstances shows this pretty clearly. The Dutch ashes, so celebrated in Belgium, contain hardly any charcoal; they in fact owe their fertilizing powers as a top dressing for artificial grasses to containing a large per contage of sulphate and carbonate of lime Some peat-ashes from Paisley -Moss, analyzed bv Professor J. F. Johnston, (Elements of Agricultural Chemistry, p. 1S9) contained, specimen No. 1, (a white ash) 54 per cent, of charcoal; No. 2, (a black peat-ash) only 3 per cent.: the first had evidently been prepared so as to retain as much of the charcoal as possible, the last had been burnt to excess. A variety of peat, charcoal, analyzed by Mr. Phillips, (Gardeners' Chronicle, 1849, p. 643) contained—

Carbon	79.24
Hydrogen	2-20
Nitrogen	0.54
Oxygen	6.44
Sand and clay	2.48
Oxide of iron	1.66
Phosphoric acid	0.34
Silicate of potash	0.93
Common salt""	2.53
Carbonate of lime	1.S6
Sulphate of lime	1.44
Loss	0.30

Even the common coal-ashes of our fires contain a large proportion of charcoal. These were analyzed by the late Professor Fowne (Johnson and Shaw's Farmers' Almanac, vol. iii., p. X&i), and also the ashes from eoko. He has given, in the following table, the proportion of silica and the carbon togother; but still the amount is undoubtedly large, although, as I have before observed, it varies acoording to the care bestowed in their combustion. In 100 parts of each, Prof. Fowne detected

In ordinary soot the proportion of carbon is also very considerable, and in a very fine state of division; in which form, when exposed to the atmosphere, Davy ascertained that it slowly combines with oxygen—hence one source of its fertilising powers. According to the analysis of Mr. Solly, it contains, in 1,000 parts Johnson's Gardener's Almanac, vol. i., p. 46):—

Combustible matter 671 parts.

Salts of ammonia 12b'"

Salts of potash and soda. ... 24 '*

Oxide of iron 50"

Silica 65"

Alumina 31"

Sulphate of lime (gypsum). 81"

Carbonate of magnesia 2"

In whichever direction, therefore, we analyze the carbon of commerce in its impure state. It seems to present itself, even in its impurities, full of promise of profitable results to the farmer. The peat charcoal of Ireland, which is now, thanks to the energy and ability of Mr. Jasper Rogers, finding its way into the London market, appears to offer a supply to the farmer of the most extensive kind, and at a reasonable rate. A section of an Irish peat bog is given at page 335 of this volume, with much other interesting matter, relating to the cultivation and uses of bog earth. On former occasions I have in the pages of this work endeavored to explain the beneficial action of charcoal as a fertilizer, when mixed with decomposing substances; I will in this little essay conclude with a few remarks founded on other chemical investigations, not only with regard to such mixtures, but to the all-important consideration of preparing the ashes so as to retain the largest proportion of charcoal. This is a difference long since remarked; for, as I had occasion to observe in another work, the distinction between charring peat, and burning it to an ash, was pointed out 260 years since, by one of the earliest of the English agricultural writers; and considering the limited chemical knowledge of his days, he did - not, as far, at .least, as the presence and operation of the two salts (sulphate of lime and phosphate of lime) of peat ashes are concerned, arrive at a very wide approach to the truth in his explanation of the cause of their fertilizing

effects. “Ashes,” says Worlidge. who wrote in 1607 (Mystcric of Husbandries 72,) "contain in them very much of a rich and fertile wit; the wood ashes are the best, and very useful. Turf and peat ashes must needs be very rich, being much after the same manner as the burning of land."

Wolridge, however, was far from being the first who noticed the use of charcoal and wood ashes. Cato recommends the burning of the twigs and branches of trees, and spreading them on the land. This appears to have been an ancient practice in Lombaruy, for in 1570 Conradus Neresbachius, in his treatise on "Husbandrie," translated by Googc, tells us in page 20, "in Lombardie they like so well the use of ashes, as they esteem-‘it farre above any doung." From the days of Worlidge down to the end of the seventeenth century, hardly an agricultural writer appeared, who did not to some extent or other advocate tho use of charcoal as a dressing for land.

In April, 1783, Arthur Young commenced a series of experiments, not only with charcoal, but with sulphuric acid, and a variety of other substances, as manures. The experimental researches of this celebrated agriculturist were much too commonly conducted on so small a scale, as materially to detract from their value; but still, notwithstanding this drawback to their practical use, the very numerous trials dispersed throughout the early volumes of his "Annals of Agriculture," abound with proofs of the sagacious reasoning and love of truth which distinguished Arthur Voting. The trials with charcoal are given in the "Annals," (vol. i., p. 129.) It is needless to closely follow these garden-pot experiments; the conclusions, however, observed Young, (p. 149) wore that, "charcoal contains something that assists vegetation, for a time, considerably. To what, then, is the benefit owing. Are we to consider charcoal as a body not differing from wood-ashes ? This trial, combined with the results of others, will not allow such a conclusion, for I have found those ashes to act in proportion to the goodness of the soil—to do little good on poor land; but we find the effect of charcoal considerable for a time." Again, he adds, (p. 153) "charcoal alone has done good in one instance from first to last." Young adds, (p. 162) with his usual love of careful detail and of truth, when speaking of one of his series of experimental pots:—" A carpenter letting a piece of timber fall on the pots, while patting up a bench, broke some, and tumbled the rest over; here, therefore, ends this trial." He seemed, indeed, ever to feel, as he remarked on another occasion, {ibid, p. 188) that the man who wants this sort of candor is fit only for voluntary ignorance."

The chemical operation of charcoal, when used as a manure, either in its simple state or when mixed with decomposing manure, in the way to which

we have attended, is not generally understood. That the carbon of the charcoal operates so beneficially upon plants, amongst other modes by a gradual combination with oxygen, hardly admit of a doubt. Charcoal, too, absorbs both the ammonia of decomposing animal substances, and the minute portion found in rain water, it also absorbs and stores up, as it were, for the service of vegetation, the gases of putrefaction; by this means purifying and sweetening, as the housewives say, many tainted substances with which it is mixed. Professor J. F. Johnston {Stem. A%. CVicm., p. 142) referred to some of these; he recognizes the good properties of charcoal as "a valuable mixture with liquid manure, night-soil, farm-yard manure, ammoniacal liquor, or other rich application to the soil." And, as he observes in another place, when speaking of the fertilizing portions of farm-yard drainage, {Trans. High. Soc.% 1846, p. 190) “The only substance at present known, by which the separation of all the valuable ingredients from liquid manure can be fully effected, is animal charcoal. A sufficient supply of this substance, when intimately mixed with the liquid manure, will take up nearly the whole of the saline and coloring matters it holds in solution, will carry down the substance it holds in suspension, and will leave the water nearly pure and colorless. The refuse of the prussiate of potash manufactories will have this effect, and what remains when ivory-black is digested in spirit of salt (muriatic acid) will do still better; but this kind of charcoal is neither cheap nor abundant, and therefore cannot be recommended to general use. The refuse animal charcoal of our manufactories is now sold for manure at the price of several pounds a ton; either those who sell it, or those who use it, might render it still more valuable, by causing fermenting liquid manure to filter through it before it is applied to the land. But other kinds of charcoal possess this property to a certain extent; wood-charcoal reduced to powder, charred sawdust and charred peat, are all capable of being used with advantage in extracting the ammoniacal and other salts, which give its value to the liquid of our farm-yards. Experiment has shown that when filtered through a bed of such charcoal, the liquid escapes without color, and almost without taste, whilst the charred peat or sawdust is converted into fertilizing manure. A great portion of the loss now incurred may be prevented by the use of such kinds of charcoal, and the fertilizing substance may, through their means, be applied to our crops at seasons of the year for which in their liquid form they are not suited. It is even capable itself of yielding slow supplies of nourishment to plants; and it is said in many cases, even when unmixed, to be used with advantage as a top dressing. In moist charcoal the seeds of the gardener are found to sprout with remarkable quickness and certainty, but after they have sprouted, they do not continue to grow well in charcoal alone.

Drilled in with the seed, charcoal powder is said greatly to promote the growth of wheat."

The young farmer, then, will observe that the use of charcoal, as a manure, is not only profitable for its own sake, but for the avidity with which it absorbs and slowly emits, for the use of plants, many of the various products of putrefaction. It is therefore a fertilizer in many ways, worthy of his attention. Let him remember that it is not only a cheap, but an enduring manure— one that is often to be made from the materials afforded by his own farm, and almost always procurable with a very little outlay of capital.

Date: March 31, 2012 9:58 PM
Topic: The Cultivator

http://books.google.com/books?id=h7ohAQAAMAAJ&pg=PA302&dq=charcoal+fertilizer&hl=en&sa=X&ei=YN53T-aIG8HjiAKIx6CnDg&ved=0CFMQ6AEwAw#v=onepage&q=charcoal%20fertilizer&f=false

The Cultivator

By New York State Agricultural Society

Experiments with Charcoal.

We have been favored with the following extract from the forthcoming Report of the Survey of Essex County, by W. C. Watson, Esq., which will be read with interest:

Enormous masses of dust or debris of the charcoal, accumulate about the iron works of the county, and create incumberances and deformities. It has been annually spread in vast quantities along the highways, constituting an admirable material for roads. An incalculable amount has been cast into the streams. The attention of men of observation and sagacity has been, within a few years, drawn to the use of this ingredient as a fertilizer. Experience has established its exceeding utility. In the midst of the disastrous drouth of last summer, while crossing a field in Moriah, occupied by Mr. Richmond, in pursuit of some Durham cattle I wished to examine, I observed a lot with its surface deeply and singularly blackened. -Upon inspection I found it thickly strewn with pulverized charcoal. The field presented a rich verdure, strongly contrasting with the parched and blighted aspect of the adjacent country.

The following detail of this experiment, supplied at my request, attests the value of this material as a fertilizing principle. "The soil is loamy. The charcoal was applied on four acres of dry land, and one acre of moist soil, by top-dressing. The amount used was about one thousand bushels to the acre, spread on so as to make the surface look black, but not to incumber or obstruct vegetation. It was applied in September and October, 1850, at an expense by contract, of forty dollars. It was procured at a furnace, from a mass of pulverised charcoal left as useless, and was drawn one mile and a half. The effect was immediate. The grass freshened, and continued green

and luxuriant after the surrounding fields were blackened by the early frosts. Although the last season had been so unfavorable for vegetation, Mr. Richmond realized one-third more than the ordinary yield of hay, and sufficient to repay the whole outlay. He thinks that he cut nearly double the quantity of grass upon this lot, that he did upon any similar meadow on his farm, and that the quantity of the hay is improved."

The Hon. J. S. Whallon has made the most decisive and valuable experiments on this subject. His operations were extended through several seasons, and were observed with great intelligence and discrimination. The result amply sustains the conclusions derived from the preceding experiment I may add that a similar application has been made under Mr. Whallon's supervisor upon another tract in Elizabeth town on a soil of lighter texture and with entire success. In this instance the charcoal was applied chiefly to a crop of oats. The action of this substance seems to be effected by its physical combinations and its chemical affinities. It attracts the rays of the sun and unites with the fertilising gasses of the atmosphere; it absorbs moisture, and combines as a new constituent in the formation of the soil. Almost imperishable, it must remain indefinitely, with no exhaustion of its properties, a perpetual invigorating agent in the earth.

The succeeding extract from a communication of Mr. Whallon, elucidates his experiments and views on this very important subject: "I began the use of it in the year 1846, and first employed it as a top-dressing on a strong clay soil, which was plowed in the fall of 1845. I spread on about fifteen wagon loads of the dust to the acre, after the wheat had been sowed and harrowed one way. I was surprised to find my crop a heavy one, compared with my neighbor's, raised on the same kind of land. The wheat was of better quality and yielded four or five bushels extra to the acre. I have since used it on similar land, sometimes mixed with barn-yard manure, and sometimes alone, but always as a top-dressing, usually on land seeded for meadow. ' The results were always the most favorable. I find my land, thus seeded, produces more than an average crop of hay and always of the finest quality.

"I have also used the dust on loamy and interval land, with the potato crop. During the series of years in which the rot almost ruined the potato crop, I scarcely lost any potatoes from that cause, and supposed it was owing to the coal dust I used. My manner has been to drop the seed and cover it with a small shovel-full of the dust, and then cover with earth. In this way I have used all the coal dust I have been able to save from the coal consumed in a

forge of five fires, and which amounts to about 250 loads per year."

In the colder regions of the Adirondacs, charcoal dust has been used with great advantage. The note of Mr. Ralph presents the experiment in tho following language: "As a top-dressing for meadows, charcoal dust and the accumulation of ashes and burnt earth left on old charcoal pit bottoms have been used here with remarkable results, and I judge from the trials which have been made, that this application has added at least one-third to the hay crop, where it has been used. It was remarked during the past very dry season, when vegetation was almost burnt up by the long continued drouth, that those fields which had been dressed with this substance were easily distinguished by the rich green color of their herbage."

Date: March 31, 2012 10:00 PM
Topic: The farmer's magazine

http://books.google.com/books?id=dylOAAAAYAAJ&pg=PA22&dq=charcoal+fertilizer&hl=en&sa=X&ei=YN53T-aIG8HjiAKIx6CnDg&ved=0CFkQ6AEwBA#v=onepage&q=charcoal%20fertilizer&f=false

The farmer's magazine

PEAT CHARCOAL.

TO JASPER W. ROGERS, ESQ.

Sir,—Although I have not the pleasure of being personally known to you, yet feeling very great interest in the condition of our unfortunate peasantry, I have carefully examined all the different plans that have from time to time been put before the public for the purpose of ameliorating their condition, and from the facts stated in the accompanying letter, which is a copy of one I sent the Poor Law Commissioners a few days since, and for which I received their thanks, you will see that I regard the Irish Amelioration Society as one which is eminently calculated to serve not Ireland alone, but England also; and indeed the inhabitants of every city and large town in the world. I feel the utmost confidence from my own knowledge of the properties of peat charcoal, of which this letter is a proof, that had the Sanitary Commissioners in London, instead of opening sewers and diffusing their noxious effluvia through the surrounding neighbourhood, employed peat charcoal in the first instance, thousands of lives and many thousands of pounds would most certainly have been saved. I need not say that this letter is fully at your service, and I trust that the facts stated in it may tend to advance the objects of the Society, and that we may soon see some of those advantages realized which in every sense is now so much to be desired.

Should you think it desirable to place these facts before the public, I will feel obliged by your sending me a copy of any paper in which they may appear, and as you cannot possibly know the character of your correspondent, I dare say that any man from Mayo, in London, will tell you who Dr. Burke is.

Wishing your Society the very fullest and speedy success, I am, sir, your

obedient servant,

Smnford, Mayo, Nov, 25. Ulic Buaee.

TO THE POOR-LAW COMMISSIONERS OF IRELAND.

Gentlemen,—In consequence of my being in temporary charge of the Workhouse Infirmary of this Union, I have had the opportunity of seeing your circular of the 16th instant, No. 61,763, 1849; and I beg to state—and I trust that the information will not be considered unacceptable — that your recommendation of the employment of peat charcoal as a deodorizer has been, at my suggestion, anticipated ; and, according to my directions, fully carried into effect, at the workhouse here, since the 3rd of May last, with the most gratifying and satisfactory results.

Having been called on that day to attend a meeting of the Board of Health, held at the workhouse, I was at once struck with the intolerable and sickening effluvinm which, arising from the sewers, cesspools, and privies, pervaded every part of the establishment; and which, with the chlorine, which was being evolved in every direction for the purpose of correcting it, formed a compound of villanous smells, which no stomach but one accustomed to it could for a moment tolerate. Your very active and efficient inspector, Captain Hanley, told me that he had done everything that could be thought of, and had spared no expense to try and have the nuisance abated, but that all his exertions were useless. I then begged him to send down and purchase a few loads of peat charcoal, which were selling at the market; and having told the master how to employ it, the suggestion was at once adopted, and though the material was not of the best description, nor " recently prepared," in a very few hours the most delicate and practiced nose could not have detected the slightest offensive odour.

Since then the master, with very praiseworthy attention, has had a large pit of the charcoal prepared every week, and by its occasional use through the grating of the sewers, and by sprinkling it over the nightsoil in the privies, the workhouse is, as far as entire freedom from every noxious and offensive effluvinm, a model to every other in the kingdom.

In every respect the results have been most satisfactory. Instead of paying from five to ten pounds, every half year, for having the privies cleansed; and having itself and the whole surrounding neighbourhood at the same time poisoned for weeks by the intolerable stench ; the establishment has that task now performed by the paupers, without the slightest reluctance on their part;

—and the contents of the sewers, cess-pools, and privies are now collected into inodorous and innoxious heaps, or mixed with the other refuse of the workhouse until removed by the contractor; which, before, he absolutely refused doing, but which he now considers the most valuable portion of what he contracted for.

But the efforts on the health of the inmates of the workhouse are very far more satisfactory. I find that the numbers registered during the half year ending 25th March last were 353, of these 132 (or one 26 ll-13ths) died during that period. In the half year ending 29th September last, the numbers are respectively 4,262 and 68, or a mortality of one in 62.23-24ths, and of these 68.23 died between the 25th March and 4th of May—a period of little more than five weeks, before the charcoal was employed, while during the last four weeks in which I had the temporary charge of the Infirmary and Fever Hospital but three deaths have occurred; one from Phthisis, one from Variola, and the third, a poor bed-ridden idiot, from Chronic disease of the bowels. Giving the utmost credit to all the officers of the establishment for the extreme cleanliness and order which prevails throughout, the difference in the mortality of the two periods is so striking, and even startling, that I feel I am not assuming too much in attributing it principally to the improved and healthy state in which the atmosphere is maintained. It must also be recollected that the latter was the period during which cholera was so prevalent, and, though some rapidly fatal cases occurred in the town and neighbourhood, not a single one presented itself in the workhouse, where it was most likely and most dreaded to prevail.

From the abundance and consequent cheapness of the raw material—from the facile and inexpensive process of its manufacture—from the lightness which renders it easily portable—and from the small quantity necessary to produce a great amount of benefit; peat charcoal is calculated to become the greatest boon, both as to comfort and health, that has ever been offered to the inhabitants of cities and large towns; nor does the fact of its not being "recently prepared" militate against its usefulness, as, however long it may be exposed to the air, and thereby rendered in some degree inert, all its valuable properties are at once restored merely by heating it to redness in a retort, such as is used for the distillation of coal gas Its introduction into general use would give the much desired employment to thousands of our destitute 'and laborious, but, at present, unemployed poor, and tend at the same time to ameliorate our too humid climate by the drainage of those dreary wastes which now disfigure the whole face of the country.

Absorbing and retaining, in spite of all atmospherical influences, the ammoniacal, sulphuretted hydrogen and other gases, the exhalation of which render the proximity of night-soil so injurious to the health ; but yielding them easily and gradually to the spongioles of the roots of the cereal and other crops, (of which they are the best aliment,) the mixture of charcoal and night-soil presents the farmer with a manure whose value cannot be too highly estimated—in my opinion, more than double in value to an equal weight of guano in fertilizing properties, and equally portable. But this is a subject on which I feel myself incompetent to speak as it deserves; and, merely stating the general fact, I leave the investigation to those to whom it more properly belongs.

I would have put the facts stated in this letter before the public through the medium of the Press, but I feared that they would appear too highly coloured, and be looked on as some of those thousand-and-one ephemeral statements in which the last four years have been so prolific, and which have been strangled almost in their birth by their equally short-lived successors. I cannot express the very sincere pleasure it affords me to see this matter, (which I firmly believe will do more good to this unfortunate country than any other single measure,) taken up by gentlemen who have the power to investigate and authenticate by the most rigid inquiry the facts I have stated—influence and means to circulate them to the greatest public advantage—and authority to enforce their recommendation in every part of the country, now that the benefit to be derived from their observance is no longer problematical.

I hope that it will not be for a moment supposed that I claim the slightest portion of the merit of the discovery of these valuable properties in peat charcoal. The power which prepared charcoal has of absorbing gases and disinfecting meat and water when tainted, has been long known to the meanest tyros in science and in the culinary world ; but I believe that Mr. Jasper W. Rogers is entitled to the merit of the discovery of the truly valuable properties of peat charcoal, and I cannot help wishing him all the success he so richly deserves. The only merit I can have any claim to, is the very subordinate one of being, I believe, the first to introduce it into a public establishment in this country, and verifying the accuracy of the discovery by a six months' trial.

Apologizing for the length to which this communication has run, permit me to express the assurance of the very great respect with which

I have the honour to be, Gentlemen,

Your obedient servant,

Swinford, Mayo, Nov. 21,1849. Ulic Buaee.

Date: March 31, 2012 10:02 PM
Topic: Journal of the Society of Arts, Volume 8

Journal of the Society of Arts, Volume 8

http://books.google.com/books?id=K2gFAAAAQAAJ&pg=PA438&dq=charcoal+fertilizer&hl=en&sa=X&ei=YN53T-aIG8HjiAKIx6CnDg&ved=0CHEQ6AEwCA#v=onepage&q=charcoal%20fertilizer&f=false

By Society of Arts (Great Britain)

We have been hitherto considering the peat principally as an article of fuel, either in the form of hard dry lumps, of convenient size to be used as coal, or in the form of charcoal, to be used principally in the manufacture of iron. Important as these applications of peat undoubtedly are, they by no means exhaust its useful capabilities, for, as we have seen, valuable chemical products may be obtained by submitting the peat to distillation. For instance, the prepared peat will lie found to yield, upon distillation, large quantities of carburetted hydrogen or illuminating gas, of the best quality, giving also as a product the peat grease above mentioned, and charcoal for fertilizing or deodorizing purposes. Apparently, however, much remains to be done' before the delicate chemical processes required to obtain many of the valuable products alluded to can be made commercially useful; but the employment of peat charcoal as a manure or fertilizer, as well as a valuable desinfecting agent, is now established, and is extensively practised.

To Mr. Jasper Wheeler Rogers great credit is due for the persevering energy he has brought to bear on this Subject. In a pamphlet published by that gentleman about 12 year's since, he gives most interesting details of a series of experiments that he and other gentlemen tried, in order to establish and prove the value of peat charcoal as a manure or fertiliser on various soils and for different crop. Some of Mr. Rogers's observations are so valuable and interesting, in reference to this subject, that I cannot help giving one or two extracts from his pamphlet. He says, in reference to peat charcoal as a fertiliser:—"The first experiment which naturally suggested itself was, to have a certain portion of peat charcoal mixed with the earth in which different plants grew, and to increase its quantity, accenting is the advantage of the method was perceived. An addition of two-thirds of charcoal, for example, to

vegetable mould, appeared to answer excellently for the gesnera and gloxinea. and also the tropical aroidia, with tuberous roots. The first two soon attracted the attention of connoisseurs by the great beauty of all their parts, and by their general appearance. They surpassed very quickly those cultivated in the common way, both in the thickness of their stems and dark colour of their leaves; their blossoms were beautiful, and their vegetation lasted much longer than usual, so much so, that in the middle of November, when other plants of the same kind were dead, those were qiute fresh and partly in blossom. Aroidia took root very rapidly, and their leaves much surpassed in size the leaves of those not so treated. A cactus, planted in a mixture of charcoal and earth, throve prodigiously, and attained double its size in a few weeks.

At the same time that those experiments were performed with a mixture of charcoal and earth, charcoal was also used, free from any addition, and in every case the best results were obtained; cuts of plants from different genera took root in it well and generally. Pure charcoal acts excellently as a mean of curing unhealthy plants; a Doryanthus naltior, for example, which had been drooping for three years, was rendered completely healthy in a very short time by this means; an orange-tree, which had a very common disease, in which the leaves become yellow, acquired, within a few weeks, a healthy green colour, when the upper surface of the earth was removed from the pot in which it was contained, and a ring of charcoal strewed in its place round the periphery of the pot.

It is unnecessary to say that one of the main constituents of vegetation is carbon; and in proportion to its proper supply to the culture of all plants, either by the atmosphere or otherwise, depends the luxuriance and vigour of their growth. Experiments made under many different circumstances have proved that the tenderest plants will vegetate and luxuriate abundantly in pulverized charcoal unmixed with earth or any other substance; and I have found that even the most moderate quantity produces highly desirable effects; but in addition it possesses a singularly beneficial property, quite foreign to other manures. It is known that in the growth of all plants a putrescent matter is yielded from the root, which, if not absorbed either by filtration or evaporation, or removed in working up the earth around, produces evil of much magnitude, which may well be compared to that arising to human life by the retention around it of those excretions of the pores etc, which nature has ordained. This is entirely corrected by the presence of charcoal. The putrescent matter is at once absorbed and decomposed, and the plant is not alone relieved from the evil, lot gets back nutrition in the

shape of carbonic oxide.

In a pulverised state, carbon acts in the first instance as sand, thus making the soil desirably porous, During rain it absorbs a certain amount of moisture quickly and then, resisting all further saturation, aids in filtration of the water downwards, or in evaporation when rain ceases, invariably retaining in itself its full amount of moisture until the super abundance around has lessened, when it not alone gives out that moisture, but with it yields a portion of its carbon and this action is unceasing until entire decomposition takes place, which is equal and gradual, usually not before four to five years. Thus, it is not alone a most lasting manure, but one by which the utmost ignorance cannot suffer; even the greatest proportion will not do evil, while the smallest will do good.

Mr. Rogers also gives the details of a series of experiments with cabbage and other horticultural plants, and potatoes both whole and diseased, in all of which cases the most astonishing results were obtained. In many diseased and unhealthy flowers and plants, the disease was promptly arrested by means of the peat charcoal and the plants restored to more than their pristine vigour in a few weeks. As a deodorizer of foecal matter, peat charcoal is the most effective substance known to chemists, it absorbs all noxious gases arising from such matters or from putrescent bodies, and therefore to the sanitary chemist it is as important as to the agriculturist. The strong affinity of noxious gases and odours evolved from foecal and putrefying substances for peat charcoal.....

Date: March 31, 2012 10:07 PM
Topic: The Fertilizers

http://books.google.com/books?id=oORk9CTwSiIC&pg=PA126&dq=charcoal+fertilizer&hl=en&sa=X&ei=YN53T-aIG8HjiAKIx6CnDg&ved=0CHcQ6AEwCQ#v=onepage&q=charcoal%20fertilizer&f=false

The Fertilizers

By Cuthbert W. Johnson

Night-soil is, in spite of all the obstacles of prejudice and inattention. much more extensively used in the neighbourhood of the large manufacturing towns of the north of England, than it was formerly. Mr. Dixon, of Hathershaw, in Lancashire, describes his mode of using it [See ante p. 99] (Journal of the English Agricultural Society, vol. i., p. 135). To its use mixed with clay or marl, I have already referred. There is another manure, charcoal, with which it forms an excellent and enduring compound. Of charcoal, as a manure, I shall hereafter have occasion to speak ; and of night-soil, when mixed with water, &c., as in house sewage, when I am examining some of the liquid manures.

The mixture of night-soil and charcoal forms a rich friable drill manure, of a very useful kind, and is an inodorous compound, readily made in almost every cultivated district. As I remarked in another work (Bell's Messenger), in urging the use of charcoal, I would not be understood as advocating the employment of the too valuable material of the charcoal burners, but of those impure varieties produced by the charring of peat, or other readily procured impure vegetable substances. It is true that the purest charcoal is the best, but there is abundant value in less expensive varieties than that commonly used for domestic and manufacturing purposes. The best specimens, however, of the charcoal of commerce were those made use of in the numerous trials at Munich in Bavaria, reported by Liebig (Organic Chem", 210). He tells us that the charcoal in his experiments was the dust-like powder of charcoal from firs and pines, such as is used in Germany, in the forges of blacksmiths. This he notes was found to have most effect when allowed to lie during the winter exposed to the action of the air. But in order to ascertain the effects of different kinds of charcoal, experiments were also made upon that obtained

from the hard woods and pure peat, and even pure animal charcoal; but he seems rather to prefer the charcoal of pinewood, on account of its porosity, and the ease with which it is decomposed, that is, by crumbling down by the action of the atmosphere, until in five or six years it becomes a kind of coaly earth. The sources from whence a supply of charcoal, at a sufficiently reasonable rate for the farmer's use, can be obtained, vary. Most places afford peculiar local facilities in some shape or other. Masses of peat, for instance, are dispersed over most English counties; still more copiously in Scotland, and in vast breadths in the sister island. On this subject, with Irish objects, and on Irish ground, Mr. Jasper Rogers has long and ably laboured; and I rejoice to notice, after numerous obstacles, with no inconsiderable success. Kilns have been erected, turf has been pared, dried, and charred, and one promising sprig of the plant of hope and gladness placed even in the midst of the great Irish bog of Allen. Still it would be well, I think, if the Irish Amelioration Society, of which he is so worthy a manager, carried into their proceedings more of the true spirit of commerce—furnished more useful practical details. If, instead of dwelling upon the pleasures and benefits of the manufactory to the poor peasantry of the bog, they laboured more clearly to show to the farmers of England, and of Ireland too, that the peat charcoal they produce is worth the money for which it can, with profit to the society, be delivered at an English port, or an English railway station ; that the peat they produce contains such a portion of carbon, and such a percentage of the salts of lime ; in fact, they should give its chemical analysis, and the price at which in cargoes it can be offered for sale. By this course of proceeding they would make the farmer aware of the cost of the article, and the true amount of carbon which it contains. To this portion of its composition, in fact, almost all the fertilizing properties of peat charcoal must be attributed. Not only does the carbon by slow degrees decompose, and become a kind of coal earth, but the charcoal absorbs, and stores up in its pores a large proportion of the gaseous matter emitted from any decomposing organic matters with which it may be mixed. A much more impure, that is, more earthy charcoal than that obtained from Irish peat, has been long used in combination with night-soil to form an artificial drill manure. It was in this way that the manures of M. Payen, M. Poittevin, and others, were made. The composition of this kind of mixed manure has been recently examined by Mr. J. C. Nesbit, who has reported the result of these distasteful inquiries with his usual clearness (Farmm-s' Mag., vol. xxxiii., p. 345). His object in this useful inquiry was, first, to give the composition of a mixture of night-soil and peat charcoal. This which in the lecture of Mr. Rogers upon the disinfecting power of peat charcoal was composed of one part of night-soil, and two parts of peat

charcoal. And second, the annual amount and composition of the excreta of a human being. He tells us that by weighing the excretions of one person, for some time, it was found that the average weight of solid faeces was 7 or 8 oz., and that of the urine 35 lb. per diem. The weight of the latter will of course vary with the quantity of water drunk, the state of the air, &c. ; but the solid materials given out in it daily will be nearly the same. The annual amounts, therefore, will be nearly lt cwt. of solid excrement, and ll cwt. of urine. The first portion of the inquiry to which Mr. Nesbit directed his attention was the amount of moisture, nitrogen, organic matter, and inorganic matter of which the mixed excreta: are composed. He found in—

The solid portion. In urine.
Per cent. Per ton. Per cent. Per ton.

lbs. lbs.

Moisture 73.25 1641 97.09 2175
Nitrogen 1.94 43 0.79 18

. Organic matter 22.01 493 1.30 29
Inorganic matter 2.80 63 0.82 18

100.00 2240 100.00 2240 When these were deprived of moisture by being dried in a moderate temperature they contained

The solid portion. The urine.
- Per cent. Per ton. Per cent. Per ton.

lb . lb . Nitrogen . 7.25 1653 27.14 607 Organic matter 82.29 1843 44.69 1002

Inorganicmatter 10.46 234 27.14 631

100.00 2240100.00 2240

The entire product of the excretse of a man, for one year, at the rate of 1% cwt. of solid and ll cwt. of urine per annum, therefore, is as follows :—

Natural. Dry.
Solid Solid
Excrements. Urine. Excrements. Urine.

lb. lb. lb. lb.
Moisture 123.0 1196.3 —- -
Nitrogen 3.3 9.9 3.3 9.9
Organic matter 37.0 15.9 4.7 15.9

4.7 . 9.9 37.0 9.9
Inorganic matter _

168.0 1232.0 45.0 35.7

We learn then from these results (and such examinations are peculiarly valuable at this period of improved sanitary drainage) that in such a weight of night-soil we have 45 lb. of dry matter in the solid fzeces, and 35.7 lb. of dry matter in mine given out annually. The following table, also constructed by Mr. Nesbit, shows the composition of the mixed materials

dry :—

	In annual amount of 80.8 lb.		Per cent.	
	lb.	lb.	lb.	lb.
Nitrogen equal to ammonia	16.00	13.2	19.8	16.33
Organic matter	—	53.0	—	65.61
Inorganic matter	—	14.6	—-	18.06
Containing phos- phoric acid	2.67	3.3		
80.8	$.03			

Comparing the composition of these 80.8 lb. of dry solid matter with that of other manures found in the market, their value is about ten shillings. Now it is practically of great importance to compare the value of this dry matter with that of other well-known manures, such as with that of guano. But then, as guano usually contains 12 per cent. of moisture, we must see what would be the composition per cent. of the dry matter when containing 12 per cent. of moisture. In this state then it would be composed as follows :

Nitrogen (equal to 17.42 per cent. of am

monia) 14.37 Organic matter 57.74 Inorganic matter (containing 2.9 per cent.

of phosphoric acid)... 15.89 Moisture... .. 12.00

100.00

K

I next proceed to compare the dry excreta: with rape-cake and guano. In this table the proportion of ammonia in the guano is calculated at 14 per cent., which is about the average, and the results obtained are, from one ton of each—

Rapecake. Guano. Excretae.
- lb. lb. lb.

