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Weller Riddell

NEWCASTLE FARMER.

VOL. I.—NO. VI. COBOURG, JAN. 1, 1847. TERMS.—2s. 6d. PER YEAR.

From the Farmers' Gazette.

PROFESSOR JOHNSON'S LECTURE AT LIMERICK.

ON THE APPLICATION OF CHEMISTRY TO AGRICULTURE.

Gentlemen, the means by which agriculture is to be promoted are of two kinds. There is first the mechanical, as by draining, and the use of improved implements. Draining, subsoiling, &c., belong to the mechanical part of agriculture; and in regard to them, their utility and advantage all, in some measure, understand, as there are few persons—I think I may say there are none here who have not discovered the advantage of such mechanical means for rendering the soil more fertile than before. But the second class are the chemical means, and unfortunately the use of these is less understood, and yet, my lord, it is materially important that they should be understood; for, though I grant the necessity of draining before all other means, yet I believe that the highest advantages—the utmost limit of fertility—is to be attained only by the application of chemistry; it is, therefore, I think, of the greatest possible consequence that the application of chemistry to the soil should be thoroughly understood. I cannot hope, in two short lectures, to lay open to you the details of these applications of chemical science. I can give you nothing more than the general heads; but I think it will be of great advantage, in a district like this, to lay before you a general sketch of the way in which chemistry may be brought to bear on agriculture. In the first place, among the materials with which a farmer works, his land is the most important.—In the next place, stand the crops which he grows upon it, and then the manures that he applies to the land, for the purpose of resuscitating and invigorating it. These matters are of general importance—and lastly, he considers in what way the crops may be best disposed of or distributed amongst his cattle for feeding. In regard to these four different subjects, with which the farmer has to do, there are certain common properties, and, therefore, we should inquire what those common properties are. If you kindle vegetable matter, you find that it burns, (then the lecturer lighted a lucifer match.) If you allow it to burn, you know that the greater part of it is wholly consumed, but there is a small portion of ash remaining. This which remains is called inorganic matter—that which is burned is called organic matter: and if, instead of a vegetable substance, you applied fire to the soil, you will find that what is true of the plant, is true of the soil; and you will, on investigation, find, that the soil consists of two matters, namely, that which will burn away, and that which will not. If you take a part of the animal body—your own body, for instance—you will find that there is, as in the vegetable and in the soil, a portion which will burn away, and another portion which will not. And this is the first point to which I would wish to draw your attention, as practical farmers, that there are in the soil, and in the vegetable and animal kingdoms, two bodies, namely, one which will burn away, and one which will not. But in different cases the relative proportions of those bodies are different. In the plant, there is a great deal more which will be consumed than in the soil; and the same difference applies to manures according to the kinds to which they belong; and if we take the animal body, we shall find that it contains a large proportion of organic matter. But again, the animal and the plant differ as to the amount of the ash which will remain after burning; for instance, in 100 pounds of bone, from 50 to 60 pounds will remain behind. And now let me ask, whence do these different substances get this inorganic matter? To-day I propose to discuss the inorganic part, because it forms a large proportion in the soil; and the first question rises as to where the inorganic matter is obtained. Beneath all our soils, at a greater or less depth, we find the solid rock. These rocks are of different kinds and different composition. They have crumbled down and formed the inorganic portion of the soil. It is from the soil that the plant acquires its inorganic matter; there is nothing of the kind in the air; there are no inorganic particles floating in the atmosphere; and it is also from the soil that the animal procures its inorganic matter, through the plant. Manures consist of animal and vegetable substances. Having ascertained whence these matters are derived, we come to their analysis, that is, a process by which the chemist discovers the component parts of any substance, and when these matters are put into his hand, and he is asked what they are, he analyses them. Now, the general components of the inorganic part of the soil, are as follows:—

COMPOSITION OF THE INORGANIC PARTS OF PLANTS.

The soil contains	Plants contain	Animals contain
Potash,	Potash,	Potash,
Soda,	Soda,	Soda,
Lime,	Lime,	Lime,
Magnesia,	Magnesia,	Magnesia,
Oxide of Iron,	Oxide of Iron,	Oxide of Iron,
Oxide of Manganese,	Oxide of Manganese,	Oxide of Manganese,
Phosphorus,	Phosphorus,	Phosphorus,
Sulphur,	Sulphur,	Sulphur,
Silica,	Silica,	—
Alumina,	—	—

Plants contain all these but alumina; and animals contain them all, but alumina and silica. Such is the nature of the inorganic substance of the plant, the animal, and the soil. Now these substances are all present; but the next question is, are they all present in equal proportion? No, they are in unlike proportions. In some there is but a small quantity, as is the case with potash; of others there is a much larger one. There is a difference between the soil and the plant, and the plant and the animal. Nor are those matters contained in different soils in the same proportion. That is the next question—are their relative proportions alike in each? They are not. Here the lecturer pointed to the following table:—

COMPOSITION OF SOILS.

	Fertile without Manure.	Fertile with Manure.	Very Barren.
Organic matter	50	97	40
Silica	833	648	778
Alumina	51	57	91
Lime	18	59	4
Magnesia	3	8	1
Oxide of Iron	30	61	81
Manganese	3	1	trace
Potash	trace	2	do.
Soda	do.	4	do.
Chlorine	do.	2	do.
Sulphuric Acid	1	2	do.
Phosphoric Acid	2	4	do.
Carbonic Acid	4	40	do.
Loss	0	15	5
	1000	1000	1000

You will see that the above table is divided into three columns, that the first represents a fertile soil without manure; the second one fertile with manure, and you will see the difference in lime is 59 to 18; in sulphuric acid as 2 to 1, and in phosphoric acid as 1 to 2. Here the lecturer described at length the differences between soils, and also between soils producing crops and those entirely barren, and then continued—In what way shall we make the soil in the second column equal to that in the first? I will allow that the same physical qualities of the soil shall be the same; why, by adding to the second the proportions of the different substances necessary to make it equal to the first, and this must be done by judicious manuring. But it may happen that there are too large quantities of some of the substances in it. This would, at

