soil, and the special adaptation of manures to the production of wheat.

We have been led to these remarks by the perusal of an excellent essay on the cultivation of wheat, in a late number of the *Farmer's Magazine*. In relation to the requisites for the growth of wheat, the writer observes that the plant is not one easy to cultivate, "for though it thrives in a stiff soil, it may be too hard; though it will grow in a loose sand, if properly attended to, it is easily thrown out; though it thrives in a hot summer, it may be burnt up for want of moisture; and though wet is injurious to it, it still requires, at certain seasons, considerable moisture. Indeed, it may be said to require a medium of soil, condition, and climate, to be brought to full perfection. If the soil be too poor, it is short and sickly; if it be too rich, it lodges or mildews; and no plant requires the watchful eye of the cultivator more carefully or more assiduously."

He speaks of the improvements in cultivation which have been adopted in England within a few years, and observes it was formerly thought that wheat could only be grown on strong retentive soils, but that it is now successfully cultivated on nearly all light soils as well as on strong. He says the "four-course," or alternating system of farming, "established the fact, that while the clover root was a better bed for wheat than a fallow, the sheep's treading and droppings were a much better dressing than lime or barn-yard manure; and that blowing sand could, in eight or even four years, be adapted to the production of as many bushels of wheat to the acre as the naked, open, laborious fallow, and with this difference, that on the latter there were the accumulation of two years' rent, tithes, taxes, and labour; on the former there was a stock of sheep to sell, and no labour beyond the plowing and sowing."

In this country, so far as our observation goes, no better preparation can be had for a wheat crop, than a clover-ley depastured by sheep. The action of clover on sandy soils, is to render them more compact. In the language of this writer, "such is the consolidating power of the trifolin, that the very lightest soils will sometimes become so hard as (when very dry) to defy the power even of a Ransom's or a Howard's plow to penetrate."

He cites the analysis of Sprengel, by which it appears that the principal ingredient in wheat of a fixed character, is phosphorus, and observes—"when it is considered how much of that material is drained from the soil year after year, and sold off the farm, it is not surprising that we hear farmers complain of 'old going land' and 'spent soil!'"

The most suitable manure for wheat, he believes to be bones, in connection with the droppings of sheep left while feeding on the land; and where this course of culture has been adopted, he says good farmers in all parts of the kingdom have come to the unanimous conclusion that no soil is too light to grow thriving crops of wheat, if only it be properly tilled. "In the bones, the phosphorus, which is so essential to the formation of the grain, is supplied, and the urine and dung of the sheep supply the other constituents necessary for perfecting the plant in straw and grain.—Many examples of the successful application of bones to wheat, it is said, might be related; and the experiments of Sir Samuel Crompton are referred to, "who has on a light and naturally poor sand, obtained most magnificent crops of wheat."

Bones are prepared for use as manure either by being crushed in mills designed for the purpose, or by being dissolved in sulphuric acid. The latter seems now to be considered, in England, the better course, and is being generally adopted. Prof. J. P. Norton, in a communication to the Cultivator for 1845, p. 266, gives the following mode of preparing bones with acid: The bones are placed in a conical heap on a bed of ashes, and the acid slowly poured on. Twelve pounds of acid per bushel is the quantity applied; but previous to its use it is diluted with once or twice its bulk of water. The bones will absorb nearly the whole of the acid; the outside of the heap should then be turned inside, and the whole will in a short time become soft and fit to mix with ashes for drilling or sowing.

They are sometimes applied in a liquid state, and are used alone as top-dressing. The quantity applied per acre is from sixteen to twenty-five bushels.

The writer of the essay of which we have been speaking above, has no confidence in the system of "dibbling and thin sowing," concerning which we have lately heard much; and though he thinks it certain that under the necessity of economy which at the present time exists, great efforts will be made to adopt it, he deems it equally certain that it will end in failure. He says,—"We are in possession of a series of experiments which have been made, and the results brought to the test of the bushel and scale, which shows the dibbling system a perfect failure, and which at a future opportunity we shall give."

He is in favour of drilling, of which he thus speaks:—

"The drill is the sheet-anchor of wheat sowing. The seed is deposited with the accuracy and regularity of clock-work; the quantity can be regulated to a fraction—a peck per acre; the rows are straight, parallel and regular; the depth can be adjusted to a trifle; and the whole apparatus adapted to the necessities, capabilities and circumstances of the soil and season, with the more loosening of a screw, or the turning of a handle."—Drills, he says, are in use, which "are as perfect, both for mechanism and practical effect, as a chronometer or a steam-engine." So complete is their execution, that in sowing a twenty-acre field, when the surface is favourable, "scarcely a variation of an inch from a straight line occurs in the whole piece."

We have, on former occasions, spoken of the advantages of this system of wheat culture; and have mentioned the example of Mr. Noble, of Massillon, Ohio, who practices drilling extensively, and with excellent results. Some of the finest wheat crops we have ever seen, were produced on his farm by this mode. He informs us that the longer he continues this practice, the more he is in favour of it. He has constructed a drill which operates well—doing the work with precision and despatch. We believe the system of drilling wheat is worthy of general adoption, and we hope to see it speedily introduced into our principal wheat districts.

As a *protection against smut and vermin*, the writer of the essay recommends arsenic. We have formerly used this substance as a preventive of smut, but cannot say that it was found any more effective than blue vitriol or sulphate of copper; either substance will answer the purpose well, if properly used. But for protecting the seed against insects and vermin, we think it probable the arsenic would be preferable, though we cannot speak on this point from our own experience. The following is the mode of using the arsenic:

"Take to every bushel of corn (grain) one ounce of arsenic,* dissolve it in one pint of water, adding half a pound of salt. Spread the corn on a level floor, and pour the liquor on the wheat, continually stirring it until the whole is wetted, or thoroughly damped. Then apply and mix quicklime until it is sufficiently dry to sow, and we will guarantee that not an ear of smut will be visible. The seed is also secure from crows and vermin; and the arsenic, so destructive to animal life, seems to have no effect of an injurious tendency on the seed wheat."

The average yield of wheat per acre, on a clover-ley, under good management, is put down at 30 bushels, and the expense of cultivation is given as follows:

	£	s.	d.
Plowing,	0	6	0
Sowing,	0	3	0
Harrowing,	0	1	0
Rolling,	0	1	6
Seed,	0	18	0
Weeding,	0	4	0
Straw for harvesting and all expenses up to marketing.			
	£1	13	6

This would give the cost per bushel 1s. 1½d., or about 26 cents. The common opinion, we believe, is that wheat is produced much cheaper in this country than it can be in England. This is at least questionable; at any rate we doubt whether many of our farmers can show that they have produced it at less expense than the above estimate shows. On the other hand, it is not improbable that with their

* Might not arsenic be turned to good account in corn planting, as a protection against its chief enemies, the crow and the grub?—Ed. *N. F.*