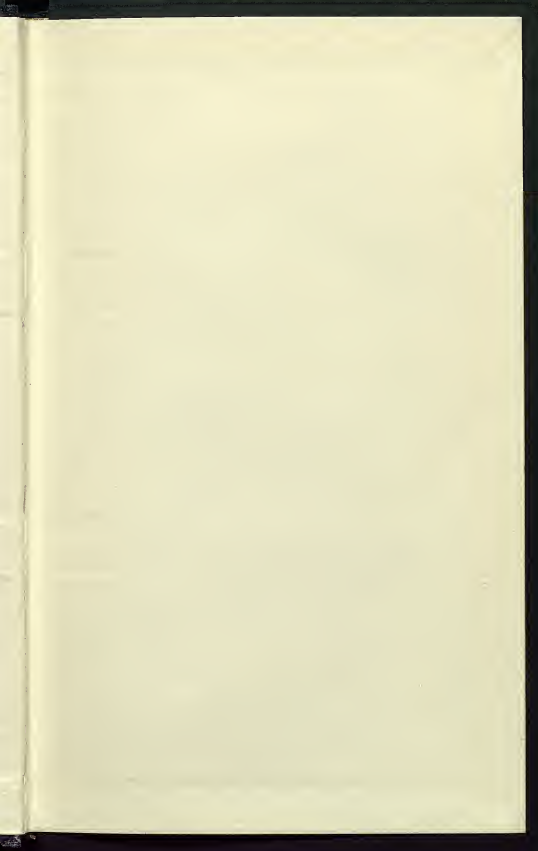


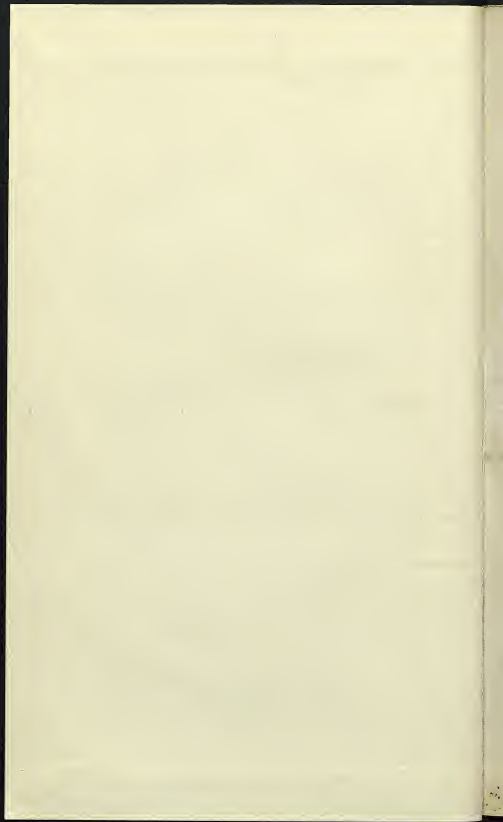
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By Charles Knapton

**OBSERVATIONS**  
ON THE  
**CULTURE AND STORING**  
OF  
**MANGEL-WURZEL,**  
OR  
**Cattle-Beet;**  
WITH  
**NOTES AND EXTRACTS**  
RELATING TO ITS  
**NAME AND INTRODUCTION**  
INTO  
**THIS COUNTRY.**

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## OBSERVATIONS, &c.



**T**HE Value of Mangel Wurzel, or Cattle Beet, has not, till lately, been generally known; but it has been found, by those who have made the experiment, amply to repay the expense of cultivation.

To ensure its vegetation, and afterwards to store, and secure it from frost and over-heating, require some experience. It may therefore be best, at first, to try it on a small scale; but, the proper management being acquired, a sufficient quantity should be grown, according to the nature of the farm, to ensure a supply for all the cattle, during that part of the year when other resources are most likely to fail. Some persons prefer mixing it with other food, for fattening, during the winter. But it is more generally used in February and March; on some farms it is doubly valuable in April, May, and part of June. A small quantity should, at first, be given with other food; and to Milch Cows, it should at all times be given with caution: two bushels per day is the *utmost* they should have, and *that in the stall*, lest some eat too greedily and injure themselves; for, although this root is of a saccharine, nutritious quality, it is, nevertheless, somewhat acrid, and occasions in Milch Animals and young Pigs, looseness, gripes, and sometimes paralysis.

This root will grow on any soil, and in any season, but vegetates most freely when sown early in the spring. On *poor heavy lands*, it cannot be sown too early in *April*, but *May* is soon enough on lands which are highly manured, or less liable to part with their moisture.

On poor lands, and lands less highly manured, or in ungenial seasons, it is, in its infant state, subject to injury from the Turnip Fly, and Slug; and on all soils, occasionally, from the brown Grub. The best method of securing a plant, is, to sow thickly: hoeing, clearing round the roots, and picking by hand, is the best remedy for the Grub.

The light-land Farmer has only frost to contend with, but the heavy-land Farmer must be guarded against rain also; each must therefore judge for himself, of the necessity or propriety of early storing. Early sowing admits of early harvesting, and the roots should be carted off heavy land in October; the experience of fifteen years having proved to me, that for one ton gained by increase of growth after that time, four times the value has been lost by the injury which the roots and land have sustained. Land intended for Beet, should be kept clean the year previous, and ploughed early; it should be worked fine, and have such tillage as circumstances may admit of, early in the spring. The seed should be deposited not more than  $\frac{1}{2}$  or  $\frac{3}{4}$  of an inch deep, and rolled in, unless the earth be too moist, in which case it might be slightly bush-harrowed. Dibbling in the seed, or marking with the drill, and depositing the seed by hand, is most common; but there are no means equal to the drill for *ensuring a plant in all seasons*.

Mangel-Wurzel does best planted in rows three feet apart, and the roots 15 or 18 inches from each other: this is sufficiently thick, as 11,200 plants may stand on an acre, which gives 5 tons at 1 lb. per root, or 20 tons at 4 lbs., and in like proportion. This distance admits of repeated ploughing during the summer, and with hoeing across it leaves merely the space which the plants occupy. I am here speaking



of common old tillage lands, and heavy soils, for there are other kinds which will grow double that number of roots.

If the seeds were all likely to vegetate, 3 or 4 lbs. per acre would be sufficient, but 5 or 6 lbs. drilled is better to begin with, though experienced growers would do with less.\*

Beet draws its nourishment from the surface, *only while in its infant state*: when once the tap root has taken hold of the solid earth, all the mould may be stirred about them, and it is beneficial to the roots to leave a hollow round them. Three hoeings should be given. The first slightly, to set out the plants and cut up the weeds; the next, as deep as the plants will admit; the third, as deep as the hoe can go; and the land should be repeatedly ploughed between the rows.

I repeat (because I find that some persons entertain a different opinion) that Mangel Wurzel *does not injure the land* more than turnips. I have seen land injured on which it has been grown, not by the root itself, but from improper management, want of tillage, and allowing the crop to stand late in the winter. But supposing that it does injure the land as much as Turnips, yet, as it increases the yard manure, and supports the cattle through the most *trying months*, it is of double value. In storing, I have not found it necessary to wait till the roots are dry, nor does the snow or rain, filtering through the heap, do any injury, provided it does not stagnate at the bottom. If a choice of situation can be had, a spot sheltered from the north and east winds, is to be preferred; *if not, a*

\* There are about 12,000 seeds in a pound, therefore, one pound of seed dibbled in, would be sufficient for an acre, if it all grew and no accident happened to the plants; but it is extremely dangerous to trust to any thing like this quantity, lest the fly or slug destroy them, and injure the crop; 16 roots will produce one cwt., and a single slug may destroy them in their infant state in the course of a night, and leave a blank eight yards long.

