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THE

CANADIAN AGRICULTURIST

AND

Transactions

OF THE

BOARD OF AGRICULTURE OF UPPER CANADA.

VOL. IV. TORONTO, APRIL, 1852. NO. 4.

SCIENCE APPLIED TO AGRICULTURE.

The following address, by Dr. Frankland, is taken from the *Transactions of the Royal North Lancashire Agricultural Society*, in England. The Doctor, we believe, is the Professor of Chemistry in Owen's College, Manchester;—an institution recently established by the princely munificence of the individual whose name it bears:—

Dr. Frankland addressed the audience to the following effect:—The subject for discussion, as most of you are aware, is "The importance of combining science with practice in farming operations." I have only this afternoon, whilst present on the field where the agricultural implements were being tried, been requested to introduce the subject to your notice. I think the *onus* of introducing the subject would possibly have better devolved upon some of the eminent agriculturists present, since in the printed announcement of the discussion, "practice" comes before "science." In fact, it appears to me that the best mode of conducting these discussions is for practical men to express their opinions on the subject to which attention is directed, and then to put questions to the scientific men present which they might not be able to answer from their own practical knowledge. However, as the *onus* of introducing the subject has devolved upon me, I will endeavour, in as few words as possible, (as the time has been so much delayed) to convey to you what in my opinion are the principal points of connexion between the science of chemistry and that of agriculture. You will perceive that the subject in the prospectus is not confined to chemistry; it is the advantage of science in general, combined with practice in farming operations. Now chemistry, I beg you to understand, is only one of many sciences which can thus be applied with advantage to agriculture. We have, for instance, the science of mechanics, which is perfectly indispensable to agriculture. We have also the science of physics, which is perhaps as important as chemistry. We have also natural history, which, as you are all aware, has a most intimate connexion with the subject before us. Now I would commence by a very broad assertion—namely, that without this combination of practice with science, all farming operations are empirical and lead to no trustworthy results. This will not perhaps be admitted by many of the agriculturists present; for we usually find that farmers, and especially tenant farmers, are exceedingly averse to adopting principles which can be deduced from the laws of science in their agricultural operations. You will, however, readily see that such a combination must take place, if we wish to have universal laws in the science of agriculture. A thousand farmers may try a thousand experiments upon a thousand different fields; and one farmer may produce an amazing crop of corn by the application of a certain manure. Another farmer may try the experiment with a different result, or with the same result; if with the same, it is looked upon as a confirmation of the original experiment, and very properly so; and there is additional reason for a third farmer to try the experiment in confidence of producing the same successful result. But if this third farmer has a field in which the chemical constituents of the soil are widely different from those of the first two, he will be mortified to find that in his case the manure completely fails. This we find an every day occurrence in agriculture. We find manures that are introduced with eulogium into certain districts, entirely fail when applied in other districts. If we would ascertain the cause of these failures, we must go to the very bottom of the subject. We must ascertain the composition of the soils upon which the manure may have been tried, and we must also have plainly before us the composition and *modus operandi* of the manure which is used upon those soils.

It is evident that this portion of the inquiry can only be set at rest by an application to chemistry. It is chemistry alone which can furnish us with a clear idea of the composition either of the soil or of the manure with which we seek to operate upon that soil. I might mention many instances in support of this position, but I will content myself with one—that of a farmer in whose soil there is a large quantity of phosphoric acid present in a form of combination in which we meet with it in bone-earth, or as earthy or alkaline phosphates. When he tries the effect of ammonia for its salts, and applies a top-dressing of sulphate of ammonia, he finds a greatly increased crop—a greater quantity of grass than would otherwise have been produced. Another farmer, whose soil is entirely destitute of phosphoric acid, tries the same experiment, and finds perhaps no benefit at all from the application of ammoniacal salt—for instance, sulphate of ammonia derived from gas liquor. What is the explanation of this? The art of agriculture itself can give us no explanation whatever. Both may be clayey, or gravelly, or sandy soils, and yet this difference of result obtained. A difference in point of mechanical structure has no influence whatever in this matter; it does not in the least explain the difference in result obtained by the application of this sulphate of ammonia. We find, however, on reference to the chemical constituents of grass, that those constituents which afford nutriment to the cattle feeding upon it must contain, as one of their essential ingredients, phosphorus. This phosphorus cannot be manufactured by the plant itself; it cannot be manufactured by any process in the soil; it must be present in the soil, or it cannot be conveyed into the pores of the plant and converted into the nutritive constituents which it is our object to form in the cultivation of plants. The consequence is, that the nitrogen contained in these nutritive constituents—this nitrogen which we wish to supply in the sulphate of ammonia, although an essential constituent of the nutritive matters referred to, is of no use whatever as supplied in the sulphate of ammonia, unless phosphoric acid be present in the soil. This is one of the many instances which we might adduce as showing the advantage of combining science with practice in ordinary farming operations.

Another advantage is, that by the aid of science we are enabled to economize our manures and apply to our fields just the kind of ingredients which they require. Take, for example, the case of a farmer who has land, perhaps, rich in nitrogenous constituents, and with a deficiency of phosphoric acid in the soil. Now if, by the advice of a neighbour or other person, he uses sulphate of ammonia or other ammoniacal salts which may be in the market, he throws away just as much money as he pays for the salts in question. If, however, he knew that his land did not require these ammoniacal salts but was in want of other constituents, such as phosphoric acid, then he would use bone-dust or guano, both of which contain these phosphates in large quantities, and would therefore supply the deficiency. Another advantage flowing from the connexion of science with agriculture is, that we are enabled to ascertain by these means what kind of crops will produce the greatest amount of nutritive and fat-forming matter from a given surface of land. It is evident this question can only be set at rest by an application to chemistry. We must ascertain, in the first place, what ingredients it is necessary that we should give to our stock in order to fatten and bring them to their full growth. We find two distinct classes of substances requisite for effecting this object—namely, substances rich in nitrogen for the formation of muscles, and another class of compounds for laying on a superstratum of fat, which is now such a great desideratum in the feeding of cattle. The first class of substances which it is requisite to produce in the food we give to animals consists of those containing a large amount of nitrogen and phosphoric acid; the second class, for the production of fat, consists of substances which may be entirely void of those two elements, nitrogen and phosphorus. If we wish simply to fatten cattle upon our land, we know, by reference to chemical science, that we must endeavour to produce as much combination of carbon and hydrogen, in the form of sugar, starch, &c., as we can; and we need not particularly trouble ourselves about producing large quantities of flesh-forming principles, since the animals we seek to fatten are usually in a full-grown state. But in rearing your animals, we must look to muscle-forming principles, and give a sufficient quantity of phosphates to enable them to form a due proportion of bone.

Another advantage which agriculture has already derived from the science of chemistry is this, that chemistry has shown us from what sources plants derive their constituent elements. Formerly, farmers imagined that the richer the land was in humus, or humic acid, the larger the crops it produced. They imagined that these carbonaceous substances were dissolved in the rain water which descended, or were in some other way conveyed to the roots of the plants, and administered to the nourishment of those plants just in the manner that soup operates in feeding man. This was the mistake: the comparison of the life of plants with the life of animals—two states of existence which are precisely opposite to each other. The function of plants is nothing more than the restoration of the equilibrium which has been disturbed by the function of animals. Animals restore to the atmosphere and to the soil those constituents which it is necessary for plants to obtain to form their tissues. This was shown by Liebig, who proved that in the extensive pine forests grown in Germany, the carbon and hydrogen contained in the wood of those trees must be derived from other sources than the soil upon which they grow; such soil containing scarcely a trace of carbonaceous matter. Upon a single acre of this land, there was reared in the course of a few years trees which contained several thousand pounds of carbon. How could this find its way into the tissues of those trees if it were not derived from the atmosphere? A knowledge of the atmosphere gives the solution. The atmosphere contains the whole of the carbon requisite for the formation of the carbonaceous tissues of plants. When we take into consideration the enormous extent of the atmosphere, the quantity of carbon contained in it in the form of carbonic acid, and the manner in which the atmosphere is brought into contact with the leaves of plants, we can find sufficient to account for the whole of the carbon discovered in the tissues of plants. It is now well known that the leaves of plants exposed to sunshine or diffused daylight absorb this carbonic acid very rapidly from the atmosphere, and eliminate from their surface pure oxygen gas. Now the carbonic acid is composed of carbon and oxygen: hence, it is mathematically certain that the carbon must remain in the leaves. It does not remain as charcoal, but is assimilated with the elements of water, and is converted into sugar, starch, woody fibre, or other substances which contain carbon along with the elements of water. In the same way, nitrogen has also been proved to be derived from the ammonia in the atmosphere. This is a most important point for agriculturists, especially for those on poor soils; because a large quantity of the manure applied to soils are manures rich in nitrogen—a material which is capable of being abstracted from the atmosphere by plants, providing they have the other mineral requisites to build up the organic substances, which they form from carbon, nitrogen, and water. If we supply these mineral substances, we can rely upon plants deriving sufficient nitrogen from the atmosphere to form the compounds before spoken of—namely, those nutritive properties which are the chief objects contemplated in agriculture.

We then see clearly that plants derive their nutriment from two sources: from one source which is perfectly independent of all man's operations—namely, the atmosphere; and from a second source—namely, the earth. We also find that it is necessary to provide certain ingredients if they are not already present in the soil. The principal of these ingredients are phosphoric acid and the alkalies; sulphuric acid is also requisite; these materials being essential to the formation of the nutritive properties already alluded to. We therefore need only look, in agricultural operations, to the supply of these inorganic constituents—namely, phosphoric acid in the form of bone-dust, and potash in some cheap form, as from decomposing materials; the nitrogen (such an essential constituent in these nutritive principles,) and the carbon being entirely derived from the atmosphere. There is, however, one condition in which we can apply nitrogenous manures with advantage, and that is, where a soil is exceedingly rich in mineral ingredients, and on which we want to raise large crops of plants which are rich in nitrogen. In order to effect this, we must supply manure artificially, and in the form of ammonia; this being the only condition in which nitrogen can be assimilated by plants. We are also enabled to see, from the application of chemistry to agriculture, the causes of the advantage derived from the rotation of crops, fallow, and quick lime. The advantages of the rotation of crops is now appreciated by most agriculturists in almost all districts. But the way in which this advantage is derived is not by any means so clearly understood. It is well known to chemists and scientific agriculturists, that different kinds of plants absorb different kinds of constituents from the soil. Wheat, for instance, requires a large quantity of silica and phosphorus for its perfection. Another class of plants scarcely requires silica at all; while a third class probably needs only salts of potash or soda. In this way we divide plants into three classes: plants which require silica; plants which principally require potash or soda. Now when we plant wheat upon a soil, we withdraw from it
large quantity of silicious materials, silica
flint in a soluble state, and a considerable am
of phosphoric acid. Consequently, if yc
tinue to crop the land with wheat, you
your crops diminish in quantity, and
cannot grow any more wheat on th
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do than to supply the requisite amount of silicious materials, phosphoric acid, &c., in order to effect this object. Probably, however, up to the present time these ingredients cannot be obtained sufficiently cheap to carry out this system; but if agriculturists were upon the watch for these compounds, there is little doubt that eventually a cheap supply of them may be rendered available, and the same land be cropped with grain crops every year in succession, without impoverishing the soil. Phosphoric acid can be supplied by bone-dust; but this is too expensive for common use. It is, however, fortunate for agriculturists that fossil supplies of this phosphate of lime occur in immense quantities in various parts, embedded in the soil to the depth of several inches, and occasionally to the depth of one or two feet. This "coprolite," as it is termed, (or excrement of animals that have long ceased to exist) contains from 80 to 90 per cent. of pure phosphate of lime. Now comes the question of supplying silicious materials to the soil—a matter which is engaging the attention both of agriculturists and of chemists at the present time. If we supply the requisite quantity of manure to a given space of land to crop it yearly with wheat, after two or three years the straw fails in strength, and the least wind beats it down, the straw not being sufficiently strong to bear the ears upon it. How are we to get rid of this difficulty? Simply by the application of these silicious materials, which are not requisite for the formation of nutritive matter, but are required to give strength to the stalk by which to elevate the grain to the atmosphere that it may ripen. It is important that we should be able to supply these silicious materials in the cheapest form. Bunson has discovered that in volcanic regions there are extensive layers of lava, known under the name of pelagonite, which contains silica in large quantities, and in such a state that it readily becomes soluble by the action of the atmosphere, and capable of being conveyed to the plants by rain water. All our soils contain a sufficiency of silicious matter, but being in an insoluble form it can only be reduced to a soluble condition by the action of air and moisture through a long series of years. This pelagonite yields silica in a comparatively short space of time, and might be imported for that purpose.

There is also another plan I would propose for adoption in places where it could be carried out to advantage—that is, the heating of silicious substances with quick lime. The chemist knows that when silicious substances are to be brought into solution, they must be heated with alkalies or alkaline earth. Now this is precisely the operation we have to apply to the silicious materials which constitute 40 to 50, and in some cases 60 to 80 per cent. of our soils, to bring them into solution, and into a condition in which they are capable of being assimilated by plants. If we take these silicious materials—namely, gravel on the coasts, and flints in the south of England—and mix them in alternate layers with coal and chalk or limestone, and ignite the whole mixture, we convert the chalk into quick lime, and heat the flints to redness. If we then turn upon the mass a stream of cold water, so as to cool it very rapidly, we slake the lime, convert it into hydrate of lime, and reduce the flints or silicious stones into an almost impalpable powder; at any rate we disintegrate them to a very great extent, and bring a large surface of them into contact with the lime; and the consequence is, we obtain a large quantity of silicate of lime, which furnishes silica in a soluble form to the plants upon the soil to which it is applied. A few months ago, one of my students tried this experiment on a small scale in my laboratory with successful results. There can be no doubt that where corn or other grain crops are liable to heavy rains or rough winds, the application of such manures would be of the very greatest advantage. There are many other points which we might mention illustrative of the advantages which agriculture may derive from the application of chemistry; but as the time is already so far advanced, and as I am sure that many of the agriculturists before me will have questions to ask in reference to the application of manures to particular soils, or on other matters, I will content myself with the few observations I have already made, and conclude by assuring you that I shall be very glad, so far as I am able, to answer any inquiries that may be put to me on these subjects, or on other subjects relating to the application of chemistry to agriculture.

Consumption of Bread.—Estimating that there are 24 millions of bread-consumers in Great Britain and Ireland, (leaving out the four millions of potatoe-eaters,) and allowing each person one and a half loaves per week, it is 36 millions of loaves. Admitting that each quarter of wheat makes 136 loaves of bread it requires 168,656 quarters of wheat per week. To this add 10 per cent for flour used in other articles, and it gives 291,521 qrs. as the weekly consumption of wheat, or 15,367,092 qrs annually. London and suburbs, with its two millions of a population, consume three million loaves weekly, and with flour, require 24,626 qrs. of wheat. A quarter of wheat will give 50lbs of flour per bushel, of the quality which makes best seconds bread, 400lbs altogether; and that quantity of flour will make 134 quartern loaves. A quartern of wheat, ground into flour, and taking out only the rough bran, say about 5lbs to the bush., will yield 58lbs. per bushel of such flour, and that will make 141 loaves the quarter. A quartern of wheat ground down into rough meal without taking any bran, will give 62 or 63lbs of meal, and that will make about 166 loaves of healthy good brown bread.

The Agriculturist.

TORONTO, APRIL, 1852.

FLAX; ITS CULTIVATION AND MANAGEMENT. NO. I.

Having been favoured with several of the best treatises on the cultivation and management of the Flax-plant, through the kindness of FREDERICK WIDDER, Esq., of this City, *Commissioner of the Canada Company,* we propose compiling therefrom a series of papers on this subject, which from various causes is beginning to excite more than ordinary attention in different sections of the Province. As the time for sowing will speedily arrive, we shall commence with some remarks on the climate and kinds of soil best adapted to this crop, the preparation of the land, and the time and method of sowing.

The climate of Western Canada is no doubt sufficiently humid for the successful growth of Flax, which has been raised in small quantities in different districts for a number of years; the produce having been used for domestic purposes. Our position may not be equal to regions possessing an insular character—such as the British Islands, for example; but we should think it as good as most of the flax-growing countries of continental Europe, where severe droughts frequently occur in the spring, after the plant has reached a height of two or three inches; a circumstance very unfavourable to its subsequent progress. The growth of Flax may be said, indeed, to have a very wide range over the surface of the globe. "It flourishes in the light soil of Flanders, in the deep alluvial deposits of Holland, in the limestone and peaty soils of Ireland, and on almost, if not on every variety of land in England. Good crops have been produced on reclaimed bog, and it has grown on the Wicklow mountains a thousand feet above the level of the sea, and flourished even at that elevation on cold granitic moory soil, which in its natural state produced nothing but heath. Like grain and other crops, flax may show a preference for other soils and situations, but it will flourish and attain maturity in all, if proper care is bestowed on its cultivation." (*Nicholls.*)

The best soils for flax are deep rich loams, resting on a clay subsoil. It is of much importance that the land should be naturally sound and dry, or made so by draining; and deep cultivation is, in all cases, to be strongly recommended, since the roots will frequently descend to a depth equal to the length of the plant above ground;—a condition deserving much attention by the cultivator, particularly in countries (among which Canada must, to some extent, be included,) that are liable to severe droughts in spring and summer. It would be a good practice, especially on heavy lands, to plough deeply in the fall, leaving the ground in ridges, sufficiently furrowed to allow the water, after the melting of the snow in spring, to find a ready exit. Care should be taken not to work the land in the spring till it is quite sound and dry;—a precaution indeed that may be said to apply to cultivation in general, as the mechanical texture of the soil is often seriously injured for one or more seasons by the treading of horses when in a wet state; thereby causing it to consolidate to an injurious extent, preventing the free penetration of the roots of the growing plant in their search for food, and excluding the healthy action of air, warmth and moisture. Experienced flax-growers, however, find that a very loose soil is not favourable, as is the case with wheat, beans, clover, &c., all which require a soil moderately adhesive.

