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From the Scottish Farmer.

ON THE CULTIVATION OF RED CLOVER, AND THE CAUSES OF ITS FAILURE.

By ROBERT M'TURK, Esq. *of Hastings Hall, Dumfries-shire.*

(Continued from page 37 Newcastle Farmer.)

We cannot think that it was in consequence of the treading of the sheep merely, in the instances to which Mr. Thorp alludes, that the abundant crops are to be attributed. We find a much more satisfactory cause in the manure which they left upon the ground, In one field to which we devoted much attention, the turnip crop of which was eaten down with sheep, and through which we had occasion to cart a quantity of stones and other articles, the clover crop afterwards was a complete failure, except on one ridge next to a dyke which sheltered it from the west, the direction in which the field was most exposed to wind and rain, and to which the sheep had constant recourse for shelter, when the weather was unfavourable. This ridge, from the quantity of rain that fell at the time, was certainly not more consolidated than the end ridges on which the turnings were made, on the part over which the road passed: still the crop in those parts seemed to derive no advantage from the compression which they had received, and it was only upon the ridge on which a much larger portion of dung and urine had been deposited, that the clover could not be regarded as a failure.

We adduce this instance, not only as a case in point, but as coinciding with what may be regarded as the general experience on this subject, of the district in which we reside.

It is true that lime, and more especially in a caustic state, by the decomposition which it promotes in the soil, does to a certain extent render it more porous, but certainly not more so than farm-yard manure, the action of which, in the state in which it is generally used, is much more active than lime, and bones are less active than either.

As to the other expedient to which we have referred, namely, sowing the clover after the oat or barley crop has been cut—first harrowing the surface, and afterwards rolling in the seeds, we have only to say, that in portions of our fields where the crop has been lodged, and the grass seeds destroyed, we have tried the plan recommended, but the experiment was not attended with that success which would warrant us in advising others to have recourse to it, unless on such parts as we refer to, and which would otherwise produce nothing. On such occasions the seed always germinated well, and shewed a thriving *braird*, but the plants were sure to give way, particularly the red clover, when frost commenced. In some instances the clover was destroyed before the frost commenced; for young braird at that season of the year is very palatable to every kind of stock, and is, on that account, sure to be cropt by every kind of stock on the ground, and when once stripped of its leaves, so tender a plant is nipped by the first frost. The recommendation to substitute a young and tender plant for one older and more hardy, when tenderness is regarded as the cause of the failure, seems to us a very extraordinary cure for the disease. It does not alter the case that rolling is also recommended; for, if that operation is to be regarded as beneficial, the older plants can be as easily rolled as the younger, besides a greater degree of solidity preserved to the soil than when it has been loosened by harrowing. In so far as protection to the neck of the plant is concerned (and this seems to be all that is considered necessary), it is evident that solidity cannot be maintained through winter, in any soil that contains more moisture than is essential for the purposes of vegetation; for every frost that penetrates the soil to the depth of one inch, must completely destroy the solidity which either the treading of sheep or rolling can effect. Besides, Mr. Thorp seems to forget that the solidity imparted by the first of these means must be completely destroyed, for two or three inches upon the surface, by the subsequent operations of ploughing and harrowing in the seeds in the following spring.

It now remains for us to shew that there are various causes which have all more or less influence in occasioning the failure of the clover plant, and to endeavour to point out the means by which the evil may be remedied.

When we ascertain the composition of any plant, we will find that the proportions of its organic and inorganic constituents are in many respects different from every other plant, however nearly allied it may be to them all, and that even the different parts of the same plant contain those same constituents in different proportions. In so far as the inorganic constituents are concerned, there is no source from which they can be derived in sufficient abundance but the soil; and as these substances are found to exist in the soil in very unequal quantities, there is no doubt but that while one kind of plant is withdrawing one substance in greater amount, another is appropriating another substance in a larger degree, and so it is with every crop. It is, therefore, evident, that unless these substances are restored in quantities equal to what have been abstracted, the soil must in course of time be exhausted. It is also evident, that while some of these substances readily accumulate in sufficient abundance from the decomposition of matter which is continually taking place, others are very slowly restored, and some scarcely at all, unless when contained in the manure which is from time to time applied. It may be observed, that in the course of the ordinary operations of Husbandry, some of the more soluble of these substances may be carried down by the rain into the soil, while in a pulverised state, in greater abundance than they are produced by natural causes, to a depth to which the roots do not extend. Under these circumstances, it is not to be wondered at that the soil should be sooner unfitted for the growth of some crops than for others; and especially for those crops which require a larger amount of those substances which, in the first instance, exist in the soil in more limited quantities, or which are more soluble and carried away by rain to a depth beyond the reach of their roots.* This is, perhaps, more the case with red clover than any other plant, which will be more apparent when we avail ourselves of the aid that chemistry affords. It tells us, in the first place, that 1000lbs. of red clover, in the dried state, according to the analysis of Sprengel, contain the following proportions of inorganic matter:—

Potash,	19.95
Soda,	5.29
Lime,	27.80
Magnesia,	3.33
Alumina,	0.14
Silica,	3.61
Sulphuric acid,	4.47
Phosphoric acid,	6.57
Chlorine,	3.62
	——74.78

From this analysis we learn the very large proportion of potash which red clover abstracts from the soil, when contrasted with the other crops with which it is generally associated in the course of a single rotation.

Wheat contains in 1000 lbs.			
of the grain,	2.25	Straw 1000 lbs.	2.45
Barley,	2.27	——	1.80
Oats,	1.50	——	8.70
Rye-grass hay,	—	——	8.81

* See Professor Johnston's Lectures on Agricultural Chemistry, p. 285.

If we allow that the straw is double the weight of the grain, then 1000 lbs.

Of wheat there is *only*	.80	of potash.
—Barley, ...	2.13	——
—Oats, ...	6.30	——

Thus we see that 1000 lbs. of red clover requires nearly as much potash as is contained in twenty times the same amount of wheat, eight times the amount of barley, and three times the amount of oats, and twice of rye-grass, the very crops which are made to form part of the rotation along with it.†

Besides, potash is one of those substances which has a strong affinity for water, and is, on that account, very soluble in every state of combination in which it is found in the soil; hence its great liability, when the land is under cultivation, to be carried off by rain. This observation, however, applies more to the rain which falls in inland situations, or to those localities which are screened from the sea by some high mountain range; for there is good evidence to shew that portions of the various saline substances contained in sea-water, and which contribute so much to the fertility of the soil, are often carried to considerable distances from the shore.‡ We may further observe, that it is owing to the still greater amount which the different green crops require of inorganic as well as of organic food, that a large application of manures is found to be necessary for their growth, in which case those substances cannot be said to be abstracted from the soil.