once, put a stop to improvement in this manner. We all know that it would be vain to attempt to grow wheat crops in the salt sands of the sea shore. I have observed in my travels through Ireland, and indeed through a great part of England, that there is too much water in the ground. To remedy this difficulty, we must drain the land. The lecturer proceeded to point out the advantages of thorough draining to the cultivation of land, and also how in undrained land the under soil became overpowered with the refuse of the over soil which sunk below, and this put a stop to vegetation. He also pointed out how draining would prevent this evil, and then proceeded to discuss the manner in which the land was exhausted by means of crops. On this subject he said, You will see by the table that a crop of wheat draws a certain proportion of phosphoric acid, lime, soda, &c. from the ground. It is the same with the other crops. Now what is the remedy for this exhaustion? Why, we must assist the soil by manure—we must endeavour to add to it as much of that inorganic matter as has been taken away by the growth of the crop. By so doing we shall put it in the same position as it was before; and in this place it is necessary for us to consider what is the particular component part of the soil which becomes exhausted, and in what degree, for there are different effects in this respect produced by different crops, and sometimes there is even a difference in different parts of the same plant, for if I take a ton of potato tops from the ground I exhaust the soil more than from a crop of tubers. Thus you see, that if a succession of the same crops be made, the result will be the exhaustion of the soil in the substance which that crop abstracts most of, and this is called a special exhaustion, in distinction to a general exhaustion. If I crop my land successively with oats, I deprive it of phosphoric acid especially, and for this a special manure is required; and it is the same, gentlemen, if I turn my land into pasture, and put dairy cows upon it.

COMPOSITION OF COWS' MILK.

Caseïn (curd)	1.43
Butter	3.13
Milk Sugar	4.77
Saline matter	0.60
Water	87.02
	100

On reference to the table you will find that they will abstract from the soil phosphoric acid. Now, if I put young stock to grow upon it, you will find on reference to the following table, that phosphoric acid and lime compose nearly 60 per cent. of that substance, and in that proportion, will the land be exhausted of those substances.

COMPOSITION OF OX BONES.

Cartilage	33.3
Phosphate of Lime	57.4
Phosphate of Magnesia	2.0
Carbonate of Lime	3.9
Soda, with a little common salt	3.4
	100

The lecturer then referred to the composition of muscle, which he stated contained only one pound of saline matter in the hundred.

ONE HUNDRED POUNDS OF FRESH MUSCLE CONSIST OF

Water	77
Fibrin, with a little fat	22
Phosphate of Lime	1
Other Saline Matters	1
	100

A knowledge of these facts, he continued, will enable us to determine what kind of stock we should put on any soil. This is a fact which is now beginning to be understood in the hill pastures, and I may state that in Cheshire, and other counties, where pasturage has been followed to a great extent, the country has become exhausted in the way I am now describing. If you exhaust the soil of one or more substances, then the application of those substances by manure restores it to its original state. And here I must advert to the liquid manure, of which a large quantity is generally allowed to be lost, but which contains a great deal of valuable inorganic matter, chiefly composed of alkalies. The professor here described, at some length, the benefits to be derived from the judicious application of liquid manure, &c., and then proceeded to speak of springs.—There are, he said, mixed with the waters of springs, certain saline substances—which restore to the soil the inorganic substances, of which it has been deprived by the negligence or indolence of man, and in this respect nature acts a beneficial part, in thus giving, as it were, a special manure, as well as in cleansing the lower soil, which, through neglect, has become deleterious to the plant, sweeping away all the noxious substances, and thus becoming a natural improver of agriculture. And with respect to this island, surrounded as it is by the sea, it is every year washed over, as I might say, by the spray, which is conveyed to every part of it, carrying with it a portion of inorganic matter. This is a beautiful design of nature, it is a design to atone for the indolence or negligence of man. But this is not all that is required for the proper cultivation of the soil. It is here, when by chance of negligence, that the soil has become barren, that chemistry can be made available for the purpose of restoring it to a proper state of cultivation. And it is to the proper application of chemistry to agriculture that we must look for the great benefits it is capable of affording, and the great results that will ensue from that proper application. By its means we are enabled to assist the soil with whatever substance it may have been deprived by the growing of crops or feeding of cattle. If it wants phosphoric acid, we can apply a manure containing a large proportion of that substance, and the same is the case with lime, or soda, or any other substance. A knowledge of the principles of chemistry throws a light on all these things, and by acquiring that knowledge you will be able to carry into effect all the improvements which have been made in agriculture.

From the Farmers' Gazette.

WANTS IN CERTAIN SOILS, FOR CERTAIN CROPS.

Aware of the necessity there exists, in certain soils, called "rich" in this country, to alter their condition to produce certain crops, we beg the attention of our readers, whose complaints so frequently reach us on the deficiency of their produce, to the following letters, relative to the farms of Mr. Davis, the champion of "thin sowing" in Kent. We had intended—nor is our intention yet altered—to give from ourselves a notice of Mr. Davis's farms, as we saw them in the autumn of 1844, when we had the pleasure of seeing his grain crops, abundant in appearance, securely harvested, and his green crops of such a character, as reflected the highest credit on the cultivator, whilst the crops of his neighbours, even more favourably circumstanced as to soil and situation, would be a disgrace even to any part of Ireland.

We saw in October, 1844, barley, on a farm adjoining those of Mr. Davis, in a green state, which was really disgraceful, after such a summer and harvest as we had that year. The cause of this backwardness was the absence of draining and subsoiling, both of which had been well and cheaply executed by Mr. Davis. His thin sowing succeeded, in consequence of his operations already alluded to, together with knowing the species of manuring his land needed—a fact that every farmer should endeavour to make himself acquainted with, before he need expect to reap the vast benefits derived from either draining or subsoiling, or both; and we hope the day is not far distant, when we shall see the land agents of this country imitating Mr. Davis, and thereby setting an example worthy of the landlord as well as the tenant farmer.—ED.

MR. H. DAVIS' FARMS, AT CROYDON.

To the Editor of the English Farmers' Journal.

SIR—In your last number, beside the elaborate report of the great agricultural meeting (worth ten times the cost of the paper), is an account of a visit to Mr. Hewitt Davis' farms in April; and having myself visited them so recently as the end of June, a summary of my notes may not be unacceptable to your readers as reciting the progress in the meanwhile.

The general aspect of the farms was of garden-like neatness, contrasting with the loose gravelly appearance of the soil, as suited rather for rye and buckwheat (of which latter, indeed, I noticed a larger proportion than anywhere else in this country); but in some places the deep four-horse plough was turning up heavy clods.

His wheat, of course the first object, did not exhibit the irregularity which has

been predicted from its lateral tillering, the ears being just as level, and the stalks as equal in height, as in the generality of broadcast fields, though I had no difficulty in counting twenty ears from one root. Some of it stood very thick, undoubtedly exceeding five quarters per acre; but I did not average it above four, and shall be glad to learn that I was in the wrong —and still more so, that one farmer in ten could get four quarters out of such a soil. His barley quite covered the ground, promising an abundant crop; the oats otherwise, which disappointed me, as I thought the soil better suited for that grain.

