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Annual Report

Chicago (Ill.). Dept. of Public Works

9ll Doc 13.5.15



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Department of public
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3 July, 1899

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Carter H. Harrison
MAYOR

MAYOR'S MESSAGE

AWENTY-THIRD ANNUAL REPORT

DEPARTMENT OF

PUBLIC WORKS

CITY COUNCIL OF THE CITY OF CHICAGO

FOR 1898

Fiscal Year Ending December 31

1898

CHICAGO

P. U. FULTON & CO. PRINTERS AND BINDERS

1898

MAYOR'S ANNUAL MESSAGE

AND THE

TWENTY-THIRD ANNUAL REPORT

OF THE

DEPARTMENT OF

PUBLIC WORKS

TO THE

CITY COUNCIL OF THE CITY OF CHICAGO

FOR THE

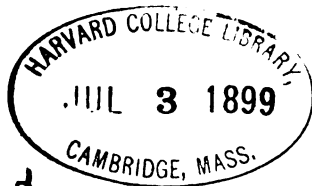
Fiscal Year Ending December 31

1898

CHICAGO:
P. F. PETTIBONE & CO., Printers and Stationers
... 1899 ...

Ill Doc 13.5.15

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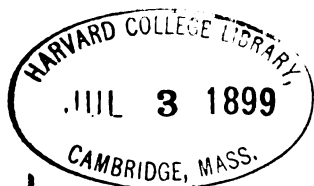


The Dept. of Works.



**MESSAGE OF
MAYOR HARRISON**

Ill Doc 13.5.15
(c II 87)



The Dept. of Works.



**MESSAGE OF
MAYOR HARRISON**

MESSAGE OF MAYOR HARRISON.

*To the Honorable, the City Council of the
City of Chicago.*

GENTLEMEN—Two years ago, in assuming the office of Mayor, I directed the attention of the City Council and the people of Chicago to the necessity for restoring “the confidence of the outside world in the capacity of Chicago to furnish adequate security to all investors who may desire to bring here and invest their moneys.” At that time I pointed out that serious misgiving existed outside of Chicago as to this City’s financial integrity. The necessity was emphasized of so shaping our official actions as to bring about a renewal of the confidence Chicago had previously enjoyed, and I ventured to predict the desired end would be secured during the administration of which I have had the honor to be the head. In claiming that my prophecy has been fulfilled I must not fail to do honor to the man whose name will forever be linked with the story that tells of Chicago’s rescue from financial uncertainty, and placed on a basis of financial security—the name of Robert A. Waller.

An administration that is managed loosely in other respects cannot be financially successful, and the following facts will show that Chicago is to-day in a position that reflects credit upon its citizens and assures continued confidence:

The bonded debt of the City has been reduced \$96,000.00 and permanent assets have been increased \$4,447,364.44; \$290,000.00 of 7 per cent. City bonds have been refunded at $3\frac{1}{2}$ per cent. and sold at such a premium as to make their average cost to the City in interest only 3.2583 per cent. per annum, a saving in interest of

\$10,850.93 per year. An issue of \$100,000.00 of these refunding bonds were sold so that they cost the City in interest only 3.20 per cent., which is the best price ever obtained for bonds of the City of Chicago. Time warrants in the amount of \$2,350,000.00 have been sold, bearing $4\frac{1}{2}$ per cent interest, a rate $\frac{1}{2}$ per cent. below the rate paid for similar warrants the year before, and a total reduction in the interest rate under the present administration of $1\frac{1}{2}$ per cent. Water certificates amounting to \$2,200,000.00 have been issued, bearing 4 per cent., which is a reduction of 1 per cent. in the rate as compared with that of former issues of the same class of securities.

These facts serve to illustrate the business-like methods with which the affairs of the City have been managed. A similar business-like spirit has governed the management of all other departments in the City Hall aside from the Comptroller's office.

COMPTROLLER'S OFFICE.

The noticeable features of the work of the Comptroller's office for the last year are these:

In connection with the Department of Public Works, more than 6,000 special assessment warrants have been thoroughly investigated, and the payment of rebates upon them begun, most of which rebates have been heretofore unobtainable by those to whom they are due because of lack of information.

All of the books of account of the several departments in the City Hall and all vouchers and warrants for the payment of money have been thoroughly examined by a well-known firm of public accountants, which examination, extending over four months and involving a close scrutiny of the records of all receipts and expenditures, has shown all moneys belonging to the City to have been properly paid out or accounted for.

The vaults in the Comptroller's office have been fitted up with steel filing cases and book racks, and all papers pertaining to the Comptroller's office, which heretofore, because of insufficient vault room, have been filed away in vaults scattered all over the City Hall,

have been brought together and filed in consecutive numerical order, where they can be referred to in a few minutes.

The Police Justices have been allowed fixed salaries for their services, and all fees collected by them have been turned into the City Treasury. This change of method of compensation for the justices has resulted in doing away with many abuses which before prevailed, and has proved financially profitable to the City.

In the Water Office is to be found another striking illustration of the business-like methods that have prevailed. This office has been the most prolific source of scandals of all the departments in the City Hall. The system in vogue was so loose as to afford ample opportunity for theft and swindling, and evidence has not been lacking to show that full advantage, at times, was taken of these opportunities. The office, however, is now conducted on as strict lines as those that prevail in a bank. The water rates have been reduced to an appreciable extent, and, notwithstanding this, the revenue received has increased. This seems strange at a glance; it is explained by the fact that the notorious "privilege list" of former days has been abolished under this administration, and the great institutions have been compelled to pay their proper share, thereby lifting the burden from those less blessed with the world's wealth.

SPECIAL ASSESSMENTS.

Under the workings of the Board of Local Improvement Act, passed in 1897, the pernicious system of rebates in special assessments is fast disappearing. Reports are now made to the court in which the assessments are confirmed within twenty days after the contract for the work is executed, as is provided by law, and upon this report the assessment is reduced by order of court to the actual contract price, plus the costs of making, levying and collecting the assessment. Favoritism shown wealthy individuals or corporations to the detriment of small property owners is absolutely discontinued. Exorbitant and unjust charges for permits, taps, inspection, etc., have been entirely eliminated from the cost of public improvements paid for by special assess-

ments, and a strict adherence to these principles has reduced the cost of street improvements below what like improvements cost in any other city in the United States.

The books of the Special Assessment Department have been carefully examined. A statement has been made of the condition of every assessment levied since 1872, and this examination and statement shows nearly three-quarters of a million of dollars of rebates due property owners. A list of these several warrants in which rebates are due has been printed, and 25,000 copies have been distributed to the public, and the close of the year 1899 will find this vast sum of money, which for years has been wrongfully kept from the rightful owners, returned to them. Strenuous efforts will continue to be made to collect and close up all unsettled assessments levied under the old law, and as soon as this is accomplished rebates due upon the same will be immediately declared and the money due property owners from that source returned to them.

DEPARTMENT OF ELECTRICITY.

During 1898, it was considered best for the City's interests to organize a separate department to look after the electrical interests of the City. The creating of this department has given the most desirable results in reducing the general expenses and improving the fire alarm telegraph and police telephone systems.

The fire alarm system is in better condition than heretofore, and the record made during the past year proves it to be extremely reliable. Six thousand four hundred and twenty-three alarms were received and transmitted, and not an error was made or a signal lost. Nearly five million reports were received from policemen, and but very few failures were reported. This immense number of signals and reports from policemen was received by means of the police telephone and signal system.

The greatest work of the department has been in the maintenance and extension of the electric street lighting system. The average expense of maintaining a 2,000-candle-power electric light all

night and every night in the year has been reduced to \$68.52, as against \$90.65 in 1897, which was the lowest previous cost.

The system has been extended during the past year to a greater extent than in the previous ten years, the total number of lights added being 1,457. The stations' capacity was increased considerably in excess of the actual number of lights placed in operation, and admits of some additional lights being installed at a nominal expense. The average cost per arc lamp for installation, including everything that could be charged to the addition of the arc lamps, only reached the sum of \$166.85 per lamp.

Formerly the City paid \$137.50 for rented lights. On the present basis of operation the cost of maintaining a light for a period of two years, added to the first cost of installation, will be less than it would have cost to rent a light for a period of two years, and the result will be a wonderful saving to the City in its street lighting. For every arc lamp that is installed enough gas is shut off to more than pay for the cost of operating the light.

The City Council has appropriated \$150,000.00 for the extension of the electric light system in 1899. The plans, as now outlined, will admit of enlarging the present stations and installing two new stations at the water works pumping stations, as previously reported to the Council, and adding to the City service a total of 1,200 additional lights. These have not as yet been definitely located.

The first three months of 1899 proved conclusively that the cost of operation per light for 1899 will not exceed \$60.00 per light per year, and it may possibly drop as low as \$55.00.

The apparatus throughout is in excellent condition, practically as good as new, and beyond incidental repairs, which are charged to the maintenance of the lights, should give excellent and economical service for a period of at least fifteen years.

The City is now operating a total of 2,923 arc lamps, and has the largest municipal electric street lighting plant in the world.

It will be noticed that the station expenses were about \$62.50 ;

for improvements to the system the average cost was \$3.00 per light ; for a proportion of the office salaries, which includes all expenses in the office, add another \$3.00 to the yearly cost, making a total of \$68.50, as against \$90.65 in 1897 and \$103.00 per light in 1896. This year, as suggested above, the rate will be made still lower.

POLICE DEPARTMENT.

The people of Chicago have reason to congratulate themselves on the successful manner in which the Police Department has coped with crime. It is acknowledged on all hands that Chicago is a singularly good place for thugs and thieves to avoid, and this notwithstanding the fact that the size of the police force is utterly inadequate.

This City, with a population of 1,875,000, has a police force numbering 2,675 men, with an area of 193 square miles to cover. The proportion of officers to population is 1 to 701. Other cities in this country are more compact. For the purpose of comparison the following figures are given :

Boston, population 500,000, officers 1,200 ; proportion officers to population, 1 to 416 $\frac{2}{3}$.

Pittsburg, population 300,000, officers 415; proportion of officers to population, 1 to 720 $\frac{1}{2}$.

San Francisco, population 350,000, officers 558; proportion of officers to population, 1 to 627 $\frac{1}{2}$.

St. Louis, population 700,000, officers 892; proportion of officers to population, 1 to 784 $\frac{1}{2}$.

Philadelphia, population 1,500,000, officers 2,400 ; proportion of officers to population, 1 to 625.

Old New York, population 1,990,562, officers 5,002; proportion of officers to population, 1 to 398.

FIRE DEPARTMENT.

The work of the Fire Department has been up to its usual splendid standard. The story of the department and its doings can be briefly told.

One new engine company, No. 84, was organized during the year, increasing the force eight men.

Contracts were let and work commenced on three new engine houses, which are now nearly completed.

Three new engines were purchased, one for service in Engine Company No. 84, and the others to replace engines worn out in the service.

The most important addition to the apparatus of the department was the new steel fire-boat, "Illinois," which was built and placed in service during the year at an expense of \$70,000.00.

The department responded to 6,595 alarms, and did duty at 5,048 fires, a decrease of 312 alarms and 278 fires over the year 1897.

The valuation of property involved was \$91,922,210.00, a decrease of \$6,961,060.00 over the previous year. The total insurance involved was \$56,550,470.00, an increase of \$1,316,874.00, and the total loss was \$2,651,735.00, an increase of \$288,745.00 over the year 1897.

There were eighteen deaths among the active force during the year, three of which were due to injuries received at fires, and two to injuries received while responding to alarms.

The buildings and apparatus of the department are in good repair and the condition of the department, as a whole, is quite satisfactory.

DEPARTMENT OF SUPPLIES.

The administration early determined that sound business principles demanded the centering of responsibility for City buying in one executive officer, and in pursuance of this policy the Department of Supplies was created a year ago. The department is organized upon a thorough business basis, and is so conducted as to insure the purchase of all supplies and the letting of small contracts in a way to economize in the use of the City's funds and secure value received for all sums expended. All transactions are based upon requisitions approved by the heads of departments, as required by ordinance. When these requisitions reach the Business Agent, it becomes his duty to make the best bargains possible for the City, and to this end there

is strict adherence to the requirements of the ordinance, which governs the department in respect to competition. A warehouse is maintained by the department, in which are carried in stock such supplies as are in regular and constant use. The purchase of these supplies in quantity effects a considerable money saving, and efficiency of service is promoted by prompt deliveries.

The report of the Business Agent shows that the cost of conducting the Department of Supplies in 1898 was \$11,066.95. With this net outlay the department transacted business involving the expenditure of \$394,200.71. There were issued during the year 16,327 orders, and the average expenditure involved in these transactions was, therefore, \$42.52. The creation of this department meant departure from long-established custom in the matter of City purchases. While there are no standards of comparison, and no way of expressing in figures the amount of money actually saved, it may be confidently asserted that funds expended through the Department of Supplies have been made to go much further than would have been possible under the looser business methods which formerly prevailed.

BUREAU OF STREETS.

The courts declaring the five-year garbage contracts invalid, the Bureau of Street and Alley Cleaning was abolished and the work added to the duties of the Bureau of Streets in March of last year.

The work of collecting and removing garbage during January and February, 1898, was performed under contract; since that time the service has been done by City men and teams. There were removed to the dumps, with an average haul of two and one-half miles, 201,957 loads of garbage and ashes, aggregating 1,010,682 cubic yards, at a cost per capita of 22 cents, a lower cost than in any large city in this country.

The number of complaints in March, 1898, was 803, as against 74 last month.

It is unfortunate that the City has so far been unable to put into

effect a more satisfactory plan for the disposal of garbage. The expense of the long haul, as well as all sanitary requirement, make the early adoption of a more modern plan an absolute necessity.

There was a total mileage of streets and alleys cleaned of 19,000 miles, at an expense of \$157,000.00, and several heavy falls of snow removed at a cost of \$55,000.00.

During the year, 450 miles of sidewalk were inspected and condemned, and estimates prepared for the construction of new walks. Eighteen thousand six hundred and thirty-nine complaints were registered and notices sent to property owners, 85 per cent. of which have been complied with. Four hundred and twenty ordinances have been passed and 253 miles of new sidewalk built by the City.

The character of street improvements paid for by special assessments has tended toward the substantial forms of pavement, such as granite block, asphalt and vitrified brick. Cedar block and macadam pavements should be laid in suburban territories only, while the permanent pavements are strongly recommended for the business and adjacent districts.

During the year, nineteen miles of cedar block were laid; nine miles of asphalt; six miles of macadam; one mile of granite block, and two miles of brick; making a total of thirty-seven miles. Specifications have been revised for all pavements, and the length of guarantees to keep the pavements in good condition has been extended from five to ten years. Bonds of reputable security companies are now exacted in place of personal bonds to protect these guarantees.

A detailed survey for the opening of Ogden avenue, from Union Park to Lincoln Park, is practically completed. The plan shows each parcel of land and all buildings affected by the proposed extension, and is a basis for an exact estimate of the cost of the improvement.

The appropriation of \$150,000.00 for street repairs was sufficient to cover only $1\frac{1}{2}$ per cent. of the cedar block pavement in the City, while between 70 per cent. and 80 per cent. of the various kinds of pavement need immediate repair.

BUREAU OF SEWERS.

During the past year, the Twelfth street and Twenty-first street intercepting sewers were completed, and since the first day of last July at least 40 per cent. of the sewage, which up to that time had polluted the waters of Lake Michigan, has been diverted, and now finds its outlet into the Illinois and Michigan Canal.

The work on the Thirty-ninth street conduit is progressing with a rapidity which will insure its completion during the coming year.

Permission has been obtained from the United States Government to erect the Thirty-ninth street pumping station upon submerged land, just east of the Illinois Central Railroad right of way at Thirty-ninth street.

A bill and memorial have been presented to the State Legislature, asking for the State's permission to do this work.

A survey and estimate was made which demonstrated that the intercepting sewer from Thirty-fifth street to Fifty-first street could be constructed inside of the Illinois Central Railroad right of way, instead of in Lake avenue, at a saving of some \$200,000.00 to the taxpayers of our City. The ordinance authorizing this change is now before the City Council.

The intercepting sewer north of Lawrence avenue to the north city limits is complete and ready for connection with the main conduit.

The branch south of Lawrence avenue to Surf street is practically completed.

Surveys and estimates made for straightening the North branch of the Chicago river, from Belmont avenue to Lawrence avenue, demonstrate that this river can be straightened as per the Council order of March 8, 1895, and that enough money can be saved in the necessary pumping plant at Lawrence avenue to do the dredging necessary to straighten the river.

BUILDING DEPARTMENT.

The Building Department has been most successfully managed during the past year.

CIVIL SERVICE DEPARTMENT.

The report of the Civil Service Commissioners will show that a splendid record has been made in this department.

TRACK ELEVATION.

The people of Chicago need hardly be reminded of the wonderful progress made in the work of track elevation during the past year. They have object lessons in this regard before their eyes every day, and all who have contributed to the good work can feel proud of their share in helping to eliminate the deadly grade crossings.

During the year 1898, the most gratifying results have been attained in the elevation of railroad tracks. The different railroad companies have elevated during this year 16.2 miles of tracks, and eliminated 96 grade crossings, including in this number one of the most dangerous and important grade crossings, by the elevation and depression of the railway tracks in the neighborhood of Sixteenth street and Clark street, throwing Clark street open to the general traffic of the City. Another great improvement of public importance was the elevation of the roadbed and tracks of the Lake Shore & Michigan Southern, the Chicago, Rock Island & Pacific and the Pittsburgh, Fort Wayne & Chicago Railway companies in the neighborhood of Sixty-third street and State street, and the elevation of the entire railroad switching yards at that point.

Another important feature to be taken into consideration in the elevation of the roadbed and tracks of railway companies is that it has given employment to fully 40,000 men, directly and indirectly, during the last year, without one dollar expense to the City. In consequence of the large number of men employed in the elevation of railway tracks there has been less demand on public charitable institutions, including the County Agent's office, than during any former year.

LAW DEPARTMENT.

The record made by the Law Department of the City is an excellent one. It appears, according to the report of the Corporation Counsel, that 97 per cent. of the cases of the office have been won, a record never attained before.

In the Supreme Court, of cases presented and argued by the Law Department, 70 have been won and 17 lost by the City.

In courts of record, other than the Supreme Court, there have been 3,039 cases disposed of. Of these the City has won 2,979 and lost 60. Of 2,355 contested and uncontested special assessment cases, only 29 have been lost. This is a showing to be proud of.

HEALTH DEPARTMENT.

At the end of February last, the Health Department tabulated the results of its daily examinations of the public water supply for two equal periods—one before, the other after, the diversion of the Twelfth street and the Twenty-second street sewers from the lake into the South branch of the river.

These sewers drain the thickly settled area north of Thirty-fifth street to the main river, and, until the diversion was made, their foul drainage was emptied directly into the lake, affecting the sanitary quality of the water of the four-mile tunnel, which, from its distance from shore, should be the purest.

These tabulations show that before the diversion the four-mile tunnel water was 13 per cent. worse than the Lake View supply; while since the diversion it has been 66 per cent. better than the Lake View, or a total improvement of nearly 80 per cent.—the four-mile supply now ranking, as it should rank, the highest in sanitary quality. They show, also, an improvement of nearly 50 per cent. in the quality of the Chicago avenue tunnel supply, which was likewise frequently affected by the discharge of these sewers.

The results upon the public health are seen in the following figures :

Total deaths from the impure water diseases, January 1 to March

31, 1898, 540; for the corresponding period this year, 327—a saving of 213 lives in the first three months of 1899, as compared with the corresponding period before the sewers' diversion.

At the value of human life fixed by the State Legislature, namely, \$5,000, this is a first installment of \$1,065,000 to be placed to the credit of the intercepting sewer system.

The tabulations and deductions indicate, among other things, the unceasing vigilance of the Health Department in all matters affecting the public health. In many respects it now stands among the very foremost of similar establishments in the world. It was the first to use the glycerinated vaccine, which has done more to popularize vaccination than anything in this connection since Jenner's day. Its work in the treatment of diphtheria, by which the mortality of the disease in this City has been reduced from 35 to less than 7 in every hundred cases; its investigations of the germ of influenza, and the resulting improvement in the methods of dealing with this disease, and, still more recently, its identification of the organism of scarlet fever, which makes it possible that this scourge of the nursery shall be handled as successfully as diphtheria now is, are attracting the attention of sanitarians both in this country and abroad. They have been characterized by the highest authorities as "remarkable," "brilliant," "nothing short of marvelous," and the *British Medical Journal* has editorially commended to the attention of the Local Government Board of London the "sanitary machinery of Chicago in dealing not only with small-pox, but with diphtheria and other dangerous infectious diseases." Chicago has reason to be proud of her Health Department.

CARTER H. HARRISON,
Mayor.

CITY EXECUTIVE OFFICERS.

CARTER H. HARRISON,
MAYOR.

ANDREW J. RYAN,
CITY ATTORNEY.

ADAM ORTSEIFEN,
CITY TREASURER.

WILLIAM LOEFFLER,
CITY CLERK.

THE CITY COUNCIL.

1899

1ST WARD.
John J. Coughlin.
Michael Kenna.

2D WARD.
Charles F. Gunther.
Eugene R. Pike.

3D WARD.
Henry S. Fitch.
Charles Alling.

4TH WARD.
William S. Jackson.
Milton J. Foreman.

5TH WARD.
Edward D. Connor.
Michael M. Blake.

6TH WARD.
Charles Martin.
James J. McCormick.

7TH WARD.
Henry L. Fick.
Nathan T. Brenner.

8TH WARD.
Edward J. Novak.
Michael S. Garry.

9TH WARD.
Edward F. Cullerton.
Rudolph Hurt.

10TH WARD.
Wm. F. Brennan.
Michael Zimmer.

