## ANNUAL REPORT

#### BY THE

# **BOARD OF COMMISSIONERS**

#### OF THE

# CITY WATER WORKS,

FOR THE YEAR ENDING DEC. 31., 1869.

TOGETHER WITH THE REPORTS OF THE

SUPERINTENDENT AND CHIEF ENGINEER, SECRE-TARY AND TREASURER, REGISTRAR OF WATER RENTS AND WATER PURVEYOR,

WITH

AN ANALYSIS OF WATERS,

BY

## Dr. JOSEPH JONES,

PROFESSOR OF CHEMISTRY, UNIVERSITY OF LOUISIANA.

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1870.

# REPORT OF BOARD OF COMMISSIONERS.

Office Board of Commissioners CITY WATER WORKS, NEW ORLEANS, 25th January, 1870.

To His Honor, the Mayor and Common Council, New Orleans:

In rendering an annual report of the administration of the trust confided to us, we feel it unnecessary to add any thing to the full and elaborate reports of the several officers herewith submitted.

These reports show how faithfully the officers have labored, and how successfully they have discharged the duties confided to them.

> F. H. HATCH, President, pro tem.

# REPORT OF SUPERINTENDENT AND CHIEF ENGINEER.

SUPERINTENDENT'S OFFICE, CITY WATER WORKS, NEW ORLEANS, 15th January, 1870.

To the Board of Commissioners, City Water Works :

GENTLEMEN: Herewith will be found the regular annual reports of the Water Purveyor, the Registrar of Water Rents, and the Secretary and Treasurer of these works, for the past year.

To give a clear and full exhibit, these reports have been made to include also the five months of 1868, during which the works were owned by the city, and administered by you.

The details are so full and explicit, both in regard to the condition of the works when received, the progress made in repairs, and the current operations, mechanical and financial, that they might well be submitted without comment.

A few remarks on the prominent points of interest, may not however, be out of place, and may prove of some value to those who appreciate the importance of an abundant supply of wholesome water.

#### CONDITION OF WORKS WHEN RECEIVED.

The works when transferred to the city on the first of August, 1868, were in a very dilapidated condition, from a long neglect

of current repairs, were entirely destitute of all stores for curren, use, and had their revenues paid up to include the 31st December, 1868. In this condition, with some \$40,000 of expenses to provide for before any revenue could be realized, and aided only by the depreciated credit of the city, you entered upon the administration.

At the close of the war, the works, from unavoidable causes were in a condition requiring extensive repairs and improvements. But the time being near when the question of purchase by the city under the original charter had to be decided, it was the policy of the owners to postpone all expenditures not absolutely necessary. The result was to leave the works, at the time of the transfer, in a very dilapidated condition.

The crib work at the river end of the inlet pipes, intended to exclude foreign and solid matter, were so decayed and broken as to be injurious, instead of beneficial.

The boilers for running the heavy machinery were so worn and burned, by long use, as to be dangerous, and to require constant patching.

One of the engine buildings, covering very expensive machinery, was in a condition to render it very dangerous, both to the machinery and to those using it.

The small reservoirs, upon which the city depends for its nightly supply of water, were in an unsound and unsafe condition, requiring extensive repairs. They were also nearly half full of sedimentary deposit, the accumulation of years, which could only be removed by tedious manual labor.

The fire plugs throughout the city, numbering nearly 1,000, were in a condition rendering them almost unserviceable, except as a means of supplying water to non-paying consumers.

The cement pipes laid in different parts of the city, incapable of bearing the increased pressure given by an improved working of the machinery, were found to require such expenditure for repairs as would justify their removal, and a substitution of iron pipe.

With this condition of the works, without a tariff of rates, and with no regulations or instructions to guide you, the labors of administration were commenced. Soon thereafter you were also charged with the adjustment of all the details of the terms of sale, and a settlement with the corporation from which the city purchased.

### FINANCIAL REPORT.

The report of the Treasurer shows how successfully the financial part of your labors have been performed. The income, from all sources, up to 31st December, 1869, including \$2,-921 79 only, received in 1868, was \$147,458 95. Out of this sum there was paid on account of 1868 :

	Extensions and repairs Operating expenses	\$11,771 29,053	66 87
	Total for 1868	\$40,825	53
or	1869: Extensions and repairs	44,049	89
			10

Making a total for the two years..... \$84,875 42

outside of operating expenses of 1869.

F

This sum is \$15,000 in excess of the amount necessary to pay the annual interest on the bonds issued by the city in payment for the works, and shows conclusively that the interest could have been paid by the income, after defraying operating expenses, had not the money been used for other necessary expenses. The appropriation of the current revenue to pay interest, after this, would have left the works without means for current operations.

The report of the Registrar of Water Rents will show conclusively that the city receives for its public supply a consideration far beyond what has been paid as interest, and this supply, in other cities, is regarded as a legitimate charge against the corporation, and not against the private consumer.

The Treasurer's summary shows that from one year's revenue, amounting to.....\$147,458 95

1st. The works have been operated for seventeen months.

2d. Extensions and repairs have been made,

nd	stores	accumulated,	costing	\$55,821	-99
-	-				10

lished, your balance on hand sufficient to carry on the works, and make current repairs, without sacrifices; and we have accumulated stores sufficient for current uses, costing over \$15,000.

#### TARIFF OF WATER RATES.

When the works came under your control, there was no fixed tariff of rates, except for private dwellings, the lowest charge for which was \$15 per annum. Your first act was to reduce this charge to \$10, and subsequently, in the tariff of 1869, to \$8. This charge though in excess of most other works, as the private consumer was burdened with the public supply, and cost of extensions and repairs, nevertheless had the effect to reduce the bills against at least two-thirds of the subscribers. Of the other one-third, not exceeding one-half were materially increased. The main increase has been to the large consumer, and has resulted from the introduction of the meter, never before used here. That unerring instrument has proved that, for domestic purposes, our people had paid at the rate of at least one dollar for a thousand gallons of water, whilst the large consumer, who used it in trade and speculation, obtained the same quantity at from three to ten cents.

The correction of this burdensome inequality, which was only partial in your tariff of 1869, was the source of all the complaints. The same opposition has been invariably encountered in other works, and has just been overcome after much difficulty, in the city of Baltimore, where a uniform charge of 20 cents per thousand gallons, has in many cases more than quadrupled the bills of large consumers.

1.4

Your present tariff for 1870, adopted after long study and comparison, is based upon the experience of other works for many years, is a great reduction from that of 1869, and moreover is a much nearer approach to uniformity. If the city would assume to pay but one-third the amount with which it is justly chargeable for the public supply, that item might be stricken from the bills of the private consumer, and the rates would then be as low, as the lowest in this country, and below any in Europe.

Nowhere have you been able to find an instance

where the public supply is delivered without consideration, and in most cases that supply is taxed and paid for as any other. It is not deemed just by the private consumer that he should be charged for what is used by the public, and complaints will continue, however low the tariff, as long as this charge is imposed. It is not in your power to remedy it.

An examination of the system of management in various works, shows several plans by which this burden is removed from the works, and placed on those benefitted.

