

soil buried last fall to the surface. The drags, harrows and cultivator, will then leave the whole with a perfect seed-bed; the former under-soil will be again under, but will now have gathered a stock of nitrogen and ammonia from the air, and will be in the right place for the roots of the new crop to penetrate and derive nutriment, and the result will show the benefits obtained in the shape of a plentiful return. We well recollect the time when deep cultivation was first publicly discussed, not in agricultural papers, for there were none then, but in ordinary publications, and in such few books on the subject as were then to be had. The arguments appeared to the father of the writer of this article so sound that he determined to carry them out, but he did not consider that present mischief might arise from a deeper cultivation than had been usual. A twenty-acre field was first submitted to the process, the soil was a black sandy loam, which had been greatly run out, and from this cause, though naturally good, was very poor, and the tradition in the neighbourhood was that the soil leached, and that all the manure went through it in about two or three years. Very well, said our amateur agriculturist, if it goes through it must be down there somewhere, and I will bring it up, so he ploughed as deep as ploughs would then be made to go, with four large, heavy English cart-horses dragging them—probably nine inches, and on the soil so brought up he sowed vetches, then a new and almost unknown agricultural crop in the part of Britain of which we speak. The vetches came up well and grew splendidly, but with them came also a wonderful crop of a pest almost unknown in Canada (except in the County of Perth), namely, wild oats. These were in such quantities as to be a crop in themselves, and as cattle and horses would not eat them readily they all went to the manure heap. The vetches were cut green for soiling, and, of course, the oats with them, and so were, in a great measure, got rid of, but they became far more plentiful on the farm afterwards, and were very mischievous.

Other people ploughed a little deeper only than common, one brought up an immense crop of charcoal, or wild mustard, another a crop of poppies, another wild spinach, and so on, according as the land contained the seeds of any particular weed, and with all those who did not "think" deeper ploughing than usual was promptly condemned. But the next few years altered matters. The fields which had been deeply ploughed seemed to have received new life, and a considerable increase of yield was the consequence. Now, the mischief which arose in these experiments was chiefly caused by want of the replacement of the soil which had been brought up into its former position, after it had been aerated and ameliorated by the influence of the atmosphere. Had this been done, the wild oats, poppies, &c., would have stood quietly below the surface, and would not have germinated in such immense quantities. The good would have been done without the evil, and all would have seen the benefits of deep cultivation, instead of condemning it. Another instance happened on the same farm. Planting trees became nearly as much of a hobby as deep ploughing, but it was stated in the same work which advocated the deep ploughing, that, for replanting, the ground must be trenched to two feet deep. Accordingly, about a quart of an acre was trenched, the surface soil was buried, and the sub-soil soil brought to the top, and the trees planted. They were set deep, and in the manner of nursery trees, and did well enough, but the surface of the soil was so poor that even weeds would not grow, so the trees were kept clean with very little trouble, but after a while they had to be planted out, and then the ground was restored to its original purpose of a farm garden, but, although manure and cultivation were not spared, nothing would do well, and, finally, the ground was trenched and the old surface-soil brought back to the light. Then the benefits were shown. Monster carrots, parsnips, and cabbages were the result. Such crops of potatoes as were never before heard of were grown, and the trenched ground was considered the best on the place.

It cannot, therefore, be doubted that in all these cases deep ploughing ultimately benefitted the land. The soil spoken of in all these instances was good though that where the wild oats grew was considerably worn out. Still it was good, and continued good to a considerable depth. But there are cases where deep ploughing is not only mischievous, but positively ruinous, unless the farmer means to make a new soil altogether; such as where the land on the top is tolerable, but lying on a poor wet sand or gravel, or where the subsoil is (as it sometimes is) absolutely inimical to good crops. In these cases great care must be taken to keep what you have that will bear a crop in such a position that it can bear one, and deep ploughing must not be practiced until

the subsoil has been thoroughly drained, or so gradually exposed to the influence of the air as not to lose too much of present benefits whilst aiming at future good.

Deep and shallow ploughing must remain as ever a matter of judgment, but let the farmer bear in mind that when he has a deep soil, deep ploughing is certain to benefit it, provided due precautions are used. Where he has a poor, thin soil he must proceed more slowly; but even there he will find it his interest, year by year, to increase his tilth, if even by half an inch at a time, taking care to add manure in proportion to the new and poor soil that he brings to the influence of the light and air.

Let him try the effect on a small scale; let him pause, think and reflect. Let him keep a diary of his operations, and a record of his experiments, and experience will soon point out the best course to be pursued. We have all seen portions of the farm assume sudden appearances of fertility or of barrenness, as the case may be. A record of operations would always show the cause of the benefit, and also act as a warning to avoid the error, which had been followed by want of success.

### Plaster for Grass and Other Crops.

PLASTER may be sown on meadows and pastures during May. It should have been sown, however, in April, but where it has been neglected, good results will follow by spreading it upon the land now. We suppose in this enlightened age there are few farmers that object to the use of plaster as a top-dressing on grass lands. Occasionally we find persons who do not like to use it, and who are afraid that it exhausts the land, and will soon run out the farm. Such persons do not read the agricultural papers; they don't believe that any good can come out of printed matter, that touches upon farming. They are about forty years behind the times, work hard, get small crops, and are eternally complaining of "bad luck." If they keep a dairy, they usually belong to the class of 300 pounds dairymen, not that their personal weight will turn the scales at that enormous figure, but that the average annual yield of cheese from their herds is about 90 pounds per cow. It is hard to convince these old-fashioned gentlemen that cows can be made to produce annually 600 and 700 pounds, and when statements are made to that effect, they are viewed with an incredulous disgust which says, "these are the stories of the agricultural papers and book farmers." Well, the tax gatherer is going to visit these old-fashioned farmers and present an argument that will be likely to be remembered. A kind of waking-up argument to produce more grass, more milk, and larger crops. When one finds an absolute necessity staring him in the face, he begins to look around for means to meet it; and so, perhaps, our increased taxes will serve a good purpose after all, in making us better farmers—in teaching us the necessity of getting better returns, and pushing us forward to devise ways and means to obtain these ends.

