

were men of great industry and thrift; and not only they, but their wives too; their wives wrought regularly at out work, and made their sixteenpence a day—not so much indeed at that time—say one shilling a day only—but they educated the boys."

Facts like the above explain to us the reason why so few emigrants come from Forfarshire and other parts of the lowlands. The people are thrifty and happy at home, and, whilst thoroughly industrious and hard-working, they are not in a hurry to get rich, but are contented to see their sons and daughters rising to higher positions in life.

J. B. LAWES, writing in *The Albany Cultivator*, says:—Although I have taken the title of my paper from the Bible, I do not propose to preach a sermon, but simply to point out that the very existence of man throughout the world is dependent on the labour he bestows on the plants which furnish him with food; and, further, that some variety of the cereal grain furnishes the bulk of the food of almost the whole of the human race. Rice, wheat, maize, rye, barley, oats, and millet are all annual plants, belonging to one botanical family, though their exact origin, and the time when they first came to be used as food, are as equally uncertain; and more so than ever now, as from the evidence I am about to bring forward, it appears doubtful whether they could exist in a wild state.

When I first began my experiments on the growth of wheat, it was considered necessary to have several unmanured spaces in which to grow the crop. We therefore took about half an acre across the top of the field, and a similar space at the bottom, as well as about an acre down the whole length. Eventually, however, this latter area was found to be ample for all our requirements.

It is now 44 years since these plots have received any manure whatever, and the average produce over the last 40 years has been 14 bushels per acre. It is probable that the average wheat crop of the world does not exceed this amount. Much surprise has been expressed at the largeness of this yield under the circumstances, and there can be no doubt that the soils upon which wheat is grown generally are far more fertile than mine, but in the case of other soils, their fertility is for the most part shared by other plants growing with the wheat; while on my land, owing to the absence of weeds, the smaller amount of fertility liberated from the soil each year is almost entirely at the disposal of the crop.

A few years ago, when writing on the subject of fertility, I hazarded some speculation as regards the time which

would be likely to elapse before the cereal crops would entirely disappear, if the human race ceased to exist, and in the autumn of last year I made up my mind to devote the half acre of unmanured wheat then growing at the top of the field, to the test of experiment. The produce, as we now know by the threshing of the other unmanured experiments, would have been about 13 bushels per acre, and the thoughts that passed through my mind, as I looked at the crop about to be abandoned to its fate, might be expressed somewhat as follows: "My friend, for the last 40 years you have lived on the fat of the land; man and horse have alike toiled for you, you have been provided with a good seed bed, and a standing army has been kept up at my expense to defend you, while the native owners of the soil have been destroyed in vast numbers in order that you might enjoy its whole wealth in peace. Nations, we know, become effeminate under too much ease and affluence, and have been subdued, and even exterminated by more hardy races; we shall now see whether plants are subject to the same law. I am going to withdraw all protection from you, and you must for the future make your own seedbed and defend yourselves in the best way you can against the natives, who will do everything in their power to exterminate you. The only help I propose to give you is this—I will not remove any part of your family; therefore, while I shall only sow two bushels of seed on an acre of the protected ground, you will be able to sow 26 bushels on the same area."

Specimens of the wheat grown on the protected and the unprotected land have been forwarded to the editor of this journal, and an illustration is given which will speak for itself. The yield of the protected land will be in all probability about 13 bushels per acre, while the history of the unprotected land may be given in a very few words. The seed that was shed came up thickly enough, but the crop was almost completely destroyed by weeds. The winter was unusually mild, and there was hardly a day in which growth could not take place. The crop of wheat was not so much smothered, as starved, and the dense mass of couch grass—which was one of the chief weeds—seemed to be capable of appropriating every particle of food. It is quite impossible, therefore, to form any estimate of the yield, and as I wish to see what will be the result of another year's self-sowing, the crop, such as it is, will be left standing; but it would be quite safe to state that the produce of the half acre this year would not amount to more than a few pints.

Some important practical knowledge can be gained from this experiment. We see that wheat has no power to contend against the natural vegetation of the soil; we may also assume that weeds, although they may not be able to destroy a crop, yet must greatly reduce the yield throughout the world. Some weeds are far more injurious than others. Thistles, for example, and similar plants which take their food from the subsoil by tap roots, are far less injurious than plants which feed near the surface; but the most injurious of all are those perennial plants which belong to the same family as the wheat, and have creeping roots. Couch grass, therefore, which possesses all of these injurious properties, is the greatest enemy to cereal crops, and, where it abounds, wheat-growing is almost impossible.

Some time ago I pointed out in this journal that although weeds and the natural fertility of the soil might exist together, artificial manures and weeds could not exist together with profit to the cultivator. Weeds have an extraordinary avidity for artificial manures, and it gives us more trouble to keep half an acre of highly manured land clean, than five times the area of unmanured, or badly manured land.

Weeds with roots close to the surface seize upon nitric acid before the crop can get hold of it, and although we may hoe them up, and they are left on the land to decay, still they are not available as food for the crop until the following year. I think, therefore, that I shall not be in error in saying that the profitable use of artificial manures must be accompanied by a cleaner system of farming; and, further, that this cleaner system of farming cannot be carried out successfully, except by the introduction of crops somewhat similar to our root crops, on which the cleaning is chiefly done by means of the horse hoe.

THE Gravenstein apple is the best apple in the world, as all promologists agree. The other day we met the man who set the first grafts of this variety of apple in America. Mr. Corham Parsons of the Fatherland farm, Byfield, received from Europe a package of the grafts from the seedling tree. They were left at his counting-room in Boston, and he sent them to his country place in Brighton, but his overseer, having no spare stocks for them, sent them to Byfield. Our informant, Mr. H. D. Rogers, was grafting over the old trees at Byfield when the grafts arrived, but the foreman of the place seeing that they were a little shrivelled, owing to their long voyage, and that they were rather small specimens of grafts at best, refused to have