*well-trodden wall of haulm or straw is useful for a break*; and it is much better to build it round the side and end most exposed, than to load the heap too much. A slight covering of straw, with two or three inches of earth on the south side, and four or five on the north over the ridge, is sufficient; for I am of opinion that more have been destroyed by heating in the heap, than by frost. Air-holes should be left at top till towards Christmas, and even then at every ten or twenty yards.

As it may be interesting to some to enter into more minute detail, with respect to its merits, and introduction into this country, I subjoin the following

### EXTRACTS.

“Mangel-Wurzel, or the root of scarcity, was first introduced into this kingdom by Sir Richard Jebb, Bart., and presented to the Society of Arts.”

HALL'S CYCLOPÆDIA.

“The name in German (its native) is Mangold Wurzel: viz. Mangold, a Beet, Wurzel, a root.”

AMATEUR FARMER.

Dr. Lettsom obtained some of the seeds from the Society of Arts, and says, “The numerous experiments that I have made, especially in the year 1785, relative to the culture, the produce, and the use of the root of scarcity, have convinced me that it deserves to obtain a decided preference over *all other roots*; it may be preserved during *eight months in the year*, and is not subject to become rotten, as is the case with Turnips, which from the end of March, become stringy, tough, and spongy.”

“Turnips often fail, especially in hard lands; they require a light, good, and sandy soil, but the scarcity root will succeed every where.”

“The milk produced by Cows fed with the root of scarcity, produces both Cream and Butter of an excellent quality.”

“The root of scarcity is never disliked by Cattle; they eat it always with the same avidity and pleasure.”

“I shall esteem myself happy if the truths which I have stated should encourage the cultivation of a root, which may increase the riches of the state, and contribute to the ease and to the happiness of the people.”

"After having given the public every useful information in my power, respecting the Mangel-Wurzel, or Beta Hybrida, and after having distributed many millions of seeds for the purpose of experiment, time must determine how far my endeavours will prove so eventually."

"To the invectives which some of the public prints have exhibited against me, I make no reply. However estimable the regard of virtuous characters, he will involve himself in disappointment and remorse, who acts merely to gain the applause, even of the good, or to deprecate the censure of the envious; if my conduct have acquired the former, my motives render me indifferent to the latter."

JOHN COARLEY LETTSON.

"Dr. Lettson has bestowed much trouble and expence in the cultivation and distribution of this plant, and doubtless from the purest philanthropic motives: his zeal has raised up a host of illiberal and anonymous opponents, some to display their wit, and others their ignorance; but all have failed in their attempts to hurt the feelings or character of so good a man."

WM. HENRY HALL, ESQ.

"My seeds were sent me very late, *two months* nearly after the most *proper time* for sowing them, however, I ventured to commit them to the ground on the 12th of June; and in a few days, I had the satisfaction to find them all rise well, and in a vigorous state of growth: I have since gathered their leaves twice, and find their roots of such size as to promise a considerable profitable production. The measure of some of them is now 15 inches round; the length of a few I pulled up is 13 inches, and the weight of them on an average 4lbs."

SIR THOMAS BEEVER, BART.

*Letter to the Bath Society.*

"I am told that at Mr. Dashwood's, of Cley, in Norfolk, there are some which measure two feet in circumference. These were sown, at least *six weeks sooner than mine.*"

SIR THOMAS BEEVER, BART.

"One acre of Mangel-Wurzel, of 19½ tons, kept a middle-sized bullock 254 days, at 3 bushels per day, with chaff."

POTT'S FARMER'S CYCLOPÆDIA.

"Sugar, Rum, and Brandy may be obtained from Beet; the Muscovado, such as is obtained by the first operation, costs about three-pence farthing per pound, where the fuel is dear, and where it is cheap, it will cost half that sum."

FORSYTH, VOL. 2.

NOTE. There are many publications of modern date, which speak highly in favour of Mangel-Wurzel: too much so in my opinion. I admit all its good qualities, but it certainly is difficult to grow, store, and feed to advantage, until the management of it is fully understood; and we may fairly presume, that the want of this is the cause which has prevented its greater progress."

From what I have seen, the Hatfield Stock produces the greatest bulk, and is probably the most valuable species; there is no other which comes in competition with it, but the Yellow, and that is inferior in size, and not suited to heavy lands, as it grows more in the ground, and is more subject to fangs.

A child may *pull* the Hatfield Stock, if properly cultivated, but the yellow must be *dug up*.

Much difference of opinion exists respecting wetting the seed. Of course, seed which has been steeped for hours or days, will vegetate more quickly than seed which is dry, or it will spring up with a *slight shower*. When very dry, seed will not vegetate; but it should be remembered, that dry seed will wait for rain without injury; whereas, wetted seed, if deposited in a *dry soil*, may be destroyed. I have steeped seed for 10 days or a fortnight, and have kept it in a heap as long or longer (waiting for rain) and have obtained a good plant from it. It is advisable to dust the seed with lime to detect imperfect delivery.

CHARLES POPPY.

FINIS.

## APPENDIX.

The Treatise on the Growth of Beet having run through two editions, the Author was induced to reprint it verbatim in lieu of embodying it in this more extended detail, to shew that he has never advocated the growth of Beet unadvisedly, or advanced any doctrine he is not prepared to defend, as to the value of his "hobby." With a starving and unemployed population, it is necessary to increase our produce by every means in our power— it is a favourite theme with political economists, to state, that "we had better employ our labourers than to pay them without work." To this we subscribe, and apply the same inference to John Bull himself! viz., that it would be more prudent to grow enough for our own consumption than to import foreign produce and ruin our own agriculture.

"Why, millions pay for foreign grain,  
From British soil we might obtain."

The seasons of late have been ungenial to the growth of root crops; the land has not been well tilled, nor hoed, and the future crops have been injured. But by a different system, root crops may be grown to a moderate extent on heavy lands to advantage, and increase our store of animal food and produce of tallow, and give employment to a class of labourers, who, of all others, are least able to obtain employment; viz, the lame and infirm, and children and women.

NOTE.—"It is said Mangel Wurzel is good for cows, if too much is not given to them. I should like to know what is too much; as my cows have been fed with the leaves at time of storing, and with the roots since, to the amount of 80 lbs. per day; and one cow gives four or five gallons of milk per day."

Mr. D. GRANT, Lewisham.

*Country Times, April 4th, 1831.*

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The foregoing observations, on the culture and storing of Mangel Wurzel, were written in 1828, since which, the seasons have been unkind for preparing the land in due time, the plants have been backward and injured by the wet, and the following crops affected from the want of due tillage. I will, however, endeavour to shew, that it *may* be grown

to advantage without the possibility of failure or injury to the land and the following crops. My observations will apply to cold, heavy, and infertile soils *only*; the common practice being suitable for such soils as are clean, tender, and fertile.

On a heavy-land farm of 100 acres of arable on the four course shift, there will be 25 acres of fallow; if one-eighth portion of this is planted with Beet, (allowing for head-lands) there will be three acres to plant. *On such soils*, the size of the roots depend *entirely* on the tillage and manure; therefore, if the manure is confined to a small space, and the roots have the full benefit of it, they will be large in proportion.

To use a greater quantity of manure per acre than is necessary for *future crops*, is injurious to such crops, and rob other lands; and it is requisite to meet this difficulty, by increasing the distance of the rows, which also gives an opportunity for better tillage and planting early.

