

THE MEASUREMENT OF WATER.

The need for the measurement of water is not felt where there is an abundance for all the land-owners. This condition exists in a very few places and is becoming less common each year. Even where an abundance of water is available, some system of measurement would enable the irrigators to prevent a large amount of the damage done to crops and soil under the present systems. As time passes and more land is brought under irrigation the supply of water will not be so abundant; hence the great need of some knowledge of its correct measurement.

There are several units of measurement; some are used for flowing water and some for water at rest. The "cubic foot per second" or the "second-foot" is the standard unit of measurement of flowing water, while the "miners' inch," although not common, may be used to advantage where a small amount of water is to be measured. One cubic foot per second is equivalent to 35.7 British Columbia miners' inches. The "acre-foot" is the unit of measurement for large bodies of water at rest. An acre-foot of water may be defined as that amount necessary to cover one acre to the depth of one foot; or is equal to 43,560 cubic feet. One acre-inch is equivalent to one-twelfth of an acre-foot, or the amount of water necessary to cover one acre one inch deep.

Care must be taken so as not to confuse the terms mentioned in the measurement of water. The cubic foot and the miners' inch indicate a rate of flow, and in order to determine the amount of water it is necessary to consider the time or duration of flow.

The following table, which is taken from Bulletin 44 of the Department of Agriculture, will show the relation between the different units of measurement:—

1 cubic foot per second is equal to 35.7 miners' inches.

1 cubic foot per second is equal to 6.25 Imp. gallons per second, or 7.5 U.S. gallons per second.

1 cubic foot per second will give in one minute, 375 Imp. gallons, or 450 U.S. gallons.

1 cubic foot per second will give in 24 hours, 2 acre-feet (approximately), or 1 acre-inch in one hour.

1 British Columbia miners' inch will give in one minute, 10.5 Imp. gallons, or 12 U.S. gallons.

1 British Columbia miners' inch running for 36 hours will give 1 acre-inch.

In British Columbia the miners' inch consists of the quantity of water which will pass through an orifice 2 inches high and $1\frac{1}{2}$ inch wide made in a 2-inch plank, the water to have a constant head of 7 inches above the upper side of the orifice. Each additional inch requires an extension of the above orifice $\frac{1}{2}$ inch horizontally.

Where water is to be measured by the cubic foot per second or second-foot, a weir-box will answer the purpose very well. The most common type is the "trapezoidal" weir-box, a drawing of which is shown in the following diagram. This may be placed in a stream, or a portion of the stream may be diverted through it. In this diagram the weir-crest is 12 inches long and the notch is 7 inches deep; the sides slope out from the weir-crest 1 inch for every 4 inches rise. The wings and cut-off aprons, as shown on the ends of the weir-box, prevent the water from washing around or under the box. These weirs may be made of wood or concrete, and should be raised level where the water strikes them squarely, otherwise they will not give accurate results.