thousand on which a deep, mellow, and productive soil can be found, without breaking the *pan*, or compact mass that lies just below the surface of the ground.—So far as the warm atmosphere can freely penetrate, with its oxygen, carbonic acid, ammonia, and vapors, chemical action will be extended, roots will grow and rot, and a fertile soil be gradually developed. The benefits of deep tillage do not all accrue immediately after the operation is executed. The formation of a deep mellow, and rich soil, by the most skilful use of natural elements and agencies, is the work of many years.—To attain this result, one needs not only mineral and organic matter in due proportions in the surface of the earth, but both minerals and mold of particular kind, and in a particular condition of solubility and combination.

After a man has deliberately made up his mind that it is better to own and cultivate good land than poor land, and that there is such a thing as improving the natural fertility of the earth, his first thoughts should be directed to the point, whether any field, or part of a field, needs draining. Stagnant water within three feet of the surface will rise by capillary attraction to a degree fatal to that warmth and friability of the soil, without which its highest productives can never be reached. All under-draining should be into ditches at least three feet deep. But there are millions of acres of tilled land that need no artificial drainage, which will be greatly improved by deep, or sub-soil plowing. The advantages of this mode of culture are the more speedy and decisive, as the manuring, liming, and ashing of the land accompany the breaking up of the inert mass of clay or gravel below the surface soil. It is not pretended that this dead earth will instantly become fertile. Admitting that the comminuted clay really contains salts of lime, potash, soda, magnesia, and soluble silica, it takes time to prepare these fertilizers for the nutrition of cereal plants. Salts of iron and alumina, such as copperas and alum, are apt to exist in excess, and require a little caustic lime to decompose them and form gypsum, or sulphate of lime. Plants that contain considerable nitrogen, such as peas and clover, and of coarse yield a liberal per centage of the alkali called ammonia, when they decay, are exceedingly favorable to the deepening of a thin soil, in connection with deep plowing. Every farmer should understand the difference in the economical value of vegetable mold. Suppose one has 100 lbs. of cabbage, exclusive of water, in one heap, and a like weight of pine saw-dust in another. Which will form 50 lbs. of the better mold? The solid organized matter is alike in each mass; and why should their be any difference in the economical value of 100 lbs. of cabbage or 100 lbs. of saw-dust, either for feeding cows and children, or feeding wheat and corn plants?

In principle, there is no difference in feeding animals, from man down to a coral or sponge, and feeding plants. All living beings need food adapted to their peculiar natural wants. Hence, place a baby oyster in saline water that contains not a particle of lime, and its stony covering must cease to grow. Nature is incapable of creating the first atom of lime, or of any other element consumed to form any plant or animal. A deep, fertile soil, is one that abounds in the raw material for making bread, milk, and meat, in an available form, to the depth of twelve or twenty-four inches, as the case may be. Is there anything unreasonable in saying that such a soil possesses a very great intrinsic value? A cubic foot of such land in the valley of the Genesee contains, on an average, over a pound of common lime, This gives over 43,000 pounds of this mineral to an acre, within twelve inches of the surface of the ground. The writer is credibly informed by one of the best farmers in the State of Delaware, that a million bushels of burnt lime are now annually used for improving the soil in that small State. One farmer pays a $1000 a year for guano.

In the last number of the working farmer we find statements in regard to sub-soiling, from which we extract the following. James Carnahan, President of Princetown College, states the results of an "unintentional" experiment he made in 1848, in sub-soiling.

"I wished," said he, "to sub-soil a lot in soil with a hard pan, and as I had only one team, I hired another to turn over the sod preceding the sub-soil plow. He came and worked one day, but did not return the next. As the time for planting was approaching, I directed my farmer to go on and plow in the common way as deep as he could. He did so. The following day the other plowman returned, worked a day (sub-soiling) and then was absent.

"The result was, the lot was plowed alternately with the common plow and the sub-soil. The whole lot manured and worked in the same way, except the sub-soiling of some parts and some not. The month of August was dry; the corn in the sub-soiled suffered very little; and that on the part not sub-soiled suffered very much.

"When the corn was gathered we could distinguish the very row where the sub-soiling was commenced and ended—*the ears were more numerous and of a larger size.* I did not measure the corn nor the ground, but the difference was so obvious to the sight, that no one could doubt the superiority of the corn on the ground sub-soiled.

"This year the whole of my corn ground was sub-soiled, and the yield was very satisfactory. The month of July was dry and hot, and the leaves of my corn did not shrivel, while those in the adjacent fields rolled up."

Every farmer knows that a deep, friable soil will take up more rain water without detriment to the growing crop, than will a shallow, compact soil. For a similar reason, moisture from below will more readily ascend in dry weather and supply the roots of needy plants with their liquid aliment. But, do not forget that a soil sixteen inches deep requires twice as much mold as one only eight inches in depth. Now, the richest mold is that formed from the carcass of a dead horse or sheep: but as such organic matter is attainable only in homœpathic doses, the farmer should test his skill in producing mold from clover, peas, corn, grass, and other vegetables, to mix with his sub-soil. Beware of the folly of spreading farm labor over too large an area for the highest permanent profit.—Fifty acres of good land are more valuable than 200 of poor land.—*Genesee Farmer.*

HARROWING WHEAT IN SPRING.

In none of the improvements in agriculture do I find farmers so slow to believe as in harrowing wheat, after the ground has settled in the spring. Some ten or fifteen years ago much was said on this subject in the Genesee Farmer, showing the results of experiments, and explaining the reasons why it should operate beneficially upon the crop.

Farmers know that a hard crust forms upon ground exposed to the frosts and drying winds of March and April, and that this crust greatly retards vegetation.—But the great objection is, it will pull up all the wheat to harrow it. Having practised harrowing my wheat for the last eight or ten years, and uniformly with good effect, I feel disposed to recommend the practice to my