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By M'. MAC LEAN.

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AGRICULTURAL.

From the Journal of the Royal Agricultural Society.

EXPERIMENTS ON NITRATE OF SODA AND SALTPETRE.

BY W. STRATFORD DOUGDALE, M. P.

Many communications have been forwarded to the society on the value of saltpetre and nitrate of soda as manures, perhaps the result of an experiment I have made upon two fields of wheat, eight miles distant from each other, may not be uninteresting. One field is of a light gravelly soil which was manured with a coat of marl in the autumn before the wheat was sown. The other field is of a stiff clayey soil, and was manured with lime in the autumn. About the middle of last April I measured off three quarters of an acre in the field of gravelly soil, and sowed one quarter with saltpetre, one with nitrate of soda, and left the remaining quarter with nothing but the marl.

I also measured off four quarters of an acre in the clayey field, and sowed one quarter with saltpetre. one with nitrate of soda. one with soot, and left the remaining quarter with lime only. In both cases the quantity of saltpetre and soda was as one hundred weight to the acre. In the gravelly field the produce of the quarter of an acre with nitrate of soda was, of—

Wheat	13 bu. 2 pks. weighing 63½ lbs. pr. bu.
Straw	9 cwt. 72 lbs.
Chaff and waste,	2 qrs. 27 lbs.

Saltpetre.—

Wheat	10 bu 2½ pks. weighing 64½ lbs pr bu.
Straw	8 cwt. 56 lbs.
Chaff and waste,	3 qrs. 24 lbs.

Marl only,—

Wheat	10 bu 2 pks, weighing 64 lbs. pr. bu.
Straw	8 cwt. 54 lbs.
Chaff and waste.	1 cwt.

In the clayey field:—The produce of half an acre, manured with—

Nitrate of soda, wheat	18 bu. 1 pk, weighing 64 pr. bu.
Do. with saltpetre	17 bu. 2 pks. weighed 63 pr. bu.
Do. with soot	17 bu. 1 pk, weighed 63½ pr bu.
Do. with lime only.	16 bu. weighing 62½ lbs. pr. bu.

In this experiment my bailiff did not measure the quantities of straw and waste.

I also sowed some soda and saltpetre, to the same amount per acre, on some grass-land.

I was not at home when the hay was cut; but am informed that the crop was greatly increased, particularly by the nitrate of soda.

From the S. C Temperance Advocate.

NEWBERRY AGRICULTURAL SOCIERY.

As the Agricultural Society of Newberry District has elected me one of the Committee to report on the raising of Wheat and Potatoes.

I comply with their requests, first on Wheat. Wheat requires its own natural soil, which is red land. Though it may be raised on sandy soil with clay bottom, if well managed. I would prefer old land to raise wheat on, and it manured with cotton seed, as it is much the easiest applied to the land, and I believe it to be as good a manure as we have for raising wheat. My mode in raising is something like this. To sow corn land. I gather off my corn as soon as it will bear it; then pasture the stalk field, until it is clean. I then cut the stalks and sprout the land; and about the middle of October, commence sowing my blue stem or any other late wheat. My manner in scattering cotton-seed, is to lay the lands off 20 feet wide, if you are very careful you may sow the seed out of the wagon, whilst it is going along the land. But if care be not taken, it will be thrown in piles. I have sown in this way, and had it well put on the land; and I have had them thrown in piles, and lifted in baskets, and scatter in that way. The amount of seed per acre, is a matter which depends very much on the strength of the land sown. This is a matter farmers will have to judge for themselves. But I will give my opinion on the subject. Land that would produce 5 bushels per acre without manuring, would produce double the amount with 25 bushels of cotton seed per acre. I prefer wheat being ploughed in with a narrow shovel, and that well done. And as your land is ploughed, have it followed with hoes, chop round the trees and stumps, also all the the corn roots and turfs of grass if any; leaving the ground perfectly smooth.—This plan I consider far better than brushing or harrowing.

