purpose. The roots are usually sown on the level, although occasionally in drills. Greystone turnips are grown for fall feed, but mangels and swedes form the bulk of the root crop. The best crops are grown in the north country. The root land is usually manured, either with barnyard manure or with fertilizer. One man I met in the south, on a large farm, made out to purchase so much oil cake, cotton cake, and other heavy feed, that he could afford to dispense with the use of artificial manures. He was a heavy stock-raiser, and hence obtained a large return to put back on his land. I believe that there are quite a number who follow the same custom, and the plan commended itself to me as a good one. Perhaps the majority of farmers, however, use fertilizer. Mangels usually get a good dressing of nitrates. On one farm, in Scotland, I found this mixture used on root land: Guano, superphosphate, and kainite, sown at the rate of eight hundredweight per acre. The mixture cost £5 10s. per ton. On the whole, larger crops are possible in England, I should say, than with us, and larger crops are grown. There are records of 1,200 and 1,400 bushels of swedes per acre. Perhaps, in this connection, it may be worth while to say that it appeared to me that some of the seedsmen have had much to do in making possible larger yields in the country. They have conducted fertilizer and crop experiments, published their results, followed selection in variety tests, and accomplished some really wonderful things in crop production. Their exhibits and methods of illustrating and advertising their work at the Royal Show were particularly interesting. Some of them have achieved a world-wide reputation, and I believe that they have done much for English agriculture.

For grain crops, the season is much longer than ours. The seed of spring grains is sown in February, March and April, and the harvest is in the latter part of August and early part of September. The temperate climate gives the grain longer to mature, and particularly in the case of oats the heads are fuller and heavier than with us. In England, the legal weight per measured bushel is 38 pounds. Fall wheat is sown about October. The land is frequently first dressed with manure, which is plowed in. It is not desirable to get too fine a seed-bed, since the rains in the winter time are apt to puddle the land. The land is generally rolled in the spring, and sometimes a light harrow is run across the rows to break the surface, and a cwt. per acre of nitrate of soda is scattered over the field. The average yield is about 30 bushels per acre; 40 bushels would be considered a good crop, but 60 bushels are sometimes obtained. The southern and eastern parts of England are noted for their barleys. The light, sandy and chalky soils of the south-east suit this grain to perfection, and barley of high malting value is grown here. It is sown in February and March, and harvests from 30 to 60 bushels per acre. About three cwt. of phosphates are used upon this grain, particularly following turnips, which have been fed off the land. Oats are grown in greatest amount in the north of England and south of Scotland. Large fields are here obtained, and it is a beautiful sight to see the thick-grown fields of waving grain just at time of harvest. I am reminded here of a Scotchman's reply to the sarcastic reference of an Englishman to the eating of oatmeal porridge by the people of the North. "Why," he remarked, "you bring up your children on the same feed that we give our horses." "Very true," remarked the Scotchman, "but I've aye noticed that in England you breed good horses, while in Scotland we breed good men." I cannot give a better estimate of the value of this grain to the country. And for the present I must close my paper, and let the Scotchman have his way.

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Improved Methods for Securing Grades in Drainage.

Editor "The Farmer's Advocate":

Mr. Good's article on simple devices for use in underdrainage work was of especial interest to me, as it recalled some of our own experiences. Our first peep-sights and homemade drainage level were substantially the same as described by Mr. Good, and, if you will permit me, I will give our reasons for adopting the modified forms we now use.

