

colating for a distance of three or four miles, springs to the surface and unites with the main stream at the upper end of Pleasant Valley; while between this latter point and the head of the water works considerable actual loss occurs. This can be prevented in the future by straightening the channel of the creek and extending up to Pleasant Valley the stone aqueduct now built along North Temple Street.

This canyon contains several sites for the construction of small reservoirs, or impounding basins, away from the main creek, the principal one of which is Little Valley. To the courtesy of Mr. C. L. Stevenson, who made the necessary surveys, we are indebted for an estimated cost of storing 80,000,000 gallons at the latter place, which he states can be done at a total cost of \$44,500, or \$556.25 per million gallons. We do not recommend reservoir construction in this canyon, unless a series of small ones should be built, but the cost per million gallons impounded by this means would be at least 200 per cent greater than would be the cost of storing in one large reservoir, and the latter is objectionable in standing a constant menace to the city; for while no engineering difficulty besets the construction of a substantial and safe dam, the bed has not yet been proven fit for the requirement, and the sedimentary deposits would soon become troublesome.

It is our opinion that the plan of development already applied, and which has been productive of the marked increase above noted, should be vigorously prosecuted. If results similar to those already attained characterize future operations, the cost of increasing our daily supply from the City Creek will be nominal compared with the method of obtaining the same amount by small reservoirs. We therefore recommend that the work of development be continued.

RED BUTTE AND EMIGRATION CREEKS.

When gauged on April 26, the flow of Red Butte was 1,094,669 gallons, and that of Emigration 1,013,444 per twenty-four hours. These streams were temporarily augmented in May by storms and rapidly melting snow; but by the middle of June the flow had receded below the discharge of April 26, and the average flow of each has not exceeded 1,000,000 gallons per twenty-four hours for the season.

The only water available from Red Butte canyon is any amount which may be in excess of Fort Douglas requirements. We are reliably informed, though, that the original settlers of the section now embraced in the Tenth and Eleventh wards made due appropriation of this water; still it has been diverted from them, and no compensation rendered.

The supply from Emigration Creek can doubtless be increased very materially by the method of development applied in City Creek canyon, since from examinations made we find that the flow a few miles up the canyon is greatly diminished at its mouth. This canyon contains an excellent reservoir site

at its mouth, which may be utilized if ever necessity demands; but it is objected to on the ground that we object to constructing any large reservoirs in the direct course of any of our canyon streams.

PARLEY'S CREEK.

The city corporation has acquired claim to eighty-two one hundredths of the volume of this creek by right of purchase and of exchange for water to be drawn from the city canal.

On April 27, 2,419,856 gallons of water were running into the city's ditch, constructed across the east bench from Parley's canyon, and 1,177,380 gallons were passing down the canyon, making a total daily flow of 3,597,236 gallons, exclusive of a considerable amount used on farms in the canyon. On May 27 the flow was again measured to apportion off the city's share, but the storms of the week previous had augmented the daily flow to 8,957,140 gallons; so under the conditions, those entrusted by the city with the division refused to make it. It was finally divided on June 3, when the daily discharge was found to be 4,725,733 gallons, the farmers in the canyon at the time using the full amount claimed by them.

A condition of the trade for the Parley's Creek water provides that the original owners shall resume their claim to it whenever the canal water fails.

Owing to unprecedented low water in Utah Lake and the condition of the canal it failed to deliver to the farmers a substitute for their canyon water, so they were compelled to enforce the conditions of their agreement, and when it was most needed by the city the water was turned off. Although the water shed creating this stream is greater than that of City Creek, its topographical features are of such a nature as to occasion a heavier flood discharge in the spring; which, however, diminishes by August to a volume not greater than that of City Creek, so that the city's right to 82-100 of it, without further development, in seasons similar to the last, amounts to about three million gallons daily. Since this supply is suitable for either culinary or irrigation use, and will flow by gravity to any necessary elevation in this city, it becomes at once an object worthy of the greatest effort to secure. Hence we would suggest the wisdom of appropriating every opportunity to increase the city's interest in the canyon; not alone because they should own the water, but also because they should have the power to keep it pure by removing the outhouses, stables and manure piles which at present tend to befoul it.

Through our examination of awards of rights, made by the board of water commissioners acting by authority of legislative enactment of 1880, we find that 162 acres were endowed with primary, and forty-five acres with secondary water rights; in all 207 acres. Last summer water for the irrigation of between five and six hundred acres was taken from the main creek in the canyon.

We emphatically suggest that a more judicious act than the purchase of these water rights cannot be considered by the city.

Parley's canyon has an excellent reservoir site in the Mountain Bell gorge. This contains a storage capacity for every drop of surplus water Parley's creek can ever furnish.

We report no estimate of the cost of utilizing this site, because we do not recommend the construction of a reservoir there at present, since improvements suggested in other directions can be more immediately effected, and this site left for future necessities.

From a careful inspection of Parley's canyon we are fully convinced that the supply here can also be greatly augmented by every means of development applied in City Creek canyon.

COTTONWOOD AND MILL CREEK.

Cottonwood and Mill Creeks were each given a share of attention. The former is used to irrigate some 7,800 acres of farming land, while the latter has 3,200 acres dependent upon it. The water of Cottonwood is, for culinary use, superior to that of City Creek or Parley's Creek, but available only at great cost of purchase and transportation. Several reservoir sites at the head of Big Cottonwood Canyon were filed upon last summer by the farmers. Being satisfied that the cost of purchase, storage and transportation will be much greater than will that of securing an adequate supply by means of the city canal, we abandoned, for the present, all plans dependent upon this source. The possibility of obtaining an interest in one or both of these creeks will be referred to in connection with the city canal.

NATURAL SPRINGS.

Beginning near Liberty Park, and extending twelve miles south along the mountain base, are numerous springs of excellent water, which, during May last, flowed in the aggregate 25,000,000 gallons daily. Two important streams have their source amongst these. The Hanauer stream is created by springs in the Cottonwood bottoms, which appear at elevations from 42 to 116 feet lower than that of the city canal where it crosses the bottom in which they use. It falls a hundred feet to the Hanauer smelter, for whose use it is appropriated, and flows thence to the Jordan River. During May it had a daily flow of 11,689,660 gallons, which by September had declined to 7,000,000 gallons. The Pratt Brothers' recent offer was based on their appropriation of this stream after it has passed the smelter.

Your commissioners are of opinion that the diversion of this water from the Jordan river, into which we are reliably informed it has run since the first settlement of the Territory, cannot be maintained, except by direct purchase from all parties interested in its use below the point of confluence with the Jordan. We therefore pronounce this plan not suitable for present consideration.

The Husler mill stream is created by springs in the vicinity of Mill