The beans exceeded anything I have elsewhere seen, covering the land so as to hide the intermediate turnips, and running up 3 to 5 feet high, full podded from top to bottom, without a blossom remaining. The peas were in fine condition, and the clover equal to any.

Mr. Davis advocates, I think, the production of all the manure on the farm itself, to the exclusion of the artificial special dressings, from which I send you, in another communication, some reasons for differing, notwithstanding his eminent success. And am yours, Sir, &c.,

J. PRIDEAUX.

Plymouth, 23d July.

The following is the communication referred to in the above letter:—

SPECIAL MANURING, OR DUNG ALONE.

Some of our first farmers (amongst them, I think, Messrs. Morton and Hewitt Davis) have argued that the farm ought to supply itself with manure, what addition it may require being made in food for the stock, as oil-cake, &c., to forward them for the market, while it improves the dung; and they exemplify, by the high condition of their farms, the efficacy of their system. Nevertheless, it is subject to the objection of presenting the same food to all the different cultivated plants, and, consequently, of stimulating the green juicy vegetation, on corn crops, where it weakens the stalk, as well as in green crops where it is desirable; so that the fertility may require to be limited, to prevent over growth of the corn-straw, and consequent laying before harvest. This, though very rare, in our neighbourhood, is a practical as well as a theoretical objection, and indicates the propriety of taking special means for strengthening the straw and increasing the ear, by determining the formation of seed rather than of leaf and stalk. The proportion, of ammoniacal compounds, in rich dung, when not at all too great for cabbages, Swedes, or mangold wurtzel, may be sufficient, if uncooked, to run up wheat, soft and juicy, to six or seven feet high; ready to fall with the first heavy weather, when the ear is full; whilst the proportion of such compounds, suited to wheat, will not give the utmost bearing of the root or green crops. To get from the land the utmost produce its breadth will admit, it should be enriched to the full extent of our means; and the vigorous vegetation directed, by special dressings, to leaf, root, or seed, as required.

Ammonia is well known to produce green juicy growth; and when in excess, will run corn up rank and soft, without filling the ear. Salt has an opposite tendency; and the wheats on our sea-coast are distinguished for thin stiff straw, and heavy ear. Lime has somewhat the like effect as salt; but *quick* or *fresh* slaked lime, applied to richly-dunged land, will set free ammonia, and increase the rank growth. In such cases, the lime must be used mild. The phosphates again, tend to increase seed; and on over-growing, or winter proud wheat, the super phosphate of lime would check the ammonia, by its acidity, whilst the phosphorous would promote the increase of grain. So that by top-dressing the young plant, at the suitable time, with salt, mild lime, or super-phosphate, (one or all, as required) we might probably direct its growth, however vigorous, to the production of heavy grain crops, without danger of laying, on the richest soil. Wheat will bear a good deal of salt; Johnson says 10 to 20 bushels per acre; but say 10, (or 5 to 6 cwt.) with twice as much mild lime upon an acre; or with 2 cwt. super-phosphate upon 2 acres would probably be enough, in the rankest cases.

On the contrary, when rapid green vegetation is the object, ammonia may be used as the dressing. Thus in the case of Italian rye-grass, we have instances in your columns, of its being cut six times in the year: liquid manuring it each time after cutting, and thus forcing it up on rich soil to the growth of an inch per day.

A variety of such facts have shown not only that plants thrive best upon the food which particularly suits them, but that their respective parts (as root, leaf, and seed) may be promoted or checked by appropriate dressings; and consequently, however high the authority, however successful the practice of using dung alone for every crop (except occasional liming), I venture to state my conviction, from facts as well as theory, that neither the greatest fertility, nor the most economical and profitable culture, can be attained, without special dressing to suit the different plants, direct the growth, to root, leaf, or seed, and even supply occasional deficiences, on the richest soils. This is borne out by many of the Scotch experiments, and seems to open even more clearly upon us, in the elaborate prize essay on the analysis of the oat, just published by the Scotch Agricultural Society; which shows, by succession of analysis, carried on for 18 months, how the inorganic (mineral) contents of the different parts of the plant alter in quantity and quality, in its different stages of growth; and hold out a prospect that, as these essays on the different cultivated plants become completed, they may indicate means of promoting and controlling the growth of the respective parts, with still more certainty and effect.

Yours, &c., J. PRIDEAUX.

From the Farmers' Gazette.

TO THE YOUNG FARMERS OF IRELAND.

LETTER IV.

My friends—This week let us consider the nature and qualities of manure.

All vegetables receive a portion of their nourishment from the invisible elements of the atmosphere,* in addition to the accidental elementary bodies mixed with them, as nitrogen and carbon, together with ammonia, which is a compound of nitrogen and hydrogen, and infinitely small particles of vegetable and animal substances.

But it is from the earth they derive their more substantial food, as is shown by the effects of rich soil in promoting their growth.

Though it is beyond our power to cause a single shower of rain to fall, or to impart heat, moisture, or refreshing coolness to the air, we can improve or injure the fertility of the soil by giving to, or withholding from it, certain substances placed in our hands by the Creator, who sends the rain in due season, and commands the earth to yield her increase.

It is by the sweat of his brow, by his industry and by the intelligence of man, that the earth is kept from becoming a wilderness; if neglected and unmanured it would return to its forest state, or to that of wild land covered with coarse and worthless herbage; it would bring forth thorns also and thistles, which would overpower the delicate and nutritious grasses, that now feed our most valued domestic animals. There is a natural tendency in the earth, when left to itself, to produce noxious or comparatively useless plants, which strive to dispossess those suited for man's use, and occupy the ground in their place. The fig tree in the parable but cumbered the earth, and was to be cut down as worthless, unless the dresser of the vineyard should succeed in rendering it fruitful by digging about and *dunging* it.

Plants worth cultivating can only be made to thrive by cultivation; we must supply *food*, too, as well as tillage to our crops, if we expect that they shall be productive, and this we cannot effectually do, except by making ourselves acquainted with the particular habits and wants of each order of plants under our management, and administering to them from our stores accordingly.

Let us consider what manures we have at our disposal, and how we may best apply them:—

Of mineral manures we have limestone, limestone gravel, marl, chalk, and sea-shells; all these calcareous substances are plentiful in different parts of Great Britain and Ireland, and are *carbonate* of lime—that is, they are compounds of lime and carbonic acid.

