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Agriculture.

The Atmosphere as a Fertilizer.

This is a subject which, practically, receives but about half the attention it merits. Substantial manures, when obtainable, are of course the great desideratum and no soil, however fertile, can long sustain nutrition without them. But in many instances these are not readily attainable, at least in appreciably large quantities, and it is well to know in such cases how best to adapt our soil for the absorption of those inexhaustible fertilizers which are chemically combined in the air around us.

The composition of the atmosphere is so well known that it need not here be repeated. It is however worthy of note, as illustrative of the wonderful resources of the air, that a young sapling, planted in earth that had been oven-dried, and receiving no other nourishment thereafter than that derived from the air, and an occasional watering, more than quadrupled its weight in a twelvemonth; whilst the earth in which it grew, having been again dried and weighed, showed a loss of only two pounds—a fact which proves that we are indebted almost solely to the atmosphere even for the solidity of our trees. The same truth on a smaller scale, as well as on the large, is being illustrated every day and all around us, but the principle could be much more effectively utilized in agriculture than it is, and that simply by a more thorough pulverization of the soil.

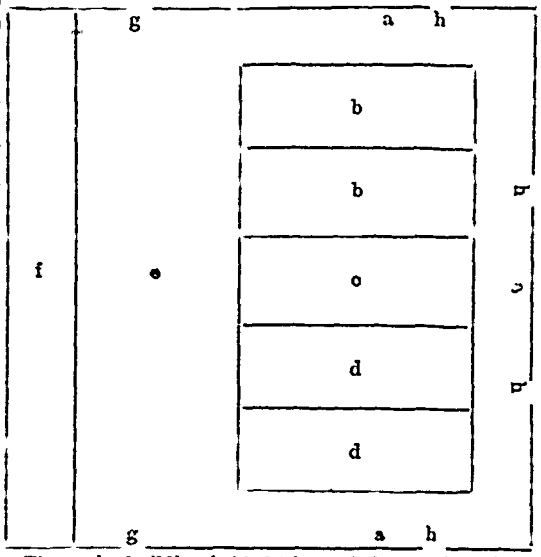
The decomposition of animal and vegetable matter keeps constantly filling the air with fertilizing gases, and perfect tillage is the first step necessary to condense these in the pores of the soil. It follows moreover that if air is such an essential source of vegetable nourishment, the more of it supplied the better; and so it is, provided only it be supplied through the proper channel viz:—the soil. The nature of soil too must here be taken into account, for some kinds are much more easily permeated than others. For instance, in testing with water, one hundred pounds of pure clay, dried, absorbed seventy pounds of water before any came through so as to drop. A similar weight of clay loam took in fifty pounds; English chalk, forty-five pounds; loamy soil, forty pounds; calcareous sand, twenty-nine pounds, and dry quartz, twenty-five pounds. The experiment illustrates strikingly the degree of tillage or pulverization requisite in each case as compared with the others. Carrying the test still farther, five hundred pounds of good, fertile soil taken from various parts of the world and made perfectly dry, gained nine pounds in weight in the course of an hour by simple absorption from the atmosphere, and this gain varied with different qualities of earth, in proportion as they were more or less productive. The lesson to be derived is obvious—always bearing in mind that that soil is best fitted for the simultaneous action of air and water, which will retain about forty per cent of the latter.

Reclamation of Swamp Lands.

This subject is one of great importance, in many parts of Canada, where vast tracts of excellent land are partially or wholly submerged in water—an importance which has been anticipated and recognized by the Legislature in its passing the Drainage Act a few years ago. Referring to the best mode of treating swamp land, which has been newly or recently drained, Mr. Erastus Osborn, of Decatur, Mich., in a paper read by him before the Farmers' Institute of that place, a short time ago, said:—"In 1864 he bought a piece of low land considered almost worthless and commenced to improve it by ditching and ploughing. His neighbors said he could never get his money back, that it would grow up with the briars and willows which had previously covered it, and be worse than ever. It did grow up, but, to good crops of oats and hay. He first cut drains sufficient to carry off the water rapidly. The mowing marsh is usually tough, should be ploughed in the fall so that the ground will freeze and be ready for cultivation the next season. He regarded buckwheat as the best crop to sow the first season, and found it almost as profitable as wheat. In no case would he recommend seeding to grass until the second season. He found potatoes a profitable crop on this kind of land."

An Excellent Grain House.

The following plan of a grain house has been sent by a recent writer to the *Ohio Farmer*. Its claim to superiority is that there is no place in the building in which rats or mice can hide from a cat or dog:



The entire building is 20x25 feet. b b are wheat bins, c rye or barley bins, d d are oat bins, around those bins is an open space or walk, a, a, a, 20 inches wide; e is a floor to clean and sack grain on, and to keep the fanning mill on; f is a corn crib 4 feet wide at top and 3 feet at the bottom; g g are doors, h h h windows.

Chilled Iron Ploughs.