I would pursue the same plan in early as in late wheat, only sow it later. The first or middle of November. I will give you my views about the smut, which is very disastrous among us. Remedy.—Soaking with a solution of bluestone will certainly prevent it. You should prepare yourself with a tight vessel, and in it put 3 pounds of bluestone, and as much water as will be sufficient to cover 6 bushels of wheat, and let it soak 24 hours, when this is taken out, put in 2 pounds more of bluestone, and add a little more water for waste, and stir well your 6 bushels again, and so on. What you soak in one day you sow the next. Experience has taught me this is a sure and infallible remedy. I sow about one bushel to the acre generally; thick sowing prevents the rusts. I am of the impression that the thrash machine was the first, and is the general cause of smut, for I have sown the bluestem wheat for twenty-six years in succession, and never missed but one crop, and that was occasioned by the fly, and in all that time, I never had one grain of smut that I perceived.

I pursued the old Dutch rule. I hailed my wheat to my barn and trod out with my horses, and threw it with my shovel for the purpose of cleansing it.

And for seed, I took the head of it.—Sifted it well with the serve, and I never had the occasion of using bluestone nor any other remedy. I let others have of my seed, and they soon complained of smut. Last year I had a thrasher built, and thrashed my wheat for the first, and I sowed a few lands of my bluestem without soaking, and it had the smut for the first time.

I have raised for the last three years, some of what is called the red spring wheat, and I am very much pleased with it. I soaked it and made a fair trial. We lacked about two lands of finishing the field. That was sown with seed unsoaked, and it was perhaps one fifth smut, the other that was soaked in bluestone I never saw the first grain of smut.

I have tried several kinds of wheat, and the old bluestem and red spring wheat has proved the most successful with me.

SWEET POTATOES.

The best plan of raising sweet potatoes, agreeable to my experience, is as follows:

Some warm spell in March, I would say, about the middle. Take your seed potatoes from the stack, sellar, or where they have been preserved during the winter. Sort out such seed as you would like to plant, end bed them in fresh earth, some potatoes and some earth, until you have as many as you need. Then leave the bed exposed to the weather until planting time. In so doing, the potatoes will sprout. Prepare your ground, which should be sandy soil if you have it. Old land is best if manured. Cowpen land is preferable. Any other manured land will do, except hog-pen. I have tried hog-pen and hog manure three times, and it has failed every time. The potatoes will come up very bad, and directly begin to fire, and finally die. You should plough your ground by the middle of March, and continue to plough it about every ten days until the 15th or 20th of April; then check your land three and a half feet, and make your hills small, then raise your seed carefully, about three in a hill. I believe cutting the potatoes in small pieces to be injurious. Plant them whole. If you should wish to plant in ridges, cut a channel on the top of the ridge and lay in it a potatoe every 10 or 12 inches. Planting at this season, the potatoes will come up in a few days, and grow finely. Whereas, if planted early they will not.

When they want work, plough and draw up dirt with a hoe. Which of those two plans is best, I can hardly say, although I believe the ridge will make the most, but the hill the largest.

I have planted yam potatoes for several years, and generally bed my seed in March. In doing this, I scrape a little of the surface off about 2 inches, and lay the potatoes thick on the ground, and cover with the soil very light; plough your patch as before directed, until the plants come up from 4 to 6 inches high. When there is appearance of rain, make as many ridges as you have plants for.—When you get a season, set your plants in as you would cabbage or any other plants, 10 inches apart, and as the plants become large enough, set out as before directed I believe they will bring a tolerable good crop, when planted as late as the 4th of July.

But the sooner the better. Sometimes however, we get no seasons, and can hardly raise them in this way. Therefore, I have tried planting them in this way. Therefore, I have tried planting them in the hill and ridge as other potatoes, and have been successful in raising them in this way. I raised the largest ones last year I ever saw; they weighed as high as seven and a half pounds. I have the red, Spanish and the yam; the red grows large, but of them all, I think most of yam.