When farmers talk of the difficulty of preparing the land in time for Beet, or injuring future crops, it seems as if the whole fallow-breadth was alluded to, when one-eighth or one-fourth at most is required. On tolerably tender soils, and in tolerable seasons, such a portion may be got ready in time on the present system; *and if not, or any objection exist to grow Beet in the usual way*, the following may be adopted, if the keeping of all the cattle through the most trying months in the spring, and the swine through the summer, *at little cost*, is an object:—

*For convenience of calculation*, I will suppose the land to lay on half-rod stetches; let the furrows be opened soon after harvest. One bout on a ten-furrow stetch, over *three acres*, is a trifle over half an acre to plough, or one day's work, (four acres are ploughed at the same cost, as it is but a day's work for a plough). Within a month or so, gather a bout, this is another day's work; and as soon after as convenient, or immediately, go in the same furrows to in-

crease the depth and raise the ridges—(or this may be omitted) this is the third day's work—the land may be left thus all winter, or the intervals may be ploughed; but as far as the *ridges* and *Beet* are concerned, it is better left till spring, because the frost will mellow and enrich the ridges more. (If the land was of wheat, if the stubble is ploughed in, all the better, unless it is very stout.) One day's work in the spring will split open the ridges; and ten or twelve loads of manure being laid per acre, takes all the horses' strength *one day*; and another day's work, gather up the ridges again and cover the manure, this make five days work for *one plough*; the ridges being rolled may be drilled or set, or the seed may be dropped on the surface, and covered with a hoe; the plants being left, on hoeing at a foot distance, 16 roots will grow on a rod in *length*, and the rows being half a rod distance, two rows growing on a rod in *width*, gives 32 roots per square rod, which at 7lbs. per root, gives 2 cwt. per rod, or 16 tons per acre. A beast of 46 stone, requires 3 bushels per day, of four stone per bushel, or half a ton per week; therefore, an acre will feed a beast 32 weeks; or a cow, of the same frame, allowing two bushels per day, 42 weeks; or what is more likely to be the case, on a farm of 100 acres of arable, and a due proportion of pasture, the *three acres* may feed six beasts, four cows, four head of young stock, and the swine for eight weeks, from the middle of March till the middle of May; and being secured against frost and other casualties, it is a sure store of feed.

I shall not calculate the cost of ploughing, as that must have been done if no Beet was grown; all that I wish to show is, that the time it takes to prepare a due portion of land to keep the stock, is so trifling, that it may be done in *due time*, without interfering with other work; neither shall I calculate the value of the manure, as I expect to prove, that the Beet will exhaust little or none of it; and admitting that it does exhaust, the ploughing in the leaves will return as much to the land, and if not, that the manure raised by



feeding the Beet, amply supply the exhaustion. It may be observed, that the quantity of manure I allow, shows that I admit the exhausting nature of Beet, but this is not the fact; the more manure, and the better it is, the sooner the seed vegetates, and the stronger the plants, and the sooner they get out of the way of the fly and the slug; and the more rapidly they grow, the more it enables the plant to establish itself and bear the drought of summer, and the sooner it may be harvested; but when the plants are well advanced in size, the more the land is ploughed and hoed about them the better; it breaks the hold of the *fibrous roots*, which are needed only in their infant state, and cause the plants to strike stronger and longer tap roots, and draw moisture from the sub-soil. Hence the beautiful freshness of Beet, when all other plants are weltered with the heat of the sun; and in unison with the nutritious effects of the earthy and nitrous particles of the air, rain, and dew on the leaves, the roots obtain their food, and *not* from the manure.

As fresh mould, yard manure, burnt earth, &c., all produce roots of so nearly the same component parts, that no variation has been detected, we may presume, that the plant is endowed with the power of absorbing and appropriating the suitable gases for its own production.

According to White's analysis, Beet contains:—

Sugar .....	50 parts
Mucilage .....	22
Starch.....	2
Extract .....	6
Wood fibre.....	35
Water.....	.885

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1.000

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Hence it is evident, there is no deleterious matter in Beet, and 5 per cent. of sugar does not exist in the manure, consequently cannot be extracted from it.

A great quantity of manure inclosed *in a ridge, on a stiff tenacious soil*, causes it to be friable and mellow, *in spite*



*of seasons*, and admit the plough and hoe close to the roots, otherwise a greater space must be left unploughed, as wet would set the land, and drought would stunt the plants; and if the plough was passed near them in that state, it would break up the earth in lumps, and snatch out the roots, and the hoe could not enter the ground, and if it did, it would do injury; and if the land is not well tilled between the rows, when the plants are young, as well as during summer, the roots will not thrive; and the thistles, coltsfoot, and other root weeds will not be eradicated, but be ready to shoot up and cover the ground the following summer, and get the entire possession of the land before it is fallowed again; hence the injury to heavy land, from growing root crops, and consequently the advantage of growing Beet in preference to other root crops, as it admits of wider intervals, and more and closer tillage; and surely as much tillage ought to be given to land bearing a profitable crop, as is given to a naked fallow, without charging it with the cost. The expence of growing Beet *in this mode*, may be estimated as follows:—

Drilling or setting, and seed....	4s. per Acre.
Hoeing three times .....	3
Singling the Plants by hand ....	1
Pulling and topping .....	1
Filling and carting 40 rods.....	5
Covering the heap.....	1
Spreading the manure out of the ridges over the land after it is ploughed out.....	1 6

Total expence per Acre 16 6

If three rows were grown on the same space, it would cost three times as much for labour and seed, excepting the spreading out the manure, and this is nearly cancelled by taking less time to spread in the first instance in one row, than in three rows; three rows might produce a greater crop possibly, but I doubt even this, taking an average of

seasons, *on such land as I am alluding too, with the same quantity of manure*, and the land could not be so well tilled; and if 4 tons more (all that I expect would be obtained) were grown, it would give only two pounds value, and deducting the extra expence, (thirty-shillings) we may call it nothing gained on the Beet crop, and probably a great loss in the following crops.

In advising a trial of such wide intervals I speak only of such lands *as would otherwise be long fallow—here is no loss of ground*, and it gives an opportunity of making as good a fallow as if no crop was upon the land. I am aware it was formerly said, that a cross ploughing was as good as a coat of muck; but this does not apply now—there is better farming and better implements; the harrow, scarifier, and roll, may be used between the rows, the roots will occupy only *what was the furrow, and may be the furrow again when cropped*. The intervals should be gathered the last time of ploughing, and the roots left on a ridge for convenience of ploughing out the manure, and this will make the fourth ploughing *this portion* of the land will receive; the roots may be ploughed out, but this I do not advise, except the roots are bad to pull or weather threatening.

Many may suppose I have taken the weight of roots and crop at too high an average; it may be so, but I think not. The roots will be large *if planted early with such tillage and manure*, and the wider the rows the thicker the plants may stand in the row; some of the heaviest crops have been obtained from roots nearly a yard distance each way, many weighing 20lbs., and some upwards of 30lbs. it is said.

