

work recorders. The cost of these (we have very satisfactory ones from Glenfield & Kennedy, of Glasgow, which cost installed about \$30.00 each) is too high to permit of them being placed at each user's gate. A cheaper mechanical device for measuring such quantities as would be used on 10 or 20 acres is still to seek. Experiments have been made with tumbling meters, clepsydras or water clocks, etc., but there is no device as satisfactory as the clock-work drum recording the varying height of water falling over a weir. When this apparatus can be made in standard sizes in large enough quantities to make it cost about \$10.00 to \$15.00 this particular problem will be solved.

Gates

For gates in small or large ditches an iron disc penstock by Adams Hydraulics, of York, is inexpensive and satisfactory. A wooden pipe is passed through the bank at an elevation one foot lower than the bottom of the ditch. A saucer-shaped depression is made in the bottom of the ditch so that at any stage of water a full head can be drawn off, and there is no dangerous obstruction in the ditch as in the case of the old style wooden box and gate.

Wooden Pipes

My experience with wire wound wooden pipe leads me to the conclusion that when used for domestic purposes, kept full and saturated, and buried below the frost line, it will last as long or longer than iron. But if used as a flume only partially buried and allowed to dry out it will soon show signs of decay, and especially so if there is any alkali in the soil. In laying such pipe this can be obviated to a great extent by coating each joint as laid, taking especial care to cover the ends of the sleeves or collars.

Siphons

Large siphons of wood stave pipes are used in some of the systems, one on the White Valley system being 36 inches in diameter. The capacity of these large wood pipes is from 30 to 40 per cent. greater than the theoretic capacities computed by Kutter's formula. A large number of air valves at the upper ends of the pipes have been effective in reducing vibration and thumping when the pipes are discharging only partially full.

Lawn and Garden Irrigation

The town of Vernon is within the area served by the White Valley system, and this has led to the installation of a pressure system for the irrigation of lawns and gardens. The pipes are fed from a small balancing reservoir of about $1\frac{1}{2}$ acre-feet capacity. The reservoir is filled from a 12-inch siphon one mile long from the main canal. A great stimulus has been given to the beautifying of the town where this system is in operation.

Pipe Distribution

The distribution over the lands of the Belgian Syndicate north of Vernon is also effected by pipes under pressure, some of the lines being under 400 feet to 450 feet head. The manufacture of glazed cement pipe capable of sustaining pressures of 100 lbs. to the square inch has been started at Peachland on the Okanagan Lake. It is quoted at prices about equal to wood pipe, and if the manufacturers' claims are substantiated in practice, there is a wide field for it in these valleys.

Cement Lining

The practice of lining ditches with concrete has made some progress in recent years, and the consequent saving of losses by seepage have fully justified the additional expense. The time is not far distant when every open ditch will be so lined, increasing the area that the same amount of water will irrigate.

Average Costs

The average cost of reclaiming lands by irrigation in the district has been from \$30.00 to \$80.00 per acre according to the character of the works. The annual cost to the user has been steadily rising as the more expensive type of work has been put in. The average annual cost per acre may be put at \$5.00, some of the earlier contracts being much lower than this, and in some of the later ones as high as \$8.00 per acre. The average difference in value between land irrigable and similar land incapable of irrigation is \$100 per acre.

Conclusion

These random remarks are not offered as a complete or comprehensive study of the subject, but it is hoped that it has been shown that in these valleys we have a region of magnificent prospects, just beginning to be realized; that serious and earnest attempts are being made to develop the water resources by modern methods and works of a permanent character. It behoves us in this room to do all in our power to assist in laying the foundations of this development on sound and true lines, in the matters of legislation, organization, and construction, so that the coming generations who will enjoy the fruits of our labors shall say "Our fathers built wisely and well."

Department of Public Works, Canada

District Engineer's Office

August 2nd, 1910.

Dear Sirs,—

The writer wishes to offer his thanks for your good offices in having instrument makers send their Catalogs. Although we had already some of these catalogs, your method of supplying the missing ones is certainly a good one.

Yours very truly,

R. de B. CORRIVEAU,
District Engineer.

The Canadian Engineer,
Toronto, Ont.

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