

soils is so great, that the value of the corn reaped from them is often not sufficient to pay the farmer for his trouble.

How could these heavy clay lands be rendered lighter and more cheap to work?—By draining, subsoil-ploughing, and by the addition of lime or marl when it is required.

Would the land after this treatment also give greater crops of corn?—Yes. Not only would it be more cheaply worked, but it would yield a greater number of bushels of wheat per acre than before, and would grow green crops in addition.

Would this increase be sufficient to pay the cost of draining?—Yes. The cost of draining clay lands is generally paid back in three, or, at the utmost, in five years, and the crops still continue greater than before.—*Johnston's Catechism of Chemistry and Geology.*

EFFECT OF CROPPING UPON THE SOIL.

May a soil which is naturally fertile be rendered barren by continued cropping?—Yes. If the same kind of cropping be carried on for a long time, the land will gradually become less and less productive.

Give me an example?—If the same field be cropped year after year with wheat or oats, it will at last become unable to grow either of these crops.

Why is this?—Because these crops draw certain substances from the soil in great abundance, —and after a number of years the soil cannot furnish these substances in sufficient quantity.

What substances does grain especially draw from the soil?—The grain of our corn crops especially exhausts the soil of *phosphoric acid* and of *magnesia*.

How would you remedy such special exhaustion?—By returning to the soil the particular substances my crops had taken out.

How would you return the phosphoric acid for instance?—I would apply bone-dust or guano or some other manure in which phosphoric acid abounds.

But with any kind of cropping, may not a fertile soil be at length made an un-productive?—Yes. If the crops are carried off the land, and what they draw from the soil is not again restored to it.

How is this explained?—Every crop takes away from the soil a certain quantity of those substances which all plants require. If you are always taking out of a purse it will at last become empty.

Then you liken exhausted land to an empty purse?—Yes. The Farmer takes his money out of the land in the form of crops, and if he is always taking out and putting nothing in, it must at last become empty or exhausted.

But if he puts something into the soil now and

then, he may continue to crop without exhausting it?—Yes. If he put in the proper substances, in the proper quantities, and at the proper time, he may keep up the fertility of his land—perhaps for ever.

How much of every thing must the farmer put into his land to keep it in its present condition?—He must put in at least as much as he takes out.

To make his land better, how much must he put in?—He must put in more than he takes out.

But if he is to put into the land as much or more than he takes out, where is his profit to come from?—His profit consists in this, that he takes off the land what he can sell for much money, and he puts in what he can buy for comparatively little money.

How do you mean?—I mean that if I sell my oats, hay, or turrips, I get a much higher price for them than I afterwards give when I buy them back again in the form of horse or cow-dung.

Then the farmer can really afford to put as much upon his land as he takes off, and yet have a profit?—He can. He puts in what is cheap, and takes off what is dear.

What do you call the substances which the skilful farmer thus puts into his land?—They are called *manures*,—and when putting them in, the farmer is said to *manure* his soil.—*Ibid.*

In a recent communication Mr. J. Beadel, a very experienced farmer and a land agent of Witham, in Essex, (who has used a fork of an improved construction to a considerable extent), observes, when comparing the use of the fork with that of the spade:—

1st. A man can dig a greater quantity of land in a given time with the fork, than he can with a spade, my experience proves one-sixth, and it strikes me, it must be so, because the chisel-pointed ends of a three pronged fork, can be more easily pushed into a hard subsoil, than the continuous end of a spade.

2nd. It does not bring up so much of the subsoil as the spade, but mixes the earth more, a great portion slipping through between the prongs.

3rd. The bottom is left more uneven and broken by the fork than by the spade, which I consider an advantage. One great objection to the plough is, I think, the smooth glazed surface which it leaves below, and which in many cases I fancy, presents too great a resistance to the delicate fibres of the plant. This is *heterodox*, but if true the plough will be altered *one day*. And if Mr. John Morton be correct, that in most instances the present surface soil is nothing more than a portion of the subsoil improved by cultivation, it must be right to increase the quantum of corn-growing earth by subjecting more subsoil to the same operation. In digging, I sometimes use the fork in the furrow, and then plough on to