To test any substance supposed to be a carbonate of lime; it is a common practice to pour some sulphuric, muriatic,

*By atmospheric air is meant a compound of oxygen and nitrogen.

or any other strong acid on it: if it effervesces it is, in all probability, carbonate of lime. But you are not to conclude that there is no lime in a substance because it does not effervesce, the carbonate of lime being the only substance containing lime that effervesces on the application of a strong acid; nor does effervescence prove the presence of carbonate of *lime*, for any other carbonate, such as that of magnesia, potash, or soda, will also effervesce with a strong acid.

Neither a bone, which is* phosphate of lime, nor gypsum, which is a sulphate† of lime, will effervesce on applying an acid; yet, bones and gypsum contain a quantity of lime.

Limestone, or sea-shells, or any carbonates, which can be calcined (burnt), cease to be carbonates by the process of burning, which causes them to part with their water of crystalization and fixed air (which is another name for carbonic acid gas) contained in them, and leaves the lime in a caustic state.

In this condition, it has a great *thirst* for water, and carbonic acid, as is proved by the quantity of the former which it imbibes before it *slakes*; it will take a fourth of its own weight in liquid, poured upon it gently and gradually, or absorb it from a moist atmosphere, without appearing moist or losing its caustic properties.

While in the caustic state, lime is, in some slight measure soluble; and, therefore, in the form in which it can enter into the structure of a plant, and, at the same time, it gives out heat as the consequence of uniting with water and the fixed air: thus heat, one of the most powerful agents of vegetation, is communicated to the soil, and the effect produced by the rise of temperature which the caustic lime causes (especially if it be ploughed or harrowed in while in the act of slaking) may be very considerable.

We perceive the immediate effects of two or three days increased heat on vegetation in spring, and how much a *cold* wind will check it; and therefore we may infer, that the consequences resulting from a steady supply of warmth to the ground given out by the lime, while slaking and absorbing carbonic acid are similar.

Caustic lime acts in the soil also by hastening the decomposition of the vegetable matter in the ground, and preparing it as food for new plants. It also, by uniting itself with some bodies, perhaps noxious to the growth of plants, deprives them of their injurious qualities, and brings into activity other bodies of a nutritious nature, which had previously been placed in combination with substances that prevented plants from deriving benefit from them.

When limestone(or carbonate of lime) is burnt it looses its carbonic acid, which is given off as gas. The remnant (or fixed product) is caustic lime, which, having a great affinity for water absorbs it quickly, combines with it and becomes what chemists call a hydrate*. In this state the water is *fixed*;† that is, in solid union with the lime, and, all this time, the lime is absorbing carbonic acid until it is brought to its original state of limestone, preserving, indeed, the whiteness which burning had given to it, but having lost its caustic quality and alkaline taste.

Lime, in any state, is good for land in which it is previously deficient; but the most convenient and economical distribution of it is made, when it is in the powder,‡ immediately after slaking, for then it can be uniformly distributed and thoroughly mixed with the soil.

Caustic lime should be used cautiously on worn out land, exhausted of vegetable organic substances; for, by rapidly dissolving what may remain of them, it impoverishes the ground still more; but, in the *carbonate state*, it can do no harm even though applied in excess; for, in this condition, its power as a solvent of crude vegetable substances is not too active, while, (if it has any power at all of this kind) by entering as an actual ingredient among the materials of the soil, it is highly beneficial to plants; and especially to those which are known as the lime plants, because this mineral is a principal element in their structures.

Next week we shall pursue this important subject further.—I remain, your faithful friend,

MARTIN DOYLE.

* Formed by the union of phosphoric acid and lime.

† Formed by the combination of sulphuric acid and lime.

* From a word which signifies water.

† Re-burning would set the water free.

‡ The scrapings of a limestone road are valuable, because the particles of lime are sufficiently separated for intermixture with the soil; and limestone, if it could be cheaply reduced to dust, would be a very desirable manure.

From the Farmers' Gazette, Aug. 15.

MR. SMITH'S LECTURE ON DRAINING.

Yesterday Mr. Smith, of Deanston, delivered a lecture, in Swinburne's rooms, the Earl of Devon presiding. The attendance was good.

Mr. Smith said, that the subject he intended to lecture on, thorough-draining and subsoil-ploughing, required more time than he could detain those gentlemen present; but he would go into a practical description, in as condensed a manner as possible, and then he would allow any gentleman to question him when the lecture was over; but he would not enter into any discussion, but merely explain any sentence that might be inaudible, and give such information as he could on the subject. In Ireland there is a considerable depth of soil waste, and if only put in proper hands would be rendered fertile and grow crops. Drainage is a subject well known for many years, and in this country immense sums of money were used in attempting to drain lands that were unfertile, by the flowing of springs. It is true that ridges or furrows are useful in carrying off rains, but in low grounds they cannot be used at all, and by making permanent drains upon a simple plan, money and time would be saved. Mr. Smith then proceeded to describe the different kinds of soil, and explained, from diagrams representing the soil in its different states, the system which had, to his own knowledge, proved useful to agriculturists. The drains that he would recommend as effective for thorough-draining should be at a distance of eighteen feet asunder, from two and a half to three feet deep, the bottom of which should be covered with small stones or tile, so as to allow the water to drain off without lodging and creating mud, which would ultimately stop the passage. The reason he limited the distance between the drains was that, from experience he learned, the greater distance the water had to go to its receiver, the longer the ground would be kept useless by being inundated. Agriculturists in setting off drains, should be careful to have the ground as level as possible; and he was glad to find that in Ireland every exertion was making to lower the beds of rivers, as he found it necessary to have the great receiver of the drains lower by some inches than the drains themselves, so as to have a fall. Some said that they found a difficulty in draining low ground; but making a channel of 30 inches deep, by six in width, he found it carried off 300 cubic yards of water, which, indeed, was a vast quantity. This was easily effected, and proved successful in draining low grounds. The receiving drain is generally made at the bottom of the field. If they had dry summers, such as in 1844, the land cracked, but properly drained there is a sufficiency of moisture in the ground to bear produce. When he first took in hand the subject he was lecturing on, the summer was very dry from intensity of heat, and the hay in Scotland was a failure. This may be attributed to the want of care, and proper knowledge of the cultivation of land.—Now, he wished to tell those present that he had under his own direction a drainage made of 130 miles in length; stones were used for bottoming, and he never heard of a failure on the land since the drains were made; though they had dry summers, yet the ground was moist. Mr. Smith then adverted to the dimensions of the different drains serviceable to the drainage of high and low lands, and concluded by recommending stones in place of tile, as less expensive and easier to be got, and by far more serviceable, as tiles are apt to fill, and stop the course of the water. He also said that twenty-seven cubic yards of broken stones, were sufficient for an acre. If tiles are used, the ends ought to be left in a rough state, and ought to be from 2 to 3 inches in diameter. He recommended small stones as preferable to large ones; the latter took up too much room in the drain, and would prevent the passage of the water. The expense of executing drains to agri-

culturists is not heavy, considering how they would repay them, by keeping the lands sufficiently dry, yet sufficiently moist. Mr. Smith here closed his lecture.

