

take off the superfluous water, and allow the free admission of air to the greatest degree possible.

6. Soils are unproductive when their physical characters are bad.

The following is an analysis, made by Dr. Voelcker, of a soil in Gloucestershire, that had been laid down to pasture five years, and at first produced luxuriant herbage, but at length became almost worthless, although frequently dressed with different kinds of manures:—

Moisture	4 04
Organic matter and water of combination	11 69
Oxides of iron and alumina and phosphoric acid	18 67
Carbonate of lime	10 63
Magnesia	1 33
Potash and Soda	1 01
Insoluble siliceous matter (clay)	55 21
	100 00

This soil is rendered unproductive, not in consequence of any marked deficiency in the constituents of plant-food,—for its chemical constitution would place it among fertile soils,—but from its physical condition: a heavy, wet surface resting on a thick and impervious bed of clay. What this soil wants is air, not manure, and draining and frequent subsoiling are the only adequate remedies. "On land like this it is only waste to apply manures, especially if the season should be dry. Artificial, such as guano or ammoniacal salts, these do positive harm; and in wet but warm seasons, water itself is the best means of developing, so to speak, the natural resources of the land, and encouraging the growth of the herbage. It is not for me to say whether it is profitable to put such land down in permanent pasture, or to break it up and adopt upon it a rotation suited to heavy clay land; but of this I am quite certain, that the steam cultivator would do wonders on these cold, stiff clays, for they contain, practically speaking, an inexhaustible store of the mineral food of plants, which, however, has to be unlocked as it were by air. The more roughly stiff clays are broken up the better; the less the farmer meddles with the land when once broken up, the more effectually the air will find access into the land. No instrument can possibly pulverise clays so effectually as air and frost, if time be allowed."

The intelligent reader will gather much useful information from the results of the preceding investigations, and while appreciating the valuable light which analytical chemistry throws on the composition and properties of soils, he will see how necessary it is to pay sufficient attention to their physical condition and capabilities also. Upon a properly balanced union of these two modes of investigation, the healthy progress of an advancing agriculture mainly depends.

Plea for Permanent Grass Lands.

OBSERVATION and experience from my youthful years convince me that lands natural to grass, and desired for its production, should never be disturbed by the plough, but their fertility kept up by top-dressing of animal manure, ashes, plaster, muck, earth, or whatsoever enriches—pastures at almost any time; mowing lands soon after the hay crop is removed, that the surface dressing may act upon the grass as the earth does upon other crops under cultivation; also affording protection and warmth during the cold and wintry season. Natural meadows—that is, the level land bordering on streams and rivers—are undoubtedly best for mowing, and can usually be made smooth without even a first ploughing, and are sometimes found self-sustaining; also, lands receiving the wash of hills, roads and barnyards, often keep up their fertility without any direct application, though the hay crop is continually taken off. Lands less favoured naturally, must be treated artificially, and strengthened and replenished by irrigation, or some fertilizing substance applied to the surface. Ploughing seems to destroy the life and take away the heart of the land for grass, which almost always soon runs out after it, and must be richly manured and thickly seeded, and the process often repeated, in order to keep it up.

The custom with farmers here, is to plough annually a small piece in their mowing lots—we have but very little natural meadow land—put on the entire manure of a large stock, get a good crop of corn, followed by oats, with new seeding, then a fair hay crop for about two seasons. If the grass has been improved, it has not been done by the cast iron plough, but by the liberal manure. A less portion put on as a top-dressing would have resulted in a greater and more permanent benefit, besides the labour of getting off the stones and preparing it for the mower. It is also the custom to plough a piece in the pasture, sow to buckwheat, followed by oats, with new seeding, and is then assumed that the land is made better, been enriched, while in fact it has been made poorer to the amount of the two crops taken off, besides otherwise injuring it for the production of grass, as a few years will show.

This unnatural method of improving old pastures by repeated ploughing and cropping, has in many instances been fairly "run into the ground," and many of these naturally fertile and grassy hills have become poor and waste places, while others near by, which have never been poisoned by the plough, nor too closely fed, still, to a good degree, maintain their productiveness. If an old pasture could be spared a few years to rest, and to grow up to white birches or other trees, whose roots should penetrate and pervade the compacted soil, while their limbs and leaves would give resting and shade in summer, and warmth in winter, and altogether rarifying, and aerifying, ameliorating, and renewing its condition, then cutting off its young growth, and you have the best kind of new ground and good pasture for years, enriched by shade and rest, fallen leaves, and decaying stubs and roots. The first ploughing is the beginning of evils, and should be never done where grass is desired. To hear an old farmer, in passing over his deteriorated mowing or pasture lands say "the grass has run out here, this needs ploughing," is strange logic to me. I believe in Cincinnatus and the plough, but on grain and not grass land. The sage saying of the Scotch minister—(our friend John Johnston will agree in this)—when taken by his parishioners, in time of drought, around with them from field to field, to pray for rain and the blessing of heaven upon the parched and feeble crops, coming to a very poor and neglected field, he said to his brethren, "Pass on, pass on; it will be of no use to pray over this land—it needs manure!" This was common sense and philosophy, as well as piety. It is somewhat of ploughing as of praying to make grass grow on a poor or run-out field—ploughing will do no good; it needs manure.—A. P. VIETS, in Country Gentleman.