Rich pasture lands are those best adapted to the growth of flax. But if this crop is too frequently repeated, the very richest lands will soon cease to yield a profitable return, under the ordinary system of cultivation. Flax is no more an exhauster of the soil, *per se,* than cultivated cereals in general;—but when it is allowed to ripen its seed, which, with the fibres wholly removed from the land, and nothing in the shape of manure returned,—a practice that has too commonly been pursued,—there can be no doubt that flax culture, in such circumstances, rapidly exhausts the land. But so it is with all kinds of crops;—particularly the grain bearing plants. From the chemical composition of flax,—particularly the seed, it must draw largely on the soil for *phosphates;*—which, however, can be readily restored by the manure of animals fed on the refuse of the seed after the oil has been expressed; and all those portions of the plant not used by the manufacturer, ought to be converted into manure and returned to the land, instead of being, as has been too commonly the case, absolutely wasted. Even the water in which flax is steeped, possesses considerable manuring qualities, and will pay for economising, and applying to the land. In Belgium, where flax-culture is the most successfully carried out, liquid manure, properly prepared and applied, is found to be extremely beneficial Strong artificial manures, however, such as guano, bone dust, &c., require much caution and judgment in using them for flax. Indeed, it has been generally found most beneficial where a heavy dressing of manure is applied to land intended for flax, to use it for the previous grain crop, as the flax-plant usually succeeds well immediately after either wheat or oats. Fresh, stimulating manures, are apt to cause the plant to grow too rapidly, therefore producing a weak and coarse fibre; whereas *strength* of fibre is the quality which constitutes its principal value for manufacturing purposes.

The ground properly prepared and *clear of weeds*, the seed may be sown broadcast, an operation that should be performed with the greatest care with regard to uniform distribution. Sowing should commence as early in spring as the weather and the state of the land will admit, which in this climate will not be the case, in general, before May. The quantity of seed should be varied to *suit special purposes and* conditions. If the raising of heavy, plump seed be the principal object, then a smaller quantity will suffice—say about 6 pecks per acre; but for ordinary purposes from 2 to 2½ bushels will be required. If particularly fine flax is desired, such as is used in making the best lace and cambrics, 4 bushels, or even more, must be sown. Riga seed is said to produce the finest quality of flax; but the American would answer our purpose generally, at least for the present; but in flax, as in other things, a frequent change of seed is advantageous and necessary. Before sowing the seed, too much pains cannot be taken to free it from all descriptions of weeds, with which it is more or less commonly mixed. Select that which is plump, shining and heavy. The practice of sowing clover and grass seeds with flax cannot be commended, except for special occasions. After the seed is sown, it should be evenly covered, about an inch in depth, by the action of a light harrow, being careful to leave the land in a smooth, firm state, with the roller, with no more open furrows than are absolutely required for the taking away of superfluous water.

We would strongly urge upon the attention of our readers the inexpediency of having more land under flax culture than can be properly prepared and thoroughly managed. This caution is indeed needful as regards the cultivated plants of the farm generally; *but in respect to flax, and the* flax crops especially, the difference between good and indifferent cultivation, will in the main be found to consist either in an encouraging and remunerative return, or a disheartening and serious loss. Beginners, especially, should commence with a little, and, to conclude this paper, we would say, emphatically, *cultivate that little well.*

IRRIGATION BY LIQUID MANURE IN GREAT BRITAIN.

The February number of the *Farmers' Magazine*, contains an interesting paper from the prolific pen of Mr. Cuthbert Johnson, on the progress making in England as well as Scotland of fertilising whole farms by means of liquid manure;—a substance which till late years was too frequently allowed to run almost entirely to waste. Capacious tanks are made for the reception of the fluid excrements of cattle, which, when properly diluted with water, become a safe and efficient fertiliser, and is distributed over the fields belonging to the farm by means of pipes made of iron and gutta percha, attached to a pump, worked by a steam engine. The outlay in the first instance is of course very considerable, but in all cases, it would appear, when the experiment has been fairly and judiciously tried, the benefit produced has far exceeded the expense.

Myer Mill Farm in Ayrshire, occupied by Mr. James Kennedy, consisting of 400 Scotch acres, is an instance that may be cited for showing the beneficial and economical application of liquid manure on an extensive scale. The whole expense of the apparatus for fertilising this farm is stated as follows:—

	£	s.	d.
Four Tanks complete	£300	0	0
Steam Engine (12 Horse-power)	150	0	0
Pumps	80	0	0
Iron pipes, laying, and hydrants	1000	0	0
Gutta percha distributing-pipes, &c.	56	0	0
	£1,586	0	0
Annual interest on £1,586, and wear and tear, at 7½ per cent.	£118	19	0
Annual wages	104	0	0
Fuel	58	10	0
	£281	9	0

This amount, divided by the number of acres, is equal to the annual sum of 14s. per acre.

The results are said to be highly satisfactory. Four or five heavy crops of grass have been cut in one season from the same land, which, by repeated dressings of liquid manure, not only suffers no diminution by the removal of such crops, but its fertility actually increases. The same farm, previous to the introduction of this system of manuring, would not keep more than a bullock or five sheep to an acre;—now it maintains, by the crops being taken and consumed in the stalls, five bullocks or 20 sheep to an acre. Some bran and oil-cake are bought for the stock, but one third or more of the farm is kept in grain, yielding heavy crops.

These few facts will afford the reader some imperfect idea of the advanced state at which farm management has already arrived in some favoured localities of the Mother Country; where the farmer's pursuit is justly entitled to the appellations, in their highest signification, of a *science* and an *art*.

DEPRESSED STATE OF IRISH AGRICULTURE.

A recent number of the *Irish Farmers' Gazette*, contains the following painful facts:

In 1847, the average price of wheat in Dublin, was 41s. 3d. per barrel of 20 stones, and Ireland raised 2,926,733 qrs. In 1850, the average price was reduced to 20s. 3d. per barrel (more than 50 per cent.!) and the amount raised was only 1,550,196 quarters; showing a similar rate of decrease. Barley and oats do not appear to have fallen off in amount so largely as wheat, but equally as much in price. In 1841 there were in Ireland 13,464,303 acres of arable land under cultivation. In 1850 that amount was reduced to 5,758,292! "What," says the *Gazette*, "has become of the *eight million seven hundred and six thousand acres* which constitute the difference?" The following figures will answer the question:—

Farms occupied and cultivated.

1847	803,025
1850	628,222
Difference,	174,803

In regard to population, the Census tells us the following tale:—

Total population of Ireland.

1841	8,175,124
1851	6,515,794
Diminution,	1,659,330

The *Gazette* attributes a large amount of this national misery and decline to the operations of "*a one-sided free trade*," which has caused Ireland to lose nearly all her export trade with England; government contracts for provisions even being made in foreign markets, provided only such markets are cheaper than her own. Without mooting the much vexed questions of free trade and protection, we think it must now be apparent to every unprejudiced mind, that England, ere she had finally committed herself to the former, would much better have consulted her own peace and prosperity by accompanying that important change in her commercial policy, with such fiscal and legislative modifications in reference to her agricultural and colonial interests, as should have enabled those interests to partake of the benefits which free trade was designed to confer;—thereby preventing discontent, and almost open rebellion in the colonies, the hopeless prospects and utter ruin of thousands of British farmers and their dependants; and the present disorganization and prostration, apparently hastening towards a national extinction, of the warm-hearted inhabitants of the beautiful "Green Isle;"—who, instead of being only a source of weakness and annoyance to England, might have been made her strongest pillar of strength and defence.

SHEEP HUSBANDRY IN CANADA.

We present our readers with the conclusion of Mr. Hume's excellent Essay read before the Township of Hamilton Farmers' Club, Jan. 24th, as reported in the *Cobourg Star*. The first portion of the Essay was published in our January number.

In concluding my last paper on Sheep husbandry, I gave up at a point, where I am satisfied the experience of many of our number would have enabled them to do the subject more justice than can be expected from me, who am comparatively a novice in the farming of this country. It is therefore with the utmost diffidence that I now, at your request, carry out the matter, and submit opinions at the best crude and indefinite, in the presence of those who are so much my seniors in Canadian sheep farming. In the management of stock, the circumstances of locality, climate, food, &c., exert such a powerful influence that it is only from the accumulated experience of many successive generations of practical men, in a given locality, that we can hope to attain any degree of success. Gradually, certain facts are established, on which men of judgment can found their reasoning and push on more rapidly in a career of improvement. But in a new country like ours, it takes some time before these principles can be fairly ascertained, and firmly grounded. The Geologist, from studying the formation of the earth, may, on finding deposits of a certain character, lead you to those places where the desired substances are to be found. The chemist, by analyzing such substances can ascertain precisely their various ingredients and properties, shewing their value in the arts and manufactures. Then comes the mechanic, and by adapting his tools and mechanism to a precise knowledge of these properties he proceeds at once to use them in the carrying out of his manufactures. But where the vital principle is concerned, there our powers of reasoning are at fault; fresh data enter into the calculation, a thoro' knowledge of which, our Creator seems to have reserved to beings of a superior order to us mortals. We can take away life, but we cannot even discern the sources whence it arises, and it is only by the accumulation of facts as to its action that we can deal with the principle.

Under these circumstances it may be seen of what great value are societies like the present,—they induce a habit of thinking, a habit of thinking leads to the observation of facts and the circumstances of their relations one to another; relations which though often of the utmost importance are neglected where habits of reflection are not cultivated. By the way a regular memoranda of ordinary occurrences as they happen would be found to be of incalculable advantage to farmers generally, affording them an opportunity of comparing season with season, and the circumstances attending one year's operations might thus be made to bear upon the difficulties of another.

But to return to the subject immediately before us, the management of sheep farming in Canada. The consideration of it seems naturally to fall into two branches: First, the mode of investment of capital in a sheep stock, so as to yield the largest profit to the farmer; next the mode of management of that stock so as to keep it in the most healthy condition; assuming always, that stock kept in the most healthy, thriving condition, will yield the best and safest return to the holder. This position I think we may safely take, notwithstanding the fact, that pampered animals, covered with an extraordinary superabundance of fat, often yield a large profit as show animals, although they cannot be said to be in a naturally healthy state. On the same ground of whom some actual diseases may, perhaps, be made occasionally to yield a profit. I remember a lawyer dining at the table of a friend of mine; when, on his expressing himself much gratified with the excellency of the mutton, his host told him that it was a sturdied wedder. The next day, he went to his butcher and begged to be supplied as often as possible with sturdied mutton, as that was the finest kind of sheep he had ever tasted.

The chief view of the farmer in the investment of capital in stock is to make a profitable market for the various productions of his soil; not in their raw state, immediately available for the use of man. There is however another consideration by no means to be neglected, that is the returning in the shape of manure a full equivalent at least to the crop taken off the land. It is true that in some localities, as near towns, a large amount of stock is kept entirely independent of the farmer, except, in making a market often of a most remunerating character, for his coarser grains, hay, and roots. In such case a large amount of stock would often seem not to be required by the agriculturist; but here he would do well to be particularly on his guard against the disadvantage arising from a short stock, a short supply of manure; and to avoid that evil by the constant use of the large quantities so easily obtained in the vicinity of a dense population. Speaking approximately, there are three modes of management of a sheep stock, which, in the extension of that husbandry, now lie open to us. First, the rearing, holding always in the highest condition, and selling off as soon as possible our own stock on a comparatively limited scale; second, the rearing and bringing to a certain point, by one party, whose position may be most fitted to the purpose; and the feeding off by a second party (who may be more favourably situated for that object) after purchasing from the raiser at a remunerating price; third, the rearing, keeping, and feeding off, on a more extended scale; an article usually kept to a greater age than the first class, and hardly until the final stages maintained in such high condition. In the latter mode of management, a larger flock could undoubtedly be maintained with less expense of labour than on the first plan, and, as the wool is one source of profit, it remains a question whether the return on the food consumed might not even be greater, especially as that food during a great part of the period might be of coarser quality. But the farms would require to be of sufficient range to allow to each class of sheep its proper distinct locality. It is however a doubtful matter, whether our present ready money market would be capable of absorbing any great amount of such stock, *en masse*, as it would require to be turned off. Should ever our market become more extended and steady, this would be a course of management well adapted to our back country; much might also be urged in favour of the second mode in back districts, where hay and other coarse fodder is often of little value, or will be so when lumbering becomes worn out. A large amount of sheep might, in such places, be with advantage, reared and sold, to the feeder more immediately on the market to finish off. There would by this arrangement be less loss from deterioration in bringing forward, and the butcher can always afford to give a better price to the man who keeps an article ready for him close at hand, when he may require it; instead of himself seeking it at a great expense of time and labour. At the same time, the front farmer who can sell his heavy fodder to advantage, and whose land is of high value, and consequently minutely subdivided, would not by this arrangement be required to keep a large stock, in its earlier, and to him, least profitable stages. The objection to this mode of management would at present chiefly be the slovenly mode of rearing stock so general through the country, rendering it difficult to procure an article of such quality as would make it desirable as a feeder. Here is a motive to the man living backward, to rear stock of a better description than he at present does; for, assuredly, the time has now arrived when such stock, were it produced in any quantity, would find a ready market. Another difficulty, perhaps, lies in what I have before alluded to, the absence of fairs bringing together stock, so that a purchaser can, with little trouble, select such as is peculiarly adapted to his purpose.

Considering, however, the class of sheep to which I have already given the preference, the heavy Teeswater or Leicester, I should, under the present circumstances of our country, choose the first mode of management. A thorough foundation for such a stock, requires now to be laid, and the rearing of this class of sheep is hardly yet in a sufficient number of hands to accomplish that object; under such circumstances, the raising for himself, is the only way by which a farmer can be supplied with a good article, at a price which will pay for feeding. By keeping this class of sheep in good order, they can be turned off at an early age, not encumbering our small farms with a heavy stock in different stages of growth. They may be kept ever ready for any demand, regardless of season. At the same time it is an important consideration in the present state of our affairs, that no actual outlay in money is required at any stage of the operation, except in the first acquirement of a breeding stock. When capital is sufficient, I should certainly recommend beginning at the root by buying as many good breeding ewes as circumstances may require, using to which, one of the best tups, you at once obtain your object. But as means are not usually too abundant here, it may frequently be desirable to begin crossing from the very bottom, or with only one or two superior ewes. In such a case, it may often scarce be worth while to use a very costly tup for the general flock, but rather to spare the expense, to be applied in sending a few of your best ewes to one of the best tups to be found in your vicinity—I say one of the best tups, for I would suggest that the very best tup to be found is not consequently the best for your purpose. Great expense and trouble are in all countries, and especially in this, thrown away by a want of attention to the true principles of breeding. In entering on breeding, you ought as a first consideration, to lay down definitely the qualities you wish to attain; be it long wool, be it short, be it fat, be it leanness, be it speed, be it sluggishness, or be it a combination of these qualities; keep your object ever in view, and never without some good reason swerve to either side; you may seek by one cross to impart a fine head, fine quarters, fine wool, or any other quality to your breed; but remember that by persisting in this crossing, you are not only engrafting this one desirable point, but mixing up all the other points also; many of which may be in direct opposition to the character you have all along been striving to maintain. There is one consideration, however, which seems to have become a fixed axiom in breeding, that while the male should have every point possible of symmetry and beauty, size is only a secondary consideration. In the female, on the other hand, every point may be in perfection, but where there is a deficiency in size, there is always a danger of a want of due development in the offspring. There is of course a limit to which you may carry this idea; but, it was a favourite one of the successful and justly celebrated Bakewell, and has been verified in the general experience of breeders. I remember (not personally, but as a family tradition,) an instance in point, when the Cullies, the first breeders of the Leicesters on the Borders, and the intimates of Bakewell, started the introduction of this breed into Northumberland —they were in the habit of holding an annual letting and sale of Tups, in which they were very successful for two or three years, and the new sheep became quite the rage. On this, some Yorkshiremen bethought themselves of trying their success in a trade so fortunate, and exposed in Morpeth market a lot of Tups of enormous size, with heavy curly wool. These were at once bought up as far outstripping their finer competitors, produced by the Cullies, and the latter gentlemen found their occupation rapidly going, if not gone. If I mistake not, this lasted two years, until the result of the cross on the small country and fine Leicester ewes began to show itself, when the next season the Yorkshiremen, with rueful countenances, had to carry back their now large importations by the road they came; and a Lincoln Tup, for I fancy by the description, of that character they were, has not been seen in Northumberland since. Under the mode of management we now speak of, it will seldom be found desirable to keep the average of the ewe flock beyond the age of five years. A number of this age might be cast every season, and either sold off in the fall, or held over on turnips until toward spring, when they would generally command a good price. In entertaining at all the thought of an extended sheep husbandry, we must not be alarmed at the fear of some additional labour; a dozen to 20 sheep may fend for themselves on a farm and do well, with almost no attention, but as the number extends, the competition becomes greater, and their care must then be made a distinct object, if success is hoped for.

But we are now arrived at the home of the practical farmer, his snug barn yard where he can bid defiance to the Chemist, Geologist, and every other Theorist, who has dared to enter the lists with him. Give me a good muck heap before all your hydro-sulphuretted, desicated composts.

The calm stillness of our Indian summer, the rich coloring of the fading woods, the rustling carpet of leaves under your feet; not unaccompanied by the still white frost of morning, through which the sun urges his ruddy beams, remind us that another season is at hand, with its due proportion of cares and pleasures. Such signs mark the time to select your breeding ewes. Though during the previous busy period they may very properly have ranged the stubbles in a somewhat neglected state, it is now desirable to put them on as good feed as you can command, a rough oat stubble, or, if your new grass be at all flush, suffer them to have the benefit of it before it is cut down by the earliest frost. I have always found it best to have the ewes rising in condition, at the time they go to tup. Mark me, I want them rising in condition, not dead fat. To rise, they must have been previously somewhat leaner. Nothing, however, seems to me more injurious than to have the ewe too fat during the time of gestation, a few white turnips or rape would be found of great value at this season.