There is so much difference of opinion in respect to the value of Beet and the propriety of growing it, that I am induced to endeavour to meet *all* objections, and shew the advantage of growing it *by every means I can*, and under *present circumstances in particular*, as *nearly all the expence is for labour*. To say, that oil cake is cheaper than roots is a farce. If it is found profitable to use cake,

it would be folly to neglect it ; but it is no argument for not growing root crops *also*. Besides oil cake is not suitable to feed cows and swine, and too expensive for young stock, including colts ; but it must be evident, that Beet is cheaper food than corn or cake, and doubly valuable to other root crops, *at the season when it is most wanted* ; besides, I am an advocate for keeping our money at home. Beet *may* cost in labour, including feeding, two pounds per acre, or for three acres on an arable farm of an hundred acres, six pounds ; or in a parish of 1000 acres of arable, sixty pounds, or the wages of two labourers for a year. Cake at 10 guineas per thousand and allowing four cakes per day, would cost nine pounds twelve shillings for thirty-two weeks, or twenty-eight pounds sixteen shillings for feeding the same number of beasts as are fed *by three acres of Beet* ; thus, deducting the cost of Beet (six pounds) the cost of cake exceeds by twenty-two pounds sixteen shillings, or if adopted through a parish of 1000 acres of arable, it would cost for cake two hundred and eighty-eight pounds ; and this sum gone into the pockets of foreigners chiefly to pay for foreign labour, whilst our own labourers are pauperised for want of work, and the poors' rates increased.

I may be thought to have assumed what may not be true in respect to the effect of Beet on land and manure, and consequently on future crops. I have tried the experiment both on Beet and *Midsummer Potatoes*, and cannot find that either reduce the virtue of manure. It is the want of due tillage that injure the land and future crops ; but lest I am thought obstinately to advocate the growth of Beet, I add facts and testimonies of others which have come to my knowledge. I *chiefly* state what has been related publicly, and, therefore, I presume may not be against the wishes of the parties ; and merely select one or two facts on each subject in dispute.

" I don't knew that I could farm without Beet."

MR. B. COLCHESTER, Woodbridge.

"Farmers don't know the value of Beet. We could not keep half the swine we do if it was not for the Beet. We have grown it nearly twenty years."

Mr. JOHN EDWARDS, Brockford.

"I wean all my calves (8 or 10 in a-year) on Beet. I begin to give it them cut small, with bran at a fortnight old, they soon eat it, and thrive more than on any other food. Fowls do well on boiled Beet and bran. I don't care how many are kept now, as no corn is used. I give it to the cart horses in spring, and my cows are fed with it."

Mr. JOHN EDWARDS, Flemmings Hall, Redlingfield,  
and late of Great Burstead, Essex.

"I find my weaning calves thrive better on Beet than on any thing; much better than when turned out to grass. I feed my cows, horses, and every thing, on Beet in the spring; think it better than any other root crop; it don't hurt the land more than turnips; I think it may affect the last crop, but it is a valuable food for every thing, particularly for horses in the spring. Grow it from 24 in. to a yard distance, according to the nature of the land."

Mr. WM. GOODING, Witesham.

"I think Mangel Wurzel a capital thing for cows, if fed in the stall, so as each have a proper quantity. I find no difference in the butter, but think it may be longer in churning. I rear all my calves on Mangel; give it them cut small at first. I have had better Barley after Mangel than after Turnips."

Mr. WM. ALEXANDER, Helmingham.

The testimony of these three farmers sets the matter at rest as to feeding cows and weaning calves, as they are remarkable for good stock and good keeping.

"I don't believe Beet injures the land if it is well ploughed and hoed between; but if it did, it makes a good yard of muck to go on other lands, and makes it up; or if it did not, it is so valuable that I should grow it."

Mr. RICHARD FLOWERDEW, Witesham Hall.

"I always grow Beet for my cows and young stock in the spring; the expence we think nothing of, because we must pay the labourers if we don't employ them. I grew part of a field with Beet, and part was long summerland; the Barley was much the best where the Beet grew, the Clover was good, and the wheat after it produced four coombs an acre more than after the long summerland; but I mucked for the Beet; the other part was not mucked."

Mr. WM. LING, Otley.

Here is a proof, the Beet did not absorb the goodness of the manure.

"I should have been ruined in these times if it had not been for the Beet; my beasts do as well on Beet and Clover as my neighbours

on Turnips and Bean-meal; I give my horses the crowns, and they are very fond of them; I feed with white turnips first, then Swedes, and finish with Beet. Last year I could not come at my Swedes during part of the time the frost lasted, and I gave my beasts Beet for a time; and I had much difficulty in getting them to eat Swedes well afterwards. I don't muck for Beet; I get about 25 chaldron loads per acre."

AN OLD AND STEADY BEET GROWER.

"I always grow Beet. I begin and finish my beasts with it; they have always done well with it."

MR. BIRCH, Sen., Grundisburgh.

Mr. Birch is an old and experienced farmer and cattle dealer.

"In Sept., 1828, I took five score of stock ewes to keep for Mr. Arthur Biddell, of Playford, they were part of a large flock (not selected.) I let them on a piece of Beet, and left them to please themselves, whether to feed on Beet or Stubbles; they fed chiefly on the Beet for six weeks. Tups were put to them (as well as the remainder of the flock.) On Michaelmas-day, these five score lambed down first, twinned most, and both lambs and ewes were stronger than the rest of the flock."

CHAS. POPPY, Winesham.

"I spread the leaves of Beet off two lands on a centre one, and the effect was as great as if a good coat of muck had been laid upon it."

MR. SAMUEL BIRD, Cransford.

"I gave my cows the leaves off my Beet during the late dry summers, or they would have been starved. I did not see that it injured the roots."

MR. LUCOCK, Grundisburgh.

"Rabbits thrive better on Beet, and are in better health than on any other food."

B. R., Ipswich.

The foregoing are all persons with whom I am acquainted, and residing in Suffolk; but lest even this abundant testimony in favour of Beet should not be sufficient to remove all doubts, I insert the following extracts from the Doncaster Report.

The Doncaster Agricultural Association submitted a list of queries to Gentlemen and Farmers in different counties, with a view of eliciting information on the

merit of *Mangel-wurzel* as a Cattle crop; the following Report is founded on the returns in answer:—

“The answers are from every description of soil, *nine* from *sand*, *six* from *peat*, *four* from *clay*, and *four* from *chalk* or *limestone*.”

“The greatest weight reported to be obtained by our correspondents is by Mr. Simpson, of Babworth, 54 tons. In comparison to Swedes, *ten* decidedly prefer *Mangel-wurzel*; viz., Lord Althorp, Mr. Blythe, Mr. Bulling, Mr. Cross, Mr. Gibbons, Mr. Paley, Mr. Park, Mr. Snowden, C. C. Western, Esq., M. P., and Mr. Warrie; two gave a partial preference to Swedes, and the rest have not expressed an opinion.”

“With respect to the effect on succeeding crops of corn, *six* give it as their opinion that it is more detrimental than *Swedes*, (two of these say to the amount of one-fifth) *eight* describe it as *not injurious*, the rest have not made any statement.”

“Lord Althorp alone has put the comparative merits to the test by feeding two oxen on *Mangel-wurzel* and *Swedes*; the result was, that they increased in weight each of them on *Mangel Wurzel* much more rapidly than when on *Swedes*, in proportion to the weight consumed. The next year Lord Althorp tried the same experiment on a single beast, and the result was the same.”

“The Committee consider there must be some land on every farm not fit for turnips; but, as with the same quantity of manure a larger bulk of produce can be grown of *Mangel Wurzel*, and for all a change of fallow crop is desirable, they strongly recommend the introduction of it into every farm in the country.”

The Doncaster Report is sold by Ridgway, 169, Piccadilly, London, price 6d., and is well worth reading, as the information is collected from many counties, and relates to every soil.

In the Doncaster Report I see two, viz., Mr. Born (who speaks of a sandy soil) and Mr. Cross (who speaks of its effect on peat) state, that the deficiency of the succeeding crop of corn after Beet amounts to one-fifth. Admitting this to be a fact, and ten coombs of barley was grown per acre, there would be a deficiency of two coombs per acre. This it appears, arises from growing Beet at 27 or 30 inches apart; and therefore do not interfere with my plan. However, as this is an important point to consider, and on which

so much difference of opinion exists, I shall endeavour to explain the subject.