1. In New York, as shown by the Registrar of Rents, the city simply pays as any other consumer. This rule also obtains in Louisville.

2. In some cities the property holder is assessed, as in case of paving the street, for the original cost of laying the main pipes in front of his property.

3. In other cities there is an annual tax per front foot on all property where main pipe is laid.

4. In other cases, again, in addition to one or more of the above conditions, every building is assessed the regular water rate, and it is collected from the owner, whether the water be taken or not.

The last plan has one great merit to recommendit. The charge being universal the rate may be made so low as to be almost inappreciable, and it at once removes, all motives inducing the use of impure and unwholesome water, now so prevalent in this city, to the great prejudice of the public health. This point will be more particularly illustrated in a report on the analysis of our water supply.

A very simple calculation shows that the property owner, by the extension of the pipe to his front, so as to supply water for street cleaning and extinguishing fires, saves on insurance four or five fold the charge made on either of the above plans, and more than would be necessary to pay his water rent for all domestic purposes.

The report of the Registrar of Water Rents, calls attention very forcibly to the injurious effect on the revenues by delay and vacillations in fixing water rates, and adhering to them. The loss in 1869 is estimated by him at a very low figure. A

low tariff, regularly and systematically enforced, if uniform, will produce more revenue than a much higher one, where discriminations are made in favor of certain classes, and constant agitation is kept up on the subject of change.

The works are self-sustaining under the present low tariff, only because of the very economical administration and of the high credit they enjoy. Never having had a bill postponed after payment was due, you have been enabled, even when temporarily without money, to procure supplies at the lowest market rates, and to select the time when those rates were most favorable.

Your year's supply of coal, for instance, was purchased at 52½c per bbl., when no other department of the city government could obtain it for less than \$1 00. This favorable condition cannot be continued, if the funds of the works are diverted or even mixed up with the other finances of the city, now so greatly embarrassed. The sum to be obtained would not be sufficient to afford any appreciable relief to the city treasury, and its withdrawal from the water works would greatly embarrass their operations and increase their expenses.

On this point, as on that of a tariff, it might be well to consult the long established rules of other cities before attempting doubtful experiments. Uniform practice, based on long experience in a complicated business, is generally considered a better guide than the crude and undigested notions of even the ablest men.

#### REPAIRS, ALTERATIONS AND EXTENSIONS.

The report of the Water Purveyor states the progress which has been made in the repairs of the works, so dilapidated when the city purchased, and indicates the necessity for further heavy expenditures. These can be made gradually from the income of the works.

A new engine house, new boilers, and boiler shed, are absolutely necessary. A coal shed should also be erected, as soon as funds are available.

Another work of the first importance will soon demand a large expenditure, unless some compromise can be made to avoid it. A short time before purchasing the works, the city sold to private parties the batture lots between the pumping machinery and the river, through which the inlet pipes pass. The holders of this property now propose to sell it, for building purposes. To erect heavy buildings over these pipes, such as are usually constructed on levee property, would almost certainly cause them to leak, and thus cut off the water supply. The property should be repossessed by the city, or the pipes be removed to the adjacent street. It was a shortsighted policy which caused the sale of the property, and its repurchase could doubtless be made at much less than the cost of removing such heavy pipes from such a location and relaying them. An early settlement of the question is urged, as further delay can only complicate it, and probably increase the cost.

To equalize and properly distribute the supply of water, the large 30-inch main on Delta street should be extended up to the pumps, and from Canal it should be extended to the lower limits of the city. This would give a basis for the general distribution throughout the territory below the pumping works.

The annual cost of repairing the cement pipe, about four miles in length, is so great as to induce the recommendation that it be removed, and iron pipe laid as soon as practicable.

The antiquated fire plug now disfiguring our streets should be replaced by some more modern appliance, suitable to the demands of improved machinery for extinguishing fires. No fire department can do itself justice without an ample supply of water, promptly furnished. After repeated experiments, both the fire and water departments agree that, for our peculiar topography, where an elevation for reservoirs cannot be had, the "FIRE WELL" is the best and cheapest means yet devised. In every instance, fires occurring in the vicinity of those wells already located, have been promptly extinguished, with comparatively trifling loss. The saving of property already, by the few in use, has been sufficient to pay many times over the necessary cost of placing them throughout the city. Were there no other advantage resulting, the saving of water alone, so lavishly wasted by the old system, would soon co m pensate for the change.

I respectfully recommend that *free drinking hydrants* be established at suitable points, where our poorer classes and labor-

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ing people, when absent from their homes, may readily obtain a cup of water, without the necessity of entering drinking saloons. Many of these people are separated for the whole day from the supply they have paid for at home. It can be done at small cost, and would doubtless contribute to the public health and public morals. The quantity of water necessary to supply the whole demand would not equal that taken by the one public horse trough.

## WATER SUPPLY.

## CONSUMPTION AND WASTE.

In seeking a source of water supply, we must examine first its quality; second, its quantity; and third, the cost of introduction.

Unless the quality is such as to recommend it as wholesome and suitable for domestic purposes, it is useless to look further; for the more abundant the supply, and the cheaper it could be had, the greater the objection. The quantity to be obtained should be sufficient to meet all reasonable prospect for future increased consumption. And the cost must be within the available resources of the community.

We are eminently blessed in having the three conditions fulfilled, in the immense volume which the Mississippi unceasingly pours by our very doors.

# ANALYSIS OF THE WATER SUPPLY.

Some prejudices, in the absence of scientific analysis, have existed against the water of the Mississippi, predicated almost entirely on the appearance given by the matter held in *suspension*. We have been long taught, however, by the habits of our oldest settlers, and by the constant practice of our seafaring people, to regard this water as pure and wholesome. To place the matter at rest, and beyond question, specimens of the water were submitted to the able Professor of Chemistry in the University of Louisiana, Dr. Joseph Jones, whose report is submitted herewith. It will be seen he pronounces the water of the Mississippi, obtained by our works, remarkably pure and wholesome. Even the few foreign substances found—principally common salt and carbonate of lime—are regarded by him as beneficial in such small quantities.

The great purity of the Mississippi water at this point is readily accounted for. The waters of all streams are originally derived from springs and surface drainage. The former bring from the bosom of the earth, in solution or suspension, large quantities of inorganic substances, and the latter add immense amounts of organic matter, swept from the surface. For several hundred miles above New Orleans, owing to the peculiar topography of the country, no streams enter the Mississippi, and all surface drainage is from the river. During the passage of the water over this distance, substances thus held, and brought into contact with each other, and with the oxygen of the atmosphere, by the constant agitation and motion of the water, are decomposed, and the elements, reuniting, form new compounds, generally innoxious, the gases escaping into the atmosphere, and the solids subsiding. In this way nearly all deleterious substances brought with the Mississippi are disposed of before the waters reach this point. Doubtless the mere trace of organic matter found is added to the water after it reaches the settle-

The immense volume of water contained in the Mississippi, however, renders it almost impossible for us to contaminate it. The sewage of London, thrown into the Thames, and that of Paris, into the Seine, have a decided effect on the waters of those streams, for a short distance; yet it is found to be rapidly changed, and almost disappears within a few miles. These waters, too, used in London and Paris, receive the drainage of a thickly populated country down to the point of supply.

ments just above the works.