Moisture 195.8 268.8 269.0
Nitrogen 115.4 258.6 322.0
Equal to am-

monia 140.0 313.6 39.0
Orga. matter 1654.2 938.6 1293.0
Inorg. matter 274.6 774.0 356.0

containing

phos. acid 43.7 224.0 64.9

2240.0 2240.0 2240.0

Thus, as Mr. Nesbit remarks, from this table it will be seen that the dried mixed excreta are more valuable as manure than guano or rape-cake, as far as the ammonia is concerned, and superior to the rape-cake and inferior to the guano as respects the phosphoric acid—a deficiency, however, which in practice can be easily supplied by the addition of bones or coprolites. The mixture of night-soil with peat charcoal as prepared by Mr. Rogers, next engaged the attention of Mr. Nesbit. This mixture of two parts of Irish peat charcoal with one part of night-soil was sufficiently dry for all practical purposes, and at the same time quite inodorous. This mixture, analyzed by Mr. Bailey, was found to be composed of-—

Per cent. Per ton.
lb. lb. lb. lb.
Moisture ... 30. 66 687
Nitrogen 4.89 100

Equal to ammonia 5.92
Organic matter and charcoal 55.23 1237
Inorganic matter 207
containing phosphoric acid 0.63 14

By the use, then, of the finely divided charcoal obtained frorI1 P98/6, or other conveniently obtained vegetable substance, it is evident that the ordinary manure obtained from cesspools and sewers may be materially increased in value. It is also more than probable that if this peat charcoal from Ireland can be furnished in large quantities, at a sufiiciently reasonable

(* Mr. Hewitt Davis, of Spring Park, near Croydon, finds six tons of night-soil, mixed with peat, to be amply sufficient for an acre of ground. He thinks this manure the best for turnips.)

Date: March 31, 2012 10:14 PM
Topic: Country gentleman, Volume 33

http://books.google.com/books?id=-ukhAQAAMAAJ&pg=PA117&dq=charcoal+fertilizer&hl=en&sa=X&ei=lt53T43NMemSiQKGm82nDg&ved=0CEsQ6AEwATgK#v=onepage&q=charcoal%20fertilizer&f=false

Country gentleman, Volume 33

"NEW" FERTILIZER FOR GRAPES.

It is interesting to observe how "old things become new," and how old methods and receipts are periodically revived. Many years ago there was a great stir made about the value of the pruning of the grapevine as a fertilizer for vineyards. Those of your readers that have read Liebig's Agricultural Chemistry will remember how emphatic hoe was in advocating the value of such matters. The California Farmer has lately been impressed with the importance of returning to the soil all the prunings and other waste matter; and the American Journal of Horticulture and some other periodicals give their endorsement of the system. That the prunings, finely chopped up and well plowed in, would be of value there is no doubt, although there are some drawbacks which have not been taken into consideration. Thus it has occasionally been suspected that decaying wood is apt to induce disease in the roots of vines if in contact with them. But the great difficulty is the labor involved. In this country of expensive labor we cannot afford to hire men or even boys for the purpose of cutting up our waste prunings. It is not impossible, however, that a very strong and powerful machine like a straw-cutter might be used. One such machine would serve a whole neighborhood and would reduce the cuttings to such a condition that they could easily be plowed under without any difficulty. Still after all it is a serious question whether it would pay. Our impression is that the benefit to be derived from the use of chopped up cuttings has been greatly over-rated. We tried the plan once, selecting out the smaller shoots and cutting them up with a straw cutter, while the larger we cut with a small hatchet. We applied the prunings of ten vines to the roots of five, and then we invested the amount which we thought we ought to have for our labor, in charcoal which we applied to the remaining five. We thought the charcoal produced the best results.

Since that time we have disposed of our prunings of all kinds by converting

them into charcoal and at the same time burning with them a quantity of heavy clay. The greatest difficulty is to make the heap sufficiently compact to allow it to be covered conveniently. This we accomplish by means of a few stout hooked stakes. After all the rubbish from the fall, winter and spring prunings, has been collected together, we lay a few stout branches or poles on the top. These poles are then pegged down by means of two or three hooked sticks applied to each pole, and in this way the mass is rendered so compact that it is easily covered with sods and similar matter. The heap after being kindled is allowed to smoulder away, more earth being thrown on as the fire progresses. Several days generally elapse before the work is finished,

but at the end of that time we find ourselves in possession of several tons of material of the very best kind for fertilizing vines or any kind of fruit trees. It consists of a mixture of ashes, charcoal and burned clay, and our present opinion Is that there are no better fertilizers for fruit trees, and especially grape vines and peach trees, than just these three articles. As for the shoots and leaves which are removed during the summer, the proper place for them is the compost heap.

In many parts of the country the cheapest plan no doubt is to go to the woods and make a lot of charcoal or buy the refuse of the charcoal heaps, and in that case of course the easiest way to get rid of the prunings is to burn them. Under any circumstances we are in favor of subjecting most of the prunings of our gardens or orchards to fire. We thus get rid of a great many Insects and their nests. The prunings of the apple, peach and plum trees; of currants, raspberries, blackberries, gooseberries, &c, should all be brought together in one heap and treated as described. The quantity which thus accumulates is astonishing, and still more astonishing is the amouut of clay which it will burn. Labrusca.

Date: March 31, 2012 10:16 PM
Topic: The New Jersey Farmer

http://books.google.com/books?id=DGupTyOwC2kC&pg=PA168&dq=charcoal+fertilizer&hl=en&sa=X&ei=lt53T43NMemSiQKGm82nDg&ved=0CFAQ6AEwAjgK#v=onepage&q=charcoal%20fertilizer&f=false

The New Jersey Farmer

By David Naar

CHARCOAL AS A MANURE

Manures may be beneficial to plants by affording carbonic acid gas to their roots. Animal and vegetable matters evolve this gas while putrefying; but we are not aware of any manure that absorbs it from the atmosphere, so as to be for that reason beneficial to vegetation. Lime attracts carbonic acid gas from the air rapidly, but combines with it so strongly, that it is useless to the plant until the carbonate of lime so formed is imbibed and elaborated by that plant.

It is to its power of gradually forming carbonic acid gas that charcoal partly owes its value as a manure. The chemical operation of charcoal, when employed for this purpose, is by no means so well understood as that of most other fertilizing additions to the land. That the carbon of the charcoal operates so beneficially upon plants, among other modes by a gradual combination with oxygen, hardly admits of a doubt. Liebig gives the results of a series of experiments by Lukas on the use of charcoal as a manure, which seem to corroborate his opinion. From the facts which these chemists, however, adduce, it is evident that the beneficial action of charcoal, as a fertilizer, depends upon the presence of other substances besides carbon. Liebig notes (Organic Chcm., p. 62) that "plants thrive in powdered charcoal, and may be brought to blossom, and bear fruit, if exposed to the influence of the rain and the atmosphere. Plants do not, however, attain maturity under ordinary circumstances in charcoal powder when they are moistened with pure distilled water instead of rain or river water. Rain water must, therefore, contain within it one of the essentials of vegetable life; and it has been shown that this is the presence of a compound containing nitrogen; the exclusion of which entirely deprives humus and charcoal of their influence on vegetation." It is ammonia, to whose presence in rain water Professor Liebig thus refers, in whese valuable work (p. 207) the experiments of Lukas will be found. From

these we learn that in a division of a low hothouse, in the Botanic Garden at Munich, a bed was set apart for young tropical plants; but instead of being filled with tan, as is usually the case, it was filled with

Powdered charcoal, the large pieces of charcoal having been previously separated by means of a sieve. The heat was conducted by means of a tube of white iron into a hollow space in this bed, and distributed a gentle warmth, sufficient to have caused tan to enter into a state of fermentation. The plants placed in this bed of charcoal quickly vegetated and acquired a healthy appearance. As always is the case in such beds, the roots of many of the plants penetrated through the heles in the bottom of the pots, and then spread themselves out; but these plants evidently surpassed in vigor and general luxuriance plants grown in the common way; for example, in tan.

M. Lukas then gives a list of several of the exotic plants upon which charcoal appears to

have produced the most beneficial effects. It appeared also to promote the rapid germination of seeds. He then proceeded to try the effects of charcoal when mixed with vegetable mould. all of which answered very well. "The charcoal," continues M. Lukas, "used in these experiments was the dust-like powder of charcoal from firs and pines. It was found to have most effect when allowed to lie during the winter exposed to the action of the air. In order to ascertain the effects of different kinds of charcoal, experiments were also made using that obtained from the hard woods and peat. and also upon animal charcoal; although I foresaw the probability that none of them could answer so well as that of pine wood, both on account of its porosity and the ease with which it is decomposed. The action of charcoal consists primarily in its preserving the parts of plants with which it is in contact, whether they be roots, branches, leaves, &c., unchanged in their vital power for a long space of time, so that the plant obtains time to develop the organs for its further support and propagation. There can scarcely be a doubt, also, that the charcoal undergoes decomposition; for, after being used for five or six years, it becomes .1 coaly earth. It exercises, likewise, a favorable influence by absorbing and decomposing the matters excreted by the roots of plants.^ so as to keep the soil free from the putrefying substances, which are often the cause of the death of the spongioles. Every experiment," concludes M. Lukas, "was crowned with success, although plants belonging to a great many different families were subjected to trial. lb. p. 211.)

Professor J. F. Johnston (Elm. ofAg. Chetn. p. 142) recognizes the good

properties of charcoal as "a valuable mixture with liquid manure, night-soil, farm-yard manure, ammoniacal liquor, or other rich applications to the soil." And as he observes in another place, when speaking of the fertilizing portions of farmyard drainage, (Trans. High Soc. 1846, p. 190,) "The only substance at present known, by which the separation of all the valuable ingredients from liquid manure can be fully effected, is animal charcoal. A sufficient supply of this substance, when intimately mixed with "the liquid manure, will take up nearly the whole of the saline and coloring matters it holds in solution, will carry down the substances it holds in suspension, and will leave the water nearly pure and colorless. The refuse of the prussiate of potash manufactories will have this effect, and what remains when ivory-black is digested in spirit of salt (muriatic acid) will do still better; but this kind of charcoal is neither cheap nor abundant, and, therefore, cannot be recommended for general use. The refuse animal charcoal of our manufactories is now sold for manure at the price of several pounds a ton: either those who sell it, or those who use it, might render it still more valuable by causing fermenting liquid manure to filter through it before it is applied to the land. "But other kinds of charcoal possess this property to a certain extent: wood charcoal, reduced to powder, charred sawdust, and charred peat, are all capable of being used with advantage in extracting the ammoniacal and other salts, which give its value to the liquid of our farm-yards. Experiment has shown that when filtered through a bed of such charcoal, the liquid escapes without color, and almost without taste, while the charred peat or sawdust is converted into fertilizing manure. A great portion of the loss now incurred may be prevented by the use of such kinds of charcoal; and the fertilizing substance may, through their means, be applied to our crops at seasons of the year for which, in their liquid form, they are not suited. It is even capable itself of yielding slow supplies of nourishment to plants; and it is said in many cases, even when unmixed, to be used with advantage as a top dressing. In moist charcoal the seeds of the gardener are found to sprout with remarkable quickness and certainty, but after they have sprouted they do nut continue to grow well in charcoal alone."—(Johnson's Mod. Ag. Im.)— Cor. Collage Gardener.

Date: March 31, 2012 10:19 PM
Topic: The Garden: an illustrated weekly journal of gardening in all its ..., Volume 4

http://books.google.com/books?id=mO8WAAAAYAAJ&pg=PA307&dq=charcoal+fertilizer&hl=en&sa=X&ei=lt53T43NMemSiQKGm82nDg&ved=0CG4Q6AEwBzgK#v=onepage&q=charcoal%20fertilizer&f=false

The Garden: an illustrated weekly journal of gardening in all its ..., Volume 4

By William Robinson

CHARCOAL AS A FERTILISER.

I Want some treatise on the virtue, chemical properties, and proper application of charcoal as applied to land. My soil is light sandy loam, and I can procure 100 loads of charcoal dust at little or no expense, except drawing one and a half miles.—Thomas Bogers.

Answer by Professor S. W. Johnson in New York Tribune :—There is good proof that charcoal has an excellent effect on light land deficient in attractiveness for moisture, especially in dry seasons. This is due to its great porosity and absorbent power for vapour of water. As is well known, charcoal takes up a large amount of water when kept in a cool damp cellar—becomes, in fact, so wet that it is difficult to set it on fire. On a soil already hygroscopic from presence of clay or humus, or in wet seasons, it has, of course, no good effect from this quality. On a heavy clay, which is unfavorable to vegetation because of its compactness and slow penetrability by water, charcoal powder, like any non-adhesive dust, separates the clay particles, prevents their cohesion where it intervenes, and thus tends to mako tho soil more open, more friable, and more early, promotes drainage, and sets in train a long series of changes for the bettor. Charcoal strewn on the surface of light coloured soil, so as to blacken it, enables the soil to become warmed under tho sun's rays more rapidly and more highly than would be tho case otherwise. This fact may partly account for the good effect reported of it in cold climates. Charcoal has been reputed to act as a fertilizer because of its absorbent power for ammonia. It does, in fact, condense in its pores fifty to one hundred times its bulk of ammonia gas when its pores are perfectly free

from air moisture and all other gases, and when the ammonia gas is also unmixed with other gases. But these conditions never exist in nature, and the fact is that charcoal exposed to the air never contains or absorbs any important amount of ammonia, and does not fertilize by acting as a means of collecting and storing this gas. Charcoal is a powerful oxidizing agent, and this quality may not unlikely come into play usefully when it is mixed with the soil. Dr. Stenhonse was the first to show that the offensive gases which escape from putrefying animal matters are deodorised and destroyed when made to pass a layer of charcoal dust, and that tho result is brought about by the oxygen gas condensed in the pores of tho charcoal. A dead rat, nicely buried in a cigar box so as to bo surrounded at all points by an inch of charcoal powder, decays to bone and fur without manifesting any odour of putrefaction, so that it might stand on a parlour table and not reveal its contents to the most sensitive nostrils. The gaseous products of decay under such conditions are carbonic acid, ammonia, and water, or the same that would result were the ordinary effluvium of putrefying flesh burned in a furnace. Tho soil often, if not always, contains nitrogen in combination with some form of humus, which is inert, or at least not immediately available as food to crops. Charcoal, we should anticipate, would hasten or set up oxidation of these matters, and might liberate a portion of this inactive nitrogen, in the form of ammonia or of nitrates, and thus enhance the fertility of the soil. This is, however, but a speculation, a bit of theory, and while probable enough to warrant investigation, must not be accepted as a fact until it has been proved to be such. As a direct fertiliser, i.e., by virtue of anything it can yield of its own substance to crops, charcoal cannot be regarded as of much value. It contains, of course, if it has not been washed by water, the ash elements of tho wood from which it has been made, and when applied in large quantity the potash, lime, &c., which it carries npon the land may easily produce a striking effect upon poor soil. This kind of effect cannot last more than a single season, and on a soil in fairly good condition would commonly make no show. From these considerations we conclude that, while charcoal (unless, as may often happen, it ia mixed with a good deal of wood-ashes) is not of much value as a fertilizer directly, it is a valuable amendment to soils which are dry from their coarse, sandy texture, or are wot from consisting of too tenacious clay. .

Date: March 31, 2012 10:22 PM
Topic: knowledge: an encyclopedia of ...

http://books.google.com/books?id=D1xFAAAAYAAJ&pg=PA451&dq=charcoal+fertilizer&hl=en&sa=X&ei=lt53T43NMemSiQKGm82nDg&ved=0CHQQ6AEwCDgK#v=onepage&q=charcoal%20fertilizer&f=false

Scammell's universal treasure-house of useful knowledge: an encyclopedia of ...

edited by Henry Bucklin Scammell

CHARCOAL.—Charcoal is a most efficient manure to all cultivated plants, especially to those under glass. It should be broken into small pieces, about tho size of a nut, and, for potted plants, may be mixed in the proportions of 1 part charcoal to 20 parts earth.

Date: March 31, 2012 10:23 PM
Topic: American agriculturist, Volume 39

http://books.google.com/books?id=RRhOAAAAYAAJ&pg=PA499&dq=charcoal+fertilizer&hl=en&sa=X&ei=lt53T43NMemSiQKGm82nDg&ved=0CHkQ6AEwCTgK#v=onepage&q=charcoal%20fertilizer&f=false

American agriculturist, Volume 39

Charcoal as a Fertilizer.—"O. J. M.." Pennville, Ind., writes: "Is charcoal a good fertilizer on clay soil? If not strictly a fertilizer. Is it of any advantage? I have some old fields and plenty of wood and could produce charcoal cheaply."

—Charcoal Is composed almost entirely of carbon, is insoluble, nearly indestructible, though it may serve as an absorbent, is not in Itself In any sense a fertilizer. When applied to heavy clay soil the mechanical effect of charcoal may be of value in making the soil more porous; but this end can be obtained by using sawdust, straw, and other coarse litter, much more readily than by converting wood into charcoal for this purpose. If the wood is to be disposed of, the quickest and best method to make it available as a fertilizer is, to burn it and spread the ashes upon the soil.

Date: April 2, 2012 8:09 AM
Topic: The Plough, the loom, and the anvil, Volume 2

http://books.google.com/books?pg=PA369&dq=charcoal+fertilizer&ei=sL95T7vLAsGriQKP24WnDg&id=mgNOAAAAYAAJ&output=text

The Plough, the loom, and the anvil, Volume 2

YET MORE OF PEAT CHARCOAL AS A DISINFECTOR AND FERTILIZER.

Since the long article, as we fear some readers may consider it, on "Nightsoil and Irish Peat ChareeaT' was cast by the stereotyper, we have received the account of another meeting in London, at which very interesting, and, if we mistake not, for the American farmer, very important disclosures were made, by Mr. Rogers, as to the absolute fertilizing power of peat charcoal particularly, and of itself. We shall give the whole of that explanation in our next, in the full persuasion that, in many parts of the United States, there exist beds of peat that may be, with great profit, used first in barn-yards, and other more offensive deposits of excretiffi, besides being applied alone, and directly, as a manure. To reconcile the reader to the. space already yielded to this subject, we must so far anticipate the supplemental expositions by Mr. Rogers,, as to give the following short extract from them, which will be re-incorporated into the whole article intended for the January number of this journal. We look on this subject as one of great interest, probably to readers generally, but certainly to all in Massachusetts and other peal countries.

In the mean time, we invite , from our readers communications as to deposits in our own country of peat, such as it may be supposed would supply a material of like value. And here we take leave to suggest that some farmers on the tide-waters of the Chesapeake Bay, on which there are so many wide margins of worse than useless marshy grounds, should see whether, on being dug and dried, the substance of these marshes jnight not be carbonized, as in kilns of wood, and used with a profit in their barp-yards, or at once in their fields.

If the "American Institute," so called, with its ample means, were not any thing but what it professes to be, and, with its means, ought to be, it is there that the farmer might send such substances with assurance, not of a newspaper puff", that such a thing had been received, and that some pedant

had pronounced a learned discourse, or read some outlandish translation at the meeting; but they would have a thorough analysis made at once, by competent men, of real science, adequately and fairly remunerated for the trouble and labour of doing it, and would publish the result as other New York C6unty Agricultural^ Societies do, through the transactions of the State Society!

For want of some better and assured means, if those who will be at the trouble of carbonizing some of our peat, will send specimens of the coal to us, we will appeal to a really scientific and public-spirited association, the Society in Philadelphia, "for the development of the mineral resources of the United States" under the Presidency of P. A. Browne, Esq.; an association, by the by, which should be patronized, and whose meetings would well reward the attention of all young farmers in the vicinity of Philadelphia. But we are trespassing on the little room that is left for the extract from the second meeting in London on the subject. For those of the first meeting, the reader is' referred back to page 337 of this number:—

"I then stated what I do now, that the fertilizing power of peat charcoal can scarcely be over-estimated. It acts upon all that the soil produces—I except nothing: and, to use the words of Dr. Lindley, in reply to a correspondent, (although the learned doctor was at first a doubter,) ' Use it for your onions, but it is good for every thing.' (Hear, hear.) My own experiments have proved its value beyond a question, but I shall give you a few particulars of those made by two- gentlemen of large landed property in Ireland, who, immediately after my first publication on the subject, entered into correspondence with me, and closely followed out my "proposition—Henry Newton, Esq., Mount Leaster^ county Carlow, and James Russell, Esq., Dnnlivey House, county Donegal—and I beg to say that both were strangers to me until my publications came before them. Mr. Russell commenced his experiments in 1846. He tried it with all the usual farm produce except wheat, with uniform success, and as a top-dressing for grass land he had fully borne out all I had stated in that respect; but his trial on a field of four acres with potatoes in 1847, was very remarkable. They were planted in ridges, or, as termed here, 'lazy beds;' one-half the field manured with farm-yard manure, the other with peat charcoal only, about a handful thrown on each seed. The result was more than a double crop from the charcoal; and he informed me that he was himself so astonished at the fact, that he requested Lord Donegal to see and vouch it. At my suggestion he planted oats the next year On the whole field without any further manure, and he assured me the increase on that portion manured with charcoal was nearly in the same, ratio as the

potatoes. Now, what is the cause? Simply this. The charcoal lay on the land throughout the winter. Every shower of rain that came brought it ammonia and common salt in abundance. This continued for the winter months, and when spring came, every grain was rich in nutriment, while it held moisture besides, to give it to the seed at once, and stimulate it into growth. Mr. Newton was most anxious to tell you these facts himself, but he arrivedin London too late for our last meeting. He brought potatoes, of which I will tell you the history. In February last he planted a large field in drills, manured as usual, not then having charcoal; but in. April he got some, and, before the potatoes being earthed, he top-dressed a few yards at the foot of all the drills as far as he had charcoal. He authorizes me to state that the result was not only very nearly a double crop, but that there was not a taint in one of them, while all the rest of the field was more or less diseased. (Hear, hear.) I regret extremely that he was unable to "wait for the present meeting; but he also authorizes me to say he has now a crop of Swede turnips that cannot be exceeded, to use his own expression. Yet they were not sown till June/. No rain came for a month after; all the crops in his neighbourhood failed, and his were only manured with peat charcoal. In short, he has fully proved its value for all plants; like me, he excepts nothing. But I must tell you his reply to my inquiry as to his experience of its value for grass land. He said,1 Nothing can exceed it; and there is little or no labour in using it.' My friend Fenwick swears by it, and he declares he will write his name on the best grass in the country with black charcoal, and ir will be the greenest part of the field.in ten days."

It would be a useful item in the statistics of our States, (to collect which there should in each of them be a bureau established,) to know how much there is in each of bog or'peat land, as well as in upland waste, and timber land. The estimate is 5,000,000 of acres of such land in England and Scotland, and Ireland. In our country, as in others, the space within which such land lies, convertible into peat charcoal, must be limited to the Northern States. In Southern States, where the decay of vegetation and evaporation of stagnant water are so rapid, the laws of .meteorology and chemistry forbid the formation of peat bog.

The range of temperature necessary to its formation in Europe is found to be between the parallels of from 40 to 55 degrees of latitude. We. respectfully appeal to our northern friends for information on this point.

Date: April 2, 2012 8:13 AM
Topic: A cyclopedia of agriculture, practical and scientific: in which ..., Volume 1

http://books.google.com/books?id=-2BNAAAAYAAJ&pg=PA438&dq=charcoal+fertilizer&hl=en&sa=X&ei=sL95T7vLAsGriQKP24WnDg&ved=0CFoQ6AEwAjgU#v=onepage&q=charcoal%20fertilizer&f=false

A cyclopedia of agriculture, practical and scientific: in which ..., Volume 1

CHARCOAL is an impure form of carbon, and is manufactured on a large scale for the purposes of the arts. The details of the process of manufacture are not suited for this publication; but it consists in exposing to heat billets of wood, or other organic matter, under such conditions as either wholly or partially to exclude air.

Charcoal has several properties which render it of valuo to the farmer. As a manure, it does not act by furnishing carbon to vegetation; because it is in reality one of the most indestructible substances known, and remains for an indefinite length of time without change. But it is remarkably absorptive of certain gases, which it retains within its pores in a state of high condensation. A fragment of freshly-burned charcoal condenses as much as ninety times its bulk of ammoniacal gas, and thirty-five times its volume of carbonic acid. A3 these two gases form the principal organic food of plants, it is obvious that charcoal may have a powerful individual action upon their growth. The experiments of Saussure, and others, have shown that plants flourish with great luxuriance when the atmosphere in which they grow contains more than the usual amount of carbonic acid. Charcoal, after having absorbed carbonic acid and ammonia from the air, places plants under favourable conditions for receiving and appropriating a larger than usual amount of this organic food. The only difference is, that instead of entering the plant by the leaves, they reach it through the roots, which absorb the rain water containing these gases, washed out from the charcoal. Thus charcoal, from its absorptivo nature, becomes an indirect means of increasing the supply of carbon and nitrogen to plants. Different kinds of charcoal h«ve varying values in this respect. Experiments made bv exposing freshly-burned pieces of charcoal to thi air, showed their different absorptive powers by the increase in weight, after they had been exposed a week to the atmosphere. The charcoal from fir gained 13 per cent, in weight; that from lignuim vitae, 9-6; that from box, 14;

from beech, 16*3; from oak, 16'5; and from mahogany, 18. Charcoal also possesses the property of absorhing and retaining the odoriferous and colouring principles of most organic substances. It is on this account used for removing the putrefactive taint from foul water, or other putrid substances. When used as a filter for foul water, both the smell and colour are removed. From this deodorizing property, charcoal is frequently mixed with night soil, and otherdecaying manures; which it keeps free from smell, and at the same time aids in preserving, by absorbing the gases which would otherwise escape. A mixture of charcoal and burnt clay is frequently used for this purpose with excellent effect. It may be useful to remark, that charcoal, when employed as a manure, acts, to a small extent, by presenting, in a soluble form, the ashes of the wood from which it was prepared; but this action is only temporary, and of small importance, when compared with its principal point of utility, viz., its power of absorbing from the air the gaseous food of plants; and, therefore, of presenting it in a more condensed form, and in greater quantity. Oj.v.1

Although the beneficial influence of charcoal upon vegetation has been long known, it is only very recently that we have attained to a definite and clear knowledge of the theory of its action; while its true agricultural value is yet very imperfectly understood. The former circumstance may, in some degree, account for the latter. So long as it was supposed that the substance acted as a manure by furnishing vegetation with carbon, of which it is an impure form, and while the full valuethe gases which the atmosphere and decaying vegetable and animal matters furnish, of which it is so valuable a condenser, was unknown, it was not surprising that it was not mentioned, in many of the modern works on agricultural practice, in the list of available farm fertilizers.

"Not only does it," to use the language of Liebig, "surpass all other substances in the power which it possesses of condensing ammonia within its pores," but it is, at the same time, "the most unchangeable substance known; it must constitute, therefore, not only one of the most powerful applications known, but really the most durable one in existence." This property, it is clear, must make it a desirable article for the farmer to purchase, even at the price which is paid for it in the market. On this point, an American farmer, Mr. J. Hepburn, of Lycoming, says (Cultivator, vol. ix., p. 106), "As it is almost indestructible, and its effects continue as long as it exists in the soil, it is possible that it may be found one of the cheapest as well as most efficient manures on some soils."

To this test, however, we have now no necessity to subject the manure. With

our more perfect recognition of its uses, many available sources of supply have developed themselves, from which it may be obtained at almost a nominal cost. In many localities, the charcoal may be manufactured at no other cost than labour; and in all neighbourhoods, substances are to be met with, which, under proper management, furnish us with a percentage of charcoal sufficiently great to make it worth our while to make use of them in preference to any other. In many cases, the use of charcoal, in this impure form, is attended with advantage; the bulk of the manure is frequently an advantage. In some instances, as upon soils of a close texture, the carbonized material has a mechanical influence upon the soil; a large body of the manure has a greater effect in improving its physical properties. And as an absorbent for liquid manures, a covering for very actively fermenting composts, or as an auxiliary to powerful ammoniacal manures, like guano, its bulk is no deterioration. It will also not unfrequently happen, that the carbonized substances employed as a substitute for pure charcoal will contain inorganic substances, which are highly valuable as fertilizers; and thus act as direct manures in a higher degree than pure charcoal, in which the percentage of mineral substances is very small; while, at the same time, the power of the substance to absorb the fertilizing gases will be quite sufficiently developed for the purposes required.

The physical capabilities of the manure, though, comparatively with the important chemical capabilities, they may seem insignificant, are worthy of some attention. Amongst these, Dr. A. Buchner, sen., refers especially to its antiseptic properties, and to its absorption of light and heat; while Mr. Hepburn, speaking of American soils, to which charcoal is an almost universal application, says, "It renders them, as far as it is present, light, warm, and friable; and gives additional warmth to them by its colour, which absorbs readily the rays of the sun."—(Albany Cultivator.)

To these properties is also ascribed the restorative power which, in many instances, it has been found to exercise upon sickly plants—the special influence which it has been known to exercise on the colour of flowers—its peculiar and powc^ul

effect in encouraging the growth of hothouse plants —and the extraordinary manner in which it facilitates the rooting of cuttings and slips, many of which are very difficult to root hy any other means. The fanner who understands the rationale of its action, will be at no loss to determine the occasions on which it may be used.

Several of the practical purposes to which it may be advantageously applied, are so important, that they may be specially adverted to with advantage:—

1. As a covering for manure and compost heaps, no other substance is more suitable. Its capacity for absorbing ammonia and carbonic acid gas, renders it the efficient means of preserving much of the effluvium which is usually permitted to escape into the air, during the fermentation of manure. Much has been spoken and written on the necessity of due care on this brauch of farm economy, and many suggestions have been offered on the best methods of remedying the evil. It will be our office to inquire into the theory of this escape of gaseous manure in the article Manube. The extent of the loss thus suffered, in ordinary practice, will ako then be pointed out. To prevent, in a great measure, this loss of fertilizing power in manure, no agent is more certainly efficient and economical than charcoal. Equal in capabilities to any other, it is, as will be shown, accessible at almost a nominal cost; easily applied to the surface of the manure heap, its action is not impeded by any little irregularity in the application, as would be the case with many chemical agents which are recommended for the purpose of fixing the gases—substances of which the cost, in the first instance not insignificant, is augmented by the injudicious use of them, arising from imperfect knowledge or inattention. Of itself, also, it carries to the heap, and afterwards to the Boil, physical and chemical properties which have been stated to be favourable to vegetation.

An absorbent for the gases evolved during decomposition is essential to tho economical arrangement of the dung heap, and a coating of charcoal, or, failing this, of a carbonized substance which has organic remains in it, is the most valuable covering we can give. If the manure heap be properly made, and rounded at the top, it will retain the volatile fertilizers; while a covering of earth upon the charcoal, or, what we prefer when the manure is intended to remain for a length of time, one of thatch, will keep the rain from doing it any injury.

2. As an auxiliary to concentrated or highly azotized manures, charcoal is a substance much

esteemed. For the purpose merely of giving bulk, these manures frequently require to be mixed with another substance. By this step an even distribution, either by drill or hand, is facilitated, and danger to the seed, from contact with the manure, 1b avoided. Charcoal is eminently capable of insuring these advantages, and, at the same time, it is materially useful when applied in

conjunction with potent and active manures, in absorbing the ammonia that may happen to be liberated more freely than can be appropriated by the plant in its early stages. Mixed with guano, an inodorous compound is formed; and numberless experiments with this and other azotized manures, in conjunction with bulky carbonaceous substances, are recorded in the agricultural publications of the last few years. A very great number of experiments, by Mr. Gardner, have been communicated to the Highland Society of Scotland (see Prize Reports on Special Manures; Trans. High, and Agr. Soc., March 1845, p. 440, and July 1847, p. 16), in which carbonized substances, either vegetable or animal, were used in combination with animoniacal substances. In his remarks on the results of these experiments, and alluding to a preparation of animal charcoal with saline substances, he says, "From repeated trials, now for four years, upon almost every,description of plants in our farms and gardens, I am induced to place this mixture in the foremost rank of fertilizing substances, if not the very first, I have ever tried. Combined with guano, with or without farmyard dung, it has grown very large crops of grass, grain, and green crops, leaving the land in first-rate condition. Indeed, I consider that guano ought never to he used without being combined with this mixture, either as a manure or a top dressing; and it possesses the property which many, if not all, other of our artificial manures want, that of not being so easily dissolved, and washed out of the soil, by rain."

