

# Fort Collins Courier, June 14, 1883

## **Our Water Works General Review of the Works, Machinery and Pipe Line An Excellent piece of Work by Honest, Careful and Praiseworthy Contractors**

It is finished. Thursday witnessed the completion and found testing of the water works system of the city of Fort Collins and the consequent advancement of the city from an ordinary town, dependent, in case of fire upon an embryo (new) bucket brigade or hook and ladder company for the protection of its massive business edifices and palatial homes, to a city high in the rank of Colorado trade centers; from the paltry safeguard provided by a few terror stricken men, supplying their water pails from a ditch, to the powerful force of a dozen or more huge torrents of water, from the domestic insufficiency of a water wagon or an alkali well to the never failing supply of pure water, direct from the melted snows of the mountains. Its incalculable importance and prospective benefit will warrant us in a short description of the appointments of this enterprise.

### **THE SUPPLY DITCH**

The supply canal taps the river about 100 feet below and the head gate of the Mercer ditch, and passes under the Greeley, Salt Lake & Pacific railroad a few rods east of the Point of Rocks. The head gate flume is fourteen feet in width and is constructed of the most substantial and durable manner.

The water, immediately after passing under the railway, is discharged into a large settling basin. Thence it is conducted along the base of the bluff, and just below the Mercer ditch, at a grade of nine inches to the mile, a distance of something over a mile to the crossing of the LaPorte road over the Mercer ditch into the main reservoir. This reservoir is 220 feet in diameter, and eight feet drop. The capacity of the reservoir, canal, and settling basin is, in round numbers, 7,500,000 gallons, a supply sufficient for any emergency.

### **FILTER**

In the centre of the reservoir is constructed a filter, through which all the water supplied to the city will pass. This structure 16x33 feet on the outside, constructed with double walls made of 2x8 plank, laid flatways one above the other, with two inch

interstices between each laying. A three feet, eight inch space between the walls is filled with gravel and sand, through which the water will percolate into a basin 4x25, and eight feet deep. From this the water is drawn into the supply pipes, and forced into the mains and distributed all over the city.

## **FLUME AND PENSTOCK**

Leading from the reservoir to the penstock and forebay is a strongly built and substantial flume made of 12x12 timbers, framed and bolted together and planked with three inch plank. The water to drive the wheels, which in turn drive the pumping works, is discharged from the flume into a penstock 10x16 feet, and 24 feet high. This is built of 12x12 timbers, substantially framed and bolted together, and planked up with heavy planking. The floors of the penstock are double, the lining being three inch plank, jointed beveling and fitted tightly, and then caulked with oakum, pitch and tar. The upper course is laid with two inch plank, jointed, fitted and caulked in the same manner. The penstock and forebay rests upon solid masonry, laid in English Portland cement. The forebay, where water wheels (turbines) will be placed, is 8x16, and is simply an extension of the penstock, but not so high, and constructed in the same manner. The two large American wheels (turbines) work under a head a twenty-two feet, which gives them 150 horse power, of which, only 15 horse power will be required for use under ordinary circumstances.

## **PUMP HOUSE**

Next below and adjoining the forebay comes the pump house, a brick structure resting on a stone foundation of solid masonry, 22x28 feet square and 14 ½ feet high from floor to ceiling. In this building are placed the Gaskill horizontal pumps manufactured by the Holly Manufacturing Company of Lockport, N.Y., which, when run together, have a capacity of 2,800,000 gallons every twenty four hours, or a daily discharge of 1,300,000 more than the contract calls for – an expense which is borne by the contractors themselves.

The pumps are placed on stone piers, four in number, are each twenty feet high and 3x9 feet in size, and extend some six inches above the floor of the pump house. The cap stones on the piers are in one block and eight inches in thickness. To these capstones the pumps are securely bolted down with strong iron bolts. Underneath the pump house is a subterranean archway twenty two feet in length with fourteen feet breast and seven foot spring of immense strength, built of stone, each stone being cut and fitted for its own peculiar position and each forming a key stone for the whole structure. The side walls of the arch are three feet thick and the foundation walls four and a half feet thick, deeply imbedded in the ground. Under this archway the water

passes the water wheels (turbines), escapes, and finds its way back into the river through a long tailrace.