11TH WARD.
Robert K. Colson.
George Duddleston.

12TH WARD.
John F. Neagle.
James C. Patterson.

13TH WARD.
William T. Maypole.
Frank T. Fowler.

14TH WARD.
Albert W. Beilfuss.
John N. Bos.

15TH WARD.
Walter J. Raymer.
Chas. E. Hallstrom.

16TH WARD.
Stanley H. Kunz.
John F. Smulski.

17TH WARD.
Frank Oberndorf.
George B. Johnson.

18TH WARD.
Michael C. Conlon.
John J. Brennan.

19TH WARD.
John Powers.
Patrick Morris.

20TH WARD.
Chas. F. Brown.
Frederick W. Alwart.

21ST WARD.
Ernst F. Herrmann.
Charles Werno.

22D WARD.
Julius Goldzier.
Kinney Smith.

23D WARD.
Albert J. Olson.
John R. Peterson.

24TH WARD.
Chas. M. Walker.
S. H. Helm.

25TH WARD.
Robert Griffith.
Walter Butler.

26TH WARD.
William E. Schlake.
Freeman K. Blake.

27TH WARD.
Hubert W. Butler.
Albert F. Kenney.

28TH WARD.
John Bigane.
Chas. H. Rector.

29TH WARD.
Thomas Carey.
John T. Russell.

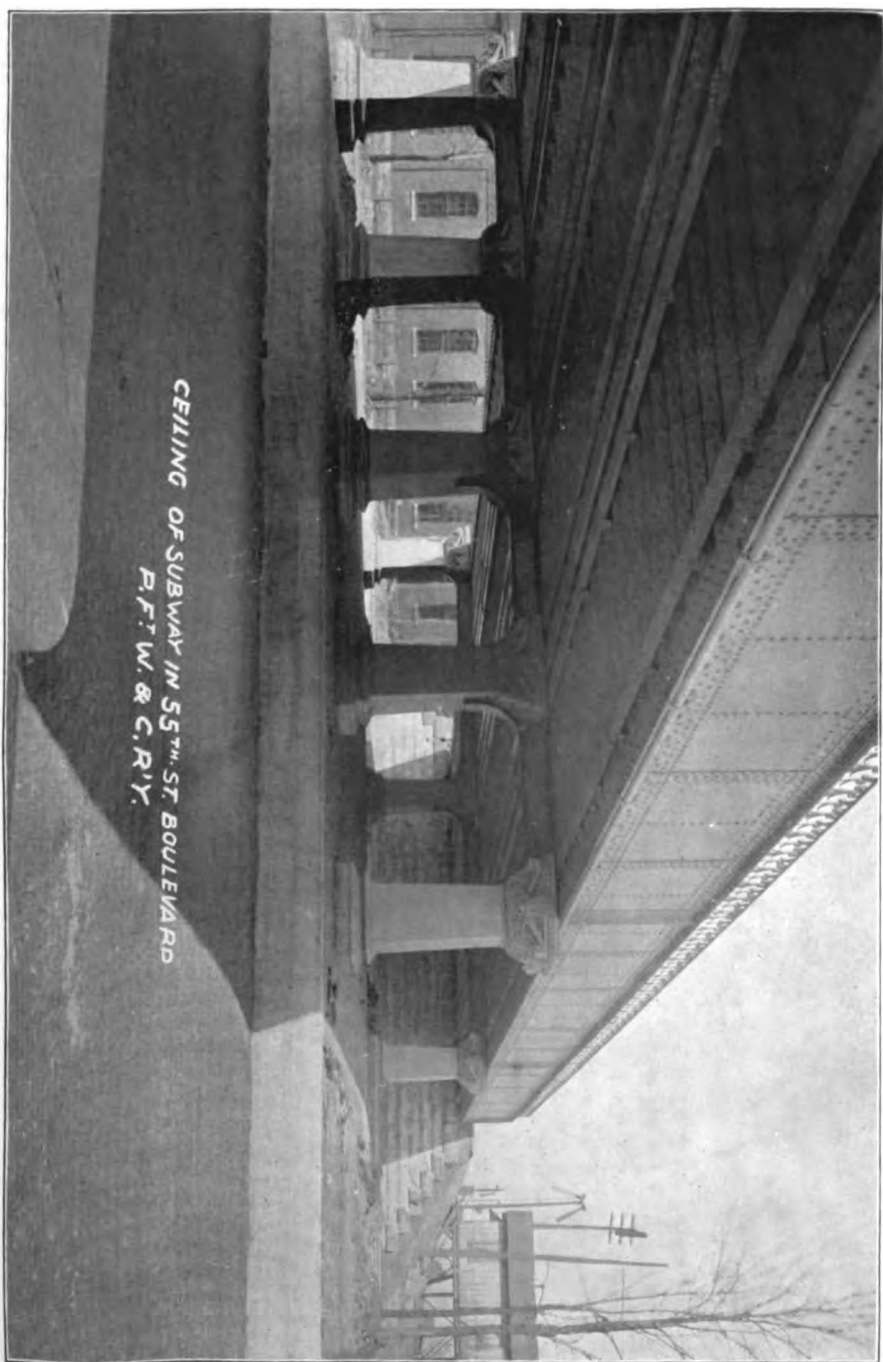
30TH WARD.
Charles J. Boyd.
Anton T. Zeman.

31ST WARD.
Joseph Badenoch.
Henry F. Eidmann.

32D WARD.
William Mavor.
Walter C. Nelson.

33D WARD.
Hugh T. Darcy.
Edward Watkins

34TH WARD.
John B. Math.
Frank I. Bennett.



*CEILING OF SUBWAY IN 55TH. ST. BOULEVARD
P. F. W. & C. R. Y.*

FIFTY-FIFTH STREET SUBWAY.

DEPARTMENT OF PUBLIC WORKS, CITY OF CHICAGO.

L. E. MCGANN,
Commissioner.

A. J. TOOLLEN,
Deputy Commissioner.

J. J. GRAHAM,
Assistant Secretary.

HEADS OF BUREAUS.

CITY ENGINEER, ...	JOHN ERICSON
SUPERINTENDENT OF SEWERS, ...	F. E. DAVIDSON
SUPERINTENDENT OF SPECIAL ASSESSMENTS, ...	J. S. SHEEHAN
SUPERINTENDENT OF WATER BUREAU, ...	H. O. NOURSE
SUPERINTENDENT OF STREET BUREAU, ...	M. J. DOHERTY
SUPERINTENDENT OF MAP BUREAU, ...	HUGO GROSSER
SUPERINTENDENT OF STREET AND ALLEY CLEANING, ...	W. E. CROSSETTE
DEPARTMENT BOOKKEEPER, ...	L. E. GOSSELIN

PAST COMMISSIONERS OF PUBLIC WORKS.

WATER BOARD.

1851-54—John B. Turner, Prest., Horatio G. Loomis, Alson S. Sherman.
1854-56—James H. Woodworth, Prest., John C. Haines, George W. Dole.
1856-58—George W. Dole, Prest., Orrington Lunt, John C. Haines.
1858-60—George W. Dole, Prest., Orrington Lunt, Noah Sturtevant.
1860-61—Orrington Lunt, Prest., Edward Hamilton, Benjamin Carpenter.

SEWERAGE BOARD.

1855-59—Wm. B. Ogden, Prest., James D. Webster, Sylvester Lind.
1859-61—James D. Webster, Prest., Sylvester Lind, Philip Conley.

Water and Sewerage Boards merged May 6, 1861, into

BOARD OF PUBLIC WORKS.

1861-63—Benjamin Carpenter, Prest., John G. Gindele, Frederick Letz.
1863-65—Francis C. Sherman, Mayor, *ex-officio* member of the Board.
1863-67—John G. Gindele, Prest., Frederick Letz, Orrin J. Rose.
1867-69—Aug. H. Burley, Prest., Wm. H. Carter, John McArthur.
1869-71—John McArthur, Prest., Wm. H. Carter, Redmond Prindiville.
1865-69—Wm. Gooding and Roswell B. Mason, members of the Board in matters pertaining to the cleansing of the river.
1869-71—Wm. Gooding and Edward B. Talcott, members of the Board in matters pertaining to the cleansing of the river.
1871-73—Wm. H. Carter, Prest., Jas. K. Thompson, Redmond Prindiville.
1873-76—Redmond Prindiville, Prest., Louis Wahl, Jas. K. Thompson.

Board of Public Works abolished September 18, 1876, and on the same date there was established by the City Council

THE DEPARTMENT OF PUBLIC WORKS.

1876-78—Monroe Heath, Mayor, Acting Commissioner.
January 7 to May 18, 1879—E. S. Chesbrough.
May 19, 1879, to October 18, 1881—Charles S. Waller.
October 18, 1881, to February 4, 1882—Carter H. Harrison, Mayor, Acting Commissioner.
February 4, 1882, to January 31, 1886—DeWitt C. Cregier.
February 1, 1886, to June 28, 1886—Carter H. Harrison, Mayor, Acting Commissioner.
June 28, 1886, to April 11, 1887—W. H. Purdy.
April 12, 1887, to April 15, 1889—George B. Swift.
April 16, 1889, to April 27, 1891—W. H. Purdy.
April 28, 1891, to December 24, 1892—J. Frank Aldrich.
December 24, 1892, to April 25, 1893—E. Louis Kuhns, Acting Commissioner.
April 25, 1893, to November 21, 1894—Hiram J. Jones.
November 21, 1894, to November 28, 1894—John A. Moody, Acting Commissioner.
November 28, 1894, to April 8, 1895—John McCarthy.
April 8, 1895, to July 20, 1896—William D. Kent.
July 20, 1896, to April 15, 1897—Joseph Downey.

ANNUAL REPORT

Commissioner of Public Works

CITY OF CHICAGO

1898

COMMISSIONER'S REPORT.

OFFICE OF THE COMMISSIONER OF PUBLIC WORKS, }
CITY HALL. }

*To the Honorable, the Mayor and Common Council
of the City of Chicago:*

GENTLEMEN :—I have the honor to submit for your consideration the Twenty-third Annual Report of the Department of Public Works for the year ending December 31, 1898.

While briefly enumerating the more important public improvements completed and in progress, and referring to the operation of the more important divisions of the public service, the reports of the several superintendents of bureaus, submitted herewith, record more fully a description of the work accomplished.

PUMPING STATIONS.

In my report for the year 1897, I called attention to the condition of the pumping stations and the repairs then being made, with the expectation that the water-supply service, which had been impaired by defects in the pumping machinery, would be greatly improved. The result has been eminently satisfactory, and during the year there was but very little cause for complaint in any part of the City. As a result of the work referred to, we were able to pump, in 1898, 2,746,590,861 gallons of water in excess of the quantity of water pumped in 1897, and at an expense for fuel of \$22,337.25 less than the amount paid for fuel in 1897. With 6,625,058,666 gallons of water pumped in excess of water credited to pumps in 1896, we made a saving of \$28,930.63, as compared with the total fuel cost in 1896. When the repairs shall have been completed, which will require only a small additional expenditure, and the machinery shall have had an opportunity to work under the new conditions, there will be a still greater decrease in the necessary expenditure at the pumping stations for operating, and a much greater increase in the efficiency of the old machinery, assuring us of a sufficient water-supply service throughout the City for many years to come.

In addition to the advantage gained by repairs, the capacity of the pumping stations was increased 50,000,000 gallons a day by the addition of a 30-million gallon engine at Fourteenth street, a 14-million gallon engine at Sixty-eighth street pumping works and the rebuilding of two pumps at Sixty-eighth street, equivalent to 6,000,000 gallons. A new water-pipe system was constructed, so that the pumping station at Fourteenth street now supplies the business section, thereby relieving the Harrison street and the Ashland and Chicago avenue pumping stations, which were heretofore operating at a considerable loss in friction because of the necessity of delivering the water at great distances from the source of power, and utilizing these stations for a proper supply in the West Division of the City, where they have suffered the greatest inconvenience heretofore. It is estimated by the City Engineer that when the Central Park avenue pumping station and the Springfield avenue pumping station shall have been completed, the capacity will be sufficient to supply a population of three and one-half millions, and always have a sufficient reserve for any emergency that may present itself.

EXTENSION OF THE WATER-PIPE SYSTEM.—The system of distributing mains, authorized by your Honorable Body on October 13, 1897, to provide feeders in connection with the new engines to be installed at Springfield avenue and Central Park avenue, were practically completed during the year, and will be available as soon as the pumping stations shall have been completed and are ready to put into service.

It will be necessary, in addition to the repairs referred to, to make some changes in the distributing pipe throughout the City, especially in the Hyde Park and Lake View districts, and in certain portions of the West Division of the City, where mains were laid in the expectation that the districts would be exclusively residence districts, having but a small population to a large area, and that the old wooden-pipe system in Norwood Park would be replaced by a proper iron-pipe system. The water pipe laid during the year was as follows :

2,337 feet.....	4 inch
151,571 "	6 "
40,018 "	8 "
11,084 "	12 "
55,995 "	16 "
37,405 "	24 "
27,809 "	30 "
72,680 "	36 "
1,518 "	48 "

400,367 lineal feet laid.

This is equal to $75\frac{4}{5}$ miles of pipe ; $4\frac{1}{5}$ miles of small pipe were taken up or abandoned. Net pipe added to the system during the year, $70\frac{2}{5}$ miles, making a total of $1,801\frac{3}{5}$ miles of water mains in use at the end of the year within the city limits.

Fire hydrants placed in position during the year.....	519
Net number of hydrants added to the system.....	478
Total number of fire hydrants now in use.....	18,311
Stop valves put in place during the year.....	689
Net number of valves added to the system.....	653
Total number of valves now in use.....	14,025
6,527 new house-service taps were added, making a total of.....	292,706
The number of service taps inserted in water mains, including re-taps and taps inserted for enlarged service pipes to build-ings previously supplied, is.....	9,384

The property of the Rogers Park Water Company should be acquired and operated by the City of Chicago, with a view to giving the citizens in that section of the City a better and a more economical service.

The buildings and grounds of the several pumping stations have also been repaired, and steps taken to preserve them from the tendency to decay that invited such severe criticism from citizens in the past.

CENTRAL PARK AVENUE PUMPING STATION.—This station is located at the terminus of Section 2, New Land Tunnel, and is to accommodate four 20-million gallon pumping engines, three engines with necessary boilers and appurtenances for this station being about completed and ready for installation. At the present time the dry well, which is to receive the engines, is about completed, with the exception of the floor and the foundations for the engines. The walls of the building are at such a height that they will be ready to receive the roof in about six weeks. The stack is about completed. The estimated cost of this pumping station is \$150,000.

SPRINGFIELD AVENUE PUMPING STATION.—Progress on this station has been much slower than on the Central Park Avenue station, due mainly to the fact that the excavation for the engine pit has been more difficult, as the excavation is carried to bed-rock. At this time the excavation for the dry well has been completed, and about ninety per cent. of the retaining walls for same is finished. Some work has been done on the foundations for the stack and on the foundations for boiler-room, coal-room, etc. The total estimated cost of this station is \$175,000.

The total cost of the pumping stations, boilers, and necessary appurtenances for both of these new stations will reach \$500,000.

The system of pumping stations at present has a nominal engine capacity as follows:

Lake View pumping station,	45,000,000 gallons per 24 hours.
North Side pumping station,	99,000,000 gallons per 24 hours.
Central pumping station,	86,000,000 gallons per 24 hours.
Fourteenth street pumping station,	84,000,000 gallons per 24 hours.
West Side pumping station,	60,000,000 gallons per 24 hours.
Sixty-eighth street pumping station,	88,000,000 gallons per 24 hours.
Total, - - - -	412,000,000 gallons per 24 hours.

These engines draw their water from the lake through tunnels. There are in addition to these, small pumping stations at Washington Heights and Norwood Park, which take their water from artesian wells.

TUNNELS.

The actual tunnel capacity, with present pumping arrangement, is as follows :

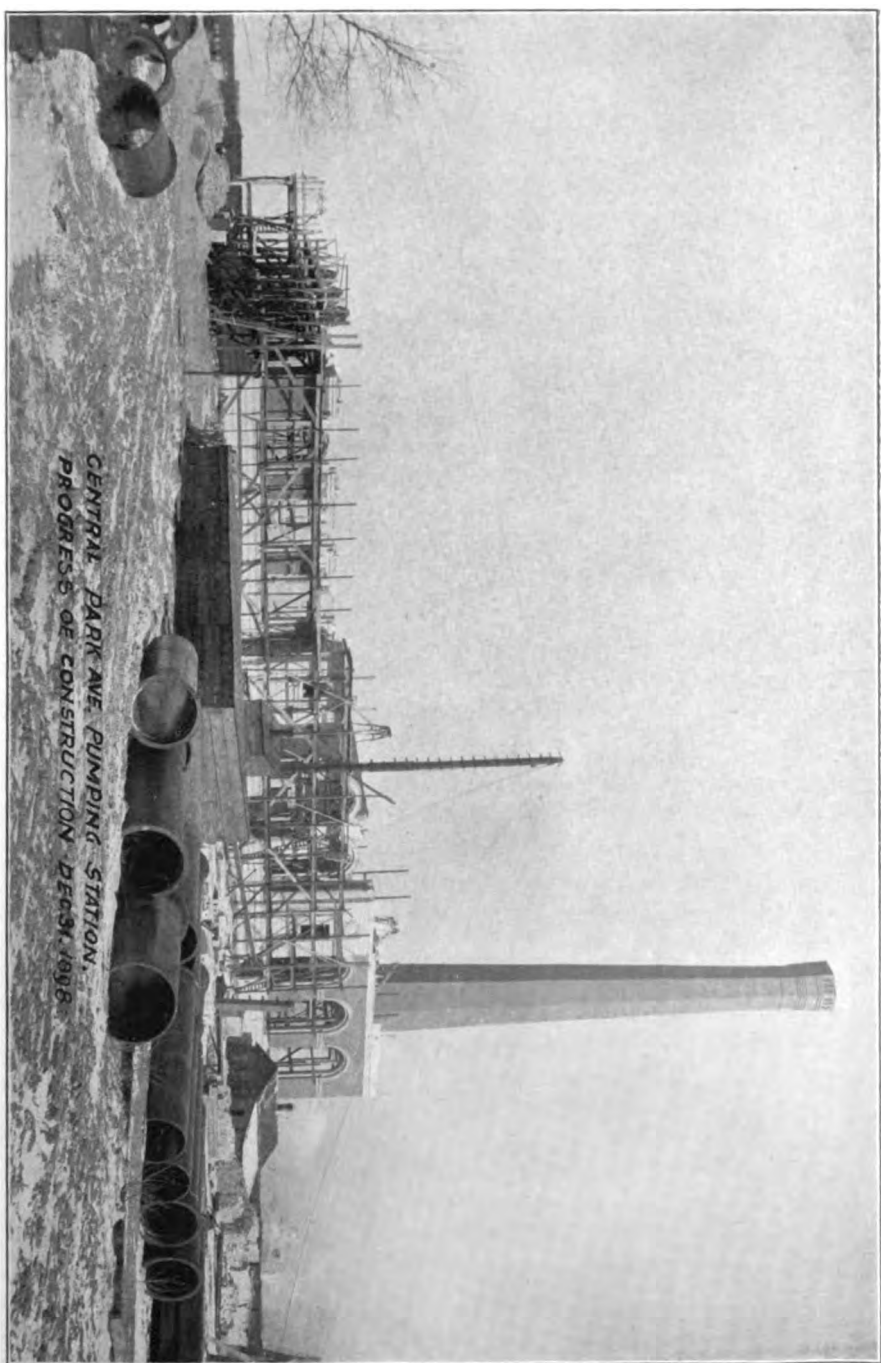
Lake View tunnel,	45,000 000 gallons per 24 hours.
Two-mile tunnels,	170,000,000 gallons per 24 hours.
Four-mile tunnel,	95,000,000 gallons per 24 hours.
Sixty-eighth street tunnel,	105,000,000 gallons per 24 hours.
Total, - - - -	415,000,000 gallons per 24 hours.

TUNNEL CONSTRUCTION:

SIXTY-EIGHTH STREET TUNNEL EXTENSION.—The plan for the tunnel at Sixty-eighth street provided for 7,316.4 lineal feet of tunnel, seven feet internal diameter, and 102 feet of tunnel, five feet internal diameter. The contract was awarded to Messrs. Ross & Ross on September 1, 1896. After a varied experience of about sixteen months, having completed 7,166 feet, they abandoned the work on account of the difficulties encountered. The Department, on the advice of the Corporation Counsel, took possession of the work and completed the tunnel by day labor. It is now in service, and has proved a valuable addition to the tunnel capacity at the Sixty-eighth street water works.

The lake section of the new tunnel, ten feet internal diameter, extends from a point two and one-half miles from the shore to the foot of Oak street, a distance of 14,039 feet, and was completed during the year at a cost of \$526,000.

Section 1, ten feet internal diameter, extends from the foot of Oak street to a point near the intersection of Green street and Grand avenue, a



CENTRAL PARK AVE. PUMPING STATION.
PROGRESS OF CONSTRUCTION. DEC. 31, 1908.

NEW PUMPING STATION--CONSTRUCTION.

total distance of 8,666 feet, and was completed at a cost of \$246,536.75.

Section 2, eight feet internal diameter, extends from a point near the intersection of Green street and Grand avenue to a shaft at the site of the new pumping station at Central Park avenue, a distance of 19,856 feet. On account of litigation commenced in 1897 by the contractors, no work was done during the year. At present there remains to be completed about 38 per cent. of the entire length. The amount paid for this work, up to date, is \$282,200.24.

