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GRAVITY SEWER

Expert Engineer Croes of New York Reports on It.

THE SCHEME IS FEASIBLE.

The Estimate of $325,000, Says Mr. Croes, is a Liberal One.

THE IRRIGATION FEATURE.

The Method of Construction Described as Well Devised and Economical.

The following report from Expert Consulting Engineer J. J. Croes was read in the City Council last night: I have the honor to report the results of the examination I have made at your request, with reference to the most advantageous method of disposing of the sewage of Salt Lake City, and especially with reference to the plans prepared by Mr. A. F. Dowson, city engineer, for the conveyance of the main part of the sewage by gravity to a closed conduit to a point several miles north of the city, where it can be utilized for the irrigation of land.

In order to have a proper understanding of the case, it is necessary to first examine the topographic features of the city and vicinity.

The Wasatch range of mountains forms the easterly boundary line of the Salt Lake Valley. These mountains rise abruptly from the plain, which is a level 4240 to 4250 feet above the sea for about ten miles from Great Salt Lake, and then rise to the south at the rate of about two feet to the mile for about ten miles further, beyond which it rises more rapidly.

Through this valley, nearly parallel to the mountain range, and five miles distant from it, a channel eight to ten feet deep has been cut by the river Jordan, a stream fed by Utah lake and discharging into Great Salt Lake, which has no visible outlet, and the water level in which fluctuates several feet, in a series of years, according to the temperature and precipitation of rain in the mountains, the annual rainfall on the lake and in the valley being only about eighteen inches per annum.

About thirteen miles from the mouth of the Jordan river at Red Butte canyon, the Wasatch mountain range advances sharply towards the river about three miles, and this advanced range is underlaid with hot and sulphurous springs. In the cove thus formed, there has been created by the wash from several canyons in the mountain range, an immense bed of material, creating a plateau sloping from the mountain to within about a mile of the river at the most advanced point of the Hot Springs mountain, and trending southerly to a distance of two miles from the Jordan in about three miles.

On this plateau is situated Salt Lake City. The city limits also include the bottom lands along the river bank on each side, the land on the east, varying as above stated, from one to two miles in width, and that on the west being almost level for several miles, and far beyond the city boundary.

The streets of the city are laid out at an angle of about 45 degrees with the line of the face of the plateau, so that the surface drainage of all the territory above the bottom lands bordering the river, is toward the south and west, while the ultimate disposal of the drainage water of all kind, must be to the northward, in accordance with the slope of the river and the valley.

It has been recognized by all those who have given the matter any attention, that the discharge of the sewage directly into the Jordan river along the city front could not be permitted. To discharge it into an intercepting sewer parallel to, and at the level of the river, with its outlet far enough below the city to avoid creating a nuisance, is impracticable, in consequence of the low elevation of the land adjoining the river, and the very insufficient slope to carry off the sewage in a pipe or sewer of practicable size.

In the system adopted, and now partially constructed and in operation, the sewage is all carried southwardly for about a mile from the highest street which runs through from the mountains to the river, and is then conveyed through Fifth South street for two miles to a well near the river bank, from which it is pumped during eighteen hours of the day through a 12-inch pipe two miles long, and discharged into a canal built to relieve the Jordan during excessive freshets, and is carried off in that canal to be discharged in Salt Lake.

This method of disposal proves to be expensive, and the pumping plant which has been put in is already very much too small for the work required, thirty per cent of the sewage which is now delivered at the pump well has to be allowed to flow directly into the river, and to pump the remaining 40 per cent over into the surplus canal, costing $20,000 per annum. The sewage which flows to the pump station is derived from sixteen and a half miles of sewers, affording drainage to 640 acres of property, out of the 2000 acres which are more or less occupied by dwellings and business houses above the low lands adjoining the river, and which ought to be all provided with sewer facilities at as early a day as practicable.

In making provision at this time for the disposal of the sewage from this section of the city, there ought also to be included an additional area which is rapidly becoming occupied by residences, in the southeast of the new city hall, and above the elevation at which it is situated. As nearly as can be estimated, the habitable area, more than thirty feet above the river, for which sewerage facilities and disposal ought to be provided, is 3000 acres. There is also an area of about 2000 acres east of the Jordan river, for which sewerage must some day be provided, and another area of 2000 acres west of the river which will need sewering. Both of those areas lie so low that there is no possibility of disposing of the sewage, except by pumping. The sewage from the 3000 acres lying at the high levels can, however, be disposed of by gravity without pumping or other means requiring constant skilled labor, and the question for us to consider is, whether the cost of so disposing would be greater or less than the apparently simpler mode of letting the sewage flow down to the lower level, and pumping it in some distant outlet, such as the surplus canal, or remaining it inoffensive, and discharging it into the Jordan river.