3. As an absorbent for liquid fertilizers, and a drying mixture for damp manures, many of tho forms in which charcoal exists are especially adapted. Its absorbent powers make it, even in its most impure form, a capital vehicle for conveying liquid manures to the soil. Substances which contain a small proportion of organic matter in them, may be charred for this purpose. Tho burnt mineral matter does not interfere with the action of the charcoal that may be present.

4. For the purpose of extracting from dilute liquid manure the most useful of its fertilizing contents, charcoal is preferable to any other substance. The desirableness of diminishing the cost of applying liquid manure, by extracting from it the fertilizing ingredients, and applying them in a dry form, has heen dwelt upon hy some writers. By proper management of manure, the quantity of liquid available for this purpose, after the compost heap has taken its share, is not great. Where, however, the buildings are at a distance from the fields, and wherever the liquid is in a very dilute state, the practice is advisable. Alluding to the comparative value of different substances for this purpose [see Clay), Professor Johnston observes, "The only substance, at present known, by which the separation of all the valuable ingredients from

liquid manure can be fully effected, is animal charcoal. The refuse of the prussiate of potash manufactories will have this effect; and what remains when ivory black is digested in spirit of salt, will do still better; but this kind of charcoal is neither cheap nor abundant, and, therefore, cannot be recommended to general use. But other kinds of charcoal possess this property to a certain extent. Wood charcoal, reduced to powder, charred sawdust, and charred peat, are all capable of being used with advantage in extracting the ammoniacal, and other salts, which give its value to the liquid of our farms. Experiment has shown, that when filtered through a bed of such charcoal, the liquid escapes without colour, and almost without taste; while the charred peat or sawdust is itself converted into a fertilizing manure. Wherever such charcoal can be obtained in abundance, and at little cost, by the practical farmer, this mode of employing it may be both useful and profitable to him. Sawdust and peat may be mixed with earth, and charred, when the heap, after being several times drenched with liquid, will be converted into a valuable compost." On this subject we must refer, for further remarks, to the article Manure.

5. As a vehicle for retaining the fertilizing substances that are usually wasted in the sewage of large towns, charcoal is capable of conferring advantages that are not confined to agriculture.

With reference to its agricultural value as an absorbent, its uses upon the farm liquid and solid manures indicate how easy it would be, by a simple but well regulated system, to mix the valuable excrementitious substances that exist in such enormous quantities in towns, with charcoal; and thus to prevent all escape of noxious effluvia, and to convert into a useful, portable, and inodorous manure, the solid substances which at present pass away partially through the sewers into the rivers, impregnating the atmosphere with exhalations repugnant to the sense, and injurious to health. In France, several companies have been formed for this purpose. In the neighbourhood of Paris, a

manure compounded of the contents of the cesspools of Paris and carbonized substances, and named animalized carbon, is a regular article of commerce. The carbonaceous materials are prepared by the company, and the other substances collected from house to house. But on this subject we must refer to the article Sewerage.

6. The efficiency of charcoal as a disinfectant has never been disputed by chemists; its preparation at a price within the reach of agriculture, and in the

abundance requisite for sanitary purposes, has been an object much desiderated. Public attention, however, has been directed within the last year or two to peat charcoal, as a substitute for wood charcoal; and during the present autumn (1849), the efficiency of the substance has been publicly tested in London. As there are abundant sources of it in England, Scotland, and Ireland, we are sanguine that this hitherto unprofitable substance will be the means of conferring important advantages upon agriculture, and upon the country at large. To the zealous labours of Mr. Jaspar W. Rogers, we are indebted for publicly propounding this subject, and for carrying it out to the test of public experiment.

7. As a fertilizing application by itself, charcoal can never be injudiciously used, if the supply of the article is abundant. The qualities that make it valuable to manure, render it equally so to soil in cultivation, as a storehouse of the food of vegetation; while its physical properties may be made useful when it can be applied in sufficient quantities. For garden purposes, its special and peculiar effects upon the health of diseased, and the vigour and beauty of all flowers and plants, make it an acquisition much appreciated.

Modern practice with substances containing charcoal, furnishes indirect evidence of its value. Thus, in some peat ashes from Paisley Moss, there was found fifty-four per cent, of charcoal; in another case, only three per cent.; the latter had been burnt to excess. In ordinary soot, Mr. Solly found sixty-seven per cent, of combustible matter —carbon. In coal ashes, Dr. Fownes found in

Yet cent.

Staffordshire coal, 64-0 of sandy and unhurnt charcoal.

Newcastle coal, 87 6

Staffordshire coke, 76 8 ""

And all these substances aro held in repute as fertilizing applications.

In preparing clay ashes, whether obtained by burning the surface, the subsoil, or hedgerows, headlands, and banks full of vegetable matter, in kilns, large heaps, or small ones, the testimony is uniform as to the importance of keeping the fire from breaking out, so that the substance may bo charred rather than Lurnt. See Paring And

BURNING.

We are not, howc vcr, without direct experiment upon the subject of charcoal as a manure, beyond that which has been furnished by ancient authority or indirect practice.

The American publications give many striking experiments with it. "It is frequently used for Indian corn at planting, also on grass land, and we have generally noticed that its effects were very favourable."—(Albany Cultivator, 1844, p. 142.) In a trial by Mr. Pell, recorded in the same Journal (1844, p. 183), land which had been manured with charcoal powder produced seventyeight and three-fourths bushels of wheat per acre. Some equally striking evidences of the fertilizing power of charcoal are given by Mr. Ilepburn, of Jersey Shore, Lycoming County, Pennsylvania.

Many precise experiments with vegetable charcoal, and also with other carbonized substances, upon farm crops, have been made during the last few years, to a few only of which we are now able to refer.

In an experiment made in 1841, by Mr. Fleming, Barochan, fifty bushels of wood charcoal increased the crop nearly three tons per acre:—

Tons cwt. qra.

Wood charcoal . . . 50 bti9. yielded 15 2 31* acre. Fresh animal charcoal . 10 cwt. " 21 2 3" Kxhauated animal charcoal 10 cwt. " 19 17 1"

Soot 50 bus. " 16 0 0"

Quicklime . . . . 50 bus. " 118 2" Wood ashes ... 50 bus. " 12 17 1 *' Farm dung .... 20 tons " 18 11 2" Guano .... 3 cwt. " 23 8 2" Nothing .... '* 12 5 3"

Bones .... 40 bus. " 14 17 1"

(Appendix to Johnston's Agr. Chem., p. 5u.)

In an elaborate experiment with twenty-eight substances, as top-dressings upon the hay crop, in 1842, by Mr. Maclean, of Braidwood, Pennicuik [Trans. High. Agr. Soc., July 1843, p. 30):—

Stones.

Nothing . . . yielded 125 per acre.

Carbon . . 8 cwt." 230"
Animulizcd carbon 8 cwt." 170"
Soot . . 80 bus." 200"

Upon a crop of white turnips, carbon was again tested in 1842, with success:—

Tons cwt

30 carts of dung per acre . . . yielded 19 4 15 do., and carbon . . .5 cwt. " 21 9 15 do., and sulphate of magnesia 2" "19 10 15 do., and nitrate of soda. . H" "20 5 15 do., and common salt . . •" "25 4 15 do., and sulphate of ammonir. } '• "19 3 15 do., and gypsum . . . 3" "18 15

In this trial, it will be observed that five cwt. of carbon produced two tons, five cwt. of turnips more than an extra fifteen loads of dung, and

exceeded all the other dressings except salt. Upon O! ts, the crop dressed with carbon, Mr. Maclean states, "made considerable advances over the undressed portions."

An experiment with charcoal, by the Earl of Essex, upon turnips and carrots, in 1844, serves to show the striking influence of charcoal pushing on vegetation. In this trial, No. 1, nothing; No. 2, charcoal and salt; and No. 3, charcoal alone, were sown on the 3d of June. The drought being severe, Nob. 2 and 3 vegetated quickly, and grew rapidly, while No. 1 appeared to make no progress. On July 17, the Earl of Essex exhibited a plant from each plot, which plants, he states (Jour. Roy. Agr. Soc., vol. v. p. 280), bore the following proportions to each other:—.

"No. 1. Just coming into rough leaf. "No. 2. Eleven inches long, from end of root to the head. "No. 3. Twenty inches long, and as big as my little finger at the crown of the root, and very vigorous."

Six acres of carrots were also sown by Lord Essex with charcoal, "the ground at tho time being dusty, and no rain falling for many weeks." Upon which trial he comments—" Carrots, under any circumstances of rain, <kc, seldom come up in less than four or five weeks; mine, in spite of the drought, were up in three weeks, and held their own during the drought."

The sources from which charcoal, for farm purposes, may be obtained, and the several processes connected with its preparation, are subjects of

agricultural importance.

The supply of pure vegetable charcoal, through the ordinary commercial markets, can only be obtained at a price which excludes it from the list of purchased manures. It may, however, in a great majority of cases, be imported or prepared upon the farm, at a price that makes it an acquisition. The districts where timber is in abundance, or where clearings of wood arc in progress, abundant supply of waste wood is not unfrequently at hand, and may be prepared very cheaply.

Upon our own farms, we have, in a majority of instances, in the branches of useless trees, in the roots and branches of hedges which may be removed, and, failing these, in the loppings of trees and hedges, and other vegetable remains, material enough for the manufacture of a valuable stock of vegetable charcoal. The ordinary process of preparation is as follows:—

The wood is cut and well dried, and sorted into brushwood—small and large faggots; the latter are cut into lengths of three or four feet. The turf is next taken off a circular space, having a diameter of about fifteen feet. The earth from which the turf has been removed is well beaten, and upon it brushwood is laid as a foundation. In the centre of the circle a stake is fixed, and round it a stratum of wood is laid upon the brushwood. After this, another course of wood is laid, as in stacking grain, until the pile attains the height of six or seven feet, in the shape of a cone or pyramid. The stack is next covered with a coating of sods and earth, the earth being firmly beaten down, except at the base, where interstices are left between the sods. When it is intended to fire the stack, the central stake is drawn out, and the hole filled with straw and chips, which are lighted at the top. After the combustibles are thoroughly lighted, the aperture at the top is closed by a piece of turf. During the next twelve hours, the pile must be watched, to prevent the flame breaking out at the sides, as, owing to explosion of the carburetted hydrogen evolved during combustion, the turf is frequently thrown off in several places. These must be closed up again, and after the explosions cease, and the smoke diminishes, the holes at the bottom, between the sods at the lower part of the heap, must be closed. In about forty-eight hours after this, the whole of the internal part becomes a mass of fire, and in four or five days it will be ready to be removed. If no flame appears when an opening is made, the stack may be removed; but if the contrary be the case, the hole should be again closed, and the heap left for a day or two longer. At a meeting of the London Farmer's Club, on November 6, 1849, Mr. Fisher Hobbs, of Colchester, is reported to have said on this subject: —" The difference between the expense of charring

logs and roots of trees, and that of burning them, is most enormous. A few years ago, I stumped up a quantity of pollard trees, and sold a considerable number of them, after reducing them into logs. My neighbours pursued the same system; and as there was no sale for my logs, I wished to see what I could obtain from them as ashes applied to the soil for manuring. In our county, logs are stacked fourteen feet long, three feet high, and three feet wide. Those stacks generally sold at 8s. each. The price was reduced to 7 s. by the competition, and parties applied to me offering to purchase them at 6s., wishing me to find horses to cart them away. As I had given 4s. to have them knocked up into logs, this offer afforded a prospect of loss rather than of profit. I thought, therefore, that I could use these logs more advantageously for agricultural purposes. I placed two of the stacks together, and blazed them; and out of 14s. worth of logs, I got six bushels of ashes, which, at 6d., the utmost value per bushel, produced, of course, 3s. Finding

that that system would not do, I made inquiry with regard to charring, I found out a charcoal burner, and asked him what he could produce from a stack of logs. He replied, 'From twentyeight to thirty-three bushels, according to the quality of the wood.' I then agreed to pay him lid., and he charred upwards of 1300 bushels at that price, and the quality was exceedingly good for agricultural purposes. I have used some thousands of bushels mixed with guano, superphosphate of lime, or other manures, for turnips. I also now collect hedge roots, and have them charred in the same manner. I find that peat could be charred as easily as wood, while the expense would not be very great. I have no doubt that peat charcoal may be manufactured at an expense of from l\d. to lid. per bushel."

Where wood is extremely scarce, a valuable carbonized material may be formed by charring leaves, and prunings of trees and hedges, vegetable rubbish, ditch scourings, garden refuse, weeds, couch grass, &c, by igniting them with dry straw and chips, between walls of sods; and after the heap becomes red-hot, covering them at the top with more sods; and as these become burnt, placing more rubbish on the heap, and another temporary covering, taking care to leave the heap well covered at night, that no damage may arise from a sudden current of wind. To the practical value of a carbonized material of this kind, Mr. Parkes, late consulting engineer to the Royal Agricultural Society, testifies very strongly. For the purposes of horticulture and floriculture, this source of supply is seldom neglected by modern gardeners.

Sawdust is a material which, in some instances, may be made available for the purpose of charring. The means by which a substance, so perfectly useless to vegetation in its fresh state, can be accelerated in decomposition so as to become a serviceable manure, at little expense, is worthy of consideration and further experiment; the usual practice is, to get rid of it by throwing it down the stream which drives the machinery. In an experiment made by Mr. Bishop, forty bushels of carbonized sawdust produced ten cwts. of potatoes, upon a space of ground, on which, in another case, three and one-sixth yards of dung produced twelve cwts.—(Trans. High. Soc., p. 65, October 1843.) Sawdust charcoal, though adapted for manure, is not so readily manufactured as that from wood in the ordinary form and shape. The dust from hard-wood is more easily charred than that from pine. It may be prepared in three ways:—1. In an iron retort or oven, and most easily and perfectly; but this mode is beyond the reach of the farmer. 2. By heing made into a compost with quicklime. Some caution is required in this process. If wet sawdust be mixed with lime, the moisture will be drawn out; and if the sawdust be used sparingly, the heat produced will burn the wood to ashes; if, however, the proportion of sawdust to the lime bo sufficiently great to keep the stones of lime thoroughly apart, the heat of slacking will bo too much diffused to produce fire. By keeping a medium, and excluding the air thoroughly by a covering, we may produce fire in the centre of the heap, and prevent it from breaking out to destroy the charcoal. The quality and dampness of the sawdust must regulate our procedure; for fir, in its ordinary damp state in the sawpit, 200 bushels may be put to ten bushels of lime, mixing one-half with the lime, and the remaining half as a covering. If the fire break through, more charcoal may be prepared by throwing fresh sawdust upon the heap. 3. By smother burning, with earth and sods, as turf and clay is burned. "Sawdust," Mr. Prideaux states, "is admirably adapted for charring with clay heaps. Although difficult to char in the ordinary way, it is calculated to render more easy the preparation of another substance which contains little combustible matter, and requires fuel to keep it burning, which is not always to be had cheap.

"Where clay-burning is the object, one ton of sawdust," he says, "would probably suffice for 100 tons of clay; and where the object is to char sawdust, I think, with skilful management, two tons of clay would do for one ton of sawdust, considering that the clay docs not consume, and will shrink but little, whilst much sawdust falls in through the hollows as it becomes charred. Where clay is not at hand, sods of peat may be used instead. Both are improved by the charcoal being disseminated through the substance of the clay, which may be easily done by the shovel before burning, and while the

clay is soft; but this may hardly pay for the labour, except in garden culture."

Peat charcoal promises to be the most accessible substance for farming purposes of any carbonized material. Existing in large quantities in nearly every district in the kingdom, peat may be carbonized by the farmer himself in many instances. When, however, the real value of the substance becomes known, it will unquestionably form an articlo of import from the uncultivated to the cultivated, districts. Mr. Kogers, whose labours, in connection with the Irish Amelioration Society, we have already named, calculates on their being able to manufacture it at a cost of £1, Is. per ton in Ireland.

In the supply of the mineral elements of the crop, peat charcoal may be considered superior to almost any other sort of vegetable charcoal. The evidence of its action, as a manure, is ample. Mr. Peter Mackenzie, of West Plean, Stirling, tells us (Quarterly Jour, of Agr., 1846, p. 467), that for some years past he has been trying experiments with peat—charred peat—and peat ashes, as a substitute for stable manure:—

"In the spring of last year," he remarks, "I collected a quantity of peat for various purposes, and part of it was charred, or burned. This mixture was applied to land about the beginning of May, to a sandy soil, for a crop of Swedish turnips. The quantity used was at the rate of at least 200 bushels per acre. We tried it against well-made stable manure, in a state like mould, to cut well with the spade, which was applied at the rate of about twenty tons to the acre, and spread into drills. The plants grew well in both cases. We tried to ascertain the amount of produce per acre from each manure, as late as the middle of January 1846; for, from the mildness of the season, the turnips till then appeared to be in a growing state, each plant having had about two square feet to grow upon. The surface was kept flat, and the ground chiefly worked with the Dutch hoe. The weight of bulbs fit for use, manured by the peaty mixture, was upwards of forty tons per acre; while those produced from stable dung weighed only about thirty tons."

The cost of preparing charcoal is usually about £4,10s. to £5 per 1000 bushels, reckoning twentyfive bushels per cubic yard. Where the farmer undertakes this labour for his own use, there are several points of practice to which he should pay particular attention.

The sort of peat for cltarring, in the first place, should be considered. That which is of a light and spongy texture wastes much in the process, and, consequently, does not produce an equal quantity of charcoal from the same

amount of labour that a peat of a more solid nature furnishes us with. The peat which is in a wet situation is also liable to be flooded, and, in such localities, it is necessary to drain the peat before the operation of drying commences.

In some peat, multitudes of small shells are found. The presence of these and other calcareous matters may be considered an advantage, as the carbonate or sulphate of lime which they contain is useful to many soils. And for some soils, the presence of clay in the peat charcoal is equally useful.

Tfie quantity of olmrcoal made from peat varies

essentially with these conditions. According to the experiments of Mr. Raynhird {Jour. Roy. Agr. Soc., vol. vii. p. 547), 578 cubic yards, dug in 1845, produced 140 cubic yards of charcoal: thus one cubic yard, equal to twenty-one bushels, wasted by drying and burning, to about five bushels, or about one-fourth its bulk when dug. "From experiments on a small scale," he says, "fresh dug peat taken from different depths, lost threefourths of its weight on being exposed seven weeks to the sun and wind; half of this was lost in charring; and half of the weight of charcoal was lost on burning it to ashes. Peat taken from the dry fibrous part at the surface will lose less weight in drying, though more in burning. If taken from a lower and more earthy part, it will lose less in burning, though more in drying."

As regards the modes of burning or charring peat, the first step in every case is to dry the peat by exposure to the atmosphere. In some instances, the sods are cut and stacked in a day or two after cutting. In others, they are spread thinly on a dry portion of land, and after having laid a few days, turned over with a rake with long iron teeth, so as to bring the damp portions to the top. After this preliminary process, they may be carried at once to the fires, or stacked in places convenient to where they are to be burnt. For this purpose the corner of a field is recommended, as the water for quenching the fires can be conveniently taken from both sides of the heap. For cutting turf, a spade or tool of wood, with the mouth or cutting part of steel or iron, is to be used.

The ordinary mode of burning peat charcoal is in heaps. For this purpose, a bundle of furze, straw, or other dry fuel is covered over with the peat, an aperture being left at the windward side of the heap, at which place the fire is lighted. More peat is laid on the surface at intervals; the principal object being to keep the fire from breaking out at the sides, and, at the same time, not to put out the fire, when recently lighted, by putting too large a quantity on at

once. When the peat is wet, there is of course greater liability of this happening.

Some good advice is furnished us by Mr. Raynhird on this point:—"The fire," he says, "should not continue burning many days; for, if it does, the heap will so accumulate that there will be great difficulty in extinguishing the fire in proper time. Before putting out the fire, a quantity of the dust, or small peat, from which the large pieces have been sifted or screened, is laid over the heap; by this means, all the peat which has been put on previously becomes charred, the fire

being prevented by the dust from breaking out on the surface. The heap is now pulled down by a long crome, similar to those used in dragging the weeds from rivers and ditches, and a sufficient quantity of water thrown on the fire to extinguish it altogether; if there is much difficulty in putting out the fire, the heap may be turned over, and water applied as the process of burning proceeds. There is no use in throwing a few pailsful of water over the heap, and then allowing the fire to smoulder underneath; for though the outside has the black appearance of charcoal, yet the fire will continue to burn in the centre of the heap. When the fire is completely extinguished, the ashes will have a black appearance, quite different from the red colour of those heaps that are allowed to burn out of themselves."

In France, and many parts of Ireland, a simplo method of kilnburning is adopted. In this practice, the turf is cut away to the original surface soil, which is at once available for culture. The face of the deposit of peat is made perpendicular from top to bottom; and in the firmest part of the uncut peat, within four or five feet of the edge of the quarry, a kiln is formed by sinking a hole, cylindrical to a certain depth, and conical towards the bottom, to the full depth of the peat. At the bottom, a hole is pierced into the quarry or open space from which peat has been removed. Through this hole, any water which may have accumulated runs off, and when the kiln is filled with dry peat, and fired, the proper supply of air is admitted by the bottom aperture.

The sides of these pits become charred and hard, and charcoal being a slow conductor, the heat does not penetrate far into the adjoining mass. The hole becomes gradually larger by use; but in bogs of a fair consistency, such kilns are, with proper management, very durable.

The mode adopted by Mr. Parkes, late consulting engineer to the Royal Agricultural Society, is entitled to attention, both on account of its intrinsic

excellence, and from the experience of the writer. "The clamps," he remarks, "which I constructed in Lancashire were small, being about two yards square within, and the walls about one and a half yard high. These were rapidly and conveniently built of massive sods, cut from the superficial bog earth, which had been recently turned over by a peculiar plough, in slices eighteen inches broad by nine inches deep. The joints of the wall were plastered where needed, with soft stuff obtained from adjacent drains. I also formed other clamps or kilns, both square and circular, by raising walls with moist bog digging, on the plan of Pisa work. Since the purport of all ovens is to keep air out, and beat iu, it is obvious tbat any material will serve a temporary purpose which may be handy to the desired spot, cheaply put together, and which does not burn away too quickly.

"Slab3 of unburnt clay would answer well, but my object was to use the materials furnished by the bog itself, and in any part of it. Three or four small holes, say four inches square, are left in the walls at bottom to give air for kindling the fire, which is first made pretty strong with dried peats, in order to establish a mass of red-hot fuel at bottom.

"These apertures are diminished as the process goes on, and finally stopped up. If the peat to be charred be nearly dry, the clamp may be speedily filled, always using the driest peat first, and covering the top with damp sods or diggings. The air holes must be quite closed when it is judged, by the appearance of the volume and clearness of the smoke, that sufficient heat is acquired below to carry on the operation. As the contents Bubside, fresh stuff is added, care being taken to maintain the kiln quite full, to close all interstices in the wall, and to fill up holes at top as they occur from shrinkage, produced by combustion. Flame must never be allowed to appear on the surface. The clamp is known to be sufficiently filled with charcoal when the added stuff settles but little. The operation Bhould be stopped when the charred mass approaches within eighteen or twelve inches of the top; otherwise the incumbent air, particularly in windy weather, may reach the charcoal, which would then be quickly reduced to ashes. The fire will gradually go out on carefully stopping the access of air, and smothering the surface with wet stuff; but the best plan is to extinguish with water, which also prevents the finer dust from being blown away when the clamp is emptied.

"These are the chief observances to be regarded in the management of such kilns; but there is some skill requisite in giving air, from time to time, at bottom, if the operation proceed too sluggishly, <kc, which must be left to

the intelligence of the attendant, and which a little practice would soon point out to him. One man can attend to many such ovens, when the stuff to be charred is close at hand; or if one kiln only be used, it must be looked to twice or thrice in the day-time, and be particularly well fed at night. In boisterous weather, it is well to protect the windward side with wattles, or some such simple contrivance, especially at the top of the kiln; and in very rainy weather, a wattle or reed roof might be useful; but I have known the operation to proceed very

well, though of course more slowly, when a clamp was unprotected in the middle of a wild bog, and under heavy snows."

The season best adapted for charring is from April to October.

Carbonized earth or clay is an impure charcoal, and may be used when circumstances do not permit us to avail ourselves of charcoal in any other form. The earth which contains the largest proportion of organic matter, is the most valuable for this purpose. In the neighbourhood of Paris, carbonized earth is mixed with the exuvias of the city, and sold under the name of annualized carbon, in which it is highly esteemed as a manure. Earth may be mo3t conveniently charred in kilns with peat, as already described, or, by the exercise of care, with sticks, leaves, sods, <fcc. Clay is extensively burnt in many parts of England for the purpose of fertilizing the soil. This practice, which is in high repute, and the results of which are recorded in several of the volumes of the Journal of the Royal Agricultural Society, is fully discussed in another paper (see Paring And Burning). We cannot, however, fail to notice in this place that the uniform concurrence of all practice, in ascribing superior effects to clay which is charred, over that which is burnt to redness, is abundant evidence that it is to the carbonaceous properties that the application owes an essential advantage.

Animal charcoal is a fertilizer in a higher degree than vegetable charcoal, inasmuch as animal substances are naturally more powerful fertilizers than those of vegetable origin. The animal charcoal used in agriculture is merely carbonized bones. By this calcination the animal matter is almost entirely decomposed. The charcoal, however, retains a little nitrogen, which adds materially to its value as a manure. Its superiority to vegetable charcoal arises principally from the great value of its mineral elements, and their favourable condition for the purposes of vegetation. These mineral substances are the earth of bones, which consists principally of phosphate of lime, one of the most important of the inorganic materials of vegetation. Its great value, and

peculiar adaptation for the purposes of the crop in the form of burnt bones, has been fully explained and illustrated by experiment in the article Bones. In 1842 (see Johnston's Lectures onAgr. Chem., Appendix, p. 55), Mr. Fleming, of Barochan, Paisley, obtained from unmanured soil twelve tons five cwt. per acre of Swedish turnips, and from the same soil when manured with ten cwt. of animal charcoal, twenty-one tons two cwt. Several successful trials, by Mr. Gardner and others, are recorded in the Transactions of the Highland Agricultural Society. The following is an instance:—

No. 1. Glue five cwt. per acre.—The turnip seed brairded regularly, but continued small and stunted, gradually dying away, and never growing to a size lit to be thinned.

No. 2. Glue two and a half cwt., dissolved and mixed with two and a half cwt. of animal charcoal, per acre.— Brairded well and evenly, and are now a fair crop.

No. 3. Animal charcoal five cwt.—Brairded quickly and evenly, and were first ready for thinning, and are now a fair crop.

No. 4. Soil simple, without manure.—A few small stunted plants.

The form in which animal carhon is most economically applied is as an auxiliary in a mixture for special crops, in which case its phosphates are an important ingredient, and its absorptive properties come into profitable action. The principal source of it for the farm is the refuse of sugar works. It is usually applied for the purpose of removing the colour from solutions of raw sugar; blood is used for clarifying the same, and lime for neutralizing the acids which they contain. The animal charcoal, therefore, is usually associated with the blood, lime, and colouring matters. As blood is one of our richest manures, from the nitrogen which it contains, and lime is also necessary to the soil, these impurities are, in some instances, far from injurious to the animal charcoal for farming purposes. In France, the demand for the refuse is very extensive; and in England and Scotland, several experiments have attested its value. Where a chemical preparation is used instead of blood in the refining of sugar, the waste charcoal is by so much deteriorated. [J. H.-K. Dj

Date: April 2, 2012 8:16 AM
Topic: The Farmer's Magazine, Vol.14, July to December 1846

http://books.google.com/books?id=WPbDqnWpZigC&pg=PA387&dq=charcoal+fertilizer&hl=en&sa=X&ei=sL95T7vLAsGriQKP24WnDg&ved=0CGsQ6AEwBTgU#v=onepage&q=charcoal%20fertilizer&f=false

The Farmer's Magazine, Vol.14, July to December 1846

By Staff

(THE FIRST FEW PARAGRAPHS ARE MISSING, BUT COULD NOT BE VIEWED IN PLAIN TEXT. USE THE LINK TO READ THEM.)

ledge of his days, he did not—as far, at least, as the presence and operation of the two salts (sulphate of lime and phosphate of lime) of peat ashes are concerned—arrive at a very wide approach to the truth in his explanation of the cause of their fertilizing effects.

"Ashes," says Worlidge, who wrote in 1697 (Mysterie of Husbandrie, 72) "contain in them very much of a rich and fertile salt—the wood ashes are the best, and very useful. Turf and peat ashes must needs be very rich, being much after the same manner as the burning of land."

Worlidge, however, was far from being the first who noticed the use of charcoal and wood ashes. Cato recommends the burning of the twigs and branches of trees, and spreading them on the land. This appears to have been an ancient practice in Lombardy, for in 1570 Conrad us Heresbachius, in his treatise on Husbandrie, translated by Googe, tells us (p. 20) that "in Lombardie they like so well the use of ashes, as they esteem it farre above any doung."

From the days of Worlidge down to the end of the seventeenth century, hardly an agricultural writer appeared who did not to some extent or other advocate the use of charcoal as a dressing for land.

In April, 1783, Arthur Young commenced a series of experiments, not only with charcoal, but with sulphuric acid, and a variety of other substances as manures. The experimental researches of this celebrated agriculturist were

much too commonly conducted on so small a scale, as materially to detract from their value; but still, notwithstanding this drawback to their practical use, yet the very numerous trials dispersed throughout the early volumes of his Annals of Agriculture, abound with proofs of the sagacious reasoning and love of truth which distinguished Arthur Young. The trials with charcoal are given in the Annals, p. 139 of vol. 1. It is needless to closely follow these garden-pot experiments; the conclusions,however, at p. 149, observed Young, were that " charcoal contains something that assists vegetation for a time considerably. To what then is the benefit owing? Are we to consider charcoal as a body not differing from wood ashes? This trial, combined with the results of others, will not allow such a conclusion, for I have found those ashes to act in proportion to the goodness of the soil; to do little good on poor land, but we find the effect of charcoal considerable for a time." Again he adds, p. 153—"charcoal alone has done good in one instance from first to last." When we arrive at p. 162, Young adds, with his usual love of accurate detail and truth, when speaking of one of his series of experimental pots:—" A carpenter letting a piece of timber fall on the pots, while putting up a bench, broke some, and tumbled

the rest over; here, therfore, ends this trial." He seemed, indeed, ever to feel, as he remarked on another occasion (ibid 188,) that "the man who wants this sort of candour is fit only for voluntary ignorance."

In 1826 a very excellent volume upon Peat, Moss, or Turf-bog, appeared by Mr. Andrew Steele, of Crosswoodhill. He says, p. 33:—"Firm peat is very easily charred by smothered combustion, even in an ordinary fire-grate, as is generally done in Holland, where its charcoal is commonly used in winter for burning in small pots for the purpose of keeping the feet warm. We are informed by Mr. Headrick, that some of the Scotch Highlanders convert large quantities of black peat into charcoal, which the smiths use in their forges; and he thinks this species of fuel is better adapted for the reduction of metal, and the making of bar iron, than even charcoal of wood." When speaking of the various modes of preparing peat charcoal, Mr. Steele adds (p. 357):—" Two methods have been followed in these trials—the one by exposing the peat to a smothering heat, as is practised in the making of charcoal from wood; the other by exposing it to a heat in close vessels or furnaces, and thus subjecting it to a kind of distillation."

A few months since, Mr. C. E. Rogers drew the attention of the public to the importance of turf or peat charcoal as a manure, and as affording abundance of remunerative employment to the unemployed poor of Ireland. After this

publication, the Royal Agricultural Society of England offered a premium of twenty sovereigns for the best essay on peat charcoal as a manure.* And within the last month Mr. Rogers has published another work on the same important subject, and especially on the value of turf charcoal to the iron manufacturers, which I recommend to the early notice of the Irish landowners and farmers. In this work he adds his testimony to the value of turf charcoal as a fertilizer, and attributes its powerful influence, as a manure, to its powers (amongst other good properties) of

* Twenty Sovereigns, or a Piece of Plate of that value, will be given for the best Essay on Peat Charcoal as a manure for Turnips and other crops.