Considering the great volume of water discharged by the Mississippi, even were it not relieved of the surface drainage, for so great a distance above us, the location of half the civilized population of the world on its banks would not contaminate its waters to the extent now produced in the Thames and Seine, whose waters are used in London and Paris.

The water of the Tangipahoa river, taken from a point about forty miles from the city, was also analysed. It is found both clear and pure, and were it not for its distance, and the cost of introduction, it would be a better source of supply even than the Mississippi.

### WELL WATER.

In all thickly populated places, the well waters soon become contaminated by the percolation of sewage matter, and after long use the soil becomes so impregnated as to render the water absolutely poisonous.

In London the terrible mortality from cholera has been readily traced to the use of such poisonous waters, and the wells have been filled, under the authority of law. In New York the same thing has occurred within a few years, chemical analysis proving the water a clear sparkling liquid poison. The wells of Augusta and Savannah, originally supplying most wholesome water, from beds of pure white sand, have become so contaminated as to poison the very animals forced to its use. The sad poisoning in the National Hotel of Washington City, a few years since, is traceable to the same cause.

With all these examples before us, it is yet difficult to prevent the use of such poison. Within a short time many of these death-dealing wells have been sunk in this city, and the water, because it is clear and sparkling, is pronounced of superior quality. It is even said to have a decided mineral taste, due, doubtless, to the foul excrement it is proved to contain. Especial attention is called to the analysis of two specimens of this water, taken from wells in the most public places, in the very heart of the city. It is unnecessary for me to comment on the conclusion of the learned Professor—"that these well waters compare unfavorably with the drainings of a graveyard."

These foul cesspools have been pronounced a great success, and the proprietors congratulated on having their own water works.

When used for either drinking or cooking, or in the manufacture of anything, as beer, whisky, cider, syrup, bread, or other articles to be taken internally, this water is a sure and certain poison, and its use ought to be prohibited here, as in other cities.

#### EXTENSIONS.

Economy and health both demand an early and very large extension of the works.

The saving on insurance alone, would, in a few years, pay the whole cost. If the city cannot accomplish the work on a scale commensurate with its importance, it may be well to invite private enterprise and capital. No other city in this country, of half the population and commerce of New Orleans is without an adequate water supply, and all make annual additions, in proportion to the progress of population.

#### DAILY SUPPLY AND WASTE.

The quantity of water delivered in the year was 1,915,963,251 gallons, or a daily average of 5,249,214, being a reduction of 1,017,043 gallons on the daily average of last year, due to the use of the meter, and partial suppression of waste. This gives a daily average to each person for 1869, allowing ten persons to each hydrant in use, of 95 gallons. The highest average in any other city of the United States is in Boston, sixty gallons, and the general average does not exceed forty-five gallons. This excessive use and waste is sufficient reason why the water rates should be higher than in works where only half the quantity is taken, and were it not for the comparative economy with which the works are run, they could not be sustained. Consuming at least double the quantity of water, our people, under the present low tariff, are receiving it for about one-half, what it costs in other cities of this country.

The public consumption is enormous, owing principally to the habit of running the water in the street gutters to do the work of scavengers.

The result is to cover the filth, or wash it back on the poor resident in the rear, there to reek, decompose, and pollute the atmosphere, at the expense of the public health. If this waste be considered necessary, it would be great economy to erect separate pumping works to deliver the supply. The water now used is raised on an average 70 feet above the river for the purpose of pouring it into the street gutters; ten feet would accomplish the same purpose, and six-sevenths of the expense might be saved.

Being considered public property, no one seems to care how much water is wasted, and public hydrants are opened by everybody, and permitted to run at all hours. The consumption at

the City Hall, for instance, is found by meter to be 6,000 gallons daily, enough for all domestic purposes in sixty families. A public horse trough on the levee is found to take 24,000 gallons daily. In the markets and other public places, the same extravagance prevails. Having no control over these abuses, the water works cannot be responsible for the results.

The effect is to render a higher water rate necessary, and the party guilty of the abuse is generally the first to complain.

#### HYDRANT PLATS.

A very valuable addition is being made to the records of the works, in a complete set of Hydrant Plats. No such record has ever been kept in the office, and no knowledge of the location etc., of private attachments existed, except in the memories of old employes.

It was often the work of days, to find a stop-cock, or a private pipe, so as to exercise control over the water supply. The work is tedious, and elaborate, taking much time and labor, and is done by the meter inspector, H. Oladowski, in the intervals of his other duties. The whole of the works above Canal street have been carefully surveyed and mapped, and he is now engaged on the district below. The great value of the work is already appreciated by those whose duty it was formerly to hunt for this information.

For any further information on matters of detail, I beg to refer you to the enclosed reports, from the officers in charge of the respective branches.

To those gentlemen I have been indebted, for a faithful support, and efficient discharge of duty.

To the members of the Board, I beg to acknowledge my obligations for the kindness and confidence they have uniformly extended to me.

> Respectfully submitted, BRAXTON BRAGG, General Superintendent and Eng'r.

## REPORT OF SECRETARY AND TREASURER.

### CITY WATER WORKS OFFICE, New ORLEANS, 31st December, 1869.

Messrs. The President and Commissioners of the City Water Works :

GENTLEMEN: I herewith submit to your Board a Report of Receipts and Disbursements of the City Water Works, from the 1st of August to the 31st of December, 1868, and from the 1st of January to the 31st December, 1869, inclusive, showing a balance of cash on hand this day of \$9,894 10.

I remain respectfully, Gentlemen,

Your Obedient Servant,

S. E. PERCY,

Sec'y & Treas.

# RECEIPTS.

Amount received for water rent from 1st Au- gust to 31st December, 1868	\$2,873	79		
Amount received for water rent from 1st January to 31st December, 1869	142,628	92	\$145 502	71
Amount received for old stores sold in 1869	\$48	00	\$140,002	1
Amount received for old iron, stopcock boxes, stores, etc., 1869	812	05	860	05
Amount received for meters			$\begin{array}{c} 445\\ 239\end{array}$	$\begin{array}{c} 79 \\ 00 \end{array}$
Amount received for discount on checks, etc.			26 384	90 50
Amount received for this sum over remitted	and retur	neu		
Total receipts			\$147,458	95

## DISBURSEMENTS.

Detailed abstract of disbursements, from 1st of August to 31st of December, 1868, including \$38,059 10, amount of liabilities incurred in the five last months of 1868, and settled since the 1st of January last, from the revenues of 1869.

