

PRACTICAL USE OF THE VEE NOTCH WEIR

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This little paper deals with the practical measurement of casual flows of water with home-made, yet accurate, weirs. The ninety degree Vee notch is used and its principle is clearly shown by Fig. 1, where the only measurement necessary is "H," the head of water flowing over the weir. Once this is measured the flow is obtained by reference to tables, or to the graph in Fig. 2, or read off directly from the graduated gauge plank if one is fitted to the weir.

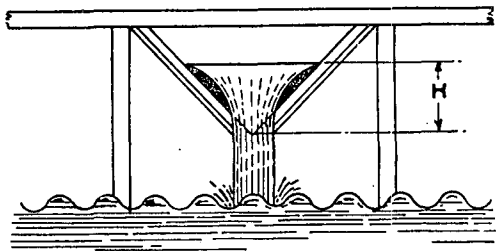


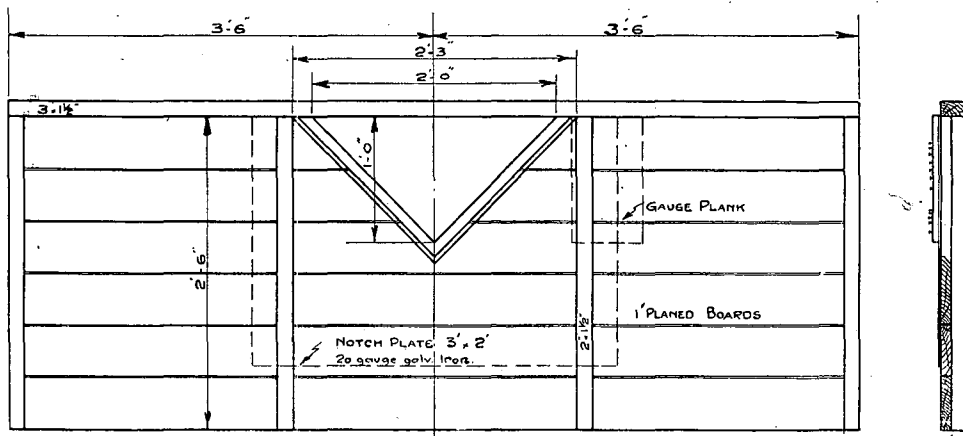
Fig. 1.

The ninety degree Vee notch has distinct advantages for this purpose. One 12 inch (depth) notch will measure flows from 50,000 down to 50 gallons per hour with fairly equal accuracy right through this range; and it would require several different sized rectangular notches to serve the same range. Generally speaking, the Vee notch would give more accurate readings than the rectangular notches. However, it has the disadvantage that it requires more head which accounts for the general use of rectangular notches in permanent hydraulic works. It should be mentioned that published tables of flows through the Vee notch differ from one another by as much as two per cent. The values chosen for this paper are probably quite suitable for the conditions.

The Notch Board illustrated by Fig. 3, is suitable for measuring flows up to 50,000 gallons per hour in earthen channels. It is sunk in the earthen bed of the channel with the bottom point or apex of the notch quite six inches clear of the bed of the channel. The channel, where the flow through the notch falls must be paved in some way. The galvanised iron notch plate and the gauge plank are on the upstream side. The channel is enlarged on the upstream side to form a pool about five feet wide. The gauge plank must be free from the earthen bank so that the position of the surface of the water in the pool upon the plank can be observed. From the position of the water surface upon the gauge plank the flow through the weir is read off directly.

The notch board is made of one inch planed planking spiked to 2 x 1½ and 3 x 1½ framing. The weir plate is a 3 ft. by 2 ft. sheet of 20 gauge flat galvanised iron with the right angled notch 2 ft. wide by 1 ft. deep accurately cut out with a sharp pair of snips. A similar and slightly larger notch is cut out of the wooden board and chamfered on the lower side. The galvanised iron notch plate is nailed to the wooden board taking care that its top is level with the top of the planking.

The gauge plank is detailed in Fig. 4, and is spiked on to the upstream side of the board as indicated with its top accurately in line with the top of the notch plate. It is a piece of clear pine 12 inches by 7 inches studded with rows of small steel or brass wood screws as indicated by the small circles. These screws project about ¼ inch from the surface of the plank. It will be seen that the grouping of these screws is two inverted triangles, one high upon the left and the other down on the



12in. Vee Notch Weir.

Fig. 3.