In considering these alternative plans for disposing of the sewage, the market values of the effluent is very important. In the climate of Utah, water is the one commodity which makes land not only productive but simply habitable, and the first thought which occurs to one on viewing the present method of sewage disposal in Salt Lake City, is that the city is expending annually a large sum to throw away and destroy absolutely valuable a sufficient quantity of water to render productive more than 2000 acres of farm land, and that, too, water of a superior quality for irrigation purposes to any that could be procured from natural sources in this mountainous, being not only enriched by domestic wastes, but raised in temperature.

In other climates where water is plentiful and the land needs other fertilizers to make it productive, many efforts have been made to utilize the solid products of city sewage and permit the water to flow to waste after having been rendered innocuous. None of those efforts have proven sufficiently remunerative to warrant their adoption, except as a sanitary necessity, and it would be folly to attempt them here, where the conditions which call for their trial do not exist.

The first point to which my attention was turned was, therefore, the existence of a locality to which the sewage water could be diverted with the greatest benefit and at the least expenditure, and the entire territory to the west and north of the city was examined with that in view.

Along the western limit of the city, between the base of the hill and the surplus canal, a distance of three to five miles, the ground lies so low that sewage from the hill cannot be distributed over the surface without being carried at least three miles in tile pipes under a head, and then either pumped from sumps or allowed to rise above the surface. In the latter case the conduits would be inverted syphons, in which the flow would be fluctuating and irregular, and they would certainly be frequently clogged by the deposits from the sewage, whether pumped or syphoned. There would be needed not less than three such conduits, five miles long, each capable of carrying off sewage at the rate of 13,000,000 gallons in twenty-four hours. In case of pumping there would further have to be not less than three pumps and pumping plants, capable of pumping a total 39,000 gallons an hour to a height of nearly feet. The annual cost of operating this pumping plant would not be less than $20,000 per annum, equivalent to the interest on $400,000. This is exclusive of the cost of the plant.

The present pumping plant, owing to an insufficient supply of force main, gives a duty equivalent to pumping 60,000 gallons an hour under a head of forty feet.

The territory on which this sewage would have to be distributed for irrigation is so low that it would be abundantly supplied with water by gravity from the upper waters of the Jordan.

This whole scheme appeared so unwieldy, complicated and expensive, that attention was turned to the project recommended by the city engineer for conveying the sewage of the plateau by gravity to a tract of land lying four miles north of the city, for which there is apparently no supply of water available, from mountain streams, all the water from the slope to the eastward being already utilized on lands directly at the base of the mountain.

The very thorough surveys made by the city engineer show that it will be practicable to intercept all the sewage flowing from the city, above a plane thirty feet above the Jordan, and convey it by a conduit of a total length of seven miles to the surface of the tract above mentioned, which lies between the foot-hills and the Jordan, has a soil suitable for immediate production of crops, if moisture is supplied, and extends with a gentle slope several miles to the northward.

I have carefully examined the line and profile proposed for this conduit by the city engineer, and am of the opinion that its construction presents the most feasible and economical method of disposing of the present and future sewage of so much of Salt Lake City as lies above the line, beginning at Liberty park on the south, and curving around past the new City hall, the Union Pacific railroad depot and the Deseret University, to near the Warm Springs bath house.

The method of construction proposed by the city engineer, partly of concrete and partly of brick, appears to me to be well devised and economical. In form and dimensions, I recommend that the conduit be circular section and of 42 inches diameter, laid on a grade of one foot in 2000 feet, from the corner of Fifth South and First East streets to the corner of Second South and Second West streets, thence of 48 inches diameter, on a grade of one foot in 2000 feet, to the junction of Fourth West and North Temple streets, and thence of 60 inches diameter, on a grade of one foot in 2000 feet for about 7,000 feet, to the terminus in section 12, at an elevation of about 4750 feet above the sea.

The estimates of costs prepared by the city engineer appear to be liberal, and so far as I have been able to judge of the cost of that character of work in this locality, I have no hesitation in saying that I believe the whole proposed work can be executed within the estimates.

As regards the existing pumping plant, while it is entirely insufficient for the present and future needs of the city there does not appear to be any practicable necessity for its enlargement, if the proposed gravity interceptor sewer is constructed at once. It will then be available for disposing of the sewerage of the bottom lands for several blocks north and south on Fifth South street. When the amount of sewage from this district shall exceed 10,000 gallons a day another outlet main will be necessary, and it would be advisable to lay that upon the gravity sewer and pump into that sewer, so as to utilize the sewage on the irrigation grounds, instead of pumping it into the surplus canal, where it can never be of use to any one and would be a nuisance to the adjacent lands, which are now being occupied, with all the proposed characteristics, it would be available for irrigation, and even if not needed there to be discharged into the river at a point where no habitations are likely to be built for a great many years.