Meantime allowing our flocks to enjoy themselves on the best we can afford, let us make our winter arrangements for their accommodation. For this purpose, a situation should be chosen where a dry sheltered shed can be erected, wet is the sheep's enemy in Spring, and especially at lambing time; the yard of this shed should if possible have a Southern or South Eastern expo-

-ure, and be devoted to sheep alone. It is always dangerous to have cattle in a yard among sheep at any time, but especially when heavy with lamb. The vicinity of the stable is also desirable, as inferior hay is often pulled down and rejected by the horses which may be with great advantage handed out to the sheep, forget not also some means for a constant supply of water to the ewes during the more advanced part of the season. Having constructed a shed suitable to your purpose, and large enough not to be too much crowded, racks ought to be arranged in the yard of sufficient capacity to admit of all the sheep feeding at once, and so constructed as to dirty the wool as little as possible. It is a slovenly and wasteful plan in a crowded sheep yard to scatter fodder around,—as sheep, well fed, seldom like to return to food they have trampled over. Troughs, also, for feeding out roots or grain, should if possible be placed under cover of the shed, in order to keep out snow and ice; and so managed by cross-bars, or some other device, as to prevent the sheep standing in them. Here again there should be ample accommodation for all; or you will see your weaker sheep grow daily poorer, sacrificed to the stronger and more fendy ruffians.

I have always found pea straw, clover straw, or even oat straw, if not too well threshed, and liberally supplied, accompanied by the stable refuse, sufficiently nourishing feed until the early part of February—during very stormy and severe weather, a little hay may be given. As the season advances, a few cut turnips or carrots may be added after their morning's fodder; at that time of day they are not apt to freeze, if they remain for a time uneaten. As lambing time approaches, I have found a few bran mashes with a little boiled Indian or Pea meal mixed through them, prove very advantageous in bringing ewes to their milk. I never have been so successful in this respect as the first year I was in Canada; I then simmered over night one quart of Indian meal in a common iron pot, full of water; with this I mixed about a pail full of thin bran mash in the morning, and gave it among 20 ewes,—on this they milked better than I have since found them do on a good supply of carrots.

You should particularly guard against bars, or any low fences around your ewe pen; have good gates and high fences. A lad carelessly leaving up the bottom bar, when the rest were down, has been the cause of many a fine ewe casting her lamb, frequently involving the loss both of the mother and her offspring. If you have any of your best ewes on which you can afford to bestow a little additional care, you may venture them to lamb a little earlier than the general flock; so that the lambs may be got out of harm's way before the more busy time comes on; with this object in view, I have always found the season from about 15th March to the 12th of April, to be particularly shunned as a lambing time. The sun has then attained much power; and it is generally wet and sloppy through the day, often freezing up most fiercely with a cold North Wester at night. This weather destroys your wheat, and it will sweep off your lambs as rapidly; such a night tells its tale in the morning.

I have found my ewes for the last six years produce the first lamb invariably five current months after the day the tup was put among them. Thus I should advise your early ewes to be put to about the 27th September, where your general flock is at all numerous, notwithstanding the remark I have made, with regard to the weather in the early part of April; I cannot advise to withhold the tup beyond the first ten days of November, as the weather often after that period becomes so boisterous, as much to affect the general heartiness of the flock.

Lambing time has at length arrived, your first care must be to provide three or four small pens, in the most sheltered part of your shed; each furnished with some convenient mode of feeding. I have always found it desirable, where ewes are lambing in a crowded pen, to shut the mother and her offspring up together, for the first night at least; if there is any difficulty in mothering the lamb, it may be continued for one or two days, but never longer than is absolutely necessary, as there is a danger of the ewe being shy of feeding in her new position. But there is a caution which I find here absolutely necessary; every ewe, on recovering from lambing, seems to require water; this I invariably provide for by giving a very liquid mash, which also assists in bringing forward the milk. Should this precaution be neglected, you will generally in six or eight hours find the ewe sicken, and have a giddy stupid appearance; while the lamb at once begins to scour; but this will generally be relieved in its earlier stages by administering the requisite liquid. If the lamb is not relieved, I have given with success a small quantity of opium in the white of an egg. The danger more to be feared here to your lambs, when confined in a crowded pen, is a stoppage of the evacuations caused by exposure to wet, intense cold, or the neglect of the mother during the night. The extremities become cold and a deadly stupor rapidly supervenes. Here I have found the administering a little warm milk, taking the lamb into a not too warm part of the house for an hour or so, not more, accompanied by continued friction of the limbs, quarters and loins, very frequently successful. But the lamb must as soon as possible be replaced with the mother in one of your small pens and suckled. In giving milk to lambs, it is necessary to know, that about a table spoonful at a time, is sufficient for the capacity of the stomach. A great cause of the want of success in bringing up young lambs on milk, is, that people often vainly endeavour to squeeze the whole contents of a tea pot into a cavity not larger than a walnut shell. The plan usually adopted by shepherds is to carry a small bottle of new milk somewhat diluted with water, and sweetened with sugar, so little as scarcely to be perceptible; this is kept warm by being carried in the breast pocket, and when about to administer it, a little is taken into the shepherd's mouth, and retained until he no longer feels any coldness in its taste; it is then dropped into the mouth of the lamb held open for that purpose. During the busiest part of lambing, your ewes should if possible be attended to, once at least in the course of the night; your pens will then be found most valuable, as any ewe, having the appearance of lambing, may be placed by herself and can be seen at once, without your perishing in the cold for half an hour.

Spring now brings to the farmer anxieties about other matters; and your flock, on getting out to grass, will not require that close attention. Your lambs should be castrated at the age of about a fortnight, while the weather is yet moderately cool. From that period, the feed and management of each farmer will depend on his own peculiar arrangements. The ewes ought to be dried in the course of July, if possible, or at latest early in August; after the stubbles are open, there can be no excuse for keeping lambs sucking the vitals out of the ewes. The ewe lambs, of course, no judicious farmer will think of breeding from, the first year; and he will take care to provide them with the best of feed during the first winter; in a situation apart from the older sheep, which would otherwise drive them from their feed. Towards spring, it will be found necessary to slice pretty fine any roots given to the lambs, otherwise, as their front teeth are getting loose, they will refuse to eat them.

I have now travelled over more ground than I purposed at starting; I have freely expressed my opinions founded on experience, abstaining from what some people call book farming, from an impression that these meetings are more for the purpose of gathering together, and digesting our mutual experience, than for repeating information from books, which we can read at our own firesides; at the same time that I would be the last to depreciate any information from whatever source derived. I trust, by thus collating our experience, we shall be enabled mutually to benefit each other, and advance the calling to which we belong. I am proud, gentlemen, of being a farmer; people tell me it is an independent mode of life, but I would rather call it a dependant one, and its dependance constitutes its pleasure. God has formed his creatures for society, each dependant on the rest for his comfort and happiness; and no man is in a position to realize this feeling so directly as the farmer. His food, his employment, his comfort, are derived from sources directly around him;—earth, air, and water, each contribute to the fruits of his labour, and there is no creature of God's creation, no law of his omnipotent providence, a knowledge of which will not assist the farmer in his every day pursuits. A field is thus opened up for the cultivation of both the mental and bodily powers, which is most in accordance with the purpose for which they were originally created. And breathing the pure air of Heaven, and surrounded by the gifts of nature, which a bountiful providence has strewed around him, his position makes the nearest approach to that of man in his primeval and happiest state. Always reminded, however, of his present position and future prospects by the curse that rests on him, that he shall earn his bread by the sweat of his brow.

A GOOD APHORISM.—Always do as the sun does—look at the bright side of everything, it is just as cheap, and three times as good for digestion.

THE COW: DAIRY HUSBANDRY AND CATTLE BREEDING.

By M. M. Milburn, Author of Prize Essays of the Royal Agricultural Society. London, Orr & Co.—This is one of the admirable series known as "Richardson's Rural Handbooks." The various kinds of milk-producing and fat-producing breeds of cattle are described, and the important subject of dairy management as practised in various localities in this country and abroad, is detailed, evidently by a practical hand. Altogether, a mass of information is brought before the reader which might even be looked for in vain in works of a more pretending character. We extract,

THE GLOUCESTERSHIRE DAIRY SYSTEM.

"In this district, celebrated for its *double Gloucester* cheese, the practice is not so entirely dissimilar to the Dunlop and Cheshire modes, as to require a very minute detail. They weigh usually about twenty-two pounds each, are a rich and useful cheese. The single Gloucester, or one half new milk, and one half blue or skimmed, are disappearing from public approbation. The milk fresh from the cows is taken and mixed at once with the rennet and anatto, and left for an hour covered up to prevent the escape of the heat, which is maintained, so far as it can be, at the same degree as in Cheshire, and the curd is broken by a knife with three blades, or a sieve made of wire. The whey is taken out with a wooden dish, and is placed in the vat, over which a linen cloth is spread. Into this cloth the curd is put, and pressed with the hands until it will bear the cover of the vat, which is then placed upon it, and loaded with a weight, or it is placed in the cheese press. The curd is then torn in pieces by a curd mill, and again placed with a clean cloth in the vat, and pressed. In four or five days the curd is thoroughly deprived of the whey, and is taken out to undergo the process of drying. It may be observed that salting has not been described. No salt is mixed with the curd, but it is rubbed upon the exterior of the cheese, some twelve to twenty hours after it has been put in the press. It is rubbed in with the hand, so long as the curd appears to absorb it; and the cheese is again transferred to the press. This takes place three times each day, and the quantity of salt allowing for waste, which a cheese of twenty-two pounds will absorb, will be about ten ounces. When taken from the cloth, they are wiped and laid to dry, in the ordinary manner, being frequently turned.—When intended for sale in London, they are scraped and painted. A coat of red colouring matter, dissolved in ale, is used, which is rubbed on the cheese with flannel. Of course this has no beneficial tendency."

THE HISTORY OF COFFEE is perhaps not known, or remembered by every one. A writer in Hunt's Merchant's Magazine says that in the 16th century an Ottoman ambassador, Soliman Aga, presented some of the seeds to a king of France, as a pleasant beverage produced in Arabia in 1654 an Armenian, named Pasquel, opened the first shop for the sale of coffee (an infusion of it) in Paris. It is now in general use all over the world: and nearly all the coffee drunk is the produce of the new continent, where about one century ago it was not cultivated at all. The people of the East in place of raising it themselves, borrow it from the Americans.

W. GAMBLE, Esq., of Milton Mills, has received a Bronze Medal similar to that awarded to Mr. Paterson of Dundas, which we noticed last week. No doubt the distribution to Canadian Exhibitors, who were successful, has been simultaneous. Such are the peaceful trophies of our young country. How much better than those of war!

MR. SOTHAM ON IMPROVED BREEDS OF CATTLE.

PIFFARDINIA, LIVINGSTON CO., N. Y., Jan. 31, 1852.

MR. EDITOR:—I see, by Mr. Parson's first letter, the reason he gives for the superiority of Short Horns, is, by their great number over other breeds. *This is a very wild thought.* Two-thirds of them, even with *herd-book pedigrees* (which he well knows) have their hides stretched over them as if tightened with a pair of pincers, and not worthy to be classed with *any improved breed.* Those who are so strongly then advocates, should be prepared with some better cause for their preference than their becoming fashionable.

I will here ask Mr. Parsons whether it was his judgment, as Chairman of Short Horn Committee, in deciding the first premium for the best Short Horn Cow at Niagara, 1850. If so, I differ very widely with him there. I should not have noticed the first premium cow; so either he or myself must be incompetent to judge of improved breeds of cattle; which of the two, remains to be proved. There were several far better cows in my estimation. I will here describe her so that there will be no "*mistake,*" for I was very much surprised when the decision was made. She was a young cow, very long on the legs, *very coarse bone,* a narrow hollow crop, large paunch, level chine, very scanty brisket, medium breadth of hips, rumps very good in shape, and flat sides,—these were covered with thick "*flabby flesh*" of very inferior quality, which concealed a multiplicity of faults *to the eye.* but could not *deceive the hand.* There was no elasticity about it. Her udder was small, but handsomely shaped. The calf, which was in the pen with her, was thin in flesh and indicated her lack of milking properties,—neck long and thick—head a staggy appearance—colour red and white. This seems to me to be as correct a statement as my recollection serves to guide "*my opinion*" of the animal. I will call upon other *disinterested judges,* who saw her at the time, whether these are *facts* or not. If this was a model of a good premium cow, I am no judge, and I think it is an important point for a man who writes for an agricultural paper on the "*qualities*" *of improved breeds of cattle,* to first show his judgment and capability. I did not advance this controversy; therefore, I am "*on the defensive.*" This is not the only time Mr. Parsons has given the preference to an animal with "*soft flabby flesh*" when he has been judge; and I can name it, if necessary.

This, Mr. Editor, is one of our most important errors; *judges are too apt to give the preference to fleshy* breeding animals, no matter what the breed, or quality; they always look at the animals as they are, and will not allow for adverse circumstances. A *good judge* ought to be able to discriminate a good *symmetrical* and *high quality* animal in *low, or medium condition,* from a common animal loaded with *inferior flesh.* If he cannot do this, he never ought to be put on any Committee. But enough of this—I suppose I shall make some enemies; but, if *facts* will do it, I *must encounter them.*

Another point. Mr. Parsons said to me, at Rochester, that I must have a better quality of *Herefords to contend against the Short Horns* than those I had there. I will admit that they were low in condition—not one of them ever had a peck of meal in their lives, to my knowledge. I have a proposition to make to him, which he cannot do less than accept, after making such an assertion. I will show six of those Cows, and Heifers, and a Bull, next July or August, in their own pastures, against a like number of Mr. Parson's, for quality alone, or weight in addition, as I consider them to be the *very best quality* that England can produce *of any breed,* and am willing to back my opinion. The judges shall be Canadians. I will name Hon. Adam Fergusson for mine; although a Short Horn Breeder, he is a straightforward, honest man—a good and unprejudiced judge—which is all I ask. Mr P. may select his. Those two, naming the third, the losers to pay the expenses of the judges, while on duty, in examining each lot. When this is decided, I will meet him on the weight of butter made by said six animals. He may send a Canadian to test mine; I will send an Englishman to test his. The time of trial may be made by him. Any intelligent person, in whom Mr. P. has confidence, can fill this office, who is not "*ashamed to work*" while the trial is being made; set and skim the milk himself; see the butter made up, and, in fact, look closely that there is no deception. I can send one to him in whom I have confidence. This can be done at little expense, which will suit my circumstances best. It is an important trial, and one Mr. Parsons proposes; therefore, let us try it. When these are ended, another trial may come forth. A pair of two-year-old Steers may be shown for early maturity; a yoke of oxen to test the plough in deep ploughing; a fat ox or cow to try the weight and quality of meat—(I sold a Hereford cow at Boston, in 1846, for one hundred and fifty dollars, that weighed 2,313 lbs. alive, on the scales, and never had any meal until Dec'r 1st, and was sold the latter end of March following.) The quantity of food consumed can be acted upon.

I will here leave Mr. P. to meditate on these proposals, and show you "*my opinion*" of S. H. and Herefords; but, before I proceed to this, I will ask Mr. P why he fed "*thousands* of Devons and *hundreds* of Herefords," if Short Horns were so profitable as he is trying to make them appear? My opinion of S. H. is this: they are fashionable animals, supported by men of money, nursed, groomed, pampered and fed, without regard to expense or profit. They are large to appearance, and with a sleek meal coat on, fine looking to the eye, but, like all other "*high fed*" and fashionable things, very deceiving.

I shall now allude to three important points objectionable to Short Horns. First. Their *apparent* large size and coarseness. Large, is a term often given to an animal standing on high legs, with a *very extended paunch,* without corresponding width, or depth of frame. Secondly. The first class S. H. are frequently covered with a thin skin—a true indication of delicacy and lack of constitution. Thirdly. They generally possess a quality of flabby flesh, which is considered very soft to *the touch*, and which is always connected with a thin skin. It is the union of these three qualities which often characterizes the first class Short Horns, and which is considered by the best judges to be only second rate, under the term called good handling. It is the union of the two latter, that establishes the constitution,—and it is from this reason, only, that they require nursing and extra care. It is not so with the Herefords—they have maintained a higher standard of excellence, for which the best of the breed has always been esteemed. A moderately thick mellow hide, with a well apportioned combination of softness, with elasticity. I prefer the touch to be moderately firm and elastic. They generally stand on short legs, over which is a straight compact paunch, wide hips, level back and crops, round ribs, meaty chine, possessing weight with compactness, their udders generally of medium size with very little flesh, and will stand the test for *rich milk* and butter, for the food they consume, against any other breed. This is the character of my herd, which I am always ready to maintain.

The following extract, from the *Mark Lane Express*, Sept'r 15, 1850, is proof of what I have said, as some of mine are descended precisely from the same herd: "The prize Hereford Bull, shown at Windsor by the Right Hon. Lord Berwick, Cronk Hill, near Shrewsbury, aged four and a-half years, was unquestionably the best bull in the yard. He has a *'large' square frame of great depth*, well covered with flesh of good quality. He has a good skin, short legs, girts nine feet, and is six feet in length;—altogether, he is a large, compact animal. The second prize Hereford Bull, belonging to Mr. Price, was also a remarkable animal, but not to be compared with Lord Berwick's bull. Although but three years and twenty days old, he girted eight feet seven inches; whilst the prize Short Horn Bull, a much higher and *apparently* a much *larger* animal, girted two inches less, although three months older. The other classes of Herefords contained some admirable specimens, and, although not so numerously exhibited as the Short Horns, yet we think as a class they stood unequalled." There seems to be something in this account of the Herefords that contains "*proof*." Since writing the above, my *Mark Lane Express* has come to hand, containing the account of the Smithfield Show, in which it seems the Herefords nearly carry every thing in classes of Steers and Oxen—10 prizes; to Devons, 3; to Short Horns, 1; and the Hereford Ox winning the cup as the best in all classes;—in Cows and Heifers—Herefords, 1; Short Horns, 6. In Cows, there were but very few Herefords shown; the Short Horns were "*great in number*." In the report, the Herefords and Devons were *all sold*, the names of the purchasers given. Of the Short Horns, two only were sold—the report says "*not sold*"—opposite each animal, which is a *proof* of the demand for best quality. The report further says that Mr. Phillips' two years and ten months old Hereford, was remarkable for its form and *early maturity*, and that the Short Horns were apparently *too large and coarse* for *prize animals or for sale*.