In the first place, in many instances it is proved beyond a doubt, *that it has not injured the future crops*, therefore we must suppose, where a deficiency has occurred it arose from want of due tillage between the rows, or from the state of the land when carted off. In the next place many think, if the Beet is a full crop, the leaves being regularly spread and ploughed in *directly*, return at least as much as the roots detract from the soil; and all these assertions are founded on experience, (of course soil and seasons and time of harvesting the crop have much to do with it) but giving up all benefit arising from the ploughing in the leaves, as an acre of Beet will make ten loads of good manure in feeding; this will increase the produce of an acre of land at least as much as the deficiency stated to be caused by growing Beet. If spread on the same land where the Beet grew there would be no deficiency, and if on any other land it is made up. But we cannot suppose any tap-rooted plant in itself can injure the land; but if the land is taken up with it so as no tillage can be given, or but imperfect tillage, the land is injured for the want of it; this particularly applies to heavy land.

I may be thought tedious in going into minute particulars in respect to cost and value, but I am writing more particularly for the information of small heavy land farmers, who are apt to judge hastily, and give up or refuse to try a new crop, and incur a loss and inconvenience; and as this little tract may travel out of the district in which my provincial terms are understood, I add a table of weights and measures, &c., on which I found my calculations.

In speaking of weight of beasts we mean when fat; and of cows of a frame capable of coming to the same weight. Stetches, more than four furrows; ridges, four furrows or less.

Lbs. of.....	16 oz.
Stones .....	14 lbs.
Cwts. ....	112 lbs.
Tons .....	20 cwts.
Rods.....	5½ yards.
Acres .....	160 rods.
Loads .....	38 bushels.
Coombs .....	4 bushels.

If Beet is grown on sands, peats, chalks, &c., where other cattle crops might be grown, the only advantage expected is, that it produces a greater bulk and is not subject to any casualties, and, that it will be of more value in the summer when the pastures are burnt up, or in the spring when other crops are out of season and the spring produce not well advanced, or as food for swine, &c. On such soils the question is, *which it is most profitable to grow*; but if grown on clays and other tenacious soils (not being in lieu of any other crop but in addition) the only question is, *what it cost to grow, and what it is worth to feed.*

I have estimated the roots to weigh seven pounds on an average, and a bushel to weigh half a cwt.; and three bushels for a beast of 46 stone per day, with due allowance of hay and stover. Hence 24 roots feed a beast one day, and a man will attend a yard of twenty beasts. Fattening stock require the roots to be sliced; store stock do not.

Three bushels per day consumes 10 cwt. per week, and of course 16 tons keep a beast 32 weeks; the cost of *labour* for an acre being two pounds, it would cost fifteen-pence per week per head; the value of keep at *that season may be* 5s. per week, (I merely state this as a ground-work of calculation, it may not be worth so much, as other food must be consumed) or eight pounds per acre, and for three acres grown on a farm of 100 acres £24, *but call it* £21, and deduct £6 as cost, and it leaves £15 as profit, or £5 per acre. It may not prove to be so much as £5, as it depends entirely on the price of beef, but it is something; and



if store stock is fed with it, it has an *extra value*, as it keeps the stock in health and condition, and off more expensive food; it cost less per head to tend than for fattening stock, and cows and young stock require nothing but straw with it, at least they will live very well upon it; cows of a small size require but two bushels per day, or an acre for 40 weeks; young stock but one bushel per day, and are kept twice as long; swine are kept through the summer at the same trifling expence; of course I am speaking of Beet grown on land *which would otherwise be fallow*. This may seem an exaggerated calculation, but it is no more strange than true that I know of, and even that expence is incurred for labour.

Lest this portion of the treatise is dlpt into, and the reader is surprised to find this statement, I have to remark, that the *rent, tilhe, and rates* may remain the same, whether the land is cropped or not in common, and *excepting the tilhe invariably*. I go no further than what may be tilled and managed without loss of time in busy seasons, and it requires *no extra labour but the hoeing and carting off*, and it fills up a vacancy in the routine of feeding cattle, which, till Beet was cultivated, was frequently expensive or injurious to the cattle. Having a store of Beet enables a grazier to keep his stock on, if the markets are glutted; and if it is decided to rid them, it is no ill store, all the store stock will live on it till May out, and eat a considerable quantity of it when out on grass, if thrown out to them, or in the house safe from flies, and thrive more with this mixed food than on any other; swine will live on it through the summer; colts are fond of it; it is good food for horses when the stover gets dry in the spring, and particularly for old horses; in fact every thing eat it, and *all ought to have it*. I sometimes see poor half-starved devils of cows, horses, and hogs, that can scarcely rise alone, when they might have been fat if their improvident master had troubled himself to grow an acre or two of Beet, even without manure.

I consider an eighth portion of the fallow will keep the stock usually kept on farms, with one-fourth pasture, for seven or eight weeks, even if grown at the distance I have calculated upon; if a backward spring happens, it keeps the stock in condition, keeps the cows in milk, and keeps them off the pastures till the feed is well grown; and by this means, probably, two acres of grass are saved for the scythe, for one of Beet consumed, as it would require a double space if the pastures were turned on when short in feed, or if fed too bare, and if drought occurs there is no feed all summer; or it spares hay, and provides against the want of it, and keeps the horses off the tares till well grown.

As to the propriety of growing a greater breadth than is sufficient to keep the cattle during the spring, this must depend upon circumstances. Beet is *doubtly valuable as a spring feed, but is of no more value than other roots at any other time*, and probably not of so much value as Swedes to feed alone; but as the crop is larger the acreable value may be equal. It seems advisable to grow Swedish Turnips for more early feeding if possible; but if not, Beet is the best substitute, and offers itself as a friend in need at all times and all seasons.

All the cattle and sheep should have salt when fed on any root crop; and when on Beet, if they have not a liberal allowance of hay or stover they should have malt combs; the additional expence is amply repaid by the thriving of the cattle, and *again* by the addition to the manure. But some, I find, think straw is as good for cattle feeding on Beet as hay; "being more binding, they require no malt combs." But surely this cannot be correct; at least, they will consume more Beet if no hay is allowed.

Many have given up growing Beet, but in no instance that I know of from any just cause; trying it on a small scale they approved of it, and increased their growth till they grew more than they could

attend to, more than they could get the land in order for in due time, more than in a ticklish season they could till or hoe during summer, and store if wet weather occurred, without injuring the land; *and the land being ridged across, if it was not ploughed immediately it was sodden and livery*; and all this work is to be done when on a heavy-land farm there is the least leisure, and mucking and ploughing for wheat were neglected. Others have given it up because the tithe was taken in kind; and others, even where a small breadth was grown, because it is "a deal of trouble;" but I believe the most injury is occasioned by harvesting too late, and which has occasioned more to give it up than any other cause.

In estimating the cost of growing Beet, I have calculated the distance to cart at 40 rods, because if grown on outlaying lands, it is advisable *to store and feed it there*, as being used late in the spring, the cattle require nosheds, and a temporary yard is made at less cost than carting the roots, and haulm and stover (if grown near) to the homestall, and the manure back to the land; the manure is made where it is wanted; but this applies only to grazing beasts and store stock; for cows and swine, it must be carted home, or other grown for them.