Although these remarks are made more particularly in reference to potash, as the substance which, with the exception of lime, enters more largely in the composition of clover than any other, and one which is more apt to be washed from the portions of the soil which is subjected to frequent cultivation, still they are applicable to other inorganic constituents, though many of them are less soluble, and exist often in much larger proportions than potash. This view of the case helps to explain why the red clover crop is less abundant on land which has been frequently cultivated, and why its failure is more perceptible on inland situations, than in those more exposed to the sea.—But there are often causes of failure on soils which cannot be said to be deficient in any of the substances essential to the growth of this crop.

In the spring of 1841, we commenced a series of experiments, with the view of obtaining some information on this subject, and conceived that we were more likely to arrive at the truth, by beginning at the germination of the seed, and marking with care the progress which it made in the different stages of its growth. A piece of ground was selected adjoining the house, the soil consisting of a fresh loam, and as much alike in character as one soil could be. Two rows of boards, eight inches broad, were placed edgeways parallel with each other, at six feet apart in the ground. The earth was then put in and equalised between the boards till an inclined plane was formed by it, with a rise of one inch in the foot. The earth was thus level with the upper edge of the south board, and six inches below the upper edge of the north one. This inclined plane, though only six feet wide, was seventy feet in length. Sixty-eight gentle impressions were made upon the mould with the handle of a rake, after the plane was made as smooth and uniform as it could be. In those impressions, the same number of the different kinds of seeds most commonly used in Agriculture were sown,* and more earth was then put in till it was level with the upper edge of the boards. The seed sown in this way, had little or no cover of earth at one end of the row, but the cover gradually increased, till it reached a depth of six inches at the other end. The boards enabled us to make this cover with great accuracy, so that at every part of the rows in which the seed germinated, there was an inch of additional covering of soil for every foot in length; so that by applying the foot rule to the surface, we would ascertain at any time the depth of the seeds, and by assuming the half of the space in which the seeds germinated, that gave the proper depth of covering. The seeds were equally exempted from the risk of germination being prevented by too much cover, and at the same time from being lost, in case of dry weather, from having too little. We thus arrived at what may, with confidence, be regarded as the proper depth at which clover seed should be placed; and of six samples sown in this way, namely, English, French, American, Flemish, Juliers, Sucklings, the average, and therefore the proper depth, may be stated at one inch.

There is no doubt that seeds will germinate at a greater depth in a light gravelly or sandy soil than in a clayey one; but we consider the soil in which the experiments were made as equally removed from both these extremes, and, in this respect, as of a very fair average for an experiment of the kind.

(To be continued.)

† Gypsum has been strongly recommended by Sir Humphrey Davy and other writers on Agriculture, as a valuable manure for red clover, but we have found that coal, peat, and wood-ashes—particularly the ashes of ash-wood—are much more efficacious. This is chiefly to be attributed to the potash they contain.

‡ Liebig's Agricultural Chemistry, pp. 110, 138. And we believe that Dr. Madden, when at Penicuik, had satisfactorily proved, by a series of observations then recently made, that the rain which falls between the sea and the Pentland hills, contains more saline substances than the rain which falls beyond that range.

* For this we were indebted to the kindness of Mr. Thomas Kennedy, nursery and seedsman, Dumfries.

To preserve Parsley in Winter.—Cut your Parsley when full grown, hang it up to dry, and when wanted for use, rub a little in the palms of the hands, put it in the pot, and it will resume its smell, flavor, and color, although it may have been kept for years.

From the Farmers' Gazette.

TO THE YOUNG FARMERS OF IRELAND.

LETTER V.

MIXED OR PUTRESCENT MANURES.

My Friends—We have, in some measure, seen how far we may supply the natural wants of the soil as to its earthy ingredients, and in what manner *mineral* manures act on it; let us now enquire how those manures which are composed of vegetable and animal substances, and without which the effects produced by mineral manures are imperfect, are to be collected and applied.

Unaided nature voluntarily contributes to the support of plants by the process of decay, death and recombination, which is continually going on, for the death of one generation of plants is but the commencement of new life and the supply of fresh nourishment to others, "that an oak may live an acorn must die." Death thus goes before life; every living thing dies and is resolved into its original elements; the dissolution of its organic form brings forth the seeds of new existences. Thus life is sustained by means of death. The earth which supports our bodies, teems with the remains of the animals and plants that have successively lived and died on it; the more it contains of the residue of living substances, the richer it is in the elements of re-production.

Instead of making a mournful visit to the churchyard in search of rank soil, fit food for plants, I procure this plateful of guano, which is a compound of decayed organic matter (principally the excretions of sea birds), and is found to contain all the ingredients necessary as food for plants. Some thousands of sailors and many hundreds of ships are annually engaged in importing this manure from S. America.

Now if I intended to force land into productiveness, suppose at the close of my term of tenure, and had no favorable intentions towards my landlord, I would go on board a ship, suppose at Liverpool, freighted with guano, and remain there (if the strongly-aromatic odour from the ammoniacal salts would permit me,) until I had purchased and carried away as much of this manure as I required, before any dealer in the article had the opportunity of trying experiments on it in his stores. Of course I do not mean to insinuate that any mercantile importer of guano would *intentionally* add any matter to the genuine article that might have the unfortunate effect of lessening its value or increasing its weight; yet, from the pure motive of rendering it better, he *might* add something to it not quite chemically correct, just as a baker occasionally adds alum or bone dust to his flour to improve the colour, or some other matter which he conceives likely to improve the texture of his loaves; therefore, I should wish to save any commercial gentleman trouble in this way, and the more so as I could probably procure the substances which he would use, without difficulty or much expense.

With pure guano I should expect to raise a very heavy crop of wheat even on very exhausted land; but what would be the result? The crop, by consuming whatever there might have been of vegetable matter in the soil, through the stimulating power of the guano, would render it still more impoverished than before. As the weight of the crop is much more than that of the guano used, it is to be concluded that the plants are principally fed from the matter in the soil (for we may leave the atmosphere out of the case, though it contributes a share), and they appropriate all the elements of the guano besides.