Yours, &c.,

WM. HY. SOTHAM.

IMPROVEMENT OF PASTURE LAND, &c.

WALPOLE, 26th Feb., 1852.

SIR:—Observing by the newspapers that there is to be an Agricultural Minister in the Cabinet, and an Agricultural Professor in the University, I, along with many of my neighbours, begin to think about what is most likely to benefit the farmers of this Province. And here I will just state that I am only a plain home-spun farmer, with neither a classical nor scientific education. But having been brought up to farming in England till thirty years of age, and having spent the last ten years in Canada, I have had some practical experience.

The principal disadvantage the farmer in this section of country labours under, is, that the only paying crop is wheat. Now, there is no need of my trying to prove to you that the English farmers make more money out of their *stock*, than of their wheat;—nay, many of them make more from their stock than by all the grain they grow of every kind. This I have no doubt you will admit. Now, Sir, I have no doubt you are ready to say, but we cannot grow turnips to the extent they do, at least, not profitably,—and here I would agree with you, for we certainly cannot. But may we not improve our pastures? Go into one of the Western counties of Old England, in the middle of May; take a morning's walk into a meadow, observe the variety and luxuriance of the herbage, to say nothing of the beauty of the scene (and surely no artificial flower garden ever could be compared with it!) and no one would wonder at the amount of stock the farmer raises on such pastures. Timothy, though an excellent grass for hay, gives scarcely any after grass, or fog, as some call it.

It is reported that you, Sir, are to have an example farm under your direction, in connexion with the professorship of Agriculture. If it be so, I believe one of the best experiments you could make, would be to seed down a piece of land with as extensive a collection of grass seeds as you could obtain, not forgetting the rib grass, or long plantain, from Britain. I believe the best possible mixture are the grass seeds found in the farmers' hay-lofts in England. I have often collected bushels after the winter was over, in my father's hay-lofts, to sow in the spring, and we always found that they filled the ground well with every needful variety. Seeds ought to be new, for after they become more than a year old, they do not half grow.

It will be but of little use to improve stock, except we improve pastures. Every farmer will acknowledge *Short Horns* to be the most splendid cattle in the world, but they are the aristocracy of the farm yard, and must have splendid accommodations and food, or they will quickly degenerate. If we cannot have improved pastures, Devon cattle or the native breed will suit us better. The after grass or fog, as the Yorkshire people call it, was always considered woith the rent of the land in the county of Somerset, where I was born; here all the fog we have is a little second clover. A good cow made about £15 pei annum, in butter and cheese, in England; here few make one-third of tha' sum. After mowing, we frequently bought sheep of the hill farmers, so poor with folding and being kept so thick, that they scarcely could walk home; but in six weeks' feeding, on nothing but after grass, we have had them so fat as to weigh from 25 to 30 lbs. per quarter.

I am very sorry that we have no club here to take the *Agriculturist,* but next year I hope we shall, and learn what practical good you and Mr. Cameron are likely to do us farmers.

I am, Sir,

Yours most respectfully,

William Hedges.

We are obliged to our correspondent for the information and suggestions which his communication contains, and shall be glad to hear from him again upon any matters that have come under his observation as a farmer in this country. It is in this way principally that our Journal can be made the most beneficial to that important class of the community. Farmers residing in different, and often widely separated sections of the country, may interest and benefit each other in a high degree, by the mutual interchange of individual thought, and the results of varied experience. *With this view we are desirous of receiving occasionally short and practical communications from experienced farmers in every Township of Upper Canada.* Our correspondent's suggestion respecting grasses, has frequently occurred to us, and we intend, as soon as practicable, to make some experiments in connexion with that and several other matters, possessing great interest and importance to the farmers of this country. After the next meeting of the Board of Agriculture, we hope to be able to submit to the public the completed arrangements of the Professorship of Agriculture in our Provincial University, and the Experimental Farm connected therewith. The Hon. M. Cameron, we learn, is already actively engaged in preparing for his department.

Peculiarities of the Desert.—It is curious to observe the prevalence of the sandy color of the soil in the creatures that have to exist upon it. Sandy-colored eagles devour sandy-colored vipers and lizards which in their turn prey on grasshoppers of the same complexion; and partridges and sparrows, by means of their resemblance to the ground, avoid the prying eyes of the falcons and hawks.—*Melly's Khartoum and the Nile.*

SUMMER FALLOWS.

Mr. Editor,—

It ought to be the study of all Farmers in these hard times to try to raise such crops as will be most profitable, and at the same time the least likely to impoverish the soil.

I have always been of opinion that the general system of naked Summer Fallows in Canada, altho' a good method of cleaning, are nevertheless a great means of impoverishing the soil. When we take into consideration the fact, that each Summer Fallow is generally ploughed and harrowed, at least three times, during the very hottest period of the year; and when thus turned up so often to the heat of the sun, there can be little doubt that, under the circumstances a great proportion of the Gaseous and Organic matter contained in the soil is exhaled by the action of the heated atmosphere.

Therefore, instead of the naked Summer Fallow, I have for some years past turned my attention to Pea Fallows; which I find, in the first place, to pay best, having two crops instead of one: and in the second place, the land is generally as clear when prepared for the sowing of Fall wheat, as it otherwise would have been by the naked Fallow, and in the third place, I have generally as heavy a crop, and even a larger sample of wheat than by the ordinary system.

The manner in which I labour my Pea Fallows is as follows:—I cross plough the ground in the Fall, in the Spring it is harrowed well *first, then it is* ploughed into twelve feet ridges, taking care to have as much comb as possible on the furrows, so that the seed may be well covered. Then I sow *(if early peas)* at the rate of four bushels per acre, or more, if the ground is not clear. For Marrowfats, three bushels will be sufficient if well covered. Three or four days after sowing I roll the ground with a roller, having a box or platform on the top of the frame, upon which is collected all stones, roots &c., which are carried to the end of the land, where the stones are thrown off and the roots are piled up and burned. My early peas are generally cut and taken off the ground about the middle of July, and the land is cross ploughed immediately afterwards. The Marrowfats are a later pea, and are not generally ready to havest before the last week of July, or the first week of August; but still they are always off the ground in time to admit two ploughings, before sowing the Fall Wheat. By this system I not only have my land clean, but I have also something in my barn, which will make the Americans feel for their purse in the Spring, when they find that their peas have so many holes in them that they won't grow.

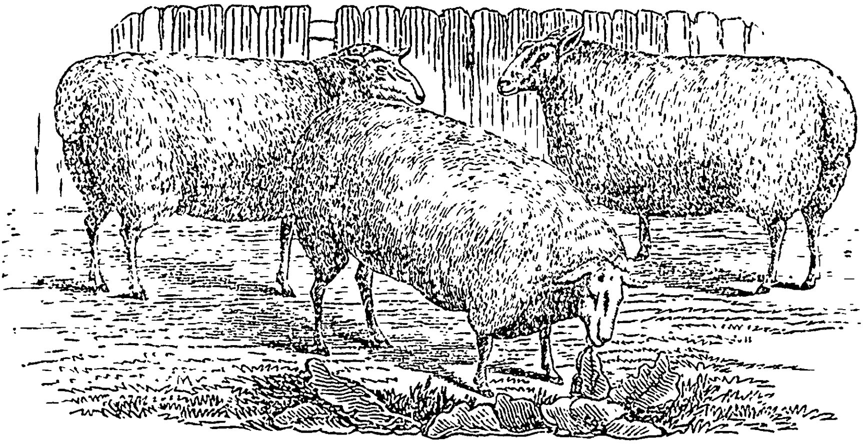
I am, Dear Sir,

Yours, &c.,

G. S.

Newcastle, March 19, 1852.

Novel Application of Water-power to Bell-Ringing.—The hours of six in the morning and ten in the evening are regularly rung from the spire of St. Peter's Church, Dundee, by a chime of bells produced by the application of water-power to a complicated piece of machinery.



LEICESTER EWES.

The above cut is taken from a steel engraving in the *Farmers' Magazine* for January last.—It represents a pen of Leicester ewes, the property of William Sanday, Esq., of Holme Pierrepoint, Notts, England. They obtained the first prize of twenty sovereigns at the Royal Agricultural Society's Show, at Windsor, in July last.

USE OF TAR FOR SHEEP.

Having had some experience in the management of sheep, I propose to say a few words on the use of tar for sheep, as a preventive of disease. I have been in the practice of feeding to my sheep 4 or 5 gallons of tar to each 100 sheep, per year. My plan of feeding is to mix it with salt, by scattering salt in a long narrow trough, and pouring the tar upon the salt. In this way I have no difficulty in getting the sheep to eat it. In addition to this, every time I handle my sheep, except when washing them, I apply a little tar to the nose of each; this external application I deem more important in the summer and fall months, when the gad-fly is troubling the flock.

This is the only article that I have used to prevent disease in sheep for a number of years in which I have been engaged in wool growing; the result has been that I have not lost one per cent. of my sheep, by diseases of all kinds, annually. When I sheared my sheep last May, I had over 600, and I am not aware of losing but one since. I ascribe the uniform health of my flock to the free use of tar.

I make these statements, that others may have the benefit of my experience.

Respectfully yours,

—*Ohio Cultivator.* Wm. S. Wright.

Deep Plowing.—"How does deep plowing improve the soil?" asks an inquiring farmer. The simple answer is, by increasing its depth. "But," says the inquirer, "if I plow deep I shall turn up the clay and inert earth that contain no nourishment for plants." Well, if clay and inert earth, containing no nourishment for plants, lie so near the sun face as to be within reach of your deepest working plow, they ought to be turned up and exposed to the influence of sun, air, frost, rain, snow, and manure and cultivation, that they may become rich. "But," says the inquirer, (it is strange how many "*buts*" such people can find for use on such occasions,) "it would require too much hard work and too long a time to do this, would it not?" That depends upon whether you would prefer five dollars profit per acre now, and forever hereafter, to two or three dollars *now*, this year and next, and ten or twenty dollars per acre hereafter.

Protecting Tender Roses.—After trying various modes of sheltering tender roses during winter, including the use of moss, inverted turf, straw, tan-bark covered with boards, &c., none appears to be equal, says the *Albany Cultivator*, to a covering with the branches of evergreens. Plants, but slightly tender, need very little shielding in this way; while those the most susceptible of injury should be encased several inches thick. One eminent advantage which this treatment possesses, is the entire freedom from *decay* in the bark and stems of the shielded plants, which sometimes results from other modes. Pine, hemlock, white cedar, &c., may be used for this purpose. Where evergreen hedges or screens have been planted, the shearings or clippings may be employed with great convenience.

Horse Power Ditching Machine.—Mr. Charles Bishop of Norwalk, Ohio, has invented and taken measures to secure a patent for a good improvement in ditching machines, whereby the old spade method of ditching by manual power is entirely thrown into the shade. His machine is worked by horse power, and is provided with a revolving excavator, the shaft or axle of which lies in the direction of the length of the ditch. The excavator is of a screw form, and is operated by an endless chain.—The ditch is cut of a semi-circular form, and it deposits the cut clay, or other kind of excavated earth in a box, from whence it is delivered at one side on the road by scrapers attached to the endless chain. The machine being propelled forward by a friction wheel, or roller, moving in the ditch, and operated by the excavator's shaft.—*Family Visitor.*

NEW PLAN OF CANADIAN FARMING.

To the Editor of the Canadian Agriculturist.

SIR:

I hope you will give me space in your valuable publication for the following remarks, on the Farming of Canada West as far as I have seen compared with that of England,—proposing some plan to reduce the expenses of Farm work, together with a rotation such as appears to me suitable to the climate and resources of the country, at the same time soliciting those who have practical knowledge to point out any defects that may occur.

I propose for the sake of example to take one hundred acres of land, 50 acres under actual cultivation—20 under some kind of pasture, and 30 in requisite wood, and shall divide the land under actual tillage into 10 acre fields, and the rotation I propose is as follows:—

5 Acres.	5 Acres.	10 Acres.	10 Acres.	10 Acres.	10 Acres.
Turnip or Mangold Wurtzel.	Potatoes, Corn, Carrots, Peas or Cabbage.	Oats or Barley, or both with Clover.	Clover Hay.	Clover Hay or Pasture.	WHEAT.

The 20 acres in pasture may be renewed every five years, by taking up one half and bringing it into the rotation taking care to put some other grasses into the land when it is to be left for pasture.

I prefer seeding down with Oats or Barley, because the Clover gets a start at the same time the *weeds* do if there are any, (and where are there none?) and by putting plenty of seed in there is every probability of keeping them well under.

The quantity of ploughing necessary for this rotation is annually as follows:—

10 Acres of Clover to be turned for Wheat.

10 Acres after Peas and Turnips, &c., to prefor the spring sowing of Oats or Barley.

10 After wheat to prepare for Turnips, &c., making only 30 acres of fall ploughing, or a little over a month's work.

10 Acres in Spring for Barley and Oats, &c.

10 Acres for Turnips, Wortzel, Peas, &c.

Fifty acres in the course of seven or eight months are most easily done by one man and a pair of Horses. In this rotation should the land require a fallow, it can be done in the second clover year without at all interfering with the course proposed; a point of importance to the Farmer.

The general method of Farming in Canada, appears to me, to be most exhausting to the soil, and unproductive to the Farmer; on the same sized clearance as above he has generally half under Wheat and summer fallow, half under Peas and Oats. Now let us see how much work he has to do with the plough.

12½ acres in Fall Wheat.

12½ acres under fallow, giving 37½ acres to plough.

12½ acres to be ploughed in the Fall, and again in the Spring for Oats.

12½ to be ploughed in the fall and again in the Spring for Peas, making in all 87½.

Now it is almost impossible for the farmer to do this and get his crops sown and harvested. He therefore dispenses with the fall ploughing altogether and most frequently with one summer fallow ploughing, leaving his land when the wheat comes off almost as dirty as before he started. Am I too severe?

I am of opinion that the rotation I propose may be worked with one man and a yoke of oxen with a boy through the summer months, and a mare for hoeing requisite between Turnips, Potatoes, &c., which would not prevent her giving a colt to pay the expenses of her keep.

I shall now give the probable yearly expenses of working the two plans, and also the profits, if any. I shall then compare the expenses with those of England.

1st. The expenses of working the plan proposed for one year in Canada:—

Hire of the man for the year				£25	0	0
Board and washing at $6 per month				18	0	0
Boy for eight months at $5 per month				10	0	0
Board and washing at $6 per month				12	0	0
Rent of 50 acres cleared land including taxes and statute labor				25	0	0
Yoke of Oxen	£15	0	0			
One Mare	20	0	0			
One Plough	3	10	0			
One Harrow	1	5	0			
One Cultivator	1	5	0			
One Horse Hoe	2	0	0			
One Waggon	15	0	0			
	£58	0	0			
At 12 per cent per annum for wear not including repairs				6	19	2
Plough points and sundries				1	5	0
				£98	4	2

Brought upward	£98	4	2
10 acres of Wheat, 20 bushels required for seed at an average of 3s. per bushel	3	0	0
10 acres of Clover, 1 bushel of seed	1	5	0
5 acres of Oats, 15 bushels of seed at 1s. 1d.	0	16	3
5 acres of Barley, 15 do. do. at 2s. 6d.	1	17	6
5 acres of Peas, 15 do. do. at 2s. 6d.	1	17	6
1 acre of Potatoes 12 do. do. at 1s. 3d.	0	18	9
2 acres of Turnips 3 lbs of do. at 1s. 10½	0	5	7½
2 acres of Mangold 6 lbs of do. at 2s. 6d.	0	15	0
To hire of a man in Hay harvest for two weeks at 3s. 9d. a day, and 1s. 3d. for his keep	3	0	0
To hire of man in Wheat harvest for one weak at $1¼ per diem	1	17	6
To hire of a man for a month to assist in getting root crops housed, and to help in thrashing, &c., including his keep	5	0	0
To thrashing 10 acres of wheat	6	10	0
	£125	7	3½

Peas and Oats to be done by man in winter months and straw fed to the cattle daily.

	£	s.	d.
200 bushel of Wheat at 3s. per bushel	30	0	0
30 tons of Clover Hay at 25s. per ton	37	10	0
150 bushel of Oats at 1s. 1d. per bushel	8	2	6
125 do. of Barley at 1s. 10½d do.	11	14	4½
125 do. of Peas do. do.	11	14	4½
150 do. of Potatoes at 1s. do.	7	10	0
40 tons of Turnips at 15s. per ton	30	0	0
60 do. Mangold Wurtzel at . 2s. 6d.	37	10	0
20 acres Fall pasture after Hay	2	0	0
	£176	1	3

I have in the purchase of seed in this estimate not given the quantity of Clover I consider necessary, by some pounds; 10 lbs. is little enough for this plan, as far as I can judge by comparison.

I now proceed to the other system—i. e. one fourth wheat, one fourth oats, one fourth peas, and fourth fallow—a portion of the grass land will of course be hayed, leaving only a small quantity of pasture. There are now 37½ acres of ploughing to be done, if the land is worked to the same standard as the first system, and that has to be done all at once, or nearly so, at the most busy time in the year and will require two men, two teams, two ploughs, besides the hire of hands to assist harvesting and haying.