I have not seen several treatises on Beet which have been recently published; possibly they may not accord with what I have written; a portion of my observations will be original, no doubt; others may corroborate, and therefore, I do not hesitate to give my opinion; most probably few, if any, will adopt my plan of excessive wide intervals; or, if they did, would be induced to sow turnips amongst the Beet, as I have seen practised even at three feet intervals; this *may* be done, and the turnip and Beet leaves fed on the land, but all the benefit of late tillage and aration will be lost, and the deficiency of the following crops *must not be attached to growing Beet*.

Some may be induced *to increase the width of the rows*, somewhat, possibly, from seeing my observations; but there is only one means of doing this safely, and those who have ploughed their land ready, may adopted it. I cannot give up the plan of putting a large quantity of manure in one row, as described, if mucked at all; and I think few will expend as much more for a second row, making together, 20 or 24 loads per acre; therefore, I would advise, that provided the land is on 10 or 12 furrow stetches, that the manure *be all laid in the furrows*, and gather a bout upon it, and drill or otherwise plant the seed upon it; horse-hoe the intervals, and plant one row upon the middle of them, *without manure*; the row on the manure will probably produce what I have stated, and the other *half as much*; thus it bids defiance to soil and season *on the one row*, and good tillage will do wonders with the other, if the season is tolerable; if it fails, there is only the seed lost. In ploughing the first earth, the land should be gathered *to the ridge on the manure*, and the other *left on a ridge*, and thus alternately, as often as ploughed, leaving the manured row on a ridge *the last earth* as described. For convenience of ploughing out the manure, and spreading on the land with the leaves, it may then be ploughed immediately, or not, as most convenient; the benefit of manure from the leaves will be lost if not ploughed, but no other loss or danger occur, as the land will lay in a proper form, and when ploughed, the space on which the *Beet grew without manure, will be the furrow*; by gathering round every alternate row, the land would always lay on stetch, except merely a ridge, on which one row of Beet grow, and be secure from injury from wet during summer, or danger of not being able to plough after the roots were off, as is the case where the land is *ridged across the fall of the land* in the common mode; and by this means, the land may be ploughed *any depth*, and the furrows well turned, without injuring the plants, as in gathering the first bout, a fleet furrow may be taken, and increase the depth every bout, as more room is obtained; and when the land is reversed, that which was ploughed fleet may be ploughed

deep, and the wider the furrows, the better, as it prevents the horses from treading on the roots; this is not the case in narrow intervals, or by any other mode of ploughing, even at this distance; this is the distance Tull advised 100 years since for common turnips, and he was right as to heavy land. Swedish turnips and potatoes may be grown in the same way, I may say *must*, to make sure of a crop and not injure the land; but as it is my intention to enter fully into the subject of other root crops, or possibly cattle crops in general at some future time, I need not say more on the subject here.

I have adopted the cognomen as used by the several authorities I have quoted, but have used the genus myself in this appendix, as most convenient. In purchasing seed, it is advisable to distinguish the species, but in speaking of the root it is not necessary.

The Germans significantly call it the scarcity root, and Mangold Wurzel, which we may understand to imply the most useful root, the golden root, or the king of roots, and if we except the potatoe, it may be so; as in feeding

Beasts, it produces .....	Beef.
Sheep .....	Mutton.
Swine .....	Pork.
Poultry .....	Fowls & eggs
Rabbits .....	Rabbit.
	Veal,
	Milk,
Cows .....	Cream,
	Butter,
	Cheese.
In Italy it is sliced and baked and eaten as.....	Bread.
It makes tolerable .....	Beer.
The wort (being dredged with flour or potatoe farina.)	Yeast.
The wort distilled.....	Whiskey.
Rectified.....	Gin.
It produces 5 per cent. of .....	Sugar
The Sugar distilled produces .....	Rum and
	Brandy.
The extract, with due proportion of water, produces a tolerable breakfast beverage, or substitute for.....	Tea or Coffee and Sugar.
Boiled down, it produces a syrup, good for Sore Throats and Coughs and spares .....	Physic.
The Leaves boiled, are eaten as.....	Spinage.
	Wine,
And in the shape of Sugar and Molasses, it enters into the composition of .....	Vinegar,
	Cakes,
	Pies, &c.
And will grow on the lofty down, the arid plain, and putrid bog.	

Hence it appears an important production to emigrant settlers and Irish locators, and for whose consideration in some measure I append this list of transmutations. Two pounds of seed will produce an immense bulk on rich new land on a small space, and may be obtained with little labour; it grows more rapidly than almost any other plant, and once obtained, keeps from one season till another. Potatoes and Beet alone will prevent starvation till the golden grain arrives at maturity, or bar against the failure of this more fickle produce; and also in some measure guard against the want of water, as the leaves first supply the cow with succulent food and enable her to forego the want of it, and produce milk to allay the thirst of the family.

It may be thought a trifling matter to *increase* the growth of cattle crops on heavy land fallows to the amount of one-eighth; but as a national concern it is an important question. I can give but a very imperfect and local calculation, but will give an outline at a guess, taking my data from three counties I am well acquainted with.

The counties of Norfolk, Suffolk, and Essex, contain 3,936,600 acres. Throw off the 936,600 for roads and wastes, one million for light land, and one million for pasture, and there remains one million for heavy arable land. Deduct two hundred thousand for fences, &c., and it leaves 800,000 acres. This, if farmed on the four-course shift, gives 200,000 for fallow. One-eighth of this (25,000 acres) planted with Beet would cost in labour 50,000*l.*, and the value of the produce would be 160,000*l.*; and this on land which *would otherwise be naked fallow, subject to the same outgoings of rent, rates, and expence of tillage*; and even the *amount of labour paid in poors' rates*: and if another eighth portion (which it seems very possible might be grown) more than is grown, double that amount. The only question to decide is, *whether the growth of Beet and Swedish Turnips injure the following crops of corn; or if it does, whether it cannot be made up by extra manure.* I have shewn, that *I believe it does not shorten the produce*, and if it did, that it would be

made up by the manure raised in feeding it, and if not it may be *remedied with little expence*, as the following statement and notes appended will shew.

In speaking of feeding with oil cake, I did not allow for the increased value of manure. My opinion is, that as much produce, either of turnips or corn, may be obtained by expending *half* the sum in burning earth; and if so, half the estimated value of the manure made from feeding with cake would be saved, and the other half would be paid for labour and reduce the poors' rates; and thus *the whole would be saved*.

As the opinions of the Beet growers, which I have inserted, were collected sometime since, I have made enquiries of several of late, to ascertain whether they had altered their opinions; some I find have not succeeded so well the last three seasons from the wetness of the land, but others have found no difficulty and are more convinced than ever of the value of it. Mr. Gooding informs me, that he saved 7 tons of stover last spring by feeding 7 horses with Beet. Another, whose opinion I had not quoted, says his cattle would have been starved if it had not been for the Beet, having nothing else to give them; all his layers fail, but he is not the least alarmed as he *has learned to grow Beet*. Another says he has never failed of plant; seldom muck for Beet.

Having read Mr. Martin's (Nacton) Treatise on Beet I select the following extracts, which corroborate all the other evidence on the value of Beet:—

“Mangel Wurzel planted at 2 ft. intervals and 15 in. in the row 50 tons per acre, of many of the roots which I weighed 8 make a cwt., one weighed 21 pounds.”

“To our milch cows it has been their sole support (bean straw excepted) for six weeks, and I have enough for 10 weeks longer; I give nothing else to our sows and suckle pigs, save a little poor wash, and I never saw sows in finer condition nor pigs growing faster.”

