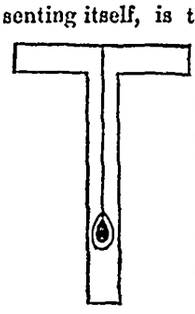
and creditor account of a sugar factory upon the continent, the locality of which, for obvious reasons, I am not at liberty to indicate. The proprietor is a large farmer. In it between 13,000 and 14,000 tons of roots per annum are made into sugar. The total expenditure, exclusive of the interest upon the money embarked, was £19,500, the total receipts about £33,000, leaving over £13,000 for profit and interest of money invested."

Practical Drainage.

BY ALAN MACDOUGALL, C. E.

As so much has been said about fall for drains and fall for water, it is necessary, now, that a few words of explanation be given, to show how the difference in level between two parts or points in a field may be ascertained. However true and regular the surface of the land may appear, the drainer, in attempting to follow that surface line with his drains cannot avoid having ups and downs in them. It is here the water lodges, and by not getting away, completely prevents air from coming up the drains and allowing them to work properly. It is very desirable, and should always be borne in mind, that the trench for the drains should have a regular grade, not be up and down anyhow, so long as the mouth is lower than the top.

To be able, therefore, to find out how his drains are to be laid, to work perfectly, the drainer needs some kind of a level, or instrument to help him take observations. The simplest thing that can be devised, and the one most readily presenting itself, is the *borning rod* already explained. Two pieces of board, three or four inches broad and half an inch thick, are nailed together in the shape of the letter T, care being taken to have the head perfectly square to the body, which is usually about three feet long. Down the centre of the body a black line is drawn, and near the bottom a hole is cut to allow a plummet to hang. When the string of the plummet cuts the line, and the bob hangs freely, that is, is not resting on the body of the T, the head being placed at right angles to the body makes a perfectly level line, as level as it could be made by a carpenter's spirit level. It is not easy to sight along the top edge of the T, so it is well to have a sight nailed on to each end, and made to project from the side about two inches. They ought to be exactly level with the head of the T, or else, when a sight is taken on the presumed level line, it will in reality be on a grade.



The operator having got his borning rod into adjustment, can easily hold it quite straight, so as to keep the string of the plumb bob on the centre line. He then has only to send his assistant with a staff to any point whose level he wants to know. By looking along the sights, he can see where the line will cut the staff, and taking the difference in height of the reading on the staff and the height of his eye, or the top of the T, above the ground, he can find out whether the land rises or falls in that distance, and how much. It is very convenient, however, to have a rod graduated with feet and inches, of any convenient length, say six or eight feet, with a large target to slide on it, coloured in opposite quarters red and white. This can easily be seen by the eye, and with very little practice any one will be able to work with considerable accuracy. When the correct level has been got, the target is tightened by means of a thumb screw at the back of the staff, and it can be kept in that position until the operator comes up to measure the difference in height.

This is the readiest and simplest form of a levelling instrument. There are one or two others, which will be explained in the next paper, but the method of going to work is exactly the same in every case, and the method now explained is very simple. Any one can get this *level*, to give it a dignified name, made by any carpenter, or, indeed, make it for himself, and if it gets broken, the cost of repairing it is so trifling as not to be felt.

Hedges and Mice.

To the Editor.

Sir,—It is with great pleasure that I have read the late articles upon "Making Hedges" in your paper. The difficulty is not, I think, so much in the growth of the live hedge, but in the preservation of the fence when the whole of the obstacles towards a fair start have been overcome.

Now, it has been well shown in the articles to which I allude what kinds of plants grow the fastest or the best, which are most impervious, and which withstand best the frost but there is a worse enemy than all these, namely, the ravages of mice. I was speaking to a gentleman the other day upon this subject, and he mentioned a case which came under his observation a few winters ago. A very fine hedge of thorn (I think he said the English thorn) had been planted and carefully attended to until it had formed a fence perfectly impervious to the attacks of the most evil disposed of breachy animals.

After much labour, time and money had been expended upon this hedge, and just as it had arrived at perfection, in one winter every plant was cut off by the mice, each stalk having been completely peeled from six to eighteen inches from the ground.

Now, such a case as this discourages many from attempting to substitute the beautiful hedge for the slovenly snake-fence. I have written, Sir, simply to draw from some of your staff, or readers, such experience as may show any easy method of preventing the ravages of these animals, or what kinds of plants seem to be most free from their attacks, thus hoping to provoke discussion, and call forth the opinions of those who have made experiments with live fences, upon this point.

C. E. W.

Ancaster, February 21st, 1870.

What has Science done for the Farm?

This is a question constantly and sneeringly asked by persons who pretend to dispute Book Farming, and who say, "I know all that twenty or fifty years of my experience can teach; I do as my father did, and so far as I can see my land is as good now as it was in my father's time, and I don't want to be troubled with "book farming."

There are thousands of such persons as these, and certainly book farming is very little use to them, for they have not the intelligence to make use of it, and yet these very people are the first to say when a crop fails, "times are not as they used to be, we had always good crops then."

The science of farming, and science in farming, has been more attended to in Britain than any place else in the world, and the consequence is that the average of the wheat and other grain crops has been within the last twenty years more than doubled, in some cases, and nearly doubled throughout England and Scotland.

Science in the first place went too far ahead of the times, the people could not understand it, and as the theorists who advanced the scientific assertions were not sufficiently practical, they could not always enforce conviction on the minds of their hearers and readers. Science first began to analyze the crops, and thus ascertained of what chemical elements they consisted. Then they analyzed the land, and prescribed as to what was required to render it fertile. Now, for want of material knowledge, the scientific people often went wrong, and every mistake was scored up against them, and widely blazoned abroad, while their successful hits