Mr. Smith again repeated his willingness to answer any question put to him on the subject of his lecture. Mr. Carroll, Editor of the *Farmers' Gazette*, begged to ask Mr. Smith a practical question for the benefit of some gentlemen present who are in the habit of getting draining done by piece work. The questions were as follows:—As you have stated, Mr. Smith, that twenty-seven cubic yards of broken stones are sufficient to supply an acre, may I ask, First—Whether we are to understand you to mean the statute, the Cunningham, or the plantation acre. Secondly—The distance between the drains. Thirdly—The depth of stones in the drain; and Fourthly—The width of the drain at the bottom and also at the top of the stones.

Mr. Smith replied to the First question—The statute acre in all cases. To the Second—Eighteen feet asunder. To the Third—The stones *four* to *six* inches deep; and to the Fourth—The bottom of the drain four inches wide.

From the Farmers' Gazette.

ANTIDOTE TO THE DISEASE OF THE POTATO.

We draw attention to the following editorial observation and letter, which we copy from the last *Mark-lane Express*, upon this all-important subject. Already have we expressed our opinion upon the value of *charcoal* as an absorbent and corrective of putrescence; and the principles laid down by Mr. Rogers show that these properties must produce most beneficial effect on the disease. We would ask, why have the papers he speaks of not been published? for, it is to be presumed, they enter at large into a question which is of almost vital consequence to the public at present.

AN ANTIDOTE TO THE DISEASE OF THE POTATO.

We this day publish a letter from Mr. Jasper W. Rogers, of Dublin, on this most important subject, to which we particularly draw the attention of our readers. If peat charcoal have the properties set forth, its inestimable value under existing circumstances is perfectly evident. It is plain that Mr. Rogers does not come before the public as a *theorist*, and experience should have its proper weight; but we shall only now say, that if he have discovered *an antidote to the potato disease*, and a means for the future production of the tuber in health, his merits are pre-eminent; and we shall not fail hereafter to render him full justice for having accomplished so great a good—a greater than which could scarcely be rendered at the present moment.

PEAT CHARCOAL AN ANTIDOTE TO THE DISEASE OF THE POTATO.

Sir,—My attention having been drawn to a paragraph in a recent number of your publication, which states that "Professor Liebeg has discovered that soot is a perfect antidote to the potato disease," I conceive it but right, under the existing circumstances of the evil, (which, permit me to say, I pointed out the certainty of to the government of this country in September last,) to state that several months since I laid before the leading authorities, both government and otherwise, of this country and England, facts incontrovertible, showing the properties and action of charcoal or carbon upon the disease of the potato, both as a preservative in pit or store, and as a manure for the healthful reproduction of the tuber. My papers written upon the subject were the result of many years' experience and practice, as regards the potato, both in its production, storage, &c.; and they pointed out in the fullest manner the fact *which Professor Liebeg now publicly verifies*, namely, that CARBON is the only antidote to the disease!

I cannot but feel proud that I am thus upheld by an authority so truly eminent; but I have to regret that so long a period has been allowed to elapse without the promulgation of a fact such as this, so deeply affecting all classes of the community.

Under existing circumstances I do not feel it right to enter into the minutiæ set out in my papers alluded to, detailing the causes and effect of the action of charcoal on the disease of the potato. But I should be culpable, indeed, if I held back one moment longer the two following facts; for they deeply concern some millions of the poor; and, without hesitation, I challenge proof to the reverse of what I state.

The diseased potato may be almost entirely preserved from the effect of decomposition, by using pulverized peat or wood charcoal—abundantly interposing it between the layers and in the interstices—in pitting or storing, the pit or store being, of course, properly ventilated.

The action is thus: the charcoal absorbs the over-abundant moisture, the attendant of the disease, and instantly corrects the putrescent matter which it largely contains; therefore, effectually protecting the whole from infection or contagion, or the evil action of heated moisture.

As a manure for the potato, the action of charcoal, when properly applied, is as follows:—It absorbs from the *seed (which, under existing circumstances, must be more or less diseased, no matter how attended to, or where procured in Europe,)* that over-moisture already named; and instantly correcting all putrescence, it leaves the soil around uncontaminated, to act with purity upon the growth; yielding to the plant abundantly, that of which the disease has robbed it—CARBON, and thus supplying a nutriment which *constitutional weakness* (its real malady) essentially requires.

These are the main causes and effects of charcoal upon the potato disease; and knowing them to be incontestible, I should feel unjustified in longer withholding their publicity, the more particularly as Professor Liebeg has now, it appears, stamped the facts with his high authority, which, so long since, have been proved by so humble an individual as myself.

It is but right to add, that *peat charcoal* can be had to any extent from the bogs of Ireland, at a cost of no consideration; and that its value as a manure generally will be found of the highest consideration. I have the honour to be, sir, your obedient servant,

JASPER W. ROGERS, C.E.

Nottingham-st., Dublin,
July 28, 1846.

From the Scottish Farmer.

ON CULTIVATING POTATOES.

Most amateur Gardeners who have space enough, grow the potato; and as skill is demanded in this as well as every other department of Gardening, I feel sure any hints I may throw out will not be considered out of place. From the unfortunate experience in potato growing of the last two years, it is to be feared the culture of this vegetable will be much restricted, if it does not become generally disused, and the combined results of the experience of all horticulturists must be brought to bear upon an attempt to mitigate the evil.

I grew nearly two acres of potatoes last year, of which about a rood consisted of ash-leaved kidneys; these all escaped the disease, having been taken up in July, before it began to manifest itself, and continued perfectly sound until planting-time. With very few exceptions this is the case in the present season, as, with me, the early kidneys were ripe before the pestilence appeared. The amateur may be reminded by this fact, that it will be better to discontinue the growth of late potatoes, and to confine himself to early sorts. Whatever may be the cause of the distemper, it does not appear to develope itself until after Midsummer, and it is evidently prompted by the rains of July. Plant early, and in the most sunny situations, sets perfectly free from disease, of the various early kinds, and you will probably escape without loss.—The ground will then be available for other crops, which is not the case with the late varieties.