“As a substitute for corn and hay, I think Mangel Wurzel stands unrivaled; the Swedish Turnip is well adapted to feeding sheep, farm horses, and swine, and also for milch cows, but then it is not in every farmer's power to grow them, and there are many objections

not here to be mentioned; but not so with Mangel Wurzel; for milch cows they are invaluable, they impart to the butter a delicate flavour; to swine they are incomparable, as I firmly believe they will refuse every other kind of food for them, clean corn excepted."

"Geese fattened on Mangel Wurzel cut in small pieces and thrown in their water, when killed eat much milder than when fed on corn."

"Poultry of all kinds uniformly devour them with avidity; hares will not touch turnips whilst Mangel Wurzel is growing near by."

"I grew 28 tons per acre *last year*; I advise heaps of 600 bushels, and if the roots are not used till middle of April or May, that the heaps should be opened and, if convenient, carted into some outhouse or barn; and *lastly*, the farmer who has once grown these roots will always endeavour to do so again, and his exertions will be redoubled to give every possible security he can, as he becomes more and more convinced of their invaluable qualities and irresistible claims to his attention."

"Let the judicious farmer bear in mind, that if his land is in the state it ought to be when this crop is cultivated, it will grow him a good crop or two without manure, as is the case where I have cultivated it."

Mr. Martin adds a letter from Mr. B. Baker, of Maldon Hall, Essex, in which he says—

"Mr. Burrell, near Maldon, grew 38 tons per acre of Mangel Wurzel, many of the roots weighed 28 pounds each; Mr. Johnson, near the same place, grew 42 tons per acre, some of the roots weighed 32 pounds; Mr. Hance grew nearly as much as Mr. Burrell, and sold it at 20s. per ton."

This was the extent I had prescribed myself, but am induced to add an addendum, to meet some objections (last shifts) of my opponents.

Every day convinces me more and more of the value of Beet. At the present time, (April 16th, 1831,) those who have a store of Beet have no difficulty in keeping their stock, others are feeding their pastures bare, or their cattle are starving. I am constantly receiving information of some new or corroborating fact in favour of it, and select the following, as particularly applicable to confute disputed points:—

"Major Ray, of Eldo House, near Bury St. Edmund's, grows Beet in preference to any other cattle feed for spring use. Last year, a 10 acre field, abutting on the great road, was sown with Beet and Swedish Turnips on each alternate stretch the field through; the Beet was



started off, and the Turnips fed on the land; the barley was so much better on those stretches where the Beet grew, that it was observed by every one who passed by."

Mr. DENTON, Bailiff to Major Ray.

"I am constantly passing a field, one half of which was of Beet last year, at 21 inches distance; the other half, of Potatoes, at three feet; the Wheat promises 8 bushels per acre more on the Beet land than on the Potatoe land at the present moment."

C. POPPY.

"I grow my Beet on land which comes in course for Beans; I do not muck for Beet, nor for the Wheat that follow the Beet; I obtain better Wheat after Beet without muck, than after Beans where mucked. The Beet and Wheat are worth as much as the Beans and Wheat, and the muck spared for other land."

Mr. STRANGE, Thorndon, near Eye.

"Mr. Dewing, of Barmer, Norfolk, who keeps a large flock of sheep, grows Beet to feed his ewes and lambs in spring, and prefers it to any other food for a time."

Mr. FLOWERDEW, Wituensham Hall, near Ipswich.

"I have fed my horses this spring on Beet, bean meal, and bran, viz.: 3½ bushels of Beet, half a bushel of bean meal, and 5 pecks of bran per week; they eat little stover, and I never had my horses in better condition, nor do their work better."

Mr. MILES CUTTING, Clopton, near Woodbridge.

From every enquiry, and from every information I can gain from pamphlets within my reach, I am confirmed in my opinion in respect to the extraordinary value of Beet. "A friend in need is a friend indeed." It offers itself on all soils and all seasons; all cattle, sheep, swine, poultry, game, goats, and deer are fond of it; it puts the heavy land farmers on a nearer level with the occupiers of less tenacious soils; and I am quite convinced it may be grown *at less expence than any other root crop*. I have grown it myself for 20 years on very infertile soils, and commonly without manure, in fact I consider I *cannot grow it with manure*, viz: if I get a plant the crop would be in bulk according to the quantity of manure used in some degree; but in tilling our lands in spring, if it is a dry time, we lose all moisture, and the seed will not vegetate; on the contrary, if wet, we can do nothing with it, and the season is lost; hence the necessity of adopting a stale furrow and early

planting; it is true early planted Beet will some of it throw out a seed stalk, but if one in an hundred run away the remainder would be of double weight and make it up, besides if the tops are chopped off with a hoe the roots will increase in size and not be much the worse in quality; or the roots may be drawn and given to the swine, it is excellent summer feed for them and cows, and the carts can always go amongst them; but gardeners sow Beet in March.

Being now convinced, from being borne out in this opinion by others, that valuable crops of Beet may be grown on land without manure, where the last crop was manured for, I will state the best mode of proceeding to escape all difficulties and danger of injuring the land, or future crops. This practice may seem to militate against what I have advanced in a former part of this treatise, but it may be reconciled; *a little muck is of little use*, and the danger of being too late in planting, and other casualties, are nearly equal to the advantage of mucking for Beet *on such lands as I have described*. The land should be ploughed early and laid dry; if on 8-furrow stetches I leave the occupiers of such to please themselves about the width of the rows, as it is too wide and too narrow a space for my calculations, but if on 10 or 12-furrow stetches a bout may be gathered to the furrows as I have described, and the centres left; or what is better (if time permits) go up the side of the stetch and take up the third furrow, slice and throw towards the furrow and down the opposite side the same, and thus continue to split open the stetch, and leave it on small stetches; in the spring scarify and plant one row on each stetch, and proceed to gather too each alternate row *as described*; this is far preferable to splitting and gathering each interval, for reasons before given.

When the roots are carted the leaves may be spread along the furrows on each side the ridge and covered by the plough; this will be the centre of the stetch when ploughed, and the manure from the leaves will amply supply the exhaustion occasioned by the Beet, and the space where the other roots grew will be the furrow; if the land is intended

to be manured the land lies in a proper state, if not *it is safe*; if a doubt exists as to the furrow sides being weak, three loads per acre of manure will be sufficient, as it is but a space of two furrows in width, or, if left according to a former calculation, the deficiency would be but five pecks per acre, as it is but a sixth of the space.

The weight of the crop will depend very much on the nature of the soil and previous state, but the roots no doubt would average 4*l.* The distance of the roots in the rows may be 18 inches, making 11 roots in a rod in length, or 44 (calculating on the 10-furrow stetches) on a square rod, or 13 tons per acre; and as half a ton per week will keep a beast 26 weeks, which at 4*s.* per week (I take weight, measure, and value at the very lowest) is 5*l.* 4*s.* per acre; or for 3 acres, 15*l.* 12*s.*, and deduct the expence (being double my first estimate from there being double the number of rows) 4*l.* 10*s.*, and it leaves a balance of 13*l.* 7*s.*, or 4*l.* 9*s.* per acre.

In this estimate I have not allowed the expence of feeding, as the manure will pay that.

I by no means wish to hold out expectations of greater profits, than I expect will be realized, or indeed, than I am confident will be obtained. The brilliant accounts of produce given by Mr. Martin, Mr. Simpson, and many others, are not to be obtained without abundance of good manure, and great skill and attention, and after all, at the hazard of missing plants or injuring future crops, by being too close to admit of sufficient tillage to fertilize the land, and destroy root weeds; I speak always of stiff soils; the jolly cultivators of rich alluvial or mixed soils, have no difficulty; such soils can easily be got in a suitable state for the Beet, or if necessary, may be well tilled after it is off.