Competitors wdl be required to attend to the following points :—

1. Quality of peat.

2. Mode of making the heaps and burning the charcoal.

3. Quantity produced from a given measure of peat.

4. Quantity applied per acre, and effect, in comparison with peat ashes, and with some other manures.

N.B. This Essay need not be sent in before the Ist of December, 1846.

absorbing the excretory matters which plants deposit in the soil.*

The chemical operation of charcoal, when employed for this purpose, is by no means, however, so well understood as that of most other fertilizing additions to the land. That plants derive their supply of carbon from those gases, such as the carbonic acid gas, of which carbon forms the base, is not only the opinion of Liebig and Johnston, but of all the enlightened chemists of our day. That the carbon of the charcoal operates so beneficially upon plants, amongst other modes by a gradual combination with oxygen, hardly admits of a doubt. Liebig gives the results of a series of experiments by Lukas, on the use of charcoal as a manure, which seem to corroborate this opinion. From the facts which these chemists, however, adduce, it is evident that the beneficial action of charcoal, as a fertiliser, depends upon the presence of other substances besides carbon. Liebig notes (Organic Chem. p. 62) that "plants thrive in powdered charcoal, and may be brought to blossom, and bear fruit, if exposed to the influence of the rain and the atmosphere. Plants do not, however, attain maturity under ordinary circumstances, in charcoal powder,

when they are moistened with pure distilled water instead of rain or river water. Rain-water must therefore contain within it one of the essentials of vegetable life; and it will be shown that this is the presence of a compound containing nitrogen: the exclusion of which entirely deprives humus and charcoal of their influence upon vegetation." It is ammonia, to whose presence in rain water Professor Liebig thus refers, in whose valuable work (p. 207) the experiments of Lukas will be found. From these we learn that in a division of a low hothouse, in the Botanical Garden at Munich, a bed was set apart for young tropical plants; but instead of being filled with tan as is usually the case, it was filled with powdered charcoal, the large pieces of charcoal having been previously separated by means of a sieve. The heat was conducted by means of a tube of white iron into a hollow space in this bed, and distributed a gentle warmth, sufficient to have caused tan to enter into a state of fermentation. The plants placed in this bed of charcoal quickly vegetated and acquired a healthy appearance. As always is the case in such beds, the roots of many of the plants penetrated through the holes in the bottom of the pots, and then spread themselves out; but these

* Letter to the Landlords and Ratepayers of Ireland; detailing means for the permanent and profitable employment of the peasantry without ultimate cost to the land or the nation, and within the provisions of the Act 10 Vict., c 107. By Jaspar W. Rogers, C. E, London,: J. Ridgway.

plants evidently surpassed in vigour and general luxuriance plants grown in the common way, for example in tan."

M. Lukas there gives a cut of several of the exotic plants upon which charcoal appears to have produced the most beneficial effects. It appeared also to promote the rapid germination of seeds. He then proceeded to try the effects of charcoal when mixed with vegetable mould, all of which answered very well. "The charcoal," continues M. Lukas, "used in these experiments was the dust-like powder of charcoal from firs and pines. It was found to have most effect when allowed to lie during the winter exposed to the action of the air. In order to ascertain the effects of different kinds of charcoal, experiments were also made upon that obtained from the hard woods and peat, and also upon animal charcoal; although I foresaw the probability that none of them could answer so well as that of pinewood, both on account of its porosity and the ease with which it is decomposed. The action of charcoal consists primarily in its preserving the parts of plants with which it is in contact, whether they be roots, branches, leaves, &c, unchanged in their vital power for a long space of time, so that the plant obtains time to develop the

organs for its further support and propagation. There can scarcely be a doubt also that the charcoal undergoes decomposition, for after being used five or six years it becomes a coaly earth. It exercises likewise a favourable influence by absorbing and decomposing the matters excreted by the roots of plants, so as to keep the soil free from the putrefying substances, which are often the cause of the death of the spongiolte." "Every experiment," concludes Mr. Lukas, "was crowned with success, although plants belonging to a great many different families were subjected to trial" (ibidx p. 211).

Professor J. F. Johnston (Elem. of Ag. Chem. p. 142) recognises the good properties of charcoal as "a valuable mixture with liquid manure, night soil, farm-yard manure, ammoniacal liquor, or other rich applications to the soil. It is even capable itself of yielding slow supplies of nourishment to plants; and it is said in many cases, even when unmixed, to be used with advantage as a top dressing. In moist charcoal the seeds of the gardener are found to sprout with remarkable quickness and certainty, but after they have sprouted they do not continue to grow well in charcoal alone. Drilled in with the seed, charcoal powder is said greatly to promote the growth of wheat."

As it is of great importance that the farmer should understand the difference between turf and peat charcoal, and the ashes of these substances, I will here repeat what I have elsewhere had recently

occasion to remark on the subject (*Bell's Messenger*, 1846, *p.* 318) :—

The distinction is very easy to understand; for the first kind, the *peat ashes*, like those of Holland or of Berkshire (owing to the mode adopted of merely burning them in uncovered heaps in the open air), contain hardly anything but the earthy and saline contents of the peat. To give an analysis, 100 parts of some Dutch ashes were examined, and were found to be composed of—

Siliceous earth . . .	32
Sulphate of lime (gypsum) .	12
Sulphate and muriate of soda, Glauber salt, and common salt . .	6
Carbonate of lime (chalk). .	40
Oxide of iron . . .	3
Loss during the analysis . .	7
	100

These ashes being totally devoid of carbon (or charcoal) are evidently adapted for the only purpose to which the Dutch farmers apply them, viz., as a top-dressing for their clover or other grasses into which the gypsnm of the peat ashes enters as an essential constituent. The charcoal being all removed by the combustion of the peat, it is evident that for crops which do not contain sulphate of lime the peat ashes could hardly be expected to be a fertilizing application. But let us examine carefully the analysis of the ashes procured from peat by a different and far less complete combustion of the carbon of the peat and turf. Such an analysis we find in the excellent little work of Professor J. F. Johnston ("Elements of Agric Chem.," p. 189). The ashes were obtained from Paisley moss by Mr. Fleming, of Barrochan. One hundred parts of each of these contained—

	White Peat Ashes.	Black Peat Ashes.
Charcoal . . .	54.12	3.02
Sulphate and carbonate of potash, soda, and magnesia	6.57	5.16
Alumina . . .	2.99	2.48
Oxide of iron . .	4.61	18.66
Sulphate of lime . .	10.49	21.23
Carbonate of lime .	8.54	3.50
Phosphate of lime .	0.90	0.40
Siliceous matter . .	10.88	4.391
	99.10	98.36

From this analysis it will be seen that the first, or white peat ashes, were so prepared (by merely checking the extent of the burning) that they contained more than half their weight of charcoal. It is to the preparation of this kind of impure *charcoal* ashes that I am now so anxious to direct the immediate attention of the owners of those estates, in whatever portion of the United Kingdom they are situated, where suitable turf abounds, and work is difficult to obtain. I hardly deem it necessary to prove to any one the value of charcoal as a valuable manure; and if it was necessary to obviate the suspicion that there is any difference in the effect produced by the use of charcoal ashes and the impure variety of these ashes afforded by peat, I am readily supplied with the means of doing so by a recent report by Mr. Peter Mackenzie, of West Plean, near Stirling (" Quar. Jour, of Agric, 1846," p. 467). He tells us that he has

been for some years past trying experiments with peat, charred peat, and peat ashes, as a substitute for stable manure, and for many kinds of crop grown by farmers and gardeners. He remarks, "In the spring of last year, I collected a quantity of peat for various purposes, and part of it was intended to be charred or burned. It was not so well prepared for burning as I wished, a good deal of moisture being in it; however, a good fire was made of wood to begin with, and as the peat dried it was drawn to the fire, and in this way was kept burning for two weeks. It required little watching, only once or twice in twelve hours. The partially dried peat was drawn to the fire, because it was intended to have a quantity of charred peat and ashes mixed together, and in order to obtain both, the fire was kept in a smothered state to cAar the peat (let the farmer mark the distinction). It commonly burst through in some parts, and there supplied the ashes. When we had a quantity to begin with, the unbutnt peat and the charred, with the ashes, were all well mixed together; at least one-half of the mass was unburnt peat." This mixture was applied about the beginning of May, to a light sandy soil, for a crop of Swedish turnips. The quantity used was at least at the rate of 200 bushels per acre. "We tried it," continues Mr. Mackenzie, "against well-made stable-manure in a state like mould, cut well with the spade, which was applied at the rate of about 20 tons to the acre, and spread into drills, like the peaty mixture. The plants grew well in both cases. We tried to ascertain the amount of produce per acre from each manure, as late as the middle of January, 1846; for, from the mildness of the season, the turnips till then appeared to be in a growing state, each plant having had about two square feet of surface to grow upon. The surface was kept flat, and the ground chiefly worked with the Dutch hoe. The weight of bulbs fit for use manured with the peaty mixture was upwards of 40 tons per acre; while those produced from stable-dun^ weighed only about 30 tons. One row of peas was also manured with the peaty composition, and yielded as great a crop as those manured with the stable-manure." Sush a preparation of charcoal, although mixed with other substances, the farmer will find very valuable in a variety of ways. It would constitute an excellent foundation for dung heaps or sheep-folds, since charcoal very extensively absorbs the gaseous matters of putrefaction, and when used in considerable proportions, would also imbibe all the drainage matters of the sheep, or other live stock. It answers as well, also, for a covering for dunghills; but to this end, again let me remind the farmer, that he must only carbonise or char his peat or turf; he must, to accomplish this, by covering the burning heap with earth or green turf, retard, regulate, and reduce the extent of the combustion as much as possible. It is to the presence of a considerable portion of carbon in the ashes of land pared and burnt, that

the advantages of this now nearly exploded operation may be attributed. The ashes of a pared and burnt chalk soil from Kent contained four to five per cent, of carbon, that of a light Leicestershire soil con

tained six per cent., and that of a stiff clay soil from Mount's Bay, in Cornwall, contained eight per cent, of carbon.

The evidence, then, is abundant in favour of charcoal as a fertilizer. At such a period as this, too, when starvation appears to threaten, if it has not already visited, a large portion of the population of Ireland, it seems a most opportune and desirable period for the extensive and immediate preparation of charcoal from the abounding bogs of the sister kingdom. Let, then, the attempt be promptly made: let every owner of bog or peat land make some effort in this way; and in so doing, such real friends of their country may rely that they will thus not only serve very materially their at present unwillingly idle neighbours without burthening themselves, but that they will moreover enrich their own estates, while they promote the comfort and the improved cultivation of the land of their birth.

Date: April 2, 2012 8:20 AM
Topic: The Rural Carolinian, Vol 7

http://books.google.com/books?id=BSkiAQAAIAAJ&pg=PA295&dq=charcoal+fertilizer&hl=en&sa=X&ei=sL95T7vLAsGriQKP24WnDg&ved=0CHAQ6AEwBjgU#v=onepage&q=charcoal%20fertilizer&f=false

The Rural Carolinian, Volume 7

The strength or quality of a fertilizer cannot be told by either the color or smell. The color comes from the absorbent used—sulphate of lime, alumina and carbon are the ones commonly used. Sulphate of lime, common plaster, leaves it in its natural color; alumina, common red clay color; carbon and charcoal dust leave it black. Alumina is nothing more than common clay; carbon can be had from charcoal, woods, earth, or decayed vegetable matter. All these are good things for the soil, also good absorbents of both ammonia and water, but the ammonia is in a more volatile form in the shape of carbonate than sulphate. This is one reason why the dark articles generally smell stronger than the others. The prime object of using what some call absorbents, is to absorb money out of the farmer's pocket.

It is very easy to take marl, plaster, red clay, and charcoal, or either of these with charcoal, with the addition of a few dead rats, cats, or something else, and make a fertilizer equal in smell, or rich looks, as a high grade fertilizer. So it will be seen that buying guano is very much like buying sansage. You don't know how many pups or cats are in the sansage; so it is in buying guano. See that you buy from a good, reliable firm or factory, with a sufficient guarantee to operate upon if necessary. If we can so manage as to have our fertilizers tested in our County, the above precantions are not necessary.

Date: April 2, 2012 8:25 AM
Topic: THE CULTIVATOR

http://books.google.com/books?id=0LgY0YpVZHIC&pg=PA192&dq=charcoal+fertilizer&hl=en&sa=X&ei=sL95T7vLAsGriQKP24WnDg&ved=0CHUQ6AEwBzgU#v=onepage&q=charcoal%20fertilizer&f=false

THE CULTIVATOR

By LUTHER TUCKER AND SON

Charcoal as Manure.—We are located in a well timbered country, too remote from a market for our refuse wood to use it profitably; and our land* require fertilizers to make their cultivation remunerative. Now it baa occurred to me that as chemistry assigns to carbonate of lime and charcoal the same principal constituent, viz., carbon, that to compare the price of lime, which costs 17 cents per bushel, with that of charcoal, which costs 5 cents per bushel, that charcoal would be the cheaper fertilizer, unless there is something connected with its use that I am not acquainted with. If you, or any of your readers, can give me any information, it wilt be thankfully received, regarding their relative value, particularly ns regards the utility of charcoal as a fertilizer; it is not used here, but lime is extensively. D. D. Gitt. Arendlsvltte, Adams Co., Pa. [Lime and charcoal are entirely distinct in their operation on land. The carbon in carbonate of lime is in such a state of combination as not to be regarded as manure. It is the lime only that is valuable. Many statements have been made of the great value of charcoal, but none, that we are aware of, that can be relied on to show its effects as compared with other manures. Many are familiar with the fact that the site of a coal pit continues unusually fertile, often for more than half a century, but we do not know how much credit to assign respectively to the charcoal, alkali, burnt earth, Ac. We can only recommend to our correspondent to try several accurate experiments on a moderate scale. We are inclined to think that where charcoal is only 5 cents per bushel it might be most profitably used by pounding fine, and mixing in compost with the richer or more concentrated manures.]

Date: April 8, 2012 3:33 PM
Topic: Annual report of the Ohio State Board of Agriculture, Volume 32

http://books.google.com/books?id=tXUSAAAAYAAJ&pg=RA1-PA75&dq=charcoal+fertilizer&hl=en&sa=X&ei=jhGCT4DbE-baiQLu_LSvAw&ved=0CIUBEOgBMAk4Hg#v=onepage&q=charcoal%20fertilizer&f=false

Annual report of the Ohio State Board of Agriculture, Volume 32

By Ohio State Board of Agriculture

The owner of a large vineyard on Kelley's Island, also writes me that he thinks some kind of fertilizing necessary. He is experimenting with bone dust, superphosphate, land plaster and charcoal, and he promises to inform me of the results, if perceptible, next fall. He also is an advocate of the use of sulphur and plaster during summer, and has given me Some facts and instructions on the subject, which I will furnish for these columns before long. On the use of charcoal, he says a neighbor of his had a large grapevine growing not far from an old cistern which had a filtering apartment filled with charcoal; and a root of the vine, having found its way into that charcoal, filled the entire mass with its ramifications; the effect on the growth and productiveness of the vine was quite remarkable. He intends, therefore, to try some experiments with powdered charcoal as a fertilizer. It is probable, however, that, in the case of the cistern, the charcoal was saturated with fertilizing ingredients filtered from rain water, and hence comparatively little benefit may result from the application of charcoal, unless mixed with richer ingredients. Saturating it with water, in which hen manure is dissolved, would no doubt be quite effective.

Date: April 8, 2012 3:34 PM
Topic: The Farmers' cabinet, and American herd-book, Volume 11

http://books.google.com/books?id=5L0EAAAAYAAJ&pg=PA43&dq=charcoal+fertilizer&hl=en&sa=X&ei=jhGCT4DbE-baiQLu_LSvAw&ved=0CFgQ6AEwATge#v=onepage&q=charcoal%20fertilizer&f=false

The Farmers' cabinet, and American herd-book, Volume 11

No. 2. Comparative Merits of Charcoal and Barn-yard Manure, fyc. 43

Mooreslown, Burlington CO., N. J.,
EightU month 8th, 1846.

The Editor has felt considerable interest in the communications of his friend S. 3. Griscom, and is unvvil ling to omit this opportunity of expressing very decidedly, that he coincides in the opinion, "that it is a matter of the first importance to the future well being of the new settlers, that they go in sufficient numbers together to form communities of their own, so as to have their own schools, places of worship," ate, &c It will indeed be impossible to accomplish much good in any other way. It is not enough that new modes of thinking and of operating be carried into the set tlement; they must be sustained there from year to year, and from generation to generation, beyond the possibility of being put down, or worked out by any surrounding errors: and this, it is obvious, can only be done by the confidence and strength, and mutual support of numbers. The new community or colony should be independent in itself—we do not mean that it should be altogether exclusive, —but it should have sufficiently within itself the elements of progress, and thus insure the diffusion more and more widely of its own beneficial influences, without the danger of being driven off the ground by the encroachment of exterior and antagonistic ones. If individual families emigrate alone, the result will almost inevitably be, that instead of turning the Virginians into Northern men, they will themselves, or their children, be changed into Virginians.—Ed.

From the Farmer and Mechanic

Comparative Merits of Charcoal and Barn-yard Manure as Fertilizers.

In the year 1788, my father purchased and removed upon the tract of land in Hanover township, Morris county, N. J. The land, owing to the bad system of cultivation then prevailing, was completely exhausted, and the buildings and fences in a state of dilapidation. The foundation of the barn was buried several feet beneath a pile of manure, the accumulation of years: little or none ever having been removed upon the lands. Even the cellar, beneath the farm-house, was half filled with the dung of sheep and other animals, which had been sheltered in it. The former occupant of the farm had abandoned it on account of its supposed sterility, and taken up the line of march for the Valley of the Miami, along with the first caravan of pioneers who accompanied Judge Symmes.

The barn, before referred to, was removed to another situation soon after its foundation was uncovered, by the removal of the manure to the exhausted fields; and its site,

owing to the new arrangements of the farm, became the centre of one of its enclosures. During the seventeen years which I afterwards remained upon the farm, the spot could easily be found by the luxuriousness of the grass, or other crops growing thereon; though the abatement in its fertility was evident and rapid. On revisiting the neighbourhood in the autumn of 1817, I carefully examined the corn crops then standing upon the spot, and was unable to discover the slightest difference in the growth or product, upon that and other parts of the field. This was about twenty-eight years after the removal of the barn.

Upon the same farm and upon soil every way inferior, were the remains of several pit-bottoms, where charcoal had been burned before the recollection of any person now in the vicinity, and most probably, judging from appearances, between the years 1760-70. These pit-bottoms were always clothed, when in pasture, with a luxuriant covering of grass, and when brought under tillage, with heavy crops of grain. Eleven years ago I pointed out these facts to the present occupant, and his observations since, coincide with my own, previously made; that they retain their fertility, very little impaired, a period probably of about seventy or eighty, certainly not less than sixty-five or seventy years.

Here then is an excellent opportunity of observing the comparative value of

charcoal and barn-yard manures, as a fertilizer of lands. The former has not, after at least sixty or seventy years exposure, exhausted its powers of production, while the latter lost its influence entirely in twenty-eight years, and most probably in much less time.

I have since had many opportunities of' observing the effects of charcoal left in pitbottoms, upon vegetation, one of which only,. I will relate. The last season, in the northern part of Ohio, was one of uncommon frost and drought . In May, the wheat fields, when promising a luxuriant crop, were cut off by frost;—especially in the valleys, and very much injured in the high lands—which was succeeded by the most severe drought ever experienced in the West. The moiety which escaped both these scourges, was afterwards very much injured by rust. Near the village of Canton, upon a farm on high ground, which had been mostly cleared of its timber by its conversion into charcoal, it was observed that upon the old pit-bottoms, the wheat grew very luxuriantly—was clear of rust—and had ripened plump in the berry; while in the adjacent parts of the field it was short in growth, the stem blackened with rust, and the berry light and shrivelled..

The hint has not been altogether lost upon some of the farmers in the vicinity, and some of them are preparing to make an application of charcoal upon their lands; the result of which, when fully ascertained, I shall be happy to communicate to the public, especially if the facts above stated succeed in attracting the attention of agriculturists.

Lewis Vail

Date: April 8, 2012 3:37 PM
Topic: The New Jersey Farmer Vol. II, No. 1, September 1856

http://books.google.com/books?id=8BXXp4019_UC&pg=PA75&dq=charcoal+fertilizer&hl=en&sa=X&ei=7BGCT5PwMYzaiQK3hJz9Ag&ved=0CIgBEOgBMAk4KA#v=onepage&q=charcoal%20fertilizer&f=false

The New Jersey Farmer Vol. II, No. 1, September 1856

By Orrin Pharo

CHARCOAL AS A FERTILIZER.

For two years paat I hare used some fifty loads each season of refuse charcoal, and being fully oonyinced that it pays, I wish to recommend it to my brother farmers. I have tried it on grass, corn and potatoes—hare tried it alone and in the compost heap, and in all situations it has proved faithful to its trust. As a top dressing for grass, it gives a green color and luxuriaut growth.. Applied to half an acre of early potatoos the last summer, the yield was 75 bushels of as fine healthy potatoes as could be desired, that sold readily for one dollar per bushel, aud yielded the best profit of anything raised on the farm.

The virtue of charcoal mainly consists in its absorbing power. The purity of the air around a charcoal pit has long been known, and the colliers, notwithstanding their smutty appearance, are robust men. The secret of this purity of the air and the health of the colliers, lies in the fact that charcoal absorbs from the air the ammonia and other noxious gasses, unsuited for our lungs, but just the food for plants.— Every good housekeeper knows that if her boiling meat gives forth an unsavory odor, a piece of fresh charcoal put into the pot will not only sweeten the air, but will remedy that taint of the meat. In the same manner it acts when applied to tho land. It absorbs from the aii those gasses offensive to the nostrils, but the main food of plants. And this it will do, not once only, or for one season, but very possibly for a century. Where an old coal-pit has been burnt, the land never seems to wear out, and the first sottlers point fo the coal bottoms that are fifty years old, still by their exuberant vegetation marking well the spot where the wood was converted into coal. A fertilizer so lasting is well worth some expense atihe outset. But where can wc get it? some may ask. If any charcoal pits are burned

in your vicinity, the bottoms will furnish three or four loads each of refuse charcoal, mingled with burnt soil. The latter is highly valued also as an absorbent.— Around furnacos and blacksmith shops, the waste charcoal also accumulates, and in many instances may be had for the carting. It may be found also around engine houses, thrown out from locomotiv«s. If none of these resouroes j are at hand, thon use the best substitute possible, which is muck, or swamp mud, and double the manure heap by composting, and if the crops arc not doubled, then my experience is vain.— Country Gentleman.

Date: April 8, 2012 3:38 PM
Topic: Annual report of the Secretary of the Board of Agriculture

http://books.google.com/books?id=r8o2AQAAIAAJ&pg=RA1-PA38&dq=charcoal+fertilizer&hl=en&sa=X&ei=7BGCT5PwMYzaiQK3hJz9Ag&ved=0CHAQ6AEwBTgo#v=onepage&q=charcoal%20fertilizer&f=false

Annual report of the Secretary of the Board of Agriculture

By Massachusetts. State Board of Agriculture

A few short rules will compass nearly all that is valuable for the application of fertilizers in practical farming. Manure must be soluble, ready to be absorbed by the roots of plants. A ton of dry charcoal or phosphate of lime on an acre of land would be useless, unless submitted to chemical decomposition by artificial process or by the slower, natural process of the atmosphere. Porous, sandy soil will not be benefited by the application of a larger quantity of fertilizers than the coming crop requires, unless the fertilizers be mixed with pulverized clay, prepared peat, charcoal, or some other medinm which will retain the surplus for future crops.

Land must be thoroughly pulverized, and the fertilizers fully reduced for their greatest solubility, so that particles of the soil and of the fertilizer are brought in closest contact. The use of a land-roller materially aids the process. In short, there must be careful cultivation of the soil, and exact chemical manipulation of the fertilizer, because all plants derive their nutriment from solution of gases, and all manures are valuable in the ratio of their actual solubility or the nature of the soil to make them so. This is true of every kind of fertilizer, whether derived from your barn-yards or the mercantile substitutes which you can supplement them with.

.....Many years ago, a farmer in New Jersey failing to procure a crop of corn from a field which he had taken much pains to cultivate, had the soil analyzed by Prof. Mapes, who found it deficient in chlorine, soda, phosphoric acid, lime, potash and ammonia. He supplied the missing fertilizers; a compost of common salt restored the chlorine and soda, spent boneblack (a waste from the sugar-refinery) restored the phosphoric acid, Peruvian guano restored

potash and ammonia, and a small portion of charcoal-dust and plaster to retain the volatile portions. These chemical fertilizers cost but one dollar and a half per acre, which produced sixty bushels of shelled corn per acre that very year.

Date: April 8, 2012 3:40 PM
Topic: The horticulturist and journal of rural art and rural taste, Volumes 18-19

http://books.google.com/books?id=jKgRAQAAMAAJ&pg=PA152&dq=charcoal+fertilizer&hl=en&sa=X&ei=7BGCT5PwMYzaiQK3hJz9Ag&ved=0CGsQ6AEwBDgo#v=onepage&q=charcoal%20fertilizer&f=false

The horticulturist and journal of rural art and rural taste, Volumes 18-19

LEAF-MOULD, ML'OK, AND OHABOOAL IN VINE BORDERS.
BY FOX MEADOW.

• Concluded from p. 132

We do not intend to dispute the authority of "Dr. Thomas Anderson, Professor of (Jhemistry in the University of Glasgow I" of the possibility of the protoxide of iron being formed by the decomposition of vegetable matter "without access of air;" neither did we claim any superiority for muck on any such ground; but we do still claim, as before stated, that vegetable matter in swamps is decomposed with the "partial" exclusion of air, and consequently a greater portion of its carbon remains in the exact condition to answer the purpose of charcoal. Now it is well known, that when oxide of iron exists, it is usually in the form of the peroxide, and that it sometimes exists in the form of protoxide, which is poisonous to plants, and renders soil unfertile. This latter (protoxide) is sometimes detected in common soils; but will Dr. Anderson, or any" other Dr., affirm that, if such soil be thoroughly plowed and worked in such a manner as to freely admit air and water, that this compound will not take up more

oxygen, and so render this protoxide a peroxide, and thus make it available for plants? Dr. Anderson would preach no such silly nonsense! Suppose sulphuret of iron compounds are found in green muck just dug from swamps, did Dr. Anderson or that "other Dr." ever discover their presence there after a winter's frost had acted upon it? or when such alkalies as potash, soda ash, or white ash, or strong wood ashes were used in its preparation? Never! Then if this "protoxide," or its possible production, "sulphuret of iron," only exists where no air is found, of what consequence is its poison to plants which only

grow where air is? Is not Mr. Bright endeavoring to frighten the readers of this Journal out of.the use of the best natural vegetable fertilizer found on this great Continent by a mere "Will o' the Wisp " argument? Dr. Anderson would tell Mr. Bright that swamp muck, aerated, and properly incorporated with such alkalies as previously named, is not second to the best of cow manure, and in the place of its being a sour, poisonous destroyer of plants, is superior to any "special fertilizer" ever concocted by "Bright" or any body else.

But what of Charcoal? What says "Prof. Lindley, of the London Gardener's Chronicle, the most distinguished vegetable physiologist of the age?" With all due respect to Dr. Lindley as a vegetable physiologist, yet, if he was put to form grape vine borders, and required to produce a crop of grapes, he would turn out in the end just as our poor penitent friend Bright has, a miserable failure!

The readers of this Journal would naturally suppose, by Mr. Bright's quoting the "authority of Dr. Lindley on charcoal, that the Professor had direct reference to vine border making; but, instead of this, we find he is talking about "Iron clads" in the dock-yard at Cherbourg! M. Lapparul, Inspector General of Timber, with a view to the preservation of ships from decay, has adopted a process consisting simply in directing a powerful jet of gas on the wood, so as to penetrate every crevice; the char

ring being sometimes facilitated by the addition of a very thin coat of tar. So much for charcoal in vine borders, and its evil tendency based on the opinion of Prof. Lindley! Dr. Lindley, however, is of opinion that charring ship timber will not prevent "dry rot," and this is the gist of the whole subject. Dry rot is, of course, a species of fungons growth, and we are of opinion, with Prof. Lindley, that charring will not prevent this growth of Fungi when already in dry timber or charred matter, or charcoal when immediately under the action of atmospheric influences. But we deny in toto that such Fungi growth will ever be produced on a piece of charcoal under ground in a vine border! Nor in swamp muck, nor in decomposed leaf-mould!*

"Old Oaks, dating at least from the time of King John," says the Doctor, "which have never shown a trace of Fungus, except such species as affect the bark and not the wood, if accidentally burnt, produce on the charred surface an abundant crop of the very Fungi which occur in such profusion in our dock-yards on badly seasoned timber." Of course; and who is there, having any pretensions to horticulture, who is supposed to be a close observer of Nature's neverdeviating laws, that is so ignorant as not to be cognizant of this

fact? Is a piece of hard burnt charcoal prepared earthy matter containing the organic and inorganic food of plants? Is the living wood of the oaks in question affected by this Fungi? Not at all, but the moment death takes place, that moment inevitable law by degrees decomposes its hardened tissue, and compels it to return from whence it came, and be once more the proper food of plants! All charred matter, if left under the full influence of the

* Perhaps one of the greatest of earthly blessings to a farmer working a poor piece of soil, would be to find it literally covered some morning in the early spring with "toad-stoolsand if he was a man of ordinary ingenuity, ho would embrace the precious opportunity of "plowing under" such a splendid green crop of the cryptogamia. The richest pasture lands of England are white orer with Agaricus campestris and Morchell eaculenta; and when Tuber cibareum Is dug from the roots of Oaks and Beeches, no person ever found their roots rotten by the action of Fungi growth I

air, nndergoes a similar state of fungoid or chemical decomposition. It is immaterial to this " Divine law " whether the subject it acts upon be a piece of rotting stick, charred stick, iron-clads, or the adamantine rock! The Doctor admits, as all do who know any thing about the properties of charcoal, its great antiseptic power, and refers back to Cffisar to show, from Ins writings, that stakes were charred at their ends to preserve them from rotting in the soil, and also speaks of the advantage derived by charring the ends of gate-posts. To suppose that charcoal or DECtoMPoaKD leaf-mould, placed in the soil, will produce a fungus growth deleterious to healthy vegetation, is too absurd to reason upon, and to endeavor to clap on the shoulders of Prof. Lindley the "authority " of such an opinion is a base calumny and a vile slander. If the Professor is not a practical gardener, he is an excellent botanist, and a sound vegetable physiologist, possessed of too much common sense to write or advocate such trashy nonsense as Mr. Bright would willingly impute to him. I trust that this calumny will never pet to his eyes or ears.

If Mr. Bright should ask Dr. Lindley for his opinion of the use of charcoal in the soil, (vine borders,) he could refer him to thousands of instances of it as an effective fertilizer, and especially to those plants grown under glass. Heaths, Rhododendrons, Cucumbers, and Melons, Onions, Roses, Orchidaceous plants, Camellias, Hydrangeas, Pineapples, and a host of other plants, have been the subjects of extensive and successful experiments; and we will vouch our word for it, that Dr. Lindley would tell friend Bright that charcoal may, with decided advantage, be applied to almost every known

plant in cultivation. He would tell him that carbonic acid applied to the roots of plants renders them more luxuriant and productive than other plants to whose roots no such applica tion is made. He would tell him that charcoal u in" the soil kept moist, slowly combines with oxygen, and emits carbonic acid, and he would also tell him that decomposed leafmould and prepared swamp muck will do the Mat, 1863.

same, and on which principally depends the solubility of mineral substances. Now is it any wonder that a man like friend Bright, who ignores (very recently) charcoal, leafmould, and muck, should utterly fail in the culture of the vine? We can tell him from practical knowledge of over thirty years' toil and study, that he nor any other living man will ever permanently and successfully grow crops of grapes without bounteous supplies of rich carbonaceous food; for without it your salts and your silicates, and all the other jumbles of compounded minerals, will be no better in or on your borders than so much insoluble flint!

Here we have presented some of the "theory" of muck, leaf-mould, and charcoal, by which we do not expect to wholly reclaim friend Bright from his past errors, but hope and trust it may have some influence on his future action; and if his heart is so hard, and his stubbornness so great, that he won't swallow this cup of common sense, and will not "honestly imbibe the wormwood," he should be at least "magnanimous," and not lead others into errors that will involve them in utter ruin. As to our "owning up," we think we have done so honestly; but to place our own individuality "along with us"—O good gracious! This reminds us of the fox who got his tail chopped off in a trap, and persuaded all his brothers to cut off theirs! it looked so much better to be all alike! But this " fox" don't see it.

