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Colostrum

RESEARCH

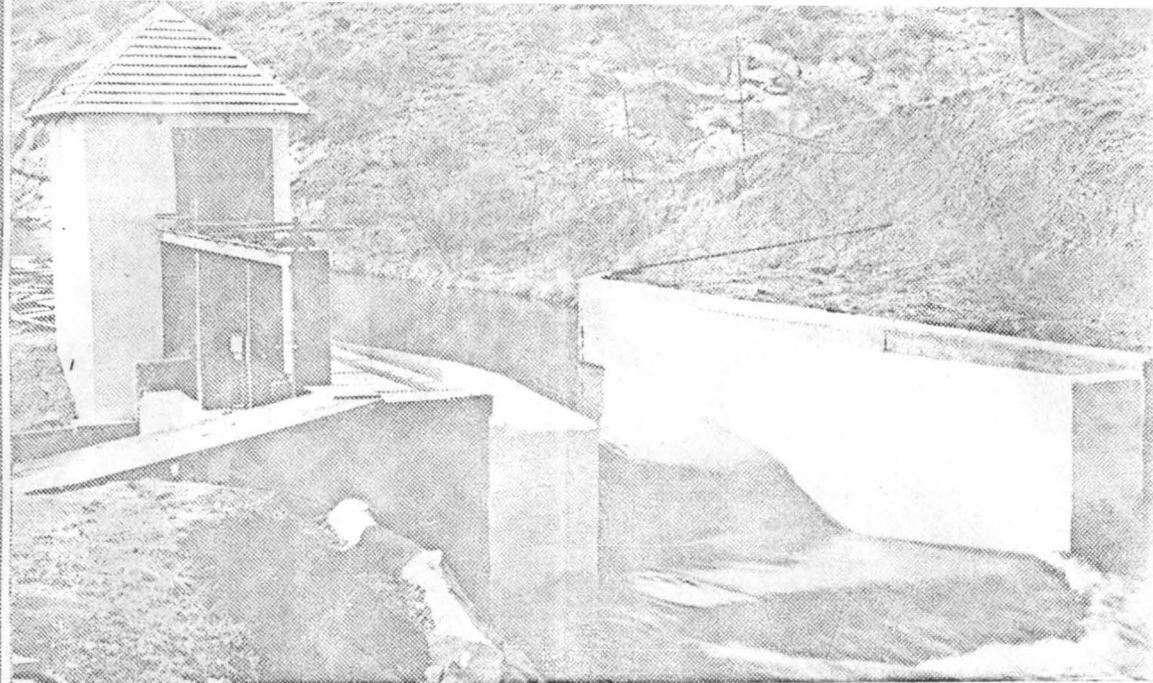
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New vaccine and serum for calf disease

Phosphorus is a vital element in the body. It is the value of your body's phosphorus that determines the value of your body's health.



Flow of 400 second-feet through a 25-foot concrete block Parshall measuring flume, Greeley No. 2 Canal.

Concrete Blocks Simplify Parshall Flume Construction

by R. L. Parshall*

During the summer of 1949 plans were prepared for the construction of two Parshall measuring flumes of concrete blocks with the idea of eliminating the forms required for conventional reinforced concrete structures. The main walls of the flume, the curved entrance to the flume, downstream wing walls and the stilling well would all be built of concrete blocks and the stilling well would be an integral part of the flume wall.

These two flumes, one in the Larimer County No. 2 and the other in the New Mercer canals, near La Porte, Colorado on the Cache la Poudre River were built during October, 1949. Since then, careful inspection of these structures has been made from time to time to note the durability

of this type of construction. Both of the flumes, at this time, are in perfect condition and show no evidence of weakness due to the method of construction, or deterioration, or failure of the concrete blocks that might arise because of water or weather conditions.

Since 1949, there have been constructed in the Poudre Valley seven additional concrete block measuring flumes ranging in width from 4 to 25 feet. The largest of these is in the Greeley No. 2 Canal, near Windsor, and has a discharge capacity of 600 second-feet. A design is now being prepared for a concrete block measuring flume, 30-foot throat, to measure a flow of 1200 second-feet.

Floors of Reinforced Concrete

The floors of these structures are of reinforced concrete varying in thickness from 4 to 8 inches, depending on the size of the flume (laid to the proper elevations and smoothed to an even surface). From the

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crest, downstream to the lower end of the flume, the top of the concrete side wall is brought up to the crest elevation so that the first course of wall blocks will have a level base through out. Also the base for the curved entrance walls is to be made level with the front or upstream end of the converging section of the flume.

The walls and stilling well should be of first grade, steam-cured, concrete blocks, 12 x 8 x 16, 8 x 8 x 16 and 8 x 8 x 8 inches in size. The 12-inch block is intended only for the large flumes having high walls of six feet or more where the first two or three courses would require the 12-inch blocks and the upper courses the 8-inch blocks. For the higher walls, deadman anchors are suggested as a means of resisting the back-fill pressure against the wall.