Now farm-yard manure, which may be said to contain all the elements which plants require for their sustenance, does not give too great an appetite to the growing wheat, but guano does; this causes it to feed on the soil too greedily, and acts on it as the tonic medicine quinine does on a man: his appetite increases, and he gains in weight from its use; but it would be absurd to estimate his increase of weight by the quantity of quinine consumed, it being due in fact to the amount of food taken under the appetizing influence of the medicine.

Guano is chiefly powerful as a stimulant, and exhausts the soil; it acts as a dram of whiskey does on a half-starved labourer, who may put forth great strength and energy while under the excitement caused by it, but, being without substantial food in his stomach, his exertions cannot be sustained, even by an additional dram, which, if taken, would leave him more exhausted than before.

A farmer's object ought to be the enriching of his land; he should consider it a fund in which he may invest money, of which the principal is not to be drawn out, while the interest is employed in discharging his current expenses.

Such manure as guano should be applied in general but in aid of that produced on the farm by cattle house-fed. Why send to South America for guano, of which the nitrogen compounds, in which I include ammonia, are the chief elements, when these may be obtained at home at much less cost by means of a urine tank and dunghill, of which the organic parts are almost as efficacious and much more lasting. As to the phosphate of lime, of which guano is so largely possessed, it is but the same substance of which bones are composed; yet it must be admitted that, from containing also many other animal substances, guano is far more valuable than bones, however well prepared.*

It is to his farm-yard manures (with occasional aid from lime in a soil requiring it) that the farmer should look, and that must be a badly-managed farm which does not keep itself in manure.

In order to produce the greatest quantity of mixed or putrescent manure, there should be a constant effort to increase the number of live stock, and, above all, to feed* them well, for the quantity and quality of their dung will be proportioned to the quantity and quality of the food consumed by them; and every beast should be confined all the year round in stables and sheds with an abundant allowance of litter.†

The experience of the late M. Dombasle convinced him that where summer pasturage is adopted, and the cattle are fed principally on straw in winter, there is but one-fifth of the quantity of manure which would be obtained from cattle constantly and highly fed in confinement. He was of opinion that the additional portion of manure raised by the house-feeding system doubled the produce of crops, and increased the net profit in a higher proportion, because the cost of labour is the same for poor land as for that richly manured.

It is clear that as the quality of land improves, the stock maintained on it may be augmented, and as this augmentation advances, an increase of dung will progress, which again tends to increase the productiveness of the soil.

The chief point in the management of putrescent manures is to produce a sufficient but not excessive fermentation of the substances which compose them‡ and since it is a property of horse litter to ferment too much, and consume away into a small, burnt up substance, with a great loss of its precious elements, it is better to mix it, while fresh, with dung from the cow-house or pig-sty, which ferment more slowly, and, being much cooler, check the heat of the former, rendering the temperature of the whole mass sufficiently high for its decomposition without any avoidable waste of its materials.

If there be no cow litter &c., sods, the scrapings of roads, peat mould, ferns, leaves, weeds (before their seeds are ripened), and such cold substances, may be advantageously intermixed with the fiery horse dung, to promote their fermentation, retard its own, and absorb the nutritious ingredients which may be formed, and this is not of trifling importance.

But it is more economical to plough dung into the soil (just before the crop is sown), especially if it be cold and cohesive, for the purposes of producing decay in the vegetable matter previously existing in it, and so helping to raise its temperature. By this method of using dung there is the least loss of its bulk and fertilizing elements. The nutritive powers of manures arise in the first place from their capability of generating heat, and in the second, from the readiness with which they part with their elements to the plants around them. Now, if manure, when applied to the soil, be in the commencement of putrefaction—that is, in the state in which it is beginning to part with its volatile elements—and if seeds or plants be so circumstanced as to seize upon these as they are given out, they are in the best position to attain perfection, with the least loss of manure to the farmer, because they have their food gradually and steadily afforded to them as they require it; and in order that this gradual supply may be so yielded, the state of the manure ought to be modified accordingly; that is, the putrefactive process must be quickened in some and retarded in others. As long as the process of putrefaction continues, so long will the supply of nourishment continue to be afforded by the manure.

But this process should be slowly performed; for if there were too quick a generation of the nutritive elements in the manure, the plants might be overpowered by them, and certainly there would be a loss of whatever portions the plants could not consume.

If this opinion be correct, the gradual supply of aliment to plants, in quantities barely sufficient for their use, would be the true system. The Belgian farmers collect the superfluous urine of cattle in

* The peculiarly advantageous circumstances under which farmers are placed who live near large towns need not be considered, because they are within reach of various manures at a moderate cost, and, therefore, are not forced to rely on their own farms for them; they may pursue systems of management which are exceptions to the general rules of improved husbandry.

* "I need hardly remind the farmers assembled in this room of the inferiority of manure made by the lean stock of the straw-yard, to that produced by the corn or cake-fed stock of the stable or the bullock-houses. The increased value of manure made by stock fed with oil-cake is, in fact, considered by the farmers of my neighbourhood, in Essex, to be equal to one-half of the oil-cake employed."—*Lecture of Mr. Cuthbert Johnson.*

† The reason why herbivorous animals—whose proper food is herbs or grasses—pass such large quantities of dung, compared with graminivorous, (of which grain is the natural food,) and, still more, compared with carnivorous animals (those which eat flesh) is, that the former swallow a great quantity of matter incapable of being digested, such as the woody fibre in hay and straw, and the skins of oats. Some are partly fed on animal substances, and on corn, and pass less excrement, because most of their food is appropriated to their nourishment. A meat-fed dog voids little matter for the same reason; his excrement is principally the lime of the unappropriated bones which he has eaten. As a general principle, all animals fed on substances closely resembling their own bodies in constitution, void little excrement.

‡ Mr. Baker, of Writtle, chairman of the London Farmers' Club, at a recent meeting, gave this testimony:—"On one occasion, about 23 years ago, by way of experiment, I applied 20 loads of manure, just as it was taken from the farm-yard; and I found it produced equally good crops with the same quantity of manure that had been fermented, and decomposed, and wasted by such process at least 50 per cent. I mentioned the experiment, at the time, at several meetings of farmers, but it was generally disbelieved, until its effect had been tested another year. On the succeeding crop that trial proved most satisfactory: since then I have continued to use it in that state." Thus did half the quantity of dung in reality produce the effect of the whole. Gardeners are in the habit of leaving a dunghill to rot until it becomes black and earthy—a mass of humus in itself; and delicate seeds require such manure. But it is extravagant for the farmer to let the material parts of fermenting cattle-litter diminish so much; for with the decrease of bulk, there is also the loss of some fertilizing elements.

cisterns, and after dissolving rape-cake and other enriching substances in it, diffuse it over clover and other crops of the same nature, and with the greatest effect on *light* soils; but this is so much liquid taken from the solid manure, which is drier and weaker in consequence.