To one man by the year				£25	0	0
Board and washing				18	0	0
One man for eight months				20	0	0
Board and washing				12	0	0
Rent of 50 acres of cleared land				25	0	0
To hire of a man for harvesting, &c., at $1¼ per diem including keep for three weeks				5	12	6
To one span of Horses	£30	0	0			
One yoke of Oxen	15	0	0			
Two Ploughs	7	0	0			
One Harrow	1	5	0			
One Cultivator	1	5	0			
One Waggon	15	0	0			
	£69	10	0			
				£105	12	6

Brought forward	£105	12	6
£69 10s. at 12 per cent per annum	8	6	9½
To shoeing Horses	1	0	0
Two tons of Hay at $5 for their keep	2	10	0
400 bushel of Oats for Horses and Oxen at 1s. 1d.	21	13	4
Plough points and sundries for 2 ploughs	1	17	6
TO PURCHASE OF SEED.			
25 bushels of wheat for 12½ acres at 3s.	3	15	0
37½ do. of Oats for do. at 1s. 1d.	2	0	7½
37½ bushels of Peas for do. at 2s. 6d.	4	13	9
To thrashing 12½ acres of Wheat	7	0	0
	£158	9	5¾

Oats and Peas as before done by hand in the winter months.

VALUE OF CROPS.

250 bushels of Wheat at 3s. per bushel	£37	10	0
375 do. Oats at 1s. 1d. do.	20	6	3
312½ do. Peas at 1s. 10½d. do.	29	5	¼
	£87	1	3¼

EXPENSES OF PLAN PROPOSED.

Dr.

To Expenses £125 7 3½

Cr.

By Returns £176 1 3

Profits £50 13 11½

EXPENSES OF FALLOW.

Dr.

By Expenses £158 9 5¾

Cr.

By Returns .... £ 87 1 3¼

Loss £71 8 2½

Now this would allow of a failure of a root crop every other year without loss—or the root crop might be grown only every second year. In fact any plan would appear better than that pursued at present.

I now compare the same system in the two countries, and also give the price of stock, wool, meat, &c., as near as possible.

I must also state that in the eastern division of Kent which these calculations are made for, land giving the yield stated cannot be hired for the sum charged. Sheep it would be almost impossible to buy for less than 25s. each, they get no more for the wool there than we did here last year, and not often so much. Of this I am certain that wool which will here realize 1s. 3d. would not there bring one shilling sterling, and many are the sheep here to be bought for 6s. str., whose wool would bring 1s. str. per pound.

As for the difference of meat it is sold in England at 4s. the eight pounds for good quality, which is only about twice the price of mutton here, the skin any old country butcher will tell you is worth next to nothing, and the tallow is above the price of English tallow. Why then do farmers in Canada leave the sheep in the Concessions for me to ride and fall over in the night, and send them burr hunting in the day? Having made these remarks, I shall at once proceed to a comparison between a 50 acre farm in Kent and a 50 acre farm in Canada, in the County of Oxford. Then conclude with a few remarks on the subject of Mangold Wurtzel growing and its yield per acre in England, Ireland, and the Island of St. Helena, from accounts worthy of credit.

BALANCE SHEET UNDER PROPOSED SYSTEM IN ENGLAND.

TURNIPS.

Dr.	£	s.	d.	*Cr.*	£	s.	d.
To Rent of 10 acres of Land in England, including Rates, Taxes, and Tythe for one year	£30	0	0	Value of the Crop at 12s. per ton	£120	0	0
To ploughing 10 acres of land in the fall	4	0	0	Do. Green tops for Cattle	2	0	0
To manure do. do. thirty loads to the acre at 2s. 6d. per load	37	10	0				
Ploughing ten acres of land in the Spring	4	0	0				
Harrowing do. do.	0	10	0				
Sowing Turnip seed	1	0	0				
Pulling, cutting tops, and storing 50 days at 1s. 6d. per day	3	15	0				
Twenty days one man with horse and cart at 5s. per day	5	0	0				
Ten quarts af seed at 2s. per quart	1	0	0				
Expenses	*£86*	*15*	*0*		*£122*	*0*	*0*

WHEAT.

Dr.	£	s.	d.	*Cr.*	£	s.	d.
To rent of ten acres of land as above	£30	0	0	Value of the crop 40 bushels to the acre	£95	0	0
One ploughing for Wheat	4	0	0	Straw 40s. per ton and 2 tons to the acre.	40	0	0
Harrowing for Do.	0	10	0				
25 bushels of Wheat at 5s. per bushel	6	5	0				
Sowing do.	0	5	0				
Harvesting do.	5	0	0				
Thrashing do.	10	0	0				
Marketing do.	1	5	0				
	£57	5	0		£135	0	

BARLEY.

Dr.	£	s.	d.	*Cr.*	£	s.	d.
To rent of 10 acres of land as above	£30	0	0	By value of the Barley 40 bushels to the acre	£70	0	0
Ploughing Fall and Spring for Barley	8	0	0	Straw 1½ tons to acre 20s. per ton	15	0	0
Harrowings	2	0	0				
Seed Barley £5 5 0 Seed Clover £3 15s.	9	0	0				
Sowing seeds	0	10	0				
Harvesting Barley £3 15s. Thrashing £5.	*8*	*15*	*0*				
Marketing	1	5	0				
	£59	10	0		£85	0	0

HAY.

Dr.	£	s.	d.	*Cr.*	£	s.	d.
To rent of 10 acres as before	£30	0	0	By value of Hay 80s per ton, 1¾ tons per acre	£70	0	0
Harvesting Hay and stacking	6	0	0	Of after crop as pasture	2	0	0
	£36	0	0		£72	0	0

HAY.

Dr.	£	s.	d.	*Cr.*	£	s.	d.
To rent of ten acres as before	£30	0	0	By value of crop 80s. (two years old) per ton, 1½ tons per acre	£60	0	0
Harvesting and stacking Hay	6	0	0	Value of after crop	2	0	0
	£36	0	0		£62	0	0

RECAPITULATION.

Dr.	£	s.	d.	*Cr.*	£	s.	d.
Turnips	£86	15	0	Turnips	£122	0	0
Wheat	56	0	0	Wheat	135	0	0
Barley	59	10	0	Barley	85	0	0
Hay	36	0	0	Hay	72	0	0
Hay	36	0	0	Hay	62	0	0
Profits	200	10	0				
	£476	0	0		£476	0	0

BALANCE SHEET UNDER A PROPOSED SYSTEM IN CANADA.

TURNIPS.

Dr.	£	s.	d.	*Cr.*	£	s.	d.
To rent of 10 acres of land in Canada West including taxes	£ 5	0	0	Probable value of the crop 10s. per ton (The cheapest food I think grown)	£100	0	0
Ploughing in the fall 10 acres of land at $2	5	0	0	Green tops for cattle, &c.	0	10	0
To manure 10 acres, 15 waggon loads to acre at 6d. per load	3	15	0				
To early Spring ploughing at $1½ per acre	3	15	0				
Harrowings	1	10	0				
Sowing seed	2	0	0				
Pulling, cutting tops and storing at 3s. 9d. per day	7	10	0				
20 days one man with Horse and cart 7s. 6d. a day	7	10	0				
Seed	1	0	0				
	£37	0	0		£100	10	0

BARLEY.

Dr.	£	s.	d.	*Cr.*	£	s.	d.
To rent of 10 acres of land as above	£ 5	0	0	By value of Barley 30 bushels to acre at 1s. 10½d	£28	2	6
Fall ploughing	5	0	0	3 tons of straw to acre at 2s. 6d. per ton	3	15	0
Spring do.	3	15	0				
Harrowings	1	10	0				
30 bushels of Barley at 2s.	3	0	0				
One bushel and a half of Clover	1	17	6				
Sowing the above	0	11	3				
Harvesting	5	0	0				
Thrashing	4	0	0				
Marketing	2	10	0				
	£32	3	9		£31	17	6

HAY.

Dr.	£	s.	d.	*Cr.*	£	s.	d.
To rent of 10 acres of land as above	£ 5	0	0	By value Hay £1 5s. per tons 1½ ton to acre	£18	15	0
To Harvesting Hay	6	5	0	Of after feed	1	5	0
	£11	5	0		£20	0	0

HAY.

Dr.	£	s.	d.	*Cr.*	£	s.	d.
To rent of 10 acres as before	£ 5	0	0	By value of Hay 1½ tons to acre	£18	15	0
Harvesting hay	6	5	0	After crop	1	0	0
	£11	5	0		£19	15	0

WHEAT.

Dr.	£	s.	d.	*Cr.*	£	s.	d.
To rent of ten acres	£ 5	0	0	By Value of Wheat 20 bushels to acre, 3s. per bushel	£30	0	0
Fall ploughing	5	0	0	Straw 4 tons to acre at 2s. 6d. per ton	5	0	0
Seed Wheat at 3s. per bushel 1½ to the acre	2	5	0				
Harrowings	1	10	0				
Sowings	0	7	6				
Harvesting	3	15	0				
Thrashing	3	15	0				
Marketing	2	10	0				
	£24	2	6		£35	0	0

RECAPITULATION.

Dr.	£	s.	d.	Cr.	£	s.	d.
Turnips	£37	0	0	Turnips	£100	10	0
Barley	32	3	9	Barley	31	17	6
Hay	11	5	0	Hay	20	0	0
Hay	11	5	0	Hay	19	15	0
Wheat	24	2	6	Wheat	35	0	0
Profits	91	6	3				
	£207	2	6		£207	2	6

It appears to me strange that when any plan is proposed and the feasibility of it is shown that no one has energy enough to try the scheme, and one answer is made to all hints on improvement, *It won't pay*. Having now shown, and I think fairly, how much better the proposed plan is to that pursued generally, and also the difference between English and Canadian Farming, looking at the price of stock of all common kinds, and their increased value when fed, I hope no one will blame me in advising the farmers even should wheat bring its 5s. a bushel, to follow my plan, because I will promise them that they will have much more to the acre, and can also grow it for centuries in this way. But let them go on in the way they are doing and I predict it will be in Canada as it was in the olden States, about 15 bushel to the acre will be the average crop.

I will now give a few extracts from the Oxford *Encyclopædia* on the subject of the Mangold Wurtzel. Turnips may be grown anywhere, and I might also say to any amount of tons per acre, for the proof which I refer you to a work published in England, viz: *The Farmers' Magazine*.

"We are told that this plant is not affected by excessive drought and that no insects will touch it. The leaves which measure from 30 to 40 inches in length and 52 to 25 across are usually gathered once a fortnight, both leaves and roots are good for man and beast. Willis's Calender for 1814, says, Bernard Howard, Esq., grows annually 10 or 12 acres, obtaining the acreable produce of from 40 to 50 tons. Col. Bentson, Governor of St. Helena, grew it extensively the quantities then obtained on experimental ground were immense—after the rate of 66½ tons per acre, manured with hogs dung and ashes—77¾ with dung of sea fowl—without manure it only gave 19¼ tons."

To shew its powers of vegetation and also its endurance of drought, I copy the following:

"On a barren ridge between two deep ravines, on which from its declining surface no moisture could be retained, Col. Bentson caused 16 different sorts of seeds to be sown at the same time, viz:—Mangold Wurtzel, Coffee, Cotton, Wheat, Barley, Oats, Peas, Buckwheat, Spring Tares, Lucern, Burnet, Sainfoin, Silla, Chicory, Rape and Sun-flower. For a long time there was no sign of vegetation, at length seven months after sowing, being soaked by rains, the Mangold Wurtzel appeared one connected line of thriving plants, and not a plant of the rest ever appeared."

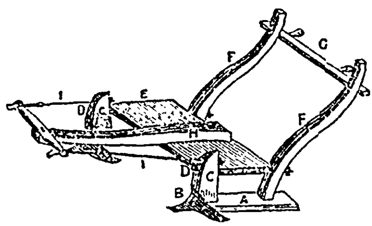
I have myself proved the strong vegetating powers of the plant under a hot Canadian sun in July, when I transplanted some which were unshaded, set in quick sand as it is called, thrown out in the process of making a drain, they were to all appearance quite dead, but after some time a shower of rain made them look quite green, and when pulled they averaged 5 lbs. each plant. I must now conclude my long letter, hoping to have a reply from some practical man, which is one great reason of my troubling you with the effusions

Of yours,
Dear Sir,
THOMAS H. WATT, M.R.C.S.E.

Woodstock, March, 1852.

A DOUBLE FURROWER.

I send you the plan of a Double Furrower, which we have used five years. We find it very handy. It furrows twice as much as the old fashioned way. It can be set two, three, or four feet apart.



Explanation of the Cut.

A. The shoe made of plank, 2 inches thick.

B.B. Shares; same as those on a double mould board plow, bolted on the shoe.

C.C. These pieces are made of 2 inch plank, and morticed in the shoe.

D.D. These rods are made with heads on one end, and nut on the other. They pass through the stanchion, C. C., through the plank, E., and the upwright, F., which forms a hinge; the holes are a little larger than the rods, and work freely.

G. Crosspiece, on which are two handles; it is bolted loosely on the uprights, and works same as plank, E.

H. Beam bolted firmly on the plank, E.

I. Rod to stiffen the beam.

The plank uprights and crosspiece, are 1½ inch stuff.

It is necessary to have a wheel on the beam, the same as on a plow.—*Cultivator.*

A SHORT CREED.—A sceptical young man, one day conversing with the celebrated Dr. Parr, said he would believe nothing which he could not understand. "Then, young man, your creed will be the shortest of any man I know."

HORTICUTURE.

GUELPH HORTICULTURAL SOCIETY.

We observe with much pleasure that a Horticultural Society has recently been formed in this place;—a fact that speaks well for the taste and public spirit of the inhabitants of this thriving town and neighbourhood. The county of Waterloo, although of comparatively recent settlement, is well known for its enterprising farmers and breeders of improved stock; and now it seems that earnest attention is being directed to the subject of gardening, which cannot be otherwise regarded than as the natural ally of improved farming. We wish the Society every success.

GLASS WALLS FOR GARDENS.

The use of glass for garden walls, in lieu of brick or stone, is being experimented upon in England; and, if it should be found to answer, the additional expense involved by such a substitution of material, will not prevent its introduction, where Horticulture can boast of so many spirited and wealthy patrons. The sides of the wall are constructed of thick sheet glass, manufactured for the purpose, a sufficient intervening space being allowed for trees, which are trained to iron wires. Such structures must be infinitely more elegant in appearance than common walls, and have many advantages as regards regulating the degree of heat and light, and the important processes of ventilation. The price at present varies from £1 1s. to £1 6s. per lineal foot, for walls 9 feet high, glazed with 16oz. sheet glass. The *Gardeners' Journal* observes: "They are, of course, as yet wholly untried; and for the present, the wisest course for those who wish to be near the truth will be to make some deductions from those who pronounce them to be perfection, and a like deduction from those who *pooh, pooh!* and call them toys; for they are neither the one nor the other. The thing is right in principle; and if the present application be less perfect than future experience may ultimately make it, that forms no valid argument against the present effort. The first step once taken is always something gained. The idea contains enough of promise to claim for it at least a fair trial."

Names of Plants.—The importance of having all plants, including fruit trees, properly named even in small gardens, cannot be too clearly pointed out. A plant may have beautiful foliage and flowers, but without a name it yields comparatively little interest. Every plant has a history of its own, and the first step towards obtaining a knowledge of that history is its name; the next its native country. A garden of plants without names is like a library of books without their exterior superscriptions.

OBSERVATIONS ON THE GROWTH OF PLANTS IN ABNORMAL ATMOSPHERES.

As oxygen is the most important consituent of the atmosphere, so far as animal life is concerned, so it is on the carbonic acid, ammonia, and aqueous vapour, that the vegetable world is eminently dependent. Do the oxygen and nitrogen of the air play no important part in the process of vegetation? The following experiments, with a view of settling this and similar inquiries, have been published by the Messrs. Gladstone:—A pansy lived for 24 days in an atmosphere of hydrogen, containing 5 per cent. of carbonic acid; one similarly placed in an atmosphere of common air, remained healthy for a longer period. Five onions, just commencing to sprout, were severally placed in carbonic acid, carbonic oxide, coal gas, air containing 8 per cent. of light carburetted hydrogen, and ordinary atmospheric air. The germination in the first two was entirely stopped; while the hydro-carbons appeared to considerably accelerate the growth of the vegetable. The plants in each case lost weight. A pansy in flower, a young stock, and a grass plant, were placed in pure nitrogen gas. The first two soon died; but the grass was left growing a month after the commencement of the experiment. Another pansy was placed in a mixture of hydrogen and oxygen gases, in the proportion requisite to form water. In order to imitate the balance which exists in nature between animal and vegetable life, some flies were introduced, along with some sugar to serve as their food. No change, for the space of two weeks, was observed in this plant. Owing to the specific gravity of the mixed gases, the flies were unable to mount on the wing, or make the usual buzzing noise; but the substitution of hydrogen for nitrogen in the atmosphere had no marked effect upon their breathing, thus confirming the observations of Reynault by an instance drawn from articulata.

At the British Association, Mr. Daubeny stated that he had ferns growing in an atmosphere containing one per cent. of carbonic acid in excess above that ordinarily contained in air, and although it was thought similar ferns growing under the same conditions, but without carbonic acid in excess, were the most luxuriant, it appeared that they thrived well in this atmosphere. Ferns supplied with water containing one per cent. of carbonic acid, grew much more luxuriously than those which were supplied with pure water, so that the conclusion might be come to, that, although very great quantities of carbonic acid were injurious to plants, yet that, when present in water from one to five per cent., it was beneficial.—*London Chemist.*

Thinking and Speaking.—We must not always speak all that we know—that were mere folly; but, what a man says, should be what he thinks; otherwise, it is knavery.

