see no change in their land, and often blame the seed the season, or something else, for poor crops, when the true cause is that the land is more or less exhausted. Some of the substances that form plant material appear in the table in very small proportions. But what looks insignificant in the table, is really a large quantity, when an acre of land is the amount to be estimated Multiply the acre by fifty or one hundred, and you have a serious task to accomplish, in supplying the deficiencies of a partially or completely worn-out farm

4. The mineral matter, on which fertility depends, is most essential. How important must be the presence of potash, soda, chlorine, sulphuric acid, and phosphoric acid, when these, even in such small quantities as shown in the table, make the difference between a fertile and a barren soil. Of these, potash and phosphoric acid are at once the most important and most difficult and expensive to supply.

5. Light is thrown by the foregoing table upon the philosophy of manuring. Its aim is to supply what is known to be lacking. It would greatly improve the soil described in the second column to add to it a quantity of bone earth, potash, soda, gypsum, and common salt. What land needs may be ascertained by making a chemical analysis of the soil—by experimenting on a small scale with special manures—by taking account of the crops that have been raised on it, and judging of the particular substances that have been removed, and by trying a variety of plants to find out which succeed the best. It is well not to shoot in the dark. Farm-yard manure never comes amiss, because it contains all the materials necessary to make a universal fertilizer. But if special manures are to be applied, they must be adapted to the wants of the soil. If sulphuric acid be wanting, gypsum should be applied. If phosphoric acid be lacking, bone earth is the specific. Much care and study are needed in the adaption of fertilizers to soils. Practical men often make mistakes which discourage them and shake their faith in scientific farming, for want of thoroughly knowing what they are about Nor must it be concealed, that even with careful study and persevering attention to the most thorough established rules, a degree of uncertainty attends the culture of the soil. As with all other human pursuits, so with this, there will sometimes be failures and disappointments, even when we do our best. This, however, ought not to repress energy, but stimulate it. Since our task is one of difficulty, let it be prosecuted with the greater vigour. If we do our part in the best way we can attain, enough of success will assuredly be secured to encourage expectation and reward toil.

An Act to Prevent the Spreading of Canada Thistles in Upper Canada.

[Assented to 18th September, 1865.]

Her Majesty, by and with the advice and consent of the Legislative Council and Assembly of Canada, enacts as follows:

1. It shall be the duty of every occupant of land in Upper Canada, to cut, or to cause to be cut down, all the Canada thistles growing thereon, so often in each and every year as shall be sufficient to prevent them going to seed; and if any owner, possessor, or occupier of land shall knowingly suffer any Canada thistles to grow thereon and the seed to ripen so as to cause or endanger the spread thereof, he shall, upon conviction, be liable to a fine of not less than Two nor more than Ten Dollars for every such offence.

2. It shall be the duty of the Overseers of Highways in any Municipality to see that the provisions of this Act are carried out within their respective highway divisions, by cutting, or causing to be cut, all the Canada thistles growing on the highways or road allowances within their respective divisions, and every such Overseer shall give notice in writing to the owner, possessor, or occupier of any land within the said division whereon Canada thistles shall be growing and in danger of going to seed, requiring him to cause the same to be cut down within five days from the service of such notice; And in case such owner, possessor or occupier, shall refuse or neglect to cut down the said Canada thistles, within the period aforesaid, the said Overseer of Highways shall enter upon the land and cause such Canada thistles to be cut down with as little damage to growing crops as may be, and he shall not be liable to be sued in action of trespass therefor; Provided that no such Overseer of Highways shall have power to enter upon or cut thistles on any land sown with grain; provided also, that where such Canada thistles are growing upon non-resident lands, it shall not be necessary to give any notice before proceeding to cut down the same.

3. It shall be the duty of the Clerk of any Municipality in which Railway property is situated, to give notice in writing to the Station Master of said Railway resident in or nearest to the said Municipality requiring him to cause all the Canada thistles growing upon the property of the said Railway Company with the limits of the said Municipality to be cut down as provided for in the first section of this Act, and in case such Station Master shall refuse or neglect to have the said Canada thistles cut down within ten days from the time of service of the said notice, then the Overseers of Highways of the said Municipality shall enter upon the property of the said Railway Company and cause such Canada thistles to be cut down, and the expense incurred in carrying out the provisions of this section shall be provided for in the same manner as in the next following section of this Act.

4. Each Overseer of Highways shall keep an accurate account of the expenses incurred by him in carrying out the provisions of the preceding sections of this Act, with respect to each parcel of land entered upon therefor, and shall deliver a statement of such expenses, describing by its legal description the land entered upon, and verified by oath, to the owner, possessor or occupier of such resident lands, requiring him to pay the amount; in case such owner, possessor, or occupier of such resident lands shall refuse or neglect to pay the same within thirty days after such application, the said claim shall be presented to the municipal Council of the Corporation in which such expense was incurred, and the said Council is hereby authorized and required to credit and allow such claim, and order the same to be paid from the funds for general purposes of the said Municipality, the said Overseer of Highways shall also present to the said Council a similar statement of the expenses incurred by him in carrying out the provisions of the said section upon any non-resident lands; and the said Council is hereby authorized and empowered to audit and allow the same in like manner; Provided always that if any owner, occupant, or possessor, amenable under the provisions of this Act, shall deem such expense excessive, an appeal may be had to the said Council (if made within thirty days after delivery of such statement) and the said council shall determine the matter in dispute.