## **PIPELINE**

Below we give the line of pipe on each street, and cross streets which it terminates:

- Mountain avenue, the entire length
- College avenue, from Maple street to Agricultural College grounds
- Linden street, from Mountain avenue to Willow
- Olive street, from Matthews street to Howes
- Mulberry street, from Matthews to Howes
- Jefferson street, from Mountain avenue to College avenue
- Walnut street, from Mountain avenue to College
- Matthews street, from Mulberry to Olive
- Howes street, from Mulberry to Olive
- Peterson street, from Mountain avenue to Oak street
- Oak street, from Peterson to Whedbee

## **THE PIPE**

The pipe used is fast superceeding the old cast iron, especially where freight is an object to the purchaser. It is of wrought iron, three sixteenths of an inch in thickness, and manufactured by the National Tube Works company, of Chicago. It is fully tested, before shipping, to a pressure of 400 pounds to the square inch, and coated, while still hot, with a secret preparation which renders it entirely impervious to the action of rust or acids. As an additional precaution, however, the entire pipe was coated, before laying, with a thick mixture of coal tar. This pipe is being extensively used throughout the east, and the manufacturers, within the past three weeks, have been given a contract for furnishing seventy miles, to be laid in Minnesota. The Salida system also employed it, as did Longmont, Buena Vista and Fairplay.

## **TERMS AND FIGURES**

The original contract price between the city and Russell & Alexander was \$74,450, provide the city should build all bridges and flumes, and the penstock forebay, foundations, tail race and arch, and all the work not covered by specifications. After the work was underway, the board of trustees, by resolution, requested the contactors to complete all the above named special work at actual cost, with the addition of ten percent as their commission.

The following is the number of feet of various sizes of pipe used:

- Ten inch pipe.....22,500 feet
- Eight inch pipe.....2,500 feet
- Five inch pipe.....13,000 feet
- Four inch pipe.....2,000 feet

The additional pipe required, by reason of various changes in plans of laying is:

- Eight inch pipe.....1,000 feet
- Five inch pipe.....400 feet
- Four inch pipe.....2,000 feet

Twenty double hydrants are distributed about the city at the most desirable corners, while the residence portion is mostly supplied by single hydrants to the number of eleven. All have independent gates at the base to shut off the water, either to prevent freezing in them, or for the purpose of making repairs. Fifteen valves complete the list, which render it easy to shut off water from any desired portion of the city in case of fire in another part, or for repairs.

## **THE CONTRACTERS**

It is a sincere pleasure to recommend the gentlemen who have so successfully and satisfactorily completed this gigantic piece of work in such a short time. Not only have they carried out their agreement in every particular, but also incurred much extra expense on their own account, that the city might be thoroughly satisfied, and their good business reputation sustained.

Among the contracts which Russell & Alexander have successfully filled, we mention the following cities, where systems have been laid:

Colorado Springs, Leadville, Golden, South Pueblo, Bessanner, Silver Cliff, Ouray and Salida in Colorado; Las Vegas; N.M.; Topeka and Emporia, Kansas; Burlington, Iowa; Winona, Minn.; Hyde Park and Lake View, Ills. From Fort Collins they go to Pueblo, where they have a contract on the state insane asylum.

## **THE CITY DEBT**

The taxes in consequence of the building of the Water Works which many have feared would be exorbitant, will, in proportion to the convenience and benefits derived, prove quite reasonable; indeed, taking into consideration the amount formerly paid for the peddled beverage; with many it will become a reduction. In 1881, the total taxes on city property were 27½ mills on the dollar. Last year this was reduced to 26½ mills.

It is estimated on good authority, that it ill this year fall short of thirty-five mills, which cannot be considered heavy.

## **THE TESTS**

It was a favorable day for testing the new Water Works, which scarcely a breeze and everything passed off on time without accident or blunder. A fifty foot hose with a 1 1/8 inch nozzle was attached to the following hydrants:

- Jefferson & Pine streets
- Jefferson & Linden
- Linden & Walnut
- Linden street & Mountain avenue
- College & Mountain avenue
- And in front of N. Weaver & Co's store on College avenue

At 10 o'clock the pressure gauge registered 120 lbs. to the square inch and the whole six streams were turned on. The pressure went down at once to 80 pounds, and during the half hour that the streams continued playing, fell as low as 50 pounds, by a gradual decrease. The highest stream thrown was in front of the Tedmon house and reached 105 feet above the hydrant. The lowest stream during the half hour was 86.8 feet, and the average height of the six streams was 95.5 feet. Taking the hydrants at Jefferson and Linden streets as a base; these hydrants being 12 feet lower than those near College and Mountain avenues. During the test there was a head of water on the wheels varying from seventeen to eighteen feet.

A second test was then made with a two inch nozzle and a single stream. This stream maintained for half an hour with a Siamese coupler, taking water from three hydrants, and was stationed in front of the Tedmon house. A stream was thrown 140 feet high with pressure at 110 pounds.