Finding my crops were suffering last year, and the tops of many sorts being quite dead, I took up some at the beginning of September, at least a month before the usual time; others were left in the ground until November, and were removed as spare time could be secured.—Now, I found invariably that those taken up early did not keep so well as those which remained longer in the ground.—It was predicted that the disease would extend if the potatoes were not stored away dry as soon as possible; but I did not find it so. On the contrary, no larger proportion of those taken up in No-

vember were useless than of those stored away two months before, while the sound ones were firmer, and kept better. I am convinced the root is safer in the ground than anywhere else, and whether the tops are pulled up or not, it will be better to allow the tubers to remain where they are, until fully ripe. I am not able to speak of the effects of removing the tops, never having tried it. My crops at present are almost all destitute of foliage, and the stems are dry and black. To be of service, I presume, the tops should be removed before the decay is consummated, for in the condition just described they perform no vital functions, and, I should think, can exert no influence on the tuber.

On taking up the potatoes last year, the rotten ones were left on the field, the sound ones stored away, and all that were affected were steamed and given to pigs. By those infected, I mean all that had the dark brown appearance below the skin, and which was easily distinguished by rottenness. Having cut some tubers thus affected, I found the wounds on the brown or infected part, granulated and healed as rapidly as the healthy portions, which proved (as it appeared to me), that no organic change of structure had taken place. I have eaten such potatoes with impunity, and the pigs did well upon them

The above practice of saving seed Potatoes we have adopted for some years past, with reference more especially to the early sorts, not so much for the prevention of disease, as to ensure earlier maturity in the following season. The past year, however, has given evidence of its importance, as being a probable means of escaping the disease; the Potatoes were dry, quite unripe, and when the plant is in full vigour, and exposed (on boards) to the light for eight or more weeks, until perfectly green, and when stored away presented no appearance of disease, while those dug at a later period were partially decayed.—Ed.

POTATO DISEASE.

To the Editor of the Farmers' Journal.

Sir—Every communication relative to this subject, must be acceptable to your readers; and I merely give you the following facts, which I have personally inquired into, and seen the different specimens of this year's crop of potatoes.

John Lea of Stoke Prior, Worcestershire, a market gardener, in 1845, sprinkled a portion of salt along the ridge of his potatoes, when laying upon the dung ready to be covered over; the produce was free from disease; the other part manured in the usual way were much injured.

The present year, he adopted a similar plan of salting a still larger portion of his crop, and they are perfectly sound and good, whilst those planted in the usual way with common manure, are very bad; and a portion to which he applied soot, as well as manure, are likewise injured, but not so bad as those planted with manure alone. Lea intends next year to apply about 10 cwt. of salt to the acre, sown broadcast, previous to the land being dug. H. H.

EARLY POTATOES.

Let your ground (a light sandy loam is best,) be laid out in trenches as for celery, about one foot nine inches wide, and thirty inches apart, laying north & south. *Dig* into each a good proportion of partially decayed leaves, filling the trench to within about six inches of the surface; place the tubers of the ash leaved kidney, *whole*, nine inches apart down the centre, pressing them into the soil only sufficient to keep them upright, *crowns uppermost* Cover with the earth from the intermediate ridges to the depth of two inches, on which place some light litter. As the shoots advance, draw earth from the ridges to them, repeating it with their growth, until the bed is level. The Potatoes will not then be deeper than by the usual method of hilling, and cleaning between the rows will complete the process. The advantages obtained by the above method are, a shelter from frosts, by being below the surface, and sheltered by the intervening ridges, and a clean and quick growth by the continued supply of fresh soil, as often as required.

FARMING.

From the Journal of Commerce.

Farming, like all other things, and perhaps more than other things, is in a revolution. We once knew as much about growing corn, potatoes and grass, as our farming neighbours; but we have glanced at enough of the science in its modern improvements, to feel that all we knew is of very little worth, and that attempting to write about farming now, we are more likely to get laughed at than admired. But no matter, farming has become a science. If a farmer wishes to grow wheat on his land, he sends wheat to a chemist to be analysed, that he may find of what it is composed, or rather looks into some modern work on chemistry, and reads it there. He then sends a sample of earth from his lot to the chemist, to ascertain of what ingredients the soil is composed; and whatever of the component parts suited for wheat is not found in it, he procures and spreads upon his land.

A field may have in abundance all the ingredients for the production of wheat but one, and yet not be able to produce wheat. By science, the Grahams have discovered the appaling fact that butter and beef are in the grass and fruits; that the cow is only the manufacturer; and that they, like the transmuting priest, abjure butter and beef, and yet eat butter and beef all the while.—The farmer who has no science will perhaps, at great cost, add those ingredients of which there are already enough; but that will not cause a crop to grow. This accounts for the fact which is often so surprising, that manure which has produced great crops on one soil, has no good effect at all on another. A scientific farmer knows little of poor land. All land is good to him, for it will produce well if only furnished with the proper ingredients. So land that would only produce a very large crop by spreading upon it one or two deficient ingredients.

These ingredients are, some of them, to be found in almost all substances:—lime of oyster shells, ashes even of anthracite coal, charcoal dust, fish, bones, &c. Everything is composed of ingredients which must be had for the reproduction of itself, and many other things. Fruit trees cease to bear often because they exhausted the soil of one or two of the ingredients which compose their fruit.—Give them but these and they will at once return to production. A pear tree may grow in a soil which has not all the qualities necessary to constitute pears, and it can no more make pears without the necessary ingredients, than the Israelites could make bricks without straw. One crop exhausts one set of ingredients, and another to some extent a different set; and so farmers learn the fact, without any knowledge of the cause perhaps, that the same crop should not be grown for successive years on the same land. Yet there is no difficulty in growing the same crop interminably, if only the exhausted ingredients are supplied.

A great deal has been learned about the mode and time of cutting and curing hay and grain. Grass, which while lying to be thoroughly dried, perhaps may get repeatedly wet, makes much better hay if, with much less drying, it is preserved with a bushel of salt to a ton. Salt is sometimes cheaper than hay, so that he makes a profit by putting it in, while the labour of curing is much diminished, and the good qualities of the hay much increased. Wheat cut in the mill has been found to weigh six or eight lbs. a bushel more than when left to ripen to the weight. So, farmers have perhaps been suffering great loss for ages, by cutting their grain at too late a stage of its progress.