To begin with, spirit levels in themselves may not be correct. In this connection, an extract from our forthcoming bulletin on Underdrainage is to the point: "I have just measured a spirit level with a pair of callipers fine enough to measure 1-256th of an inch, and found that one end of the wood is deeper than the other by 1-64th of an inch. I supposed at first that the two ends did not season quite the same, but I found the brass plates on the ends to differ by the same amount, so that the error is probably one of manufacture. The level is two feet long, so that 100 feet equals 50 lengths of the level. Therefore, the error due to the level itself in 100 feet is 50-64ths, or pretty nearly 5-6ths of an inch. In 200 feet there would be 1 2-3 inches of an error, which is becoming rather too large, hence the level should not be used over more than 100 feet; that is, 50 feet on each side of the level. In using the spirit level for drainage work, the ends should be reversed every 100 feet; then, if there is any constant error in it, half of the errors will be in one direction, and half in the other, and these will balance, making the net result correct." I may add that in the bulletin mentioned a method is described for correcting such an error. Without peep-sights the level can be sighted equally well both ways, and a man using it, without paying special attention to the matter, will reverse it from time to time, so that the errors in one direction will balance those in the other, giving, on the whole, a correct result, although, owing to the difficulties due to refraction, he is liable to considerable irregularity from station to station. With peep-sights which could be sighted in only one direction, we felt that nearly everyone would adopt a method, as Mr. Good did, that would not involve reversing the level, and hence any constant error in it or in the sights would be always in the same direction, and becoming greater and greater as the length of the drain increased. Hence, we concluded that we must have peep-sights that would admit of sighting both ways.

In devising our peep-sights, we were of the impression that they should not be such as to fasten permanently above the level, for, when not in use, they would be almost certain to meet with accident, and become bent and inaccurate. To overcome this, two methods occurred to us: First, to fasten our strip of brass (we were using brass, instead of galvanized iron) by screw nails through slots, which would allow the sights to be slipped down along the end of the level, where they would be perfectly protected when not in use; second, to have a hinge in the sight that would allow it to be turned down along the end, somewhat after the manner of a peep-sight on a rifle. We tried the latter device, and, after making the sights, fastened them to the level. We next tested them with a surveyor's instrument, and found that several adjustments were necessary to get them correct, and this experience led us to abandon the idea of a sight, the adjustment of which depended on the farmer who had no surveyor's level or other means of testing the accuracy of the adjustment. It also led us to doubt whether he could make a set of sights accurate enought to be safe, unless he had some special training, say, in a machine shop, a college, or a university. The sights described in "The Farmer's Advocate" some time ago need no adjustment. They sit flat on top of the level, and are clamped in that position.

But, aside from the desirability of reversing the level, there is another reason that led us to want peep-sights that could be used both ways. The assistant, who carries the measuring pole, holds a target across it, the level-man directing when it is in line with the sights. At 50 feet the target is quite distinct, but at 100 it is not so plainly seen, hence there is greater liability to err in placing the target if sighting 100 feet than if sighting 50 feet. Hence, to be as accurate in following the one-direction method of sighting as in following the two-direction method, the level and staff must be set twice as often, which, by comparison, seemed a serious disadvantage.

We tried the cross-piece without set screws for holding the level when devising the homemade drainage outfit, and only a month ago, when writing the description for our bulletin, we tested the same point again, and on both occasions we came to the conclusion that the outfit is immeasurably better with the set screws, but they should fit loosely in the hole, so that they can be easily turned. Most spirit levels have no graduation on the glass, and so it is difficult to tell when they are exactly level. In order to test the value of the set screws, we proceeded as follows: With a file we cut two scratches on the glass just as far apart as the length of the bubble, and then trued up the level. We then tried levelling it with and without using the screws. Without them, it was almost an impossibility to get it exactly level, but with them it could be levelled to a hair's breadth. Anyone who has tested the set screws in this manner will not discard them.

The slot in the upright of the homemade drainage level was put in originally for use in setting the grades for the ditch; but in the method of grading which we follow now, and which is being described in the bulletin mentioned we make no use of the slot, but we find in practice that it is often very convenient to be able to change the position of the crossbar, and so the slot is retained in our description.

Mr. Good will pardon me if I suggest that it is a mistake to state that "a stretched string would be useless for grading a curved ditch." I have seen many curved ditches graded by use of the overhead line. To be sure, a string is "somewhat in the road"; in our opinion, a level tied on a straightedge is more so. It takes some time to set the crossheads and stretch the string, but, on the other hand, the testing of the grade by the overhead line takes much less time than testing it with a level and straightedge. The distinct advantage of the overhead line method is that, in following it, one works to an exact grade. To be sure, the skilled ditcher, or anyone with special training in accuracy, can, in most cases, dig a fairly true grade by the use of the level and straightedge; but a novice, or anyone not trained in accuracy, can dig an equally true one with the overhead line.