1. Street Service Extension.	20			1	
Paid for wages of hands Paid for pipe, castings, valves, etc. Paid for lead Paid for lumber and other mater'ls	\$3,569 3,320 516 213	00 80 22 90			
Total street service extension.		un de m	\$7,619	92	
2. Street Service Repairs.					
Paid for salary of Water Purveyor Paid for wages of hands Paid for pipe, castings, etc Paid for lumber and other materials Paid for paving Paid for tools, spanners, etc	\$396 511 1,455 293 624 870	83 00 08 91 30 62		The second	
Total street service repairs			\$4,151	74	\$11,771 66
OPERATING EXPENSES.	i) allen				Les Cit
1. Hydrant Service.	, here				- Wind
Paid for salary of collectors and inspectors.         Paid for wages of hands.         Paid for freight.	\$1,260 1,708 6	00 67 25			[st#]
Total hydrant service	]		\$2,974	92	
Amount carried form	ard		\$2,974	92	\$11,771 66

22

1. Street Service Extension, including City Fire Wells and Meters.         Paid for salary of Surveyor of Meters Paid for pipes, castings, valves, etc Paid for paving       \$862 50 4,761 14 8,382 01 1,372 58 382 89
Paid for salary of Surveyor of Meters. Paid for wages of hands
Paid for salary of Surveyor of Meters\$862 50 Paid for wages of hands
Paid for wages of hands
Paid for pipes, castings, valves, etc 8,382 01 Paid for paving 1,372 58 Paid for lumber
Paid for paving 1,372 58 Paid for lumber
Paid for lumber
Paid for city fire wells
Paid for water meters
Paid for freight and drayages
Total street service extension 29,751 44
2. Street Service Repairs.
Paid for salary of Water Purveyor 999 96
Paid for wages of hands 3907 11
Paid for wages for cleaning and repair
ing reservoirs
Paid for tin, plugs, rods, ferrules, etc. 1,004 41
Paid for white lead, packing yarn, ce-
ment, tools, etc 209 /1
Paid for castings, pigs lead, patterns, 1 406 06
etc 1,430 00
Paid for treight of castings 400 05
Deid for lumber 382 88
Paid for paying and dravages 1 640 30
raid for paving and drayages
Total street service repairs 14,29845
OPERATING EXPENSES.
1 Hudrant Service.
1. Hydrano Adronos
Paid for salary of Surveyor of Hydrants 862 50

23

862 50 862 50 44,049 89 Amount carried forward, .....

DETAILED ABSTRACT OF DISBURSEMENTS .- Continued.

Amount brought forward	\$ 862	50		44,049 89
Paid for salary of Collectors and In-			1112	
spectors Paid wages of hands (water police)	4,400 5,514	00 16		
Total hydrant service			\$10 776 66	ALL PLAN
10tal hydrant service			\$10,110.00	
2. Pumping Service.				
Paid for salary of Water Purveyor.	999	96	-	1.1.1.1
Paid for repairs to buildings	9,549	12 85		
Paid for lumber	406	58		
Paid for oil, tallow, etc	1,903	00	1	
Paid for coke	1.845	00	-/	1.7
Total pumping service	Jul .		23,496 98	1291
3. Office Expenses.	more		n fani	and at
Paid for salaries of officers	14 746	68		
Paid for stationery, books, rent of	14,740	00		and got for
offices, attorney's fees	3,317	11	A attac	
Total office expenses		15	18,063 74	Same ?
			and and a	
4. Miscellaneous Expenses.			and the state	
Paid special police for arresting par-			21 - 1m	
ties violating city ordinances con-			0,240 TRA	
eic.	203	70		10.7
Paid for returned water rents	148	35		
Total miscellaneous expenses	••••••		352 05	52,689 43
Total disbursements from 1st Jan	n. to 31	st D	ec. 1869	96,739 32
For extension and repairs		!	44,049 89	
For operating expenses	•••••	• • •	52,689 43	
Total expenditures			96,739 32	

L.	Street :	service (	extensio "	n for	$     1868 \\     1869     $	\$7,619 29,751	92 44	37,371	36		
2.	Street	service	repairs	for "	1868 1869	$4,151 \\ 14,298$	74 45	18,450	19	55,821	55
	01	perating	Expen	ses.		24		or Vice	11		
1.	Hydra	nt servi	ce for		1868 1869	2,974 10,776	92 66				
2.	Pumpi	ng serv	ice for		.1868 .1869	17,779 23,496	31 98	13,751	58		
3.	Office	Expens	es for.	:	.1868 1869	6,947 18,063	64 74	41,276	29	(ast)	
<b>1</b> .	Miscel	laneous	expense	es for	1868 1869	1,352 352	00	25,011	38	1	
4.	" Miscel	," laneous	expense	es for	1869 1868 1869	$     18,063 \\     1,352 \\     352     $	74 00 05	25,011	38	01 749	

# REPORT OF REGISTRAR OF WATER RENTS.

DEPARTMENT REGISTRAR OF WATER RENTS, OFFICE CITY WATER WORKS, NEW ORLEANS, Dec. 31 '69.

## Gen. Braxton Bragg, Superintendent :

GENERAL: Herewith I have the honor to submit a statement, showing the amount of bills made in the respective districts of the city for the present year, the total amount collected, amount cancelled, and amounts still unpaid.

All bills unpaid, have been ordered to be closed, and are so reported.

The large amount of bills unpaid, say \$5,035 13, is made up chiefly of meter bills upon large establishments, at the present time not working, but which in all probability will shortly recommence work, when their bills will prove good.

from the same source are only..... 142,628 92

Thus showing a falling off of ..... \$16,002 87

This deficiency I attribute in part to the change in the adopted tariff, which practically diminished the charge of water to the majority of water takers, whilst increasing the rate of comparatively a small number. But the chief cause of this serious loss, can be traced to a source, which is again at work, with a fair promise, in the year 1870, of greatly increasing the loss to the city of receipts from water rents, over that of the present year.

I refer to the action of the Common Council in relation to a tariff of rates. This tariff, which should have been in the hands of the clerks of this office, to enable them to have the bills made, and ready by the 1st of January, 1870, has not yet been passed, and not a bill will be prepared in time. In the meantime the public are hourly calling for their bills, in anticipation, and are sent away dissatisfied, with the answer that the tariff has not been passed.

Precisely the same result is foreshadowed as at the first of this year. The bills will not be ready till late in February, perhaps not before March, and many persons will have enjoyed the use of water, for a great part of the year, free; many will have taken their departure, being merely birds of passage; and many will not think it worth while to pay for water, which during the summer months, they will not use, by reason of absence from the city, and very naturally, too.

I append a list of hydrants of the city, open and closed, and the objects of assessment.

It will be seen that there are 9,273 hydrants, of which 5,533 are open and 3,740 shut.

A large number of these hydrants supply the water consumed by public schools, public buildings, jails, workhouses, etc., etc., which, together with water for street cleaning, extinguishing fires, etc., is absolutely free to the city. In other departments of the city, if work or materials are required for public use, or the use of any particular department, it is necessary that requisitions be made and approved before it can be had, and the cost charged to the one, and credited to the other. I do not pretend to set forth the absurdity that no water can be furnished at a fire, for instance, except that the red tape routine of requisitions has first been complied with before water can be furnished, but I do maintain, and with all respect be it said, that a proper credit should be allowed this department for what it costs in money to supply. At present all expenses are payable out of the funds of the works. By the budget for 1870, the interest on the bonds due for the purchase of the works are also added to the expenses.