Several years ago we remember hearing an old dairy farmer argue the plaster question in this wise. He had a good upland farm, and was somewhat noted for keeping a large stock, and getting a heavy yield of cheese from his herd. He sowed plaster liberally on meadows and pastures, but was not thoroughly convinced that this top-dressing was an important element in his success. He was inclined to believe that he was wasting money and labour, and so for some years he abandoned the use of plaster on his farm, but the result was very unsatisfactory. His herd dropped off in their product 100 pounds of cheese per cow. The meadows did not yield sufficient hay for wintering stock, and fodder had to be purchased. In fact, said he, I found I had been an old fool, and was glad to get back again in my old tracks.

Now, perhaps, the same results could not be had on all farms, nor in all we have said do we wish it to be understood that the farmer is to place his whole reliance upon plaster, or that by its use he can get along without other manures, for plaster properly is not a manure in the full sense of the word. It does not enrich the land, but induces plants to better appropriate fertilizing material, and prevents the waste of matter that can be made available in the various processes of vegetation. The action of plaster is not fully understood, it acts partly as a manure, feeding the plants with its sulphuric acid and lime, and partly as a stimulant, hastening by its lime the decay of vegetable matter in the soil. Its constituents are in 100 parts, as follows: Water, 21; lime, 33; sulphuric acid, 46. It attracts ammonia from the atmosphere, and retains it for the use of vegetation. This fact is put to a practical use by some observing farmers. We remember hearing at a club meeting of farmers, one of the members remark that

he knew of a very shrewd operator in his neighbourhood, who, when his neighbours chanced to be spreading manure in fields adjoining his own, always commenced sowing plaster, and in this way was actually benefitted at his neighbour's expense. He said he had frequently noted the effect of such sowings, and it was a convincing argument to him to use plaster immediately after top-dressing his grass-lands, since he did not care to be at the labour and expense of enriching his neighbours' fields, by allowing the better portions of the manure to be evaporated and carried in the atmosphere for the use of somebody else.

The effect of plaster on large leaved plants is more marked than on others, hence potatoes, corn, and vines, etc., are greatly benefitted by its use. Its influence on the clover is extremely favourable to the growth of that plant, and it is on this account, therefore, which renders it so valuable on dairy farms for the production of milk. Plaster makes clover, and clover makes milk. In the application of plaster to grass lands there is a difference of opinion among farmers whether it should be applied annually, or every alternate season. Some follow one practice, and some the other. When applied annually, of course a lighter coating can be used. The quantity per acre will depend something on the land; if a considerable proportion is already in the soil, a less quantity is needed, and the soil may contain so much as not to be effected by its use. It is applied with good results at the rate of a bushel per acre. Some use considerably more, and soon learn to adapt the quantity to the particular location so as to produce the best returns. We have always found the best results from plaster on grass lands when applied early in the season, so as to get all the benefit of the spring rains, or before grass starts in the spring. When used later, it is always best to sow just before a rain.

Some farmers say that its application late on pasture lands, and at a time when it is not followed by rains, but remains on the grass to be partly consumed by stock, is injurious to milch cows. They claim that it induces a complaint known among dairymen as "fly in the teat," or a gradual stoppage of the milk passage of the teat, and of course destroying that portion of the bag. We have been assured by dairymen whose herds have been badly afflicted with this trouble, and who claim to have given the matter special attention, that it was plainly traced to this cause. We give the suggestion for what it is worth without endorsing it, but it would be well to be cautious about sowing plaster at such times, since its consumption by stock can do no good, and may possibly be of injury in the way alluded to.—*Ulster Herald.*

### The Late Mr. Fowler and the Steam Plough:

On Thursday week a paper was read at the Institution of Mechanical Engineers, Birmingham, on steam ploughing, which was commenced by the late Mr. John Fowler a few weeks before his death, and finished by his coadjutor, Mr. David Greig, who conducts the works in Leeds. The cause of Mr. Fowler's first entering on steam-ploughing, was his invention of a system for laying down drains by means of an instrument which first bored a hole any convenient depth in the soil, and then drew after it a long string of drain pipes. This led him on to solve another problem—why not go further, and plough the land by steam? Then came the great question. How is this to be done?—by a rotary digger? by a steam plough coupled direct to the engine? or by an engine communicating by ropes to the plough? Mr. Fowler's practical mind soon solved the question as to which was the right plan to adopt, and then came years of experiments to demonstrate and develop the system to which his name will ever be attached. It will hardly be necessary to say that the system, as perfected by Mr. Fowler, consists of, first, a steam-engine working on the headland; second, an endless rope stretched from the engine across the field round a drum, so secured on a moveable frame that, while it is able to resist the pull of the rope, either in the backward or forward motion of the plough, it is also self-acting along the other headland at the same rate as the engine on its headland; third, a balanced machine, containing two different series of ploughs, which are used alternately in crossing and re-crossing the field, the weight of the man who guides the machine being sufficient to elevate the one and depress the other, or vice versa and the shares, five or six in number, being so arranged that the soil is wedged off in alternate slices. The perfecting of this system, which Mr. Fowler lived to see, is a long history extending over some fifteen years, and explains many reasons why steam-ploughing has not become universal. There is the usual history of development, great