Fixed Facts in Agriculture.

THESE may be assumed as fixed facts in Agriculture:

1. All lands on which clover, or the grasses are grown, must either have lime in them, naturally, or it must be artificially supplied. It matters but little, whether it be supplied in the form of stone lime, oyster-shell lime, or marl.

2. All permanent improvement of lands must look to lime as its basis.

Lands which have been long in culture, will be benefited by applications in the form of bone-dust, guano, native phosphate of lime, composts of fish, ashes—or in oyster-shell lime—or marl—if the land needs liming, also.

4. No lands can be preserved in a high state of fertility, unless clover and the grasses are cultivated in the course of rotation.

5. Mould is indispensable in every soil, and a healthy supply can alone be preserved through the cultivation of clover, and the grasses, the turning in of green crops, or by the application of composts rich in the elements of mould.

6. All highly concentrated animal manures are increased in value, and their benefit prolonged, by admixture with plaster, or pulverized charcoal.

7. Deep Ploughing greatly improves the productive powers of a variety of soil, that is not wet.

8. Subsoiling sound land, that is, land that is not wet, is eminently conducive to increased production.

9. All wet land should be drained.

10. All grain crops should be harvested several days before the grain is thoroughly ripe.

11. Clover, as well as other grasses, intended for hay, should be mowed when in bloom.

12. Sandy lands can be most effectually improved by clay. When such lands require liming, or marling, the lime or marl is most beneficially applied, when made into compost with clay. In slacking lime, salt brine is better than water.

13. The chopping or grinding of grain, to be fed to stock, operates as a saving of at least twenty-five per cent.

14. Draining of wet lands and marshes adds to their value, by making them produce more and better crops—by producing them earlier,—and by improving the health of neighbourhoods.

15. To manure or lime wet lands, is to throw manure, lime, and labour away.

16. Shallow ploughing operates to impoverish the soil, while decreasing production.

17. By stabling and shedding stock during the winter, a saving of one-fourth of the food may be effected—that is, one-fourth less food will answer, than when such stock may be exposed to the inclemencies of the weather.

18. A bushel of plaster per acre, sown broadcast over clover, will add one hundred per cent. to its produce.

19. Periodical applications of ashes tend to keep up the integrity of soils, by supplying most, if not all, of the inorganic substances.

20. Thorough preparation of land is absolutely necessary to the successful and luxuriant growth of crops.

21. Abundant crops cannot be grown for a succession, unless care be taken to provide and apply an equivalent for the substances carried off the land in the products grown thereon.

22. To preserve meadows in their productiveness, it is necessary to harrow them every second autumn, apply top-dressings, and roll them.—North Carolina Farmer.

The Cultivation of Live Fences.

To the Editor of THE CANADA FARMER:

SIR,—Your suggestion that the mode of cultivating live fences, adopted by me, might be interesting and instructive to the readers of THE CANADA FARMER, and at the same time be an inducement to some parties to adopt the same method, before the material for fencing in common use shall have become exhausted, I cheerfully comply, and shall endeavour to give my experience in as clear and lucid a manner as the nature of the subject will admit. The principle which I have adopted in setting the plants, may be termed the ditch and mound process; the ditch serves a double purpose, the first, to furnish material for making the mound, or covering for the plants, as well as for their protection; in the second place, it supplies an open drain for taking the waters from the adjoining land. The first object in making a fence is to have it straight, and as level as the face of the ground will admit. After setting stakes on the line on which you intend your hedge to grow, you will place a cord four inches from the stakes, and another eighteen or twenty inches from the first; these cords will show the width of your drain; then cut the turf with a spade along each inside the cords, at an angle of thirty degrees, or more, according to the nature of the soil. You will next proceed to make a bed or flat, upon which to lay your sets, by taking a spit off the turf and lay it in line with your stakes, sloping back to preserve the angle as indicated above, and one foot wide, and showing a level surface. You are now prepared to place the sets which should be laid flat, and but six inches from each other. The sets should be cut six inches from the root, and laid as to project one inch from the face of the mound, and then take another spit of turf and lay grass side down, upon the sets, still preserving the same angle. Care should be taken that the covering be made compact, so that the plants may not suffer from draught. You are now ready to complete the mound, which should be two and a half feet on the base, and at least one foot deep on the sets. The bottom of the ditch should be made on an incline, that the water may run freely from the drain. Although the hawthorn is a hardy plant, it does not relish cold feet, or a surplus of drink. The soil on which my hedge is planted, is a stiff clay, which is not so favourable for a rapid growth of plants, as a more sandy or gravelly soil; yet I have not lost one plant in every hundred that I have planted. I omitted to state that the turf left between the edge of the ditch and the sets should be shorn off the grass of sufficient depth to prevent it growing. The ledge thus formed will serve to catch the earth that may be washed or crumble from the face of the mound, and being deposited in the ditch. As this letter is somewhat lengthy, I will at some future time, give some remarks regarding the treatment which is necessary, and its cost.

C. YALE

St. Catharines, Feb. 27, 1866