

It would appear, then, that in order to restore our fields to such a condition as will give heavy crops we must return to them ample supplies of lime as well as its phosphates. A judicious use of these with such a system of cropping as will largely increase the supply of humus is necessary. If the land remains several years in grass, in each rotation, the amount of humus or organic matters will be largely augmented and give increased supplies, both of carbon and ammonia, provided the grass be consumed at home, and the manure of the farm be carefully saved and distributed.

If, however, farmers and planters will persist in putting their fields in grain or tobacco every other year, or two years out of three, they will find it necessary to supply ammonia and phosphoric acid, or manures which will produce them. But even with these additions *very* heavy crops are not to be raised continuously for a long period from a soil containing an insufficient supply of humus.

The bad effects of hard cropping are so gradually shewn, as often to escape the notice of cultivators, until serious mischief has been done.

The crops begin to fail in amount after sometime, more especially during unfavorable seasons. It is common to charge it all to the season, or to disease, or the ravages of insects; and it is unfortunately too true that the farmer's hopes are sometimes blasted by these causes, even upon soils abounding with every requisite. It is equally true, however, almost always, that in the most exhausted soils the yield of the crop is proportionally most impaired by the above named causes.

I have been often asked within the last twenty or thirty years, by agricultural friends, "why it is that in certain districts the cornstalks and wheat straw grow as luxuriantly as ever, while the yield of grain is much less than in former years." The answer is obvious, that by a long system of hard cropping, a deficiency of phosphoric acid and humus has been produced, and consequently the plant is deprived to a great extent of matters essential to perfecting the grain.

The various substances available as manures, or capable of enriching the soil, will be noticed in subsequent chapters; but it is necessary to refer to the action of some of them in this place.

Lime, in several of its combinations, has been advantageously applied to land from a very remote period. According to Pliny it was in use in Germany at the period of the Roman conquest, in the form of marl.

Its uses are two-fold—

1. It is one of the essential constituents of plants,
2. It acts chemically upon both the organic and the mine-