The next test was with four 1 1/8 inch streams with a pressure ranging from 120 to 102 pounds, the highest stream reaching 102.2 feet.

The last test was with two streams only and water was thrown 132.7 feet high. The greatest pressure on the pipes this morning was 205 pounds to the square inch.

Considering the low head of water, consequent upon the headgates not being sufficiently large from the Mercer ditch, the contract test was more than fulfilled; and Russell & Alexander further to agree to carry it out to the letter at anytime when the ditch will bear the amount of water necessary to give the full head on the wheels.

## RETROSPECTIVE

The subject of providing suitable means for supplying water for the city of Fort Collins, at once in sufficient quantity to be protection against fire, and desirable in quality for household purpose, has been in the minds of our most prominent businessmen and thinking citizens generally for more than two years past. In the summer of 1880, the newspapers of the city agitated different means looking to this end. One plan proposed and discussed was that of placing pumps at or near Linden Mills, to be operated by the mill power, and the City Engineer Handy, who from the very incipiency of the movement, has taken an actual and credible part in preparing plans, figures and data for the consideration of the city, was instructed to draft plans for the works of the kind referred to, in cost not to exceed \$35,000. Extended and exhaustive discussion results, however, in the belief that the project was not feasible, owing to the mill race being situated below a portion of the town, and consequently liable to receive seepage and refuse matter which would affect the water. Another method discussed was that of constructing a reservoir back of the Windsor Hotel to be supplied from the town ditch, but this was, likewise, abandoned, as the town ditch, it was feared, would prove incapable of sufficient supply. Mr. Handy, from time to time, as made seven or eight surveys in the attempt to secure a plan to answer the desired purpose at a minimum cost. Although, at the abandonment of the above methods, the project was virtually "indefinitely postponed," public sentiment still reiterated its demand, and the discussion of ways and means was kept up until the summer of 1882. During this time conflagrations of more or less importance has taken place in the city, destroying property of immense value, while the awe stricken citizen stood rooted to the ground in stupefied impotency. The burning of the Welch block, in the spring of 1880, with its destruction of life and \$40,000 worth of property, revived the subject for awhile, and the razing of the Keystone block, one of the best designed, and appointed in the state, on Friday September 15, 1881, served to increase the cry for "protection against fire." In the meantime, a special election was called in May, 1881, to vote on the subject of building a Water Works system according to the mill race plan. This was defeated by a majority of four votes.

Nor was this the loudest, or perhaps the most important, call made which could only be quieted by a Water Works system. The primitive water wagon, with its two slow mules, jingling bells and compound of alkali water, mud and seaweed, still made its semi-occasional rounds, to the detriment of the health, wealth, and happiness of the citizens of one of the fastest growing towns in Colorado.

In the summer of 1882 however, owing to the phenomenal growth and improvement of Fort Collins, coupled with the fire protection demand, matters began to assume definite

shape. A mass meeting was held at the opera house, while the city journals resumed the agitation of the subject with redoubled vigor. The result was the calling by the town board, of a special election on Wednesday, September 20, at the city hall. The plan, as submitted to the voters, provided that the works should not exceed in cost \$85,000, and to furnish water for 10,000 users, to be taken from the river about three and a half miles above town; guaranteed to give sufficient protection for fire purposes within eight minutes from the sound of alarm, to have a fifty-five foot head and water to be filtered from the river. The number of votes cast were 273, 182 being for the proposed plan, and the remaining 91 being divided among different plans, such as "for fire protection only;" "for city wells or reservoirs," etc. This virtually decided the matter in favor of the plan proposed by the board, and bids were at once advertised for.

Bids were received up to October 30, and the following day, Tuesday, October 31, the town board, after a session with closed doors, virtually awarded the contract to Russell & Alexander, though the papers were not formally signed until November 5<sup>th</sup>. Six days after the contract was signed the contractions commenced work on the excavation of the reservoir and canal.

The system, machinery and materials adopted by the town board were only decided upon after careful and thorough investigation, and the examinations through a committee appointed by the board – consisting of Trustee Abner Loomis and W. F. Watrous and Engineer Handy – of the Works, adopted and the satisfaction attending each at the following points in the state: Longmont, Salida, Canon City, Pueblo, Colorado Springs and Denver. The board of town trustees who pushed the affair to focus, and awarded the contract for the system to Russell & Alexander, was composed as follows: George S. Brown, Mayor; Frank P Stover, Recorder; H.E. Tedmon, Abner Loomis, W.F. Watrous, and Jay H. Boughton, Trustees; Charles II Sheldon, the present city treasurer, was town treasurer at that time.