But in Switzerland the farmers prepare (as M. Dombasle explains the process,) this liquid in a manner which appears to be far less objectionable.

Behind the cattle is a trough of the length of their house, sunk in the floor, and half filled with water, in which the bedding taken from the cattle is soaked every day before it is removed to the dunghill, where it ferments rapidly. The remainder of the liquid is then run off into a tank, where it is left to putrify. The farmers think that by wetting the litter in this way it loses nothing in quality.

It appears from experiments made by M. Sprengel, that diluting *fresh* urine with its own bulk of water has the effect of doubling the quantity of ammoniacal matter, and increasing it *eight fold*, if the mixture (diluted in the same degree) be allowed from two to three months for complete putrefaction. We may possibly explain this: the water added may, by absorbing the volatile ingredients, and thus preventing their escape, make the mixture richer in ammonia, and possibly by checking the temperature, prevent the too rapid putrefaction and consequent loss of nutritive elements. If the water in this instance has the power of preventing their escape, we are led to think that moisture will have a similar effect on horse-dung and other pungent manures.

It seems to me that by adding water to the urine we cannot increase the quantity of ammoniacal matter—we only prevent its escape from the mixture. The same elements for forming ammonia are contained in the watered and unwatered urine, and the same quantity must be generated in both; but as the water may absorb the ammonia which otherwise would pass off, it makes it appear greater in the product of the diluted than of the undiluted urine. The quantity of ammonia derivable from the water used can be but very little indeed—not worth consideration. The diluting, however, may keep the mixture in a cool state, which is quite necessary to its retention of the ammonia.

M. Sprengel used *rain* water in his experiment, which is no doubt somewhat richer in ammonia than other water, but this, too, is a matter of no moment. It is, I think, on the whole, better to retain the urine in the manure, especially if litter be abundant, when we consider the small quantity of urine that can be saved in proportion to the large amount of solid matter, and the benefit arising from mixing warm and cold manures together.—The advantage gained by the general improvement to the entire accumulation, by retaining the whole of the urine in it, may more than counterbalance the sacrifice of so much liquid manure for separate use.

In a word, the grand principle is to keep the dung moist and cool, and therefore the practice should naturally be not to abstract the urine and the liquid manure of the farm-yard from the dunghill. While the manure continues sufficiently moist, there is an absorption of all its volatile ingredients; the reduced temperature prevents the escape of ammoniacal and other nutritive principles.

Next week we shall pursue this subject further; for the present we halt here.—I remain your faithful friend,

MARTIN DOYLE.

From the London Farmers' Journal.

A HINT TO AGRICULTURISTS.

The unexpectedly high price at which corn now ranges is apt to lull the Farmers into a false security. Contented with the present, they may disregard the future. But there are certain immutable laws, however liable those may be to temporary suspension or perturbation, which the wise and prudent never overlook. If a comet does not reach its perihelion at a predicted day, it would be folly to conclude that it had been struck out of the system; it may be retarded in its orbit by planetary attractions, as astronomers have clearly demonstrated, calculating the law of retardation as well as the law of progress: in a similar way it behoves us to inquire whether we are living under a mercantile law which has a general tendency to raise or lower prices, that we may not confound the exception with the rule, or mistake a fleeting for a permanent prosperity. On this point we propose to offer a few remarks based on those monetary principles which have received the sanction of the Legislature, and which must determine the question at issue.

All the mystery of money becomes clear when once we have distinct perceptions of VALUE and PRICE. Value is condensed labour. Price denotes labour and taxation combined. Taxes add nothing to value, but increase the cost of production. Hence it follows that that which measures value accurately cannot also measure price, because the things measured are dissimilar, incompatible, and antagonistic.

Parliament has decreed that our measure of value should be gold, and so far no exception can be taken. It would be a sufficient and mathematical measure had we no taxes to pay, or if the taxes were levied directly on property and not on produce. But that is not our case. Our revenue is mainly raised by Customs, Excise, and Stamps, and as all these add to the cost of production, without adding to the value of the product, gold does not and cannot measure that addition which they cause to prices, for our gold has a definite and invariable price put upon it by the mint, and that price only represents intrinsic value, to the entire exclusion of any tax whatever.

Now let us apply these principles to Free Trade. In exchanging value for value intrinsically, we fear not foreign competition, for in that sense we should only marshal our labour against foreign labour, for, as we have already said, all value is nothing more than condensed labour. But if the foreigner has less taxes to pay to his Government than we have to pay to our Government, and if his standard of living is inferior to our standard of living, then we cannot compete with him on even terms, for it is no longer a question of intrinsic value for intrinsic value; it is a question of intrinsic value *plus* taxation, and the weights of taxation are not balanced between him and us. There it is that the shoe pinches, and there it is that we want and are entitled to protection.

Take a case for illustration. Suppose that a hat were intrinsically worth one pound, or 5 dwts. of gold; but that a tax of 50 per cent. were imposed on hats.—Then the producer would require 7½ dwts. of gold for each hat; because 5 dwts. would represent its value or the labour it condensed, and 2½ dwts. its taxation; but these 2½ dwts. would have added nothing to its intrinsic value, but simply increased its cost of production.

Now let an untaxed foreign manufacturer of hats come into our market to compete with the taxed native producer. It is clear that he would be satisfied with 5 dwts. of gold, which would give him the intrinsic value of his hat. What then becomes of the Englishman? If, to hold his position, he also takes 5 dwts., he must lose 2½ dwts. on every hat he sells; he must, in fact, pay the tax which our wise political economists affirm always falls on the producer. It *ought* so to fall certainly, but we see it does not, and it never can, so long as we have free trade with money of intrinsic value.

Now what is true of hats, is true of corn, true of every product of native industry. Let our farmers then look to the future, when America has prepared itself to supply us with wheat, by cultivating some millions of acres. If the currency is not changed before that time, they will see wheat at 34s. per quarter, which is its gold-equivalent intrinsic value.

THE CARROT A SUBSTITUTE FOR THE POTATO.

To the Editor of the Weekly Journal.

SIR—The carrot (*Dulcus Carrota*) is a weed indegenous to almost every district of Britain. While other valuable plants are affected with a tainted atmosphere, the carrot is only occasionally attacked at the root by the common coiling myriped which good cultivation can destroy. Impressed with the idea that the carrot is the best substitute for the uncertain potato which the cottager as well as the farmer can grow, I offer the following hints for the present preparation of the land, purposing at a convenient season to give my views on the general treatment of this valuable crop.

