THE FARMER'S ADVOCATE.

The Farm.

Farm Drainage. No. V.

How to Take the Level of a Field.-There are complaints throughout the country that " practical " drainers are scarce. This cry of scarcity is uncalled for, when it is considered that a little head-work on the part of the farmer will do the leveling, and any man who can handle a spade

FIG. 1.

can easily do the rest-excepting, however, the laying of the tile, which should be done by the farmer or by a laborer working by the day, not by the job. No wonder that practical drainers is done by the naked eye, or by observing the flow of water in the drain. No drainer, however practical, should be entrusted with the random system of determining the fall, for the durability of a drain is largely dependent upon the evenness of the flow.

There are many instruments used for taking the level of a field, some being expensive and some not. Although it would pay to procure and that the point 1 is one foot higher than the delicately accurate instruments

where a large amount of drainage is done, yet we shall not

retain a firmer footing in the ground. The head end of the stick is very slightly rounded off and acts as a pivot when placed into the tin receptacle in the centre of the tube. It is now plain that if the eye be placed close to any one of the bottles, just even with the water, and a sight be taken over the water in the other bottle, any distant object placed in line with the eye will be on a level plane, and will indicate how much higher or lower the ground is at that point than it is at the point of observation.

Fig. 2 is another leveling instrument used exactly for the same purpose, but can be made by any farmer who is accustomed to the use of carpenters' tools. This cut appeared in our issue of last April, but we reproduce for the benefit of new subscribers. This instrument has also been used with great success; we don't know which is the best, so that the farmer will act wisely if he procures the cheapest. Take Fig. 1 to a tinsmith and Fig. 2 to a carpenter, and get estimates of the cost.

Fig 3 shows how these instruments are applied in the process of leveling. For the sake of variety, we have supposed that the drain to be dug is too long, or rather the instrument too inaccurate, to take the sight from one position, and we have placed one of the instruments in one position, using the other for the other instrument for the other position. Let A B C represent an uneven surface of the field through which a drain is to be dug. Place a leveling instrument in any position near the lower end, say at y. Stick a post at A, having feet and inches marked on it. A sight taken at the right side of the instrument will strike the post at 3, and another sight taken at the other side are so much in demand so long as the leveling of the instrument will strike the point 1, the stake first having been removed from A to B. The distance from A to y will depend upon the delicacy of the instrument or the accuracy of the sight of the observer. Take care that the points 3 and 1 can be distinctly seen. If each mark on the post represents a foot, it will now be seen that the point 3 is three feet above the level of the lowest point of the field at A,

at the lower end for the purpose of making it | fall of 2 feet in 400, or 1 foot in 200. This calculation would be quite simple, providing the drain was to be only 400 feet long, or that a greater distance could not be accurately seen at one sight-taking-without changing the instrument. But let it be supposed that the length of the drain is to be from A to C, or say 800 feet; then it will not do to take the fall from B to A and then from C to B, but the fall from C to A must be ascertained. In this case proceed as before in taking the sight 3 to 1 ; then remove the stake to C, and place the instrument at z. In taking the sight over the water in the bottles, the point 3 will be found from the right, and the point 2 from the left. By subtracting 2 from 3 it is found that

JAN., 1886



C is a foot higher than B, or three feet higher than A, as will also be proved by counting up the dotted lines. Therefore the fall from C to A is 3 feet in 800 or 1 in $266\frac{2}{3}$. In the same manner the fall must be taken from the upper to the lower end of the drain, no matter how often the instrument has to be changed.

In using the instrument represented in Fig. 1, some coloring material should be put into the water, especially by beginners, as the sight can then be taken more accurately.

These instruments possess a double advantage, as they can also be used in measuring the fall in the drain. Take a ten foot straight edge and fasten it on the feet of the instrument represented by Fig. 2, taking care that when

the thus completed instrument stands on level ground, the string supporting the weight will fall on the centre of the cross piece; then let one end of the straight edge drop until the desired fall of the drain is obtained, and mark the position of the string on the cross piece. For example, if the fall is found to be half an inch in the ten feet, let one end of the straight edge drop one-half inch below the level, mark the position of the string, and when digging the ditch, the desired fall will be obtained when the straight edge lies in the bottom of the ditch in such

recommend their use under average circumstances. Fig. l is an instrument which we have seen used with astonishing accuracy and success, and it is so inexpensive that no farmer will complain of the cost. The horizontal portion is a tin tube, in each end of which a bottle is placed. It will be observed that the bottles are about half full of water. The bottom of the bottles must be perforated or broken out in order that the water may find its level. They





ground at B. Now if this I foot be subtracted a manner that the string will coincide with line below the line of sight, or 2 feet, meaning that the ground at B is two feet higher than the ground at A. Let us now suppose that the

the aforesaid mark on the cross piece.

The instrument represented in cut No. 1 can also be used in the same manner. Fix a leg pendicular portion is merely a stick, sharpened will be easily seen that there will be a lower extremity, securing it firmly by means of distance between A and B is 400 feet, then it the tube, and then fasten a straight edge at the