Who, then, pays for the public supply? As no money comes from the city, not even a credit on their books, it is evident that the nine or ten thousand private hydrants pay not only their own water rents, but that they are saddled with the cost of the public supply and the interest on the bonds, no other means being furnished these works, save the money which comes through the Water Registrar's hands from private consumers.

I beg leave, in this connection, to quote resolution 4 of the Common Council of the city of New York, in relation to this subject, as published in their ordinances, concerning the Croton Water Works, page 81, of the year 1856.

"4. Resolved, That the public schools, and public institutions, and public offices within the city and county be charged for Croton water at the same rate as to individuals."

I will add, that by a careful assessment, the amount of the public supply reaches the sum of \$139,225 98, as will more fully appear from the detailed statement accompanying this report, being only \$3,402 94, less than the amount of the actual receipts of the present year.

> Very Respectfully, Your Obd't Sv't. JAMES STRAWBRIDGE, Water Registrar.

#### ESTIMATE OF WATER CONSUMED FOR PUBLIC SUPPLY.

No.	Objects.	1	Remarks.
1 24 33 4	28 Public Schools. City Hall	\$405 00 1,781 60 7 44 00 20 00	For rooms. For 8,008 scholars, at 20c. By meter, 6,000 galls per day, at 34°. Rooms and hands
5	3 City Pounds 3 Recorders: Officer	18 00	Offices and animals.
7	Central Police Stu'n	37 50	39 employes, 1 water closet, 1 urinal.
8	1st Precinct do.	47 00	4 employes, 25 prisoners, 17 lodgers, 3 urinals-constant stream
9	2d do. do.	9 50	3 6 10
10	3d do. do.	13 50	4 " 9 " 14 "
11	4th do, do.	. 14 00	3 ** 16 ** 9, **
12	5th do. do.	14 50	3 " 13 " 11 "
13 14	Charity Hospital Jackson Square	1,115 00	76 rooms, 100 hands, 600 patients, 12 water closets, 6 uri- nals, 12 baths, 1 stationary basin, 6 faucets in klitchen, 18 faucets in wash room. 9 hydrants in yard. 1 public hydrant, 1 hose box, washing 300x300 fectcon- stant flow.
15	Workhouse	204 50	2 rooms, 16 cells, 11 employes, 30 prisoners, 1 fire plug, 1 hydrant
16 17	Boys' H'se Refuge Girls' do.	108 50 43 00	11 employes, 130 inmates, 3 hydrants, 1 bath, 20 rooms. 2 11 18 12 1 1 19 1 1
10	Darish Drison	188 00	Bydrant in Kitchen.
19	Insane Asylum	143 00	5 " 50 " 7 " 143 inmates, 4 " 4
20	11 Markets	3,120 00	30 fire plugs using 15 600 000 galls water at 20c per 1 000
21	Street cleaning, etc.	1 105 500 00	on me half i mall relatione Bunnt mater, in mot her 1,000
22	Extinguish's Fires	3121,120 88	Estimated 1-3 of 1,915,963,251 galls., at 20c. per thousand,
23	Court Buildings	91 00	8 courts, 9 offices. 10 cells, 1 urinal-constant flow, 1 keep- er's room, 1 bar room, 9 jury rooms, 25x25 ft,and 25x40
24	Fire engine houses	344 50	54 horse, 20 houses, 49 employes.
25	Public 'Irough Delta, n'r Girod st.	} 1,752 00	By meter delivers 24,000 galls per day, say 8,760,000 galls. per annum, at 20c. per thousand.
	States & March	\$139,315 98	

# REPORT OF WATER PURVEYOR.

#### WATER PURVEYOR'S DEPARTMENT, OFFICE CITY WATER WORKS, 1st January, 1870.

### To the Superintendent City Water Works :

SIR: I respectfully submit for your consideration the following report and suggestions, on matters pertaining to this department during the past year. I had the honor, on a former occasion, to call your attention to the necessity of having several important repairs and improvements made, in order to add, not only to the efficiency of the pumping service and supply system, but also to the prevention of accidents, which were then, and are now likely to occur, on account of the dilapidated condition of some portions of the works.

During the progress of repairs lately made on the reservoir, a dangerous opening or break was discovered, caused by the separation of the outer wall and the bottom of the reservoir.

The waste caused by this break has been partially and temporarily stopped, by a layer of brick and cement, extending around the inner base of the wall, at its junction with the bottom of the reservoir, and by using two additional tie bolts, to strengthen the most defective basin. The entire structure was originally imperfect, and is now by no means secure. I venture to express an opinion, that by an expenditure not exceeding one-fourth of the amount required to erect a new reservoir, of the same height and dimensions, that the available capacity, (not now exceeding three and a half millions gallons,) and usefulness of the present reservoir could be increased at least 50 per cent.

I would call special attention to the urgent necessity, of erecting a

#### CITY WATER WORKS REPORT.

new building in place of the very insecure one which now threatens the destruction of the smaller engine, and endangers the lives of the engineer and his assistants, while in discharge of their duties.

It would be a measure of great economy, also, to have two batteries of boilers, each of sufficient capacity and fire surface, to supply the larger engine. The boilers now in use, besides being old and unsafe, are inadequate for the work required.

Several other changes, tending to equalize the power of the larger engine with the work it should perform, and enable it to deliver with ease and facility the full quantity of water of which the machinery is capable, could be suggested, were it thought advisable at present to incur the expense necessary to effect the same. The delivering capacity of the pumps attached to the larger engine being but 1023.6 gallons of water for each revolution, is not proportionate to the working power of the engine.

This discrepancy is due, no doubt, to the fact that the proportions were originally designed for a lifting power of at least 150 feet, whereas the maximum height required in this city is not more than 75 feet.

A crib work was erected in the river, during the past year around the end of each of the influent pipes, and copper strainers used, to prevent the introduction of drift, or any foreign substance likely to injure the machinery.

In accordance with instructions received, I have during the past year caused such alterations and repairs to be made on the old, but substantial brick building, (formerly used as an engine house,) as the spare time from more urgent duties would admit of. This has been done with a view of converting it into a storehouse and workshop, or for any other purpose which may be desirable.

The somewhat heavy expenditure for street service account, during the past year, is mainly attributable to the fact, that it was found necessary to make extensive repairs on the fire plugs throughout the city, many of which had become unserviceable through neglect.

The annual expense necessary to prevent an almost incessant waste of water, by the frequent bursting of the cement pipes now in use, would justify the gradual substitution of iron pipes.

Such general satisfaction has been given in every instance in which the few fire wells located, have been used, and their undoubted superiority, over the antiquated and expensive fire plug has been so thoroughly established, that their immediate substitution for the latter, is earnestly recommended.

The extension of main lines of water pipe, has been confined entirely to such localities as were found to need most urgently an immediate increase of water supply. The continuation of the 30-inch main on Delta, to connect direct with the pumping works, and the extension of a large main from Canal street to the lower part of the city, are the only remedies for the very meagre supply of water now furnished in some portions of the Second District, and throughout the entire Third District.