In closing this subject, we respectfully invite our poor brother, the " Pilgrim now in the pillory," to take another annual trip and see "Fox Meadow;" it will do his poor desponding heart good, we know, to look at our vines, hard forced for seven years, with thousands of Hamburgh leuves measuring over twelve inches across, and bunches of fruit in proportionate size, growing in Muck and Sasn, mulched with a foot of rotten leaves 1 We also extend the invitation to all those faint hearted amateurs who have been led to doubt the practical use of a good rich carbonaceous soil by the cloud of smoke thrown over their mental vision from that luminous and "Bright" propounder of poisonous (ungated Leaf-mould. 10

[Since this controversy has been under way, we have received a number of

letters from parties not yet "deeply founded in the faith," asking whether there is any danger in using muck, &c., and whether they must continue to follow the advice that we have long and persistently given them. This makes it necessary for us to say again, without reference to either side of this controversy, that there is no one thing of greater value to all who grow plants, than carbonaceous matter in some of its forms.

We never advise the use of a thing unless we know it to be good; and we do not believe that, among all the readers of the HohtiOulturist; there is a single one who, having faithfully followed our advice, has had cause to regret it. Let the doubting, therefore, and those of little faith, be reassured, and go straight on in the " carbonaceous" path that we have marked out for them, while Fox Meadow and Mr. Bright discuss the merits of leaf-mould and muck.—Ed.]

Date: April 8, 2012 3:43 PM
Topic: Waste products and undeveloped substances: or, Hints for enterprise in ...

http://books.google.com/books?id=gWM1AAAAMAAJ&pg=PA296&dq=charcoal+fertilizer&hl=en&sa=X&ei=7BGCT5PwMYzaiQK3hJz9Ag&ved=0CGUQ6AEwAzgo#v=onepage&q=charcoal%20fertilizer&f=false

Waste products and undeveloped substances: or, Hints for enterprise in ...

By Peter Lund Simmonds

dry lumps, of convenient size to be used as coal, or in the form of charcoal, to be used principally in the manufacture of iron. Important as these applications of peat undoubtedly are, they by no means exhaust its useful capabilities, for, as we have seen, valuable chemical products may be obtained by submitting the peat to distillation. For instance, the prepared peat will be found to yield, upon distillation, large quantities of carburetted hydrogen or illuminating gas, of the best quality, giving also as a product the peatgrease above mentioned, and charcoal for fertilizing or deodorizing purposes. Apparently, however, much remains to be done before the delicate chemical processes required to obtain many of the valuable chemical products alluded to can be made commercially useful; but the employment of peat charcoal as a manure or fertilizer, as well as a valuable disinfecting agent, is now established, and is extensively used.

Date: April 8, 2012 3:45 PM
Topic: Friends' review: a religious, literary and miscellaneous journal, Volume 38

http://books.google.com/books?id=4lEpAAAAYAAJ&pg=PA182&dq=charcoal+fertilizer&hl=en&sa=X&ei=7BGCT5PwMYzaiQK3hJz9Ag&ved=0CFUQ6AEwADgo#v=onepage&q=charcoal%20fertilizer&f=false

Friends' review: a religious, literary and miscellaneous journal, Volume 38

edited by Samuel Rhoads, Enoch Lewis

Charcoal In Horticulture.—Not only florists but the growers of small fruits in Europe are making use of charcoal for promoting the growth of the plants they cultivate. It is not claimed that the charcoal is in any sense a fertilizer. It is an inert substance, and one not liable to pass into a state of decay even under the most favorable circumstances It endures longer when exposed to the action of the elements than any of the metals, except those that are ranked as precious. When it forms a union with the oxygen of the air it forms nothing but carbonic acid, which, though highly useful to plants, is obtained from the air without the trouble of producing it. It contains considerable potash and some lime, which the roots of plants will appreciate. Its principal use, however, consists in storing up moisture, fertilizing elements contained in water, and various gases, as ammonia, and giving them out as the wants of plants requiie. A barrel of freshly burned charcoal will absorb nearly its own bulk of soap-suds or liquid manure without presenting the appearance of being wet. The roots of the plants will pass between the pieces of charcoal, and will often penetrate them, and in so doing will be in a position to appropriate the substances in the pores. Charcoal is very desirable for placing in pots or boxes in which house plants are raised. It will retain many of the bad odors that are likely to arise from most fertilizers. It is also very desirable for garden beds, in which roses, annual flowers, and edible vegetables are raised. It is an excellent substance to bury in the ground where grape vines are planted. For placing in pots, boxes, and garden beds, it should be tolerably fine. For grape vines and large shrubs it may be in the form in which it is taken from the kiln, or is usually found in the market. For thesg purposes it should be buried quite deeply. Persons who sell or use charcoal often have

considerable that is too fine for keeping up a fire, and will dispose of it at a nominal price. This will be very suitable for use in the house, or flower, or vegetable garden. Persons who have large graperies will find it to their advantage to burn their own charcoal. —/^dependent.

Date: April 8, 2012 4:10 PM
Topic: Southern planter, Volume 3

http://books.google.com/books?id=mTRKAAAAMAAJ&pg=PA252&dq=charcoal+fertilizer&hl=en&sa=X&ei=CxOCT8a8H-qriQLw4JzyAg&ved=0CFUQ6AEwADgy#v=onepage&q=charcoal%20fertilizer&f=false

Southern planter, Volume 3

CHARCOAL AS A FERTILIZER.

It will be recollected by our readers, that in our last two volumes we have published several able papers upon the virtues of charcoal as a fertilizer of the soil, and of its supposed efficacy in the preservation of wheat from rust. One of these papers, by Judge Hepburn, particularly points out cases in which lands which had been dressed by charcoal had grown wheat free from rust, when wheat grown on other lands, contiguous, which had not been so treated, had suffered greatly from that cause. We allude to these circumstances now, with a view of introducing the subjoined paragraph to the notice of our readers ; by which it will be seen, that in France the same virtues have been ascribed to charcoal as in our own country. Of the precise mode of action by which this exemption from rust is produced, we are not prepared to speak positively ; but will claim permission to observe, that it may be owing to the very great affinity which charcoal is known to possess for ammonia, and the reluctance with which it gives it out after having once absorbed it. If the opinion which is now gaining strength and consequence, that the cause of rust is plethora, and that ammonia is one of the chief aliments or food of plants, be correct, the preventive properties of the charcoal may arise, first, from its absorption of ammonia as formed, and, secondly, from its yielding it slowly to the wheat plant in the last stage of the maturing of its stem, thus, as it were, hindering it from feeding to that degree of excess productive of repletion, and the consequent disruption of the stem of the plant. At all events, as the rust is one of the most disastrous diseases in its effects, to which the wheat crop is subjected, we think that the use of charcoal to a limited extent, by way of experiment, is worthy of the consideration of every wheat grower. If it should, on trial, fail of the anticipated efficacy, it can do no possible injury either to the grain or to the soil, and may be beneficial to the latter, in supplying it with silicate of potash, a substance of vast importance to all grain crops, and especially useful in giving strength and elasticity to the

straw.

With these remarks we will direct attention to the following paragraph :

Charcoal As A Fertilizer.—We have been astonished at the enormous increase of the wheat crop in France within the last eight or ten years, and have devoted some attention to the investigation of the subject. It appears that charcoal—an article that can be obtained here for a tithe of its cost in France—has been extensively used, and with marked effect, in fertilizing the wheat lands in that kingdom. A correspondent of the New Farmers' Journal, an English print, states that during a sojourn in one of the central departments of France he learned that some of the most productive farms were originally very sterile; but that for a number of years their proprietors had given them a light dressing of charcoal, which had resulted in a large yield of wheat of excellent quality. Since his return to England he has tried the experiment upon his own lands with the same happy effect. The charcoal should be well pulverized, and sown like lime, after a rain or in a still, damp day. Even in England, the writer says, "the expense is a mere trifle, in comparison with the permanent improvement effected, which on grass is truly wonderful."— He states one other very important result from its liberal use. "I am quite satisfied that by using charcoal in the way described rust in wheat will be entirely prevented; for I have found in two adjoining fields, one of which was coaled and the other manured with farm-yard dung, the latter was greatly injured by rust, while that growing in the other was perfectly free from it."—Buffalo Commercial Advertiser.

Date: April 8, 2012 4:15 PM
Topic: The Family economist, Volumes 1-3

http://books.google.com/books?id=QltFAAAAYAAJ&pg=PA215&dq=charcoal+fertilizer&hl=en&sa=X&ei=zRqCT-3NDoapiALQ9fGtAw&ved=0CFUQ6AEwADg8#v=onepage&q=charcoal%20fertilizer&f=false

The Family economist, Volumes 1-3

PEAT CBARCOAL, THE BIST DEODORIZER;
(OR SJIILL-DRSTBOTBK.)

Sir,—In 1845, when I first brought forward the advantages of Peat Charcoal as a fertiliser, your most valuable publication led is urging the trial and proof by practice, of what was then deemed to he a very doubtful theory. Uebig declared that plants depended upon the atmosphere for the quantum of carbon tbey contained, and it was then the Jathion to bow the head to bii name and his doctrine; but happily fashions change, even in science. Now every farmer in tire" kingdom manures with carbon to the utmost extent be can; and the rich and verdant green of the plant, even as It begins to peep above the surface, truly tells the fallacy of the 'fact,' th -it plant* inhale through their leaves all the carbon, which supplies them with some forty to fifty per cent of their solid substance. To be the humble means of awaking public attention toso valuable a reality, and to see such happy result!, is |n itself a rich reward. Let me hope for a richer still, in now begging the trial and proof of the Inestimable advantage of peat charcoal, as a deodorizer of human ejtreUe, a means of almost initanianeously depriving that most noxious matter of all its noxiousness, and Instantaneously taking up, absorbing and holding its gases and other products; all combined, possessing the highest capabilities known for the general fertilization of the soil. My anxious researches have been rewarded with perfect success. Peat charcoal, properly prepared, sand intermixed in sufficient proportion with human excreta;, conTens the whole into a dry inodorous mass, capable of being packed in sacks, and transported without the slightest annoyance, by any conveyance. Trie effect on the intermixture is immediate, and the result of my discovery, may, 1 believe be thus summed up.

Human excretes, now the cause of disease aa-1 death. In cities, may be made the profitable producer of beallhfulness and life to the country ai large. Ita removal will no longer be an evil drea led by all around; and it will become not

only the source of wealth to the •crieartarist, but of considerable wealth to the citizen. When given to the land, the preparation contains every essential lor fertilisation. The combination is such, that Its benefit cannot be overestimated; phosphates, xrtphates, gluten. &c, and ammonia in great abundance are interwoven, it may be said into •rery grain of charcoal. Carbon, the staff of rotation is filled with all the other essential* fer luxuriance, and yields the whole to the plant In the most beneficial form; while in riving out its aqueous and other matter, it becomes ready to receive another change. Brery shower of rain yields a further supply of ammonia and salt; and every grain of charcoal tans becomes a reservoir not alone of tianure, but of moisture. No limit, therefore can be assigned to the benefit produceable by Mcb a fertilizer.

Seme time since, I announced the leading particulars of these facts, In your valuable columns, cad I am now happy to add, that the

discovery has been thoroughly proved. It has been patented, &c, in the United Kingdom; and 'The Irish Amelioration Society,* who possess the whole right for the preparation of peat fuel and charcoal, etc., in Ireland, Is making every preparation for the introduction Into this country of prepared peat charcoal, which can be delivered at such cost, as will permit its most economical use, throughout the whole country, for sanitary, agricultural, end otherpurposes. And when ills recollected, that the employment of the miserable labourers of Ireland In producing this most valuable commodity, from the now watte and useless bog, will be the means of saving them from future famine—perhaps death, and raise them nam from discontent, recklessness, and consequent crime, to Independence and comfort, the combination of so many blessings to the country at large, cannot full to give pleasure and gratification to all who feel for Irehind's miseries, and who properly think of England's good.

(The foregoing valuable statement is a letter which has been addressed to the Editor of the Hark Lane Express, by Jasper W. Roosrs; we gladly give it further diffusion.)

Date: April 8, 2012 4:16 PM
Topic: Annals of horticulture

http://books.google.com/books?pg=PA431&dq=charcoal+fertilizer&ei=zRqCT-3NDoapiALQ9fGtAw&id=tF8CAAAAYAAJ&output=text

Annals of horticulture

PEAT CHARCOAL.

Charcoal has been long known to possess considerable merit as a fertilizer, although it has not attracted much public attention till within the last few years. We do not here open the inquiry as to how charcoal acts beneficially on the soil, but assume the fact as now abundantly attested by experience. It would appear, that, whatever the value of wood charcoal may be in this respect, (and past experience speaks for the most part of this form of charcoal,) that of charcoal made from peat moss is much greater.

At a meeting of the Botanical Society of London, on the 8th of July, the subject was introduced by Jasper W. Rogers, Esq., C. E., who exhibited various samples of the charcoal in different states, and well adapted for cultural purposes. Mr. Rogers says :—

"Peat charcoal possesses several advantages over wood charcoal. The small quantity of pyroligneous acid originally contained in the peat is entirely dispersed in the preparation; hence, no acetic odour arises, which is complained against in wood charcoal, and produces severe headache. Again, its light and pure blaze gives a greater extent of calorific effect, because it extends itself generally over the surface to be heated, and carries with it no smoke. Peat charcoal emits a blaze, which wood charcoal does not. But one of its great advantages is the power of fertilization in its individual state.

"In the year 1845, I first brought the fact under the consideration of the Relief Commissioners of Ireland, in a report I was called upon to make upon the subject of peat fuel. The theory was then smiled at, both by scientific men and scientific bodies; but it has happily outlived opposition. The Royal Agricultural Society offered a prize the following year for the best essay on the subject; and now, a great number of farmers save every bramble from their hedges to make charcoal, and by drilling it in with their seeds, produce great advantage to the crops.

"But I would draw special attention to that which I deem to be the main and grand advantage which peat charcoal possesses in so singular a degree, namely, that of perfectly deodorizing and disinfecting animal excretice. I say, peat charcoal, because the same capability does not exist in wood charcoal generally, and in several descriptions, not at all; for instance, the charcoal of lignum vitae, teak, and hard oak, has, in fact, no deodorizing power. This capability increases a9 the wood becomes softer and more porous, and that which I have found to have most effect, is the charcoal of the willow. In addition to peat

charcoal, specially prepared for deodorizing, being infinitely more porous than that of wood, it pcrhap3 contains some other property not yet discovered, for I have no hesitation in saying we are all, as yet, strangers to it.s eminently useful powers, and that it is a subject particularly worthy of investigation."

For fertilizing purposes, the charcoal prepared from the peat in an uncompressed state appears to be best adapted, although a more dense material can be obtained. Indeed, by a particular process, "the density of peat charcoal can be made to exceed that of wood charcoal. It is only to make the peat as d-.-nseas wood, to produce equal density in charcoal; and this is very simply done by exhausting the chamber in which the piece of peat is compressed, at the same instant that the compression commences. The atmospheric air being withdrawn from beneath, the aqueous matter must follow, and rush into the airpump; the resistance, therefore, presented to the power of pressure, is simply the fibre of the peat; while the vacuum produced underneath gives the aid of the natural pressure of the atmosphere, at top, to assist the operation. Thus, the imaginary difficulty of producing dense charcoal from peat has been overcome—so simply, that it is only to be wondered at that it had not been done long since. The present market value of peat charcoal varies from 41. to even 8l . or 9l . per ton, the latter being the average price of wood charcoal sold in London for culinary purposes; it may be sold with large profit for much lesv."

"In its natural state, peat moss has several peculiarities. It delights in moisture, and yields it up most unwillingly. It contains, in different small proportions, ammonia, pyroligneous acid, tar, &c, and also a very singular production, a ' fatty matter,' which, when purified, closely resembles spermaceti, and makes a very beautiful candle. Mr. Reece Reece has recently patented a process for the extraction of these articles, carrying out the production of iron from ore which is upon the property. Possibly 'Price's

patent wax candle' may yet be rivalled by ' Reece's bog spermaceti.' To speak seriously, the production is really beautiful, and gives a pure and strong light. The question to be solved, however, is, Can it be obtained in sufficient quantity to be profitable? It is found in its natural state, at times, in small quantities collected together by some peculiar local filtration, or, perhaps, affinity, which draws it from the mass around to one spot. The matter, when pure, is about the colour of butter. The superstitious tradition of the peasantry is, that the Fairies hide it for their use, and hence it is called 'Fairy butter.' It is but rarely found in that state, and is then treated with great reverence. Another property of the peat moss is the singularly preservative nature of its water, which is of a dark brown colour, almost approaching to black. It has been said to contain a tannin quality, but analysis proves to the contrary. However, its power of preserving animal matter from decomposition is very extraordinary. Human bodies have been found in bogs, undeconiposed, which must have been long buried."

Mr. Rogers, it will be seen, assumes that peat charcoal is not only valuable in itself as a fertilizer, but may be made even more so as a fertilizing agent, at the same time that it is employed to deodorize and disinfect putrescent animal faeces. On this point he observes :—

"The fact that the health of towns mainly or entirely depends upon the almost immediate removal of their refuse, is at present so well understood, that it cannot be requisite to enlarge upon it. All are now aware that in the ratio of the retention or removal of such matter, is the average of life or death; and the question on that score comes upon us now in so fearful a form, that it cannot need any adjunct to enlist our energies in the cause of our own preservation. It is singular, that that substance which produces the evil, and which has hitherto spread disease amongst us, should contain not alone the principles of health, but also of wealth; and perhaps it may be said that nature'has provided in proportion to the moss of beings congregated together, the means for their subsistence, in the very refuse or matter which we permit, by our neglect, to produce so much evil.

"It has long been known to science, that the excretise of mankind contains a greater amount of the properties essential to the fertilization of plants, than any other substance. To its most careful preservation and use China owes the capability of supporting a population almost incredible, with reference to the extent of the soil under cultivation; and in the ratio of the introduction of excretias as a manure, on the continent of Europe, has been the increase of agricultural profit. There its use is now almost universal, while we, of England,

neglect that which, perhaps, as in most other things, we should have led the way in using. But there have been many difficulties to contend with in its introduction as a marketable fertilizer.

"Firstly,—Its collection without annoyance and evil.

"Secondly, — Its deodorization, so as to admit of convenient transport.

"Thirdly,—Its preservation, in a manner to retain its valuable qualities as a manure.

"To obviate these evils several chemical deodorizers have been produced, but being liquids, the advantages proposed to be obtained became neutralized by the increased difficulty of reducing the matter to a sufficiently dry state for transport. Happily, however, nature has provided, by a production of the vegetable world, a simple remedy for this difficulty, in peat charcoal. It is perhaps the greatest absorbent known; it will take up and retain above 80 to 90 per cent, of water, and at least 90 or 100 volumes of those noxious gases arising from animal excrement and other putrescent matter. Hence its great value for effecting deodorization, and for retaining all the value of the liquid as well as its volatile products.

"Equal parts of prepared peat charcoal and excretise will, under almost every circumstance, accomplish this if properly intermixed—producing a manure of almost incalculable value. The proportion of charcoal may be less in some instances, even down to one-third—if very intimate mixture be made, and the charcoal be properly prepared.

"This mixture is quite dry, and can be transported in bags, or even in bulk, by almost any public conveyance. Its value as a manure cannot, I believe, be over-estimated. In all the trials made with it, both by myself and others, the effect is singularly great; but it cannot be otherwise, when we consider what the compound contains. Professor Phillips's analysis of peat charcoal (the same as on the table) for deodorizing purposes, is as follows :—

Carbon 79-24

Hydrogen 2-20

Nitrogen 0-54

Oxygen 6"44

Combustible matter . . 88 42

Sand and Clay 2-48

Oxide of Iron 1.66

Phosphoric Acid 0"34

Silicate of Potash 0-93

Chloride of Sodium 253

Carbonate of Lime 185

Sulphate of Lime lit

Loss: 0-30

Incombustible matter. . 11-58

100-00

"Now, add to this, ammonia, gluten, phosphates, urea, &c. contained in human excretiae» and it will be obvious that it is perhaps impossible to produce a combination more perfectly adapted for the food of plants. All the elements for their nurture are interwoven, it may be said, into every grain of charcoal; carbon, the staff of vegetation, is the base, and the whole are yielded to the plant together. It is well known that the strongest affinity exists between the ammoniacal and other atmospheric gases, and carbon ; and here again a singular advantage arises. Every shower of rain that falls, gives a greater supply of the ammonia, salts, &c. contained in that rain, to the charcoal. Hence it is not only the means itself of giving health and strength to the plant, but every little grain becomes a reservoir, not alone of manure, but moisture, both of which never cease to act upon and invigorate the vegetable."

Mr. Rogers then enters into some very singular calculations as to the value of the refuse which is at present permitted to enter the sewers of the metropolis, and to pollute not only the river into which they empty, but the atmosphere, into which they evolve gases of the most deleterious nature. We shall quote some of his statements upon this matter :—

"If these be facts, why should we permit one ounce of that which now

produces disease and death amongst us, to be lost? Why should we, for health sake—and why should we, for the sake of our pockets? For I shall undertake to show by a few figures that every one who has a family of six, may, if proper means be made use of, not only increase their health, but add to his wealth to the extent set forth.

"The average of excretiae yielded by a human being per annum is 10 cwt. Six will therefore yield three tons: add to this, say three tons of charcoal, and you will have of manure six tons. Now although this manure must be infinitely superior to guano, which sells at 10Z. to 12Z. per ton, suppose we estimate it at 5Z.; the gross value of the manure will therefore be 30/. per annum!

"From this we have to deduct the cost of the charcoal, which can be produced in London at from 21. to 31. per ton, say at 21. 10*. Therefore 71. 10a. and the expense of collecting and intermixing will be the whole deduction from the 30/. In order to be entirely on the safe side, add 7/. 10.s\ for these expenses, and by this very fair estimate it will be seen that the smallest possible value of the household produce will be at least 15/. per annum.

"That you would perhaps laugh at this I anticipated, for I smiled at it myself when I first worked out the figures; but though laughable, this is, nevertheless, fact, and I am willing to submit the whole to any public test that may be suggested. But figures in the aggregate are more startling still.

"The average number of houses within the districts of London, assessed above 10/. per annum, may be assumed as 200,000; consequently, the total of assessed taxes of that class may be taken as 2,000,000/. Now, if the inhabitants only determined on ridding themselves of the evils that encircle us by the present fearful sewage system, and saved that which nature intended as a means to produce

food in abundance, they would not only confer a great boon upon the population generally, but the profit to be had in money woald amount, at 15/. per house, to 3,000,000/, per annum; or, in other words, that class of the citizens of London who pay those taxes, may save them, and perhaps put into their pockets 1,000,000/. yearly, at the same time that they preserve the health of the city, and prevent the disgraceful and death-dealing fact of their noble river being converted into a monster cesspool."

Mr. Rogers has, it appears, placed before the Sanitary Commission a proposition founded on the facts above named, and has pointed out how, in

his judgment, the whole of London may be freed from its present dreadful sewage evils, most ample profits being returned, in place of millions being expended in trying to get rid of that which should be carefully saved.

Date: April 8, 2012 5:27 PM
Topic: The true cure for Ireland, the developement of her industry: a letter. With ...

books.google.com/books?id=2iRcAAAAQAAJ&pg=PA28&dq=charcoal+fertilizer&hl=en&sa=X&ei=8huCT7v4ErLciQKhs9muAw&ved=0CFwQ6AEwAjhG#v=onepage&q=charcoal fertilizer&f=false

The true cure for Ireland, the developement of her industry: a letter. With ...

By George Henry Stoddart

3. But there is a further use for peat-charcoal, which will not only make its demand certain and progressive, but will confer on the agricultural interests of England, considerable benefit. It has been proved by unquestionable experiments, commenced some years since at Munich, that carbon, or charcoal, applied as a manure, or fertilizer, produces great advantage to vegetation; and by a succession of trials since, it has been iucontestably established, that peat-charcoal is one of the most valuable general fertilizers now known—one that cannot produce injury by over use, while almost the smallest quantity will yield a certain amount of good. It is lasting in its effect, and general in its action; not being confined, like most other fertilizers, to an isolated capability. It supplies to the root in ample abundance, that carbon, of which most vegetables contain from forty to fifty per cent., and to obtain which, they are now left dependent almost solely on the atmosphere.

Date: April 8, 2012 5:29 PM
Topic: Michigan farmer, Volume 4

http://books.google.com/books?id=vtvhAAAAMAAJ&pg=PA55&dq=charcoal+fertilizer&hl=en&sa=X&ei=8huCT7v4ErLciQKhs9muAw&ved=0CGEQ6AEwAzhG#v=onepage&q=charcoal%20fertilizer&f=false

Michigan farmer, Volume 4

From the Farmer and Mechanic.

Charcoal for Wheat and Rye.

Gentlemen: In fulfillment of my promise, I communicate the following statement of some of the results of my inquiries in relation to the beneficinl effects of charcoal as a fertilizer, and as a preventive of shrinkage in winter grain.

Mr. Holloway, of Hancock, Delaware county, informed me that he had heard his lather remark that he had never known land to wear out where therw had been a coal pit; but that such places always produced better than the adjoining land. It may be well to remark here, that in some instances I have been told that the burning of a coal-pit had for a while destroyed the fertility on the immediate site of the pit. But this may be owing to excessive burning of the soil, or too great quantity of the coal. We would not expect a crop from seed sown in a heap of lime or silica. Almost all of whom I have inquired confirm the account of Ilolloway os to its uses as a fertilizer, and its durability. 1 will state but one of a number of facts proving its benefit in increasing vegetation, besides the luxuriant growth on the sites of coal-pits.

An aged and credible man, Mr. Dow, of Chehocton, in Delaware county, said that some years ago, when living at a place called Butternuts, he purchased a load of charcoal to use in a small furnace. The man who brought it, in passing through a piece of ground, occupied as a garden, upset his load. They gathered up all they could, but much fine coal was left. Mr. Dow and his wife both said that it was astonishing to see the increased vegetation to the extent of where the coal was left. They say it was a moist soil.

These, and a number of facts, the result of much inquiry on the subject, have convinced me that coal can be profitably used as a fertilizer. But it is peculiarly valuable as a preventive of rust and shrinkage in wheat and rye. In

proof of which, Colonel Holliday, of Colchester, Delaware county, a reputable man, well esteemed for truth, who was himself a blacksmith, and whose father had followed the same trade, and had burnt many coal-pits, told me that he had made the remark to his father that he had never known grain to be shrunk where there had been a coal-pit Last year, my son-in-law, Henry Woolsey of Deerpark, in Orange county, said he had a piece of rye much shrunk, and of little value except where there had been a coal-pit, where it was plump and fair. Many other facts have come to my knowledge confirming my opinion that charcoal may be used so n« to greatly increase the profits of farming, and particularly where wood is abundant. But as there has, as yet, been littlle experience on the subject, I would suggest that every farmer who reads this should try the experiment, at least in a small way, Almost any one can procure a little, (if only a bushel;) try it in different proportions; observe the nature of the soil; and, if possible, compare the effect of coal from different kinds of wood—if those containing more potash are better; and if so. what soils, &c. Some (as the coal from hemlock) contain little or no ash; if such are bonlicial, it proves pure carbon to be indeed a manure. Respectfully yours,

Henry V. Kleeit.

Date: April 8, 2012 5:31 PM
Topic: Fruit recorder and cottage gardener, Volumes 7-8

http://books.google.com/books?id=isdFAAAAYAAJ&pg=RA1-PA51&dq=charcoal+fertilizer&hl=en&sa=X&ei=8huCT7v4ErLciQKhs9muAw&ved=0CGYQ6AEwBDhG#v=onepage&q=charcoal%20fertilizer&f=false

Fruit recorder and cottage gardener, Volumes 7-8

From T. K. Jf. Hocstox, Texas, Jan. 89. I8i6.

Have you any knowledge of the fertilizing properties of charcoal dust as an application to strawberries, aud if so how best applied (By the side of iny garden Is an old coal bed, on which the fine coal ard duel is one foot deep. Would it injure my plants to be allowed to ket a small quantity ol fruit now? Tour firm sent the plants out la Jfovorubor, and some of the 'Mctcalfs "havoboirles almost half grown. Oar tpriug Is very furwnrd.

In answer to this question and many others received, we copy as an answer the following from "Onnlrniti/i for thr South" page 43:

[Charcoal renders the soil light and triable, gives It a dark color, and additional wutmth for early crops. The bed whereon charcoal has been burnt is always marked by a most vigorous growth of plants when it becomes eufllcicnily mixed with earth. It contains also small quanti'lcs of salts of potash and other fertilising salts.

It nbsorbs both carbonic acid and ammonia from the air. and yields them to the roots of plants. It is most marked in its effects on plants which require abundant nitrogen. As it is indestructible, its beneficial effects last as long as it remains m the soil, sup. [.King the rootlets of plants with carbonic.acid, which Is renewed as fast as abstracted. Its geod eliects liegin to be seen when the dust is applied at the rale of forty bn-bcla per acre. Charcoal is invaluable for destroying the odor of decajiug animal matter, retaing a'l the gases in its own substance ready to yield them up fur the use of plants. Hence, the best applicatiin of this sub stance is not directly io the soil, b.it to compost it with putrescent animal matters, urlue or night soil, of which it will absorb all the odor aud fcitldzlng gases given off daring their decomposition. Composted with the last iwnied substance, It bocoues pou<lretfr, a"d is second only to

guano as a fertilizer.

lu striking ruttinps or polling plants, fino charcoal is a valuable substitute for saml, plants rooting in it with great certainty. Plants will flourish in powdered charcoal alone with considerable vigor, and, added to the other materials used in pottlug, it is found greatly to promote hnalthy growth io most plants.)

Date: April 8, 2012 5:33 PM
Topic: The American farmer: devoted to agriculture, horticulture and rural life

http://books.google.com/books?id=yV5TAAAAYAAJ&pg=PA335&dq=charcoal+fertilizer&hl=en&sa=X&ei=8huCT7v4ErLciQKhs9muAw&ved=0CGsQ6AEwBThG#v=onepage&q=charcoal%20fertilizer&f=false

The American farmer: devoted to agriculture, horticulture and rural life

By Maryland State Agricultural Society

Charcoal and Some of its Uses.

There are various opinions afloat in regard to the value of charcoal as a fertilizer. As an absorbent of ammonia, carbonic acid, &c, it certainly has scarcely a superior. It is also pretty well ascertained, that it readily yields up for the use of the plant, the substances thus absorbed. But there are two features connected with its use which have always commended it to my favor. One is its mechanical effects upon the soil, rendering it more open and friable, and consequently more easily worked, and more open to the action of the atmosphere. The other is the warming effect produced where it is applied in any considerable quantity. A dark soil, we all know, has the power to a greater extent of absorbing heat than a light-colored one. This, in many locations, is a great desideratum. Many plants which it is desirable to grow, but which, for the want of a sufficiently warm soil, is next to impossible, may be cultivated by the use of charcoal. Its carbon yields no food to plants, consequently, even if applied in large quantities, it can do no harm, unless it renders the soil too light and open; not a very likely result.

In gardens, therefore, I esteem it highly, and have found it, for the purposes briefly named above, most excellent.—Farmer and Gardener.

Date: April 8, 2012 5:36 PM
Topic: British husbandry: exhibiting the farming practice in various ..., Volume 1

http://books.google.com/books?id=W0REAAAAYAAJ&pg=PA637&dq=charcoal+fertilizer&hl=en&sa=X&ei=0SyCT7TNF-WTiQLZ5oCUAw&ved=0CGAQ6AEwAjhQ#v=onepage&q=charcoal%20fertilizer&f=false

British husbandry: exhibiting the farming practice in various ..., Volume 1

By John French Burke, Cuthbert William Johnson, Society for the Diffusion of Useful Knowledge (Great Britain)

In the case of stables and sheds, to prevent this loss of the richest portion of the manure, there are two substances which maybe readily and profitably employed—gypsum (sulphate of lime) and charcoal. The first absorbs and decomposes the carbonate of ammonia, forming sulphate of ammonia, a valuable fertilizinr salt, which is not, like the carbonate of ammonia, volatile; the second, charcoal, absorbs the salts of ammonia, and the other soluble matters of the farm-yard, and retains them unaltered for a considerable period. In either case it is only necessary to spread these substances as a foundation for the litter of the live stock in covered buildings, to prevent the recurrence of the serious loss to which we have alluded. Let those who are annoyed by the smell of stables have the gypsum powder carefnHr and systematically sprinkled on the floor of the stalls, and tbey will speedily be convinced of the power of the gypsum. A still better mode, when the quantity and quality of the manure, as in a farm, is an object. is to mix the gypsum with a considerable proportion of either charred peat, burnt clay, or any other substance containing a portion of charcoal; for by this plan the whole of the urine, of at least the shed-fad stock, is not only entirely preserved in the pores of the charcoal from putrefaction, but when carried on to the field it is gradually and steadily emitted, and becomes the food of growing crops. Of the use of charcoal as a fertilizer I shall hereafter have occasion to speak, and for these purposes an impure variety is profitably attainable, either in charred peat or refuse tanners' bark, or even in the charred matters of clay on moist farms. Whatever doubt there may exist of the value of charcoal, in its tolerably

pure state, as a manure, there is I am convinced, from the result of my own trials and observations, none as to its value for the purpose of forming a bed on which the ordinary manure of animals is prepared.