The next is how to preserve them during the winter. I have tried several plans, and the plan most successful, is in hill or stack. Scrape out a hole about 4 inches deep, and as round as you well can, large enough to hold 25 or 30 bushels; then place heart pine boards in the bottom; then pine straw, a good layer under and over the potatoes. Then stand corn stalks very close all around the straw. Then cover with dirt. The stacks should be covered so as to keep the rain and cold from them. Perhaps I should say something about the time and manner of digging! The vines should be well frost bitten before digging, and I am of the impression that they ought to be let stand several days after frost.—The potatoe hull or peeling will harden very much by sranding, and the potatoe is not half so apt to bruise and injure in putting away, and I believe if the potatoe vines were all cut off as soon as frost bitten, it would be an advantage to the potatoe, for when the vine is frost bitten, the sap is inclined to run back to the potatoe, and if the vines were cut off, it would prevent the sap's returning. The potatoe would be dryer, and perhaps not rot so soon.

My common mode of gathering them is with the plough, first dragging the vines away, then plough the hill or ridge followed with hoes.

IRISH POTATOES

are a potatoe that I have never planted largely, although I raise enough for my use. I generally plant them in February, and have manured with several kinds of manure. Stable, cotton seed, rotten straw, and hogs hair, the last named, (hogs hair,) I believe, excells all others, dry as it seems to be.

GEORGE BOZEY.

July 22d, 1841.

DRIVING NAILS INTO HARD WOOD.—We have lately seen another experiment of driving nails into hard seasoned timber fairly tried. The first two nails, after passing through a pine board, entered about one inch, and then doubled under the hammer; but, on dipping the points of the other six or eight nails into lard, every one was driven home without the least difficulty.

Carpenters who are engaged in repairing old buildings sometimes carry a small lump of lard or tallow for this purpose on one of their boots or shoes.—*New Genesee Farmer.*

A NEWLY-DISCOVERED SALT SPRING.—A salt spring has been opened in the town of Galen, county of Wayne, (N. Y.,) about fifty rods from the Erie canal, on the land of the Rev. Dr. Judd, of Ithaca, with the fairest prospect of the best of brine, and even of the fossil salt, as is evidenced by comparing the borings in Europe and the late boring near Abingdon in Virginia, with the report of the engineer employed at Galen. The diameter of the tube bored is 4 inches, and 230 feet deep. The vein is strong, and continues to run profusely over the tube, destroying all vegetation within its reach. It is uncommonly pure, producing the finest salt without the use of lime. The brine is forced up by the gas with a violence known no where else.—*Rochester Dem.*

Some Notices of the recent Experiments made in the Propagation and growth of Plants, in Charcoal. Extracted from the translation in the *Garden-Magazine*, from the "*Garton Zeitung-er's*

Since the publication of Liebeg's Organic Chemistry, charcoal seems to have become a more important substance in vegetation, and to possess more valuable properties than heretofore has been supposed. Recent experiments in Germany have resulted in placing it as one of the most important agents in the propagation of plants, which has ever been discovered. The theory of its operating has been explained by some of the German writers, which we shall have occasion to notice in our remarks. Believing the subject to be one of importance to all cultivators of plants, we have devoted a few pages to a notice of the experiments which have been made in Germany, and which are, at the present time, attracting attention in England, by the publication of several articles translated from the "*Garten Zeitung,*', of germany, in the Gardener's Magazine.

The discovery of the method of growing plants in charcoal was first made by M. Lucas, an assistant in the Royal Botanic Garden of Munich He observed several plants in the hot-house, that were plunged in charcoal ashes, [the dust,) or the refuse of charcoal, showed an extraordinary vigor of growth, as soon as they had pushed their roots through the holes in the bottoms of the pots, into the charcoal Among other plants which exhibited this vigorous growth so strikingly, was the Thunbergia alata, which ripened its seed without impregnation. M. Lucas struck with the appearance of the plants, thought it would be well to follow up the experiment: this he did by adding a proportion of charcoal powder to the usual mixt soil, in which plants were already rooted, and also by using it pure for cuttings, instead of sand. We shall divide the subject into three parts, viz:—Propagating Cuttings in Charcoal—Charcoal as a mixture with earth—and the Theory of its action on Vegetation.