The extension of the 16-inch waste pipe into the river was necessary from the fact that the batture into which this pipe formerly emptied had been filled by the deposit formed during the cleaning of the reservoir, (amounting in quantity this past year alone to 176,990 cubic feet,) and could no longer be used for that purpose.

During the year 1869 the pumping service has supplied the city with 1,915,963,251 gallons of water, or a monthly average of 159,663,604 gallons.

The total monthly supply is as follows:

and the second	Total Gallons per month.	Daily Average per month.
January	157,456,125	5,079,230
February	135,143,074 142,091,166	4,820,538 4,583586
April	141,562,100	4,718,736
MayJune,	162,689,792	5,422,993
July	176,396,003 175,783,234	5,670,427
September	176,930,568	5,897,685
November	160,191,503	5,339,716
December	160,690,779	0,183,075
Total	1,915,963,251	5,249,214

The daily average height of water at the pumping works was 48 feet, and at the office 27 feet.

The amount of coal and coke consumed, and balance on hand is as follows:

Coal in yard, August 1st, 1868 Purchased during the year	.2,610 14,927	bbls.
Total Consumed during 1868	17,537 .7,447	دد دد
Coal in yard January 1st, 1869 Purchased during the year	10,090 15,508	دد دد
Total, Consumed during 1869	25,598 16,858	در در
In yard January 1st, 1870	.8,740	bbls.
Gene purchased and consumed during 1868- """"""""""""""""""""""""""""""""""""	-5,461 6,954	bbls.
Total for 17 months	12,415	bbls.

I cannot close this report without expressing an opinion that an efficient and economical administration of this department requires that the entire control and supervision of the water system, including all private and public supplies, should be exclusively confined to the officers in charge of the City Water Works.

> TOWSON ELLIS, Water Purveyor.

# APPENDIX TO WATER PURVEYOR'S REPORT.

#### SCHEDULE A.

Water Pipe Extensions made from Aug. 1, '68 to Dec. 31, '69.

#### 1868.

484 feet 12-inch pipe on Calliope, between Rampart and Franklin.
1,081 " 8-inch pipe on Calliope, between Franklin and Freret.
374 " 4-inch pipe on Freret, between Calliope and Clio.
298 " 4-inch pipe on Clio, between Freret and Locust.

2,237 feet.

#### 1869.

327 feet 16-inch pipe on Market, between New Levee and the river
1,102 " 6-inch pipe on St. Thomas, between Clio and Melpomene.
103 " 4-inch pipe on Commercial Alley

1,532 feet,

#### RECAPITULATION.

PIPE LAID DURING 1868 AND 1869.

 327 feet 16-inch pipe.

 484 " 12 " "

 1,081 " 8 " "

 1,102 " 6 " "

 775 " 4 " "

 3,769 feet.

SUPPLY MAINS, AUG. 1st, 1868.

600 feet 48-inch pipe. 560 " 30 " "

1,160 feet.

DISTRIBUTING AND SUPPLY PIPES AUG. 1ST, 1868.

150	feet	36-	inch .	Iron ]	Pipe.
4,830	"	30	16 '	"	
3,178	**	24	"	**	
14,635	"	18	"	::	
20,678	*6	16	"	"	
3,265	"	12	"	66	
24,834	6.	10	"	**	
51,614	• 6	8	"	"	
56,669	"	6	"	4	
50,129	"	4	"	"	
37,796	"	3	"	"	
3,452	"	5	"	"	

271,230 feet Iron Pipe. 20,835 " Cement Pipes,

292,065 feet. 1,160 " Supply Mains. 2,237 " laid in 1868 1,532 " " " 1869

296,994 feet, equal to 56.25 Miles.

#### SCHEDULE B.

CONNECTIONS TO STREET MAINS FOR FIRE PURPOSES DURING THE YEAR 1869.

One 6-inch connection, and Iron fire well, corner Magazine and St. Mary's.

Two 6-inch connections and Iron fire well, corner Poydras and Front. One 8-inch connection and brick fire well, corner Customhouse and Bourbon.

One 8-inch connection and brick fire well, corner Magazine and Gravier One 8-inch connection and brick fire well eorner of Magazine and Lafayette One 8-inch connection and brick fire well, corner Tchoupitoulas and Delord.

One 8-inch connection and brick fire well, corner Rampart and Canal. One 8-inch connection and brick fire well, corner St. Charles and Commercial Alley.

One 8-inch connection and brick fire well, corner Bienville and Old Levee.

- One 8-inch connection and brick fire well, corner of Toulouse and Old Levee
- One 8-inch connection and brick fire well, corner Poydras and Carondelet.

One 8-inch connection and brick fire well, corner Common and Liberty. One 8-inch connection for Iron fire well, corner Tchoupitoulas and Robin.

One 6-inch connection for Iron fire well, corner New Levee and Robin One 6-inch connectien for Iron fire well, corner New Levee and Terp. sichore.

One 6-inch connection for Iron fire well, corner Annunciation and Clio.

#### SCHEDULE C.

ATTACHMENTS FOR PRIVATE HYDRANTS MADE SINCE AUG. 1, 1868

for	Families
"	Stores
•6	Engines 3
"	Markets 2
"	R R. Depot 2
"	Distillery 1
"	Coffee Houses 3
"	Factories 6
"	Stables 7
"	Offices 5
"	Groceries 3
"	Foundry 1
"	Cotton Presses 1
"	Liquor Stores 2
"	Fruit Stores 1
**	Asylum 1
£ £ =	Oyster Saloon 1
**	Club Room 1
	Theatre 1

### SCEDULE D.

METERS PLACED DURING THE PAST YEAR, AND NOW IN USE.