THE DRAINAGE OF THE FARM-YARD*.

The amount of drainage which usually takes place from farm-yards may be commonly very much diminished by only a proper arrangement of eaves-troughs for the conveyance of the rain-water from the roofs of the barns and other outbuildings of the yard; and then, if the drainage still flows, there is either the tank and the water-cart to have recourse to, or it may be received and absorbed in a properly hollowed heap of earth, turf from the borders of fields, or best of all, of the earth to which I have alluded abounding in charcoal. It may be useful to the young farmer to remember that carefully charred peat ashes contain more than half their weight of charcoal; and that, if the peat is obtained from a calcareous district, it also commonly contains about ten per cent, of sulphate of lime {gypsum). (See Brit. Husb. vol. i. p. 336.)

Date: April 8, 2012 5:37 PM
Topic: Annual report of the Commissioner of Patents, Part 2

http://books.google.com/books?id=lCgHAQAAIAAJ&pg=PA108&dq=charcoal+fertilizer&hl=en&sa=X&ei=0SyCT7TNF-WTiQLZ5oCUAw&ved=0CGgQ6AEwAzhQ#v=onepage&q=charcoal%20fertilizer&f=false

Annual report of the Commissioner of Patents, Part 2

▪▪▪▪▪▪▪The other matters introduced into a soil are classed as mechanical or physical amendments, and affect principally the texture and physical properties of a soil. They are frequently as valuable as the manures themselves, in giving the soil its best mechanical qualities as to structure, dryness, or moisture, retentiveness of heat, offering also a proper degree of porosity, so as to enable the air to penetrate to matters requiring oxidation in the soil. Charcoal powder acts mechanically in absorbing ammoniacal gas, and also by its color in absorbing the heat of the sun's rays, and retaining the heat by impeded conduction. When the charcoal is burned only to brownness, then it acts also chemically, being in a condition to form humus, and to undergo oxidation by the action of the atmosphere. Charcoal is undoubtedly a powerful fertilizer, and one of great duration, as is shown by the continued fertility of places where the aboriginal inhabitants of New England built their camp-fires more than two hundred years ago, while nothing peculiar to those spots can be discovered beyond the admixture of large quantities of charcoal and clam-shells with the soil.

It would seem from the persistent effects' of charcoal, that it acts l>y catalysis, or mere presence; that is, not being consumed itself, but serving convey other molecules to the plants, and of effecting chemical changes. This force, though not fully understood, is one recognised in chemistry, and it undoubtedly plays its part in the soil, and probably in the functions of vegetable economy.

Date: April 8, 2012 5:39 PM
Topic: farmers magazine

http://books.google.com/books?id=B3_J7Cdj72EC&pg=PA154&dq=charcoal+fertilizer&hl=en&sa=X&ei=0SyCT7TNF-WTiQLZ5oCUAw&ved=0CHEQ6AEwBThQ#v=onepage&q=charcoal%20fertilizer&f=false

farmers magazine

By Joseph Rogerson

PEAT CHARCOAL THE BEST DEODORIZER.

In 1845 we brought before the public the facts which had come to our knowledge of the value of peat charcoal in its natural state as a fertilizer of the soil. It was then doubted, because Liebig and his followers had laid it down that all plants were indebted to the atmosphere for the carbon they contained—in fact, that inhalation gave to the general structure their mass of woody fibre, amounting, when converted into carbon, to from 40 to 50 per cent, of the whole. We doubted this assumption; and since, our doubts have been set at rest; for the Royal Agricultural Society offered a prize for an essay on the subject, and almost every farmer in the country now knows the value of charcoal as a manure, and that which was smiled at then, is not only admitted, but practised now.

We feel no small gratification in having been the first to draw general attention in England to this most valuable fact; and we feel the same as regards the extraordinary value of peat charcoal as a deodorizer—but not only a deodorizer, hut the producer of a manure, the value of which we believe there is scarcely any means of estimating.

In our columns of this day will be found a letter from Mr. Jasper Rogers, to which we beg particular attention. It is impossible to contemplate the facts set forth without feeling that a revolution may be worked in our agricultural community. If the result stated be effected on an extended scale

throughout the country, no oae can say what the advantage will be; and too much credit cannot be given to Mr. Rogers, to whose intellect, zeal, and unceasing efforts in the cause of science and humanity, we owe the discovery

and development of these invaluable facts.—Mark Lane Express.

TO THE EDITOR OF THE MARK LANE EXPRESS.

Sir,—In 1845, when I first brought forward the advantages of peat charcoal as a fertilizer, your most valuable publication led in urging the trials and proof by practice of what was then deemed to be a very doubtful theory, Liebig had declared that plants depended upon the atmosphere for the quantum of carbon they contained, and it was then the fashion to bow the head to his name and his doctrine; but, happily, fashions change, even in science. Now, every farmer in the kingdom manures with carbon to the utmost extent he can; and the rich and verdant green of the plant, even as it begins to peep above the surface, truly tells the fallacy of the "fact" that plants inhale through their leaves all the carbon, which supplies them with some 40 to 50 per cent, of their solid substance. To be the humble means of awaking public attention to so valuable a reality, and to see such happy results, is in itself a rich reward. Let me hope for a richer still, in now begging the trial and proof of the inestimable advantage of peat charcoal as a deodorizer of human excrelia; a means of instantaneously depriving that most noxious matter of all its noxiousness, and instantaneously taking up, absorbing, and holding its gases and other products ; all

combined possessing the highest capabilities known for the general fertilization of the soil. My anxious reseirches have been rewarded with perfect success. Feat charcoal, properly prepared and intermixed in sufficient proportion with human excreta;, converts the whole into i dry, perfectly inodorous mass, capable of being packed a sacks, and transported without the slightest annoyance, by any conveyance. The effect of the intermixture -• immediate, and the results of my discovery may, I believe, be thus summed up.

Human excreta:, now the cause of disease and death in cities, may be made the profitable producer of ^ealthfulness and life to the country at large. Its removal will no longer be an evil dreaded by all around; and it will become not only the source of wealth to the agriculturist, but of considerable profit to the citizen. When given to the land, the preparation contains every essential for fertilization. The combination is such, that its benefit cannot be over estimated—phosphates, sulphates, gluten, &c., and ammonia in great abundance, ire interwoven, it may be said, into every grain of charcoal. Carbon, the staff of vegetation, is filled with ill the other essentials for luxuriance, and yields the whole to the plant in the most beneficial form ;

while, in giving out its aqueous and other matter, it becomes ready to receive another charge. Every shower of rain yields > further supply of ammonia and salt; and every grain of charcoal thus becomes a reservoir,

not alone of manure, but of moisture. No limit, therefore, can be assigned to the benefit produceable by such a fertilizer.

Some time since I announced the leading particulars of these facts in your valuable columns, and I am now happy to add that the discovery has been thoroughly proved. It has been patented for the United Kingdom, and " The Irish Amelioration Society," who possess the whole right for the preparation of peat fuel and charcoal, &c., in Ireland, is making every preparation for the introduction into this country of prepared peat charcoal, which can be delivered at such cost as will permit its most economical use, throughout the whole country, for sanitary, agricultural, and other purposes. And when it is recollected that the employment of the miserable labourers of Ireland, in producing this most valuable commodity from the now waste and useless bog, will be the means of saving them from future famine,—perhaps death, and raise them now from discontent, recklessness and consequent crime—to independence and comfort, the combination of so many blessings to the country at large cannot fail to give pleasure and gratification to all who feel for Ireland's miseries, and who properly think of England's good.

I have the honour to be,

Your most obedient servant,

London, July 22. Jasper W. Rogers.

Date: April 8, 2012 5:46 PM
Topic: The Farmers' Register, 1841

http://books.google.com/books?id=4GytG01theQC&pg=PA467&dq=charcoal+fertilizer&hl=en&sa=X&ei=EC-CT4imBvTOiAKuiIDCAw&ved=0CGMQ6AEwAzha#v=onepage&q=charcoal%20fertilizer&f=false

The Farmers' Register, 1841

By Edmund Ruffin

"The ammonia absorbed by the clay or ferruginous oxides is separated by every shower of rain, and conveyed in solution to the soil.

* 100 sulphate of lime composed of 32.} lime, 46} sulphuric acid (dry) and 21 water. 100 carbonate of ammonia, 43} ammonia and 56} carbonic acid.

"Powdered charcoal possesses a similar action, but surpasses all other substances in the power which it possesses of condensing ammonia within its pores, particularly when it has been previously heated to redness. Charcoal absorbs 90 times its volume of ammoniacal gas, which may be again separated by simply moistening it with water (De Saussure.) De-' cayed wood approaches very nearly to charcoal in this power; decayed oak wood absorbs 72 times its volume, after having been completely dried under the air-pump. We have here an easy and satisfactory means of explaining still further the proprieties of /minus, or wood in a decaying state. It is not only a slow and constant source of carbonic acid, but it is also a means by which the necessary nitrogen is conveyed to plants."—(p. 146.)

It would seem to us, as a necessary deduction from the foregoing extract, that powdered charcoal oughi to be the richest fertilizer, and therefore best manure, that could be applied to soil, and rotien wood not much interior. Yet all farmers know that neither of these substances possess any thing like such value.

Date: April 8, 2012 5:48 PM
Topic: Facts and fallacies of the sewerage system of London, and other large towns

http://books.google.com/books?id=In8BAAAAQAAJ&pg=PR1&dq=charcoal+fertilizer&hl=en&sa=X&ei=EC-CT4imBvTOiAKuiIDCAw&ved=0CG4Q6AEwBTha#v=onepage&q=charcoal%20fertilizer&f=false

Facts and fallacies of the sewerage system of London, and other large towns

By Jasper W. Rogers

APPENDIX.

EXTRACTS FROM LECTURES ON THE PROPERTIES OE PEAT CHARCOAL, & ON SANITARY IMPROVEMENTS.

DELIVERED IN 1849 AND 1851, AT THE BOTANICAL SOCIETY

OP LONDON; KING'S COLLEGE, LONDON; THE SANITARY

ASSOCIATION J THE ROYAL DUBLIN SOCIETY; ETC. ETC.

BY JASPER W. ROGERS, ESQ., C.E.

Early in the year 1845,1 first brought the question of the value of the peat charcoal, as a fertilizer of the soil, under public consideration in a report then published, which I had previously made for the Relief Commissioners of Ireland.

My investigation of the question was induced by experiments made at the Botanical Gardens at Munich, in 1844, by wood charcoal applied there to aloes, pelargoniums, &c. Seeing the effect produced by wood chafcoal, it occurred to me, that if peat charcoal possessed a fertilizing power, a mine of wealth (to use an Irishism) lay upon the surface of my country. I tried my experiments, and one and all were successful. This fact, however, was then not only doubted, but actually laughed at by many, and I had the honour of being refused the gold medal offered by a public body in Ireland, for an essay

on the treatment of the potato disease (although offered a silver one, which I declined), because, as I have been informed, I had set forth, "that carbon given to the roots of Plants will invigorate them." This was then deemed a fallacy, but I am happy to say any one may now allege the same without being "laughed at." At that period, a popular chemist had set it down "that all plants depend upon the atmosphere for the carbon they contain," but the leading chemical writer of the present day says very differently. Brande states, in 6th edition, that "although the accumulation of decaying matter, which chemists term 'humus,' performs an important part in vegetable nutrition, it is not by its direct absorption and assimilation, but by its influence as a source of carbonic acid, which is partly taken up by the juices of the root, and partly evolved into the atmosphere; so that plants, independent of their leaves, can thus receive carbonic acid." Thus, Brande admits what I had promulgated, namely, that carbon, acted upon by the soil and atmosphere, yields carbonic acid to the plant—for peat charcoal performs the same part exactly as Humus. I then stated what I do now, that the fertilizing power of peat charcoal can scarcely be over-estimated. It acts upon all that the soil produces, I except nothing; and to use the words of Dr. Lindley, in reply to a correspondent (although the learned Doctor was at first a doubter), "Use it for your onions, but it is good for every plant."

At our last meeting, I proved to you that the amalgamation of peat charcoal and excretia produces an inoffensive mass, capable of being packed in bags and transported by any conveyance. I would now pray attention to what that compound contains. I do not hesitate to say it is richer in fertilizing powers than any manure that has been produced. The components of peat charcoal are—carbon, hydrogen, nitrogen, oxygen, oxyde of iron, phosphoric acid, silicate of potash, chloride of sodium, carbonate of lime, sulphate of lime, fyc. —possessing the power of absorbing, deodorizing, and retaining, for the uses of vegetation, the components of human excretia, which are—phosphate of ammonia, phosphate of lime, phosphate of magnesia, phosphate of soda, phosphate of iron, chloride of sodium and alkaline sulphate, sulphate of lime, sulphate of soda, sulphate of potassia, hydrochlorate of ammonia, lactate of ammonia, free lactic acid, urea, uric acid, animal matter, mucus, earthy phosphates, 8fc. It is impossible almost to conceive anything richer in the essentials of vegetation. In fact, it may he said there is nothing! And recollect, that whilst it originally contains all you have heard, peat charcoal has the extraordinary power of drawing to itself, so long as it rests in the land, all the ammonia, salts, &c, which every shower of rain brings down; still enriching itself more and more: and according as it gives out its store of nutrition to the plant, it becomes the vehicle to receive a new supply from the atmosphere. It

is, in fact, at all times, a reservoir of both manure and moisture combined. It will take up above 80 per cent, of water, and above 90 volumes of those volatile gases which are the food of plants. The intermixture may well be called Artificial Humus.

If rain continue until it can bear no more water, charcoal commences to act as a grain of sand, and aids filtration. When the soil subsequently becomes drier than itself, it then, and not before, yields its moisture to the soil or plant. Thus it is usually a reservoir of water, ready to irrigate its immediate locality. Assume that each grain be filled with water to the extent it will absorb, and that rain still falls; so strong is the affinity that it will absorb the gases and reject the water.

This can be readily proved by the following experiment:—Take a quantity of sewage containing the average gaseous components, and place it in a glass vase; put as many lumps of properly made peat charcoal into the vase as it will hold. Although the pores of the charcoal will almost immediately become filled with water, without any change taking place in the general appearance of the sewage matter; after a time (proportioned to the quantity), the charcoal will absorb the impurities of the water, and leave it transparent, although originally opaque.

Whilst ammonia, phosphate, &c, are yielded to the root of the plant, so is carbon in the shape of carbonic acid.

My experience led me to this conclusion, from the fact that plants which contain carbon in abundance appear to be specially benefited by the use of charcoal; and all subsequent experiments bear out this view. When placed in the soil, the action of the atmosphere and soil combined produces a slow combustion, aided or retarded by the greater or lesser amount of oxygen present. Carbonic acid is thus produced and evolved in contiguity to the root of the plant, and assimilated by it in the same manner as the ammoniacal and other gases, each of which, although known to be inhaled by the leaf, facts have shown are more beneficial when given to the root.

..... goes on and on.

Date: April 8, 2012 5:51 PM
Topic: The farmer's mine, or source of wealth: being a compilation, with the ...

http://books.google.com/books?id=71xJAAAAYAAJ&pg=PA129&dq=charcoal+fertilizer&hl=en&sa=X&ei=EC-CT4imBvTOiAKuiIDCAw&ved=0CHQQ6AEwBjha#v=onepage&q=charcoal%20fertilizer&f=false

The farmer's mine, or source of wealth: being a compilation, with the ...

By Henry Heermance, Joseph A. Smith, Anthony Benezet Allen

CHARCOAL AND SOOT.

Charcoal has of late attracted considerable attention as a fertilizer. We find the following interesting experiments and observations on the action of charcoal from wood on vegetation, by Edward Lucas, as an appendix to Liebig's Agricultural Chemistry.

"In a division of a low hothouse in the botanical garden at Munich, a bed was set apart for young tropical plants; but instead of being filled with tan, as is usually the case, it was filled with the powder of charcoal, (a material which could be easily procured), the large pieces of charcoal having been previously separated by means of a sieve. The heat was conducted by means of a tube of white iron into a hollow space in this bed, and distributed a gentle warmth, such as tan communicates when in a state of fermentation. The plants placed in this bed of charcoal quickly vegetated, and acquired a healthy appearance. Now, as is always the case in such beds, the roots of many of the plants penetrated through the holes in the bottoms of the pots, and then spread themselves out; but these plants evidently surpassed in vigor and general luxuriance plants grown in the common way—for example, in tan. Several of them, of which I shall only specify the beautiful Thuribergia data, and the genus Peireskice, throve quite astonishingly; the blossoms of the former were so rich, that all who saw it affirmed, they had never before seen such a

specimen. It produced also a number of seeds without any artificial aid, while, in most cases, it is necessary to apply the pollen by the hand. The Peireskice grew so vigorously, that the P. aadeata produced shoots several ells in length, and the P. grandifolia acquired leaves of a foot in length. These facts, as well as the quick germination of the seeds which had been scattered spontaneously, and the abundant appearance of young Filices, naturally attracted my attention, and I was gradually led to a series of experiments, the results of which may not be uninteresting; for, besides being of practical use in the cultivation of most plants, they demonstrate also several facts of importance to physiology. The first experiment which naturally suggested itself was, to mix a certain proportion of charcoal with the earth in which different plants grew, and to increase its quantity according as the advantage of the method was perceived. An addition of two-thirds charcoal, for example, to vegetable mould, appeared to answer excellently for the Gemeria and Gloxinia, and also for the tropical Jlroidece with tuberous roots. The first two soon excited the attention of connoisseurs, by the great beauty of all their parts and their general appearance. They surpassed very quickly those cultivated in the common way, both in the thickness of their stems and dark color of their leaves; their blossoms were beautiful, and their vegetation lasted much longer than usual, so much so, that, in the middle of November, when other plants of the same kinds were dead, these were quite fresh, and partly in bloom. Jlroidece took root very rapidly, and their leaves surpassed much in size the leaves of those not so treated; the species which are reared as ornamental plants, on account of the beautiful coloring of their leaves, (I mean such as the Caladium bicolor, Pictum, Pcecile, &c), were particularly remarked for the liveliness of their tints; and it happened here also, that the period of their vegetation was unusually long. A cactus, planted in a mixture of equal parts of charcoal and earth, throve progressively, and attained double its former size in the space of a few weeks. The use of the charcoal was very advanageous with several of the Bromeliacece and Liliaceee, with the Citrus and Begonia also, and even with the Palma. The same advantage was found in the case of almost

all those plants for which sand is used, in order to keep the earth porous, when charcoal was mixed with the soil instead of the sand; the vegetation was always rendered stronger and more vigorous.

"At the same time that these experiments were performed with mixtures of charcoal with different soils, the charcoal was also used free from any addition, and in this -case the best results were obtained. Cuts of plants from

different genera took root in it well and quickly; I mention here only the Euphorbia fastuosa andfulgens, which took root in ten days; Pandanus utilis in three months, P. Amaryllifolius, Chamtsdorea elatior in four weeks, Piper nigrum, Begonia, Ficus, Cecropia, Chiococca, Buddleya, Hakea, Phyllanthus, Capparis, Laurus, Stifftia, Jacquinia, Mimosa, Cactus, in from eight to ten days; and several others, amounting to forty species, including Ilex and many others. Leaves, and pieces of leaves, and even pedunculi, or petioles, took root and in part budded in pure charcoal. Among others we may mention the foliola of several of the Cycadea as having taken root, as also did parts of the leaves of the Begonia Telfairite and Jacaranda brasiliensis; leaves of the Euphorbia fastuosa, Oxalis Barrilieri, Ficus, Cyclamen, Polyanthes, Mesembryanthemum; also the delicate leaves of the Lophospermum and Martynia, pieces of a leaf of the Agave Americana; tufts of Pinus, &c; and all without the aid of a previously formed bud.

"Pure charcoal acts excellently as a means of curing unhealthy plants. A Dorianthes excelsa, for example, which had been drooping for three years, was rendered completely healthy in a very short time by this means. An orange tree, which had the very common disease, in which the leaves become yellow, acquired, within four weeks, its healthy green color, when the upper surface of the earth was removed from the pot in which it was contained, and a ring of charcoal, of an inch in thickness, strewed in its place around the periphery of the pot. The same was the case with the Gardenia.

"I should be led too far were I to state all the results

of the experiments which I have made with charcoal. The object of this paper is merely to show the general effect exercised by this substance on vegetation; but the reader who takes particular interest in the subject will find more extensive observations in the 'Jlllgemeine Deutsche Garten zeitung' of Otto and Dietrich, in Berlin; or Loudon's Gardener's Magazine for March, 1841.

"The charcoal employed in these experiments was the dust-like powder of charcoal from firs and pines, such as is used in the forges of blacksmiths, and may be easily procured in any quantity. It was found to have most effect when allowed to lie during the winter exposed to the action of the air. In order to ascertain the effects of different kinds of charcoal, experiments were also made upon that obtained from the hard woods and peat, and also upon animal charcoal, although I foresaw the probability that none of these would answer so well as that of pine-wood, both on account of its porosity and the

ease with which it is decomposed.*

"It is superfluous to remark, that in treating plants in the manner here described, they must be plentifully supplied with water, since the air having such free access penetrates and dries the roots, so that, unless this precaution is taken, the failure of all such experiments is unavoidable.

"The action of charcoal consists primarily in its preserving the parts of the plants with which it is in contact —whether they be roots, branches, leaves, or pieces of leaves—unchanged in their vital power for a long space of time, so that the plant obtains time to develope the organs which are necessary for its further support and propagation. There can scarcely be a doubt also that the charcoal undergoes decomposition; for after being used five to six years it becomes a coaly earth; and if this is the case, it must yield carbon, or carbonic oxide, abundantly to the plants growing in it, and thus afford the principal substance necessary for the nutrition of vegetables.* In what other manner indeed can we explain the deep green color and great luxuriance of the leaves and every part of the plants, which can be obtained in no other kind of soil, according to the opinion of men well qualified to judge 1 It exercises likewise a favorable influence by decomposing and absorbing the matters excreted by the roots, so as to keep the soil free from the putrefying substances which are often the cause of the death of the spongioid. Its porosity, as well as the power which it possesses of absorbing water with rapidity, and, after its saturation, of allowing all other water to sink through it, are causes also of its favorable effects. These experiments show what a close affinity the component parts of charcoal have to all plants, for every experiment was crowned with success, although plants belonging to a great many different families were subjected to trial." (Buchner's Repertorium, ii. Reihe, xix. Bd. S. 38.)

* M. Lueas has recently repeated these experiments, and found that the animal charcoal obtained by the calcination of bones possesses a decided advantage over all other kinds of charcoal, which he subjected to experiment. —Liebig'a Annalen, Band xxxix. Heft 1, S. 127.

r We make a further extract on this subject, from Vol. L of the American Agriculturist, by Dr. Raymond.

From an article on Dr. Liebig's Organic Chemistry applied to Agriculture, in the April number of the North American Review, it appears that the most valuable property of a soil, is that of absorbing and giving off those vapors

and gases that constitute so considerable a portion of the food of plants. Reflecting on this fact, it occurred to me, that charcoal might prove a most valuable manure; from its well known capacity of absorbing vapors, gases, and saline solutions, and under certain circumstances giving them out.

* As some misconception has arisen regarding this explanation of the action of charcoal upon vegetation, and an idea propagated that the introduction of these opinions into this work incorporated them with those of Liehig, it is necessary to state that they are merely inserted here as part of the papers of M. Lucas. The true explanation is, that charcoal possesses the power of absorbing carbonic acid and ammonia from the atmosphere, which serve for the nourishment of plants.—Ed.

The ladies make use of charcoal in their flower-pots, from an experience of these results. At this time I did not know of its being used on a large scale. I communicated the idea to Mr. Phineas Sargent, and he remarked he did not know that it had been used as a manure; but he had often observed the charcoal hearths were more productive than the surrounding land. I made further inquiries of Mr. A. B. Allen on the same point, and he had the kindness to furnish me Mr. J. H. Hepburn's valuable paper "Charcoal as a Manure," published in the Trans, of the Ag. Soc of N. Y.? p. 298, 1842. I was not a little gratified to find my speculations sustained by so accurate an observer.

As Mr. H. declined to enter into the chemical character of charcoal, I propose to supply that portion of the subject compiled from such writers as are within my reach.

From Ure's Dictionary of Chemistry, article Gas, we extract: "Of all solid bodies, charcoal is the most remarkable in its action on the gases. In M. De Saussure's experiment, the red hot charcoal was plunged under mercury, and introduced after it had become cool into the gas to be absorbed without ever coming into contact with the atmospherical air.

"One volume of charcoal made from boxwood

absorbed of ammonia, - -	90	volumes.
Muriatic acid gas, - - -	85	"
Sulphurous acid - - - -	55	"
Sulphuretted hydrogen, - -	55	"
Nitrous oxide, - - - -	40	"
Carbonic acid, - - - -	35	"
Olefiant, - - - - -	35	"
Carbonic oxide, - - - -	9·42	"
Oxygen, - - - - -	9·25	"
Nitrogen, - - - - -	7·5	"
Gas from moist charcoal, - -	5·0	"
Hydrogen, - - - -	1·75	"

"The absorption was not increased by allowing the charcoal to remain in contact with the gases after 24 hours, with the exception of oxygen, which goes on condensing for years in consequence of the slow formation and absorption of carbonic acid gas. If the charcoal be moistened, the absorption of all those gases that have not a strong affinity for water is diminished. Thus boxwood charcoal, cooled under mercury, and drenched in water, is capable of absorbing only fifteen volumes of carbonic acid gas; although before being moistened, it could absorb thirtyfive volumes of the same gas.

"Dry charcoal saturated with any gas, gives out, on immersion in water, a quantity corresponding to the diminution of its absorbing power. When a piece of charcoal which is saturated with either oxygen, hydrogen, nitrogen, or carbonic acid gas, is put into another gas, it allows a portion of the first to escape, in order to absorb into its pores a portion of the second gas."

Charcoal, when reduced to powder, will absorb but hal f the quantity of gas that it would when in the lump.

The advantage of this article over every other that has been used as a manure is, that what is not actually consumed or washed away, is retained on the soil, and will continue to absorb and give off the vapors, gases, and saline solutions for an unlimited period. It would therefore be an experiment worthy of trial by our western agriculturists, to make their wood into charcoal and spread it on the soil, rather than reduce it to ashes, which at most will last but

a few years. C. H. Raymond.

Buffalo, August 6th, 1842.

Soot is a valuable manure, peculiarly rich in humus as well as salts, and in its composition more nearly allied to > the solid substance of animals, than anything else. It contains of humus or geine 30-70, of nitrogen 20-, and of salts of lime 25-31 parts in 100. It also abounds in salts of soda, potash and ammonia. According to the analysis of Dr. Dana, 100 lbs. of soot contain as many of the valuable salts as a ton of cow dung, and its nitrogen, compared with that manure, is as 40 to 1. The ordinary farmer can make but little use of soot, as it is not to be had in the country in any considerable quantities; but those in the vicinity of cities may avail themselves of this manure with much profit. For the gardener or the floriculturist, soot is an excellent manure; but care must be taken not to use it too freely, as we have known tender garden plants at once destroyed by too liberal applications of it, particularly in a dry state. Mixed with water, in the proportion of six quarts of soot to one hogshead of water, it has been found a most efficacious liquid for watering plants, particularly those grown in green houses.

Date: April 8, 2012 5:53 PM
Topic: Gardening for the South: or, The kitchen and fruit garden: with the best ...

http://books.google.com/books?id=kIIMAAAAYAAJ&pg=PA35&dq=charcoal+fertilizer&hl=en&sa=X&ei=EC-CT4imBvTOiAKuiIDCAw&ved=0CIYBEOgBMAk4Wg#v=onepage&q=charcoal%20fertilizer&f=false

Gardening for the South: or, The kitchen and fruit garden: with the best ...

By William N. White

Charcoal and all carbonaceous matters have the power of absorbing carbonic acid gas in large quantities, supplying constantly to the roots of plants an atmosphere of carbonic acid, which is renewed as quickly as it is attracted. The same substances are especially valuable for their power of absorbing ammonia. Charcoal will absorb ninety times its volume of ammoniacal gas which can be separated by simply moistening it with water.

.....Gypsum enters into the composition of many crops, but a very small quantity will suffice. One bushel per acre yearly is all that is needed. In absorbing ammonia from the manure heap, charcoal dust and leaf mould are much cheaper.

Marl where it can be obtained may be applied with advantage especially to sandy soils. It is generally beneficial in proportion to the quantity of lime it contains.

Soot is rich in ammonia; very little of this can be procured, but it should be carefully preserved and applied in small quantities to cabbage and other plants infested with insects. It drives these off and its ammonia also promotes the growth of the plants.

Among the vegetable matters which may add to the stock of manures for the garden, the very best is cotton seed where it can be obtained. If the husk were removed and the remainder reduced to an equally dried state, it would scarcely be inferior in strength to guano itself. It may be applied with

advantage to any crop.

Charcoal renders the soil light and friable, gives it a dark color and additional warmth for early crops. The bed whereon charcoal has been burnt is always marked by a more vigorous growth of plants when it becomes sufficiently mixed with earth. It contains also small quantities of silicate of potash and other fertilizing salts.

It absorbs both carbonic acid and ammonia from the air, and yields them to the roots of plants. It is most marked in its effects on plants which require abundant nitrogen. As it is indestructible, its beneficial effects last as long as it remains in the soil, supplying the spongioles or rootlets of plants with an atmosphere of carbonic acid which is renewed as fast as abstracted. Its good effects begin to be seen when the dust is applied at the rate of forty bushels per acre. Charcoal is invaluable for destroying the odor of decaying animal matter, retaining all the gases in its own substance ready to yield them up for the use of plants. Hence, the best application of this substance is not directly to the soil, but to compost it with putrescent animal matters, urine or night soil, of which it will absorb all the odor and fertilizing gases given off during their decomposition. Composted with the last named substance, it becomes poudrette, and is second only to guano as a fertilizer.

In striking cuttings or potting plants, charcoal is a valuable substitute for sand, plants rooting in with greater certainty. Fine charcoal can be obtained in considerable quantities from the old hearths where it has been buried, also the refuse of smith's shops, founderies, and machine shops. All the refuse of the garden that will not decay, pea-brush, trimmings of trees, cabbage and corn stalks, together with tanbark, saw-dust, fresh shavings may be collected, the coarser materials placed at the bottom and set on fire when the heap is building, then covered with the finer, beating all well together, cover it well with short moist,rubbish weeds and clods. Bermuda grass turf is the best material for this purpose if you are troubled with it. Thrust a stake in different places that the fire may run through the entire heap, and if it breaks out in any of these, stop them with rubbish or earth and make holes in a new place. When finished and the fire put out, store it up for use. The roasted turf as well as the charcoal is a most valuable manure, especially for roses.

Beside charcoal, there are many other vegetable substances of great value, as absorbents of the fertilizing salts and gases that would otherwise escape from animal manures.....

Date: April 8, 2012 5:58 PM
Topic: The young farmer's manual: detailing the manipulations of the farm ..., Volume 2
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The young farmer's manual: detailing the manipulations of the farm ..., Volume 2

By Sereno Edwards Todd

VALUE AND USB OF CHARCOAL.

"TOO. The virtue of charcoal mainly consists in its absorbing power. The purity of the air around a charcoal pit has long been, known; and the colliers notwithstanding their smutty appearance, are robust men. The secret of this purity of the air and the health of the colliers lies in the fact that charcoal absorbs from the air the ammonia and other noxious gases unsuited for our lungs, but just the food for plants. Every good housekeeper knows that if her boiling meat gives forth an unsavory odor, a piece of fresh charcoal put into the pot will not only sweeten the air, but will remedy the taint of the meat. In the same manner it acts when applied to the land. It absorbs from the air those gases offensive to our nostrils, but the main food of plants. Where an old coal-pit has been burned, the land never seems to wear out ; and the first settlers point to the coal bottoms that arc fifty years old, still by their exuberant vegetation marking well the spot where the wood was converted into coal. A fertilizer so lasting is well worth some expense at the outset. But where can we get it, some may ask. If any charcoal pits are burned in your vicinity, the bottoms will furnish three or four loads of refuse charcoal mingled with burnt soil. The latter is highly valued also as an absorbent. Around furnaces and blacksmith shops the waste charcoal also accumulates, and in many instances may be had for the carting. It may be found also around engine houses, thrown out from locomotives. If none of these resources are at hand, then use the best substitute possible, which is muck or swamp mud ; and double the manure heap by composting; and if the crops are not doubled, then my experiencs is vain.