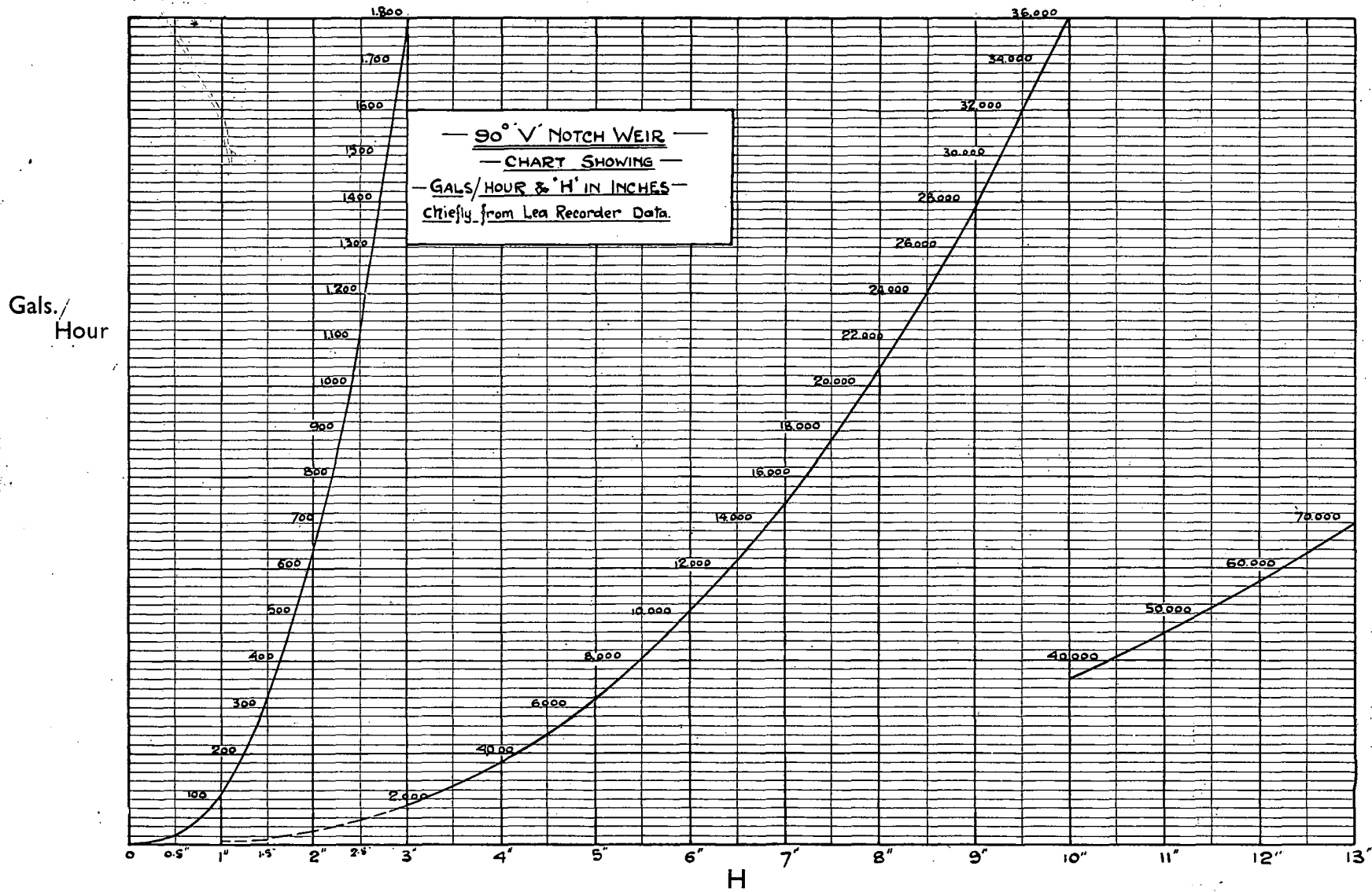
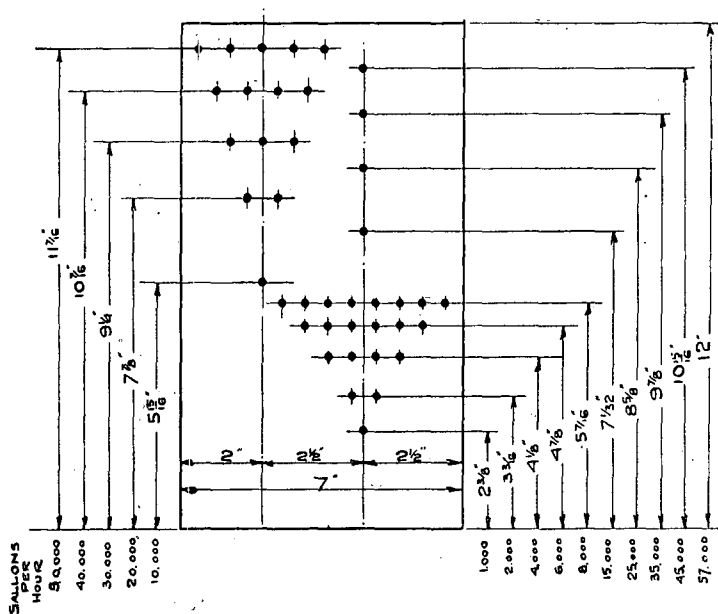


Fig. 2.

right. When the water surface touches the centre of the 5, 4, 3, 2 or 1 row of the upper triangle it indicates a flow through the weir of 50,000, 40,000, 30,000, 20,000, or 10,000 gallons per hour. Level with this upper triangle and on the right there is a vertical line of four screws which indicate the half-way points, that is, flows of 45,000, 35,000, 25,000 and 15,000 gallons per hour. Intermediate flows can of course be estimated.