5 The Municipal Council of the Corporation shall cause all such sums as have been so paid under the provisions of this Act, to be severally levied on the lands described in the statement of the Overseers of Highways, and to be collected in the same manner as other taxes; and the same when collected shall be paid into the Treasury of the said Corporation to reimburse the outlay therefrom aforesaid.

6. Any person who shall knowingly vend any grass or other seed among which there is any seed of the Canada thistle, shall for every such offence, upon conviction, be liable to a fine of not less than Two nor more than Ten Dollars.

7. Every Overseer of Highways or other officer who shall refuse or neglect to discharge the duties imposed on him by this Act, shall be liable to a fine of not less than Ten nor more than Twenty Dollars.

8. Every offence against the provisions of this Act shall be punished, and the penalty hereby enforced for each offence shall be recovered and levied, on conviction, before any Justice of the Peace; and all fines imposed shall be paid into the Treasury of the Municipality in which such conviction takes place.

Plaster of Paris.

The *Maryland Farmer and Mechanic* publishes an interesting article (editorial) on Plaster of Paris, as follows:

Ever since the German workman in a gypsum quarry first discovered the fertilising effects of plaster, from the ranker herbage which had been sprinkled with plaster dust as he walked across the field to his daily labours, the *modus operandi* has been a subject of dispute among agricultural chemists. Sir Humphrey Davy ascribed its fertilising qualities to the sulphur which it contains. Chaptal, to its regulating the solubility of salts in the soil. Liebig to the fact that it possesses the property of fixing the ammonia in rain water, whilst Dr. Muse, of Maryland, many years ago stated the theory that the chief efficacy of plaster arose from its tendency to produce phosphoric acid. All of these investigators were right, as far as they went, but all were wrong in ascribing to plaster a single property, when its action, as we have reason to believe, is complex. Plaster, in our opinion, possesses two distinct and separate functions, and whilst it acts directly as nutriment to a certain class of plants, it also acts indirectly by fixing the ammonia contained in the atmosphere, and in the dew and rain and snow which are thence derived, and thus furnishes additional food of a stimulant nature to the same plants. In an article which we had occasion to write, upon this very subject, some five years ago, we took occasion to say that "when the physiology of plants comes to be better understood, it will be found that their leaves play a much more important part in the vegetable economy than is generally ascribed to them, and that they serve not merely as lungs, but as mouths also; absorbing the food supplied by the atmosphere, just as the fine fibrous roots collect the food supplied by the soil. How else can we account for the fact that plaster acts more beneficially upon clover when its leaves have fairly expanded, and with the least advantage when applied directly to the soil?"

Sir Humphrey Davy established the fact that the measure of absorption in any given soil was the measure of its fertility—that the richest soils possessed this capacity in the highest degree, and the poorest soils in the lowest. By analogy of reasoning the same rule will apply to plants and animals. "A feeble and sickly plant can no more collect and assimilate from the atmosphere the large share of nutriment that it contains, than the feeble and sickly animal can digest the food that is offered it. Stimulants and tonics are required in both cases to restore the system to its natural vigour," and only such a class of stimulants and tonics as the peculiarities of each case may seem to demand. A large amount of salt, for instance, is excellent for the production of beets and asparagus; but the same quantity applied to other plants would be very apt to destroy them altogether. And these are the effects of plaster, so far as clover and the leguminous plants are concerned. "Now when Dr. Muse attributed the efficacy of plaster to its tendency to become phosphoric acid by exposure to the atmosphere, he was perfectly correct so far as his statement went." So was Davy in ascribing its fertilizing properties to the sulphur which it contained, although the lime should also have been taken into consideration. So also was Chaptal, in saying that plaster regulated and controlled the too rapid action of soluble salts—and so was Liebig when he pointed out that it fixed that ammonia and conserved it for the uses of the growing plant, which, by its volatility, would otherwise have escaped again into the atmosphere. They were nevertheless all of them wrong in ascribing its virtue to a single property or to a single function.

"Plaster acts principally upon the leaves of plants, increasing the stem and foliage, and is therefore much better adapted to certain forage crops than to the cereals." It produces but little effect when buried in the soil, except when spread upon a clover ley before it is turned down; when, by arresting the volatile ammonia—regulating the action of the salts, as Chaptal has it—it exerts a remarkable influence upon the succeeding wheat crop—especially as the constituents of wheat and clover are very similar, as chemists have frequently shown by analysis of the ashes of those plants respectively.

We subjoin the following tables as drawn up by us some years ago, for the further elucidation of this interesting subject:

An analysis of plaster shows that it is composed as follows:

Sulphuric Acid. ...	 43	parts.
Lime.....	33	"
Water.....	24	"
	100	

Analysis of the ashes of red clover, upon the basis of the product of an acre of land—the clover being dried and cured in the usual way:

		Our Comments.
Nitrogen.....	78 lbs.	Drawn in part by the plaster from the atmosphere in the shape of ammonia.
Potash and Soda.	77 "	
Lime.....	70 "	—Contained in the plaster.
Magnesia.....	18 "	
Sulphuric Acid .	7 "	—Contained in the plaster.
Phosphoric Acid.	13 "	Ascribed by Dr. Muse to the conversion of plaster into a phosphate by atmospheric influence.
Chlorine	7 "	—&c., &c.

There is no sensible difference in the action of white or blue plaster where both are pure. A field once plastered with from 250 to 400 lbs. per acre will not need a similar top dressing for four years.