The great end of force being to overcome friction and attraction, it follows that whatever lessens either of the latter will proportionately aid the former. In other words, if by any contrivance we can diminish the friction of a plough, for example, in passing through the soil, we lessen the draught on our horses by just so much. Now the ordinary method of effecting this end in machinery is to use oil or some other lubricator, which, of course, we could never apply to the plough. But failing one principle, we can fall back on another which generally, though not invariably, holds good in mechanics, and that is that friction is usually diminished or increased in proportion to the hardness or softness of the rubbing surfaces.

Acting upon this principle, manufacturers have recently been turning out chilled, *i.e.*, hardened mouldboards for ploughs, and the results, according to the testimony of some at least who have tried them, are highly satisfactory. Mr. Ives, of Batavia, N.Y., narrating his experience of chilled ploughs to the Western New York Farmers' Club, said:—In ploughing a few acres of turf ground the last days of December, I took my best common plough, which is made for either two or three horses, and with two horses commenced ploughing about seven inches deep, but soon found it was too much for the team, so I was obliged to hitch on the third horse, when I was able to go on steadily with the ploughing. The next day I sent my man with the three-horse team, and I took two lighter horses and a chilled plough to the same land, and after gauging it to the same depth and width of furrow, I followed the other plough readily that day and the next, and the horses did not appear to have any harder draft than those on the other plough, both turning the same sized furrow, as near as any one could see, after it was done.

Now, in looking for the reason or cause for so much difference in the draft of these ploughs, we will suppose the form of both to be alike, then the diminished draft comes in favor of the chilled iron. Now let us see how much difference that might make. It takes, we will suppose, about one-third of the draft of the plough to cut and divide the furrow from the land, and two-thirds of the draft goes to overcome the friction caused by the plough carrying and turning a heavy furrow while being drawn over bare ground, as it necessarily is. Now, in the case of a hard or a soft sleigh-shoe, we see the difference between drawing hard or soft iron over bare ground to be probably fifty per cent. in favor of the hard shoe. Or turn the grindstone for sharpening a hard or a soft ax, and we find about as much difference. So then if friction causes two-thirds of the draft of the common plough, and if by having the plough made of hard chilled iron we can save half the friction, then two horses might draw the chilled plough as easily as three would the common one. We were also told that the chilled plough would outlast three or four common ploughs; but the practical farmer will see readily that where he saves a dollar's worth of plough iron because it is hardened, he will save some twenty-five dollar's worth or horse-flesh in the draft of it.

Leaves from Farming Experience—No 5.

Crops and Feeding.

To provide for 810 tons yard manure, and $4,400 wanted, we must manufacture the produce, either into cheese and butter, or cheese alone, or into cattle for the butcher. I reckon that every ton of hay, straw and grain used will make 2¼ tons manure, and every ton of green food used will make 1000 lbs. of manure, one month old, so that a cow will make 13 or 14 tons annually. The stuff grown on these 180 acres will feed 64 cows, 16 young cattle, and 7 horses, which will make plenty of manure if care is taken of it. A cow between 1100 and 1200 lbs. will eat daily in summer 100 pounds cut grass or corn, and two pounds of peas or oats ground; and when hay was used, each cow got 30 lbs of hay and 9 lbs of barley, or beans, or malt—varied every 14 days. The food and dung being analyzed by Dr. Thompson and assistants, shows that about two thirds of the nitrogen and carbon of the food was voided as manure, and three fourths of the inorganic matter was expelled as manure. See the following statement.—

A cow eating 14 days, at the rate of 100 pounds grass daily, will eat of—

Carbon	161¾	lbs.	In dung	64	lbs.	assimilated	97¾	lbs.
Hydrogen	21	"	"	7¾	"	"	13¼	"
Nitrogen	6¼	"	"	2¼	"	"	4	"
Oxygen	149	"	"	82	"	"	66	"
Ash	18¾	"	"	13¾	"	"	6	"
Water	1070	"	"	860	"	"	210	"

This shows that three fourths of the potash, soda, lime and posphoric-acid remain in the dung, and care is necessary to prevent waste by rain, air or heating; and if the food is rich, the dung will be rich. Mr. Sibson states that a ton of these mentioned kinds of food, after being converted into manure, may be worth about, say 1 ton linseed cake, $18.40; 1 ton peas, $12.60, 1 ton oats, $6.90, 1 ton corn, $6.30, 1 ton barley, $5.90, 1 ton clover hay, $9.00, 1 ton meadow hay, $6.00, 1 ton of oat straw, $2.40, 1 ton of turnips, $0.85, as manure. The values are based on the amount of inorganic materials and nitrogen contained in each crop named.

There is not much value set on the carbonaceous parts; still, carbon is of much use to start the plant strong, along with nitrogen; as when it starts with a broad thriving leaf it is able to absorb nitrogen and carbonic acid from the atmosphere.

Bell's Corners, Ont. JOHN ROBERTSON.

(Continued Next Month.)