Of course, where the fall is pronounced, say 4 inches or more in 100 feet, and uninterrupted—that is, there being no basins or ponds to drain—accuracy and a uniform grade are not as important as when there are slower grades and basins to contend with. We have encountered numerous cases where men using methods that depended upon judgment, rather than rigid accuracy, "lost fall" (lost depth, would be better), and failed to drain the low ground or the basin at the back, thus missing the chief purpose of the drain.

WM. H. DAY.

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Big Corn Yields.

Editor "The Farmer's Advocate":

I notice that you ask for practical experience in corn-raising. Our plan is to plow the field in the spring, plowing only four inches deep. We usually have an oat field that was very thick with thistles the previous year. Then we disk it until it is reasonably well broken up and pulverized. After this, when it is about time for planting, we give it a couple of turns with the duck-foot harrows, going diagonally the second time. This gives the marker a good chance to make a clear mark. When the ground is not too sticky, we plant about the 20th of May until June. This year was wet in this locality, delaying the planting until June 4th. When the corn is just sprouting through the ground, we give it another turn with the straight-tooth harrows, which kills all the young weeds. This is important. If you look closely at the ground after such a harrowing, you will find it covered with little white weed stalks, scarcely any thicker than pins. Our planting is always 3 ft. 6 in. each way, with from three to five stalks to a hill. If there are more, hoe them out. More than five stalks to the hill we find to be unprofitable, so far as cobs are concerned, although this is no great objection when the grower wants forage and is not particular about the grain turn-out. As soon as we can see the rows, the cultivator is set to work. We use a double cultivator, straddling each row both ways, usually twice in June, twice in July, and then in August until the corn is too high for the double, when we take a few turns with the single one. In short, whenever there is a spare day or so, we cultivate. When six inches high, we hoe it carefully, then again when about a foot or so. After the corn is too far advanced for the cultivator, we go through it with the hoe, to kill thistles. There are always a few thistles left to be cut. I have known my employer to leave any other job to cultivate his corn. He claims, and with good reason, too, that every day's hoeing is worth five dollars. We use the white flint corn, and cut it as soon as it is glazed. When it has stood three weeks in the shock, we let Indians husk it. They usually husk it in about four days.

Our yield? Well, this year, from six acres, we got 675 bushels. Last year we had eight acres, and got 900 bushels; in 1907, eight acres, 807 bushels. The year before that was a short season, as everyone knows. We had eight acres, a good crop, but spoilt. The farmers in this locality are good corn-growers, although raising just a few acres apiece. Each man tries to grow the best corn.

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British Crops of 1909.

The Board of Agriculture has issued a preliminary statement showing the estimated total produce and yield per acre of the principal crops in Great Britain in the year 1909. It is believed that Scotland will produce 255,822 quarters of wheat from 49,681 acres of ground, being an average estimated yield of 11.19 bushels per acre. The yield in England is expected to be 7,300,056 quarters, 1,074,875 more than last year, from 1,734,236 acres, or at the rate of 33.68 bushels per acre. The estimated crop of barley in Scotland is put down at 936,950 quarters from 199,989 acres, as against 897 quarters and 192,418 acres last year, and the average yield per acre is put down at 37.48 bushels. England is believed to have produced 6,343,562 quarters from 1,379,133 acres, the average yield being 36.80 bushels per acre. Scotland is credited with growing 4,737,718 quarters of oats, 142,507 more than in 1908, on 943,412 acres, the average yield being 40.18 bushels per acre. England is believed to have produced 9,780,616 quarters, from 1,839,912 acres, the average per acre being 42.53 bushels.

This has been a white-grub year in Ontario. It is doubtful if ever before have they been known to be so destructive. Complaints were first heard of pastures and lawns being destroyed, then of potatoes being eaten into and rendered unsalable, and last of wheat being attacked and injured by them.