Mr. Martin and I differ in respect to harvesting the roots dry; I am of opinion, it is of no consequence; and undoubted facts prove, that water filtering through the heaps does no injury, but probably prevent the roots heating in the spring, and dry rotting; and I differ, also, with many, as to the propriety of packing close; some have the roots on the

outside the heap, all laid with their crowns outward, because they believe, they bear frost better than the tail ends; on the contrary, I have them thrown promiscuously on the heap, to give more air, and prevent heating; the coating of earth may be increased, if necessary, to give greater protection, but I still recommend *a slight wall as a breach, in lieu of over loading the heap.* Air holes should be left till Christmas, and opened again in March. Mr. Martin recommends small heaps, to which I subscribe; they are safer from frost and heating, and being tolerably regular made of the produce of an acre of land, the store in hand is ascertained, as well as if it was corn in sacks.

Some are inclined to put Beet on the land where the layers have failed (and which is the case this year to a great extent); this is a bad plan, it increases the horse work, and the fallows are neglected; and if, in addition to fallow beet, it cannot be stored without interfering with other work, and if in lieu of fallow beet, it is a great loss; an acre of beans may afford half a peck of meal per day, whilst the cattle are feeding an acre of Beet, and thus supply the want of stover.

CHARLES POPPY.

*Witnesham, April 18, 1831.*

John May  
Was with the  
W. H. May

# APPENDIX

TO

## TREATISE ON BURNT EARTH.



“Thirst rages strong, the fainting spirits fail,  
And ask the sov’reign cordial, home-brew’d ale.”

As this little treatise may fall into the hands of some of those who have my observations on Burning Earth for manure, I reply to some questions which are put to me, and which others might be inclined to ask.

The longer burnt earth is kept before it is laid on the land, the more effect it has on the first crop; but, possibly, in the end, it is not more beneficial, and on some lands certainly not so much; as, before it is pulverised, it keeps the land open, otherwise it takes no harm from laying on the heap over year.

It is good for turnips and beet, but it can seldom be burnt, spread, and mellowed down soon enough for Swedes, and more seldom still for Beet, except when turfs or other tender earth is burnt; it will not do to put either turnips or Beet seed with burnt earth, *hot and dry*.

I know nothing of the shape and make of General Beetson's kilns, his book must be referred to for information.

Kilns certainly are not necessary; and if I understand the matter, kilns are an useless expence, and cause more labour; if the walls are high, all the earth have to be thrown over them; if sunk, there is danger of flooding; or if on a side hill (which can be but rare) there would still be more labour, than if burnt on a heap. This is the view I take of it, but having never seen a kiln, I may be in error—they may be merely furnaces; but if so, I think they are worse than useless.

Burnt earth is excellent, mixed with yard manure; but it may be equally beneficial if spread on the land, and the muck laid upon it—this mode saves expence; scattered in the stables and cattle yards, it is as good, or better than sand.

The fire certainly consumes the oleaginous matter contained in the earth or clay; but it also destroys the vitriolic acid, and this renders even a brushy soil fertile. I know very little about the effect of fire on earth; all I know is, that every thing thrives in burnt earth, somewhat, perhaps, about the same as in red sand, and from the same cause, viz. its being friable and saline; but for what we know, the benefit the earth receives from burning, may arise as much from its destroying noxious qualities, and altering the texture, as creating useful ones; in fact, we have great reason to suppose, this is the case, as exposing a sour unfertile subsoil to the sun and air, sweetens it, and evaporate the gases; and nothing shows this more;

that the effect of a heavy shower on fresh ploughed land, the rain condenses the gases, and causes the land to be clung and unkind; when, on the contrary, if a due time elapse before the rain comes, after it is ploughed, the gases are evaporated and dispersed, and the land remains friable and mellow.

It is a mistaken idea, that the labourers require less beer in burning pit clay, or other moist subsoil, than when burning dry earth; it is harder work to burn pit earth, and on large heaps; besides, the surface soil being dry, it can only be burnt in fine clear weather, giving out little smoke, except on first lighting; the smoke is consumed by a clear fire, or is rarified and dispersed; and if it was not, surface soil having been clarified by tillage and the air, ~~has no poisonous gasses in it; subsoil,~~ whether clay, bog, earth, or brashy soils, throws out abundance of thick, sulphurous, vitriolic, raw, and stinking gases, which cause debility, head-ache, and loss of appetite, and without the aid of beer, a man is wearied out with fatigue.

Where a "grift," or vein of clay or loom exists, 10 or 12 feet deep, no doubt but it will answer to build a temporary shed, a very slight one will do; the earth can be burnt as well for sixpence per load under cover, as for eightpence exposed to the weather; clay, wetted and trodden with straw, (as for walling) and formed into lumps in a mould, 18 in. long, 13 in. wide, and 7 in. deep, inside the mould, and then dried, form the best and most convenient supporters for a temporary shed, as they can be shifted easily, and wont burn; but these are subject to a duty; the charge is trifling, but an entry must be made of a *brick-yard*, under a penalty of £50.; this is oppressive, as they are probably broken up and thrown on the fire at last. if the tax was taken off lumps of clay of this size, it would benefit the farmer very much, and not injure the revenue, as the foundations of walls must be of masonry, and the copings, (where not intended for a

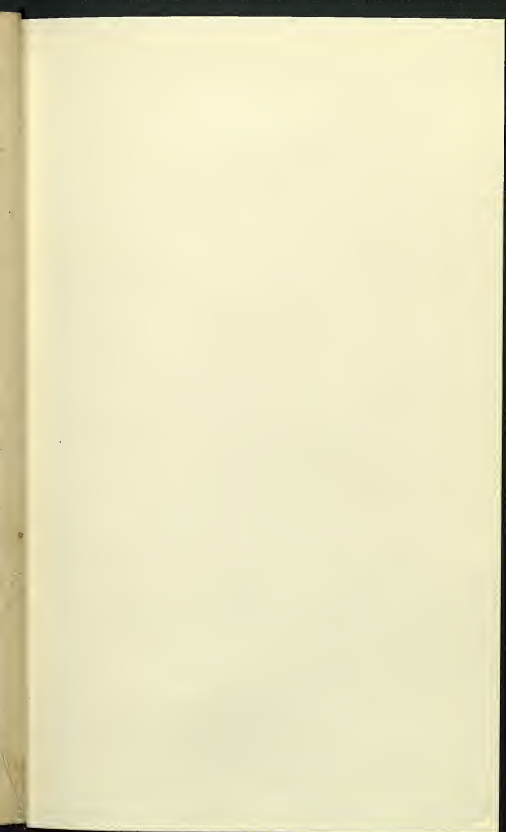
shed) would pay duty; and as thousands of walls would be made where none exist, nor ever will, without this tax is taken off, it would create labour, and add to the comfort and health of the cattle; some may think common clay walls are as easily made, but this is not the fact, from reasons which I have not time to state at present.

Burnt clay, I am told, makes excellent footpaths; where sand and stone is scarce, it may be convenient to use it.

These observations apply *chiefly* to light or mixed soils, and to which I had only incidently alluded to; the treatise, published under the title of Cheap manure, is more explicit on this subject; mine applies to heavy land, where I believe the system can be carried to any extent, and on which it is of much greater importance,

Burning earth, and increasing the growth of root crops, must increase the produce of both corn and animal food. A friend of mine, on seeing a crop of Beet, exclaimed, "See here, brother, what's going on in this field, here's clay burnt for manure to grow Mangel Wurzel, to feed cattle, which increases yard manure, and so on in endless reproduction."





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