If my readers will look at the accompanying sketch of a plough at work, they will see at once that there is no injurious angle formed, such as Mr. Sanborn blames, but " the two hooks support the chain-traces, just below the exact line of draught; if above that line the force of the draught would be thrown as a strain upon the groins of the horse, by means of the back band." See Stephen's Book of the Farm, page 158, vol. I, cd. 1850.

Let any one compare the sole of two furrows, the one cut with a wheel-plough and the other with a swing plough, and he will not long hesitate as to which of the two implements he should assign preference.

Experiments were also tried with coulter less ploughs, and the draught was shown to be less than when a coulter was used. The favourite furrow seems to have been one 7×14 inches, but as the draught of this required three horses, - to 450 pounds-I presume it would only be done in cool weather: the middle horse suffers dreadfully in hot weather,



A SCOTCH PLOUGH AT WORK.

as the Omnibus proprictors found in 1830, when they tried that style of team. In London, they soon fell back upon the pair, though in Paris, I believe, three horses are still used abreast. "All the three factors discussed, the truck or wheel, the coulter, and the width and depth, make a saving of 49.7 per cent.; or, to put it in another way, a plough with wheel on, coulter off, and ploughing a good-sized farrow, will give this percentage of gain when put against a plough with coulter and wheel off, and turning a shallow narrow furrow.

What shall we say about this question of furrow width? How, I ask are the harrows to get hold of land when the furrows are laid over as flat as Mr. Sanborn recommends? Mr. Lunan, of Sorel, one of the best farmers I have met with in this province, aims, he told me last year, at making his man hold the plough, in stubble-land, 8 ~ 9 inches, I believe in 7×10 , or 8×11 , and here comes Professor Sanborn with his three horses and his 7×14 inch furrow. We cannot all three be right! I grant the professor that the absolute draught in a 7×14 inch farrow is less than in a 7×10 -inch, because the dynamometer says so, but is minute subdivision to go for nothing? Is the complete pulverisation of the land secured by the use of the digging fork no better than the lumpiness of a spade dug plot? A. R. J. F.

In the following extract, C. S. makes the usual mistake which Lawes and Gilbert have done so much to correct. He evidently thinks that an analysis showing the constituents of a plant is enough to show what manures should be applied to the soil to grow a crop of that plant. Professor Robert's caution is, as almost everything he says in public is, full of sound sense.

(Answer by Prof. I. P. ROBERTS of Cornell.)

C. S. asks-Is the phosphoric acid in South Carolina rock worth as much as the same in fresh animal bone, and if not, why not? Also how much plant food is carried off the land by one ton of various kinds of crops?

it is ground fine; while fine ground bone soon gives up to the soil its phosphoric acid. Phosphoric acid made soluble by being treated with sulphurie acid is just as valuable when

procured from rock as when procured from bones. The plant foed carried off by the removal of one ton of the crops named below is as follows:

| | Nitrogen. Ibs. | Potash. | Phos. Acid. |
|-------------|-------------------|---------|-------------|
| Timothy | . 31.0 | 40.8 | 14.4 |
| Clover | 40.1 | 36.6 | 11.2 |
| Wheat | 41.6 | 10.6 | 15.8 |
| Oats | 38.4 | 8.8 | 12.4 |
| Wheat straw | 9.6 | 12.6 | 4.4 |
| Oat straw | 11.2 | 17.8 | 3.8 |
| Potatoes | 6.8 | 11.4 | 3.2 |

C. S. says: " If I knew just how much of each element was required to grow a crop, I think I could use commercial manures with more profit." That may be so; but remember hat you have another problem to solve, for you must know .chat is in the soil and available, as well as what is removed from the soil. Here, the chemist can give you but little or no assistance. The farm, your farm, is the place where this knowledge is to be gained. There is no use of dodging these questions any longer. The complex and more difficult problems must be attacked by the experiment stations, while the simpler and local ones must be solved by every farmer on his own farm.

Treat one plant to phosphate, another to potash, another to nitrogen; then mix two or three elements of plant food together in varying quantity, and then find out what kind and quantities of the elements desired are present, and what deficient.

It is a great thing to have got an agricultural chemist to see that, beyond a certain point, nothing but experimental practice can guide the farm. I fancy Ville was the first to confess that in this, as well as in numberless other cases, Lawes and Gilbert had been right from the beginning. The whole foundation of their teaching rests upon this, and, I am very glad to see how very generally the principle is being carried out.

I am only surry that Professor Roberts did not add our aparte to the Carolina Rock, in speaking of its indissolubility. I hear a new method of utilising the former is about to be brought forward : what it is I do not yet know, but I shall look sharply after it when it makes its appearance, and if it is worth any thing I will let my readers know, if not-.

Wheat.-The average crop of wheat in England for the year 1887, was thirty-two bushels an acre, and the price four shillings and four pence a bushel; equal to thirty-four dollars an acre. The crop of the United States yielded ten and a-half bushels, at an average price of, say eighty cents a bushel, equal to eight dollars, fifty cents. Thus the value of an acre of wheat in England exceeded the value of an acre of wheat in the States by twenty-five dollars, fifty cents; or, in other words was just four times as valuable. I do not think the English farmer is falling back in his cultivation of the wheat erop, and I fear that, low as is the price, it will be some time before he feels much anxiety to invest his capital in the purchase of the worn-out farms of the New-England States.

FRUIT

Champion grape. - Mr. Pattison, the most successful The phosphorio acid in South Carolina rock *untreated* grape grower of the province, still holds the opinion that the *utili* sulphuric acid is not worth as much as that found in Champion is the most profitable grape to grow. At his place, bones, because it is almost insoluble in the soil, even though Clarenceville, E. T., the vince frequently yield as much as