Immediately select light, dry, deep

land for the carrot. If at all poor, dung it well, but do not apply common dung, or trench it later than February (but the sooner now the better). Rich soil will not presently require manure. Spade-trench the land or plough-trench it with a very narrow deep furrow in dry weather, burying the dung a foot or more down. In this rough way it may remain till sowing time. Should, however, a peculiar winter or soil render the furrow weedy, stiff, or sour-like by February, cross-plough it then with an ordinary furrow. It is thus ready for top-dressing as sowing. By such practice I have grown at the rate of 45 tons, and by a more expensive one, eighty tons, at present worth £450, per acre! The *carrot*, *beet*, and *parsnip*, are all better grown on partially consolidated land, prepared in autumn or before February, than on a fresh furrow. Let every cottager trench over all spare ground now two or three feet in depth, draining it well as the trenching proceeds. Let farmers hesitate not to prepare large fields for the purpose.

The nutritious qualities of the carrot for the labouring man, as well as horses, cattle, sheep, and pigs, are attested by both chemical analysis and experience to excel the potato, while the produce of the former may be rendered much greater.

Superior carrot crops might be produced on waste bog land in Ireland, &c., and might presently yield seasonable and profitable employment in draining and trenching the land. Indeed a joint stock company for the purpose might pay very well, and effect much present good.—Might there not at least be national subscriptions, say of 6d. each, from the high and middle classes, in order to offer immediate premiums of £1, in each parish throughout Ireland, Scotland, and England, for the heaviest carrot in each parish. ROBERT ARTHUR.

From the Farmer's Journal.

ON THE PRINCIPLES OF DRAINING.

BY HEWITT DAVIS.

Experience had shown to me the important difference between drains of 2½ feet and 4 feet in depth many years before Mr. Parkes had written on the subject, and so satisfactorily removed all doubts by his conclusive reasonings and experiments. I had found out that the deepest drains were the cheapest, most durable, and far more effectual in all soils: hence in all my practice I have long since abandoned putting in any in arable land at less than four feet. I have repeatedly had to redrain land that had been previously drained at shallow depths, and seen that the deeper drains run first, the longest, and discharged the greatest volume, and in Spring-park removed the cold damp from the surface, which the shallower had failed to do.

The practice of shallow draining has arisen from the erroneous impression prevailing that their use is to take the surface water, and not to permit it to first soak down, whereas no rain water should pass off the ground, but all should be encouraged to go through it, and which, with proper tillage and drainage, it will do. Drains are intended to prevent the return of water upwards, and not to admit water from above. That draining is so little understood is hardly to be wondered at, when we consider that until Mr. Parkes's attention was directed to it, the practice had been generally confined to tenant farmers, and the advantages derived from extended experience and science were unknown. I confess, until I had read Mr. Parkes's Essay on "the Temperature of Soils as affected by Drainage," I was at a loss to give satisfactory explanations for my practice, although I had come to the same conclusions that reading his works will, I think, at once bring every one. To his works I would refer all who are about to drain, for it is a lamentable fact that by far the greater portion of the money spent in draining is comparatively lost, and as yet few are aware of the full benefit to be gained.

One of the most important benefits to be derived from drainage is a higher temperature of the surface soil—a benefit of extreme importance in our climate, but which is not fully attained by drains less than four feet deep, and scarcely felt at all when only of 2½ feet. If rain passes through the soil to the depth of 4 feet, the temperature of the soil, by the passage of the water, is considerably raised; whilst on the contrary, if drained only 2½ feet down, the water from below is soaked upwards to the surface (on the principle of capillary attraction), and will be continually passing off by evaporation—this rise of water, and the effect of evaporation producing extreme cold in the spring, appears too often unknown. I have drained all descriptions of soil, and as yet have never seen occasion to drain arable land less than 4 feet in depth, nor at distances less than 35 feet; of course the distance from 35 feet upwards will vary with the character of the soil, the lighter requiring fewer drains; but I take 4 feet to be the best depth for all soils, and the least expensive.

I pay 9d. per rod for cutting and laying and filling-in 4-feet drains; but labour in England varies considerably.—There are draining tools which, in the hands of men accustomed to them and to the work, enable them to earn 3s. or 3s. 6d. per day at this rate of pay per rod. There is no material equal to tiles or pipes. The labour of picking and breaking stones is nearly equivalent to the cost of tiles. Where fuel is moderate, 1½-inch tiles may be made at from 10s. to 18s. per thousand, the cost of coals being from 8s. to 28s. per ton; and about 750 are sufficient for an acre at 40 feet distances. If tiles are used, no stones should be put on them. I put a little heath or straw on the tiles to prevent their dislodgement by the fall of the earth in filling in, or soil working in at the joints. At the prices I have given draining costs from 65s. to 90s. per acre, including carriage of materials: I never use pipes or tiles less than 1½ inch bore.

I think the use of stones alone is objectionable, and have lately heard great complaints where they have been used, and the draining cost from £8, to £9, per acre. All drains should be carried directly up the fall, never across. The object in view should be ever to give an even current with the greatest fall, and then there is every chance of the drain being permanent and always washing itself clean. A knowledge of geology will much assist in arranging the direction of the drains: cutting across the lines of strata or deposits lets out the water that lies between them.

Above all, before draining examine your land by sinking little wells 4 or 5 feet deep; and if you find a porous substratum that allows water to freely pass down, and you are not shown that water rises in winter, do not drain, for no benefit can accrue therefrom.

From the Albany Cultivator.

OPERATION OF PLASTER.

MR. TUCKER—There seems to be a great diversity of opinion as to the reason why plaster or gypsum fails to benefit such a large portion of our Atlantic coast, Long Island, and New-Jersey, particularly. Mr. Ruffin of Virginia, in a work on Calcareous Manures, advances a theory based on his experience as a practical farmer, that appears to me to be more satisfactory than any other I have seen, and I am somewhat surprised that his theory has never found its way into our northern agricultural journals.