Section 3, eight feet internal diameter, extends from a point at the intersection of Green street and Grand avenue to the new pumping station at Springfield avenue and Bloomingdale road, a distance of 22,177 feet. At the end of the year 60 per cent. of this work was completed. Work was prosecuted until April, but owing to claims made by the contractors, and which could not be allowed by the City, the contractors discontinued work. In accordance with an ordinance passed by the City Council July 11th last, making allowances apparently satisfactory to the contractors, the work was resumed and continued until November 11th last, when the contractors again made claims, which could not be allowed, and the work was discontinued. The contractors secured a temporary injunction restraining the City from taking possession of the work or interfering with their operations. During the year the contractors completed 5,588 lineal feet. The total cost of this section, up to date, is \$627,342.

CHICAGO AVENUE TUNNEL EXTENSION.—This work was undertaken for the purpose of connecting the New Land Tunnel system with the present Two-mile Tunnel system running from the Two-mile crib to the Chicago avenue pumping station. Connection is made with section one of the New Land Tunnel several hundred feet west of the Oak street shaft. This connection will furnish water to a well which will supply a new engine to replace the north pumping engine at this station and, incidentally, raise the head in the other wells so that water can be more economically supplied. In addition, this connection was made as an emergency measure in case, for any reason, the supply should be partially shut off from the intake shaft supplying the present two-mile tunnels. The work was begun by day labor June 20, 1898, and completed December 3, 1898. There were built four shafts of a total depth of 359.3 feet, 860 feet of seven-foot tunnel, 518 feet of six-foot tunnel, and 127 feet of five-foot tunnel. The entire cost was approximately \$40,000. The work was executed by laborers employed by the day, under the direction of the City Engineer. From the experience gained by this and other tunnel work done by day labor, I feel justified in recommending that all work of like character be performed by day labor under the immediate direction of the City Engineer.

STREETS.

The reconstruction of streets, where the pavements have been worn out, and the extension of pavements during the year, have not been equal to the needs of the growing heavy traffic of the city's business section or the growth of the City towards its limits. The property owner, in addition to paying for the pavement in front of his property, is burdened with the cost of street intersections and the rebuilding of catch-basins and connections that have heretofore been regarded as a proper charge against the general fund. On January 22, 1894, the City Council passed an order directing that in the preparation of ordinances the "Commissioner of Public Works be and he is hereby directed to report such ordinances with a provision that the whole cost of such improvement shall be raised by special assessment upon the property benefited thereby."

The lot owners give expression to their disapproval of the practice of assessing them with the cost of the intersections, sewers and catch-basins rebuilt, at the public hearings of the Board of Local Improvements, and it frequently results in defeating the resolutions for much-needed repaving and extension. The same may be said of sidewalks. When assessments are levied to secure the construction of proper walks, the cost of intersections is assessed against the lots, and, in many cases, where the property owner has constructed a walk in front of his property, he expresses indignation at being compelled to pay an assessment and costs of spreading and collecting same for improving what he regards as the City's portion of the street. Believing that the assessment for these intersections are unjust, he is frequently compelled to give much time to securing an explanation of the causes that lead to such assessment, and in many instances, the property owner failing to pay such assessment, the property was sold for taxes, which is expensive and leads to great annoyance.

STREETS IMPROVED.

During the year 1898, streets were improved as follows:

Paved with cedar blocks.....	18.82 miles.
Paved with macadam.....	6.52 miles.
Paved with granite blocks.....	.62 miles.
Paved with brick.....	1.70 miles.
Paved with asphalt.....	8.52 miles.
Curbed and filled.....	.48 miles.

Total number of miles improved..... 36.66 miles.

KINDS OF PAVEMENT.

The following table gives the mileage of each class of pavement in use in the three divisions of the City:

DIVISION.	Cedar-Block, Miles.	Macadam Miles.	Medina Stone, Miles.	Granite, Miles.	Sheet Asphalt, Miles.	Block Asphalt, Miles.	Brick, Miles.	Found'n, Miles.	Total Miles.
North	160.31	66.99	0.49	1.02	8.97	.....	4.43	1.08	243.29
South.....	218.70	263.33	1.41	20.52	18.80	2.97	7.78	.....	533.51
West	395.91	29.78	.89	4.77	36.01	.....	4.29	.....	471.15
Totals.....	774.92	360.10	2.29	26.31	63.78	2.97	16.50	1.08	1247.95

SIDEWALKS.

MILES OF WOOD, STONE AND CONCRETE SIDEWALKS BUILT DURING 1898.

DIVISION,	MATERIAL.			Total Miles.	Sidewalks Repaired, Miles.	Total Work, Miles.
	Wood Miles.	Stone Miles.	Concrete, Miles.			
North.....	18.25	1.20	27.81	42.36	6.18	48.44
South.....	72.89	1.82	39.85	114.56	18.06	132.62
West.....	62.35	2.32	31.22	95.89	21.02	116.91
Totals.....	153.49	5.34	98.88	252.81	45.26	297.97

NUMBER OF MILES OF SIDEWALK UNDER THE CONTROL OF THE CITY AND THE SOUTH, WEST AND LINCOLN PARK COMMISSIONERS, AT THE CLOSE OF THE YEAR.

UNDER CONTROL OF	MATERIAL.			Total Miles.
	Wood, Miles.	Stone, Miles.	Concrete, Miles.	
City.....	4,200.81	242.14	687.15	4,976.27
South Park Commissioners.....	.....	20.00	30.75	50.76
West Park Commissioners.....	.....	11.05	55.60	66.65
Lincoln Park Commissioners.....	.....	2.47	5.79	7.96
Totals.....	4,200.81	275.86	871.18	5,101.64

The sidewalks throughout the City, especially in the unsettled sections, are in a very bad condition, frequently leading to accidents, and judgments, aggregating a large sum, are secured against the City annually on account of personal injuries.

Nine hundred and thirty resolutions have been passed by the Board of Local Improvements, and public hearings held for the purpose of considering ordinances for improvements on 480 miles of sidewalks, but the dissatis-

faction growing out of the proposed assessments against the property for public benefits has resulted in defeating a majority of these ordinances. There were 400 resolutions passed by the Board of Local Improvements aggregating 175 miles of street improvement, or 3,150,000 square yards. Two hundred and twenty of these ordinances were sent to the City Council, amounting to 95 miles of improvement, or 1,710,000 square yards, and at an estimated cost of about \$3,000,000.

It is absolutely necessary, if the municipality is to discharge its duty to the public, that steps be taken by the City to pay for its share of public improvements. Objection has been made also to the practice of making estimates, which appeared much higher than were necessary, to secure funds for the performance of work. The Board of Local Improvements adopted a rule basing all estimates on the average cost of the last three improvements of the character proposed, and adding fifteen per cent. for emergencies. This will preclude the possibility of making an estimate higher than is absolutely necessary to secure a fund for the work. In the event, however, of the proposals for the performance of work being too high, the law provides a remedy. After the award is made by the Board of Local Improvements, the contract is not executed for ten days after such award, during which time the property owners may indicate their desire to take the contract, if they should so elect, at ten per cent. less than the offer made at public letting, and the Board of Local Improvements is obliged to award the contract to the owners.

The paving materials now being used, namely, granite, brick, asphaltum and cedar, are not wholly satisfactory to the general public. On streets subjected to very heavy traffic, granite is more satisfactory than any other pavement. Asphaltum and brick are not regarded with as much satisfaction, because the first cost is claimed to be too high and the cost of maintenance is regarded as a burden on a city. Very few requests are being made for paving with cedar blocks, because of the material being unsanitary and not durable.

In all ordinances prepared by the Board of Local Improvements, unless otherwise directed by a majority of the property owners, it is provided that the street shall be so constructed as to be in good repair at the end of ten years, and a satisfactory bond is required to secure a faithful compliance with the contract. A change was found necessary in the quality of the cement used in the foundations, for the reason that in constructing streets in the City, natural cement was not as reliable as Portland cement. This resulted in a slight increase in the cost of the foundations, but in most cases it has met with the hearty approval of the property owners seeking permanent improvements.

Four hundred twenty-five thousand and ninety-six square yards of

repaving and repairs have been made on improved streets, in each division of the City, as follows. This does not include the repaving done by private corporations.

North Division.....	106,275 square yards.
South Division.....	158,034 square yards.
West Division.....	165,787 square yards.
Total	425,096 square yards.

During the year, 20,668 permits were issued to corporations and others for openings in pavements, for the purposes of inserting or repairing underground work. The defective condition of the underground improvements, such as gas mains, electric conduits, water mains and sewers, will prevent the maintenance of a permanent pavement in the business section of the City until all the defects shall have been remedied. No matter what kind of pavement may be on the surface, if gas escapes from the mains into the streets, the very necessity of the case requires that the street should be opened and the defect in the gas mains repaired. The same may be said of leaks in water mains, obstructed, and of defective sewers or breaks in electric wires. To obviate this, steps should be taken to secure some system of conduits, approachable by openings at frequent intervals for the purpose of construction and repair, in which all underground gas, water and sewer pipes and electric wire conduits should be placed.

The amounts appropriated for street cleaning and repairs were so notoriously inadequate that the service was anything but satisfactory. Street cleaning for the year was performed by manual labor, employed by the day and furnished by the Civil Service Commission. Each man was apportioned a district, the streets and alleys of which he was expected to keep clean. During the period of employment the work was fairly well performed, but when the funds were exhausted, the men were discharged, except those employed in the business section of the City, so that for a period of about three months during the year, no attempt whatever was made to clean the streets outside of the business district, except in cases of emergency.

By far the largest percentage of paving repairs is necessary on cedar blocks. We have 774.92 miles of cedar pavements in Chicago, equal to 14,547,903 square yards. The average life of a cedar pavement is about ten years. To maintain cedar pavement in fair condition would require repairs equivalent to ten per cent. per annum. This would cost a minimum price of fifty cents per square yard, or a total of \$727,395. This does not include 360.10 miles of Macadam, 2.29 miles of Medina stone, 26.31 miles of granite, 63.78 miles of sheet asphalt, 2.97 miles of block asphalt and 16.50 miles of brick roadways, all of which should receive constant atten-

tion during the year and at an aggregate expenditure equal to the amount necessary to maintain cedar block pavement.

From the foregoing, which is not disputed by men experienced in the supervision of pavements, some idea may be had of how ridiculous it is to expect to maintain the pavements of Chicago on the amounts appropriated. This is one of the serious problems to be solved in the municipal management of this City. Should the City not pay for renewing the improvement as each successive pavement is required? The Municipality will have to contend with an adverse public opinion on this subject until it shall be provided by law that, after a permanent improvement is once made, property shall not be again assessed for a like improvement, and that the Municipality shall forever maintain the pavement in first-class condition.

FINANCIAL STATEMENT.

Amount paid contractors for street improvements by special assessments	\$818, 46.96
For sidewalks built by the Bureau under special assessment	24,715.25
For repaving and repairing improved streets.....	196,419.71
For repairing Hegewisch road.....	4,880.84
For grading, ditching, building and repairing aprons, culverts, crossings, etc., on unimproved streets.....	99,987.11
For sidewalk general repairs and intersections.....	55,826.25
For City parks.....	10,417.96
Grand total.....	<u>\$1,205,448.58</u>

STREET IMPROVEMENTS.

There were 36.18 miles of streets improved during the past year, and 425,076 square yards of street pavement repaired.

Total streets in the City.....	2,574.00 miles
Total alleys in the City.....	1,372.00 miles
Total streets paved in the City.....	1,188.81 miles
Total alleys paved in the City.....	114.14 miles
New sidewalks constructed.....	255.02 miles
Sidewalks repaired.....	45.26 miles
Total sidewalks in the City.....	5,354.85 miles

STREETS AND ALLEYS.

During 1898, 34.83 miles of streets and 1.35 miles of alleys, a total of 36.18 miles, were paved. Streets curbed and filled, .48 miles.

SIDEWALKS.

There was constructed by the City during the year 1898 a grand total of 254.72 miles of sidewalk, divided as follows:

Plank sidewalk.....	148.49 miles
Concrete sidewalk.....	98.88 miles
Stone walk.....	5.34 miles
Concrete walk, constructed by the various Park Boards.....	2.81 miles
Total.....	<u>255.02 miles.</u>

PARKS.

The cost of maintaining the various parks under the control of this Department during 1898 was as follows:

Aldine Square.....	\$1,146.28
Douglas Monument Square.....	1,043.14
Ellis Park.....	1,243.84
Bickerdike Square.....	565.35
Jefferson Park (Jefferson).....	460.28
Irving Park.....	73.50
Green Bay Park.....	492.36
Oak Park.....	386.95
Washington Square.....	2,664.37
Holstein Park.....	470.75
Gross Park.....	999.72
Shedd's Park.....	67.25
Eldred Park.....	403.10
Lakewood Park.....	123.00
Norwood Park.....	74.35
DeKalb Square.....	188.45
Kedzie Park.....	15.00
	<u>\$10,417.69</u>

HOUSE MOVING.

Five hundred and sixty-seven permits to move buildings were granted, of which 484 were for frame buildings, eighty-two were for brick, and one, for iron.

The following gives the number moved in the different sections of the City, the height, and the total frontage:

NORTH SIDE	SOUTH SIDE	WEST SIDE	TOTAL
149	225	193	567
ONE STORY.	TWO STORIES.	THREE STORIES.	
296	263	8	

The total frontage was 11,719 feet, or about 2.21 miles.

GARBAGE REMOVAL.

Except for a period of about thirty days, the garbage service during the year was satisfactory, by comparison with the service given citizens during previous years, but in no sense satisfactory compared with the standard established by the most modest citizen in his conception of proper sanitary conditions. Nor will the service be satisfactory, even if the collection is most punctual and thorough, until the system is changed

so that the decomposing wastes from the household will be placed directly into the collecting wagons and not scattered broadcast in the alleyways. The alleyways, themselves, must all be paved so as to make it possible to clean them, otherwise the service will never be satisfactory, and the nuisances created by careless householders and negligent collectors will be a constant menace to the health of the City. Repeated efforts have been made by this administration to secure for the City a service based on modern methods of collection and a sanitary disposal of garbage, ashes, refuse and wastes, but each failed to succeed because of the limitation placed on the City's indebtedness and annual income.

On November 9, 1897, the City advertised for proposals for the collection, removal and sanitary disposal of ashes, garbage and refuse, and a contract for a period of five years was awarded November 20, 1897, to Mr. A. J. Murphy, the lowest bidder. He failed to qualify, and specifications were again prepared, proposals invited and contracts awarded to Messrs. Hanrahan & Downey, Messrs. Dowdle & Chamberlain and Messrs. Mulcare & Burke for a period of five years, for the collection and sanitary disposal of ashes, refuse and garbage of the City. An injunction was secured by Mr. M. C. McDonald against the City on the ground that the contract exceeded the City's debt limit. The Supreme Court of Illinois decided the contract was illegal. Specifications were again prepared and advertised for a period of twenty-one days. These invited proposals on every known method, and by direction of your Honorable Body were referred to the Committee on Finance, where they are now pending.

CONTRACTS.

The City, during the year, entered into contracts for improving streets and alleys, and for constructing various public works, and for furnishing various classes of material and supplies, aggregating \$4,509,770.89, distributed as follows :

TO BE PAID BY SPECIAL ASSESSMENT.

124 Contracts for street and alley improvement.	\$1,571,973.84
101 Contracts for water service and supply pipes	131,614.67
110 Contracts for sewers.....	332,889.63
57 Contracts for house drains.....	56,655.89
207 Contracts for sidewalks.....	98,856.90
10 Contracts for lamp posts.....	5,766.42

PAID FROM GENERAL FUND.

7 Contracts for intercepting sewers.....	1,641,266.77
1 Contract for sewer at Sixty-eighth street pumping station.....	3,893.78

6 Contracts for office fixtures	\$ 9,906.00
2 Contracts for Cottage Grove avenue police station.....	3,073.00
4 Contracts for police station at Forty-seventh street and Paulina street.....	10,545.00
2 Contracts for police station at Sheffield avenue.....	5,352.40
6 Contracts for addition to Sixty-eighth street pumping station.....	35,315.68
1 Contract for Washington Heights pumping station....	3,587.91
5 Contracts for new pumping stations.....	71,229.00
4 Contracts for fire engine house, Michigan avenue and Washington street	17,831.00
3 Contracts for fire engine house, Lawndale avenue.....	6,490.00
1 Contract for fire engine house, West Cuyler street.	2,950.00
2 Contracts for Carter H. Harrison bath-house.....	4,640.00
1 Contract for boiler, John Worthy School.....	1,132.00
4 Contracts for constructing Carter H. Harrison crib....	31,141.50
1 Contract for removing Sixty-eighth temporary street crib	1,500.00
1 Contract for removing Lake View crib.....	3,300.00
1 Contract for steam heat at Four-mile crib.....	1,647.00
4 Contracts for cast-iron gates and gate valves.....	28,076.00
1 Contract for special castings (water-pipe).	15,000.00
1 Contract for brass castings for hydrants and stop-valves	5,000.00
1 Contract for cast-iron rings and covers.....	10,000.00
2 Contracts for tug service.	8,500.00
1 Contract for removal of portico, La Salle street entrance of City Hall.....	7,043.00
1 Contract for widening and dredging Chicago River at Diversey avenue.....	42,293.71
6 Contracts for oak and pine lumber.....	10,921.98
3 Contracts for teaming.....	47,451.30
1 Contract for rebuilding Jackson street viaduct and bridge.....	6,273.00
1 Contract for steel vault cases for Comptroller's office...	2,295.00
1 Contract for water meters.....	7,758.00
1 Contract for Corporation ferrules.....	7,670.00
16 Contracts for coal.....	225,268.90
1 Contract for manhole and catch-basin covers.....	3,156.51
1 Contract for removal of Sixty-first street viaduct and build three bridges over North branch.....	12,000.00
3 Contracts for Twenty-ninth Ward bath-house.....	5,152.00

The following table shows the quantity of water furnished, the total revenue received, and the cost per million gallons pumped annually, from 1858 to 1898, inclusive:

YEAR.	Million Gallons Furnished.	Revenue.	Revenue per Million Gals.
1858	1,092	\$102,178.85	\$93.57
1859	1,415	122,753.50	86.75
1860	1,717	131,162.73	76.39
1861	1,767	131,035.10	74.15
1862 .....(15 months)....	2,705	188,448.25	69.66
1863 .....( 9 months)....	2,336	192,246.39	82.29
1864	2,523	224,902.57	89.14
1865	2,778	253,114.49	91.11
1866	3,169	302,017.59	95.30
1867	4,232	338,929.28	80.08
1868	5,375	420,686.94	78.26
1869	6,801	476,968.24	70.13
1870	7,945	539,180.19	67.86
1871	8,423	445,834.64	52.93
1872	10,051	544,465.90	54.17
1873	11,723	708,804.32	60.46
1874	13,903	705,926.64	50.77
1875 .....( 9 months)....	10,957	635,996.54	58.04
1876	15,346	771,940.38	50.30
1877	19,047	908,509.64	47.70
1878	19,564	944,190.97	48.26
1879	20,558	922,001.26	44.85
1880	21,003	865,618.35	41.21
1881	23,332	936,922.07	40.16
1882	24,151	1,049,576.90	43.46
1883	16,742	1,142,868.54	42.73
1884	29,286	1,204,338.74	41.12
1885	33,451	1,339,038.00	40.03
1886	35,693	1,374,837.32	38.52
1887	37,199	1,490,023.68	40.05
1888	38,122	1,557,116.78	40.84
1889	40,504	1,621,786.34	40.04
1890	55,614	2,202,724.58	39.61
1891	63,552	2,364,463.09	37.21
1892	71,035	2,738,434.10	38.55
1893	86,298	2,949,548.87	34.18
1894	87,074	3,158,492.94	36.27
1895	91,922	3,318,483.85	36.20
1896	93,040	3,176,855.71	34.14
1897	96,918	3,206,357.83	33.08
1898	99,665	*3,489,390.87	35.01

* For years prior to 1898, the above table gives the possible revenue of the Bureau of Water, affected by the increases and decreases as result of the work done in the inspection division. The figures for 1898 give the actual collections for that year.

SEWERS.

The sewerage system was extended in the three divisions of the City during the year, as follows :

Constructed in the West Division.....	23.579 miles
Constructed in the South Division.....	17.971 miles
Constructed in the North Division.....	8.053 miles
Total.....	48.603 miles

Number of catch-basins built.....	1,812
Number of manholes built.....	1,916

Construction of sewers and catch-basins during the year in these divisions of the City cost as follows :

West Division.....	\$144,738.75
South Division.....	54,86 .98
North Division.....	279,8 7.65
Total.....	\$678,949.38

Total number of catch-basins.....	49,438
Total number of manholes.....	51,405
Total number of miles of sewer in the City.....	1,388.89

INTERCEPTING SEWERS.

When the plans were being prepared for the Intercepting Sewers in accordance with the order of the City Council, March 22, 1897, it was clearly apparent that large and expensive portions of the work recommended would parallel work of a like character to be done by the Sanitary Trustees, in order to perfect the plans for the completion of the Sanitary Canal. So as to avoid an unnecessary expenditure of money by either the City Government or the Sanitary Trustees, His Honor the Mayor addressed that body a communication asking for information as to the plans necessary to complete their work and their co-operation in the preparation of plans and in performing the work in the most economical manner, to meet the requirements of the statute and to secure at the earliest possible day the end for which both organizations were working, namely, pure water. After many conferences and negotiations, the following plan was agreed to. The City of Chicago was to increase the diameter of the conduit at Thirty-ninth street from twelve to twenty feet and on Lawrence avenue from nine and one-half to sixteen feet, construct both conduits, with necessary pumping machinery of a capacity of 40,000 cubic feet per minute at Thirty-ninth street and 35,000 cubic feet per minute at Lawrence avenue, and deliver same when completed to the Sanitary Trustees, they forever to operate, maintain and keep in proper repair the conduits and machinery.

