Creek. The claims upon it are similar to those upon the Hanauer, consequently it cannot be thought of for the city's use.

Near the point of the mountain, at the south end of the valley, and located considerably above the city canal, are several springs of warm water, suitable for irrigation only. This water can be turned into the canal at a very trifling cost, and can be purchased, we are informed, but no price has been stated. In case of a future emergency it might then be well to consider them.

ARTESIAN WATER.

The idea of tapping this source was suggested at a time of scarcity when it had become urgently necessary to adopt some measure providing the earliest possible relief.

The spots selected for the sinking of the first well are in the city's 10-acre lot at the southeast corner of Liberty Park, and is at the confluence of the water sheds at Red Butte, Emigration and Parley's canyon streams, where the surface indications are excellent.

The work of sinking was entrusted to your commission, who solicited bids for letting it out by contract. The prices asked by eastern parties for sinking and furnishing well casing varied from $6 to $10 per foot, and in each case a guarantee of a profitable amount of work was required. Finally the offer of Mr. F. E. Roche of Ogden was accepted. A machine owned by him was guaranteed to penetrate to any required depth of strata similar to that anticipated by us. His services being required on the Bear River Canal, he would make no contract, but offered to sell the machine and guarantee its successful operation in the hands of men he would furnish to run it.

This was accepted by authority of the Council.

The cost of the machine was $2500, $1500 of which was paid down, and the remaining $1000 held in reserve by mutual consent until a flow of water satisfactory to the city corporation, or a depth of 1000 feet, was attained.

A nine-inch well was started on the 1st of August. By the 21st of the month a depth of 115 feet was attained and a fine stream of clear, cold water was in the pipe four feet above the surface of the ground, and flowed at the rate of over half a million gallons per twenty-four hours.

Driving was continued, however, with the object of drawing from still lower streams, which we then believed and have since proved to exist.

By September 4, 215 feet were driven. Here the breaking of the cable and consequent dropping of the tools to the bottom of the well was occasioned by the pipe buckling about seventy feet from the surface. Efforts to recover the tools proved futile, and were abandoned when it became evident that to recover them would cost more than their value. By cutting the pipe at the 115-foot level the half-million gallon flow can be had at any time and is in itself a profitable return for the outlay.

The actual cost of sinking and casing the first 115 feet was $3.79 per foot; below this the average cost per foot was $3.25.

The possibility of obtaining a good supply from this source being demonstrated, negotiations were entered into early in November with Mr. Charles R. Beckwith of Richwood, Union County, Ohio, which resulted in his contracting to sink a number of wells, the cost of which shall be $2 per foot, the city to furnish pipe, machine and fuel.

And if work amounting to $5,000 is furnished the contractor, it becomes optional with the city whether he shall purchase the machine for $2,000 or receive a uniform price of $1.75 per foot for the total number he has sunk. Pending the result of the work, he receives only 50 per cent of what becomes due.

From experiment with a number of drive wells in the vicinity of Liberty Park, some of which are down 260 feet, we find the most profitable pipe for the artesian wells to be one of a diameter of not less than 8 inches, for the following reasons: The difference between the flow of the 2-inch and the 9-inch pipe is in about the ratio of the square of their respective diameters, for while the flow from a 2-inch pipe is 21,600 gallons, that from the 9-inch, at the same depth, is fully 500,000 gallons per day.

Moreover, we have demonstrated that a flow of water from a 9 inch pipe is obtained at about one-third of the cost of obtaining the same amount from 2-inch pipes.

Pursuant to special instruction from the council, a number of drive wells were sunk to supply the urgent demands for drinking water in parts of the city not provided with mains. These were mostly 2-inch pipes, and varied in depth from 20 to 450 feet; the sum of their depths amount to 5,526 feet, and their daily flow aggregate a little over 400,000 gallons.

We desire to impress the fact that a daily supply of 8,000,000 gallons can be secured in the vicinity of Liberty Park, by sinking about twenty-four wells; twelve to the 115 foot level, and twelve to 260, the cost will be about $4.50 per foot, at a total of $20,250.

Such supply will flow by gravity to all lands below the northwest corner of Washington Square and south and west of the Utah Central depot, or it may be turned off and become a reserve for seasons of scarcity similar to the past.

To conclude this reference, the daily flow from the city's wells sunk in Utah Valley under the supervision of the city watermaster was, at the time of measurement in August, over 5,000,000, or as much as the past season's average daily flow of City Creek. This is increasing, and can be increased indefinitely, by sinking other wells. This water can be conveyed to the canal through the Jordan River, and arrangements should be made with the canal companies for taking this amount from the stream in addition to the city's proportion of the natural flow. If this cannot be done and the water is needed another season, it can be conveyed from its present source to the city canal by a flume or wooden pipe, about five miles long, but this would cost not less than $12,000 per mile.

SALT LAKE CITY CANAL.

In suggesting canal improvements we must bear in mind the permanency essential in this important water war; and while immediate needs demand temporary improvements, the expenditure of every cent should be made with a view to the most permanent result possible. The canal was originally constructed with a bottom width of 20 feet, side slopes of 1 to 1 and a depth of 4 feet.

Between Jordan River and Sugar House Ward the gradients vary from 30 to 19 inches per mile, and between the latter point and the city the controlling gradient is unfortunately almost level.

When in fair condition the daily discharging capacity of the canal, as calculated from the above dimensions, with a gradient of one foot per mile and an allowance of 15 per cent for seepage and evaporation, is as follows:

	GALLONS.
For 1 foot depth of water	6,413,956
For 2 foot depth of water	22,164,413
For 3 foot depth of water	45,408,760
For 4 foot depth of water	75,433,279

Its failure to even partially fill this requirement led to our running a line of levels over it. From the head of the city flume on Second South street to the sill of the headgate of the canal, the distance is 27 4.10 miles, and the difference in elevation 82 2.10 feet, which gives an average available grade of thirty-six inches per mile. Had the gradient established at the upper end been continued throughout the canal, its dimensions could have been reduced and its carrying capacity augmented without increasing the cost.

On the 21st of May the Jordan river was gauged at the dam in the narrows, with the object of dividing the stream into six equal parts, one of which belonged and was turned into the city canal. The daily flow was 218 424-1000 cubic feet, or 141,161,315 gallons; of the one-sixth, or 23,526,886 gallons, delivered to the city canal, barely six millions reached the Sugar House Ward, showing a surprising loss of 75 per cent in twenty-four miles. A great proportion of this loss occurs in the loose, gravelly soil of the Cottonwood bottoms. The flow of the Jordan in the latter part of August and September was only one-fifth of the flow in May.

The growing importance of the city canal suggests the conclusion that ere long it will have to be superseded by a masonry conduit. This will consist in paving bottom and sides with suitable stone laid in cement, and cannot be built to the canal's present dimensions, for less than $5.60 per linear foot, or $29,568 per mile. By reducing bottom width of canal to twelve feet, side slopes remaining 1 to 1, and gradient of 1 foot per mile, and an ample allowance of 1 per cent. for evaporation, the daily discharge will be as follows:

For 1 foot depth of water	8,090,679 gallons
" 2 " "	26,027,687 "
" 3 " "	52,557,206 "
" 4 " "	87,851,630 "