I made a visit to Virginia last winter, preparatory to removing there, and while there I made particular inquiries in relation to the extensive marl formation which underlays nearly the whole eastern portion of the state, below the falls of the rivers, and its effects upon the soil. I found it to be extensively and profitably used, and producing important and permanent changes in the soil; so much so that clover cannot be made to grow at all until marl, or its equivalent, lime, is applied. The marl contains from 30 to 80 per cent. lime, which is the principal if not the only fertilizer contained in its composition. I inquired how plaster succeeded on clover, and the almost invariable reply was, it does no good whatever until the land is marled or limed. I inquired the reason of this, and was referred to Mr. Ruffin's work on Calcareous Manures. I there found what appeared to me to be a very satisfactory reason, and I will give you a brief abstract.—He says that the most of the soils of eastern Virginia, we found upon analysis, to contain but a slight trace of calcareous matter, and with the exception of the land along the margins of the rivers, which he terms neutral soils, he calls them all acid soils; and the presence of sorrel on the land he considers an indication of acid soils. Sorrel grows abundantly on all land which he terms acid. Oxalic acid is the acid of sorrel. Now, sowing on plaster in the usual quantity, that being a sulphate of lime, the oxalic acid has a strong chemical affinity for the lime; the lime leaves its combination with the sulphur, and combines with the oxalic acid, and forms an oxalate of lime, and sets the sulphur free to combine with iron or any other ingredient that it can find. Apply a good dressing of marl or lime, and it combines with the acid and neutralizes or destroys it, and as a proof of this, sorrel is no longer found. Plaster applied then is left free to act, and produces the most satisfactory results, frequently doubling the crop.

Long Island and New-Jersey have soils somewhat similar to Virginia. I can speak more confidently of Long Island, as that is my place of residence; its soils produce sorrel plentifully. Lime has been used but little, and in many cases with no perceptible effect, and plaster, with a few isolated exceptions, has totally failed. I hope that some of your Long Island and other readers who are similarly situated, will make the experiment, and see if like causes will produce like effects. The experiment need not cost them but little money or labor.

While on a recent visit to Dutchess Co., a friend informed me that the prevailing opinion in that county was, that plaster applied to one field, injured an unplastered field adjoining, as much as it benefitted the one that it was applied to, and that some went so far as to say that if a piece of woodland was left amidst cleared land, and that cleared land plastered, the timber commenced decaying and dying. He told me of an instance that went strongly to prove the truth of that opinion. An old farmer had a very fine meadow, in a creek bottom. He commenced plastering his upland lying around and adjoining it. His meadow, which had never before failed to produce luxurious crops of grass, began to fail, and continued to do so until it was hardly worth mowing. He then commenced plastering it, and its ancient fertility was at once restored. Now what can be the cause of that? Perhaps our chemists are the most proper persons to judge; but I can give my own opinions, as they do not cost much. The idea at once occurred to me that it might be caused by the absorption of ammonia from the surrounding atmosphere, by the plaster, (as ammonia and sulphuric acid have a strong affinity for each other,) that the unplastered land was deprived of its due share from that source, as plants are said to derive a large share of their ammonia from the atmosphere. Perhaps some of your able correspondents can enlighten us as to the cause of it. G. P. Lewis.

Huntingdon, L. I.. Oct. 14th, 1846.

The pain from the sting of a bee may be alleviated by rubbing the part with parsley.

DESTROYING THE GRUB AND WIRE-WORM.

In a recent conversation with an intelligent farmer of Cayuga Co., N. Y., he described the method by which he saved his corn crop from the destruction of the wire-worm and grub. The former of these depredators had appeared in prodigious numbers—something less than a bushel per square rod of land, and their ravages were great. He ascertained by observation that they did not descend deep into the soil at the usual time of ploughing sward land for corn, but continued mostly among the roots of the grass. His object, therefore, was to bury them alive. This he accomplished by turning over the sod with a powerful team, to a depth of at least 8 inches, the soil being rather heavy. The surface was then pressed down evenly and firmly with a heavy roller. By this process several inches of compact soil lay above the region of the wire-worms, and as a consequence, whenever they attempted to pass upwards to the surface, they met with too formidable a resistance to penetrate. Hence, they continued with the grass below, and perished with its decay. Whether this be the true explanation or not, one thing was certain,—that where the corn was formerly almost wholly destroyed, it is now full and even in the rows, without the usual numerous vacant spaces over the field, always existing under the old practice.

By a similar process of observation, he was enabled to destroy the grubs. He discovered that these depredators, instead of remaining at the surface, like the wire-worm, descend deeply, and hence that deep ploughing brings nearly all of them to the surface. Hence by the use of a heavy roller, many of them were crushed, and the remainder immovably compressed in the solid earth, till a fine toothed harrow passing over the surface, tore out and destroyed them. The utility of this practice, like that of the former, has been amply proved by successful experiment. —*Albany Cultivator.*

THICK AND THIN SOWING.

To the Editor of the English Farmers' Journal.

Sir—Your correspondent, Mr Hainworth, in his article last week on seed wheat, says he dibbled two pints of Mr. Merton's white wheats, and the produce of these pints (*about 55 pints each*) " which I again dibbled, and their produce was 42 bushels per acre."

Let me ask Mr. Hainworth *why* he only got 42 bushels per acre? Had he taken as much care in dibbling the wheat the second year, as when he only grew the first pint, he should have had a 55 fold increase: that is, if he sowed one bushel the acre he ought to have had 55 bushels; if two bushels, there should have been 110 bushels the acre. I think this is a question bearing on the disputed point of thick or thin sowing. H. W.

THICK AND THIN SOWING.

To the Editor of the Farmers' Journal.

Sir—If the difference between thick and thin sowing were in accordance with the theory of " H. W.," as stated in your *Journal*, this week, " that is, if he sowed one bushel of wheat per acre and it produced 55 bushels, if he sowed two bushels per acre there should have been 110 bushels per acre," there would no longer remain a doubt as to which would be the best system to practise.