701. A correspondent writes: "For two years past I have used some fifty loads each season of refuse charcoal, and being fully convinced that it pays, I wish to recommend it to my brother farmers. I have tried it on grass, corn and potatoes—have tried it alone, and in the compost heap, and in all situations it has proved faithful to its trust. As a top-dressing for grass, it gives a green color and luxuriant growth. Applied to half an acre of early potatoes the last summer, the yield was seventy-five bushcla of as fine healthy potatoes as could be desired, that sold readily for one dollar per bushel, ancd yielded the best profit of anything raised on the farm."

702. Finely pulverized charcoal is an excellent fertilizer for grass, grain, vegetables and fruit trees. If it is coarse, it will pay to run it through a corn mill, to reduce it as fine as possible. Let it be sowed or spread on land, the more abundant the better. Charcoal dust ought not to be mixed with manure, in the hog-pen, in the privy or anywhere. If the substance be mixed first with charcoal, and then covered with soil or muck, little loss will take place, and the coal will be a real benefit. Mechanically and chemically, charcoal is often of great benefit to the soil.

Date: April 8, 2012 6:00 PM
Topic: Agriculture of New-York: comprising an account of the classification ...

http://books.google.com/books?id=JTrnAAAAMAAJ&pg=PA260&dq=charcoal+fertilizer&hl=en&sa=X&ei=FDSCT4bSE-PXiQKAyfX9Ag&ved=0CFYQ6AEwAThu#v=onepage&q=charcoal%20fertilizer&f=false

Agriculture of New-York: comprising an account of the classification ...

By Ebenezer Emmons

Peat ashes and soot possess valuable properties: they contain more potash and phosphates than anthracite coal ashes; indeed, abating the quantity of earth which is necessarily intermixed with peat ashes, I can see no reason why they should not be nearly equal in value to wood ashes, inasmuch as they are derived from vegetable matter. In some parts of New-York, particularly in that tract of country extending from Rome to Syracuse, peat ash' :.; 0ht be manufactured expressly for fertilization. Heaps of peat might be made, and, after drj ing, burned upon the field, and their ashes spread. The whole operation would be attended with liHV xpense. Ash obtained in this mode will be intermixed with much charcoal, or peat iuaj.ci.iei.Jy consumed, which, in itself, will become valuable in promoting a rank vegetation. Allied both to charcoal and ashes, is soot: it is esteemed as a valuable fertilizer abroad. Imperfectly burned wood or coal rises in vapor and smoke, from the burning substance, which is deposited in the flues and chimneys. Soot is quite as complex in its composition as ashes; indeed it is probably more variable, and we find one element which is not present in ash, namely, ammonia. Phosphates and sulphates, together with carbonates, of lime, soda, potash, iron and magnesia, are the principal constituents. Soot will be applied in a diluted state, as a top dressing, and may be uyed to the extent of thirty or forty bushels to the acre: very few instances, however, are known of its use, in this country, on so large a scale.

Date: April 8, 2012 6:04 PM
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http://books.google.com/books?id=RZYZAAAAYAAJ&pg=PA50&dq=charcoal+fertilizer&hl=en&sa=X&ei=qjSCT5ydCofniALm9tmTAw&ved=0CF4Q6AEwAjh4#v=onepage&q=charcoal%20fertilizer&f=false

Collection of nineteenth century pamphlets relating to various economic ...

Charcoal of peat has been found by analysis to possess almost identical qualities with wood charcoal: prepared as it hitherto has been, however, it is more friable, and therefore more fitted for many purposes —such as the working of iron, manufacture of gunpowder, &c, &c, and also as a Fertilizer—the great value of which is not known in this country, and which I shall more fully describe under that head: but peat charcoal is quite capable of being prepared, by proper care, so as to obtain a density little, if at all inferior, to wood charcoal.

Peat Coke As A Fertilizer.

It may be well to say, that I was first attracted to the action of charcoal on vegetation, by an interesting paper which I heard read a few years since, at the Royal Victoria Gallery, in Manchester, detailing the particulars of the experiments which had been carried on at the Botanical Gardens of Munich, and pointing out the beneficial effect of carbon upon many varieties of plants.

The idea then struck me, that both the soil and peat of this country made them peculiarly applicable to aid each other, and a variety of experiments which I have since made, have fully proved the advantage of charcoal, or carbon as a fertilizer. The following extracts from the paper I allude to, forcibly impressed themselves on me at the time :—

" The first experiment which naturally suggested itself, was to have a certain portion of charcoal mixed with the earth in which different plants grew, and to

increase its quantity according as the advantage of the method was perceived. An addition of the two thirds of charcoal, for example, to vegetable mould, appeared to answer excellently for the gesnera and gloxinea, and also for the tropical aroidae, with tuberous roots: the two first soon attracted the attention of connoisseurs by the great beauty of all their parts, and their general appearance. They surpassed, very quickly, those cultivated in the common way, both in thickness of their stems and dark colour of their leaves: their blossoms were beautiful, and their vegetation lasted much longer than usual, so much so, that in the middle of November, when other plants of the same kind were dead, those were quite fresh and partly in blossom. Aroideae took root very rapidly, and their leaves surpassed, much in size, the leaves of those not so treated.

"A cactus, planted in a mixture of charcoal and earth, throve prodigiously, and attained double its size in a few weeks.

"At the same time that those experiments were performed with a mixture of charcoal and earth, charcoal was also used, free from any addition, and in every case the best results were obtained. Cuts of plants from different genera, took root in it well and generally. Pure charcoal acts excellently as a means of curing unhealthy plants ; a doryanthus excelsa, for example, which had been drooping for three years, was rendered completely healthy in a very short time by this means; an orange tree, which had a very common disease, in which the leaves became yellow, acquired within a few weeks a healthy green colour, when the upper surface of the earth was removed from the pot in which it was contained, and a ring of charcoal, of an inch in thickness, strewed in its place, round the periphery of the pot."

It is almost unnecessary to say, that one of the main constituents of vegetation is carbon, and in proportion to its proper supply to the culture of all plants, either by the atmosphere, or otherwise, depends the luxuriance and vigour of their growth. It cannot be requisite to enter into minute detail to prove a fact so well known; but it is desirable to point out, that the quantity of carbon used in manure is by no means commensurate with the quantum found to exist in the plant grown from it—hence, it is evident, that the luxuriance of the plant principally depends upon the quantity of carbon, drawn partly from the soil, but principally from the atmosphere:—which at once accounts for the greater or lesser vigour in vegetation, according to the nature of the season—in other words, the greater or lesser amount of carbon afloat in the atmosphere—and, therefore, agriculture is now left mainly dependent upon what cannot be controlled; but for which a remedy may with

ease be applied.

Sir Robert Kane gives, in his " Industrial Resources of Ireland," the following highly valuable table, shewing the amount of carbon in each plant, which he names, viz:—

Wheat Carbon, 46-1 per cent.

Wheat Straw do. 48-4 do.

Oat do. 50-7 do.

Oat Straw do. 50-1 do.

Potatoes do. 44-0 do.

Turnips do. 429 do.

Ked Clover Hay do. 47-4 do.

This, in itself, is sufficient to prove the indispensability of supplying carbon to vegetation, otherwise than by the atmosphere; and the experiments at Munich, incontestably decide the value of charcoal, as a fertilizer, of the highest order. My own, made under many different circumstances, have proved that the tenderest plants will vegetate and luxuriate abundantly in pulverized charcoal, unmixed with earth, or any other substance ; and I have found that even the most moderate quantity produces highly desirable effects ; but, in addition, it possesses a singularly beneficial property, quite foreign to other manures. It is believed that in the growth of all plants, a putrescent matter is yielded from the root, which if not absorbed either by filtration or evaporation, or removed by working up the earth around, produces evils of much magnitude ; which may be well compared to that arising to human life, by the retention around it, of those excretions of the pores, &c, which nature has ordained.

This is entirely corrected by the presence of charcoal. The putrescent matter is at once absorbed, and decomposed ; and the plant, not alone relieved from the evil, but it gets back nutrition in the shape of carbonic oxide. It need scarcely be said, that so admirable a property, stamps at once its value and identity, as a wise and bountiful provision of nature; which, like many others, we neglect and are ungrateful for.

To this climate and soil its advantages are particularly adapted. In a

pulverized state it acts, in the first instance, as sand, thus making the soil desirably porous. During rain it absorbs a certain amount, quickly; and then, resisting all further saturation, aids in filtration of the water downwards, or in evaporation, when rain ceases; invariably retaining in itself its full quantum of moisture, until the superabundance around ceases, when it not alone gives out that moisture, but with it yields a portion of its earbon ; and this action is unceasing until entire decomposition takes place, which is equal and gradual; usually not before four to five years.

Thus, it is not alone a most lasting manure, but one by which the utmost ignorance cannot suffer. Even the greatest proportion will not do evil, while the smallest will do good—and were it not that equal blessings have lain dormant for centuries, at our doors, it might be doubted that one so great could have been so long unknown. It is known, however, that the principal value of farm-yard manure lies in its straw, because of the quantity of carbon which it contains—yet this straw is given back to the land, at a certain loss to the farmer, while carbon, pure and in its fittest form, lies within reach unused. To florists in England, the value of charcoal is not a secret; but not alone its price, but the impossibility of obtaining it, has prevented its introduction there amongst agriculturists. Here again, is an opportunity afforded for most profitable and extended export, which the farming classes there will gladly embrace; and that it is the interest of Ireland to yield the produce of her soil to so good a market, it would be idle to enlarge upon— suffice it to say, that every additional pound, which labour draws back to this country, is a step towards her contentment—- every guinea her people earn and retain, an earnest of their future happiness.

Having now, as I hope, proved the value of Peat, as a fuel and a fertilizer, I would desire to shew what we suffer in our monetary system by not using the advantages which nature has given us.

Date: April 8, 2012 6:08 PM
Topic: Ohio Cultivator vol. 3 No. 1 Columbus, Ohio, January 1, 1847

http://books.google.com/books?id=7HEr8tU414YC&pg=PA55&dq=charcoal+fertilizer&hl=en&sa=X&ei=qjSCT5ydCofniALm9tmTAw&ved=0CG0Q6AEwBTh4#v=onepage&q=charcoal%20fertilizer&f=false

Ohio Cultivator vol. 3 No. 1 Columbus, Ohio, January 1, 1847

Charcoal as a Fertilizer.

Mr. Bateham:—Sometime since there was an enquiry in your paper, respecting the use of charcoal as a fertilizer. I have one word to offer on the subject, which is this: some 15 or 20 years since, while owned by another individual, there was much coal burned on my farm while iu the act of clearing the land. The land siuce that time has undergone much tilling, with little or no manure and not much rest until lately; and notwithstanding the time that has elapsed, the places where the coal pits were burned, produce the best of crops of every kind whenever the fields in which they are found are tilled. I am so much pleased with it that 1 wish my farm was covered I 3 or 4 inches thick with pulverized charcoal. I think the benefits of it could never be exhausted. Respectfully,

Hiram Gard.

Date: April 8, 2012 6:09 PM
Topic: Transactions of the Massachusetts Horticultural Society

http://books.google.com/books?id=8jgCAAAAYAAJ&pg=PA136&dq=charcoal+fertilizer&hl=en&sa=X&ei=qjSCT5ydCofniALm9tmTAw&ved=0CH4Q6AEwCDh4#v=onepage&q=charcoal%20fertilizer&f=false

Transactions of cthe Massachusetts Horticultural Society

By Massachusetts Horticultural Society

Mineral Constituents In Plant Growth.

Hon. Marshall P. Wilder said that at the last meeting a gentleman spoke of carbon derived from charcoal, decomposed or dissolved in water, as a great fertilizer, and advised its use. The speaker believed this view to be wholly erroneous, and wished to correct it, lest a wrong impression should go abroad, and those who look to these discussions for information should be led into error. Charcoal is not a fertilizer. It is not easily decomposed, but nearly indestructible, and wholly insoluble in water. It is a disinfectant and deodorizer, absorbing many times its bulk of ammoniacal gas. It acts as a storehouse of ammonia and moisture, giving them out as needed by plants. Its mechanical action is to lighten the soil, and it is therefore beneficial on heavy soils, like that of the speaker. It also tends to purify it and keep it sweet. If there is any principle established in the chemistry of vegetable growth, it is that plants take their carbon from the air by their leaves, and not from the earth.

Date: April 8, 2012 6:16 PM
Topic: Journal: Appendix. Reports, Volume 6

http://books.google.com/books?id=49JDwIj72_QC&pg=RA6-PA370&dq=charcoal+fertilizer&hl=en&sa=X&ei=jjWCT-CdCqfViALthvn_BQ&ved=0CG0Q6AEwBTiCAQ#v=onepage&q=charcoal%20fertilizer&f=false

Journal: Appendix. Reports, Volume 6

By California. Legislature

I sowed, on May sixteenth, six seed grains which had been steeped twenty-four hours in urine, and then coated with charcoal dust; and the same number similarly steeped, but not dried with charcoal dust. Prom the former, on May twenty-first, nine plants had come up; on the twenty-second, thirteen; and, on the twenty-third, two more, making fifteen in all. From the latter there were, on the twenty-first, five plants; on the twenty-second, eight; on the twenty-third, thirteen. It thence follows that the seed kernels treated with charcoal dust produced more and stronger plants than without. That fifteen plants should be produced from six kernels (planted one fourth inch deep) is in consequence of the size of the capsules. A large seed capsule may produce five plants; only a single plant sprouts from a very small one.

That manuring the seed by means of steeping effects a decidedly quicker and stronger growth of the young; plant in the first fourteen days is certain, and easily to be proved by experiments. The advantage thus gained is not inconsiderable. The young plant quickly outgrows dangers from insects, and, at the very beginning, lays a sure foundation for its subsequent growth, since its organs for absorbing nutriment develop earlier and stronger. Its infancy is the critical period; if the young beet plant once passes that, the battle is half won. The most advantageous method in practice is, therefore, to steep the seed one or two days in manure water; then to keep them moistened for two or three days in thin layers, four inches deep, in bags for instance, so that an aggregate temperature of 50° E., by exposure for five days at a temperature of 10°, or four days at a temperature of 12°, may be attained without heating. How important such ti'eatment is for effecting the quick as well as certain germination of the seed, is proved by a comparative trial which I made in

eighteen hundred and sixty, in which I planted, on the twelfth of April, seeds which were unprepared, and on the eighteenth seeds treated according to the above directions, otherwise under precisely the same conditions, side by side, in the field. The unprepared seed came up May second; the prepared seed as soon as April twenty-sixth. There were thus twelve days gained for the growth of the plant by this treatment of the seed. If rainy weather should prevent sowing, the prepared seed may be kept without injury as long as desired in cold water (cooled with ice). The practical inconveniences are, therefore, not insurmountable.

Especial care is to be taken that the seeds, after having been steeped and while lying in small heaps, do not become heated, since this elevation of temperature would impair its vitality. Instead of steeping, it'8 frequently preferred to spread the seeds in thin layers, and to sprinkle or water them, in order to induce a more gradual, natural effect on the embryo. In this case, also, the temperature must not rise too big"

The sprinkling may then be frequently repeated or continued during several days.

Whichever of those methods the manufacturer prefers, at all events the long continued practice of many other countries sets the example of, a similar preparation of the seed. Humboldt, for instance (Travels in Equatorial liegions, vol. 2, p. 234), states "that in America they leave the seeds of the coffee tree, or the bean with part of the pulp still adhering, to germinate in heaps between banana leaves for a space of five days, and do not plant the seeds until germinated. Plants reared in this way will stand the heat of the sun better than those grown by planting in the ordinary way."

The pulp, the berry, and the banana leaves are here evidently to be considered as a source of fertilizing material, which, under this treatment, promotes a more vigorous growth. The seeds of the Chinese sugar cane {sorghum saccharatum j are also steeped twenty-four hours in water to advantage before planting. (Navara, Travels Around the World).

It would seem, then, that more importance should be assigned to seed manuring than has been, commonly, hitherto. Seed manuring supplies directly to the young plant the nutritive substances which it requires for its vigorous development, at the time it is just beginning to grow and while its organs are yet unfit to seek its nutriment over a wide range of soil. The vigorous development of the plant while young is, moreover, a sure guaranty of its full

perfection and ripening, and it is for this reason I specially refer to it. An experiment which I made, of covering with charcoal powder seeds that had been steeped in manure water, gave very surprising results. It is known that charcoal has the property of accumulating a large quantity of ammonia in its pores, and . can thus furnish an abundant supply of nutriment to young plants. It is possible, however, that other substances may prove still better; and it remains a task for the agricultural experimental stations to determine which is the best fertilizer for this purpose, and to publish the result. In order to cause a larger quantity of fertilizing material to adhere to the seeds, there might be a kind of fluid mucilage made from potatoes, the seed kernels sprinkled with it, and then shoveled over with fertilizing substances. At all events, the idea of seed manuring, as applied to beet seeds, seems to me not yet to have been sufficiently tested, and these observations are designed to call attention to it.

Date: April 8, 2012 6:17 PM
Topic: Agriculture: twelve lectures on agricultural topics: delivered before the ...

http://books.google.com/books?id=6k7TAAAAMAAJ&pg=PA88&dq=charcoal+fertilizer&hl=en&sa=X&ei=jjWCT-CdCqfViALthvn_BQ&ved=0CHMQ6AEwBjiCAQ#v=onepage&q=charcoal%20fertilizer&f=false

Agriculture: twelve lectures on agricultural topics: delivered before the ...

By Alexander Hyde

88 CHARCOAL A3 A FERTILIZER.

The organic matter in soils is not wholly of vegetable origin. The myriads of living animals that walk on the earth, or fly in the air, were originally made of dust, and to dust they must return. Like plants, animals as they decay on the surface of earth leave little trace of their organic constituents; still the soil is a great absorbent of ammoniacal and other gases, and although they may mostly pass into the air when the animal decays unsurrounded by an absorbent, still every rain brings them back to the earth, and we are inclined to think the fertility of a soil is more dependent upon its capacity to absorb these gases than is generally supposed. Charcoal, and indeed all carbonaceous substances, are great absorbents. Charcoal will absorb ninety-five times its own bulk of ammonia, fifty-five of sulphureted hydrogen and nine of oxygen.

We have all noticed that where a charcoal pit has been burned the soil remains good for a long time. On the mountains of Berkshire we have seen white clover growing luxuriantly on the bed of an old charcoal pit, making an oasis in the desert of ferns and briars that surrounded it, and on inquiry we found that the coal pit must have been burned half a century ago. On digging into this soil we discovered the charcoal with little if any appearance of decay, and promising to do good service for half a century more. Dry muck is mostly

composed of carbon, and much of its virtue must consist in its power of absorption. A dead animal, covered with a foot or two of muck, does not pollute the air with the gases generated in its decay. All soils have their power of absorption to a greater or less extent, and on this principle the modern earth closets are constructed.

A friable clay loam, containing from 10 to 20 per cent.

Date: April 8, 2012 6:56 PM
Topic: American journal of agriculture and science, Volumes 5-6

http://books.google.com/books?id=UbcEAAAAYAAJ&pg=RA1-PA204&dq=charcoal+fertilizer&hl=en&sa=X&ei=XDiCT_HiJoifiQKyzomkAw&ved=0CGAQ6AEwAjiMAQ#v=onepage&q=charcoal%20fertilizer&f=false

American journal of agriculture and science, Volumes 5-6

PEAT CHARCOAL.

The use of charcoal as a fertilizer is generally well known. Its expense, however, often precludes its use. To cut down a forest for the sake of the charcoal it would furnish for agriculture would undoubtedly be bad policy. As a substitute, however, for the ordinary wood charcoal, it is certainly important for many to know, that peat charcoal will prove an excellent substitute. In some respects it may be regarded as a superior article to wood charcoal, inasmuch as it will be obtained in a state of fine subdivision, and consequently in a state to operate to the best advantage. In the state of New York peat is a most abundant product. In Champlain, Clinton county, a peat swamp exists, which extends between one and two miles in length, and half a mile in breadth; besides many in other parts of the county which occupy less extent. In Warren, in Warrensburgh, a peat swamp is known of about fifty acres, the middle portion of which is sixty feet deep. So, in most of the towns upon the Hudson river peat is an abundant product, though rarely in extensive deposits. In the western counties it is still more abundant, and is accompanied with marl. The great level extending west from Rome, contains an inexhaustible supply of this substance, and which in process of time must become of vast importance to the state. Those who have access to the geological reports will be able to learn where avast amount of peat is deposited; and yet New York is not a cold and wet part of the Union. Many of the depressions upon higher parts of the state are small basins of peat and marl.

The peat is cut from its bed by a spade, in rectangular pieces of a convenient size, and which when dry will shrink to the size of a brick. It is necessary that these pieces should be dried by exposure to the sun and winds for four or five days. When dried sufficiently to ignite, they may be arranged in conical heaps, or in the form of an ordinary coal-pit. At the bottom a parcel of wood must be

laid, which when ignited will set fire to the mass.

It is scarcely necessary to add, that the fire must always be smothered, and never suffered to break through the outside. To the first mass, when it has ignited, more peat may be added from time to time, when the fire will continue to extend outwards. A precaution which it may be well to observe is, to lay the pits where water is accessible, in case the fire is likely to obtain the mastery.

Peat coal may be considered about one half as valuable as wood coal, or $2.50 per hundred bushels, or sixty to sixty-five cents per cubic yard. Every farmer, however, must be his own judge of the price he can afford to pay for fertilizers belonging to this class. When, however, it is once known that charcoal is probably one of the best fertilizers for potatoes, and bids fair to counteract the potatoe malady to a certain extent, it appears rational to maintain that it will be a good investment to purchase peat coal at the rate of twenty-five dollars per thousand bushels. The subject especially commends itself to the attention of those who have peat beds upon their estates. Its home profit will pay a heavy interest upon the outlay of labor and capital.

Peat coal being more porous than common charcoal, will exert a greater influence upon the soil. It may be regarded as an absorber of ammonia and water, and undergoing a slow combustion it will furnish before it is consumed, a vast amount of carbonic acid. Most persons are perfectly familiar with the effects of charcoal upon vegetation. The great desideratum is how to obtain it in quantities, and at a rate to make it an object in husbandry. Surely no one can afford to buy coal, not because there is so much expense in making it, but on account of the value of the materials of which it is formed. Peat however, is a material lying in a waste, useless as it is, and in order to make it valuable, it is only necessary to raise from its half submerged condition, and char it Or it may be used as a fuel quite economically, and then its ashes are valuable fertilizers also. In this operation no timber is sacrificed, no groves of fine trees are desti oyed. We reclaim however, an unhealthy marsh, and bring into cultivation, a new field which has laid barren and useless. More considerations than one recommend peat charcoal to the consideration of farmers throughout the Union.

Date: April 8, 2012 7:10 PM
Topic: Annual report

http://books.google.com/books?id=LhY2AQAAIAAJ&pg=PA36&dq=charcoal+fertilizer&hl=en&sa=X&ei=XDiCT_HiJoifiQKyzomkAw&ved=0CHYQ6AEwBjiMAQ#v=onepage&q=charcoal%20fertilizer&f=false

Annual report

By North Carolina Agricultural Experiment Station

Do not patronize the peddlers who travel through the country selling farm rights to make manures by their formulas. They are usually very ignorant men, and their formulas are either entirely worthless or possess no novelty at all to entitle them to be sold. The fact that the formula has been patented at Washington, is no guarantee at all that it is worth anything. We have seen the most ridiculous and worthless things which had been patented. Last year we investigated a ease and found, on inquiry at Washington, that the government had given a man a patent on a method of making a "complete fertilizer," the whole of which was to cover a large heap of pine-needles partly with earth, and then set fire to the pine-needles and burn them, as charcoal is burned. When they had burned all they would, you were told to mix the earth and charred mass together, which was your fertilizer. It cost you S5 to learn this. A few of the formulas produce good mixtures or composts, but there is no need for anybody to pay for what is well known and can be had for nothing by applying to us.

Date: April 8, 2012 7:12 PM
Topic: The Scottish Gardener: vol 2

http://books.google.com/books?id=HN9IAAAAYAAJ&pg=PA320&dq=charcoal+fertilizer&hl=en&sa=X&ei=XDiCT_HiJoifiQKyzomkAw&ved=0CFUQ6AEwADiMAQ#v=onepage&q=charcoal%20fertilizer&f=false

The Scottish gardener: a magazine of horticulture and floriculture, Volume 2

London Sewage Manure.—One ton of charcoal will depdorize and make perfectly pure one hundred tons of the filthy sewage of London, and nobody could discover the slightest taste in the water thus purified. But the ton of charcoal increases to nearly double the weight, even when dried, and it is perfectly void of smell, resembles coarse gunpowder, yet must retain all the fertilizmg properties of the nauseous mass which has been filtered through it. Charcoal is a capital fertilizer of itself, but when saturated with the strongest fertilizer we have, becomes the finest and most lasting dressing that we can put on the ground. We might add, it is the most economical, for it is only three pounds per ton, and while we have noticed the effect on many different productions, we bave[seen enough to convince us that it tells belter the second year than the first.— Glenny.

Date: April 8, 2012 7:16 PM
Topic: Commercial relations of the United States with foreign countries

http://books.google.com/books?id=lB9JAQAAIAAJ&pg=PA133&dq=charcoal+fertilizer&hl=en&sa=X&ei=0USCT4SoA-esiQKL3-TyAQ&ved=0CHgQ6AEwBziWAQ#v=onepage&q=charcoal%20fertilizer&f=false

Commercial relations of the United States with foreign countries

By United States. Dept. of State, United States. Bureau of Foreign Commerce

• The first day of our.trip, we saw the farmers engaged in burning stocks of millet, &c., in heaps of earth, as it is done in the manufacture of charcoal, in order, we supposed, to bring out their fertilizing properties. It a very likely then, that, in China, they have known the value of charcoal as a fertilizer long before us, It's use for that purpose being among us of a recent date.

Date: April 8, 2012 7:18 PM
Topic: Vick's monthly magazine, Volume 13

http://books.google.com/books?id=eEBJAAAAMAAJ&pg=PA116&dq=charcoal+fertilizer&hl=en&sa=X&ei=0USCT4SoA-esiQKL3-TyAQ&ved=0CFEQ6AEwADiWAQ#v=onepage&q=charcoal%20fertilizer&f=false

Vick's monthly magazine, Volume 13

The soil in which they are to be potted is best made up of turfy loam as foundation, with modicums of sand, leafmold, charcoal and fertilizer from cow-stalls to make it light and rich. The pots must also be well drained, as none of the Cacti will endure even an approach to sour soil. Phyllocacti are splendid window or conservatory plants....

Date: April 8, 2012 7:19 PM
Topic: Vick's magazine, Volume 9

http://books.google.com/books?id=8pkEAAAAYAAJ&pg=PA13&dq=charcoal+fertilizer&hl=en&sa=X&ei=0USCT4SoA-esiQKL3-TyAQ&ved=0CFYQ6AEwATiWAQ#v=onepage&q=charcoal%20fertilizer&f=false

Vick's magazine, Volume 9

In August, I repot into four-inch pots, putting charcoal into the bottom of the pot for drainage, and as a fertilizer; then I let the blossom buds grow,.....

Date: April 8, 2012 7:23 PM
Topic: The Gardener's monthly and horticultural advertiser, Volume 9

http://books.google.com/books?id=mVNNAAAAYAAJ&pg=PA134&dq=charcoal+fertilizer&hl=en&sa=X&ei=YEaCT_3FGoqmiQLJ6dn6Ag&ved=0CHwQ6AEwCDigAQ#v=onepage&q=charcoal%20fertilizer&f=false

The Gardener's monthly and horticultural advertiser, Volume 9

Refuse Charcoal.—The refuse charcoal, obtained from the rectifiers of spirits, from the Railroads where wood is burned in locomotives, from old charcoal beds, &c., is a very useful material in the garden. As a mulching about fruit trees I consider it very valuable. It keeps out frost in winter: it keeps the soil loose and moist in summer, and it does not afford a harbor for mice or insects. In the soil, it assists to promote moisture in a dry season; and by its slow decay (for it does decay more rapidly than is generally supposed) it yields carbonic acid gas to plants, and greatly assists in the decomposition of vegetable and mineral matter. It is an excellent mulching for Strawberries, in winter or summer.

Date: April 8, 2012 7:28 PM
Topic: The farmer's friend: a record of recent discoveries, improvements, and ...

http://books.google.com/books?id=dh9EAAAAYAAJ&pg=PA199&dq=charcoal+fertilizer&hl=en&sa=X&ei=oEeCT728OOiyiQKjwJWVAw&ved=0CHAQ6AEwBTiqAQ#v=onepage&q=charcoal%20fertilizer&f=false

The farmer's friend: a record of recent discoveries, improvements, and ...

By National Art Library (Great Britain). Forster Collection

Art. XLV.—ON THE USE OF CHARCOAL AS A FERTILIZER.

By Cuthbert W. Johnson, Eso., F.R.S.

I Hardly deem it necessary to prove to any one the value of charcoal as a valuable manure; and if it was necessary

to obviate the suspicion that there is any difference in the effect produced by the use of charcoal-ashes and the impure variety of these ashes afforded by peat, I am readily supplied with the means of doing so by a recent report by Mr. Peter Mackenzie, of West Plean, near Stirling.l He tells us that he has been for some years past trying experiments with peat, cJiarred peat, and peat-ashes, as a substitute for stable manure, and for many kinds of crop grown by farmers and gardeners. He remarks,—" In the spring of last year, I collected a quantity of peat for various purposes, and part of it was intended to be charred or burned. It was not so well prepared for burning as I wished, a good deal of moisture being in it; however, a good fire was made of wood to begin with, and as the peat dried it was drawn to the fire, and in this way was kept burning for two weeks. It required little watching, only once or twice in twelve hours. The partially dried peat was drawn to the fire, because it was intended to have a quantity of charred peat and ashes mixed together, and in order to obtain both, the fire was kept in a smothered state to char the peat (let the farmer mark the distinction). It commonly burst through in some parts, and there supplied the ashes. When we had a quantity to begin with, the unburnt peat, and the charred, with the ashes, were all well mixed together; at least

one-half of the mass was unburnt peat." This mixture was applied about the beginning of May, to a light sandy soil, for a crop of Swedish turnips. The quantity used was at least at the rate of 200 bushels per acre. " We tried it," continues Mr. Mackenzie, " against well-made stable-manure in a state like mould, cut well with the spade, which was applied at the rate of about 20 tons to the acre, and spread into drills, like the peaty mixture. The plants grew well in both cases. We tried to ascertain the amount of produce per acre from each manure, as late as the middle of January 1846; for, from the mildness of the season, the turnips till then appeared to be in a growing state, each plant having had about two square feet of surface to grow upon. The surface was kept flat, and the ground chiefly worked with the Dutch hoe. The weight of bulbs fit for use manured with the peaty mixture was upwards of 40 tons per acre; while those produced from stable-dung weighed only about 30 tons. One row of peas was also manured with the peaty composition,

1 Quar. Jour, of Agric, 1846, p. 467.

and yielded as great a crop as those manured with the stable-manure." Such a preparation of charcoal, although mixed with other substances, the farmer will find veryvaluable in a variety of ways. It would constitute an excellent foundation for dung-heaps or sheep-folds, since charcoal very extensively absorbs the gaseous matters of putrefaction; and, when used in considerable proportions, would also imbibe all the drainage matters of the sheep, or other live stock. It answers well, also, for a covering for dunghills; but to this end, again let me remind the farmer, that he must only carbonize or char his peat or turf; he must, to accomplish this, by covering the burning heap with earth or green turf, retard, regulate, and reduce the extent of the combustion as much as possible. It is to the presence of a considerable portion of carbon in the ashes of a land pared and burnt, that the advantages of this now nearly exploded operation may be attributed. The ashes of a pared and burnt chalk soil from Kent contained four to five per cent. of carbon, that of a light Leicestershire soil contained six per cent., and that of a stiff clay soil from Mount's Bay, in Cornwall, contained eight per cent. of carbon.

The evidence, then, is abundant in favour of charcoal as a fertilizer. At such a period as this, too, when starvation appears to threaten, if it has not already visited, a large portion of the population of Ireland, it seems a most opportune and desirable period for the extensive and immediate preparation of charcoal from the abounding bogs of the sister kingdom. Let, then, the attempt be promptly made ; let every owner of bog or peat land make some effort in this way; and, in so doing, such real friends of their country may rely

that they will thus not only serve very materially their at present unwillingly idle neighbours, without burthening themselves, but that they will moreover enrich their own estates, while they promote the comfort and the improved cultivation of the land of their birth.