One 4-inch M	Meter at St. Charles Hotel,		man				
One 4 "	" "Thompson's Sugar Refinery,			1.1			2 2 20
One 4 "	" "Pelton's Sugar Refinery,		On hand.	Received	Expended	On hand,	
One 3 "	" "Madden's Distillery,	MATERIAL	Aug. 1,	since Aug. 1	SINCE	Jan. 1,	Value
One 3 "	" "Thompson's Sugar Refinery,		1808.	1000.	Aug. 1, 00.	1010.	1
One 3 "	" " City Hotel.		Feet.	Feet.	Feet.	Feet.	
One 3 "	" " St. James Hotel,	48-inch iron pipe -	30			30	\$514 66
One 3 "	" "Pontchartrain R. R. Depot,	36 " " -	39			39	558 28
One 3 "	" "Gas Works,	30 " " -	523			523	5,546 42
One 2 "	" "Merz' Brewery,	18 " " -	9			919	48 09
One 2 "	" "New Basin,	16 " " -	744	548	184	210	846 30
One 11 "	" "Golding's Iron Works.	12 ··· ·· -	114	1 260	1 252	122	183 00
One 11 (	" "McGinnis' Oil Factory,	6	235	2,715	1,202	1,748	2,359 80
One 1	" " Carre's Lumber Vard.	. 4 " " -	38	737	775		
	( ( Durvie' Sech Factory	4-inch meters		6	3	3	1,527 65
One 1	" " I ulvis Dabit Pattory;	3 " "		9	6	3	942 00
One 1 "	" "Julia Street Dakery,	2 " "		0		4	490 00
One 1 "	" Leonard's Livery Stables,			12	4 5	7	455 60
One 1 "	" " City R. R. Stable,	5 4 4		17	5	12	372 00
One 5 "	" "Letorey's Seltzer Water Establishment,	Sinch valves		23	11	12	715 80
One 5 "	" " Orleans Navigation Co.	6 " "		. 16	7	9	392 40
One 5 "	" "Horse Trough corner Crossman and Peters.	Iron stopcock boxes -		709	117	592	1,776 00
One § "	" "Horse Trough, corner Conti and Peters.	24-inch sleeves	1	10		11	158 01
One § "	" "Rodd's Reboilding Establishment,	18 " "	2	10		12	121 38
Ono 3		16 " "	2	13	3	12	18 04
	Three 4-inch Meters	12 " "		10	1 9	9	25 84
	Six, 3 " "	10		10	2	15	37 61
	Two 2 " "	6 " "		20	2	18	51 00
	Two 14 "	30x12 single branches	6			6	377 40
	Five 1 "	18x8 " "	5			5	151 13
	Fire 5 ( "	16x6 " "	4			4	104 55
	Tive s	* 18x6 " "	1			- 1	31 80
	Twenty-three Meters.	16x8 " "		9	3	0	183 30
		12x8 " " "		0	9	9 7	70 43
		10x8 " "		9	4		10 10
		24x8 double branches		4		4	205 36
		6x8 " "		10		10	101 57
		6x6 " "		10	1	9	81 77
	and the second	8x6 reducers		11	3	8	20 77
		Coal, bbls	2,610	30,435	24,305	8,740	5,244 00

#### SCHEDULE E.

## Material on Hand.

\$25,530 64

## CHEMICAL EXAMINATION.

### CHEMICAL EXAMINATION OF THE WATERS OF NEW ORLEANS, LOUISIANA, BY JOSEPH JONES, M. D. PROFESSOR OF CHEMISTRY, IN THE MEDICAL DE-PARTMENT OF THE UNIVERSITY OF LOUISIANA.

#### General Braxton Bragg, New Orleans, Louisiana :

DEAR SIR: The samples of the waters of the Mississippi river, and of various localities within and around New Orleans, submitted to me for analysis, by you, as Superintendent of the City Water Works, have been subjected to careful chemical and microscopical examination, and the following results are respectfully submitted.

#### No. 1-Mississippi River Water, from Inlet Pipe.

When first drawn, the water presented a turbid appearance; upon standing, the suspended matter settled, forming a light greyish yellow deposit; and the supernatant water remained slightly turbid, from a small remaining portion of suspended matters.

The insoluble suspended matters, amounted to twenty-three and two-tenths (23.2) grains to the gallon of water, and, under the microscope, were found to consist chiefly of very finely divided sand (silicic acid) and the silicates of alumina, and contained but few remains of animalcules or of vegetable structures.

After the removal of the suspended matters, the water yielded a specific gravity similar to that of distilled water, viz: 1000 at  $60^{\circ}$ , and the amount of saline matter, upon careful evaporation, was found to be only eleven and nine-tenths (11.9) grains per gallon.

Upon analysis, it was found that these saline matters contained only traces of the sulphates of potassa, soda and magnesia, and consisted almost entirely of the carbonate of lime, and chloride of sodium. Each gallon contained 2.91 grains of lime (equivalent to 5.29 grains of carbonate of lime) and 3.378 grains of chlorine (equivalent to 5.53 grains of chloride of sodium, common salt).

No. 1.—One Gallon (70,000 grains) of Mississippi River Water contained:

Specific gravity at 60° F.	000.00
Suspended matters deposited upon standinggrains	23.30
Fixed saline constituents do	11.90
Carbonate of lime do	5,29
Chloride of sodium do	5.53
Carbonates and sulphates of soda, potassa and	
magnesia do	1.08

No. 2.— Waters of Mississippi River, (sample marked No. 3,) from hydrants in office of City Water Works.

The water was turbid, from sedimentary matters, when first drawn. Upon standing, the suspended earthy matters settled, leaving the water slightly turbid, from the presence of the more finely divided silicate of alumina. The sedimentary matters were in slightly less amounts than in the preceeding sample, being only eighteen and eight tenths (18.8) grains to the gallon. On the other hand, the fixed saline constituents were, within a fraction of a grain, similar in amount to those of the first samples, being eleven and two-tenths (11.2) grains to the gallon.

The reactions under different reagents were in like manner similar; chloride of barium producing a very slight, scarcely perceptible precipitate; whilst the nitrate of silver and oxalate of ammonia produced a more decided precipitate.

The sedimentary matter, in like manner, was found, under the microscope, to consist of minute fragments of sand (silicic acid) and of mineral silicates, with very few particles of organic matter or animalcules.

1.1

Each gallon contained 5.18 grains of chlorine and 1.45 grains of lime.

No. 2-1 Gallon (70,000 grains) of Mississippi River Water, from hydrant in office of City Water Works contained :

Specific gravity at 60°	1000.00
Suspended matters (silicic acids, silicates etc.,) grain	s 18.80
Fixed saline constituents do	11.20
Chloride of sodium do	8.51
Carbonate of lime do	2.69
Sulphates and carbonates of alkalies do	0.05

From the preceding examination we conclude that the waters of the Mississippi, when freed from the suspended matters, are of great purity, and will compare favorably with the *drinking* water supplied to the largest and best regulated cities in the world.

The truth of this assertion is established by a comparison of the preceding results with the results of the analyses of the various springs and rivers used in the supply of cities, as exhibited in the following table. In order to render the comparison more simple and conclusive, we have introduced into this table only the total amount of saline constituents.

(This elaborate table of details is omitted.)

\* \* \*

\* \*

\*

\*

If the solid saline residue of one hundred thousand parts of the Mississippi river water, be compared with the solid saline matters of the drinking waters of the noted rivers and springs recorded in the preceding table, it will be found that the drinking water supplied to the city of New Orleans compares favorably with each, and is in fact far purer than the majority of the drinking waters heretofore analyzed by chemists. In each glass of Mississippi water less than half a grain of saline constituents are present, and this small amount, almost absolutely inappreciable in its effects upon the animal system, is composed almost entirely of common salt and carbonate of lime.

If those salts exert any effect whatever upon the animal economy, it is beneficial and not deleterious.

A point of considerable interest, in a sanitary point of view, is that the suspended matters of Mississippi river water are free from organic impurities, and consist almost entirely of finely divided silicic acid and silicates. The suspended matters, so far from rendering the waters of the Mississippi river unfit for sanitary purposes, add to their disinfectant properties.

The health of New Orleans would be without doubt greatly promoted by flushing out the main drains and gutters continuously with full streams of Mississippi river water. The mud which would settle along the sides and bottoms of the drains would possess no noxious properties whatever of itself.