In comparing the 55 pints of wheat, the produce of one pint, with the 42 bushels per acre from the 55 pints of seed, your correspondent infers that the produce per acre from the one pint, exceeded the produce per acre from the 55 pints. As I did not state the quantity of ground on which either of them was planted, I am at a loss to know from what data such an inference could be drawn; and "this question does not at all 'bear on the disputed point of thick or thin sowing.'"— When I planted the two pints, I planted them thinly, covering five poles with each in order to obtain as large a produce as I could, independant of the yield per acre. "H. W." will find the return only 27½ bushels per acre; from a pint of wheat at the same time, on nearly 7 poles of ground, I obtained 76 pints; the produce per acre differing very little from the 55 pints. As the time of planting was January, and considerable destruction was committed by birds, no argument in favor of either system can be founded on such a trial. I have tried thin dibbling with various results. In 1839 I dibbled 14 acres, three pecks to the acre, the produce 25 bushels per acre; the same season I drilled 40 acres, 2 bushels to the acre, the produce 40 bushels per acre; this difference was not the result of the different quantity of seed sown, so much as it proceeded from the state of the land when dibbled. The holes would not stand so as to get the seed in deep enough; when this is the case there is no method of planting wheat so bad as that of dibbling, and although I now dibble some every year it is only when the land is in a proper state. It appears to me that the advocates of thin sowing do not make allowance for the state and condition of the land, and the time of year when sown, I generally dibble five pecks per acre, and drill six pecks. If an equal distribution of seed could be insured, perhaps three pecks would do as well, but never having observed any injurious effects from six pecks, or even from eight pecks that might be attributed to thick sowing, I think about this quantity of seed will be found safer than less. In one instance when the drill-man had been using three bushels per acre, and the drill was altered to two bushels, the crop from the two bushels was very superior to that from the three bushels, the straw equal to that of the three in quantity, being much stouter, standing more upright, and having finer heads. I should not have troubled you with this letter had not my former one appeared to be misunderstood. I only referred to the pints of seed to show that I had taken the best means in my power to obtain the best sorts.

I am, Sir, your obedient servant,
W. HAINWORTH.

Hitchin, November 12th, 1846.

Two years since, having one pint of seed of a peculiarsort of wheat, which we had raised from a single head of the preceding year, and being desirous of obtaining information on two points;—first the relative yield from the pint, as compared with the quantity from the single head; and secondly, the actual loss or failure; from non germination,—destruction by insects, or dying out during winter or spring.

Now the single head contained 90 grains, and the pint, the produce of the head held about 10,600 which gave 118 for one sown—but as only 88 grains germinated, and moreover in the May following only 47 out of the 88 plants were alive, the yield under more favorable circumstances would have been 150 for 1.

The space occupied by the plants was 1½ yards square, or about the fourteenth part of a rod—the 2240th part of an acre, consequently the yield per measure would be about 35 bushels per acre, but as it weighed 68 lbs to the bushel,* it would have been equal to 40 bushels per acre.

The pint thus raised, we dibbled in after *early* potatoes on exactly the 32nd part of an acre two or three grains in each hole, but from covering them (as we believe) too deeply, not more certainly than two thirds germinated; and in the following spring scarcely more than half the number of plants, or about the same proportion as in the former experiment, were alive. However, they stooled out well, and eventually produced sixty-two and one half pints, weighing 66½ lbs, or at the rate of thirty five bushels (by weight) per acre.

Now it remains to enquire, to what cause is to be attributed the enormous loss of 43 out of 90 plants, and whether such loss, could have been obviated by thicker sowing; for the quantity sown was only equal to one-third of a bushel per acre, and would treble the quantity,—have produced a threefold crop? we should say decidedly not, for in consequence of the plants being, so thin (*at first*) upon the ground, we were under the necessity of hand hoeing in June to keep down the weeds, which we think, from its effects, was fully equal to doubling the plants upon the ground. Now supposing six times the quantity of seed to be sown to ensure the same result (35 bushels per acre) the value of the seed sown would be comparatively trifling with the amount incurred by hand hoeing a thin crop in a country where labor is dear; but if on the lighter soils a crop can be doubled by thin sowing and after culture, would it not then pay? We wish some of our readers would favor us with their opinions on the subject.

We have the last fall sown three quarters of a pint of the same wheat on the same land, and again after potatoes; and the only difference made is in the method of sowing; one half is in drill 10 inches apart, and the grains about 2 inches asunder in the drills; the remainder is in hills about 12 or 14 grains in a hill, and 2 feet 6 inches apart each way. It was sown late, but nearly every seed germinated, but had scarcely commenced to tiller out when the frost came. The issue shall be noted hereafter.

* Verified and confirmed the year following by weighing a bushel.

Newcastle Farmer.

COBOURG, FEBRUARY 1, 1847.

Not having received any replies from our numerous readers to the question stated in our last number, on the relative value and importance of Fall ploughing, we shall offer our own opinion on the subject. We regret this the more as we well know we are surrounded by clever, intelligent, and practical men, who, we are assured, are only prevented by their extreme diffidence from venturing to appear in print. We positively think we shall have to make some startling heterodox statement in order to rouse them into action, and elicit controversy, for we are quite certain that a fund of valuable information might be amassed by a plain statement of their various opinions on agricultural topics.

That much valuable time might be saved in the Spring, by the diligent use of the plough in the Fall, all must concede, and, to land which has borne Peas, and which is intended to be sown with spring grain, (Barley or Wheat,) and which is frequently in a foul state, from the seed peas being imperfectly cleaned, or from not covering the ground sufficiently early in the summer, Fall ploughing (all other circumstances being favourable,) is highly advantageous, as it serves to destroy the growing crop of weeds by burying them, and at the same time exposes to certain destruction by frost, many others not before brought into a position for germination, while those root weeds which are biennial or perennial, receive a decided check from the same operations.

That the stiff clay and retentive soils are benefitted is equally obvious, for retaining as they do, such an amount of moisture, and being so cohesive in their nature, it would, after our summer's heat, be almost impossible to reduce them sufficiently, without subjecting them as much as possible to the action of severe frost, by which their cohesiveness is destroyed, and their substance made permeable to the admission of the smallest fibrous root of the ensuing crop.

For fitting land for Barley or Indian Corn, we think a winter furrow almost indispensible, should the land at all incline to a stiff, loamy nature, and if of any other description, should weeds abound, much will be accomplished by fall ploughing; and should the soil be dry, and the surface water easily removed, a couple of turns with the harrows would cause many weeds to sprout, to their certain destruction by the first frost,—while for Spring Wheat, where the land is really suitable to the crop, the sowing on the winter furrow is decidedly the most preferable.

Again, for whatever crop intended, the turning in of grain stubble in the Fall, is most efficacious, for in dry soils, particularly lime stone lands, the process of decomposition is so slow, that unless such stubbles have the advantage of a thorough soaking by the winter rain and snow, and *their* percolation through the soil at the spring thaw, fermentation and decomposition scarcely takes place at all, or in a manner not noticeable, and the woody fibre remains undecomposed during the entire year, yielding nothing as a stimulant, and little as a fertilizer to the ensuing crop.

Where a naked fallow is resorted to, and perhaps under our burning sun, on heavy days, they cannot be altogether dispensed with, as it is almost impossible to rid the land of those weed seeds which are bound up in the soil, and which nothing short of a thorough pulverization can ever bring to the light and air, so essential to germination, and which must take place ere they can be subdued, a winter furrow is of all things most essential as a first step in the process.