If, in the experience of other cities would increase as likely, the enriched and tempered water supplied from the sewer comes into great demand, it will be practicable to increase the normal flow in the sewer by diverting a fair share of the surplus waters from City Creek and the other irrigation canals of the city, which are now permitted to run to waste to the Jordan. Such a disposition of the water might readily be made, pending the time that the population has increased to such an extent as to render the full capacity of the sewer needed for disposal of the sewage proper.

For the bottom lands north of Third South street an additional pumping plant will be needed in a few years, and the sewage should be carried from the gravity sewer at or near the Warm Springs. This whole district is so flat that it will probably be found advantageous to use some of the portable systems, which have proved effective in flat districts, and by which the sewage of small sub-districts is collected in a number of sumps and automatically forced by compressed air to a central pumping station. Such a system combines advantageously applied to the whole of the bottom lands on both sides of the river within the city limits, but the immediate needs of the city appear to demand the disposal and utilization of the sewage from the elevated and growing districts, and this can be most efficiently and economically accomplished by the construction of the intercepting gravity sewer recommended by the city engineer. Respectfully submitted.

STEERAGE PASSENGERS.

The Steamboat Lines Increase the Rates from Europe.

NEW YORK, March 3.—Agents who dispose of steerage tickets for the Red Star line, North German Lloyd and Netherlands American line have received circulars informing them of a renewal of steerage passenger traffic from March and an increase of rates. Steerage passage on the Red Star steamers from Antwerp will cost $32 instead of $30; Netherlands American steamers from Rotterdam, $32 instead of $28, and North German Lloyd have made a corresponding advance on their vessels from Bremen. Agents will renew the sale of steerage prepaid and return passage to all points of Europe except Russia.

For Eight Hours a Day.

LONDON, March 3.—Gladstone received today a large deputation of delegates representing workers in coal mines, who asked the government to support the enactment of a law establishing eight hours a day for employes in mines. Gladstone replied that eight hours could be legally fixed as the limit if the miners were morally unanimous in favor of such change, but practical difficulties existed in the definition of such legislation. He suggested local option as a possible way of meeting the difficulties and expressed the hope that the question would be debated at this session of parliament.

A Manitoba Town Burning.

WINNIPEG, March 3.—Large Wawanesa in southern Manitoba is burning. The town is without fire appliances. Particulars cannot be obtained.

The Immigration Bill Signed.

WASHINGTON, D.C., March 3.—The President today affixed his signature to the immigration bill, known as the Chandler immigration and contract labor bill.

A Badge for Cleveland.

WASHINGTON, D. C., March 3.—A pleasant incident occurred at the Arlington hotel this evening. This was the presentation to the President-elect of a badge in honor of his election to Sigma Chi, the Greek letter fraternity, into the mysteries of which he was initiated several months ago. The badge is a Roman cross of gold and white with four large diamonds between the arms and center diamonds, and it is said it could hardly cost less than $500.

Citizens Indignant.

LANCASTER, Penn., March 3.—There was considerable excitement and indignation caused here today when it became known that the steeple of one of the leading churches had been utilized as a sack pit while the pastor was holding services in the auditorium below. It is said a number of missing mains have been held there.

The leading sugar factory men, Messrs. Cutler, Granger and Austin, have returned from a successful beet trip to the valleys of western Colorado on the R. G. W. They succeeded in contracting for a large number of beets.

Index to This Paper.

PAGE 1—The Gravity Sewer—Proposed Improvements.
PAGE 2—City Council—Local News.
PAGE 3—Editorial—Miscellaneous Telegrams.
PAGE 4—Business—Serious Railway Accident.
PAGE 5—Business.
PAGE 6—Business—Sunday Reading.
PAGE 7—Sunday Reading and Correspondence.
PAGE 8—Correspondence—Editorial Comments.
PAGE 9—Correspondence—Sunday Reading.
PAGE 10—The Fire Death.
PAGE 11—New York Dock Laborers.
PAGE 12—The Mormon Battalion—Young Woman's Journal.

THE LAST HOURS

Business Transacted by Congress Last Night.

THE CONFERENCE REPORTS.

Bill Passed Over the President's Veto —Appropriations.

WORLD'S FAIR AMENDMENTS.