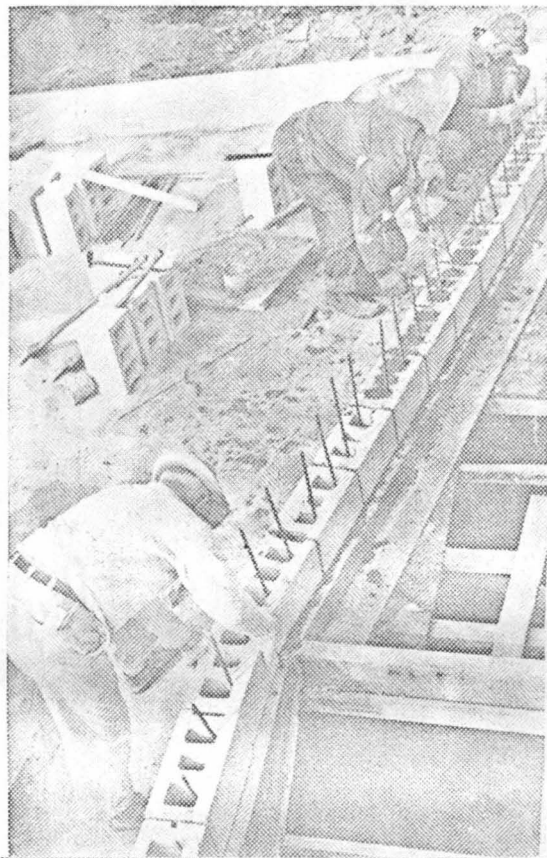
The 16-inch block is made with either two or three cells. This feature is to be noted in order to have the proper spacing of the vertical reinforcing steel. These vertical bars, set in the concrete floor, to be in line 4 inches back from the inner face of the wall and placed in position before the concrete has set. For walls about three feet high the vertical bars should extend full length to the top of the finished wall. For wall heights exceeding three feet the vertical steel should be about two feet high above the floor line so that the blocks can be threaded easily down through the bars to the proper setting. The vertical steel bars to be spliced to reach the height of wall. The verticals to be either $\frac{3}{8}$ - or $\frac{1}{2}$ -inch bars.

After setting the block at each end of the crest, to the exact width of throat, the block at the up-stream end of the converging section of the flume is set to agree with the width of floor at this point. A taut line or wire stretching between the crest and upstream blocks will serve as a true guide for placing the intermediate blocks. After the first course of blocks has been set the cells are to be filled with

(Continued on page 8)



Horizontal reinforcing bars, $\frac{1}{4}$ -inch steel, concrete block, Parshall measuring flume, 8x16-inch blocks.



Construction of side wall, 15-foot concrete block, Parshall measuring flume, North Poudre Canal.

mortar to make a solid block of concrete. Mortar should now be spread for the joint and imbedded therein is a $\frac{1}{4}$ -inch steel reinforcing bar set one inch back from each face of the wall. These two pieces of steel constitute the horizontal reinforcement. The next course of blocks would start with an 8-inch block at the throat thus offsetting the vertical joints by 8 inches. The angles at the upper and lower ends of the throat are to be sharp and definite and therefore the vertical joint between blocks at these points is continuous, however the $\frac{1}{4}$ -inch bars continue on past these joints.

Attaching Deadman Anchor

At the joint, next below the finished height of wall, a piece of reinforcing steel is hooked around the vertical steel at a suitable point for attachment to a deadman anchor. Such an anchor may serve two or three supports for the wall. When the top course of blocks has been laid a finish coping is formed to add to the appearance of the structure. One continuous piece of $\frac{1}{4}$ -inch bar should be imbedded in the coping to prevent transverse cracking of the finished work. At the completion of the masonry work, it is recommended that two coats of white waterproofing compound

be applied to both faces of the walls. This waterproofing is intended to seal pores in the surface of the blocks and joints and where the water through the structure contains a liberal amount of salts in solution the waterproofing protection will tend to guard against alkali deterioration. Of the several block flumes now in operation none have shown any trouble in this respect.

The Stilling Well

The stilling well should be built as an integral part of the side wall of the flume. The top of the floor of the well should be 8 inches lower than the floor of the flume so as to have the horizontal joints agree in both structures.

It is believed that this type of construction will provide a substantial reinforced concrete wall without the use of forms and at a considerable saving in cost.

Editor's note: Further information on the use and construction of Parshall flumes is available in bulletins which can be obtained free from your county agent's office. Ask for bulletin 172-A, "Measuring Irrigation Water on the Farm," bulletin 426-A, "Parshall Flumes of Large Size," or bulletin 488-X, "Improving Distribution of Water to Farms by Means of the Parshall Flume."

Flow of 50 second-feet through a 15-foot concrete block Parshall measuring flume, North Poudre Canal.