Acting on this agreement, plans were prepared for the conduits on

Thirty-ninth street, from Halsted street to Lake Michigan, a distance of 12,000 feet; proposals were invited and the contract awarded for \$786,591.00 to the Chicago Star Construction & Dredging Company, who were the lowest bidders. This work is progressing in a satisfactory manner, considering the necessity for using mechanical appliances devised especially for this kind of work. From the progress now being made it is safe to predict that the contractors will have completed their work at the time specified in their contract, namely, September 1, 1899.

THE LAWRENCE AVENUE CONDUIT commences on Lawrence avenue, about 1,000 feet east of the north branch of the Chicago River and runs east to Lake Michigan. Proposals were invited for this work and the contract awarded to the lowest bidders, Messrs. Farley & Green, for the sum of \$479,663.50. Some delays have been occasioned in this work owing to the inability of the contractors to secure a completion of the shield and steam shovels to be used on the work, but they are now being delivered and we have the assurance that the work will be completed as required by the contract.

SECTION 2 of the Intercepting Sewer commences at Sheridan road and Lawrence avenue, thence north on Sheridan road to Devon avenue, thence west on Devon avenue to Sheridan road, thence north on Sheridan road to Pratt avenue. The diameter of this sewer is six to eight feet. The work was awarded to Nash & Dowdle, who were the lowest bidders, and was completed on November 17, 1898, at a cost of \$149,798.25.

SECTION 2—EXTENSION, authorized by the City Council on October 24, 1898, commences at Pratt avenue and Sheridan road and extends north on Sheridan road to Bryan avenue. The diameter of this extension is three and three-fourths to five feet. The contract was awarded to Nash & Dowdle, who were the lowest bidders, and was completed on December 27, 1898, at a cost of \$23,894.95.

SECTION 3 commences at Sheridan road and Lawrence avenue and extends south on Sheridan road to Lakeside avenue, thence east on Lakeside avenue to Clarendon avenue, thence south on Clarendon avenue to Graceland avenue, thence east on Graceland avenue to Pine Grove avenue, thence south on Pine Grove avenue to Sheridan road, thence east on Sheridan road to Lake Shore drive, thence south on Lake Shore drive to Belmont avenue and then south on Lake View avenue to Surf street. The diameter of this sewer varies from three to six feet. The contract was awarded to Cogan & Pound, the lowest bidders, for \$107,805.80. The work has progressed rapidly and will, no doubt, be completed at the time specified, April 30, 1899.

SECTION A—What is known as Section A of the Intercepting Sewer,

commences at the Chicago River and runs thence east on Fourteenth street to State street, north on State street to Twelfth street, and then east on Twelfth street to Lake Michigan. This constitutes an outfall sewer for the sewerage district bounded by Van Buren street on the north and Seventeenth street on the south, and was reconstructed for the purpose of reversing the flow from Lake Michigan to the Chicago River. The contract was awarded to the lowest bidder, James H. Roche. The work was commenced on March 14, 1898, and completed on June 15, 1898, at a cost of \$31,004.88.

SECTION B of the Intercepting Sewer System commences at the Chicago River, extends east on Twenty-first street to Prairie avenue, thence south on Prairie avenue to Twenty-second street, and then east on Twenty-second street to Lake Michigan, with spur on State street from Twenty-first street to Twenty-second street, and constitutes an outfall-sewer for the district bounded by Seventeenth street on the north and Thirty-first street on the south. It was reconstructed to change the flow from Lake Michigan to the Chicago River. The contract was awarded to Byrne & Shortall, the lowest bidders, at a cost of \$68,146.16. The work was commenced on March 8, 1898, and finished on July 11, 1898.

MAINTENANCE OF SEWERS.

The following tabulated statement shows the cost of cleaning and repairing sewers, the cost per mile, the number of miles and the number of catch-basins and manhole chambers distributed in the three divisions of the City:

DIVISION.	Miles of Sewer.	Number of Catch-Basins.	Number of Man-hole Chambers.
West.....	592,163	21,763	21,128
South.....	540,588	18,779	20,301
North.....	255,644	8,896	9,976
Totals.....	1,388,390	49,438	51,405

The cost of repairing sewers and catch-basins during the year was \$68,190.29. This is an average cost of \$49.115 per mile.

The cost of cleaning was \$92,961.88, or an average cost of \$66.955 per mile. The total cost of both repairs and cleaning was \$161,152.17, or an average of \$116.07 per mile.

Of the 48 miles of sewers constructed in 1898, 14.35 miles are of brick, and 34.232 miles, of vitrified pipe, and of the total of 1,388.39 miles of sewers in the city, 528.629 miles are of brick and 859.761 miles are of vitrified pipe.

TOTAL COST OF SEWERS:

DIVISIONS.	MILES.	COST.	Average Cost Per Mile.
West	592.163	\$ 7,974,111.80	\$13,466.70
South	540.583	7,552,558.70	13,971.18
North	255.641	3,247,650.44	12,708.90
Totals	1,388.390	\$18,774,320.94	\$ 13,522.44

BUREAU OF WATER.

On February 21, 1898, your Honorable Body passed an ordinance changing the rates to water consumers, making a reduction in the revenue of the Water Department, on the basis of the property then on the books, aggregating about \$300,000, and in other respects modifying the law so as to protect the property owner against loss by the failure on the part of the tenants to pay the water rents as agreed, and on the part of the City for failing to enforce the law. It also provided for the correction of an abuse that has so frequently resulted in loss to the City and in scandals growing out of the practice of making rebates without warrant of law. While the law changing the rates was expected to reduce the income of the City on account of water rents some \$300,000, a more thorough inspection of the City resulted in placing on the books properties that had heretofore escaped paying any water rents whatever. A rigid enforcement of the law and the refusal to make deductions, except as authorized, resulted in a net increase of \$311,684 over the revenue of 1897, instead of a decrease of \$300,000. The receipts of the office from all sources amounted to \$3,489,390.87.

WATER METERS AND HYDRAULIC ELEVATORS.

Number of new meters put in during the year 1898	478
Number of old meters removed	37
Net increase	441
Total number of meters now in use	5,837
Total number of meters repaired	1,370
Number of meters removed and replaced by new ones	35

The revenue derived from water measured by these meters and hydraulic elevators for the past year amounted to \$1,087,858.31.

The Water Commission appointed by His Honor the Mayor, on authority of your Honorable Body, to consider changes in the water rates, expressed the belief that if the City would invite competition on prices of standard meters to the consumer, a much larger number of consumers would use meters, greatly to the advantage of the consumer and of the City. The argument in favor of the extended use of meters is found in the statement of fact, that while but 13 per cent. of the water pumped is

measured by meter, it pays 31 per cent. of the revenue. This shows an enormous waste of water among consumers not measuring water by meter, and works a great injustice to those who are practicing economy. If the same economy could be secured throughout the City it would result in a remarkable decrease in the cost of operating the pumping works and a decrease in the unit cost to the consumer.

Acting on the suggestion of said Commission, the City advertised April 18, 1898, inviting proposals for water meters, and the following proposals were received April 28, 1898:

BIDDERS.	MAKE OF METER.	SIZES—INCHES.							
		½	¾	1	1½	2	3	4	6
Thompson Meter Co.....	The Thompson.....	\$ 8.40	\$12.60	\$16.80	\$30.00	\$50.00	\$85.00	\$190.00	\$380.00
Neptune Meter Co.....	The Trident.....	8.00	12.00	16.00	30.00	50.00	85.00	190.00	380.00
National Meter Co.....	The Nash.....	8.00	12.00	16.00	30.00	50.00	85.00	190.00	380.00
	The Emplre.....	10.00	15.00	20.00	40.00	60.00	100.00	225.00	400.00
	The Crown.....	12.00	19.00	27.00	50.00	65.00	135.00	250.00	500.00
Pittsburg Meter Co.....	The Pittsburg.....	6.95	10.00	12.00	25.00	40.00	80.00	160.00	325.00
	The Hersey.....	11.00	18.00	25.00	40.00	60.00	120.00	240.00	480.00
J. B. Clow & Sons.	The Disc.....	8.00	12.00	16.00	30.00	50.00	85.00	190.00	380.00
	The Torrent.....						82.50	175.00	380.00

The contract was awarded to the lowest bidder, the Pittsburg Meter Company, to furnish meters for a period of one year, as required by the Department of Public Works, all meters to be tested by the City of Chicago and be of a guaranteed efficiency and said meters to be paid for by the consumer. The cost of the meters was thereby reduced to the consumer about twenty-five per cent., and another source of scandal in the administration of the Water Office disposed of.

WATER WORKS.

Since the purchase of the Water Works in 1854 from the Chicago Hydraulic Company, the City has expended, to December 31, 1898, including the cost of the said company's property, \$30,220,952.53, as follows:

Cost, up to May 1, 1861, when the Works were transferred from the Board of Commissioners to Board of Public Works..... \$ 1,020,160.21

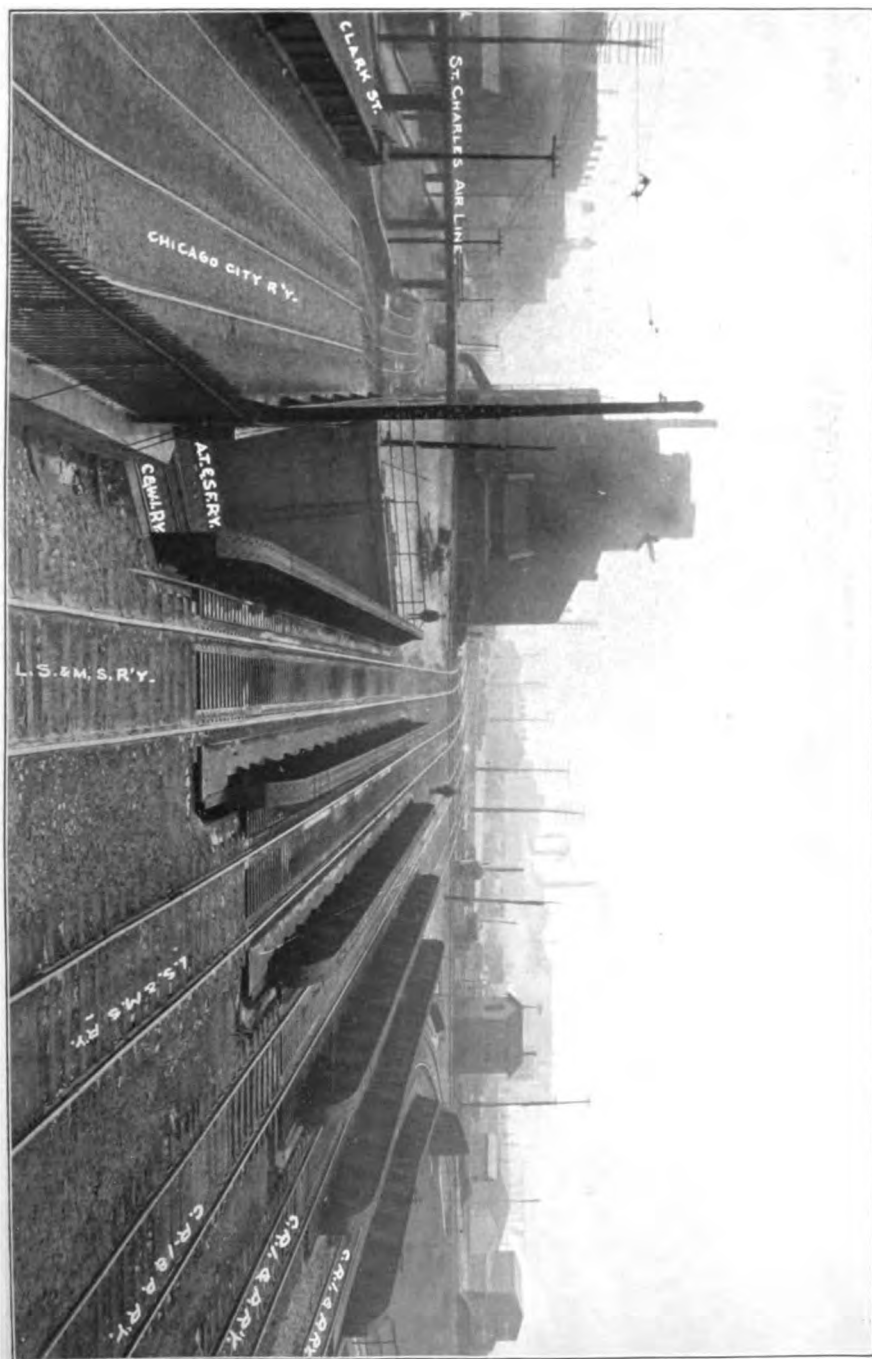
EXPENDITURES SINCE 1861.

Cost of water pipe including labor..... \$15,815,339.64
 Cost of North pumping works..... 929,532.44
 Cost of Springfield avenue pumping works..... 141,726.89
 Cost of West pumping works..... 944,212.77
 Cost of Central Park pumping works..... 228,080.37
 Cost of Sixty-eighth street pumping works..... 333,056.31

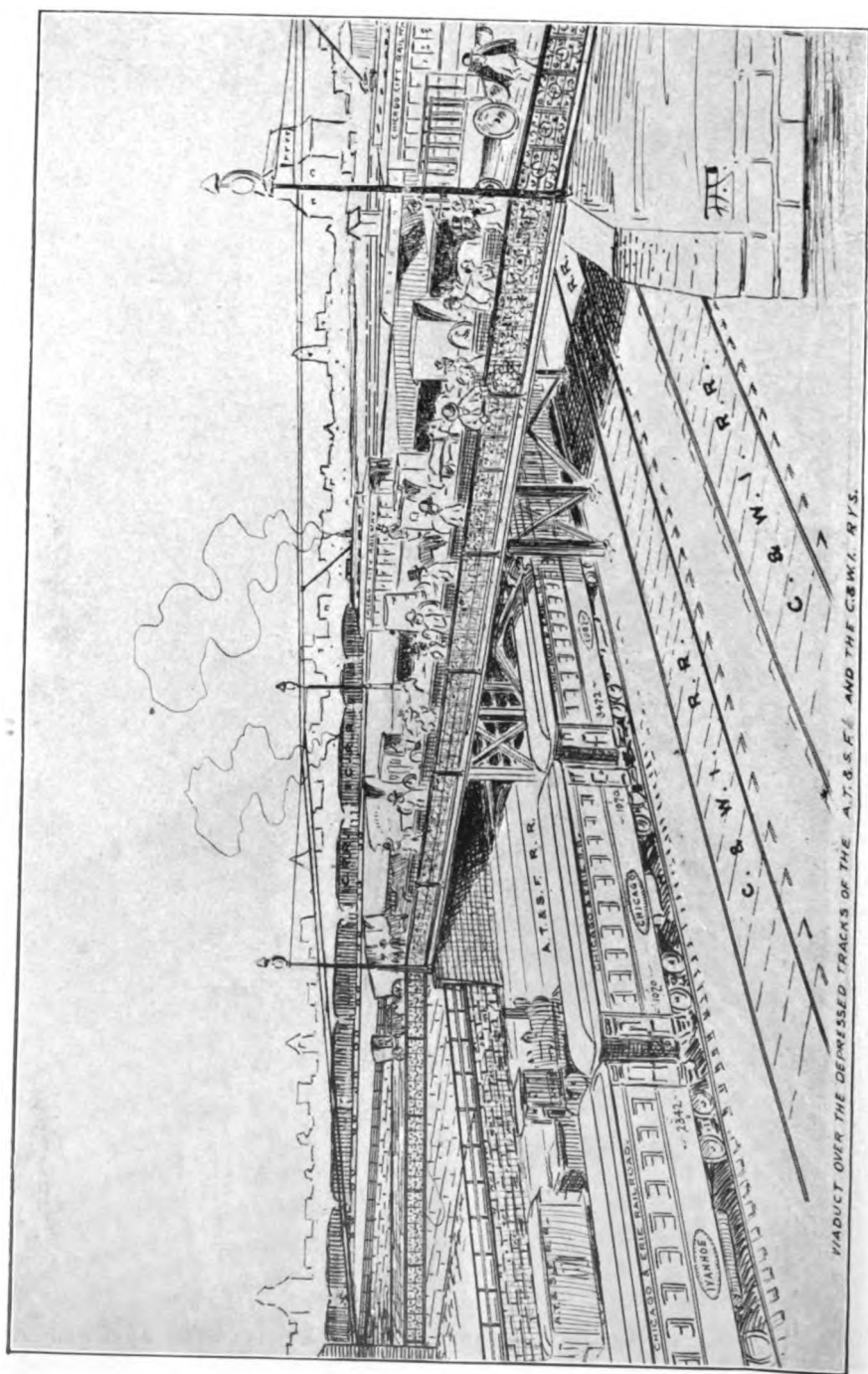
Cost of Central pumping works	\$ 372,227.77
Cost of Norwood Park pumping works	2,300.00
Cost of Washington Heights pumping works	13,834.78
Cost of Lake View pumping works	190,002.48
Cost of South pumping works	633,483.49
Cost of new lake tunnel	1,104,744.12
Cost of Carter H. Harrison crib	10,017.52
Cost of Lake View tunnel	701,792.45
Cost of new lake shore inlet	132,345.34
Cost of new lake shore inlet extension	146,459.04
Cost of new lake shore inlet extension	21,093.09
Cost of North breakwater crib	41,780.11
Cost of Two-mile crib	102,984.43
Cost of Four-mile crib	469,574.83
Cost of Lake View crib	91,462.21
Cost of Sixty-eighth street crib	47,420.47
Cost of Sixty-eighth street tunnel extension	741,371.06
Cost of Chicago avenue tunnel extension	41,358.62
Cost of Ashland avenue tunnel	17,453.36
Cost of Kedzie avenue tunnel extension	6,417.93
Cost of first lake tunnel	464,866.05
Cost of second lake tunnel	415,709.36
Cost of lake crib protection	149,431.63
Cost of land tunnel to West pumping works	542,912.63
Cost of intersecting sewers	522,510.91
Cost of new land tunnel	284,380.04
Cost of Water Works shop	27,240.58
Cost of Water Works stock	29,318.00
Cost of Northeast lake tunnel, 1895	610,560.63
Cost of Water Reservoir fence	1,702.87
Cost of addition to stables	1,019.48
Cost of real estate for sites of pumping stations, etc.	242,285.75
Cost of works, annexed territory	1,160,164.24
Cost of Jefferson street tunnel	15,968.17
Cost of new land tunnel, 1895	1,380,181.68
Cost of Western avenue tunnel	29,614.58
Cost of new repair shops	42,749.11
Total cost of entire works to December 31, 1898	<u>\$30,220,952.53</u>

This sum was paid as follows:

From general taxes	\$ 2,713,878.53
From City of Chicago Water Loan bonds, 4 per cent.	1,485,000.00



16TH AND CLARK STREETS—LOOKING SOUTH.



16TH AND CLARK STREETS—LOOKING SOUTHEAST.

From City of Chicago Water Loan bonds, 4 per cent.....	\$ 1,706,500.00
From City of Chicago Water Loan bonds, 3 $\frac{4}{10}$ per cent..	332,000.00
From City of Chicago Water Loan bonds, 3 $\frac{1}{2}$ per cent....	333,500.00
From bonds canceled.....	2,114,500.00
From Hyde Park Water Loan bonds, 5 per cent.....	50,000.00
From Town of Lake Water Loan bonds, 5 per cent.....	60,000.00
From Lake View Water Loan bonds, 4 per cent.....	50,000.00
From Lake View Water Loan bonds, 5 per cent.....	23,000.00
From water certificates....	1,700,000.00
From water earnings.....	19,652,574.00
Total	\$30,220,952.53
Total Water Works income to December 31, 1898.....	\$48,556,042.12
Total operating expenses and maintenance to December 31, 1898 (including \$8,096,775.52 interest on bonded debt and bonds and certificates canceled).....	28,766,298.89
Difference between income and expenses.....	\$19,689,743.23

Accounted for as follows:

Paid toward Water Works construction...	\$19,652,574.00
J. W. Lyons, cashier water office.....	2,000.00
Meter Department, stock on hand.....	8,426.27
Water Works Shop, stock on hand.....	28,575.56
Tapping Department, stock on hand.....	2,800.86
Water pipe, etc., stock on hand.....	210,094.74
Balance to credit of Water Fund, January 1, 1898.....	152,949.66
	\$20,057,421.09
Less amount due depositors for hydrant wrenches.....	\$ 2,056.82
Less amount advanced by private parties to lay water pipe in non-paying districts.....	365,601.04
	367,677.86
	\$19,689,743.23

BONDED DEBT OF WATER WORKS.—City of Chicago Water Loan bonds outstanding December 31, 1898, bearing 4 per cent. interest and maturing as follows:

July 1, 1908.....	\$ 150,000.00
July 1, 1910.....	159,500.00
July 1, 1912.....	821,000.00
July 1, 1914.....	576,000.00
July 1, 1915.....	1,485,000.00
	\$ 3,191,500.00

Bearing $3\frac{1}{2}$ per cent. interest, maturing—		
July 1, 1909.....	\$ 225,000.00	
July 1, 1910.....	108,500.00	
		\$ 333,500.00
Bearing $3\frac{1}{10}$ per cent. interest, maturing—		
July 1, 1902.....	\$ 332,000.00	332,000.00

ANNEXED DISTRICTS.

Town of Lake bonds:		
5 per cent. bonds, due April 1, 1899.....	\$ 15,000.00	
5 per cent. bonds, due April 1, 1900.....	15,000.00	
5 per cent. bonds, due April 1, 1901.....	15,000.00	
5 per cent. bonds, due April 1, 1902.....	15,000.00	
		60,000.00
Hyde Park bonds:		
5 per cent. bonds, due January 1, 1904.....		50,000.00
Lake View Water bonds:		
5 per cent. bonds, due July 1, 1904.....	\$ 23,000.00	
4 per cent. bonds, due July 1, 1907.....	50,000.00	
		73,000.00
Total bonded debt of Water Works.....	\$ 4,040,000.00	
Total interest paid on Water Loan to January 1, 1898....	\$ 8,299,101.65	

FINANCIAL.