The application of science to agriculture has developed wonders in the capabilities of the ground which have lain from the creation unobserved. Men are astonished when they see what boundless blessings the Creator has spread thick around, and how slow the race has been in observing them. They have spent century after century in shedding each other's blood, in creating and spreading poisonous superstitions, and in every possible way destroying all that was good. Despising the blessings of creation and providence, they have sought their happiness in the employments of fiends, and if the malice of men could but have had its way, the race would long since have been extent, and the earth would have rolled on to the end of its course, its

treasures unexplored and useless. Science shows us that the capacities of the earth have hardly begun to exist, either in numbers or individual enjoyment.—Evidently no sort of conception has been formed in the minds of more than a very few, of the swarming millions which this earth is capable of sustaining in luxurious plenty. Land and labour have been brought so ignorantly together, that nothing almost has been the product. The meagre, stinted crops, which have so poorly repaid the labour of the farmer, have exhibited the measure of man's ignorance rather than of earth's barrenness. We are opening now upon an era, when every field will be a scientific laboratory, most interesting in its operations to every noble feeling. This change will operate to compensate the farmer near the great markets, for competition they endure from the cheapness of western land. In proportion as the quantity of crops is increased, the value of proximity to market is increased. If the crop of wheat were doubled per acre, the expense of transportation per acre would be doubled, and this would go to enhance the value of land near to market, to the amount of the capital upon which this saving would pay the interest. But when we come to fruits and vegetables, which decay rapidly, or are injured by much travelling, or are of great value, then we have another element of value for land near to market.

SUBSOILING HEAVY LAND.

To the Editor of the Essex Standard.

Sir,—Deep cultivation being one of the "doubtful" or "disputed" principles in this country, I beg to trouble my brother agriculturists with the following fact, which they may witness on coming to my farm. One-half a field was subsoiled 15 inches below the common plough, with *Smith's* Deanston plough, drawn by six horses; the remainder of the field was ploughed nine inches, and not subsoiled; a portion of both the subsoiled and the unsubsoiled was sown with mustard and rape, being equally manured and sown the same day. Just so far as the subsoiling goes there is a splendid crop; where not subsoiled, next to no crop at all.—This has made a complete though reluctant convert of "my man Mayne," who, in common with plenty more of my Essex friends, has long watched with a dubious and reprehensive glance my "divings down" into the "nasty subsoil."—We should never forget the dying desire of the old man who wished his sons to dig deep for a supposed treasure in the land he bequeathed them, and which they received in increased crops. But woe betide the unfortunate wight who does this without *deep drainage*; his soil would become like the bottom of a pond after heavy rains, and his crops seriously injured. Disbelief of deep drainage is the parent error from which springs a whole family of mistakes; but education and intercourse will, in time, clear away the fog of prejudice. The sooner the better, is the sincere wish of,

Sir, your obed.ent servant,

J. J. Mechi.

Tiptree Hall, Sept. 20, 1846.

WHITFIELD EXAMPLE FARM.

The system pursued on the Whitfield Farm, as explained by Mr. Morton, is that the land which is wheat this year shall bear green crops the next, and that all the land which bore a green crop last year is wheat this. The system has been carried on for years; and from what I saw I have no reason to conclude that the farm is sick of wheat, the growing crops of which are looking quite equal to any I have seen any where, and superior to most.

The next striking feature is the absence of hedges, which certainly is an improvement on the old method of small enclosure, with broad hedges and ditches, which occupy much of the best land, besides forming a nursery for weeds of all descriptions, which gradually cause a constant and uniform supply of seed for the propagation of weeds, which are annually distributed over the farm by the cattle, wind, and birds, thus encouraging the farmer's worst enemy, weeds, against which he is compelled to carry on a constant and expensive warfare. Perhaps it may be thought by some that the ditches are necessary; if so, under the old slovenly system they but imperfectly perform their duty, being constantly subject to rubbish and weeds. But at Whitfield the water is much better carried off by good and perfect under drains, than it ever could have been by the old ditches.

The system of broad setting, and ploughing in between, in the bean crop, is beautiful; the intervals are planted, as the season advances, with potatoes and carrots, and the last done are turnips; ploughing and harrowing in between for the crops, and as they advance, horse-hoeing and hand-hoeing. This is the perfection of the Tullian System; but Mr. Tull carried his system too far, as he, seeing the effects produced by the plough and the hoe, thought manure not necessary. Had he lived to have paid a visit to the Whitfield Farm, he would have acknowledged that manure had its purpose, and that God had appointed to every thing a use.

The Whitfield farm is in a high state of cultivation so as to require the manure only for the green crops, and not for the wheat. This secures a good head without an over luxuriance of show, which would act mischievously by pulling down the crop before the grain was perfected.

The farm is a pattern of cleanliness: there are but very few weeds, and those attacked by a band of hoers on their first appearance. In consequence of the drought the turnips were backward, still the late rains have brought up a goodly supply, which give promise of a most abundant crop.

HINTS WITH RESPECT TO MILK COWS.

From the Scottish Farmer.

I have been a constant reader of your valuable paper since its first publication, as also of every book on Agriculture and Live Stock, that have come in my way for thirty years past. It has constantly been my study to cultivate the acquaintance of the most intelligent Farmers and Breeders, and I have reaped much pleasure and profit from their information. There is, however, one error that seems to be universally admitted by the whole of them, namely, that quick feeders are bad milkers, though, in all my experience, I have uniformly found the contrary to be the case; and that the cow that gave the greatest quantity of butter in a given time, fed fattest when dry; that the ewes that had the fattest lambs were first fat themselves after the lambs were taken from them. In buying cows in the spring, that have missed calf, to feed upon grass, I never scruple to give a few shillings more for each (than I would otherwise do), if I learn that they have been remarkable for giving a great quantity of butter; and, although old, if they have teeth to eat their meat, I prefer them to younger ones which are parted with for not giving enough of butter.—The small bone, the fine shape, the thin skin, the mellow *indescribable feel*, so much talked of by the connoisseurs in breeding, are the very marks of a good milker; in short, great milkers and quick feeders, are inseparable. I confess I have seen a very ugly ill-shaped animal, provided the other properties were possessed, a great milker. The only fault of such is, that they don't lay the fat on the most valuable parts; which quality seems inseparably connected with fine shape, or beauty of form, as the breeders term it. By great milkers are meant those that yield the greatest quantity of butter in a given time; for a great quantity of thin milk is out of the question in any situation, even where the milk is sold, as the sellers are at no loss to add water till they bring it to the standard quality of the market. Z.

IMPORTANT DISCOVERY.