Propagation in Cutting Charcoal.—M. Lucas, before proceeding with a record of his labors, describes the mode in which his beds were prepared for the insertion of the cuttings. He states that small boxes are suspended in the front part of a bed, [on the inside,) in the hot-house, which bed is warmed by means of a tube of sheet iron, instead of tan. The boxes have glazed sashes for covers; in one of these boxes he made the first experiment. The charcoal used for the purpose was, fir, [pine,] the refuse of which, being too fine to be burnt may be had in any quantity. It is sifted through a coarse earth sieve, to separate the large pieces that are usually mixed up with it, and is then used without further preparation. The charcoal, he remarks, is better if it has laid exposed to the influence of air and weather. In the propagating box, it is laid only four inches thick in the bottom, as a deeper layer would prevent the access of heat. charcoal, as is well known being a bad conductor. Thus prepared, the cuttings were put in. Cuttings of the following plants, placed in charcoal rooted in eight to fourteen days:—Euphorbia fulgens and picta, loomæ a purga, and I. superbs, Hakea microcarpa, Lobellia pieta, Thumbergia alata, Lycestria formosa, Passiflora religiosa and pendola, Begonia fagifolia, saguinea, and dipetala, Tropæ olum majus fl. pl., and several other plants. Cutting of the Cacti family, planted in charcoal, were particularly successful: of some hundred specimens that had been dried for some days previously in the air about twenty succeeded perfect among them were some echinocactuses melocactuses, and mamiliaries, many of them from one and a half to three inches in diameter. Cereuses and epiphyllums rooted readily, and in this short space of time the roots of many of the species were six inches long; other succulunt plants rooted quickly.

In from a fortnight to three weeks the following, very difficult of propagation:—Piper nigrum, Aster tomentous, Mimosa Houstoni, Barleria, bystrix, Alnus barbisa, and many others.

In from three to four weeks:—Croton adenophylla, Dracæna humblis, Pandanus amaryllidifolius, and several others.

In from six weeks to two months, a few exceedingly hard plants to grow, rooted in the charcoal.

These being the first experiments, some of which did not succeed well, allowance must be made for the newness of the method, and other circumstances attended upon resorting to new systems.

M. Lucas was also highly successful in rooting leaves and parts of leaves of various plants, some of which were the following:—Lophospermum scanden, Conlamen indicum, Sinnigia guttata, gloxima, &c.

It will be seen that many slow rooting plants have been more speedily rooted than by the ordinary method of propagation, and we trust that future experiments, conducted with care by our amateur gardeners, will show more particularly its results.

Application of charçoal as a mixture of earth.—The success which attended M. Lucas in his mode of inserting cuttings in charcoal, induced him to try it for another purpose, viz.. using it as a mixture with various sorts of earth. It here also showed its extraordinary effects, by the luxuriance and more pefect development of the plants; it was particularly the case with tuberous rooted plants.

A bed appropriated to the growth of seedling plants in pots, plunged in charcoal, was cleaned out and made ready for the reception of a lot of arums, begonias, gloxinias, &c.: the pots were plunged in the charcoal to the run, and the surface of the soil covered with loose mould from a dung bed. These tubers soon shot up vigorously, but owing to the frame being wanted where it was intended to remove them in the summer, they were allowed to remain. The plants absorbed a great deal, and needed water every day. When the pots were taken up in the fall, it was found that the roots had grown over and under the pots, and penetrated into the charcoal and grown so strong that it was absolutely necessary to replant the tubers in larger pots. Charcoal was of course mixed with earth in repotting, in the proportion of rather more than one half. Every plant soon showed extraordinary luxuriance under this treatment; some were particularly rich in the inflorescence, the foliage darker, and the period of the duration of the flowers unusually long. Some small tubers from which no flowers were expected the first year, flowered beautifully. Some Cacti grew beautifully, and several of the Mexican euphorbias showed great vigor.

The application of charcoal to the roots of sickly trees, was not less successful. M. Lucas states that an orange tree with yellow leaves, having had a layer of charcoal laid on, after the surface soil was removed, soon recovered its vigor; and this was also the case with gardenias. Of the quantity to be used, there is no particular rule: half charcoal may be used without injury, observing only that it has been exposed to the influence of the weather for some time, and the large pieces removed: watering must not be neglected, as the soil is rendered more porous, and the moisture passes off rapidly.

Many other experiments were tried, such as sowing seeds in charcoal: ferns, sown directly on the surface of a pot of charcoal, vegetated quickly and well.