The sum appropriated by the Common Council, together with various amounts from other sources, to be expended in public improvements under the supervision of the Department of Public Works, during the year 1898, is as follows:

Balance January 1, 1898, to the credit of Water Fund.....\$63,920.64

RECEIPTS.

Appropriation for 1898.....	\$1,635,858.57
Rent of Rookery lot.....	35,000.04
Water revenue, including meter and private work and tapping permits.....	3,512,934.97
Advance to lay water mains.....	9,953.91
Hydrant wrenches.....	918.00
Sale of water certificates.....	2,200,000.00
Drain permits and drain licenses.....	20,588.51
House-moving permits.....	1,272.00
Deposits for street permits (work done).....	21,185.75

Special assessment sewer inspection and work.....	\$ 64,634.61
Deposits for sundry improvements, special assessments and other funds.....	135,505.25
Total.....	<u>\$7,701,772.25</u>

EXPENDITURES.

The expenditures were distributed as follows:

Bridges and viaduct repairs, street cleaning and removal of garbage, repairing improved and unimproved streets, public buildings and parks, pumping stations, street intersections, sewer catch-basins, labor, material and salaries	\$1,856,245.93
Transferred to General Fund.....	2,017.55

CONSTRUCTION.

Expenses of special water pipe system necessary in connection with new tunnel system and new pumps and pumping stations:	
Labor.....	\$278,455.34
Tools, material and miscellaneous supplies.....	138,471.50
	<u>\$417,926.84</u>
Expenses of laying water pipe for circulating and revenue purposes:	
Labor.....	\$205,726.20
Tools, material and miscellaneous supplies.....	113,540.90
	<u>319,267.10</u>
City's portion of pipe laid under special assessment plan...	250,006.65
Building hydrant basins and repairing pavement.....	47,811.76
Purchase of real estate for pipe yard.....	32,720.00
Transferred to General Fund amount due for office rent....	25,316.25
Water pipe and special castings.....	578,305.81
Intercepting sewer.....	521,288.53
Sixty-eighth street tunnel.....	20,713.71
Northeast lake tunnel.....	174,447.00
New land tunnel.....	314,289.21
Kedzie avenue tunnel.....	6,417.93
Sixty-eighth street pumping station.....	48,789.71
Washington Heights pumping station.....	3,587.91
Lake View pump.....	480.00
Carter H. Harrison crib.....	9,380.28

Four-mile crib	\$ 1,647.00
Central Park pumping station.....	97,810.34
Springfield avenue pumping station.....	136,950.86
South side pumping station.....	64,210.65
Chicago avenue tunnel extension.....	41,358.62
Maintenance of water system, operating pumping stations, cost of assessing and collecting water taxes, stock on hand, etc.	1,823,539.66
Redemption of water certificates.....	500,000.00
Town of Lake bonds.....	15,000.00
Interest on bonds and certificates.....	202,326.33
Advance for laying water pipe refunded.....	36,915.06
Total.....	\$7,548,822.59
Balance to credit Water Fund, January 1, 1899	152,549.66
Total.....	<u>\$7,701,772.25</u>

WATER WORKS RECEIPTS AND EXPENDITURES.

Credit balance, January 1, 1898.....	\$ 63,920.64

RECEIPTS.

Water rate collections (including delinquents).....	\$3,423,507.09
Water permits (permits, plumbers' licenses, etc.).....	10,263.00
Water meter, labor, etc., for private parties.....	55,409.94
Rent for Rookery lot.....	35,000.04
Advance to lay water pipes.....	9,953.91
Hydrant wrenches.....	918.00
Sale of water certificates.....	2,200,000.00
Special assessments (old water account).....	54,536.15
Total.....	<u>\$5,853,508.77</u>

EXPENDITURES.

Expenses of special water pipe system necessary in connection with new tunnel system and new pumps and pumping stations :

Labor.....	\$278,455.34
Tools, material and miscellaneous supplies.....	139,471.50
	<u>\$417,926.84</u>

Expenses of laying water pipe for circulating and revenue purposes :

Labor.....	\$205,726.20
Tools, material and miscellaneous supplies	113,540.90
	\$ 319,267.10
City's portion of pipe laid under special assessment plan...	250,006.65
Building hydrant basins and repairing pavement.....	47,811.76
Purchase of real estate for pipe yard.....	32,720.00
Transferred to General Fund amount due for office rent....	25,316.25
Water pipes and special castings.....	689,244.46
Water pipe repairs.....	428,260.80
New land tunnel, 1895.....	314,289.21
Northeast lake tunnel, 1895.....	174,447.90
Kedzie avenue tunnel.....	6,417.93
Sixty-eighth street tunnel extension.....	20,913.71
Meter and private works.....	63,516.00
Water permits.....	50,277.04
Chicago tunnel extension.....	41,358.62
Bridgeport locks.....	4,298.99
North pumping station.....	174,110.53
West pumping station.....	102,273.42
South pumping station.....	182,968.24
Central pumping station.....	60,480.65
Sixty-eighth street pumping station.....	128,119.93
Lake View pumping station.....	65,413.01
Washington Heights pumping station.....	11,886.17
Norwood Park pumping station.....	6,304.39
Canal pumping station.....	69,643.57
Northwest pumping station.....	97,810.34
Southwest pumping station.....	136,950.86
Water Works shops.....	55,572.58
Two-mile crib.....	26,480.01
Four-mile crib.....	9,360.27
Lake View crib.....	8,765.97
Sixty-eighth street crib.....	6,870.81
Carter H. Harrison crib.....	9,380.28
Water Office salaries.....	235,688.27
Water Office expense and postage.....	17,342.84
Water proportional (office salary).....	34,563.30
Water proportional (office expense).....	17,351.22
Advance for laying water mains, refunded.....	36,915.06

Hydrant wrench deposits, refunded.....	\$ 420.00
Miscellaneous items.....	5,665.40
Refund vouchers.....	6,599.06
Dredging inspectors and harbor police.....	7,755.81
Town of Lake water loan bonds.....	15,000.00
Water loan interest.....	202,326.33
Water office rent.....	60,879.00
Water loan certificates.....	500,000.00
Intercepting sewers.....	521,288.53
	\$5,700,559.11
Balance to credit of Water Fund, January 1, 1899.....	152,949.66
	\$5,853,508.77

The City has extended its water mains and supply pipes until its service for fire protection is equal to that of any other city of the United States, and its supply for manufacturing and domestic consumption is as satisfactory as modern engineering, under governing conditions, can make it.

The following table, scheduling the rate of charge ruling in several other cities, will enable the citizen to make comparison with the rates charged here. The table makes a comparison of meter rates in some of the larger cities. It also shows amount of tax against an eight-room two-story dwelling, supplied with bath, closet, wash-basin, kitchen sink, laundry tubs, and hose for sprinkling purposes :

NAME OF CITIES.	Meter Rates per 1,000 Gallons.	Water Tax for the average eight- room residence.
Boston.....	.18 $\frac{3}{4}$	\$18.00
Brooklyn.....	.10	11.00
Cincinnati.....	.10 $\frac{3}{4}$	.....
Kansas City.....	.31	19.00
Milwaukee.....	.06	22.00
New York.....	.13 $\frac{1}{4}$	9.00 <i>e</i>
Omaha.....	.35	15.25
Philadelphia.....	.04	9.00
Pittsburg.....	.20	15.50
St. Louis.....	.30	29.50
Chicago.....	.10 <i>a</i>	.....
Chicago.....	.08 <i>b</i>	.....
Chicago.....	.04 <i>c</i>	11.50 <i>d</i>

a. Rate for first 165,000 gallons used on one premises in one month.

b. Rate for all in excess of 165,000 gallons used on one premises for one month.

c. Rate for all in excess of 5,000,000 gallons used on one premises for one month, after May 1, 1898.

d. This rate governed after May 1, 1898, and permits the use of all fixtures without additional charge.

e. Sprinkling, or use of hose prohibited altogether.

The following table shows the appropriations for Public Works from 1888 to 1898, increase of population and area during the period, and other matters of interest connected with the work of the Department :

YEAR.	Appropriation.	Expenses.	Square Miles of Territory.	Census.
1888.....	\$1,942,495.65	\$2,057,422.79	37	802,651
1889.....	2,317,291.20	2,220,365.30	37	880,000
1890.....	2,581,445.20	2,492,808.45	100	1,208,669
1891.....	2,429,644.05	2,929,431.47	180	1,850,000
1892.....	2,597,148.17	2,508,771.98	180	1,438,010
1893.....	2,703,175.36	2,845,571.38	186.2	1,500,000
1894.....	1,979,863.85	2,220,321.43	186.2	1,600,000
1895.....	2,026,568.53	2,024,542.06	186.2	1,725,000
1896.....	1,780,557.93	1,777,337.11	186.2	1,800,000
1897.....	1,748,614.09	1,748,942.40	187.14	1,850,000
1898.....	1,635,858.57	1,633,841.02	187.14	1,851,588

YEAR.	Number of Miles of Paved Streets.	Number of Miles of Unimproved Streets.	Cost of Cleaning and Repairing Improved and Unimproved Streets.	Total of Appropriation for all Public Works per Square Mile of Territory.	Amount of Appropriation per Capita.	Cost per Mile of Cleaning and Repairing Improved and Unimproved Sts.
1888.....	348	314	\$345,204.69	\$52,499.88	\$2.42	\$521.45
1889.....	348	314	477,866.65	62,629.49	2.63	721.85
1890.....	669	1,567	583,468.69	14,341.36	2.13	260.94
1891.....	774	1,559	803,171.02	13,498.02	1.79	344.26
1892.....	879	1,493	896,017.02	14,428.60	1.80	377.74
1893.....	1,007	1,459	999,558.58	14,494.23	1.80	405.33
1894.....	1,086	1,400	696,627.99	10,615.89	1.23	280.22
1895.....	1,123.54	1,406.63	681,234.06	10,883.82	1.17	269.24
1896.....	1,183.64	1,494.61	589,944.43	9,562.53	1.01	220.21
1897.....	1,224.69	1,464.12	570,619.63	9,343.88	1.05	212.21
1898.....	1,247.95	1,440.19	458,667.70	8,739.00	.88	170.62

Of the 1,247.95 miles of pavement 114.14 are alleys and 1,133.81 miles are streets.

BOARD OF LOCAL IMPROVEMENTS.

ASSESSMENTS PREPARED.

Cedar block pavement	54
Asphalt pavement.....	25
Macadam pavement.....	18
Vitrified brick pavement	11
Granite pavement	6

Slag pavement	1
Miscellaneous street and alley improvements	2
Openings and widenings	9
Water supply pipes	51
Water service pipes	50
Sewers	110
Private drains	57
Plank sidewalks	89
Cement sidewalks	115
Stone sidewalks	3
Gas lamp posts	7
Boulevard lamp posts	3
Total	611

The amount of work performed by the Board of Local Improvements and the Bureau of Special Assessments is not represented by the amount of improvements accomplished by special assessment. Under the new special assessment law, the amount of preliminary work on account of each proposed improvement is many times greater than under the old special assessment law. The investigation of petitions, preparation and consideration of resolutions, public hearings given to property owners as to the merit of proposed improvements, and the preparation of estimates greatly increased the work of this Bureau, so that its work cannot be measured as heretofore by the amount of improvements actually accomplished. In addition to the current work, the whole force of the Bureau of Special Assessments has devoted much of its time to a review of the work of the Bureau since 1872. The errors and complications of the Bureau have been many, and have resulted in great injustice to the property owners, delaying the accomplishment of the work intended by ordinances, the adjustment of the accounts of the several warrants, and the payment of rebates to property owners. The following brief statement of the account will give some idea of the complications that have arisen, due to carelessness and inefficiency in the conduct of the Bureau :

Total amount of rebates due on all special assessment warrants from origin of the department up to and including Warrant No. 22,346, which was the last warrant in collection in 1897. This amount includes also the amount due on country town warrants prior to annexation. \$719,389.84

Total amount of rebates due from warrants, for which there are sufficient funds to the credit of to pay in full. 510,692.60

Total amount of rebates due from warrants to the credit of which there is either nothing or not a sufficient amount to pay in full.....	\$208,696.74	
Amount due on warrants, for which there is a portion on hand.....	81,581.82	
Amount on hand.....	29,867.74	
Deficiency.....		\$ 51,714.08
Amount due on warrants which are overdrawn.....	127,114.92	
		\$178,829.00
Amount which these warrants are overdrawn.....		646,290.55
Total deficiency		\$825,119.55
Total amount deficiency due on several condemnation warrants.....	32,906.69	
Due from City for public benefits	2,848.14	
Due from City tax certificates	2,205.24	
		4,558.38
Amount due, exclusive of public benefits and tax certificates.....		\$27,358.81

In addition to the foregoing, we find a large number of the proposed condemnation proceedings, in which the court proceedings have been terminated and the rolls certified to this Department but in which no order of possession has been entered, for the reason that a deficiency exists. This prevents the City from paying the owner of the property condemned the amount of the award, only upon the payment of which amount would the City become legally entitled to possession. In many instances adjacent property owners who were assessed in the supplemental proceeding for the purpose of raising the amount necessary to pay the award, have paid the amount of their assessment to the City, and, by reason of the City's inability to get legal possession of the land condemned, the improvement for which they were assessed has not been made and they have thus far received no benefit therefrom. These several deficiencies arise from substantially the same reason and causes which created the deficiencies in the special assessment proceedings proper, and to which we have heretofore referred more in detail. In some cases, as shown by this statement, public benefits assessed against the City have not been paid, and in others, the City has, at the time of sale, bought in the property but placed nothing to the credit of the warrant on account thereof. In most of these cases the proceedings have been in the condition in which this report shows them to be, for more than ten years, and in several instances, for twenty or twenty-five years. Some means should be provided by which all of these matters can be closed up, the owners of the property taken paid the balance due them, and an order of possession properly entered in court of the proceeding.

A review of the books resulted in the preparation of a list of about 4,000 warrants, including the amounts to the credit of the warrants available for distribution among the property owners. This has been given to the public, and they have been advised that by calling at the Department, vouchers will be made for the amounts due the respective property owners in the City.

Since 1897, all credits due the property owners have been properly entered, and where rebates were due they were given on the completion of the work and the payment of the contractors.

So as to prevent a recurrence of the complications described in the foregoing, I would recommend that an ordinance be passed requiring a report to be made to your Honorable Body, and printed in the proceedings, of every improvement ordered, immediately after its completion, and where there are legal complications that will prevent the completion within one year, that a report be made to your Honorable Body of the reasons for not completing said work, so that if it is best to repeal the ordinance for said improvement, it may be so repealed and thus release property from judgments pending the removal of legal objections.

LIGHTING OF THE CITY.

EXPENSE OF LIGHTING.

The cost of lighting and maintaining the City lamps, for the year ending December 31, 1898, including the cost of extinguishing, under schedule adopted by the Council, was as follows:

For lighting and maintenance of gas trust lamps.....	\$377,914.82
For miscellaneous expense, including cost of other lamps....	30,406.92
For gasoline lamps (lighting by contract).....	123,400.78
For maintenance electric lamps, City.....	11,041.21
For rental electric lights (contract).....	44,672.17
Total cost of lighting the City.....	<u>\$689,465.85</u>

GAS LAMPS.

IN SERVICE.

North Division.....	6,905
South Division.....	10,463
West Division.....	11,248
	<u>28,611 @ \$25=\$ 715,275</u>

OUT OF SERVICE.

North Division.....	2,135
South Division.....	1,733
West Division	11,299
	<u>15,167 @ \$25=\$ 379,175</u>
	<u>\$1,094,450</u>

STREET LAMPS.

Below is shown the number of street lamps of the various kinds in use, and the number erected and discontinued during the year:

DIVISION.	ELECTRIC LAMPS.			
	No. in City Jan. 1, 1898.	Erected during 1898.	Discontin- ued in 1898.	No. in City Dec. 31, 1898.
North	241	87	7	271
South	1,116	100	18	1,198
West	612	785	.....	1,397
Totals	1,969	922	25	2,866
	GAS LAMPS.			
	No. in City Jan. 1, 1898.	Erected during 1898.	Discontin- ued in 1898.	No. in City Dec. 31, 1898.
North	7,157	40	252	6,905
South	10,732	30	269	1,463
West	15,153	20	3,910	11,243
Totals	33,042	90	4,431	28,611
	GASOLINE LAMPS.			
	No. in City Jan. 1, 1898.	Erected during 1898.	Discontin- ued in 1898.	No. in City Dec. 31, 1898.
North	794	12	31	775
South	6,165	15	44	6,136
West	3,265	24	93	3,196
Totals	10,224	51	168	10,107

TRACK ELEVATION.

There is no public improvement now being made or considered that is so far-reaching in its effects on the safety and welfare of our citizens as the elevation of railroad tracks where they cross the streets.

By the elevation of the tracks at each grade crossing a death trap is removed. Trains, no longer restricted in their movements, make much better time, and, therefore, better accommodate the traveling public and at greater profit to the railroad companies themselves. The railroad companies save damages on account of injuries to persons and the taking of lives, and the cost also of maintaining crossing gates and attendants.

Street traffic is no longer delayed. Street cars make better time, and, therefore, save time for their patrons and money for the stockholders of the operating companies.

During the year 16 $\frac{3}{10}$ miles of tracks were elevated and ninety-six grade crossings eliminated at a cost of \$6,650,000. The work is being rapidly prosecuted, and 1899 will see all of the work ordered by your Honorable Body completed.

The report of the expert on track elevation is embodied in the general report of this Department.

BRIDGES AND VIADUCTS.

There is no portion of the City's service that is in such need of immediate attention as the bridges and viaducts of the City, and it is to be regretted that appropriations of sufficient amount cannot be secured to make proper and necessary repairs. Many of the structures are old and dilapidated and have reached that stage of decay where wise expenditure of money cannot be made to repair them, and they should be replaced by new structures. All the bridges to be constructed hereafter should be constructed on such a plan that center piers will not be necessary. The practice of placing obstructions of any character in the Chicago River should be discontinued, with a view to accommodate navigation and to conform to the policy of the statutes governing the construction of the Sanitary Drainage Canal. While the importance of the Chicago River appears to be appreciated by citizens in the discussion of the development of Chicago, no practical steps have been taken by the City to preserve it as a harbor for modern vessels. A reference to the tables submitted by the City Engineer in his report must convince any one that the greater facilities offered in the Calumet Harbor are diverting a large portion of the business from the Chicago River, and while the Calumet interest should be conserved and promoted as a Chicago interest, due consideration should be given to the Chicago River in any plan for the future development of Chicago.

The cost of the maintenance of bridges and viaducts for the year 1898, including labor, material, supplies, etc., has been \$109,820.97.

HARBORS OF CHICAGO

During 1898 dredging has been done in the Chicago river as follows:

By the City:

At Diversey avenue and dock removal there.....	\$42,393.71
Payments for land taken	13,600.00
	<u>\$55,993.71</u>

The United States continued the work of improving the Chicago river, the following work being done, viz:

Chicago river, North branch.....	1,008,560 cubic yards.
South branch and main river.....	628,928 cubic yards.

No dredging by the United States was done in the Calumet river in 1898.

CITY OF CHICAGO—SUMMARY OF COMMERCE BY LAKE.

	No.	Tons.
Chicago river entrances.....	7,624	5,285,559
Chicago river clearances	7,763	5,466,321
Totals for Chicago river	15,387	<u>10,751,880</u>

Calumet river entrances.....	1,565	2,208,370
Calumet river clearances.....	1,560	2,156,176
Totals for Calumet river	3,125	4,364,546
Totals for Chicago	18,512	15,116,426
Average cargo, Chicago river.....		699 tons.
Average cargo, Calumet river.....		1,897 tons.
Average cargo, City of Chicago.....		817 tons.

PERMITS.

There were 103 permits issued by the Department of Public Works during the year, under which the following work was done in improving the docks of the harbor and river :

Chicago river and lake front, 92 permits.....	fees, \$2,825.74
New docks built.....	3,805 lineal feet
Old docks rebuilt.....	5,736 lineal feet
Old docks repaired.....	5,937 lineal feet
Calumet river, 11 permits.....	fees, \$420.85
New docks built.....	100 lineal feet
Old docks rebuilt.....	1,968 lineal feet
Old docks repaired.....	90 lineal feet

The duties on imported merchandise collected at this port during 1898 aggregated \$5,298,036.70, a sum exceeded by the collections of but one other year in the history of Chicago.

The report of Mr. W. S. Chance, special agent of the United States Treasury, shows that the total of entrances and clearances at the port of Chicago for the year ending June 30, 1898, was 4,748 greater than the total at the port of New York. It also shows that the total at this port is but 1,253 less than the combined entrances and clearances at the ports of Boston, Philadelphia, Baltimore, New Orleans and San Francisco.

The report of Mr. Chance further states that of dutiable merchandise "transported without appraisement" under government act of 1880, Chicago received and forwarded goods which paid 30.27 per cent. of the gross revenue of the nation received from dutiable merchandise of the class named.

The report of the City Engineer shows that of the total tonnage receipts at this port by lake, the Calumet river received a greater and the Chicago river a less percentage in 1898 than they severally received in 1897.

This diversion of lake freights to the Calumet river must year by year grow larger unless our public-spirited and enterprising citizens take immediate and effective steps to improve the Chicago river so as to accommodate the great lake carriers which to-day bring to and from our port so large a

percentage of our lake freights. Its decaying docks must be rebuilt and extended and every center pier bridge in the river removed. Then the United States government, already committed to do its share in improvement, will aid our people in widening and deepening the harbor entrance and the Chicago river till the largest vessels in the carrying trade of the lakes can pass freely throughout the entire length of its North and South branches, as well as its main channel.