A circumstance of considerable importance to the dairist, as well as to every one who can appreciate mellow butter and good cheese, occurred at the recent Show of the Highland Society. A gentleman applied to enter some milk pans, manufactured by Mr. Rice Harris, of the Islington Glass Works, Birmingham, on a principle which, while it possesses the singular advantage of preserving milk in process of creaming from the destructive effects of electricity, at the same time shews the remarkable quality of inducing the milk to generate and throw up to the surface a richer cream, and in larger quantity, than can be generated by any other kind of pan yet made. The pans, which are called 'registered compressed milk pans,' it seems, were first tried in

comparison with wedge ware and brown ware, when a difference appeared in favour of the compressed glass of 30 per cent. This fact was brought under the notice of Mr. Percy, the dairy chemist of the Royal Agricultural Society of England, who made a series of experiments, the results of which are thus stated:

Analysis of the Cream of four Phials—same Milk, and skimmed at the same time.

	Compressed Glass Pan. No. 1.	Blown Do. No. 2.	Wedge ware pan No. 3	Brown Do. No. 4.
Water . .	58.32	71.91	7.3.66	64.79
Butter . .	35.04	21.31	12.88	27.94
Solid Residue	6.64	6.73	7.26	7.27
	100.00	100.00	100.00	100 00

Struck with these remarkable results, Mr. Percy was led to try other experiments, which have proved equally satisfactory. The application for entry was too late; but the subject was considered to be of so much importance that means were to be adopted for getting the whole subject fully discussed. Meantime, it is clear that a discovery has been made, which is of great practical importance; and science will, no doubt, be able in due time to account for the remarkable difference which thus appears in favour of compressed glass pans.—*Inverness Courier.*

Newcastle Farmer.

COBOURG, JANUARY 1, 1847.

We had hoped, ere now, to have been favored with many communications from our brother farmers, on the various subjects connected with Agriculture.

It is well known, that a difference of opinion exists concerning many agricultural operations, and that, too, among well-informed and practical men; but it would most likely appear, by comparing notes, that such opinions, although diverse—and in some cases apparently adverse, were by no means irreconcilable. Now we would suggest to our friends the farmers, that they should communicate with us (for insertion in the *Newcastle Farmer,*) on the subject of the propriety *(or the contrary)* of Fall ploughing; stating the nature of the soil most capable of being benefitted by the operation, its comparative value as a preparative for other crops, to what crops it would be most beneficial, together with the reasons for its adoption, on any soil, and for any particular crop; as also the reasons for its rejection, and under what circumstances. Our wish is to make our paper locally interesting, and that object will be most effectually accomplished by being put in possession of local information. We therefore call the attention of our readers to the subject, and hope, in our next number, to have to record the results of the experience and observation of many of our friends.

We thank our correspondent, Mr. R. Wade, for his communication in the last number relative to the encouragement of home manufacturers of agricultural implements, together with the importance of having such implements as perfect as possible, in order the more readily, effectually and profitably, to execute the various operations for which they are severally designed. We believe the reason why such manufactures have been discouraged, originates not in the quality, but in the price of the article, as also with the lack of an assortment to select from, and the delay occasioned by waiting for their construction. That our mechanics *can* turn out an article equal to any made in the States is certain, and it rests *only* with them to accomplish it on as low terms.

There is one consideration in favor of home manufactures, which our correspondent has overlooked, viz., that (in complicated articles especially, such as Reaping and Threshing Machines,) in case of accident the repairs are more readily effected, from the patterns and castings being on the spot. It must also be remembered that the manufacturers, with all in their employ, are consumers of farm produce, and consequently return to the farming interest a proportion of the funds so expended.

Effects of Soaking Seeds in Chemical Solutions.—Seeds of wheat steeped in sulphate of ammonia on the 5th of July had, by the 10th of August, tillered into nine, ten, and eleven stems, of nearly equal vigour; while seeds of the same sample, unprepared, and sown at the same time in the same soil, had not tillered into more than two, three, and four stems. The time of steeping varied from fifty to ninety-four hours, at a temperature of 60 degrees Fahrenheit. Barley does not succeed so well if steeped above 60 hours. *Transactions of Highland Society.*

[Acting on the above notice, we last year steeped and sowed two parcels of wheat, the one steeped in the muriate and the other in the sulphate of ammonia. Some portions were sown after steeping 24, some 48, and some 90 hours,—the last period too long, as it was impossible at that season (August), to reduce the temperature below 76 degrees for the whole time. They all tillered well, *(were sown wet from the steep,)* but with no advantage of the sulphate over the muriate. We have four acres this season steeped in the muriate for 60 hours.—Ed. *Newcastle Farmer.*

N. B.—Lime, in any form, should not come in contact with seed steeped in the sulphate.]

Rats.—The following is given as Dr. Ure's prescription for destroying rats:—Melt hog's-lard in a bottle plunged into water heated to 150 degrees; introduce into it half an ounce of phosphorous for every pound of lard; then add a pint of proof spirit whiskey. Cork the bottle firmly after its contents have been heated to 150 degrees, taking it at the same time out of the water bath, and agitate smartly till the phosphorous becomes uniformly diffused, forming a milky-looking liquid. This mixture being cooled with occasional agitation at first, will afford a white compound of phosphorous and lard from which the spirit spontaneously separates, and may be poured off to be used again, for none of it enters into the combination; but it merely serves to communicate the phosphorous, and to diffuse it in very fine particles through the lard. This fatty compound, on being warmed very gently, may be poured out into a mixture of wheat flour and sugar incorporated therein, and then flavoured with oil of Rhodium, or not, at pleasure. The flavour may be varied with oil of aniseed, &c. This dough being made into pellets, is to be laid into rat-holes. By its luminousness in the dark it attracts their notice, and being agreeable to their palates and noses, it is readily eaten, and certainly proves fatal. They soon are seen issuing from their lurking places to seek for water to quench their burning thirst and bowels; and they commonly die near the water. They continue to eat it as long as it is offered to them, without being deterred by the fate of their fellows, as is known to be the case with arsenical doses.

Labour-saving Soap.—Take 2 lbs. of common soda, 2 lbs. of yellow bar soap, and 2 quarts of water; cut the soap into slices, and boil for two hours; then strain through a cloth, and let it cool.

Put the clothes in soak the night before you wash; then to every pail of water you boil them in, add one pint of the above preparation; boil them well, stir with a stick, no rubbing is necessary; rinse them out, and when dried you will find them perfectly clean.

Artificial Glazing.—As a covering for flowers, &c. nothing can be better than the varnish or solution of caoutchouc, spread with a clean brush upon fine holland (not calico); when the linen is properly stretched upon frames, it is tight as a drum head, and is no contemptible substitute for glass.

TOWNSHIP CLUB MEETING.

The Township Club Meeting for January, will be held at the Town Hall, on Saturday next the 2nd inst., at the usual hour.

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