The free use of *coal tar* and gas lime, also, in the gutters and drains, would tend in like manner to arrest noxious emanations, and to preserve the purity of the atmosphere of the city.

No. 6. Water from the Tangipahoa river, (marked No. 6.)

\*

This specimen of water was clear, transparent and crystalline in appearance. The specific gravity was similar to that of distilled water, viz: 1000.

Nitrate of silver and oxalate of ammonia produced only a slight cloud, and chloride of barium produced no deposit.

The fixed saline constituents amounted to only five and six-tenths (5.6) grains to the gallon, and consisted of chloride of sodium, 1.41 grains, and carbonate of lime, 2.51. 1 gallon (70,000 grains) of Tangipahoa river water contained :

Specific gravity 1000	,00
Sedimentary matters no	one
Fixed saline constituents	.60
Chloride of sodium1	.41
Carbonate of lime2	51
Carbonates, silicates and sulphates of potassa, soda, and	
magnesia 1	.68

The preceding analysis establishes the great purity of the waters of the Tangipahoa river.

No. 7.— Water from a well 87 feet deep, sunk in the central densely settled portion of the city of New Orleans.

Specific gravity at 60° ..... 1001.2

This water presented a deep yellow color. Careful examination showed that this color was due to the presence of organic matters. A solution of per-manganate of potash was rapidly decolorized by the organic matters dissolved in the water.

This water was found upon evaporation to contain one hundred and five-tenths (100.5) grains of solid matter to the gallon,

Nitrate of silver produced a very heavy deposit, and chloride of barium and oxalate of ammonia very light precipitates. Lime existed in the proportion of 7.65 grains; sulphuric acid, 2.3 grains; and chlorine, 51.66 grains in the gallon.

When the solid residue was treated with nitric acid, the crystalline mass resulting presented, under the microscope, the characteristic form of the nitrate of urea. The solution of the per-nitrate of mercury, (nitrate of the red oxide of mercury,) formed the characteristic white compound with the urea.

One gallon (70.000 grains) of water, from well in the city of New Orleans contained;

Specific Gravity 60°	1001.20
Solid residue	s 100.50
Chloride of calcium do	12.65
Chloride of sodium do	70.80
Sulphates of magnesia and ammonia do	
Potassa and soda do	3.42
Urea, carbonate of ammonia and coloring matters do	13.63

This water is fit neither for drinking nor washing, nor cooking.

## CITY WATER WORKS REPORT.

No. 8. - Well water from well sunk within the limits of the city of New Orleans; depth of well 95 feet.

Water clear, colorless, strong saline chalybeate taste, with light brickred deposit of oxide of iron.

Specific gravity at 60°..... 1002.3

Per-manganate of potassa revealed the presence of a large amount of organic matter.

Fixed saline constituents in one gallon (70,000 grains) grains 175.00.

When the solid residuum left after evaporation was treated with nitric acid and viewed under the microscope, well formed crystals of nitrate of urea appeared.

The solution of per-nitrate of mercury (nitrate of the red oxide of mercury) in like manner revealed the presence of urea.

During the evaporation, the clear fluid assumed a reddish-brown, turbid appearance, from the precipitation of the peroxide and carbonate of iron.

Aqua ammonia threw down a heavy deposit of the protoxide of iron and magnesia. One gallon contained, chlorine, 65.27; lime, 39.96; sulphuric acid, 10.80; oxides of iron and magnesium, 73.35.

One gallon (70.000) of well water from the interior of the city contained:

Specific gravity	1002,30
Solid constituents	175.00
Chlorida of sodium	34.00
Chlorida of calcium	73.19
Chloride of magnesia soda and potassa do	14.40
Urea, organic matters and oxide of iron do	53.41

It is evident that this water was suitable neither for drinking, nor for washing nor cooking. It appears that the *wells* supplying these samples of water, are known as "*drove wells*." The pipe, in sections of ten feet, perforated at the end with holes, is driven by pile, until the vein of water is reached. The joints of the pipes also admit a free percolation of water from the whole mass of earth penetrated.

In a large city, with the sinks constructed near the surface, and without any efficient sewage, as in the case of New Orleans, wells of this description receive necessarily large amounts of extraneous and deleterious matters. Not only would the mineral substances contained in these waters act medicinally and injuriously upon the stomach and kidneys, but the decomposing organic matters might give rise to severe and fatal diseases.

The organic matters occasion these effects most probably by being

resolved into certain deleterious substances and gas, as the carburetted, sulphuretted and phosphoretted hydrogen gases, *cyanides*, etc., as well as doubtless many other lethal products, the nature and composition of which have hitherto eluded the detective powers of chemical science.

The wells sunk within the limits of New Orleans have not only been contaminated by the salts resulting from the decomposition of the excrements and urine of man and animals, blood, meat and filth of every description, accelerated and modified by the action of large quantities of lime used to purify the streets and privies, and necessarily incorporated with the soil in the erection of houses, but also by the salts contained in the different strata of the earth. As the soil upon which the city stands has been elevated from the bed of the Gulf of Mexico, at a comparatively recent date, large quantities of the salts of the sea exist in some of the strata.

I have examined some of the deeper wells, which yielded upon evaporatiou, near three hundred grains of fixed saline constituents to the gallon of water, and this consisted almost entirely of the chlorides of sodium and calcium, and the sulphates of magnesia and soda In certain localities, near the borders of the river, wells sunk in the beds of sand yield pretty fair drinking water, which appears to have percolated through from the river ; but a few feet will frequently alter the character of the water entirely.

The results of the preceeding examinations demonstrate that the waters of the older settled portions of New Orleans are entirely unfit for any of the purposes of life; in fact, if actual disease does not result directly from the use of these waters, they will induce such a state of the system as will aggravate every constitutional tendency, and cause it to fall an easy prey to the mildest epidemics.

In fact, these waters are as bad as, if not worse than the drainings of grave yards. The water of a well close to the church yard on the top of Highgate Hill, recently examined by an English chemist, Mr. Noad, was found to contain even less than two samples of water from New Orleans, viz: 100 grains of solid matter to the gallon consisting of:

Nitrate of lime	0.12
" " magnesia1	7.06
Sulphate of potash 1	7.04
Sulphate of soda	9.52
Chloride of sodium	9,63
Chloride of calcium	5.91
Silica	0.90

It will be seen, upon comparison of this water from the graveyard with those of the wells of New Orleans, that the difference, as to purity, is in favor of the former.

This subject is of great importance in a sanitary point of view, and should be brought to the attention, not only of the proper authorities charged with the conduct of the sanitary police of the city, but should also be brought to the notice of the parties most interested in the preservation of their lives and health, viz: to the citizens.

The attention of the President of the City Water Works is respectfully called, in this connection, to the numerous analyses of the waters of certain Southern towns, which I have executed and published in my report to the Cotton Planters' Convention, in the "Agricultural Resources of Georgia." See pp. 245-305,

With great respect and high esteem,

I have the honor to be Your Obedient Servant, JOSEPH JONES, M. D.

UNIVERSITY OF LOUISIANA, NEW ORLEANS, Nov. 12th, 1869.