During 1898, 16.55 per cent. of all entrances at the Chicago river was stopped at the Rush street bridge, and of all that passed the Rush street bridge 30.65 per cent. discharged their cargoes east of Wells street.

The Calumet river is a part of Chicago, it is true. The national government is developing it into a great harbor. Chicago citizens may justly be proud of it. We will have another Chicago river in the Calumet. But there is no reason why both rivers should not be maintained so as to accommodate modern lake traffic.

Respectfully submitted,

L. E. MCGANN,
Commissioner of Public Works.

ANNUAL REPORT

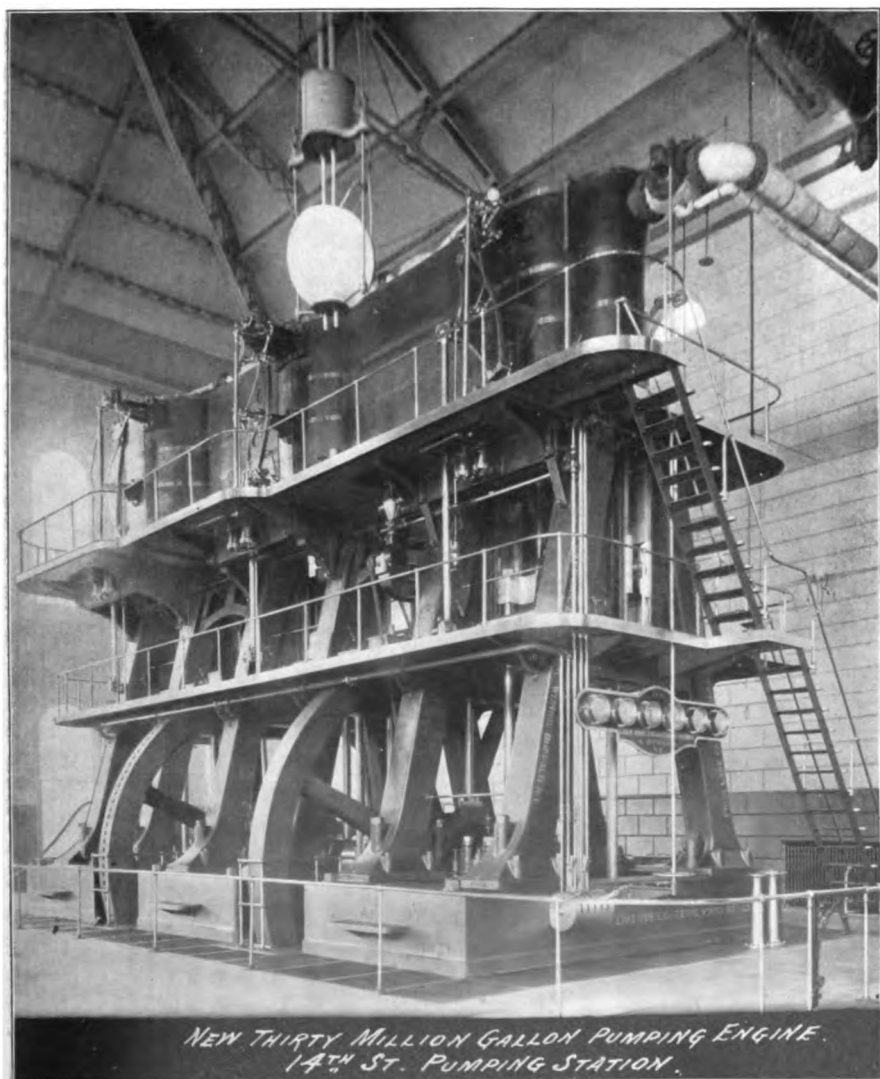
Bureau of Engineering

CITY OF CHICAGO

1898

JOHN ERICSON

CITY ENGINEER



CITY ENGINEER'S REPORT.

HON. LAWRENCE E. MCGANN,
Commissioner of Public Works.

DEAR SIR—I have the honor to submit herewith the annual report of the Bureau of Engineering for the year ending December 31, 1898.

The work done under the supervision of the City Engineer during the past year has been of vast extent in several divisions, greatly exceeding the work of any previous year. The benefits derived and to be derived by the citizens, in proportion to the expenditures, have been and will be far-reaching and of the greatest importance.

PUMPING STATIONS.

When, early in 1897, as City Engineer, I assumed charge of the eight pumping stations of the City Water Works System, I soon came to the conclusion that, in this division alone, a great field of hard work lay before us. Owing to a false economy, both the machinery and buildings had been allowed to reach such a dilapidated condition that heroic measures had to be adopted and considerable prudence had to be exercised. While the various engines were credited with pumping the number of gallons based on the displacement of the plungers, it was found, upon examination, in nearly every instance, that the numerous valves in the pumps were in such condition that instead of the water being pumped into the mains, a churning process was taking place and a large percentage of the water leaking back into the well through the defective valves. Owing to the great demand for water and the many complaints on account of insufficient pressure, which necessitated keeping all of the engines possible in operation, but little could be done in 1897 to remedy these defects. Steps were immediately taken for the installation of new machinery at the Fourteenth street pumping station and at the Sixty-eighth street pumping station, and the work of completing these necessary additions was prosecuted with vigor, so that an opportunity should be given to shut down the old engines one after another, in order to make the much-needed improvements.

In the meantime, every opportunity was seized to commence the work of construction, for such in fact it was. In order to carry on this great

work in a satisfactory manner, a skillful mechanical engineer was employed and placed in charge of this work.

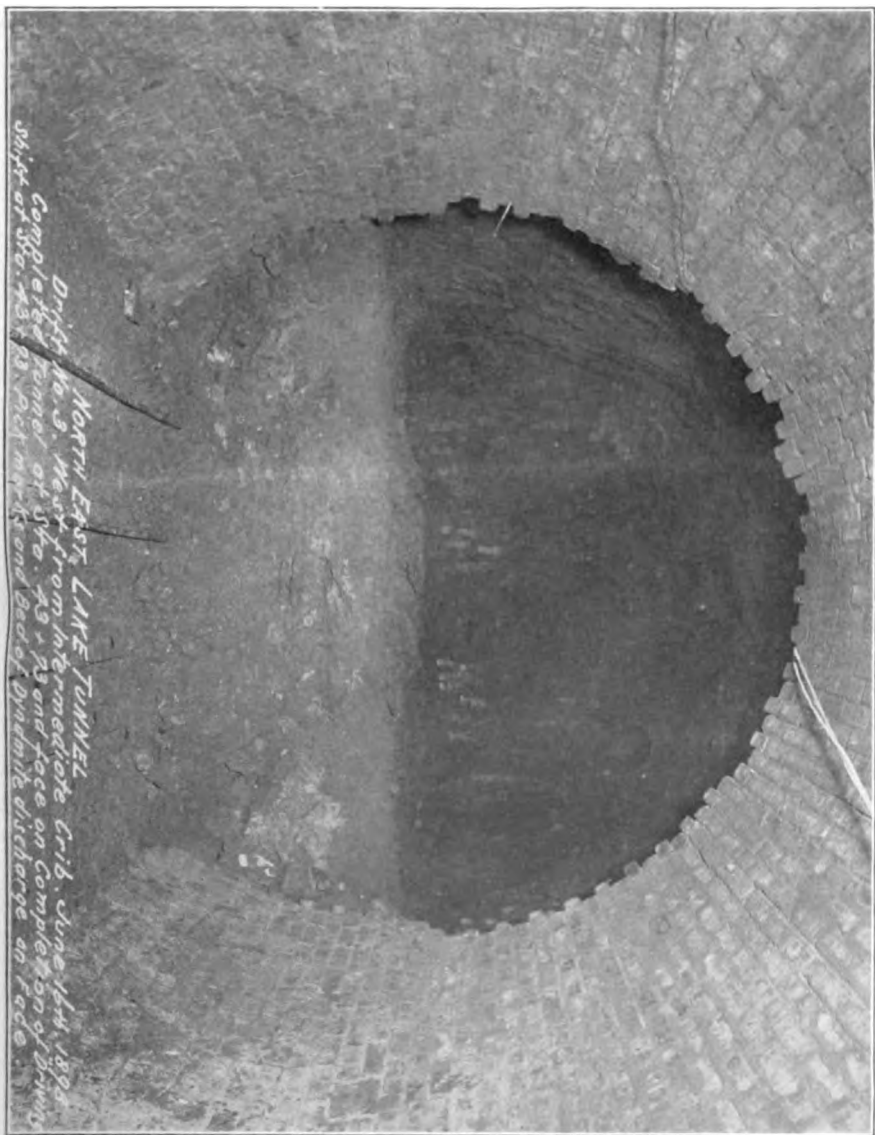
The result of the work done in this direction, described more in detail further on in this report, has been most gratifying. About 17,000 new pump valves have been placed to take the place of defective ones. Twenty-four boilers have been thoroughly overhauled and entirely retubed, and in a number of stations a large amount of pipe on both engines and boilers has been renewed and remodeled, thereby effecting a considerable economy in fuel.

Although the expenses necessarily incurred have been considerable, the results obtained have been proportionately greater. During 1898 the water supply has been abundant in all parts of the city. Very few complaints on account of an insufficient supply have been entered, and in nearly every such case the trouble was attributable to obstructions or defects in the service pipes or to similar causes, while in 1897 and in former years, complaints by the hundreds were received, and during all seasons of the year.

The cost of fuel has already been reduced to such an extent that the expenditures for reconstruction and repairs, when viewed in the light of returns already obtained, will seem insignificant. The pumps working under the old conditions required less steam, and therefore required less fuel per million gallons of water pumped, as more energy is required in forcing the full displacement of the plungers into the mains against a high head than when a considerable portion of the same is allowed to escape back into the suction chambers. Nevertheless, with a full displacement and greatly increased horse power, we have been able to pump in 1898, 2,746,590,861 gallons of water in excess of the quantity of water credited to the pumps in 1897, and at an expense in fuel of \$22,337.25 less than the amount paid for fuel in 1897. With 6,625,058,666 gallons of water pumped in excess of water credited to the pumps in 1896, we have made a saving of \$28,930.63 as compared with the total cost of fuel in 1896. This saving in fuel is attributable, at least to a considerable extent, to the above repairs and remodeling, especially when the churning process of the pumps in previous years, whereby they were credited with much more than actual pumpage, is considered.

It should also be borne in mind that this saving in the cost of fuel is only a small beginning, and that when the machinery, after these repairs and improvements, some of which have not yet been completed, shall have had some time to work under the new conditions, the returns from the expenditures made in this direction are sure to become proportionately greater.

The buildings proper, some of which were actually falling to pieces,



LAKE TUNNEL.—CONSTRUCTION.

have received considerable attention, as may be seen from the detailed reports. A civil engineer was placed in charge of all repairs to buildings and grounds.

In addition to the above, this branch of the service has been placed on a better business basis. There have been instituted a number of reforms in the method of keeping accounts, such as a uniform and more complete system of log books, whereby the hourly pressures and other valuable data pertaining to the pumping engines are accurately and carefully recorded; also a separate daily record of oil, waste and other supplies used.

The most urgent work at present in connection with the water supply system is the remodeling of the Chicago avenue pumping station, where both boilers and engines are of such antiquated types and in such condition that no time should be lost in installing machinery of a modern and economical design.

During the year, the work of preparing an atlas of all the pumping stations, showing buildings, machinery, suction and discharge pipes, with valves, sewers, etc., was also commenced and will be completed in a few weeks. This atlas will be a very valuable addition to the records of this Bureau.

TUNNELS AND CRIBS IN OPERATION.

A valuable addition to the tunnel capacity was obtained with the completion of the new extension at Sixty-eighth street. Attention is also directed to the important work done at the Lake View pumping station by the connection of the west pump well with the tunnel system. General improvements were made at the various intake cribs, all of which are described in detail in another part of this report.

CONSTRUCTIONS.

The completion of the new Northeast lake tunnel in accordance with the original plans and specifications is an event of considerable moment in the history of lake tunnel construction. The tunnel is constructed in a straight line throughout its entire length, has an internal diameter of ten feet, and is a very satisfactory piece of work. The daily progress made on this lake tunnel, the largest of its kind, considering diameter and length, ever constructed, exceeded all expectations. Progress on other sections of the new tunnel system has been considerably delayed, on account of litigations between the City and the contractors.

The attempt made during the year to construct tunnels by City labor under the direction of an assistant engineer of the Bureau has proved very successful.

With the completion of the new tunnel system, the extension of the Chicago avenue tunnels from the old Two-mile crib to the new Carter H.

Harrison crib, and some minor modifications of the complicated system at the Chicago avenue pumping station, the water tunnel system of the City should answer all purposes for which it was intended, for many years to come, without any further expense.

For many years it has seemed, that, notwithstanding untiring efforts, the City authorities have been unable to keep pace with the unparalleled growth of the City, as regards extensions to its water supply system. This state of conditions seems at last to be at an end.

As previously stated, the water supply is now abundant in all parts of the City, and, with the completion of new tunnels and pumping stations now under construction, the water supply of the City will be adequate for a population of 3,500,000, and the system contain ample reserve machinery.

WATER PIPE EXTENSIONS.

In order properly to distribute the additional supply of water that will be available when the new pumping stations, located at Central Park avenue and Fillmore street and at Springfield avenue and Bloomingdale road, are in operation, and also in order to provide feeders in connection with the new engines installed at the Fourteenth street and the Sixty-eighth street pumping stations, it was necessary to construct an extensive system of large distributing mains. This work was designed with a view of reaching directly, as far as possible, and indirectly, by connecting with existing mains, all parts of the City, and at the same time to connect as directly as possible with the larger mains leading from all other pumping stations, thus equalizing the pressure and reducing the friction over the greatest area possible. It was thought advisable to carry out this extensive work independently of the regular water pipe extension division, and a new division, called the division of Special Water Pipe Extension, was therefor organized. The work done under this division is set forth in detail in another part of this report.

Over ninety per cent. of the work laid out for this branch of the Bureau was completed during the year. While a great part of this system is intended to be used as feeders from the new pumping stations, connections with the old system were made wherever advisable, and as much of the new pipe as possible used as feeders from the old pumping stations. This policy has been one of the means of obtaining the gratifying result of an abundant water supply in many districts, where previously there had been considerable suffering on account of insufficient pressure. The full benefit from these new water mains will not, however, be obtained until the work has been completed and all connections made.

The work of the Regular Water Pipe Extension division has consisted of the repairs and maintenance of the whole water pipe system, and the

laying of smaller mains. While pipe laid in 1898 by these two divisions is only a fraction over seventy-five miles, as against forty-three miles laid in 1897 by the regular water pipe extension division alone, the number of tons of pipe laid in 1898 is 34,061, as against 5,965 in 1897.

It would seem that the extensive work done and the great amount of money expended in this direction should be sufficient to place the system in the very best condition for many years to come, at least as far as main feeders are concerned. It should be borne in mind, however, that the water works system of Chicago is not the development of one great comprehensive plan, but a congregation of a number of smaller systems. A study of the map showing the water mains will show that, in a number of districts, the extensions and additions of sub-mains have in past years been made without any regard whatever for the size of the main feeders which must supply all these smaller mains.

To correct as far as possible these mistakes has been one of the aims in the designing of the new feeder lines, and, while only a limited number of such districts could be directly reached, these pipes bring an available and sufficient supply within easy reach. By the judicious expenditure of a moderate amount of money each year for this purpose, the system will soon be in good shape.

An enemy that in many places seriously threatens our water pipes is the electric currents from electric surface and elevated railways, by producing electrolytic action. Unless the railway companies are made to provide proper return conduits for the electric currents, this matter is liable to become very serious.

BRIDGES AND VIADUCTS.

The bridges maintained by the City of Chicago number sixty-one, a total length of $1\frac{2}{3}$ miles. There are also thirty-seven systems of viaducts, a total of $3\frac{44}{100}$ miles.

A great number of these structures have done service for many years. In order to obtain the longest possible service from this class of structures, they should be well maintained, painted whenever necessary, and should not be allowed to rust or deteriorate for lack of funds, but should be kept in good condition. To do this properly, considering the great number of structures, necessarily requires a considerable expenditure of money. The appropriations for this purpose never having been quite adequate, have been made smaller and smaller, until in 1898, it reached the low figure of \$85,000, about \$10,000 of which had to be expended on one bridge alone—the State street bridge.

While the appropriations have decreased, the number of structures have increased and their condition become worse. The consequence of this

policy, necessitated by insufficient revenues, is that we to-day find our bridges and viaducts in a most deplorable condition, a condition that will rapidly grow worse unless some way is found whereby adequate appropriations can be secured for their maintenance and reconstruction. A number of the old, decayed and worn-out bridges should be replaced by new, modern structures, and several viaducts should be replaced by new ones.

During the past year, the small appropriation allowed was expended as judiciously as possible, and yet after the money had all been expended, a number of structures were in such condition that nothing remained but to close them to traffic. An emergency appropriation of \$12,500 enabled us, however, to keep these structures in service.

The railroad companies have this year, more generally than formerly, come to the aid of the City, by doing to some extent their part of the repair work to viaducts spanning their tracks. This result has been obtained by your valuable co-operation.

HARBORS.

Our trade by the lake shows a healthy growth during the year, both as regards tonnage and the number and capacity of vessels engaged. This emphasizes the possibility in this direction when the harbor facilities shall have been improved.

The work done by the various divisions of the Bureau of Engineering is treated separately under the following headings:

1. Water Supply System, including tunnels and cribs in operation and Water Works shop.
2. Tunnel and Crib Constructions.
3. Water Pipe Extension.
4. Special Water Pipe Extension.
5. Bridge and Viaduct Construction.
6. Bridge and Viaduct Maintenance.
7. Harbors.
8. Architecture.

DIVISION OF WATER SUPPLY SYSTEM.

PUMPING STATIONS.

MR. THOMAS DOWNS, Supervising Engineer, is in charge of all Pumping Stations.

NORTH PUMPING STATION.

MR. CHARLES SCHLACKS, Engineer in Charge.

This is the largest station in the City, and being the oldest, a large annual expenditure is necessary in order to keep the machinery in operation, as some of the engines and many of the boilers have outlived their usefulness and are in constant need of repairs.

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Engine No. 67 was dismantled and thoroughly overhauled, a number of new brasses being provided for the main connections and valve motion, and an entire new set of suction and discharge valves were placed.

Considerable repair work was required on engines Nos. 52 and 57 to put them in serviceable condition, the most important being the placing of one new and the repairing of three old bucket valves, and the renewal of the induction and eduction valves.

Engine No. 72 was kept in a serviceable condition with the exception of one breakdown, which caused a delay of several days, considerable damage being done to one of the pump chambers and two of the large new segments being broken. These segments were replaced and the entire pump chamber strengthened by two sets of iron bands. A large new overflow pipe was built for engines Nos. 52, 57 and 67 to replace a worn-out one.

The most important repairs on the two Gaskill engines were the replacing of 3,000 new suction and discharge valves, the repacking of the pump plungers and air pumps and the shimming of the brasses on the main connections. The two reheaters were also rebuilt and the piping to the same remodeled. As these engines have never been thoroughly overhauled, a large expenditure will be necessary to put them in first-class condition. A large amount of repair work was necessary to keep the boilers in service. The four marine boilers, which have been in use in this station for twenty-seven years, should be condemned and new ones installed as soon as possible. The two low-pressure tubular boilers were equipped with new tubes, and the nozzles on the mud drums were renewed. The feed water piping on the six Holly boilers has been renewed, three boilers equipped with new water purifiers, and a new eight-inch reducing valve attached on the Holly boilers, to reduce the pressure of the steam supplied from seventy-five pounds to twenty-nine pounds in order to use it in the old low-pressure engines, thereby temporarily dispensing with the services of the worn-out boilers. These six boilers should also be retubed.

The interior of the engine-room has been repainted. The roof over the Holly room, having been in a leaky condition for a long time, made it necessary to remove a portion of the metal covering, and a new covering material, composed of four to six layers of felt, roofing composition and gravel, was substituted. On the south side of the main engine-room area, walls have been built to provide light for the basement and also make an entrance for heavy castings whenever required for repairs to pumps.

A new roadway was laid extending from the east side of the engine-room north to Pearson street, connecting with nearly all the pockets in the coal sheds.

Repairs are in progress on the exterior walls and turrets of the building. The stone-work of six turrets has so far been removed down to the

line of the cornice, and four of them rebuilt full height and a fifth nearly completed, work being delayed on account of the weather.

The two smokestacks were repointed. Work is also in progress replacing all window caps and sills that are badly checked or broken. Portions of the grounds surrounding this station have been refilled and seeded.

WEST PUMPING STATION.

MR. THOMAS KAVANAUGH, Engineer in Charge.

The report for 1897 called attention to the fact that this station was getting into a dilapidated condition, as no repairs other than the most urgent had been made to the machinery since 1893, and none to the buildings since the time of erection in 1875.

Two of the four engines, Nos. 25 and 26, were completely dismantled and to a great extent rebuilt, all the brasses on the main rods and links and the entire valve motion being renewed and refitted, including the starting cylinders and dash pots.