Corridors and Galleries Crowded with People.—Both Houses Held Night Sessions.

WASHINGTON, D. C., March 3.—The House for continuing block the on the five hours July 1, 1893, was spented back from the Senate conference and placed on the calendar with an amendment changing the time to July 6th.

After roses the corridors and galleries were jammed with people. The conference report on the deficiency bill was read and agreed to, and the senate rules to insist on the amendments not settled in conference, and to ask a further conference on to them.

The House then passed a resolution authorizing the state of Wisconsin to place in statuary hall at the capitol a statue of Pere Marquette who reported and passed.

The House bill, to authorize the issuance of 25 per cent on lines costing 100 to issue per square foot, the rate now approved by law, was passed with amendments making it take effect in 1895 instead of 1894.

The conference report on the sundry civil bill was then presented, showing several points on which the conference was unable to agree. Mr. Allison, in charge of the bill, said there were now in controversy only five amendments, and after the Senate should have agreed on the House bill, he would move that the Senate insist on the amendments, and ask for a further conference. The report was agreed to, and Mr. Allison proceeded to make a long statement of the amendments relating to the Columbian Exposition. Senator Allison's motion that the Senate insist on the World's Fair amendment was then carried.

Edwards presented the conference report on the Indian appropriation bill, and it was agreed to without debate.

Senator Hoar then called up the message of the House announcing that it had passed over the President's veto the bill providing for the appointment of a district attorney and marshal for the middle district of Alabama. It was passed, and therefore became a law notwithstanding the veto.

Allison from the finance committee submitted the report of the majority on the wholesale and transportation features of the committee investigation of the tariff act of 1890, and he gave Harris, a Democrat from Tennessee, to file a report for the minority.

By resolution the Vice-President was authorized to pay to his personal use the writing sent and appurtenances used by him during his term of office.

The aye and nay vote on the amendment to the celebrated Mediterranean claim bill, which was taken up in the Senate, found a quorum too, and a call of the Senate was dispensed.

The Mediterranean bill finally came to a vote and was passed, ayes, 37; nays, 12. It now goes to the President.

Hale then presented the conference report on the deficiency appropriation bill. It was adopted and is now ready for the President's signature, leaving only the sundry civil appropriation bill to be acted upon.

Time is being consumed in a vain endeavor to secure a quorum.

Senator Allison stated that the conferees of the sundry civil bill would probably agree within a short time.

Vilas leaves the Indian bill hanging fire, as the House has rejected the conference report.

The Senate further insisted on its Cherokee strip amendment to the Indian appropriation bill.

The Senate has adopted the conference report on the sundry civil bill.

WORLD'S FAIR APPROPRIATIONS.

The conference upon the sundry civil bill have reached an agreement as to the World's Fair items, the only remaining point of dispute. The appropriations for the object were fixed as follows: For government exhibits, $100,000; for commissioners, including $70,000, for the board of lady managers, $211,000.

For juroms' awards, etc., an appropriation of $570,000 is made, but it is also made a charge against the Exposition and the government must be reimbursed by the first day of November next.

HOUSE.

WASHINGTON, D. C., March 3.—Pending further action on the sundry civil bill Herbert submitted his conference report on the naval appropriation bill. The report was agreed to. Hitchcock submitted the conference report on the agricultural appropriation bill and it was agreed to.

Henderson submitted the conference report on the possible appropriation bill. In speaking of the report Lond took occasion to deny the statement made yesterday by Burkhead of Alabama, that there was a scandal over the selection of a site for the public building at San Francisco. The report was agreed to.

Consideration of the Senate amendments to the sundry civil bill was resumed. The World's Fair amendments were disagreed to and the bill was again sent to the conference. The House then took a recess until 8 o'clock.

There were present a vast flood of humanity when the House met at 8 o'clock after recess. On the floor there was not a quorum present.

Sayers submitted the conference report on the general deficiency bill. The main point of disagreement was the House amendment to the appropriation of the Florida soldiers' claims, and the Senate recedes from the Senate appropriation bill. Sayers explained the action of the House conferees. The conferees reported to the Senate approximate bill was then adopted. Considerable discussion between the two houses was the Senate non-concurrent relative to the Cherokee strip.

Pending the discussion of the conference report on the deficiency bill it was agreed to. The conference on the deficiency bill agreed to insist on the amendment relating to the Cherokee strip. The report of the Senate appointed the conferees. The Senate could agree on nothing in the appropriation bill. The Senate could agree on nothing in the appropriation bill. The House adhered to its action in the matter and asked a further conference. The Senate could not agree to the conference report on the sundry civil appropriation bill to be acted upon.

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