ever, with these small flows an easy method is to measure with a two foot rule the width of the surface of the stream flowing through the notch itself. One has to allow for the slope of the water surface and estimate the width at level of the still water above, which is quite a simple operation. The head over the weir "H" is half the width measured so from the graph Fig. 2, the flow in gallons per hour can be read off. On one occasion the writer

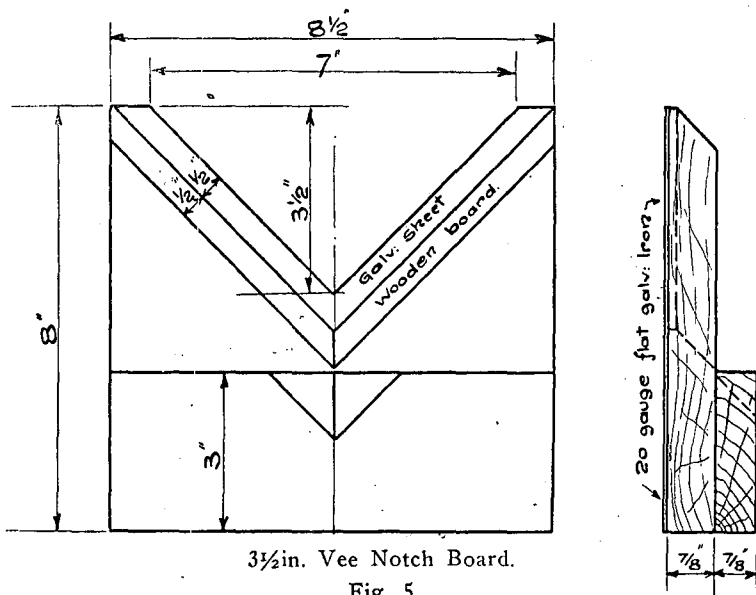


Gauge Plank
For 12in. 90 deg. Vee Notch.

Fig. 4.

Low down on the right is the second inverted triangle showing flows of 8,000, 6,000, 4,000, 2,000 and 1,000 gallons per hour. It would be quite simple to add another grouping low down on the left to indicate flows below 1,000 gallons per hour taking measurements from the graph Fig. 2. How-

had to measure seepage from a dam and the width of the stream through the notch was 2 1/2 inches consequently, the head "H" was 1 1/4 inches and from the chart this gave a flow of 200 gallons per hour. With the same notch-board he measured flows of 50,000 gallons per hour.



3 1/2 in. Vee Notch Board.

Fig. 5.

An interesting little notch-board is shown in Fig. 5. It was used to measure the flow in a small brick gutter. The board was placed across the gutter and fixed tight with a luting of stiff clay. The width of the stream through the notch was measured.

On another occasion experiments were being made on a close mesh wet screen and it was necessary to measure the flow. A wooden box was made as shown in Fig. 6 which combined stilling

chamber and Vee notch. An enlarged view of notch-board and gauge plank is shown. The gauge plank obviously is the lower portion of the gauge plank shown in Fig. 2 with points for 500, 200 and 100 gallons per hour added. The dimensions for these latter points are read off from the graph.

These weirs described are cheap improvised constructions but the measurements are not necessarily rough and approximate.

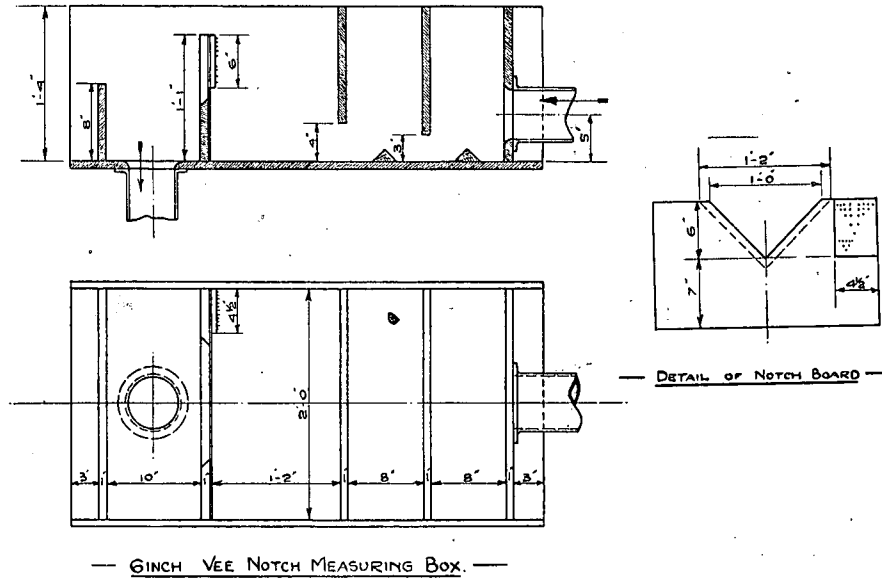


Fig. 6.