THE SCIENCE AND PRINCIPLES OF GARDENING.

NO. IV.

THE AGENTS WHICH AFFECT PLANTS.

4.—WATER.

This agent is composed of two parts of hydrogen gas and one part of oxygen. In its simple state, it is therefore not unfitted partially to sustain plants. But it is very rarely found thus free from other ingredients, and is capable of taking up all the various matters which go to preserve and develope life. It is, in short, the principal medium by which plants feed.

Water exists both in a liquid and fluid state, according as it is found in or upon the earth, or the atmosphere. It is always more or less naturally present in soils, and is discharged from the atmosphere, to which it travels by means of evaporation, in the form of rain, dew, &c. Without water, vegetables would speedily die. It must therefore be supplied when it is naturally lacking, and to such plants as are kept in an artificial state. The soil in which plants grow should be constantly moist, but not wet. In extremely wet soils, there can never be sufficient heat or air, and the vessels of plants placed in them will soon become turgid and diseased. This is the basis of all draining, whether in the natural ground, or in pots.

A great variety of nutritive matters are conveyed by nature to plants through the medium of water, and may be applied artificially by the same means. As only liquids can be absorbed, *nothing that will not dissolve in them can be expected* to enter the plant, or do it a particle of good.

Water is very necessary and very refreshing to the leaves of plants, to wash away dust and dirt from them and keep their pores in healthy action; besides checking any extravagant drain on their resources in dry weather. Rains and dews are beneficial in their ways, for the most part, and in artificial water, whether given to plants in the open ground or in pots, syringing over the leaves will be an important addition, without which common watering at the roots would be of *comparatively* little avail. But it should be seen that the water, however applied, is not of an injurious nature, and does not contain deleterious matter.

5.—ELECTRICITY.

For the absence of any definite knowledge of this mysterious power, it can only be mentioned as a thing that acts decidedly and strongly upon plants. There can be no doubt that it promotes healthiness, when present in only its ordinary condition and quantity. But it also *seems*, at least, to occasion disease, and to be in some sort productive of what are popularly termed "blights," which are sometimes in no way attributable to insects. How far it may go, in its usual state, towards composing or upholding vegetable life, it is impossible to say. Neither can it be determined by any means at present known or understood, to what extent (if at all) it has been productive of the disease which has so unhappily become notorious as the "potato blight," though this is most commonly ascribed to atmospheric influences. But as the further discussion of this principle could not tend to any positive practical result, it may be dismissed with a simple reference to the known potency of its action on vegetable life.

6.—WEATHER.

The wonderful variations of the weather consequent on atmospheric changes, and forming the climate of a district, exert a powerful agency upon plants, and require to be well considered and studied. The barometer, thermometer and even the hygrometer, to measure the heat and moisture and calculate the changes of the atmosphere, will be useful instruments to the cultivator, as indicating, what the senses, however nicely tutored, can never so accurately make known. The occurrence of frost, reminding him of the need of protection for some plants—of rain, admonishing him to gather in crops that require to be stored while dry, or to plant such as will be benefitted by moisture—of gales of wind, pointing out the necessity of shelter and support—may thus often be foreseen and provided against. A few simple rules, such as a good almanac will furnish, relating to the leading signs of the weather, may be of great service in gardening.

Frost commonly occurs when the sky is clear and during the time the moon is above the horizon, or after hail storms. A lurid redness in the sky about sun-rise, or a very sudden and extensive fall of the barometer, portends violent winds. Rain generally follows a heavy gale, or a sudden fall or rise in the temperature; and cold showery weather mostly succeeds to thunder storms. In *summer, rain seldom comes* with the first cloudiness after a week or two of drought, but is lingering and tardy in its arrival. Very low clouds, however thin, are commonly charged with rain.—Near tidal rivers, or the sea, a continued rain may be expected if it commence steadily just about the occurrence of high water.

Such rules might easily be extended to a great length, were they of more universal application; but different localities have each various weather symptoms; and general directions of this sort are not entirely and at all times to be depended on. They are only useful as common (not invariable) guides.

7.—SOILS.

These, as far as the mere matter of which they are made up is concerned, are of little consequence in themselves. But they are of the highest value as the means of conveying other things, and may contain ingredients which plants will largely feed upon. They may be considered with reference to their texture, and their capacity for being pervaded by roots, or for receiving liquids and gases and transmitting them to the plants.

The mechanical properties or texture of soils are of first concern. No soil that is not open, and comparatively unretentive of the latter, will ever be fit for growing plants in unless it can be reduced to a better state by art. Stiff and unctuous clays, with close and fatty bog earth, are entirely unsuitable for the cultivation of plants, until they are thoroughly broken up, and drained, and pulverised, and mixed with lighter ingredients. The mere draining and working of bog soil will do a great deal towards improving its texture. But clays will require long tillage, and the liberal use of such things as coal, ashes, sand, lime, and stone rubbish, light manures, or sandy peat, to bring them at all into a good condition. And even with these much time and patience will be demanded. Throwing them up in ridges during Autumn, and leaving them thus till Spring exposed to the action of the Winter's frosts will be greatly conducive to their pulverization. Very light sandy soils, on the other hand, possess faults of texture of an opposite description, though they are much more easily remedied. They give off water too freely, admit air too thoroughly, and become parched and dry in the Summer, not being able to sustain any crop whose roots lie near the surface, or any strong-growing kind of plant. Their defects may be corrected by the application of marl and the clays, and by the use of such manures as cow and pig dung. They should never be ridged up in Winter, nor turned up more than is really necessary.

The best kind of soil for garden purposes is a moderately strong light-coloured loam, or such an alluvial earth as is produced by deposits from streams and rivers. This will be open, if properly worked, and yet never become dried up in ordinary summers. It will possess sufficient substance not to be soon impoverished, and may at any time be got into new "heart" by manure. Chalky soils are often, however, good; and possess the merit of keeping away many insects. But soils that are gravelly are mostly poor, and easily dried up, and unsatisfactory as to produce, and obstructive of the roots of growing crops.

The mineral part of the soil, which is composed of clay, lime and flint-earth, in the form of sand and gravel of various degrees of fineness, together with, sometimes, magnesia, iron, and a few other metals, contributes little or nothing to the nourishment of plants. These portions of the soil appear to be chiefly used mechanically or chemically, in improving the texture and distributing the more nutritive parts, or in mixing with other things, or operating upon them, to produce nourishing compounds.

On these principles, we may easily account for the barrenness of stiff clays, dry sands, and, more particularly, soils chiefly consisting of granite sand, as those in Arran, and near Plymouth; while in the instance of sand or clay, from basalt or whinstone, as well as from limestone and chalk, when mixed with other soil, the carbonic acid gas tends to promote greater fertility, as in the Lothians, Ayrshire, and Kent. Volcanic rocks, as in the Campagna of Rome, are very fertile for the same reason. No mixture, then, of clay and sand will be productive, without limestone, chalk, or basalt, (that is, whinstone) and, more particularly, without decayed. plants and manures.

Some mineral substances, such as iron, are injurious to soils, and, perhaps, all the metals are so when combined with oxygen gas or acids. Many good soils, it is true, contain iron, known by the reddish rusty colour it imparts; but their fertility appears not to be owing to the iron, but to exist in spite of it.—*Kemp's Principles of Gardening.*

THE VALUE OF STEAM AND RAILROADS.—The value of Ocean Steam communication, and Railroad conveyance is already being experienced in Bytown. Two of our enterprising merchants lately sent an order to Leeds, in England, for a large quantity of goods, and in less than fifty days from the date of the order, the goods were received in Bytown, although they had to be manufactured after the order was received in Leeds. So soon as our own Railroad is completed, goods can be delivered in Bytown in from two to three weeks from Britain, and at as low rates as to the Montreal importers. It will be necessary only to have a bonding warehouse here, to secure to the Bytown merchants, all the advantages that go to make up the sources of profit to the importers in the Atlantic cities. And instead of being obliged to provide six months' or a year's stock at once, and lose the use of the money invested in goods that must lie over for months, orders could be received at all seasons at reasonably low rates of cost.—*Bytown Citizen.*

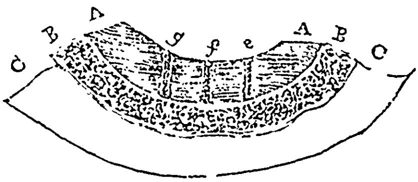
A LITTLE LEARNING IS A DANGEROUS THING.—It is universally admitted that the first draughts of knowledge are apt to intoxicate the soul. A deeper acquaintance with the mysteries around him may indeed tend to humble any man, by fixing his eyes on his own absolute lack of knowledge, rather than on his relative superiority. But as he first emerges from the mere level, it is rather with those below him than with the heights which soar far above, that he is disposed to contrast his standing-place: and so the lowest eminence may swell easily into a mountain, and the half-learned man may be fearfully elated, with an amount of knowledge which would seem to one above him to be nothing but a marvellous ignorance.—*Bishop Wilberforce's Sermon at Oxford.*

"POUR IN KNOWLEDGE GENTLY."—Plato observed that the minds of children were like bottles with very narrow mouths; if you attempted to fill them too rapidly much knowledge was wasted and little received; whereas with a small stream they were easily filled. Those who would make young children prodigies, let them act as wisely as if they would pour a pail of water into a pint measure.

RUSSIA A NATION OF MANUFACTURERS.—Commerce is, moreover, a thing so natural, so indispensable to Russian life, that despite climate and despotism, industry takes gigantic strides. Now from Moscow to the Black Sea all the villas are transformed into factories, all the serfs into workmen. The highest nobility has become manufacturing. Princes, generals, have become cotton spinners and cloth makers. Industry presents such advantages that there is still a profit for nobles without capital to borrow money at 6 per cent. from the Lombard. In 1832 there was at St. Petersburgh but one merchant for every 48 inhabitants, and at Moscow one out of every 54. This figure has increased tenfold at Moscow.—*Roberts' Monde Slave.*

CLEANING CHINA AND EARTHENWARE.—They should be washed in plenty of soap and warm water, rinsed clean in a second bowl of water alone, either warm or cold, should be then turned down to drain, and afterwards wiped dry with linen tea-cloths. Settlings of any liquid which have been suffered to dry up at the bottom of earthen vessels, may be dissolved by a little pearlash and water, or with soda instead of pearlash.

SCIENTIFIC.



ARTESIAN WELLS.

A correspondent having sent us some inquiries respecting the conditions under which Artesian wells act, we have had the above cut engraved; which, with the following description, condensed from the best authorities, will, we trust, prove satisfactory.

Artesian wells derive their name from the fact that as early as the beginning of the twelfth century, artificial borings for spring water were successfully made at great depths, in the French province of "Artois;" where no appearances of springs could be discovered at the surface. The great advantage which they offer is that of enabling us to procure a copious, and frequently a continuous, supply of pure water, from depths, and under conditions, which would either preclude our sinking a well altogether, or without such an expense as would be impracticable. The plan has been adopted with success in various countries, where the conformation and character of the stratification are favourable;—a few remarkable instances we shall notice presently.

In the Tertiary formation resting on the chalk, such as the London and Paris basins, these wells have been made to immense depths, and never cease in sending up large supplies of water. The above cut represents the action of such a well made by boring through the impervious clays on which the city of London is built, to the subjacent stratum, consisting of loose, porous materials, resting immediately on the chalk. The upper stratum, *a, a,* rising to the surface, consists of impervious materials, denominated the London and plastic clays;—*b, b,* is a porous deposit of sand and gravel, through which water finds a ready access, either downwards by its own gravity, or upwards by hydrostatic pressure;—*c. c.* represents the chalk, which is of immense thickness, of a retentive character, and the whole deposits forming a basin-like structure. Now it is obvious that the water which falls on the chalk hills, *c. c.*, cannot penetrate that stratum, it may accumulate and form subterranean reservoirs, and must, by continued pressure, be forced into the porous bed above it, *b. b.*, which becomes thoroughly saturated; and nothing but the impervious stratum of clay above, *a. a.*, prevents the water from reaching the surface. Now borings made through this retentive stratum into the gravelly beds beneath, as at *d. e. f.*, the water contained in those beds will be forced to the surface, and frequently many feet above it, in obedience to the well known law of hydrostatic pressure. In a word, the water will rise in the pipes to a level with the source of its supply. There are in most countries several circumstances and several geological conditions by which Artesian wells may be formed, but the principle is the same in all, and the modifications must be decided on by the Civil Engineer, in accordance with the actual geological phenomena of the particular locality.

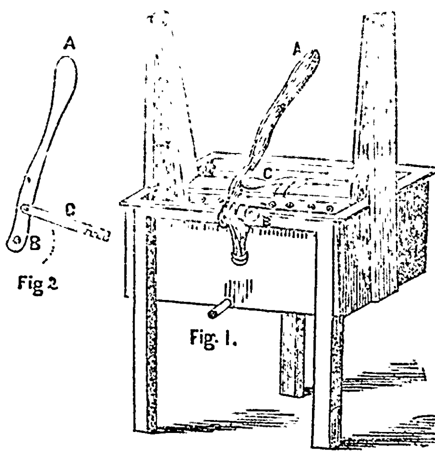
The Artesian well completed a few years since at Grenelle, one of the suburbs of Paris, at the suggestion of a number of scientific men, is worthy of a brief notice; showing as it does the intimate connexion which exists between a knowledge of geological science and the most important wants of daily life. This work was commenced in 1834, with an auger of unusual dimensions (being about a foot in diameter) and as the undertaking progressed, the different underlying formations were successively passed through with augers diminishing from 9 to 6 inches aperture. At 1,500 feet, no water was obtained, and the Government began to be disheartened. At the earnest entreaty, however, of M. Arago,* the work was proceeded with, and at an additional 300 feet (making the entire depth 1800 feet) the rushing up of a vast body of water offered the most satisfactory proof of the correctness of the principles on which the work was commenced. This spring has lost none of its original force or quantity, and continues to supply about *half a million of gallons*, in twenty-four hours, of perfectly limpid water!

In the neighbourhood of London, water has generally been obtained by borings from two to six or seven hundred feet, and it is in all cases fresh. In several parts of the Western States, borings have been successfully made for salt water as deep as 800 or 900 feet. In the cities of New York, Baltimore, Albany, and in various parts of New Jersey, &c., borings for fresh water have been carried, and in most instances with success, to the depth of nearly 400 feet, though water has usually been obtained at a much less depth. An excavation in the city of New York, 100 feet deep and 16 feet diameter, yields 8000 gallons daily; and another in the same city, 442 feet deep, yields 44,000 gallons daily (*Hitchcock*).—The deepest Artesian well in North America, is probably the one recently completed at Charleston, S.C., which is said to have reached nearly 1000 feet.

The deepest well of this kind, or indeed of any other, if we except those reported to exist in China, is the one commenced in 1832, near the Baths of Kissengen, in Bavaria, for the purpose of supplying saline water for the manufacture of salt. On August 12th, 1850, the auger penetrated the earth to the immense depth of 1,878½ feet, when a column of salt water was forced out with such prodigious power as to elevate it 58 feet above the surface of the ground! The water is remarkably clear, and has a temperature as it issues from the surface of 90 ° F., charged with 3½ per cent. of pure salt, at the rate of 100 cubic feet per minute. A large quantity of carbonic acid gas was met with at a depth of 1,680 feet, at a junction of strata consisting of gypsum and sandstone; this gas will in some measure account for the great force with which the water is ejected above the surface. It is thought that an immense stratum of carbonic acid gas underlies the whole valley of Kissengen, imparting to the springs in the vicinity a peculiarly piquant and pleasant character.

The temperature of the earth is found to increase, though not always in a uniform ratio, as we descend, and it has been inferred by natural philosophers from this and other considerations, that the central mass of the globe, which must be of very great density, is in a state of perpetual incandescence, so that we who occupy the crust may be said to dwell on the shell of a mass of molten materials. Careful experiments made with the water of the Charleston well, show an average temperature at the present depth (952 feet) to be 82½ ° F.; the mean temperature at the surface being 65 ° F. This result is not in agreement with the one obtained at the Grenelle well, near Paris,—the depth of which is, as before stated, 1800 feet; the mean temperature of the water being 83 ° F. and that at the surface 51 ° F. (Scientific Annual, 1851.)

It is observed by Dr. Buckland, in his Bridgewater Treatise, that, until recently, these borings have been generally performed by means of a continuous iron rod, sharpened like a drill at the lower end. But a far more convenient and economical method, which has long been in use in China, has lately been adopted; viz., to use a heavy cylinder of iron in the same manner, by means of a rope attached to its upper end; a borer with valves being connected with the lower end, for bringing up the comminuted materials.



WASHING MACHINE.

A boy ten or twelve years of age will work this machine with great facility, and it requires *not a third* of the labor of rubbing on the best wash-board It is worked by an alternating motion of the lever A, turning on the hinge or pivot B, and communicating thrusting motion to the bar C, which moves the perforated board like the swinging of a pendulum in the trough. The leverage is precisely like the elbow-joint of the old-fashioned printing press, and hence the box should be strong, for the pressure exerted against the side is enormous. The notched end of the bar C enables the operator to regulate the space occupied by the clothes. The levers are all made of cast-iron. The whole cost of one of these machines is five or six dollars. We know of no good washing machine worked by horse power.

A wringing machine for bed-clothes, is made by providing a shallow trough about seven feet long, set on legs like those of a bench, and one end of which is fixed, directly over the trough, a simple wooden screw-vice. At the other end is a winch (or hand windlass) which is also furnished with a small screw vice. The article to be wrung is secured at its extremities in these two vices, when by turning the winch any degree of twisting may be given, the water pouring out into the trough beneath. Where but few bed-clothes are washed, a shorter trough may be made, wringing half at a time, and serving for ordinary wearing garments. The trough should be lower at one end, under which a pail is to be set for receiving the water. Most of the water in washed clothes may be pressed from them by means of the washing machine just described, first drawing the plug with which it is furnished.