Farmer's Magazine, Nov. 1846.

Date: April 8, 2012 7:31 PM
Topic: Western druggist, Volume 14

http://books.google.com/books?id=UkbnAAAAMAAJ&pg=PA421&dq=charcoal+fertilizer&hl=en&sa=X&ei=vEmCT7zoNYeNigK2xOSUAw&ved=0CF4Q6AEwAji-AQ#v=onepage&q=charcoal%20fertilizer&f=false

Western druggist, Volume 14

Plants require about the same treatment except in the matter of food. Ivies may be given plenty of warm water, but should not be stimulated with liquid manure. Callas will bear stimulating to almost any degree. Give them an abundance of stable manure and warm water. Commercial fertilizers are of no value in creating blossom stocks. Give your pinks a little lime water, but never stimulate them with guano or anything of the sort. Give roses a little powdered charcoal or weak soot tea. If flowers do not mature well, they may be made to by placing a layer of powdered charcoal half an inch deep on the earth in the pot.

Date: April 8, 2012 7:41 PM
Topic: Journal of the Royal Agricultural Society of England, Volume 6

http://books.google.com/books?id=GWgZAQAAMAAJ&pg=PA547&dq=charcoal+fertilizer&hl=en&sa=X&ei=d0uCT8i-EaO9iwK88cSAAw&ved=0CGcQ6AEwBzjSAQ#v=onepage&q=charcoal%20fertilizer&f=false

Journal of the Royal Agricultural Society of England, Volume 6

By Royal Agricultural Society of England

(on peat charcoal as a fertilizer...)

4. Quantity applied per Acre, and effect in comparison with some other Manures.

I have previously mentioned the power of charcoal as a fertilizer in hastening the germination of the seed, and on this account alone charred peat may with great advantage be used as a manure for root-crops. Its manner of application maybe broadcast by hand, or with the shovel; this may be better performed by means of a broadcast drill,* or by drilling in rows at the same time as the seed by the common manure-drill. For the latter purpose it. is a cheap and excellent substance for mixing with the more expensive artificial manures previous to their application, such as guano, bones, super-phosphate of lime, &c. &c. Ashes are frequently added to artificial manures; but an objection to their being used in a dry state (which by the way is the only state in which they can be applied by the generality of drills) is this: that, should dry weather follow the sowing, the dry ashes, being under the seed, will retard its germination. It is perhaps hardly necessary to mention that the charred peat will require to be sifted before it is drilled. The large pieces that will not pass through the sieve can be pulverised by a rammer, or by drawing a garden-roll over them.

The quantity used per acre will of course vary with the circumstance of the crop: when drilled in rows, with or without the addition of other artificial manure, the quantity need not exceed

* Mr. Crosskill of Beverley has constructed an excellent implement for sowing manures, which, I believe, has been approved by the Royal Agricultural Society.

from 20 to 40 bushels per acre; when drilled broadcast, from 100 to 150 bushels will not be a very expensive dressing.

I have never made any very careful experiments with peatcharcoal in comparison with other manures; but if we maybe allowed to judge from appearances, the results are evidently satisfactory. As an instance, on July 2, 1845, 40 bushels per acre of peat-charcoal were drilled with green-top Aberdeen turnips on a light sandy loam, the previous crop being rye and vetches mown for soiling. The young plants appeared above ground in a short space of time, and were singled out within a week, as soon as turnips of a quicker growing kind that had been drilled twelve days earlier with 14 cwt. of guano mixed with peat-ashes per acre; this was on the same description of soil, the previous crop being rye fed off with sheep, and the land then manured with 15 cartloads per acre of farm-yard dung; the other, in addition to the peat-charcoal, had been folded. The crops were good, but the cost of the peat-charcoal was barely one-half that of the guano, without taking into consideration the extra dressing of farm-yard manure.*

This- essay is now brought to a conclusion; and though it is imperfect in many respects, yet sufficient has been said on the subject to show that, where peat can be conveniently dug, it will be to the farmer's advantage to make use of it as a manure in the shape of peat-charcoal: if it is merely used as an addition to the solid or liquid manure of the farm-yard, it will amply repay the expense of preparation.

The removal of a bed of peat three or four feet in thickness will be no injury to the soil; where there is a good drainage it will in all probability increase the fertility of the land; and even when the water cannot be drained from the hole which has been excavated, it may be rendered valuable by being converted into a plantation of osiers, or, if water covers the surface, into a pond for the cultivation of the common reed (Arundo phragmites), which will be invaluable for the purpose of covering farm-buildings.

Cirencester, Nov. 28, 1846.

* The crop of turnips to which the peat-charcoal was applied in 1845, was fed off late in the spring of 1846; the land ploughed and subsoiled, and on May the 9th drilled with Belgian carrots; the seed being mixed with 2 bushels

per acre of powdered wood charcoal: notwithstanding the dry weather the carrots came up well. The produce was about 1200 bushels per acre, and each bushel of carrots weighing 3 stone 3 lbs., will give upwards of 24 tons of roots per acre, exclusive of the tops. The only manure, besides the 2 bushels of charcoal, being the folding of the sheep while feeding the previous crop of turnips.

XXXVII.—On the Fairy-Rings of Pastures, as illustrating the Use of Inorganic Manures.' By John Thomas Way, Professor of Chemistry at the Cirencester College of Agriculture.

Note.—This paper was read at the Chemical Section of the British Association at

Date: April 8, 2012 7:48 PM
Topic: Pennsylvania farmer and gardener, Volume 2, Issue 7 - Volume 3, Issue 7

http://books.google.com/books?id=Sc9FAAAAYAAJ&pg=PA267&dq=charcoal+fertilizer&hl=en&sa=X&ei=_0yCT-rqLcS5iwKKIZ2OAw&ved=0CGUQ6AEwAzjmAQ#v=onepage&q=charcoal%20fertilizer&f=false

Pennsylvania farmer and gardener, Volume 2, Issue 7 - Volume 3, Issue 7

Many farmers dislike to use the night soil made upon their premises, from the fact, that the smell is unpleasant. This is undeniable, and yet it should not be permitted to be the reason why so much good manure should be lost. Thore are various and very cheap deodorizers, which are easy of application, and within the reach of every farmer. Thus, for instanoe, charcoal is very good, and its use is attended with a double benefit, as it is not only an excellent deodorizer, but is possessed, itself, of desirable manurial qnalities.....

CHARCOAL AND SOME OF ITS „ _ USES.

Mb. Editor:—

There are various opinions afloat in regard to the value of charcoal as a fertilizer. As an absorbent of ammonia, carbonic acid, &c, it certainly has scarcely a superior. It is also pretty well ascertained, that it readily yields up for the use of the plant, the substances thus absorbed. But there are two features connected with its use which haTe always commended it to my favor. One is its mechanical effects upon the soil, rendering it more open and friable, and consequently more easily worked, and more open to the action of the atmosphere. The other is the warming effect produced where it is applied in any considerab'e quantity. A dark soil, we all know, has the power to a greater extent of absorbing heat than a light-colored one. This, in many locations, is a great desideratum. Many plants which it is desirable to grow, but which, for the want of a sufficiently warm soil, is next to impossible, may be cultivated by the use of charcoal. Its carbon yields no food to plants, consequently, even if applied in large quantities, it can do no harm, unless it

renders the soil too light and open; not a very likely result.

In gardens, therefore, I esteem it highly, and have found it, for the purposes briefly named above, most excellent.

Date: April 8, 2012 7:55 PM
Topic: The Journal of agriculture, Volume 1

http://books.google.com/books?id=OBtGAAAAYAAJ&pg=PA14&dq=charcoal+fertilizer&hl=en&sa=X&ei=W02CT5HPB7LaiQKJvMG8Aw&ved=0CFsQ6AEwATjwAQ#v=onepage&q=charcoal%20fertilizer&f=false

The Journal of agriculture, Volume 1

By William S. King

ON THE USE OF CHARCOAL.

BY COL. M. P. WILDEK.

I notice in the last number of your valuable periodical the request of Mr. Trimble, soliciting advice as to the advantages of charcoal, and the best method of using it as a manure.

I reply with pleasure, but my experience has been on a limited scale, and my operations confined rather to the garden than the farm, on account of the difficulty of procuring it in sufficient quantity for the latter purpose.

My attention was first drawn to the influence of charcoal, by the wonderful experiments of Baron Von Liebig, in the propagation of plants, and the fncility with which cuttings were rooted in this substance.

Its use became very general in Europe by amateurs and cultivators of plants, and for a time it was considered a great fertilizer. Chemists soon, ascertained, however, that its chief virtue consisted in its great porosity, being able to absorb 90 per cent, of its bulk of ammonia.

As a medium for storing up the volatile portions of manure and compost heaps, and for absorbing the ammonia which descends in the snow and rain, it has probably no superior. But what renders charcoal still more valuable is its power of holding in reserve those subtle elements, and yielding them up only as they are wanted for the purposes of nutrition, and as the vital force of the root searches for food.

It will therefore readily be perceived, that charcoal is not only valuable as a component part of manures, but that its influence, when applied alone, is

highly beneficial. Instances similar to those quoted by Mr. Trimble, where large crops had been obtained from lands on which charcoal pits had been burned years' before, are frequently witnessed. In this vicinity a farmer has annually, for the last eight years, harvested extraordinary crops of hay on these charcoal lands, without the application of any manure whatever; and from the indestructibility of this substance, I know no reason why he may not continue to do so for the next twenty years to come.

One of the most striking illustrations of its efficacy, tehen applied alone, that has come to my notice, was the experiment made by Mr. Hay ward, of Sandusky, Ohio, many years since, and which, if I am not mistaken, was published either in the last volume of your Farmer's Library, or the first volume of The Plough, the Loom, and the Anvil. The facts I think were substantially as follows: — Mr. H., having prepared his coal by grinding in a mill, set apart seven lots of land for experiments, the soil and cultivation being precisely alike on each, except as it regarded the application of charcoal. The result was, that on the lots where fijly bushels of coal were applied, there were twenty-five bushels of wheat obtained, while on those lots where there was no coal applied the crop was only five or six bushels. It will be borne in mind that there was no other manure administered to the crop, and that consequently the fertilizing properties must have been imparted by the ammonia which was stored up in the coal.

This experiment was very satisfactory, but not more so than many others which we have witnessed, particularly in the application of charcoal to fruit trees, plants, and garden vegetables; and I have yet to see the first instance where charcoal formed a part of the compost, that vegetation did not grow luxuriantly,producing the increasing and quickening effects described by Mr. Trimble. In fact, it is no unusual circumstance to notice the roots of trees and plants either clasping pieces of charcoal, or piercing them through with their fibres. The best method, where any considerable quantity is to be used, would undoubtedly be to grind the charcoal, and I should prefer that one half at least should be as coarse as Indian corn. As to the amount which may be applied to the acre, I think Mr. Hayward's experience will furnish a good criterion, although I have no doubt a larger quantity than fifty bushels to the acre, for the first dressing, might produce an in crease of the crop.

If charcoal is to be applied alone, and without manure, the time is not material, except that should be well incorporated with the soil, either by ploughing in, or harrowing, but not deeply. Mr. Trimble describes his soil as being " generally a strong yellow clay based upon limestone." Charcoal will no

doubt prove valuable on these lands, but more so on light soils which allow the salts of manure to leach through; for clay is also a substance which holds securely the volatile portions of manure, and when made fine by the frost or otherwise, is a capital ingredient for the compost heap,

P. S. On recurrence to my file of letters I find Mr. Trimble's, but which, from the circumstance of its arriving just as 1 was on the point of starling on a journey, was laid aside, and being "out of sight was out of mind." From the character of his land, " limeing" would not only be a waste, but worse than a waste of time and money, the soil being al ready sufficiently charged with lime. And here let me drop a word of caution, never to use lime either in conjunction with charcoal or the manure heap, on account of its disengaging the fertilizing gases and sending them off in " thin air." I beg his pardon for the neglect, and fear from the haste with which the above has been written, that it will be of little •ervice to him or others.—The Plough, the Loom, and the jinvil.

Date: April 8, 2012 7:59 PM
Topic: Transactions of the agricultural societies of Massachusetts: for the year ...

http://books.google.com/books?id=5Y87AAAAcAAJ&pg=PA252&dq=charcoal+fertilizer&hl=en&sa=X&ei=W02CT5HPB7LaiQKJvMG8Aw&ved=0CGgQ6AEwAzjwAQ#v=onepage&q=charcoal%20fertilizer&f=false

Transactions of the agricultural societies of Massachusetts: for the year ...

He had only to refer to the lucid and interesting statement of Hon. Mr. Brooks, to show that, even with the sale of his produce, he had increased his manure to superabundance. How had he done it 1 He had carefully saved every particle of urine and faeces, and all rubbish and offal on his premises, and, to mix with and absorb this, he had carted loads of stuff from his peat bog. Now this peat muck, called by chemists, under various names, as geine, humus, coal of humus, vegetable mould, is, as far as regards agriculture, charcoal, the absorbent, the storehouse of ammonia. Mr. Brooks's next process is, to pare his meadow, burn these parings, and mix them also with the urine and fasces. Now here is another storehouse, both of ammonia, and of inorganic salts, and nothing is lost, as it used to be; all is stored up for use. Every horticulturist, who has grown plants in garden pots, which are nothing but burnt clay, the same as Mr. Brooks's burnt parings, knows, that the roots of plants leave the soil in the centre of the pot, and push for the sides of the pot itself, and why? Because the salts, dissolved by watering the plants, have been absorbed by the burnt clay, and there the roots go to find their nourishment. These storehouses, also, absorb the ammonia, which comes down in rain and snow, as well as the inorganic salts, arising from the annual disintegration of stones and rocks.

A preference has been stated for plaster, as an absorbent of ammonia, because plaster is a manure, which charcoal is not. Plaster may be, and, in some cases, not the majority certainly, is a manure; by the absorption of ammonia, it becomes sulphate of ammonia and lime. Now one hundred parts of sulphate of ammonia contain about sixty parts of sulphuric acid, not very advantageous to vegetation, about twenty-six parts of ammonia, and about fourteen parts of water. Charcoal can condense im its pores about ninety

parts in bulk of ammonia. Plaster is an excellent material to strew in stables, where many horses are kept, as it destroys all noxious effluvia, and it is then, unquestionably a good manure, but it appears far inferior to charcoal, as an absorbent, and certainly where plenty of peat muck exists, it is bad economy to purchase it for this purpose.

The notes read by Mr. Newhall, of his observations on his manure composts, are very interesting, if every agriculturist would make such notes, and place them where men of science could have access to them, they would soon be classified, sifted out, and compared; this would unquestionably lead to generalizations of some importance to agriculture. *

A desire, in which everyone must cordially join, has been expressed for definite experiments in agriculture. In order to have definite experiments, however, it is necessary to work with definite compounds, and this, with the immense diversity of soils, although not absolutely impossible, is difficult. A farmer may, year after year, add seaweed to his manure composts, and always produce excellent crops; if, to spare labor or expense for one year, he omits this ingredient, he may still have as good crops, nay, even a second year; then, from this, which he considers a definite experiment, he will conclude seaweed to be of no use. The third year, another may be in possession of the farm, and, having heard of seaweed, determines to try it on half the land, the other half without. From that half manured with seaweed he obtains much better crops than from the other, and he concludes, from this definite experiment, that seaweed is a valuable manure. Now, the probable truth would be, that, from the seaweed put on, there had been a superabundance of phosphates and other inorganic salts, enough to supply the crops, for the two years, and that then a fresh addition of them was required. No doubt this case often occurs in the application of lime and plaster, and has caused so much diversity of opinion.

But definite experiments, though difficult, are not absolutely impossible; for instance, that stated by the president, at Sandusky, Ohio, where, on a breadth of twenty or thirty acres, fifty bushels charcoal were spread per acre, on land hitherto barren, with intervening spaces, where none was used. The spots with charcoal gave from twenty to twenty-five bushels wheat per acre, those without, from three to five bushels per acre.

There is, however, one definite experiment of the utmost importance, to be tried; it is the experiment of establishing agricultural schools, and experimental farms throughout this vast and flourishing agricultural country.

What is the reason why youth pant after commerce or the learned professions 1 It is because they require the exercise of the utmost energy of the mind, and this exercise is precisely what youth demand; the "want of it drives them into all kinds of foolish excesses; for, the desire for it is invincibly strong, and will be gratified. Now, is it not possible to divert these energies of the mind to the successful pursuit of agriculture? The experience of other nations answers, yes, but only by the preparation of a previous, suitable education, of the first order. Young men generally consider a farmer as a mere machine, a plough, a cart, or a hoe, with nothing to do but what their fathers did before them. Will these ideas apply to any other industrial pursuit, or any other profession? Had they been so applied, the railroad, the steamboat, the electric telegraph, had still been unknown—and, as long as these ideas exist amongst them, so long will the best of our agricultural population flock to the cities, and many a fine mind be irretrievably lost.

Remarks By M. P. Wilder.

[At the same meetings of the Legislative Society, at which Mr. Teschemacher made the foregoing remarks, Hon. M. P. Wilder, the President, made the subjoined statement of his own experience, in the making and applying of manures.]

Mr. Wilder said that he was no chemist, and made no pretensions to farming, except, as it is connected with gardening and the horticultural art.

He had made some experiments with manures, some of which he would relate :—He did not wish it to be understood, that he undervalued stable or barnyard manure; but such as was purchased from the stables of the city, by the cord, when deprived of straw, or decomposed, was, in reality, only half or threefourths of a cord. To obtain a real solid cord of manure, equal in quality, and at less price, had, with him, been a great desideratum, and he believed he had succeeded, by making a compost of meadow muck, crushed bones, and leached ashes, in the following proportions:—

One cord of meadow muck, having been exposed

to the action of air and frost, at least one year, $1 50
Twelve bushels of leached ashes, . . 1 20
Six bushels crushed bones, ... 1 50
Labor, 30

Total cost per cord, $4 50

The bones and ashes were mixed together, while the latter were in a damp state; and, when fermentation had taken place, these were incorporated with the meadow muck. In this condition, the mass should remain, until heat is generated again, when it will be fit for use.

He had found this compost equal to any stable manure for root crops, grass land, gardening purposes generally, and for fruit trees. For the last two years, he had mixed his stable manure with the compost, and also had added to it, one-eighth part in bulk, of fine refuse charcoal, from the depots of venders. This can be purchased at five dollars the cord, delivered, and does not much increase the cost above named.

Since Liebig first promulgated his opinion, as to the wonderful influence of charcoal, in rooting cuttings of plants, and as a component part of soils, experiments have been making, verifying its importance. He also informs us, that the volatile gas, which arises from our stables and manure heaps, and descends in the rain and snow, and which we call "ammonia," is the great fertilizer of the earth. To secure this subtle element, Mr. Wilder had added charcoal to his compost heap, and, as he thought, with great advantage. It is very durable, if not indestructible ; a substance of great porosity, and we are told, he said, by chemists, that it will absorb ninety per cent, of its bulk of ammonia; but its beneficial effects are supposed to arise from its power of retaining this volatile gas, and yielding it up only, as it is washed out by rains, or as the vital force of the root searches for food. He did not consider it a fertilizer in itself, but that it was a medium of administering nourishment, having used it with good success, for greenhouse plants, for many seasons.

Mr. Wilder said the compost—with the charcoal and stable manures combined—was the best he had ever used, as a general manure. On fruit trees, its effects were remarkable.

In the spring of 1847, he planted a square in his nursery, with imported trees from England, this compost having been spread and ploughed in. These trees were from four to five feet in height, and, although it is not usual for trees to make a large growth the first year, they acquired branches of three to four feet, and were so handsome as to command one dollar twenty-five cents each, for a row of fifty trees, without any selection.

In June last, which is very late to set out trees, he prepared another square, on rather poor land, and planted trees, just received from England, upon it.

The soil had been thrown up to the frost the previous winter, and the compost here was applied in the trenches, near the roots. Mr. Wilder exhibited two shoots, ▪which had grown from those trees, since they were set out in June. The shoots were four feet in length, and the wood hard, and well ripened.

It is stated, that, on old beds, where charcoal had been burned ten years before, the corn and wheat, to this day, are uniformly better than on the adjoining lands, being more vigorous, of a darker green color, and producing larger crops. A farmer remarks:—"I sowed fine charcoal over my land, in strips. These strips have increased one-half in product, and without any apparent diminution, for five years."

Mr. Wilder mentioned several instances, showing the beneficial effects arising from the use of fine charcoal, one of which, in the State of New York, was an extraordinary product of wheat.

Says an English gardener:—" My composts consist of nothing but loam and charcoal, without a particle of manure, of any sort; and I never saw the plant that did not delight in it, and every plant under my care, has some charcoal used about it."

As a deodorant, or disinfector, Mr. Wilder related the following experiment, which appeared in a late English paper :—

" Two fluids, and charcoal from peat, were prepared especially, by different chemists, for the purpose of depriving nightsoil, stable, and pig-stye manures, of their offensive smell. The fluids both proved ineffectual, but the charcoal not only instantly neutralized, and destroyed the offensive odors, in each of these substances, but also deodorized the fluids themselves."

Date: April 8, 2012 8:06 PM
Topic: Agricola's letters and essays on sugar farming in Jamaica

http://books.google.com/books?id=hx0EAAAAQAAJ&pg=PA246&dq=charcoal+fertilizer&hl=en&sa=X&ei=aVGCT9D1CsimiQLO48X3Ag&ved=0CH0Q6AEwCTj6AQ#v=onepage&q=charcoal%20fertilizer&f=false

Agricola's letters and essays on sugar farming in Jamaica

By W F. Whitehouse

. Being alive to, the. disadvantages. pf the system of fly-penning by the loss, of the ammonia of the urine by evaporation, he proceeds, subsequently, to. consider how this disadvantage can be remedied ;. so that we may ob'. Vain all the advantages of the system, and neutralize the disadyaij. Vagi's. Thin he proposes to do by sprinkling tin- lan.l. immediately previously to penning the stock, with either gypsum, sulphuric acitl, stokeholl! ashes or charcoal, tor the purpose of imbibing all the urine as f.ist as dropped, and for uniting chemically with the gases of the decomposing matter as fast as formed. This shows the advantage of chemical knowledge; who would have thought that such an easy and si mule application as that of stokehole ashes could have such a beneficial effect ?—and yet from the study of chemistry he is enabled to state the fact positively. All estates have plenty ofstokeho'e ashes, but they are usually considered as of no value. Above all the substances he has recommended for use, he prefers charcoal; "this," he savs, "is the most profitable, because it is not only the most powerful absorbent of tiie carbonate of ammonia, but its own qual ties, as a. fertilizer, are considered by chemists to be quite inexhaustible..' This is quite in accordance with, iny own opinion formed I'ro.n the study of Liebig, and from what slight chemical knowledge I possess. 1 consider charcoal destined to become the most valuable of ail manures for the cultivation of the cane. 1 think it will furnish ammonia in sufficient quantity for a luxuriant growth of the cane, and carbon in such large quantities as to facilitate and increase the depo-.it of sugar. Charcoal and humus. (the residuum of decayed vegetable matter) are, according to Liebig, almost analogous in lheir effects on vegetation. Now we all know what a luxuriant growth of cane and what a large amount of saccharine matter are obtained from canes cultivated in new land What is it that causes this result? I answer the land being rich in decayed vegetable

matter or humus, accumulated during many years. Why may we not therefore expect similar results from the application of charcoal to our fields? I hope these rerpaiks will awaken attention to the subject, for it is a manure we can obtain for the mere cost of manufacture, which h very trilling; and we can obtain it in inexhaustible quantities it appears also that the good eifect of it never lessens or wears out. Our author says ho buys it flora the bakers at two shillings per. barrel. ,

As we are on the subject of charcoal, we will give the author's succinct account of it. "Charcoal is destined for the future, to rank amongst the most valuable manures the planter possesses. Its peculiar property, and the only one that makes .t useful in connexion with manures, is its power of absorbing various gases, and yielding them again to moisture. It is proved, beyond all doubt, that pure and fresh burnt charcoal possesses the power of absorbing ninety limes its volume of ammoniacal gas and thirty-five times us volume of carbonic acid gas; but this power is much diminished by reducing it to a state of powder. When used for agri-. cultural purposes it should be broken just small enough to allow of its being equally distributed over the surface of the soil, in this state it will absorb any gas with which it may come in contact, and ifanymanuie has been applied containing ammonia in its free state, that is liable to pass off in its gaseous form, the charcoal will absorb it as it rises, and return it again to the plant with the first rain that falls. When, in course of cultivation, the charcoal originally applied is ploughed under the surface of the soil, even then it does not lose its power of absorption, but carries on its operations with undiminished energy.

Date: April 8, 2012 8:09 PM
Topic: Good housekeeping, Volume 2

http://books.google.com/books?id=0VQ7AAAAMAAJ&pg=PA323&dq=charcoal+fertilizer&hl=en&sa=X&ei=wIKCT7TkM5PSiAKKzNDtAg&ved=0CF8Q6AEwAjiOAg#v=onepage&q=charcoal%20fertilizer&f=false

Good housekeeping, Volume 2

It is an easy matter to cultivate plants in hanging baskets if the directions I shall give are followed. They require but little care, and the chances of success are greater with the class of plants suitable for growing in this fashion than with those of a tenderer nature only fitted for pot-cultivation. Although I shall describe numerous kinds of baskets that will be charming when dripping with flowers and foliage, I recommend that the pots and baskets purchased are chosen of clay or porous ware, which may be placed inside wooden or iron frames, or glazed vessels. If the pots are not porous, plants will not thrive in perfection, because there is no escape for surplus moisture and all side ventilation is impossible. In this case the soil sours and the roots become more or less diseased. When the baskets have been selected, cover the bottom to the depth of two inches with little pieces of charcoal which serve a threefold purpose,—that of fertilizer, purifier and drainage. The dust of charcoal is excellent, beside, to mix with the earth for growing plants. Very rich soil is not required in hanging baskets; ordinary earth from the garden is best. If the soil is too nourishing the plants will run too much to stem and lose their graceful loveliness. Drooping and climbing plants may be permitted to run as much as they like, but in the center of the hanging basket must be erect plants, which, if over-stimulated, outgrow the room allotted to them and become, besides, what is known in technical terms by florists, " Drawn."

It is a very good plan to place among the charcoal bits in the basket a coarse sponge, particularly if the vessel is deep, for this will absorb all moisture not taken up by the soil, and will then give it out again when it is needed. One-third of the soil should be composed of common sand such as is used for scouring. Thoroughly mix this with leaf-mould and loam. The earth to be found surrounding pine trees is admirable for baskets, which, if supplied with charcoal and sponge, will not require to have a hole in the bottom for drainage. When putting plants into any vessel, do not use turf soil, lest it be sufficiently friable that it may be pressed down firmly around the

plants. If succulant plants, or those with watery tissues are to be grown, the soil near ponds or streams will suit them best.

Date: April 8, 2012 8:36 PM
Topic: American desert (The Western garden ..., Volume 1, Issue 2 - Volume 5, Issue 2

http://books.google.com/books?id=YeRIAAAAYAAJ&pg=PA16-IA24&dq=charcoal+fertilizer&hl=en&sa=X&ei=8VeCT--JIqKWiQLGnaWeAw&ved=0CIABEOgBMAk4mAI#v=onepage&q=charcoal%20fertilizer&f=false

American desert (The Western garden ..., Volume 1, Issue 2 - Volume 5, Issue 2

Palm culture is not nearly so difficult as most people imagine. Nearly all the finest sorts thrive well in good, fibrous, yellow loam or soil composed of rotted sods, sand and old, well-decayed manure. A sprinkling of charcoal added to this will help to keep the soil fresh and sweet for the tender young rootlets. Any substance which decays in the soil, except it be very slowly, injurts rather than aids these roots. Bone-dust applied in small quantities is also a good fertilizer for palms.

When proper attention is given to watering, ▪ palms grow better if planted in pots which fit their roots rather snugly than when given pots that are much too large. Whatever the size used, they must be well drained; I like to use broken bits of charcoal for draining all my pots, because when the roots reach down to it they feed upon it greedily, the tiny fibers clinging all about it; and then, too, the charcoal keeps the drainage and bottom soil sweet and healthful for the roots. My experience has been altogether with wood charcoal. Over whatever material is used for drainage, a thin layer of moss or cocoa-fiber should be spread to keep the earth from washing down into the drain and clogging it.

Date: April 8, 2012 8:38 PM
Topic: Pamphlets on Biology: Kofoid collection, Volume 2853

http://books.google.com/books?id=EC0XAQAAIAAJ&pg=RA1-PA25&dq=charcoal+fertilizer&hl=en&sa=X&ei=KVmCT5LCB6mmiQLKiLCgAw&ved=0CFMQ6AEwADiiAg#v=onepage&q=charcoal%20fertilizer&f=false

Pamphlets on Biology: Kofoid collection, Volume 2853

Again some materials may be put upon the soil that are not themselves plant food yet their action may be very beneficial. They may by their effegt release plant food already there, from the soil, or by forming new combinations, liberate the same; or they may simply like charcoal dust hold plant food by absorption, to be given up when the plant demands it.

Date: April 8, 2012 8:46 PM
Topic: Popular gardening and fruit growing, Volumes 3-4

http://books.google.com/books?pg=RA1-PA15&dq=charcoal+fertilizer&ei=q1mCT_yHOoeriQKLq-CsAw&id=PNNNAAAAYAAJ&output=text

Popular gardening and fruit growing, Volumes 3-4

For the final potting, use the following compost; turfy loam, one bushel; leaf-mould, halfbushel; marl, which has been exposed to the frost and air, one-third bushel; coarse gritty sand one-third bushel, a six-inch potfull of commercial fertilizer, and the same quantity of powdered oyster shells; also a five-Inch potfull each of soot and lime, and to these ingredients a nineinch potfull of roughly broken charcoal, well inter-mixing the whole.

Date: April 11, 2012 8:20 AM
Topic: The Horticulturist and journal of rural art and rural taste, Volume 24

http://books.google.com/books?id=mrnNAAAAMAAJ&pg=PA349&dq=%22The+Horticulturist,+And+Journal+Of+Rural+Art+And+Rural+Taste%22+charcoal&hl=en&sa=X&ei=t6CFT6juGca0iQKUxp31BA&ved=0CDkQ6AEwAA#v=onepage&q&f=false

The Horticulturist and journal of rural art and rural taste, Volume 24

edited by Andrew Jackson Downing

Charcoal, already well known to be of inestimable value as an absorbent or disinfectant, and likewise containing abundance of nutritious food for growing plants, has also a remarkable influence on the color of flowers. This fact is too well known to gardeners to require much repetition.

A few years since, a New-Haven gardener tried the experiment of the use of charcoal on the health of plants in pots in his greenhouse, and said that he could not possibly see the advantage of continuing under the old system without it.

" The result of my experience is, that, when not using charcoal in growing roses, they have been more or less subject to mildew, and the roots of the plants more apt to be injured by fungus, whereas with the free use of that material they are not liable at all to be attacked.

" And besides, when treated in this way the plants are remarkable for their freshness and beauty; the flowers are so much improved that they seem as though they had been

We observe that the subject is again being discussed with practical interest in France, and we quote a paragraph from the Revue Horticole, of appropriate effect.

" A correspondent of that journal says that not long ago he made a bargain for a rose-bush of magnificent growth and full of buds. He waited for them to blow, and expected roses worthy of such a noble plant and of the praises bestowed on it by the vender; but when it bloomed, all his hopes were

blasted. The flowers were of a faded hue, and he discovered that he had only a middling multiflora, stale colored enough. He therefore resolved to sacrifice it to some experiments which he had in view. His attention had been directed to the effects of charcoal, as stated in some English publications. He then covered the earth in the pot in which it was, about half an inch deep, with pulverized charcoal. Some days after, he was astonished to see those which bloomed of as fine a lively rose-color as he could wish. He determined to repeat the experiment, and therefore, when the rose-bush had done flowering, he took off the charcoal and put fresh earth about the roots, and waited for the next spring impatiently, to see the result of this experiment. When it bloomed, the roses were at first pale and discolored, but, by applying the charcoal as before, they soon assumed their rosy-red color. He then tried the powdered charcoal in large quantities upon petunias, and found that both the white and violet colored flowers were equally sensitive to its action. It always gave great vigor to the red or violet colors of the flowers, and the white petunias become veined with red or violet tints ; the violets became covered with irregular spots of a bluish or almost black tint. Many persons who admired them thought they were choice new varieties. Charcoal has no effect on yellow flowers."

It is not stated whether the effects are permanent, or whether they fail after a single season.