hood made a socket of two inches in diameter at one end, and three-quarters of an inch at the other. The large end was made to receive the wooden boring rod, and the smaller was formed to receive the iron auger shank. Our Yankee preferred a wooden rod (nearly of the same size of the hole to be bored) to a smaller iron one, as its size fitting the hole made by the auger, kept the auger itself in a more directly straight line when in use. At the upper end the cross-bar or handle to turn this wooden boring bar with was somewhat enlarged, to afford extra strength and precaution against splitting. Four tressels, two for the log and two for the auger to work in, were next made, and a moveable upright piece went perpendicularly through the two tressels, with a half moon cut at the top of each to support the auger rods. A wedge at the side enabled the operator to raise or depress these upright pieces, so as the auger rod, when resting in the semi-circular hole cut to receive it, would cause the auger to "look" exactly into the centre of the pith in the log. A string or line at the top, and another at the side, attached to the farther end of the log, enabled the operator to see (when holding the string parallel to the log) that the auger and rod pointed straight to the other end, so that the auger would be sure to make its exit in the rear in the pith, as it entered on the front. This was all that was done, and after securing the log with a chain to the tressel, the engineer began to bore away. The auger was good, and the screw part long, and every day saw sixty or eighty feet bored. It was astonishing how fast it was done; but it all depended on the peculiarity of the auger as adapted to its work, and the order in which it was kept. This auger would easily bore a foot a minute, and would have done five times the quantity of work if the log could have been set up on an end, and the chips allowed to run out, instead of having to draw it back so continuously to empty it. In some cases, and with some description of logs, we were obliged to turn ends with them, and thus bore half way from each end, and meet in the centre; but generally if the pith was well defined and the log clear of knots, we had but little difficulty of that kind to contend with.

After the logs were all finished boring, came the jointing and banding. Our American friend procured a quantity of 3-inch hoop iron, somewhat thicker (but not much) than that ordinarily used, and cut it into lengths of about 14 inches. The blacksmith welded these into rings, and at the same time bevelled about half an inch of each side of the ring thus formed, until it had a somewhat sharp edge, leaving the centre of the band or ring all round much thicker. When jointing the logs, one of these rings was taken and driven against the end of the log, with the hole or bore of the log exactly in the centre of the ring. A chisel was then driven in about one inch deep all around the mark thus made in both ends of the log, and one ring was driven half way into one end of each log, and allowed to remain there. When the logs were placed in the drain dug to receive them, they were raised or depressed until each ring fitted or "looked" into the marks made by the chisel for its reception, then a few blows with a heavy mallet drove up the log last laid down until the joint between them was closed up almost tight, the sharpened edge of each ring having been driven into the end of the log. This formed a perfectly tight joint, and at the same time effectually banded each end of each log, and prevented splitting by the pressure of the column of water.

We next came to the levelling and digging the trench. I was anxious to place my logs below all frost influence, but my Yankee friend decided that the expense would be doubled and the benefits doubtful, as he said the water was spring water and always running—never under any possible contingency stopped—so that one foot under the surface for the top of the log, was, he thought, sufficient. To this I agreed, and we soon had the trench dug. We wormed about somewhat to miss stumps, but by staking out the ground first it is astonishing how few direct line trees were altogether in the way. At the fountain-head I put in a box about three feet square and three feet deep, and the log was entered about half way up; but a contrivance was made whereby the water was always at the top of the box, and the log 18 inches under the surface of the water. This afforded a supply for cattle, easily got at, and at the same time a reservoir to protect the mouth of the log from frost. At large pipe trough received the outlet water, which was compelled to rise about two feet before overflowing into the cattle trough. The log was continued underground to the site selected for the dairy, and the end plugged up, to be opened when wanted.

The whole was well done, and at a reasonable expense. If I remember right, and from calculations I have many times gone into when questioned by parties wishing to perform a similar work, the cost out of pocker was about 6½ cents a foot. It could not be done for that now, I suppose, as the timber cost me nothing and labour was cheap; but we did it at odd times when work was not pressing, especially boring the logs. Wet, stormy days were always appropriated to this work.

C.

Beet Root Sugar.

"Vectis" having written to the editor of *The Sugar Cane* an account of all the difficulties he has met with in his pursuit of this subject, and requested information, particularly such as should ensure the proper crystallization of the sugar, has received the following reply. *The Sugar Cane* is a modern English publication, purely devoted to the subject of cane and beet root sugar, both crude and refined. Its circulation is chiefly amongst professionals in the trade, and it is therefore the best authority that can be given.

The following is the reply in question:—

LONDON, 17th June, 1871.

(To the Editor of the Sugar Cane.)

SIR,—I would recommend your correspondent "Vectis" to try the following (premising that he will work on a small scale), and I think he will find no difficulty in crystallizing the beet juice, provided it is not too weak. He should grow beets weighing not more than from 2 to 2¾ lbs. each.

1st. Heat the expressed juice to about 168° Fahrenheit, and then add cream of lime of the density and proportion mentioned in "Crookes," page 79. (These particulars have been given in the CANADA FARMER—ED.) Stir it in, and continue heating until very near the boiling point; then remove it from the fire for a few minutes, and again replace it, and increase the heat until the first signs of boiling appear; now remove it from the fire, and filter through a cloth until it runs bright.

2nd. Insufflate (or blow into—ED.) all the filtered juice with carbonic acid, until it is no longer alkaline to red litmus paper; allow the carbonate of lime to subside, and pour off the juice into another vessel; boil for a few minutes to throw down in the form of "mono carbonate," the bicarbonate of lime held in solution, and again filter through a cloth until it runs quite bright.

3rd. Run the filtered juice through animal charcoal, using the latter in a granulated form, about twelve per cent. of the weight of juice employed.

4th. Concentrate the filtered juice to 30° Baume, about 1.245 specific gravity; then, if not transparent, filter through a cloth until it runs bright, and, while hot, pass it through another portion of animal charcoal, using about half as much again as on the first occasion. (See note.)

5th. Concentrate the filtered and now colourless syrup to a density of 42°, Baume, S. G., 1381. This density should not be passed, and almost before it is cold it will be found to crystallize.

Your obedient servant,

E. B.

NOTE.—If the animal charcoal is new, i. e., freshly burned, it should be previously washed with boiling water, to remove the sulphides, and dried.

The foregoing is an exact copy of the communication, and I hesitate to alter it, even to make it more easily understood. The editor of *The Sugar Cane* has also most kindly given a translation from "Walkhoff," who is belived to be the best and most particular writer on the subject of beet root sugar, and Walkhoff's opinion bears out that of "E.B.," so that the plan recommended for the small scale may be unhesitatingly adopted.

The only difficulty with farmers and people who have not received a scientific education, is the strength given by "Baume," and the "specific gravities." To meet this trouble I recommend the following plan:

The ordinary Canadian pint (wine measure), such as is stamped by the inspectors of weights and measures, when *exactly* filled with ordinary cold spring water, weighs a trifle under one pound and half an ounce. The same pint measure, filled with syrup, will weigh as much more, as the difference which exists in the density or thickness of