a mode of manuring be found easily practicable, more skiilful mixtures than those of Vietor, (such as would be more certain to succeed, and such as would be fitted especially to aid the growth of this or that kind of crop,) could easily be suggested.

In illustration of this opinion, I will here briefly state the facts from which I am led to believe that considerable benefit may in reality hereafter accrue to practical agriculture, from a careful study of the effect of certain known steeps or prepared mixtures upon the after-growth of the seeds upon which they have been tried.

1. The quantity of inorganic matter contained in the grain of wheat, oats, barley, &c., is comparatively small. In wheat and barley it varies from 1½ to 2 per cent. of the whole weight; in oats it is about 3½ per cent., but a considerable proportion of this is contained in the husk with which the oat is usually invested. But, though small in quantity, this inorganic matter is absolutely essential to the perfect condition of the seed, and to the healthy growth of the plant that springs from it.

2. When seeds are steeped in water, they swell and increase in bulk. They absorb a portion of the water and of any saline substances it may hold in solution. Now, if the small quantity of saline or inorganic matter which exists in seeds does really promote their growth, may not a larger quantity promote it more? May not the growth be more luxuriant if the seed be steeped in water containing saline substances in solution, and be thus made to absorb an additional proportion? It does not appear unreasonable to suppose that a bushel and a half of seed wheat may be made to absorb a pound of saline matter. This appears, indeed, to be only a very small quantity, and yet, if absorbed, it would add one-half more to that which the seed naturally contains. We cannot pronounce beforehand, with absolute certainty, that by this absorption the growth of the seed would be greatly promoted, though both theory and practice concur in rendering it probable. Thus the experiments of Bickles (whose mode of preparing seeds appears to be a simple steeping in saline solutions) appear decisive in favour of the opinion that such artificial additions to the saline matter of the seed do really, in some cases at least, greatly promote the growth of the seeds, and increase the luxuriance and produce of the after crops.

The fact that saline manures are beneficial, in many cases to the growing crop, when merely applied to the soil, is in favour of the same view. The salts, it is true, when applied to the soil, enter the plant by its roots; but, nevertheless, their action is simply to yield saline matter to the plant in larger quantity, than it could otherwise readily obtain it from the soil. This additional supply might be given it, to a certain extent, by steeping the seed itself.

3. Further, we know that some seeds germinate much more rapidly and certainly than others. We know, also, that the proportion of inorganic matter, or of ash they leave when burned, varies in different samples of seeds of the same kind. That contained by wheat, for example, is sometimes 1½, sometimes 1¾, and sometimes nearly 2 per cent. of its weight. Can this difference in the growth of seed and the difference in the proportion of saline matter, have any connection with each other? Do some germinate feebly, do others fail entirely because they contain too small a proportion of the usual saline constituents of the seed? Would they germinate better if more were by some means given to the seed? The same experiments of Bickles, upon the effect of steeping, seem almost to answer these questions in the affirmative; they at least, render it very probable that some such relation does exist between the two differences to which I have alluded The same may also be said of the observation made by Mr. Fleming, of Barochan, that seed wheat, which had been dressed the previous year, with certain saline substances, grew more luxuriantly, and gave a better crop than that which, though grown on the same field, had not been so top-dressed. It is not very unreasonable to suppose that this better growth of the dressed seed might be owing to its having obtained, from the substances applied to the soil, a larger proportion of saline matter than that to which no top-dressing had been applied. Still these circumstances only render probable the opinion to which I have adverted. They point out, however, new series of researches, both in the field and in the laboratory, by which the opinion will be tested, and either refuted or confirmed. In the field, experiments must be made with different seeds, dressed and undressed. In the laboratory these seeds must be examined, the proportion of inorganic matter they respectively contain determined, and if this inorganic matter be equal in quantity in seeds exhibiting different powers of germination and growth, the difference in the kind of quality, as well as in the quantity of the ash, must be more or less rigorously ascertained. By these united methods of investigation, we may hope, by and bye, to make out what are likely to be the real and constant effects of steeping upon seeds—to what kind of seeds or roots it may be applied most beneficially—under what circumstances this treatment ought to be especially adopted—what kind of saline substances ought to be applied to each species of seed, and in what proportion—and what is the nature of the influence they may be found to exercise in promoting or otherwise modifying the growth of the after-crop.

In the meantime, there are two principles by which our trial of steps ought to be regulated, by which the saline substances we may employ with advantage in our first experiments in the field and upon different crops are distinctly pointed out. In a future paper I shall explain these principles and state the practical suggestions which may be drawn from them in regard to experiments upon the steeping of roots and seeds.