We consider Fall ploughing can only be injurious, when a considerable declivity obtains, or where from its situation there is a superabundance of moisture, and where the soil partakes of a peaty or porous substrata; in the one case, a large proportion of the most valuable properties of the soil, is liable to be carried away by the hasty spring thaws, and the more organic substance remains in preponderance, divested of nearly all its fertile particles, while on the low moist soils alluded to, by loosening the upper surface too much the subsoil receives and sponge-like, retains such an accession of surplus moisture, which, if it is not removed by thorough draining, can only by slow percolation or evaporation be rendered sufficiently dry to work, and consequently, cannot be got ready sufficiently early in the spring to receive its intended crop, and as a consequence aquatic weeds and grasses usurp the place of more valueable productions; on such land we would prefer merely opening sufficient drain furrows to carry off from the frozen, unbroken surface, the accumulated moisture of a winter's snow.

We should be most happy to gather the opinions of our readers on the subject of the Winter killing of wheat, and the most likely method to be adopted for its prevention, and whether any mode could be suggested for the amelioration of the evil.

We are gratified by the reception of the communication of our correspondent, (A Canadian Farmer,) and with him, we do most sincerely hope, that the attention of the Agricultural Societies will be turned to the importation of some of those valuable adjuncts to the agriculturist, which our English brother farmers possess. We hope to hear from a Canadian Farmer frequently.

To the Editor of the Newcastle Farmer.

SIR,—I should like to hear, through the medium of your valuable paper, any opinions on the best time of sowing plaster, and any experiments that may have been tried. I am of opinion that the crop receives more benefit from the plaster being sown on the land in the autumn.—To substantiate this, I will mention two experiments that I have made. In September 1839 I sowed a field of 7 acres to wheat, early in the spring following I sowed one land through the middle of the field with plaster, and I could not perceive it was of the slightest benefit to the crop; in the spring of '41 I sowed the field with oats, and when the crop was near ripening, the oats on the land that was sown with plaster the year previous was several inches taller than the rest, several days earlier, and a much better crop; and I am sure if the whole field had been treated in the same manner it would have yielded fifty bushels more than it did.

In 1845 I sowed the same field, with the exception of one land, with plaster, (it then being in clover.) It being a very dry summer that land literally yielded nothing, and on the remainder there was a good crop. You will say, perhaps, that plaster sown in the spring, in this instance, produced a good effect, and so it did. But, in the spring of 1846 I again sowed plaster on the same field, and on the land that was neglected the year before I put a double portion, which scarcely showed itself even in the colour of the clover, while the remainder of the field produced a heavy crop; In consequence as I believe, of the plaster that was sown the year before.

I have sown plaster with fall wheat, and harrowed it in with the wheat, with very good effect. Yours &c.

CHAS. H. VERNON.

Haldimand, Jan. 25th, 1847.

To the Editor of the Newcastle Farmer.

DEAR SIR,—Permit me to express my thanks to you for the exertions you are putting forth, in laying before your brother Farmers, from time to time, in the *Newcastle Farmer*, information both entertaining and instructive. You are endeavouring (no very easy task,) to rouse us up from the lethargy in which too many of us are prone to indulge. The grasshopper appears to be a burthen to us, (by the bye, a pretty heavy load in July and August!) and most of us are content to leave things as they are, smoking our pipes, and whittling our sticks by the fire side, with the perfect assurance that inasmuch as Potatoes grew with luxuriance in the days of Sir Walter Raleigh, so they *ought* to grow now. In other words, like the Monkeys in a cage at the show, we require "stirring up."

In the *Newcastle Farmer* of the present month, which is replete with useful information, you express a regret that you had so few communications from your brother Farmers, and that you hoped in future to hear from them; and although you suggest one particular subject for discussion, (fall ploughing,) I conclude that any ideas upon farming, which may occur to your readers, will be acceptable. Now in your last number, there are three or four most important statements which I think deserve experimenting upon.

1st, The use of Salt as a top dressing for wheat.

2nd, Ditto as a manure for potatoes.

3rd, The use of Charcoal as a corrective to the potato rot.

4th, The use of compressed glass milk pans.

By the statements alluded to, it would appear that so satisfied are the parties who have used salt as a manure, that they intend applying it more largely than ever, and that with regard to charcoal as a manure for Potatoes, the use of it has the high sanction of Lieberg, who is reported to have expressed the opinion that carbon is the only antidote to the disease.

As respects the use of glass milk pans, if it is true that 30 per cent more of cream is obtained, what an important consideration is this? Why it would eventually enable Canada to be an exporting country for butter; and I cannot help thinking that it is an object well worthy of the attention of the various agricultural Societies of Canada, who ought, *at once* to send to England for some, in order to experiment upon them.

Not to make my letter too long, will any of my brother farmers consent with me next spring to be "stirred up" to make these experiments; and I request, Mr. Editor, that you will use all your influence with the highly respectable and intelligent President of our Agricultural Society, and "stir him up" for the glass milk pans.

I am, dear Sir,
truly yours,
A CANADIAN FARMER.

Haldimand, January 8, 1847.

For the Newcastle Farmer.

Haldimand, Jan. 25, 1347.

MR. EDITOR,—Have the goodness to enquire through the medium of the *Newcastle Farmer*, the opinion of Farmers in general respecting the present state of Fall Wheat, and the effect likely to be produced upon this most important branch of agriculture, by this unusually wet season.

In this section, the great quantity of rain that fell lately had the effect of dissolving the snow, and forming a coat of ice upon the surface of the ground in contact with the plant,—thereby, in my opinion, placing it in a most perilous situation. Yours truly,

CHAS. VERNON.

TO PURIFY BAD WATER.—Five drops of sulphuric acid, or twenty drops of diluted vitriolic acid, put into a quart of bad water, will cause the noxious particles to fall to the bottom. The water should stand for two hours, and then pour off three parts for use.

CURE FOR TOOTH-ACHE.—Take 60 drops of creosote, 60 drops of laudanum, and 120 of *sweet* spirits of nitre; a piece of lint dropped in this mixture, and applied to the tooth, will seldom fail to effect a cure.

MOULDY CASKS.—Concentrated sulphuric acid is recommended for purifying casks from mould, and mouldy smell.—So much is poured into the vessel as shall (on rolling the cask,) be sufficient to moisten every part; after a quarter of an hour, wash the vessel out with water.

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