## DEEP PLOUGHING.

BY PROF. J. J. MAPES

NEWARK, N. J., April 25

*Dear Sir:*—In my last communication, I promised to give your readers some account of my experience in Deep Ploughing. Before entering immediately upon the advantages to be derived from Deep Ploughing, it may be well to give the reasons why *ploughing at all* is necessary for encouraging the growth of plants.

The offices assigned by Nature to the soil are:

1. The mechanical sustaining of the roots of plants, and necessarily of the plants themselves, in proper position; and at the same time, that the mass of soil should be pervious to the increasing length of roots.

2. The reception and retention of the gases, fluids, &c., which Nature has supply to the soil, until the requirements of growing plants shall appropriate them.

3. Such mechanical combination of articles as shall best tend to the ready partition of excessive quantities of nutrient [illegible] exceeding nutritious matter, arising from Vegetation.

4. Free admission of such components of the atmosphere as, by combination with the constituents of the soil, cause them to undergo changes beneficial to their general properties.

It is well known that, if soil is disintegrated but to slight depths, the roots of plants, on reaching the compact or indurated portion, cease to be healthy and refuse to sustain the plant—thus meadows when seeded down with the surface only disturbed and not properly ploughed, will soon run out—for the under soil, from not receiving the influence of the atmosphere, remains *sour*, and unfitted for supplying the necessary aliment at the tender roots, consequently the plants die. If meadows be deeply ploughed, they will last much longer without reseeding; and, where both subsoil and deep surface ploughed, the instance has not yet occurred where reseeding became necessary. Lucerne (French Clover) will grow forever, two and sometimes three years, or shall [illegible] food; but if [illegible] some parts of France, it has [illegible] to flourish with increased vigor for forty years. When Lucerne fails, [illegible] server will find that its roots have not had soil that has not been disintegrated.

This effect is common to all plants, and no error is more common than to consider the length of roots of plants. The roots of ordinary Corn stalk will average 5 to 6 feet in length; and if a field be planted with Corn in hills 4 feet apart, no portion of the soil, to the depth disturbed by the plough, of one inch cube, can be found that does not contain roots. Many of them are too small to be discerned by the naked eye, but still they exist, and found in [illegible] the only part capable of receiving nutriment. Even the common Onion has roots 18 inches long, and many of these will descend to their full length if the soil has been sufficiently disintegrated. The roots of most plants descend generally on an average of two-thirds their length, a portion only maintaining the horizontal position.

Soil has the power to absorb and retain many of the gases found in the atmosphere until required by the growing plant, and this retention is just in proportion to the quantity of surfaces of particles exposed, and, therefore, an unploughed [illegible] not avail of this action, nor can shallow ploughed land receive as much benefit from this cause as that more deeply disintegrated. The rationale of the above will be plain in a future letter.

Compact soils will not permit the water resulting from rains to enter them, and shallow-ploughed lands will hold a [illegible] quantity of water near its surface, from deeper disintegration it might pass downward to a sub-soil capable of receiving it. Heavy lodgement of water about the roots of most plants is detrimental to their growth, while large quantities passing over their surface without being received will carry off the more valuable portions of the manure.

Growing plants not only receive but throw out matter from their roots, for they reject certain portions which are termed excrementitious: these, in well disintegrated soils are got rid of, but when shallow-ploughed they remain on the impervious soil, and from their proximity to the roots, injure the plants.

All soils are improved by continued contact with the atmosphere and many constituents of the soil are useless to plants until they have been thus operated upon; the particles of soil have also the power to absorb the resultant gases of the decomposing manures, but only after disintegration; and as these gases, if not absorbed will be carried off by currents of wind, it becomes necessary in economical culture to prepare as much soil for their reception as may be required, and this quantity is found to be greater than can by possibility be rendered pulverulent by surface-ploughing, even when performed to the full depth of ordinary surface soil. I have proved this fact fully; for such parts of my farm as were thoroughly ploughed to the full depth of the loam, say seventeen inches, did not give as good crops as other parts where the subsoil had been disturbed to a still greater depth by the sub-soil plough run in the bottom of the furrow left by the surface plough.

The advantages of sub-soil ploughing I shall reserve for my next letter; but to return to those of deep surface-ploughing.

No farmer can doubt that a deep soil can yield better crops than a shallow one. Let us suppose, then, a soil to be 8 inches deep and underlaid by clay, and that the farmer should plough to the depth of 8½ inches, and thus bring up half an inch of clay to be acted upon by the atmosphere and rendered into good soil; that the clay will undergo this change even in a single year, he cannot doubt, if its proportion be no greater than stated above. Let this practice be continued four years, and the soil will then be 10 inches deep, and when at that depth, an inch instead of half an inch of clay may be added each year without his discovering that his land is any more cloggy than before he commenced the deepening; but its power to produce plants will materially increased. If she ploughing be done in the Fall, and so performed by back-furrowing as to ridge the land, two inches of clay instead of one may be safely thrown out on the surface of these ridges, and the frequent freezings and thawings of Winter will render it perfectly pulverulent by Spring, and charge it with the necessary constituents of ammonia and carbonic acid from snow-water to enable the clay so changed to form a valuable addition to the mass. The farmer should bear in mind that the ultimate constituents of plants are never destroyed; for when a plant is consumed, decays, or is even burned, its ultimate particles are thrown again on the face of Nature for re-appropriation. The consumed crops of 1849 will supply the raw material for the manufacture of those of 1850; and he should have his soil in a condition to receive his share of Nature's bounties.—*Tribune.*

## Turning in Green Crops.

The stage at which crops turned into the soil would be of the greatest value as manure, is a point of considerable importance. Heretofore it has been a common opinion that plants produced the most beneficial results in their prime, when they had attained their greatest bulk and weight, and hence the field has been diminished from [illegible] experiments have shown that when a large bulk of green vegetable matter is placed in the soil, the sap runs into the acetous fermentation—product great and injurious to growing crops.

Andrew Nichols, of Danvers, Mass., stated to the members of the Essex Ag. Society that he had a good corn fodder in the month of September, and had it carefully buried in the soil by the plow. The result he says, was no benefit to the land, the loss of the corn plowed in, and half the crop of corn planted thereon the succeeding year. He attributes these acts on the following ground: "The stalks had fermented, and have converted chiefly, into alcohol and carbonic acid—the former evaporating, and the latter uniting with the alkaline or earthy constituents—forming salts [illegible] than their bases, as they existed in the soil previous to their coming with the soil."

We have heard similar results from plowing in [illegible] and [illegible] Hence, [illegible] plowing in Clover.—*Cultivator.*


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