Since writing the above, we have been favored by a kind neighbor and skilful housewife with the following directions, founded on full experience, for the use of *Crane's Soap*, which we believe is pretty widely disseminatad through the country, and which may be had at a moderate price. Our own experience confirms its value, more especially on those occasions when domestics are missing, and the mistress or her daughters are compelled to do their own washing.

After having tried various methods of washing, and numerous varieties of soap, to cleanse clothes with little labor, I have become quite a convert to the efficacy of "Crane's Patent Soap" for this purpose. I have used it weekly for three months, and find it *all* that the inventor represents it to be. The ordinary clothing for a family of six persons, is generally washed, rinsed and hung up in the course of three hours.

The process is very simple. I take a half pound of the soap, and slice it into two quarts of hot water, and keep it hot until the soap is dissolved; then pour it into a tub containing ten gallons of water, heated to about 100°. Let them soak half an hour—then rub them slightly with the hands, and if any articles are unusually soiled, I rub them on the board. It is astonishing with what ease every spot is removed. As you rub them out, throw them into a tub or boiler of scalding water, which may be kept hot by adding a dipper of hot water occasionally. Ten minutes in the scalding water is sufficient—then rinse and blue them as usual. The water in which the clothes were soaked may have a quarter of a pound, (or less according to the number of colored articles,) of soap added to it, and a little hot water. Then soak your colored clothes just as the white ones were; scald, rinse, starch, &c., as is usually done. My experience tells me that they do not fade nearly so much as with the ordinary hard soap."—*Cultivator.*

NEW DISCOVERIES:—In London, among the scientific questions of a practical kind much discussed, is that of a patent process for contracting the fibres of calico, and of obtaining on calico thus prepared colors of much brilliancy. It is regarded by chemists as likely to lead to valuable results. In the British Association, it was described as the discovery that a solution of cold but caustic soda acts peculiarly on cotton fibre, immediately causing it to contract; and although the soda can be readily washed out, yet the fibre has undergone a change. Thus, taking a coarse cotton fabric, and acting upon it by the proper solution of caustic soda, this could be made much finer in appearance; and if the finest calico made in England —known as one hundred and eighty picks to the web—be thus acted on, it immediately appears as fine as two hundred and sixty picks. Stockings of open weaving assume a much finer texture by the condensation process; but the effect of the alteration is most strikingly shown by colors; the tint of pink cotton velvet becomes deepened to an intense degree; and printed calicoes, especially with colors hitherto applied with little satisfaction—such as lilac—come out with strength and brilliancy, besides producing fabrics finer than could be possibly woven by hand. The strength, too, is increased by this process; for a string of calico which breaks with a weight of thirteen ounces when not soaked, will bear twenty ounces when half condensed by the caustic soda.

MR. RUTTAN'S REJOINDER TO CARBONIC ACID.

To the Editor of the Canadian Agriculturist.

SIR,—I had hoped that the discussion whic had commenced upon so important a subject as the ventilation of buildings, in your popular and wide-spread Journal, would have proved instructive and beneficial to some of your thousands of readers; but the abusive letter of my opponent, contained in your last number, of course puts an end to it, so far as I am concerned.

My friend find that he has gone quite beyond his depth, and that he has no way of backing ou except under cover of vituperation. He is, evidently, some Tyro; for no practised writer or scientific man would so far forget himself as to lose temper to such a degree as to induce him to make use of the hard names and naughty personalities which compose his letter—even though he was worsted in the argument—of which, so far as your correspondent and I are concerned, your readers must be the judges.

So far as I am personally concerned, I cann regret this abrupt termination of the discussion for, having been for some years, and being at present, engaged in a very extensive correspondence upon the subject, public and private, in both the United States and Canada, and out of which I flatter myself has, in a great measure, grow the very general awakening of the people upo this continent to the necessity of a mitigation o the evils resulting from the filthy manner in whic we are living, I have no time, nor, is it to b supposed, have your readers patience, to throw away upon any merely personal altercation, be tween any parties; much less where one of th parties is anonymous.

"Carbonic Acid" says that by my "acuteness" I have discovered who he is. This is th whole secret of the very amiable temper display in his last production. Now, I beg he will n flatter himself with the idea that I ever cared a straw who he was. It is to your readers that addressed my arguments, not to him. He quite mistaken if he supposes that we have a right to occupy the columns of any paper wi matter which does not concern its readers—a them only.

In another thing I wish to set him right. correspondent, writing over his real name, has right to complain of personalities—an anonymo writer has no such privilege. He voluntarily as sumes a fictitious character—he must take all t responsibilities attached to it. Not only h "Carbonic Acid" thus sheltered himself, but has gone the length of writing in the first perso and this is the character who complains of pe sonalities! Suppose I were to tell my querulo friend that he was a murderer? He might c this outrageous; yet it is the truth. You scarce take up a newspaper in which you do not fi deaths by "Carbonic acid gas" recorded. I p the thing in this light in order to show my th skinned opponent the utter absurdity of *his* co plaining of "personalities."

Again; he is paying *you* a rather left-hand compliment by his assertion that my "acuteness" has wormed the secret out of you; for of course it must have come out in that way, if any —I say nothing of the exalted opinion he must entertain of me as a gentleman, who would descend to so mean an action as to attempt it.

Now, Sir, in order to exonerate you from so foul a charge as the betrayal of your correspondents, I beg to assure "Carbonic Acid" that I never inquired, either from you or any other person, who he was—no one has ever told me—that I am just as ignorant of his name and place of residence as I am of those of the Khan of Tartary; and I now further assure my opponent that he need have no fears that I shall ever take the trouble to ascertain either.

As that "strong narcotic poison," carbonic acid gas, is daily murdering its scores and hundreds, and against whose ravages I am endeavouring to arm its victims, I should now go on and show your readers the *modus operandi* by which this arch-enemy of the human family can be bound in chains, and confined to his legitimate sphere, as a constituent in the great economical arrangements of nature—but for two reasons: one is, that I know your readers are impatient of long articles; and the other is, that, if I should do so before your correspondent had time properly to digest and comprehend the ordinary rules and usages incident to public discussions of this kind, he might think that I meant him!

I shall, however, at some future time, when my sensitive friend shall have cooled down, and clearly discerned that while writers *may* be "personal" to *each other*, it is impossible that any body can be *personal* to *nobody*, take advantage of your kind permission to pursue this important subject.

Your obedient Servant,

H. Ruttan.

Cobourg, March, 1852.

The Alchemists not all in the Wrong.—In our day, men are only too much disposed to regard the views of the disciples and followers of the Arabian school, and of the late alchemists, on the subject of transmutation of metals, as a mere hallucination of the human mind, and, strangely enough, to lament it. But the idea of the variable and changeable corresponds to universal experience, and always precedes that of the unchangeable. The notion of bodies, chemically simple, was first firmly established in the science by the introduction of the Daltonian doctrine, which admits the existence of solid particles, not further divisible, or atoms. But the ideas connected with this view are so little in accordance with our experience of nature, that no chemist of the present day holds the metals, absolutely, for simple undecomposable bodies, or true elements. Only a few years since, Berzelius was firmly convinced of the compound nature of nitrogen, chlorine, bromine, and iodine; and we allow our so-called simple substances to pass for such, not because we know that they are in reality undecomposable, but because they are as yet undecomposed, that is, because we cannot yet demonstrate their decomposability so as to satisfy the requirements of science. But we all hold it possible that this may be done to-morrow. In the year 1807, the alkalies, alkaline earths, and earths proper were regarded as simple bodies, till Davy demonstrated that they were compounds of metals with oxygen.—*Liebig's Letters on Chemistry.*

Important Discovery.—The Glasgow *Herald* says, that at the meeting of the Philosophical Society of Glasgow, Dr. Penny communicated the important discovery, made by himself, of the presence of a considerable quantity of potash salts in the soot from blast iron furnaces. The soot experimented upon was obtained from the Coltness Iron Works, where it collects in the flues that lead the heated gases and other products of combustion, from the top of the furnaces to the air-heaters and steam-boilers. Dr. Penny, gave the particulars of a careful analysis of the soot, and exhibited specimens of the potash salt, which had been extracted in large quantities by Dr. Quinlan, of Hurlet. The salts has been pronounced by competent judges to be a good marketable article, consisting chiefly of carbonate and sulphate of potash, with a small admixture of soda salts. According to the results of experiments described by Dr. Penny, it appears that the soot will yield about fifty per cent of this marketable salt containing forty-three per cent of pure potash. It has been found that the amount of potash in soot procured in other iron works is subjected to variation, arising, no doubt, from the use of different coals in the blast-furnaces. From the well-known value of potash salt, there is every reason to expect that this discovery will prove of considerable importance to those who are interested in these commercial products, and also to iron-masters, who will now be enabled to turn to account a substance which has not hitherto been applied to any practical use.

Proper Length of Lightning Conductors.—The rule prescribed by the French Academy is that a lightning rod will protect a circle whose radius is twice the height of the rod; but Prof. Loomis cited to the American Association at New Haven an instance which he says "demonstrates to my mind that it is unsafe to rely upon a rod to protect a circle of a radius larger than one and a half times the height of the rod, at least upon the west side, whence most of our thunder showers come." These observations drew out various remarks. Prof. Henry stated that he had found in trees struck by lightning that there would be no traces of electricy on the upper branches, but it appeared to strike at the main trunk. He had observed that when the color of the electric discharge is red, it indicates that the electricity is very high.

The reason why candles with platted or twisted wicks do not require snuffing is this:—the burning wick by the force of the torsion of the fibre which composes it, presents itself to the air, and, finding a due supply of oxygen, the carbon burns away. The little beads of vitreous matter, which are seen to accumulate at the end of the wick, are so many beads of glass. Formerly the dropping of ashes into the tallow or stearine of the candle was productive of much inconvenience, when it was suggested that the wicks previously to being covered with their greasy coating, should be steeped in a solution of borax. The plan was found to succeed perfectly; the ashes fusing with borax, formed a glass, which no longer soiled the searine by dropping upon it.

LECTURE ON THE STRUCTURE OF THE EARTH.

BEFORE THE SMITHSONIAN INSTITUTE, BY PROFESSOR SILLIMAN.

We take the following interesting lecture upon the Structure of the Earth from the *New York Herald.* The lecturer said, It was his purpose this evening to pass on to Sicily, and to call the attention of his auditory more particularly to the contemplation of Etna. He then gave a brief account of his voyage to Sicily, and of the islands in the bay of Naples. The morning after leaving Naples, he said, they were up with the Eolian islands, and close to the volcano of Stromboli. These islands are ten in number, and lie between Sicily and continental Italy. Stromboli, it is said, has never ceased its volcanic action a single day—its fires are in unremitting activity, the eruptions taking place at regular intervals, varying from three to eight minutes; but as the vessel passed it in the day time, the fire was not visible, which would have been apparent at night, and they merely witnessed the emission of smoke and steam, at an elevation of fifteen or sixteen hundred feet. They passed on, and discovered Sicily, with the horn of Etna towering above the adjacent mountains, the cone of which is capped with lava—then comes the region of ice—then the woody region, and then that of a highly fertile character. They passed through the strait, about two miles in length, and completely landlocked, in which is situated Sylla and Charybdis, without seeing anything of the famous whirlpool, so remarkable in classic story, although it was stated that at a particular turn of tide danger might be apprehended. The party landed at Massoiri, and distinctly traced the ravages of the earthquake of 1783, in which poor Calabria was destroyed, and from fifty to eighty thousand persons perished. They then visited Saourminia, and thence proceeded to Catania, that they might have a better view of Mount Etna. At Hartford, Connecticut, the Professor said, there is in the possession of Mr. Cole, a sketch of the mountain, taken from this spot. Lava is so abundant here, that all the houses and other structures are built of this material, and which must have been discharged at a very early date. The first object that attracted attention was an immense field of lava, that overflowed in 1669, which is three miles long and three broad. It flowed on to the walls of Catania, which had been constructed to the height of sixty feet in anticipation of such an occurrence. When it had arrived near the walls it seemed to pause, and then mounted up, and without touching them, fell over and overflowed the city, and thence flowed to the sea, where it formed a cove, and created a harbour where none existed before. The arrest of the progress of the lava opposite the walls, the Professor attributed to the gasses which were emited in advance, and thus obstructed the onward movement. The lava in this place, he said, was not decomposed, although it frequently decomposes, and becomes a fertile soil. The party now commenced the ascent of Mount Etna. From Catania to its summit the distance is thirty miles; and the latter is upwards of eleven thousand feet above the level of the sea. Its circumference at its base is one hundred and eighty miles, and on its sides are seventy-seven towns and villages, containing 115,000 inhabitants. The mountain, as has before been observed, is divided into three regions—the fertile, the woody and the barren. The cultivated country abounds with all that is required in civilized life, and extends through an ascent of from twelve to eighteen miles The woody temperate region, extends in a direct line eight or ten miles, and forms a zone of bright green all round the mountain, exhibiting a pleasing contrast to the snow and ice above, and parts are considered as the most delightful spots upon earth. Around the main cone, are numerous parasitical or subordinate cones. From these different substances are thrown out sometimes gases, sometimes water, sometimes ashes and sometimes small stones. The Professor stated that he had mentioned, on a former evening, that the diameter of the cup of the crater of Mauna Loa is seven miles in diameter, with a depth of one thousand feet; but here is a crater with a diameter of twenty miles, and a cup of upwards of three thousand feet deep. Etna, he continued, had been eruptive, and its eruptions were recorded from the earliest periods of history; but during the present century they have not taken place oftner than once in four years; the noise that is made, which resembles the firing of artillery, being heard at regular intervals of three minutes. And although during one of the eruptions upwards of fifty thousand people were destroyed, yet the inhabitants dwell on the sides and at the base of the mountain, entirely unapprehensive of danger. The Professor said he might multiply instances of volcanic phenomena; but after what had been described, it would only be a waste of time. He gave a minute account of the ascent and descent of Mount Etna on the backs of faithful mules and donkeys, who are left to select their own path, wading through ashes, the person who is mounted having to hold only the mane in the steep ascent, but who, in descending, experiences more difficulty and danger. The scene, he said, on arriving at the summit, is magnificent beyond conception; and its beauty was enhanced by the subordinate, or as he termed them, parasitical cones, of which, it is said, there are three hundred; at one time he counted fifty. After all that had been stated, Professor Silliman remarked, his audience could need no other proof of the existence of fires in the interior of the globe, and which may break out at any time. Connect the circumstance of the existence of these volcanoes with the heat that is found to exist beneath the surface of the earth, and there could remain no doubt that internal fires are constantly raging beneath. There cannot be a greater fallacy than the popular idea which prevails, that cold water may be obtained by digging deep, for, at a depth of two miles from the surface, such is the heat of the globe at that point, that water will boil. Still, he said, this internal heat has nothing to do with the temperature of the atmosphere on the surface of the earth. The Professor here stated that, in his introductory lecture, he gave some general definitions of the trap and basaltic formation. Of the former of these were the Palisades in New Jersey, on the North river; the Giant's Causeway in Ireland, and a mountain of trap formation near the Columbia river in Oregon—drawings of which were exhibited. The term trap he explained, was derived from the Swedish word *trappa*—a stair, which these strata very much resemble, between each of which, on that near the Columbia river, is a layer of pebbles and debris—the cause of which he did not very satisfactorily account for. He considered it, however, as a submarine mountain—of which there are doubtless many under the ocean—in full volcanic activity; and if they do not protrude above its surface, it is because of the superincumbent weight of water. The Professor here diverged to touch upon Siberia, where there is only three feet of soil over a bed of ice, through which a well has been sunk ninety feet; and it was expected that water would be reached at the temperature of 32 degrees. On this thin soil, however, rye will grow, and even trees are to be found. After alluding to the circumstances of igneous rocks not being always volcanic, the imperceptible transition from compact lava to basalt and trap in their varieties, and various rocks used in architecture and the arts, he concluded by illustrating the theory of internal heat by some experimental illustrations. Having satisfactorily proved the existence of internal fires, he said the question naturally presented itself—whence is this heat derived? Werner, owing to his limited field for observation and study, referred the changes on the earth's surface, for the most part, to water, and attributed the combustion which produces volcanic action, to the burning of coal fields. But all the coal fields known to be in the world, the Professor said, would not supply Mount Etna. Of the sources of this internal heat, however, modern science has informed us. About sixty years since, Galvani made the discovery, of which, doubtless, many of those present had heard. While dissecting a frog—which animal is much used for food on the continent—some one touched it with a metallic substance when it became immediately convulsed, and this led to all the subsequent discoveries in galvanism, which was at first thought to be peculiar to animal life. But in 1800, the construction of the voltaic pile—which the Professor described—showed that such was not the fact, and that it was not restricted to animal life. By taking certain materials from the earth itself, and applying galvanic action, an intense heat is produced. Here then is the secret of central fires. The fact being ascertained that this internal heat exists, it is equally evident, owing to the progress of scientific discovery, in what manner that heat may be generated. The earths themselves were regarded as simple bodies until the brilliant researches of Sir Humphrey Davy proved them to be compounds; and who, by means of the voltaic apparatus, made potash to undergo fusion, and from it extracted small metallic globules called potassium. He was equally successful in discovering the metallic base of soda, which forms one-third of common salt, and from which also he extracted sodium.—It is evident, therefore, when we consider the power of galvanism, not only to decompose compound substances, but to generate intense heat, that the earth contains within her bosom agencies which are competent to produce the volcanic phenomena that had been the subject of the three last lectures, and to perpetuate the central fires, of which they are the undoubted evidence.