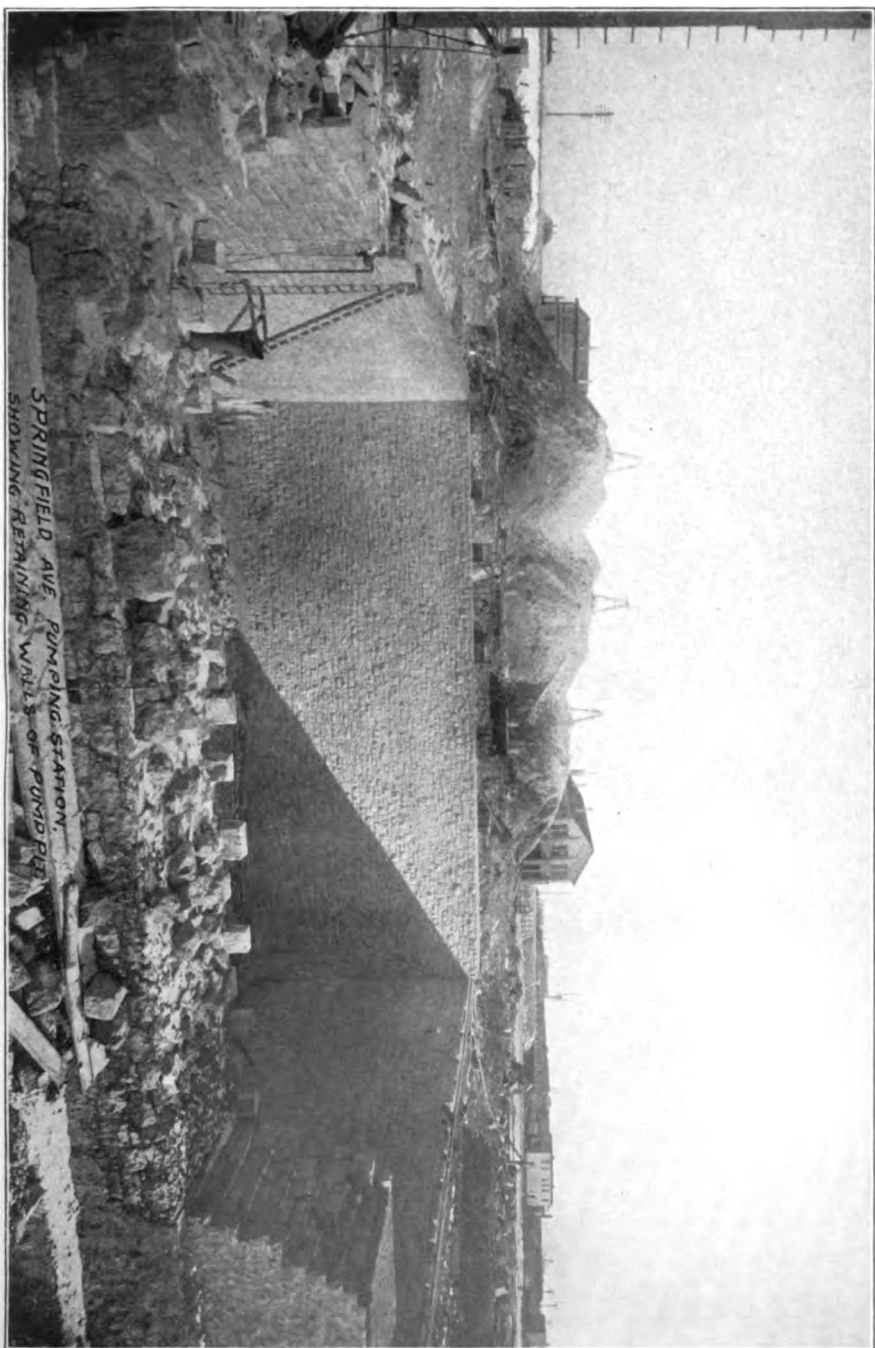
The four steam pistons were equipped with new steam packing rings and springs, and new metallic packing was placed on two of the piston rods. The pump chambers were furnished with induction and eduction valves and the pump plungers were replaced. All injection, priming and circulating pipes used in connection with these two pumps were renewed. Two new bilge pumps with necessary connections were furnished to take the place of worn-out pumps and pipes, which, with the injection, priming and circulating pipes, had been in service about twenty-four years.

Certain repairs were made on engines Nos. 50 and 51, but owing to lack of time, much work remains to be done. The pump chambers were furnished with forty-eight new eight-inch double-beat bronze valves, and also with one hundred and thirty-two four-inch rubber valves.

The four air pumps were thoroughly overhauled and the south battery of six boilers was provided with new tubes, and the furnaces were repaired. Twelve new three-inch valves were provided for the auxiliary steam header.

In consequence of the above repairs, excellent service has been given by the machinery at this station since June 1st, the engines being in constant operation during the day, with the exception of one delay of forty minutes on engine No. 50.

The repairs and improvements to the buildings and grounds comprised the following: The flight of stone steps at the main entrance to the station, as well as that at the tower, have been reset, and where stone rails and steps were broken, new material was used. All the old material found suitable was recut. The stone-work of the north entrance was repaired and partially reset. Some new stone caps and lintels were put in place.



SPRINGFIELD AVE. PUMPING STATION.
SHOWING REMAINING WALLS OF PUMP PIT.

NEW PUMPING STATION—CONSTRUCTION.

A new terra-cotta coping has been supplied for the ornamental gable over the main entrance. The grounds in front of the station have been enclosed on the north and south sides with a board fence. The entire front was enclosed with a low iron picket fence. The exterior walls, including the stone trimmings were painted. The entire lawn has been trenched, graded and seeded.

All the walls and ceiling of the engine-room were painted and the tile floor repaired. The roof trusses in the coal shed were reinforced. A new oak plank roadway was built from Ashland avenue to the coal shed. The narrow walk between the railroad tracks and the fence leading from the tower to the pipe yard was excavated and filled with cinders.

FOURTEENTH STREET PUMPING STATION.

MR. HUGH MARTIN, Engineer in Charge.

In the course of the year, a thirty million gallon, vertical triple expansion pumping engine, built by the Lake Erie Engineering Works, of Buffalo, N. Y., was installed in the station, increasing its capacity to a total of 84,000,000 gallons per twenty-four hours. With this engine the boiler capacity was increased by three 200-horse-power water tube boilers, with automatic stokers. A tunnel and shaft was constructed from the suction-well on Indiana avenue to the pump pit, to accommodate the forty-eight-inch supply pipe to this engine.

The construction of the foundations for the new engine was commenced February 1, 1898. The brick foundation was started from the top of a stone foundation at the level of the basement floor. The entire work was ready for the engine by April 28th. The foundations for the boiler settings were commenced April 17th and the work so advanced that boiler erection began April 28th. On the same day, the first casting for the pumps was delivered. The brick-work of the boiler settings was commenced May 16th and completed June 18th.

Excavation for the suction-pipe tunnel was begun April 21st. The construction of this tunnel was done under considerable difficulty, as a large portion of the excavation was inside of the building, between the foundation piles of the boiler-room wall and the foundation of the northeast engine. This pit was about 10 feet wide and 23 feet deep. Nearly all of the excavation was soft clay and old filling, mixed with old plank and timbers. Outside of the building the excavation was through soft clay, which required very heavy bracing. The tunnel is horseshoe in shape and 7 feet in diameter. The illustration shows the arrangement of the suction-pipe and the method of connection with the old well on Indiana street.

By the construction of a new by-pass system, connecting the old and a new forty-eight-inch discharge mains, excellent results have been attained in equalizing the pressures throughout the North and West sides.

The pumps of the three fifteen million gallon engines were equipped with 2,860 new suction and discharge valves ; new plungers were provided for the attached boiler feed-pumps, and changes made in the latter, whereby the feed-water from the hot well is pumped direct to the boilers.

On nine of the boilers skeleton arches were built to take the place of the cast iron ones, which were continually breaking. The bottom grate bars in all these boilers were renewed. Six of the boilers in this station are in need of new tubes.

Considerable expense was incurred in repairing the steam header and main steam pipes, owing to their improper construction—in the renewal of the blow-off valves and in other changes in the piping necessary to connect same with the new engine and boilers.

An entire new system of sewers adjacent to the station has been built in Indiana avenue, Fourteenth street and the alley, and the streets and sidewalks were regraded and relaid. The ceiling and walls of the engine-room are being painted. Extensive repairs were made to the plastered walls, as the cornice was badly broken in numerous places. The concrete floors around the engines were replaced with iron floor plates.

The service rendered by this station during the past year was excellent, there being but one delay of a few hours, due to the making of water main connections with the new engine.

CENTRAL PUMPING STATION.

MR. MARTIN MAHONEY, Engineer in Charge.

The chief repairs made during the year to the engines at this station were as follows: All brasses on the connecting rods and main connections were refitted, the cylinder jacket pipes repaired, the high pressure piston rods on engine No. 1 were equipped with metallic packing, the air and boiler feed pumps overhauled, and a new automatic pump installed to control the condensation from the steam jackets and receivers, delivering same direct to the boilers. Sixteen hundred and eighty new valves were placed in the suction and discharge chambers of the pumps.

The above repairs placed the engines in first-class condition and they have been kept in uninterrupted service.

The three boilers of the west battery were practically rebuilt, being provided with three new twenty-feet continuous sheets, retubed, and the longitudinal seams reinforced with butt straps, thus making it safe to raise the steam pressure from 110 to 140 pounds. The boiler settings and the Murphy furnaces of this battery were also rebuilt and all feed water pipe and steam headers of same were remodeled, renewed and covered with non-conducting material.

On the south battery of boilers, the mud drums and Murphy furnaces were repaired and minor repairs made to the shells of the boilers.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is essential for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and techniques used to collect and analyze data. It highlights the need for a systematic approach to data collection and the importance of using reliable sources of information.

3. The third part of the document describes the process of interpreting the data and drawing conclusions from it. It stresses the importance of being objective and unbiased in the analysis and the need to consider all relevant factors.

4. The fourth part of the document discusses the importance of communicating the results of the analysis to the relevant stakeholders. It emphasizes the need for clear and concise communication and the importance of providing actionable recommendations.

5. The fifth part of the document concludes by summarizing the key points of the document and reiterating the importance of maintaining accurate records and using a systematic approach to data collection and analysis.

In conclusion, the document emphasizes the importance of maintaining accurate records and using a systematic approach to data collection and analysis. It highlights the need for transparency and accountability in the organization's operations and the importance of being objective and unbiased in the analysis.

The document also stresses the importance of communicating the results of the analysis to the relevant stakeholders and providing actionable recommendations. It concludes by summarizing the key points of the document and reiterating the importance of maintaining accurate records and using a systematic approach to data collection and analysis.

The document is a comprehensive guide to the process of data collection and analysis. It provides a clear and concise overview of the various methods and techniques used to collect and analyze data and the importance of maintaining accurate records and using a systematic approach to data collection and analysis.

The document is intended for use by anyone involved in the organization's operations and is a valuable resource for ensuring transparency and accountability in the organization's operations.

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The walls and ceiling of the engine-room were painted, as well as the sash and casings on the exterior of the building, including the front door. The walls of the boiler-room and basement were whitewashed.

The floor of the coal shed was repaired. The floor over the shaft, being badly decayed, was removed and a new one laid. The four skylights over the coal room were repaired. Two new ventilators, each 24 feet long, made of galvanized iron, were built on the roof over the boiler-room. This entire roof was covered with felt and roofing composition and gravel.

General repairs to all furnace walls were made when required.

SIXTY-EIGHTH STREET PUMPING STATION.

MR. DANIEL SULLIVAN, Engineer in Charge.

During the year, a new fourteen million gallon, horizontal compound pumping engine was built and erected by the Holly Manufacturing Company, of Lockport, N. Y. With this engine there were installed four 60-inch by 18-foot tubular boilers.

Two of the old Holly pumps were re-equipped with 2,880 pump chamber valves of a new design, increasing the valve area forty-five per cent. This improvement has increased the pumping capacity of these two pumps 3,000,000 each per twenty-four hours, which, with the addition of the new pumping engine, increases the capacity of this station 20,000,000 gallons per twenty-four hours. The total capacity now is 88,000,000 gallons.

The air and attached feed pumps, brasses and pins were overhauled and adjusted. Five hundred valves were placed in the pump chambers of the Holly engines Nos. 1 and 5, and the Worthington engine.

Twelve boilers were repaired, 700 new tubes were provided replacing worn-out ones, eight new sets of oil burners were installed, the entire feed water and blow-off piping remodeled and covered on eight Holly boilers, and twelve water purifiers were attached.

These repairs on the engines and boilers place the machinery of this station in excellent condition with the exception of four Worthington boilers, which require resetting and repiping. Excellent pressure has been uninterruptedly maintained at this station throughout the year.

Contracts for additions to the main building and boiler-room at a cost of \$35,000 were let near the close of the year. These improvements are now in progress and are intended to accommodate new machinery in the future.

An entire new sewerage system has been provided, a new 24-inch sewer having been built on Oglesby avenue extending from Sixty-eighth street to Seventieth street, and 12-inch lateral pipes laid, one in Sixty-eighth street from the new sewer to the old pumping station, and one in the alley to the oil house. The exhaust pipes from all the pumps in the sta-

tion have been connected with the new sewer by means of iron and vitrified pipes.

The roof over the coal shed on the easterly side has been covered with felt and roofing composition. Various other minor repairs were made, and when the addition to the station is completed the buildings will be in first-class shape.

LAKE VIEW PUMPING STATION.

MR. F. D. PARKER, Engineer in Charge.

Holly engine No. 4 was dismantled and in many particulars rebuilt. All connections were provided with new brasses, the walking beams rebuilt and provided with new pins, the valve motion was refitted and the steam pistons, both high and low pressure, readjusted, the air and attached feed pumps were overhauled, and a serious leak between the high and low pressure cylinders was closed. Fifteen hundred new valves were placed in the pump chambers, and the plungers repacked. The four steam cylinders were covered with non-conducting material and relagged with walnut lagging.

The above indicates the first general overhauling this engine has received since its installation in 1888.

One thousand new valves were placed in the pump chambers of Holly engine No. 1. The plungers were repacked and all lost motion taken up in the connections. The air and attached feed pumps were overhauled and two high-pressure piston rods were packed with metallic packing.

The water plungers in the new Holly engine were re-equipped with rawhide packing. The two reheaters on these engines were rebuilt, three new jacket heaters installed, and the entire steam jacket and feed water piping remodeled. By these changes, all the condensation from the steam jackets, which previously was discharged into the sewer, is delivered direct to the boilers. The above repairs place the three Holly engines in good condition.

Worthington engine No. 3 was provided with an entire new set of induction and eduction valves, but much work remains to be done, as this engine has been in service about thirteen years and has never been overhauled. Six of the boilers in this station require new tubes in order to place them in good condition. The condensation from the steam headers has been directed back into the boilers by means of new drip piping, thus dispensing with the use of steam traps. The water grates in a number of the Holly furnaces were renewed and the remodeled feed water piping, reheaters and tanks covered with non-conducting material.

The only inlet into the suction-well for the west engine at this station, with its 36-inch suction, was a 16-inch cast iron pipe, 18 inches below datum, leading to the next well. When the plant was run to its full

capacity the water was lowered in the well so that the 16-inch pipe would at times be only partially filled and the supply so decreased that the engine would lose its vacuum. To provide against any emergency of this kind a 5-foot shaft was sunk from the bottom of the suction-well and a 4-foot drift was driven to the next shaft. The elevation of the bottom of the well is -13 C. D., the bottom of the 5-foot shaft is at -28.69 and the top of the tunnel eye, at -22.19. The work was begun February 18th and completed March 15th, when the diver cut the tunnel eye through the shaft.

The repairs required to the buildings at this station were few in number. The interior of the building, the outside woodwork and the entire machinery plant was painted. Minor repairs were made to the roof and smokestack and a plank roadway built from Montrose boulevard to the coal sheds.

WASHINGTON HEIGHTS PUMPING STATION.

MR. JAMES PEARCE, Engineer in Charge.

The demand on this station having gradually increased as a consequence of the rapid settlement of the adjacent territory, the supply from the artesian well, together with the lake water pumped by the duplex pumps, became insufficient, particularly during the summer or in case of a sudden demand for large quantities of water, as during a fire. To overcome this deficiency, two new reservoirs, 25 feet in diameter and 16.6 feet in depth, were built and the existing reservoir deepened to 16.6 feet, all provided with proper connecting valves, thus increasing the storage capacity for lake water from 17,000 gallons to 140,000 gallons. By the addition of these reservoirs and alterations to the pumping engines, it is possible to give a permanent supply of lake water, the water being furnished by a city main by way of the Sixty-eighth street pumping station and leading into the reservoirs. The deep-well pump can be held in reserve, and by dispensing with the services of this pump a large economy of fuel is effected.

The lawn in front of this station was regraded and covered with black soil. The old plank walk in front of the station was removed and replaced with cinders. A narrow concrete walk was laid leading from the engine-room to the valves on the lawn. A number of minor repairs were made, so that the machinery, buildings and grounds are in good condition.

NORWOOD PARK PUMPING STATION.

MR. NELS SAMPSON, Engineer in Charge.

In consequence of the extensive repairs made in 1897 and the installation, early in 1898, of the new 54-inch by 16-foot boiler to replace a worn-out boiler of insufficient capacity, the service given by this station has been satisfactory, the territory depending on this station having had a plentiful supply of water throughout the entire year.

TABLE "A."—MONTHLY PUMPAGE IN GALLONS, 1898.

MONTH.	North Pumping Works.	West Pumping Works.	66th Street Pumping Works.	14th Street Pumping Works.	Lake View Pumping Works.	Central Pumping Works.	Washington Heights Pumping Works.	The City as a Whole.
January	2,269,748,015	1,942,828,600	1,205,584,945	1,828,119,058	884,577,204	899,581,088	6,305,468	8,586,784,833
February	1,891,592,515	1,786,077,000	1,094,752,975	1,218,160,242	884,923,819	776,806,400	5,788,408	7,608,051,359
March	1,982,860,870	1,867,679,000	1,217,786,500	1,253,042,665	958,707,704	722,053,568	7,022,120	8,009,107,412
April	1,993,678,548	1,477,954,800	1,186,188,060	1,223,284,876	1,015,989,474	726,028,980	7,602,600	7,680,621,788
May	1,965,488,262	1,529,378,400	1,263,985,800	1,246,022,460	1,189,176,198	729,007,959	8,960,600	7,902,008,679
June	1,868,461,688	1,805,683,200	1,307,445,125	1,204,268,605	1,165,722,294	721,898,059	10,142,900	8,088,566,871
July	2,059,060,502	1,998,042,600	1,568,871,055	1,279,527,082	1,288,115,015	887,015,638	10,975,080	8,881,606,972
August	1,726,996,444	1,846,534,000	1,680,888,476	1,226,560,308	1,263,984,007	947,152,817	10,948,000	8,652,509,050
September ...	1,592,371,891	1,784,065,200	1,600,458,928	1,587,175,545	1,216,953,562	900,198,350	9,528,420	8,640,751,891
October	1,557,462,182	1,655,806,400	1,630,860,995	1,707,158,596	1,102,510,944	895,660,157	6,541,242	8,555,990,516
November ...	1,442,406,903	1,608,675,400	1,566,467,718	1,562,452,484	1,041,478,062	988,426,164	9,280,340	8,169,184,091
December	1,611,989,365	1,723,170,600	1,629,074,127	1,946,484,011	1,094,476,656	957,048,848	8,988,180	8,971,221,782
Totals	21,982,113,685	20,870,840,200	16,901,694,699	16,782,200,915	12,001,608,969	10,060,377,368	101,968,368	99,641,804,184
Total Pumpage Norwood Park Works								24,068,700
Grand Total, City as a whole								99,665,872,884

THE "A" WOMEN'S SERVICE IN ALL INDIA 1900

TABLE "B."—OPERATIONS OF PUMPING STATIONS, CHICAGO, DURING 1898.