M. Lucas observes, that his employer, the court gardener, M. Seitz, acknowledged the importance of the use of charcoal, and will practise a number of systematic experiments upon plants in the open air, in order that a "well grounded opinion on the application of charcoal ashes in general can be formed."

Theory of M. Lucas's Experiment on the Effect of Charcoal in Vegetation.—Dr. Buckner has published an account of the theory of M. Lucas's experiments in the "Garten Zeitung," the substance of which we give below, the original article occupying several pages. The experiments of M. Lucas, detailed above, are thought by Dr. Buckner to be very important contributions to vegetable physiology and dietetics, and his remarks are made with a view to introduce a clear scientific notion of the effects of charcoal on vegetable life. These effects are founded, undoubtedly, on several laws, of which the following appears the most important.

1. Absorbtion of light and generation of heat.—It is well known that bodies receive the light of the sun more perfectly, the darker, duller, and looser they are, and the consequent development of heat is in proportion of light. As charcoal dust is one of the darkest, dullest, and most porous bodies, it must, on account of its peculiar capacity of receiving the sun's light and changing its heat, be particularly favorable to vegeteble life.

2. Absorption of atmospherical air.—Among all porous bodies that have the capacity of absorbing gases and vapors, charcoal has been proved, by numesous experiments, to hold the first rank. Modern physiologists are, for the most part of opinion that plants can receive no solid nourishment from the earth, that is, that every thing they can assimilate (or digest) must be in a liquid and gaseous or vapory state. If we, therefore; meet with solicious earth, chalk, magnesia, oxide of iron, in short such substances in plants as could only be received from the soil, we may always consider it certain that these sorts of matter can only be absorbed by the roots in proportion as they are in a fluid or dissolved state in the soil. These sorts of matter, and particularly the different organic salts which we find in the ashes of vegetables, are not actually to be considered sources of nourishment; but stimulants to assist in digestion, as salt and spice are to the higher animals and man.

In connection with the subject Dr. Buckner introduces a treatise by M. Payen, read before the Academy of Sciences at Paris, on the 8th and 14th October, 1839, viz:—That charcoal operates as a condenser, under the influence of water, on the constituent parts of the air, in the manner as spongy platina on the elements of detonating gas; so that nitrogen and oxygen are dissolved. and. mixing with water, are absorbed by the spongioles, and carried to the cambium for assimilation. This property of condensing the air, and making it fit to be received by plants, does not exclusively belong to charcoal; but charcoal powder appears to possess this power in the highest degree. consequently, besides light and heat, is capable of carrying to the roots both air and water, i. e. nitrogen, hydrogen and oxygen, in the greatest abundance.

3. Decomposition of the charcoal, and formation of a nourishing substance for plants.—For a long time it was generally believed that charcoal, as an inanimate body, incapable of decay, contributed in no degree to the nourishment of plants, and that charcoal dust could only serve at most to make the earth looser and warmer. But M. Lucas found from his experiments, that the charcoal, in which plants grow, by degrees undergoes dicomposition, and at last becomes a sort of humus. This obviously takes place merely because the charcoal dust acts as humus, and with the co-operation of water and air, continually gives out to the plants oxide of charcoal, or carbonate, together with the saline particles which are in the charcoal and remain in the ashes after burning. But to prove this, some chemical experiments were necessary.

4. Comparative chemical examination of charcoal dust.—The more perfectly to establish the theory of the effect of charcoal on vegetation, M. Lucas gave me for examination.

1st. Ashes of fir [or pine] charcoal, in which no plant had grown.

2d. Ashes of fir charcoal, in which plants had been grown for half a year. [This was used for most of the experiments.)

3d. A portion of charcoal dust which had been used for another purpose for two years [to fill up a bed for plunging in plants.]