FORMULA for an ink that resists the action of acids, alkalies, water, or any of these substances usually used in defacing writing:—Shell lac, 2oz.; borax, 1oz.; distilled or rain water, 18oz. Boil the whole in a closely covered tin vessel, stirring it occasionally with a glass rod until the mixture has become homogeneous: filter when cold: and mix the fluid solution with an ounce of mucilage of gum Arablic prepared by dissolving 1oz. of gum in 2oz. of water, and add pulverized indigo and lampblack *ad libitum*. Boil the whole again in a covered vessel, and stir the fluid so as to effect the complete solution and admixture of the gum Arabic. Stir it occasionally while it is cooling, and after it has remained undisturbed for two or three hours, that the excess of indigo and lampblack may subside, bottle it for use. The above ink for documentary purposes is invaluable, being, under all ordinary circumstances indestructible. It is also particularly well adopted for the use of the laboratory. Five drops of creosote added to a pint of ordinary ink will effectually prevent its becoming mouldy.

NEW MODE OF PLANTING APPLE TREES.—A horticulturist in Bohemia has a bueautiful plantation of the best apple trees, which have neither sprung from seeds nor grafting. The plan is, to take shoots from the choicest sorts, insert them in a potato, and plunge both in the ground, having put an inch or two of the shoot while it pushes out roots, and the shoot gradually springs up, and becomes a beautiful tree, bearing the best fruit, without requiring to be grafted.

MISCELLANEOUS.

We take the following humorous lines from a recent number of the *American Magazine*, published in England. They cannot fail to be read with interest in Canada, where happily the system of communication by means of Railroads has been auspiciously commenced.

RHYME OF THE RAIL.

Singing through the forests,
Rattling over ridges,
Shooting under arches,
Rumbling over bridges,
Whizzing through the mountains,
Buzzing o'er the vale,
Bless me! this is pleasant,
Riding on the Rail!
Men of different "stations"
In the eye of Fame,
Here are very quickly
Coming to the same.
High and lowly people,
Birds of every feather,
On a common level
Travelling together!
Gentlemen in shorts,
Looming very tall;
Gentlemen at large,
Talking very small;
Gentlemen in tights,
With a loose-ish mien;
Gentlemen in grey,
Looking rather green.
Asking for the news;
Gentlemen in black,
In a fit of blues;
Gentlemen in claret,
Sober as a vicar;
Gentlemen in Tweed,
Dreadfully in liquor!
Stranger on the right,
Looking very sunny,
Obviously reading
Something rather funny;
Now the smiles are thicker,
Wonder what they mean?
Faith he's got the KNICKERBOCKER Magazine!
Stranger on the left,
Closing up his peepers,
Now he snores amain,
Like the Seven Sleepers;
At his feet a volume
Gives the explanation,
How the man grew stupid
From "Association!"
Ancient maiden lady
Anxiously remarks,
That there must be peril
'Mong so many sparks;
Roguish-looking fellow,
Turning to the stranger,
Says it's his opinion
She is out of danger!
Woman with her baby,
Sitting *vis-a-vis*;
Baby keeps a squalling,
Woman looks at me,
Asks about the distance,
Says it's tiresome talking,
Noises of the cars
Are so very shocking!

Market woman careful
Of the precious casket,
Knowing eggs are eggs,
Tightly holds her basket;
Feeling that a smash,
If it came, would surely,
Send her eggs to pot
Rather prematurely!
Singing through the forests,
Rattling over ridges,
Shooting under arches,
Rumbling over bridges,
Whizzing through the mountains,
Buzzing o'er the vale;
Bless me! this is pleasant,
Riding on the Rail!

DOMESTIC MANIPULATION.

ON THE OPERATIONS AFFECTING WATER.

The subject of the Water supply to the Metropolis and other large towns is one of the highest importance to the well-being of the community at large, in whatever point of view it may be regarded—whether as affecting the comfort, the health, or the pocket of the consumer, its influence can scarcely be overrated. To enter, however, into this matter, affecting, as it does, so many varied and conflicting interests, would be to pass beyond the limits set to this series of papers: what remains for us to do is to avail ourselves of the vast amount of scientific knowledge which has been recently brought to bear upon the question, and to cull from it such portions as bear directly upon *Domestic manipulation.*

The quality of water for domestic purposes depends mainly upon its degree of hardness or softness; and this in its turn depends almost entirely upon the quantity of lime dissolved in some form or other in the water. In speaking of the quality of water, the term "degree of hardness" is much used; thus we say that the water of the Thames is of 14 degrees of hardness, that of the Hampstead springs about 10 degrees, &c. &c. In these and most other cases the hardness is owing to a certain amount of chalk, carbonate of lime, dissolved, and the degrees of hardness correspond with the number of grains contained in a gallon of water. The Thames water, of 14 degrees of hardness, has in each gallon 14 grains of chalk, and the Hampstead 10 grains. It is found, upon experiment, that one gallon (weighing 70,000 grains) of *pure* water will not dissolve more than two grains of chalk, and so acquire two degrees of hardness; and that whenever more is contained in water, the excess is always owing to the presence of carbonic acid gas, which enables it to dissolve a much larger quantity. The practical part of our subject depends upon this fact; for if by any means we can get rid of carbonic acid, the dissolving chalk is necessarily precipitated, and the hard water, unfit for culinary and domestic purposes, becomes soft, and well adapted to both these uses. Carbonic acid is in part expelled from water by heating it to the boiling point; a still larger quantity is got rid of after boiling for some few minutes, and nearly every trace disappears at the end of half an hour; and just in proportion as the carbonic acid gas is expelled, so does the chalk fall, rendering the water in the first instance turbid, and becoming deposited on the interior surface o kettles, and where it forms the well-known rock or *fur.*

It has been found that water of 14 degrees of hardness lost two degrees when merely made to boil; boiling for five minutes reduced the hardness to six degrees; and for a quarter of an hour, to little more than four degrees. The practical application of this knowledge needs scarcely t be pointed out. Whenever a soft water is required, boil for several minutes before using. In making tea, for instance, the economy and general superiority of a soft water is well know Those, however, who use Thames water ju made to boil, employ a water of upwards of 1 degrees of hardness; those who boil for fiv minutes, diminish the hardness of the water b nearly one-half; and by boiling for a quarter (an hour, it can be lessened to one-third. Th circumstance is one of those that prove how gre a substratum of truth there is at the bottom (most popular notions. How many a young ge tleman, with a smattering of science just enoug to inform him that water gets no hotter howev long or violently it is boiled, has laughed at h grandmother's antiquated notions, because sl requested that the water might be made to b *thoroughly before the tea was made;* the c lady could give no very satisfactory explanatio of her prejudice, yet it was not the less a corre one.

Before going further in this matter, it may stated that there are some waters in which t lime is dissolved in the form of gypsum (sulph of lime); in these, which fortunately are rare, t hardness is of a permanent character, and cann be lessened by boiling. Tea made under such c cumstances may be improved, either by the ad tion of a very small quantity of carbonate of so or the tea should be kept soaking for half an ho under such circumstances as will retain the he This latter is the plan followed in Greenw Hospital, where they use a well water of 19 grees of permanent hardness.

In washing, the use of hard water is, as is w known, extremely prejudicial. The explana is exceedingly simple: every degree of hard *in a gallon of water destroys ten grains of s* and by following out the calculation, it will found that 100 gallons of unboiled Thames w wastes exactly two pounds of soap before any proach to a lather can be made. Now wh the remedy for this evil? Simply to boil water some time before use; one quarter o *hour's boiling will reduce the waste of soap* two pounds to ten ounces; and half an ho boiling will still further lessen it to six oun but no amount of boiling will make Thames ter equal to rain water, which is without h ness.

There is one practical matter of great im tance to which we wish to draw the attentio all concerned: it is the effect of boiling line hard water. If clothes are put into cold w and then boiled, the precipitation of chalk (w has been so often alluded to) takes place on the clothes, and whatever colouring matter exists in the water goes down with the chalk, and also becomes attached to the linen, rendering it of that disagreeable and unremovable dirty hue which is so characteristic of certain laundries. If boiling is absolutely requisite for white fabrics, it should be done in water which has been boiled half an hour, allowed to stand, and then poured off from the sediment; otherwise, from the immediate precipitation of the chalk, the dirt is boiled in and thoroughly fixed to the fabric. A moment's consideration will convince any one that a deposit to the *fur* in a tea-kettle cannot be expected to improve the appearance of white linen. Where clear rain water can be obtained, there is no objection to the boiling of clothes in it, as, being absolutely free from lime, no precipitation can take place. The use of soda in softening water employed in washing, is well known; but the remedy is not without its own evil: it weakens the fibre of the cloth, and unless it is much more thoroughly removed by rinsing than is usually the case, it occasions a very permanent yellow tinge when the cloth is heated, as in ironing, or in airing; and the evil effect of it upon various colours is well known.

For the purpose of removing on a large scale the hardness of the water, a very ingenious process has been proposed by Dr. Clark, and is now in active operation in many parts of Lancashire; at one printworks alone it is employed daily to the extent of softening 300,000 gallons of water. Although the account does not in strictness come within our limits, inasmuch as it is scarcely a domestic operation, it is so beautiful in its theory, and so successful in practice, that we may venture to devote a few words to its explanation.

We have already stated that the hardness of water is usually owing to chalk or carbonate of lime, dissolved by excess of carbonic acid gas, existing in the water; and that on the removal of that by boiling, the chalk falls as a sediment, entangling and taking down many of the other impurities. Dr. Clark's plan proceeds on the apparent contradiction, that by adding more lime to water, we shall remove that already dissolved; and this is found perfectly effectual in practice. The principles on which it proceeds are these: Pure lime, recently burned, is soluble to a considerable extent in water; when united to carbonic acid gas, it forms chalk, which is nearly insoluble in pure water, but which is dissolved readily by water containing an excess of carbonic acid. Now if pure lime, in the *proper proportion* is added to such hard water, it unites with the excess of carbonic acid, and forms chalk, which falls, and at the same time throws down that portion of chalk which was previously dissolved; and water so treated becomes, on standing, beautifully clear, soft, and pure. This process, however, is one which can scarcely be conveniently performed on a small scale; it should be done in immense reservoirs, the lime being mixed with the water as it flows in. The process, though not in active operation in London, has been repeatedly tested on 3,000,000 to 4,000,000 gallons at a time at the Chelsea water-works; and it has been found that the Thames water is by it reduced from 14 to 4 degrees of hardness; that it is rendered clear, bright, and much purer, without acquiring any odour or taste; and that the expense may be regarded as being about £1 for so purifying every million gallons.

We take the above from an excellent little London periodical, having an immense circulation, entitled the *Family Friend*, from which we shall occasionally furnish our pages.

A Singular Relic.

Capt. D'Auberville, of the bark chieftain, of Boston, writes to the editor of the *Louisville Varieties* that he put into Gibraltar on the 27th of August last to repair some damages his vessel had sustained, and, while waiting, himself and two of his passengers crossed the straits to Mount Abylus, on the African coast, to shoot, and pick up geological specimens. Before returning the breeze had freshened so much as to render it necessary to put more ballast in the boat, and one of the crew lifted what supposed to be a piece of rock, but from its extreme lightness and singular shape was induced to call the attention of the captain to it, who at first took it for a piece of pumice-stone, but so completely covered with barnacles and other marine animalculæ as to deny that supposition. On further examination he found it to be a cedar keg. On opening it he found a cocoa-nut, enveloped in a kind of gum or resinous substance; this he also opened, and found a parchment covered with Gothic characters, nearly illegible, and which neither he nor any one on board was able to decipher. He, however, found on shore an Armenian book merchant, who was said to be the most learned man in Spain, to whom he took it, who, after learning the circumstances of its discovery, offered 300 dollars for it, which offer Capt. D'Auberville declined. He then, says the letter, read word for word, and translated it into French as he read each sentence; it was a short but concise account of the discovery of Cathay, or further India, addressed to Ferdinand and Isabella, of Castile and Aragon, saying the ships could not possibly survive the tempest another day; that they then were between the Western Isles and Spain; that two like narratives were written and thrown into the sea, in case "Carnaval" should go to the bottom, that some mariner would pick up one or the other of them. The strange document was signed by Christopher Columbus in a bold and dashing hand. It also bore the date of 1493, and consequently had been floating over the Atlantic 258 years.

Acknowledgments.—Our best thanks are tendered to the editors of the *Mark Lane Express* and the *Irish Farmer's Gazette*, for the receipt of those valuable Journals; and we hope to have soon the same pleasing duty to perform to the *North British Agriculturist*; when we shall be fully able to give our numerous readers such information as is peculiar to each great division of the United Kingdom.

Portrait of J. G. Bowes, Esq.—Mr. Hoppner Meyer, the well known artist, of this city, has favoured us with an excellent likeness of our much esteemed Mayor. Both the original painting and engraving fully sustain Mr. Meyer's well-merited fame in this department, and are highly creditable to the state and progress of the Fine Arts in Toronto,

TO BREEDERS OF IMPROVED STOCK.

We have received from Lewis G. Morris, Esq., the following announcement of his next annual sale, which such of our subscribers as are desirous of improving their stock could not do better than attend. Mr. Morris's sound judgment, great industry and enterprise in his particular department, coupled with his high standing for honorable dealing, fairly entitle him to the confidence and support of a discerning public.—EDITOR C. A.

LEWIS G. MORRIS'

Third annual Sale, by Auction, of Improved Breeds of Domestic Animals, will take place at Mount Fordham, Westchester County, (11 miles from the City Hall, New York,) on Wednesday, June 9, 1852.—James M. Miller, Auctioneer.

Application need not be made at private sale, as I decline in all cases, so as to make it an object for persons at a distance to attend. Sale positive to the highest bidder, without reserve.

Numbering about fifty head of horned stock, including a variety of ages and sex, consisting of pure bred short horns, Devons, and Ayrshires; Southdown buck lambs, and a very few ewes; Suffolk and Essex swine. Catalogues, with full pedigrees, &c., will be ready for delivery on the first of May—to be obtained from the subscriber, or at the offices of any of the principal Agricultural Journals or stores in the Union. This sale will offer the best opportunity to obtain very fine animals I ever have given, as I shall reduce my herd lower than ever before, contemplating a trip to Europe, to be absent a year, and shall not have another sale until 1854.

It will be seen by reference to the proceedings of our State Agricultural Society that I was the most successful exhibitor of domestic animals, at the late State Fair.

I will also offer a new feature to American Breeders—one which works well in Europe; that is, *letting* the *services* of *male animals*; and will solicit propositions from such as see fit to try it. Conditions—The animal hired, to be at the risk of the owner, unless by some positive neglect or carelessness of the hirer; the expense of transportation to and from, to be borne jointly; the term of letting, to be one year or less, as parties agree; price to be adjusted by parties—to be paid in advance, when the bull is taken away; circumstances would vary the price; animal to be kept in accordance with instructions of owner, before taking him away.

I offer on the foregoing conditions, three celebrated prize bulls, "Major," a Devon, nine years old; "Lamartine," short horn, four years old; "Lord Eryholme," short horn, three years old. Pedigrees will be given in catalogues.

At the time of my sale, (and I would not part with them before) I shall have secured two or three yearly setts of their progeny; and as I shall send out in August next a new importation of male animals, I shall not want the services of either of these next year. I would not sell them, as I wish to keep control of their propagated qualities hereafter.

I also have one imported buck, the prize winner at Rochester last fall, imported direct from the celebrated Jonas Webb, and also five yearling bucks winners also, bred by me, from bucks and ewes imported direct from the above celebrated breeder; they will be let on the same conditions as the bulls, excepting that I will keep them until the party hiring wishes them, and they must be returned to me again on or about Christmas day. By this plan, the party hiring gets rid of the risk and trouble of keeping a buck the year round. All communications by mail must be prepaid, and I will prepay the answers.

L. G. MORRIS.

Mount Fordham, March, 1852.

Markets.

AGRICULTURIST OFFICE,
TORONTO, APRIL 1, 1852.

Our market has been very thinly supplied this week up till to day, owing to the bad weather and very heavy roads. We had, however, from 300 to 400 bushels of wheat in to-day which was disposed of at prices ranging from 3s. 3d. @ 3s. 7d. There was a good supply of common field pease which brought from 1s. 10½d. to 2s. Marrowfat pease are however very scarce, and bring from 5s. to 6s. 3d.

Potatoes are also very scarce, and command 4s. readily.

Fresh butter still holds at 1s.

Eggs have declined to 7d.

There is little Timothy seed coming in, and prices are rather down.

Clover seed has advanced.

The following are the quotations:—

	S.	D.		S.	D.
Flour, mil's. ex. sup. ꝑ brl. 196lbs	17	6	@	18	9
Farmers' Flour ꝑ brl. 196 lbs....	15	0	@	16	3
Wheat ꝑ bushel 60lbs	3	3	@	3	7
Barley ꝑ bushel 48lbs	2	3	@	2	5
Rye ꝑ bushel..................	2	3	@	2	6
Oats ꝑ bushel 34lbs.............	1	3	@	1	4
Pease ꝑ bushels 60lbs	1	10½	@	2	0
Marrowfat do. do..............	5	0	@	6	3
Potatoes ꝑ bushel..............	3	9	@	4	0
Beef ꝑ lb.....................	0	3	@	0	4
Beef ꝑ 100lbs..................	20	0	@	25	0
Fresh Butter ꝑ lb..............	0	0	@	1	0
Salt Butter do.	0	9	@	0	10
Firewood ꝑ Cord	13	9	@	15	0
Mutton, ꝑ lb...................	0	3	@	0	3½
Hay ꝑ Ton.....................	35	0	@	50	0
Pork ꝑ 100lbs..................	22	6	@	26	3
Turkies........................	2	6	@	4	0
Geese.........................	1	3	@	2	0
Chickens ꝑ Pair................	1	6	@	2	0
Ducks ꝑ Pair...................	1	6	@	2	0
Timothy Seed ꝑ bushel..........	8	9	@	9	0
Clover Seed ꝑ bushel...........	25	0	@	26	3

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N. B.—No advertisements inserted. Matters, however, that possess a general interest to agriculturists, will receive an Editorial Notice upon a personal or written application.