With these materials Dr. Buckner made the following experiments, which we extract entire:—

Two drachms of them were reduced to fine powder, and digested in three ounces of distilled water for twenty-four hours. All the three quantitise filtered off from the charcoal, were uncolored, and left the test appear unchanged. After the evaporation of the water, there remained only a very trifling yellowish residum of a saltish taste, which acted somewhat like an alkali, and, besides potash, contained also chlorine. No difference could be distinguished in the case between *a. b.* and *c.*

The portions of charcoal powder to which water had been applied, were each separately dgested in a sand bath that a three ounces of water, to which a drachm of corrosive lie of potash was added. The liquid filtered from *a* was almost colorless, and was not the least muddy when saturated with muriatic acid. The liquid from *b* was brownish, and with muriatic acid, yielded 0.46 grains of humic acid.

Two drachms of each of the three portions of charcoal were reduced to ashes in the platina crucible. The ashes of *a* weighed twenty-two grains, and lost, by shaking with distilled water, one grain in weight. The ashes of *b* yielded only nine grains of ashes, of which only half a grain was dissolved by the water. The ashes of *c*, on the contrary, weighed thirty-three grains; apparently because the charcoal powder, while in use for two years, had become fouled with garden mould: of these thirty-three grains of ashes, two grains were dissolved in water. The constituent parts of the three persons of ashes retained their qualities; so that in the dissolved parts were found potash, chalk, carbonic acid, sulphuric acid, muriatic acid, and phosphate. The portion indissoluble in water contained chalk, magnesia, traces of oxide of iron, carbonate acid, phosphate and silicic acid.

If the objection be made, with respect to these three portions of charcoal, that they are not all from the same tree and might therefore yield a different weight of ashes, we may, with probability, suppose that this natural difference is very inconsiderable, as the charcoal was all of fir wood from the neighborhood of Munich, where limestone *debris* is the general understratum of the woods.

The result is quite decisive and undisputed, that diluted lie of potash scarcely ever dissolves any thing from fresh fir charcoal, and that, on the contrary, charcoal in which plants have grown, being partly changed into humus and this being drawn out by diluted lie of potash, amounted in the charcoal *b*, after six months use, to 2.25, and in the charcoal *c*. after being two years in use, to 3.76 of 100. By this it is also proved, that charcoal, under the influence of light, of air, water, and vegetation, is gradually decomposed, by losing carbon; in the place of which hydrogen and oxygen predominate, and concur with the remains of carbonate to form humic acid.

No less interesting is the further comparison of the ashes of virgin the charcoal *a* and the charcoal which had been used half a year for vegetation; in this instance *a* and *b* were in the proportion of 122 to 75 of ashes from 1000 of charcoal. Undoubtedly the dissoluble salts were, in proportion to the increasing decomposition of the charcoal, absorbed by tha roots. That the greater weight of the ashes of *c* is not decisive, has been already mentioned. To make very correct experiments of this sort, charcoal from the same tree should be burnt, equally reduced to powder, and, in planting in this powder, all impurities of garden mould, &c., carefully avoided, and watering the plants with rain water attended to.

5. Antiseptic powder of charcoal.—The antisceptic powers of charcoal are of great importance, for it has very little power of retaining water, and the little it retains is partly absorbed by the roots and partly evaporated. This property deserves the greates attention of gardeners in respect to the recovering the health of plants, the roots of which have become injured by being in a clayey soil. and too freely watered or after continued rein, or being in conatct with manure not sufficiently decomposed. They should be immediately transplanted into charcoal powder, as the most effectual method of cure.

In concluding this article, which we have condensed as soon as possible, and that the same time preserve all the necessary information, in order that our readers may understand the experiments and be able to repeat them, we cannot be recommended the trial of experiments by our amateur cultivators of the use of charcoal, in propagating plants, as well as in renovating sickly and diseased ones. No particular care is necessary, nor are we aware that there is any material difference in the qualities of charcoal: oak, maple and pine are often brought to market together, and may be obtained in mixture, or may be separated and used by themselves after they have been powdered. As we understand it, the only care is to powder and sift the charcoal, using only the dust, which may be put into a box or pot, as is usual with common soil, and the cuttings inserted. We shall institute some experiments ourselves, and give the results in our pages. Those of our friends who may adopt M. Lucas's plan, will, we trust, keep some record of their operations and send us an account of them. A list of the plants experimented upon.—the length of time which they required to root, and other particulars connected with their growth, would be interesting, and furnish some data by which others might be guided in further experiments.—*Horticultural Magazine.*