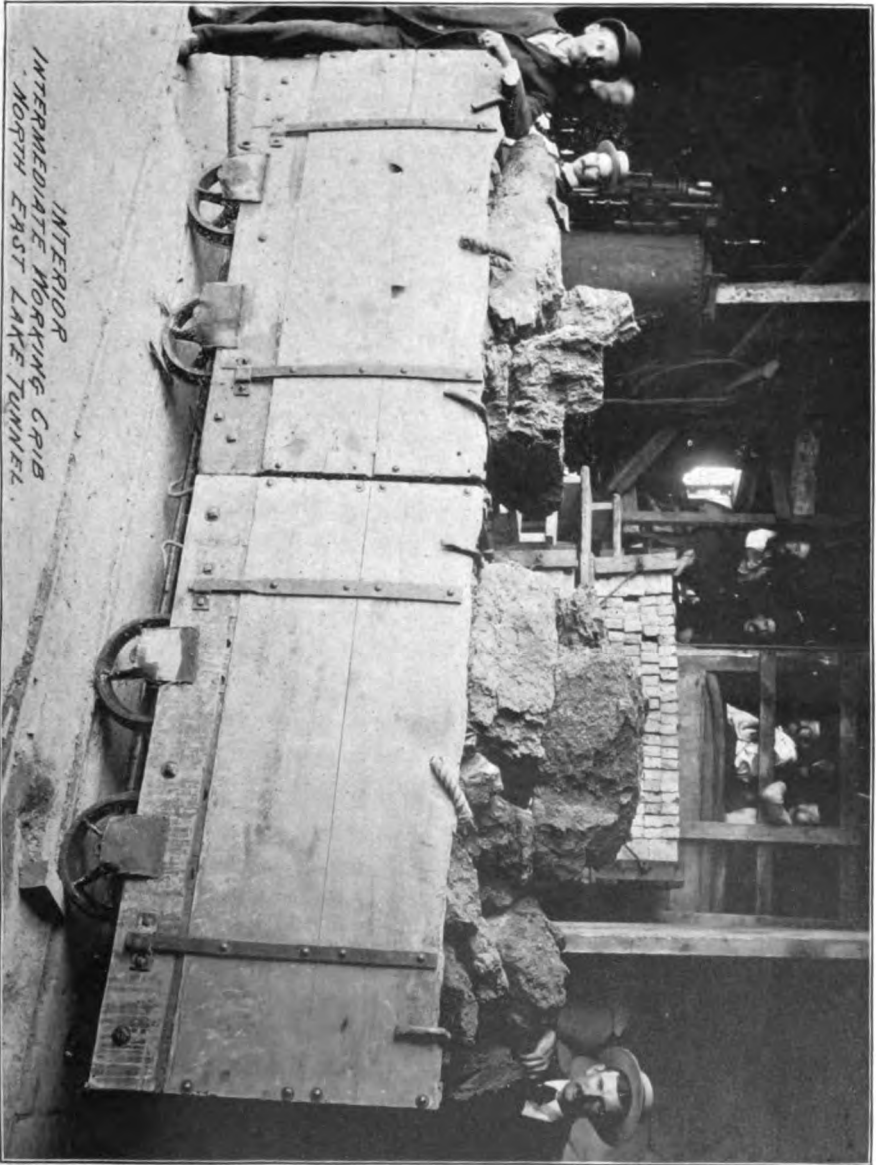
	North Pumping Works	West Pumping Works	Sixty-eighth Street Pumping Works.	Fourteenth Street Pumping Works.
Anthracite Coal, tons.....	11,706.18 ^c			
Bituminous Coal, tons.....	10,870.5 ⁶⁰	16,381.4 ⁸⁶		11,615.4 ⁸⁸
Fuel Oil, gallons.....			2,850.120	
Price of Anthracite Coal, per ton.....	\$4.84			
Price of Bituminous Coal, per ton.....	2.10	\$1.94		\$1.97
Price of Fuel Oil, per 100 gallons.....			\$1.21	
Cost of Anthracite Coal.....	\$57,176.95			
Cost of Bituminous Coal.....	22,791.80	\$31,619.63		\$22,931.97
Cost of Fuel Oil.....			\$23,338.19	
Total Cost of Fuel.....	79,968.75	31,619.63	23,338.19	22,921.97
Salaries.....	53,662.81	38,221.79	29,186.11	37,893.73
Cost of Oil Stores and Lighting.....	7,034.38	4,143.52	1,886.84	2,431.11
Repairs to Buildings, Pumps, Engines and Boilers.....	22,812.66	16,902.30	11,693.58	10,285.73
Total Expense of Operation and Maintenance.....	\$163,478.60	90,887.24	70,554.72	73,522.54
All other Expenses combined.....	2,863.37	5,554.60	45,269.78	89,149.32
Grand Total of Expenses.....	166,341.97	96,441.84	115,824.45	162,670.86
Total Gallons Pumped during the year.....	21,932,113.685	20,370,840.200	16,901,694.939	16,732,200.915
*Per Cent. of Pumpage of City as a whole.....	22.0	21.0	17.0	16.8
Greatest Amount Pumped in one day, gallons.....	77,300,629 Feb. 3	64,590,600 Jan. 27	58,919,150 Sept. 2	73,364,853 Dec. 17
Least Amount Pumped in one day, gallons.....	37,766,955 Nov. 11	32,033,200 May 15	33,310,620 July 30	13,906,081 Aug. 2
Average Pumped per day, gallons.....	60,224,969	57,180,384	46,306,013	45,841,646
Average Head against Pumps, in feet.....	106.7	98.5	126.1	112.9
Cost of Fuel Pumping 1,000,000 gals., one foot high.....	3.4 ^{8c}	1.7 ^{6c}	1.7 ^{6c}	1.7 ^{6c}
Total Cost of Pumping 1,000,000 gals., one foot high.....	6.7 ^{7c}	4.1 ^{6c}	3.7 ^{6c}	3.7 ^{6c}

*Norwood Park Station not included.

TABLE "B."—OPERATIONS OF PUMPING STATIONS, CHICAGO, DURING 1898.—CONTINUED.

	Lake View Pump- ing Works.	Central Pumping Works.	Washington Heights Pumping Works.	The City as a Whole.
Anthracite Coal, tons.....				11,706.88 ^c
Bituminous Coal, tons.....	11,116.88 ^c	6,907.88 ^c	696.18 ^c	57,487.88 ^c
Fuel Oil, gallons.....				2,850,130
Price of Anthracite Coal, per ton.....				\$4.84
Price of Bituminous Coal, per ton.....	\$1.94	\$2.16	\$2.04	2.00
Price of Fuel Oil, per 100 gallons.....				1.21
Cost of Anthracite Coal.....				57,176.95
Cost of Bituminous Coal.....	\$21,597.82	\$14,546.81	\$1,424.96	114,902.99
Cost of Fuel Oil.....				28,338.19
Total Cost of Fuel.....	21,597.82	14,546.81	1,424.96	200,418.18
Salaries.....	27,688.97	27,420.88	3,608.82	217,582.61
Cost of Oil Stores and Lighting.....	3,059.39	3,279.82	181.28	21,606.74
Repairs to Buildings, Pumps, Engines and Boilers.....	8,667.77	14,315.98	1,150.69	85,828.71
Total Expense of Operation and Maintenance.....	60,968.85	59,562.99	6,865.25	525,385.19
All other Expenses combined.....	1,200.00	1,850.00	4,804.84	150,190.86
Grand Total of Expenses.....	62,168.85	61,412.99	10,669.59	675,525.55
Total Gallons Pumped during the year.....	13,001,608,959	10,080,877,868	101,968,358	99,641,804,184
*Per Cent. of Pumpage of City as a whole.....	13.0	10.1	.1	100.0
Greatest Amount Pumped in one day, gallons.....	41,990,877 Aug. 30	31,669,659 July 28	423,600 July 8	308,920,821 Sept. 3
Least Amount Pumped in one day, gallons.....	25,973,960 Jan. 18	10,517,955 Feb. 27	165,311 Oct. 15	235,095,336 May 8
Average Pumped per day, gallons.....	35,620,846	27,636,650	279,865	278,055,816
Average Head against Pumps, in feet.....	98.7	95.7	109.0	106.5
Cost of Fuel Pumping 1,000,000 gals., one foot high.....	1.7 ^c	1.7 ^c	12.8 ^c	1.8 ^c
Total Cost of Pumping 1,000,000 gals., one foot high.....	5.19 ^c	6.19 ^c	57.76 ^c	4.96 ^c

*Norwood Park Station not included.



INTERIOR
INTERMEDIATE MORNING CRIB
NORTH EAST LAKE TUNNEL.

TUNNEL CAR8.

The Norwood Park pumping station was enlarged by an addition on the west side to accommodate a new boiler plant.

A new coal shed was built in the rear of the engine-room and both engine-room and coal shed were extended and joined to the water tower, enclosing the discharge pipe leading from the pump to the tower.

AUXILIARY PUMPING STATIONS.

The Canal and Fullerton avenue pumping stations, heretofore under the jurisdiction of this Bureau, were, in May, transferred to the Bureau of Sewers. Previous to this transfer extensive repairs, entailing large expenditures, were made to the machinery and plant at both stations, under the direction of the City Engineer, so that when the transfer was made, both stations, especially the Fullerton avenue station, were in good condition. Repairs and improvements to the Canal pumping station, after the transfer, were under the supervision of Mr. Thomas Downs, Supervising Mechanical Engineer of the Bureau of Engineering.

The appended diagram shows the daily pumpage at each station, separately and combined, with the quantities, heads and temperatures of the air and water.

The preceding tables give detailed information as to pumpage, expenditure, etc. Table "A" gives the monthly and annual pumpage at the various stations. Table "B" gives the more important figures relating to quantities and expenses.

WATER TUNNELS (IN OPERATION).

The Sixty-eighth street tunnel system was increased when the new 7-foot tunnel, completed early in the year, was put into operation. A description of the construction of this work is given under the head of "Tunnel and Crib Construction."

The total length of tunnels in use from the Two-mile crib to the Sixty-eighth street pumping station is as follows:

7-foot tunnel.....	11,167 lineal feet.
5-foot tunnel.....	8,132 lineal feet.

There is also 5,026 lineal feet of 6-foot tunnel leading from the submerged crib to the pumping station. By the addition of this 7-foot tunnel, the submerged intake crib being abandoned, the loss of head through the system has been greatly decreased, inducing greater economy in the operation of the pumping engines and also providing sufficient water for another engine to be installed in the future.

The Two-mile tunnel system at the Chicago avenue pumping station was modified by a connection between the system in the rear of the station

with the new 10-foot land tunnel. A full account of the construction of this connection is given under the head of "Tunnel and Crib Construction." No change of any kind was made in the Lake View and Four-mile tunnels.

LAKE CRIBS.

MR. PAUL G. BROWN, Assistant Engineer in Charge.

General improvements were made in all the cribs, thus maintaining their efficiency and at the same time promoting the comfort of the men who are obliged to live at the cribs.

TWO-MILE CRIB.

JAMES DONEGAN, Keeper.

This crib and its protection were greatly damaged in the October storm, the decking being torn from the protection breakwater on the easterly side. The house over the outside shaft was wrecked, and forty cords of stone washed out of the breakwater. Necessary repairs have been made and the crib is in good condition for the winter.

In the middle of December, the anchor ice caused more trouble than ever before in the history of the crib. For five days, both night and day, the keeper with a large force of men battled with the ice, and with such success that the water was at no time shut off. Steam jets have been placed in the suction pipes, so that the anchor ice cannot shut off the crib pumps. Plans are being perfected by which the three tunnels terminating at this crib will be joined and continued in one tunnel to an intake shaft constructed at the Carter H. Harrison crib. The Two-mile crib can then be removed, thus saving a large annual amount necessary to maintain this crib, and also doing away with the constant menace during the winter to the water supply obtained through this intake.

LAKE VIEW CRIB.

GILBERT JOHNSON, Keeper.

This crib and protection are in a very dilapidated condition, requiring constant repairs. Plans will soon be prepared for a new and permanent superstructure to replace the temporary wooden house. A contract was let July 1st for the removal of the Lake View intermediate crib, one mile from shore. The storms of the previous winter destroyed a great part of the superstructure of the pile portion of this crib, so that it was concluded advisable to dome over the intake shaft and remove the crib. The shaft was domed over in June. The contractor removed the shell of the east shaft and part of the iron sections from the west shaft, burned the crib to the water's edge, removed the stone to the water line, and on September 10th abandoned the work. On account of the lateness of the season no steps were taken by the City to complete this work. The remainder of the crib will be removed the coming spring.

FOUR-MILE CRIB.**CHARLES MILLER, Keeper.**

During the year a steam heating plant was installed and double windows placed in the openings around the wellroom, so that in the future it will not be necessary to keep a gang of men during the winter to remove ice, which heretofore formed in the well. A temperature of seventy degrees is constantly maintained.

SIXTY-EIGHTH STREET CRIB.**JOHN KELLY, Keeper.**

No special repairs or changes were necessary at this crib. It is the best protected crib in the lake, the breakwater being long and containing deep water ports. There is practically no danger of an ice blockade. The steam heating plant, installed during 1897, has proven entirely satisfactory.

WATER WORKS SHOPS.**Mr. JAMES GARVEY, Superintendent.**

The new shop at Twenty-second street and Ashland avenue, completed in 1897, is in excellent condition. The machinery, being completely overhauled, is in perfect order. During the year one new separator and two standard steam traps were added to the engine. The throttle valve was reversed and rebuilt, making the engine equal to new.

The steam heating system was repaired throughout the entire shop, and many new globe valves were added. Steam heat was placed in the toolroom and in the new carpenter shop. Flooring was laid under the storehouse behind the shop for the storage of hydrant and valve castings, protecting them from the weather.

The meter testing department was equipped with a new 4-inch testing apparatus and new tools, making this branch of the shop second to none. A hoisting tackle was placed on the second floor for hoisting meters to the old carpenter shop, recently refitted as a storeroom for new meters.

The following new hydrants and stop valves were made during the year, together with a large amount of miscellaneous work for the various departments:

HYDRANTS—NEW.

	2¼-inch Single.	2¼-inch Double.	4-inch Double.
On hand January 1, 1898	4	127	6
Manufactured during 1898.....	349	424	18
Total	353	551	24
Delivered to Water Pipe Extension	305	515	20
On hand January 1, 1899.....	48	86	4

STOP VALVES—NEW.

	4-inch	6-inch	8-inch	12-inch	16-inch	24-inch
On hand January 1, 1898.....	9	19	36	3	2	3
Manufactured during 1898.....	57	567	229	32	39	20
Total	66	586	265	35	41	23
Delivered to Water Pipe Extension	59	510	251	27	39	20
On hand January 1, 1899	7	76	14	8	2	3

The expenditures during the year for labor and material were as follows:

349 2½-inch single hydrants.....	\$3,894.02	
424 2½-inch double hydrants.....	8,518.26	
18 4-inch double hydrants.....	346.88	
		\$12,759.16
Hydrant repairs.....		130.83
57 4-inch stop-valves.....	\$ 490.14	
567 6-inch " ".....	6,846.16	
229 8-inch " ".....	4,272.18	
32 12-inch " ".....	1,318.61	
89 16-inch " ".....	2,625.48	
20 24-inch " ".....	2,589.20	
		18,141.72
Valve Stock.....		1,408.99
Repairing and testing meters.....		2,242.74
Expenditures on account of water pipe extension, pumping stations and other departments.....		55,414.20
Total		<u>\$90,097.64</u>

DIVISION OF TUNNEL AND CRIB CONSTRUCTION.

MR. J. H. SPENGLER, Assistant City Engineer, is in charge of this Division.

NEW LAND TUNNEL.

SECTION 1.

At the close of the year 1897, the Oak street shaft, the eastern terminus of this section, remained to be completed. This shaft, being used in connection with the work on the Northeast lake tunnel, was finally domed over and abandoned upon the completion of that portion of the Lake tunnel between this shaft and the intermediate crib in November, 1898.

SECTION 2.

October 18, 1897, the contractors for this work suspended operations, pending litigation with the City. The questions at issue were finally carried to the Supreme Court, but at the close of the year 1898 no decision had been handed down. The work has, therefore, remained at a

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standstill during the entire year. The annual report of 1897 shows the progress of work on this section up to the time of the shut-down.

SECTION 3.

At the beginning of the year 1898, work was in progress in Drift 2, running northwesterly from Keith street shaft, in Drifts 3 and 4, running in opposite directions from Potomac avenue shaft, in Drifts 5 and 6, running in opposite directions from Kedzie avenue shaft, in Drifts 8 and 9, working from Wabansia avenue shaft. At that time, Drifts 2, 3, 4 and 5 were being excavated and were partly in earth and partly in rock. Drifts 8 and 9 were in solid rock. At the close of the year 1897, a total length of 14,999.2 lineal feet had been excavated, of which a total average length of 11,579.3 lineal feet had been bricked up.

Owing to contentions between the contractors and the City authorities, active work was discontinued by the contractors April 20, 1898, although the various drifts were kept free of water until May 18th, at which time the pumps at the shafts were withdrawn and the tunnel allowed to fill with water.

On July 11, 1898, the City Council passed an order by the terms of which the contractors were authorized to proceed with their work, the method of payments to be the same as had been followed previous to the shut-down, all questions at issue to be finally decided by the Courts, without prejudice to either party by the making of the arrangement under which work was resumed.

The contractors at once began pumping at the various shafts and active work in the different drifts was commenced August 15th. The City made semi-monthly classifications, estimates, and payments in accordance with the terms of the contract, specifications and the orders of the City Council. Notwithstanding this, the contractors on November 11th, without notice to the City, filed a bill of particulars in the Circuit Court, claiming, among other things, that the City had refused to issue proper estimates for work done, and had threatened to take possession of the tunnel and the contractors' plant. They therefore prayed for an accounting and for an injunction to restrain the City from taking possession of the tunnel and plant, as well as to prevent the City from in any way interfering with their operations. This injunction was granted by the Court and immediately after, on the same day, the contractors stopped all operations, withdrew their pumps from the various drifts and allowed the tunnel to fill with water. At the close of the year work had not been resumed.

The following shows in detail the work done on this section during the year:

KEITH STREET SHAFT.

The excavation of this shaft, which was the first one constructed by

the contractors, was completed in December, 1895. The shaft, of a total depth of 90 feet, was timbered down to rock at an elevation of 50 feet below Chicago datum, the bottom of the shaft being at —75 feet C. D.

On July 8th, which was during the time that work was shut down on this section, the shaft collapsed. At this time no part of the shaft had been bricked up. By the collapse of the timbers the shaft was filled for part of its depth with clay, sheeting, etc., breaking the four-inch watermain, sewer and gas pipes, and producing a settlement of the surface over a considerable area and for an average depth of about four feet. The contractor disclaiming responsibility for this collapse and refusing to take steps to put the shaft in proper condition, a force of City men, under Assistant Engineer Paul G. Brown, commenced work, clearing away debris and retimbering outside of the former area of the shaft, removing the old timbers as the excavation proceeded.

By July 19th, at which time the contractors assumed charge of the rebuilding of this shaft, the City had excavated and retimbered to a depth of 30 feet below street level. August 20th, the contractors discontinued work at this point, having at that time removed all debris from the shaft, bricked up the remaining 21.2 feet of tunnel in Drift No. 1 adjacent to the shaft, and bricked up 64.7 feet of the shaft, having also placed the gate frame for the 8-foot gate in position.

On August 25th, a force of City men again took charge and with the contractors' plant completed the shaft, bricking up the 21.8 feet of Drift No. 2 adjacent, putting the 8-foot gate in place, doming over the shaft and restoring all street paving, sidewalks, water and sewer pipes, the entire work being finished about September 5th.

DRIFT No. 1. This drift, of a total length of 3328.2 feet, extends from Keith street shaft to Green street shaft. It was completed in 1897 with the exception of 21.2 feet adjacent to the Keith street shaft, which work was done at the time as before stated.

DRIFT No. 2. At the close of the year 1897, 3053 lineal feet had been excavated, of which an average of 2315.8 feet had been lined with brick. Work in this drift continued until April 20th, the time of the closing down of work on this section, and was not resumed when operations were again commenced in the other drifts, the intention being to complete the gap between Drifts 2 and 3 by way of the latter. The work done was in part earth and part rock, and was entirely lined with brick, with the exception of 4½ feet next to the face and 21.8 feet adjacent to the shaft, the latter being later bricked up by the City in connection with the restoration of the shaft. The face of this drift is at station 34+61. During the year, a total of 408 lineal feet was excavated, and 1170 feet of arch and 1111.3 feet of invert were lined with brick, the difference between

what was excavated and the length bricked up being that portion of the drift in solid rock, which had been excavated previous to 1898.

POTOMAC AVENUE SHAFT.

DRIFT No. 3. At the close of the year 1897, 2244 lineal feet had been excavated, of which 2219 lineal feet had been lined with brick. Work in this drift was continued in part earth and part rock up to station 26+49, at which point the excavation again entered solid rock and so continued until the close of the year, at which time the face was at station 33+32.8. During the year the progress was as follows: 1088.8 lineal feet were excavated and 713 feet of arch and 817 feet of invert were bricked up.

DRIFT No. 4. At the close of the year 1897, 2548 lineal feet had been excavated, of which a total of 1939.0 feet was lined with brick. Work was continued in solid rock in this drift up to station 27+78, at which point, excavation in part earth and part rock commenced and so continued to station 31+93, when the drift emerged into an all-earth section and so continued to station 33+19, the end of the drift at the close of the year.

During the year a total of 771 lineal feet was excavated, of which 230.0 feet were in solid rock, 415.0 feet in part earth and part rock, and 126.0 feet in all earth. A total of 1,301 lineal feet of arch and 1,296 lineal feet of invert was bricked up.

KEDZIE AVENUE SHAFT.

DRIFT No. 5.—At the close of the year 1897 a total of 1,383 lineal feet had been excavated, of which an average of 669 lineal feet was bricked up. During the year 1898 a total of 597 lineal feet was excavated, all in part earth and part rock; 595.5 lineal feet of arch and 957.5 lineal feet of invert were bricked up. The station of the face at the close of the year was at 19+80 and at this point, the rock had practically run out, so that the excavation was in all earth.

DRIFT No. 6.—At the close of the year 1897, 1,627 lineal feet had been excavated, of which an average of 679.5 lineal feet had been lined with brickwork. Work was continued in this drift, all in solid rock. March 11, 1898, connection was made between this drift and Drift No. 9, running southeasterly from the Wabansia avenue shaft. The brickwork was practically completed in March with the exception of about eight feet adjacent to the shaft, which will be completed when the shaft is bricked up.

SPRINGFIELD AVENUE SHAFT.

DRIFT No. 7.—The excavation of this drift, all in solid rock, running southwesterly from this shaft, was completed for a distance of 502 feet pre-

vious to 1898, and of this distance 450 lineal feet was bricked up. No work was done during 1898 on the connection to be made between Springfield avenue and Wabansia avenue shafts by way of Drift No. 8.

WABANSIA AVENUE SHAFT.

DRIFT No. 8.—At the close of the year 1897, 163 lineal feet had been excavated, no portion of which was bricked up. During the year, work on this drift, all in solid rock, was continued until November 5th, at which time connection was made with Drift No. 7, running southeasterly from Springfield avenue shaft. From that time until the time of the suspension of work, November 11th, the contractors were mucking out, preparatory to the laying of brickwork.

The station of the junction with Drift No. 7 was at 16+29. During the year a total of 1,466 lineal feet was excavated and no portion of this drift had been lined with brick.

DRIFT No. 9.—This drift extends southeasterly from Wabansia avenue shaft and, as before stated, connection was made with Drift No. 6, March 11, 1898, and all brickwork practically completed during that month. This drift is entirely in solid rock, and during the year 569.3 lineal feet was excavated and 702.8 lineal feet bricked up. This practically completed that portion of section three between Kedzie avenue and Wabansia avenue shafts. The number and total lineal feet of shafts remained the same as given in the annual report for 1897.

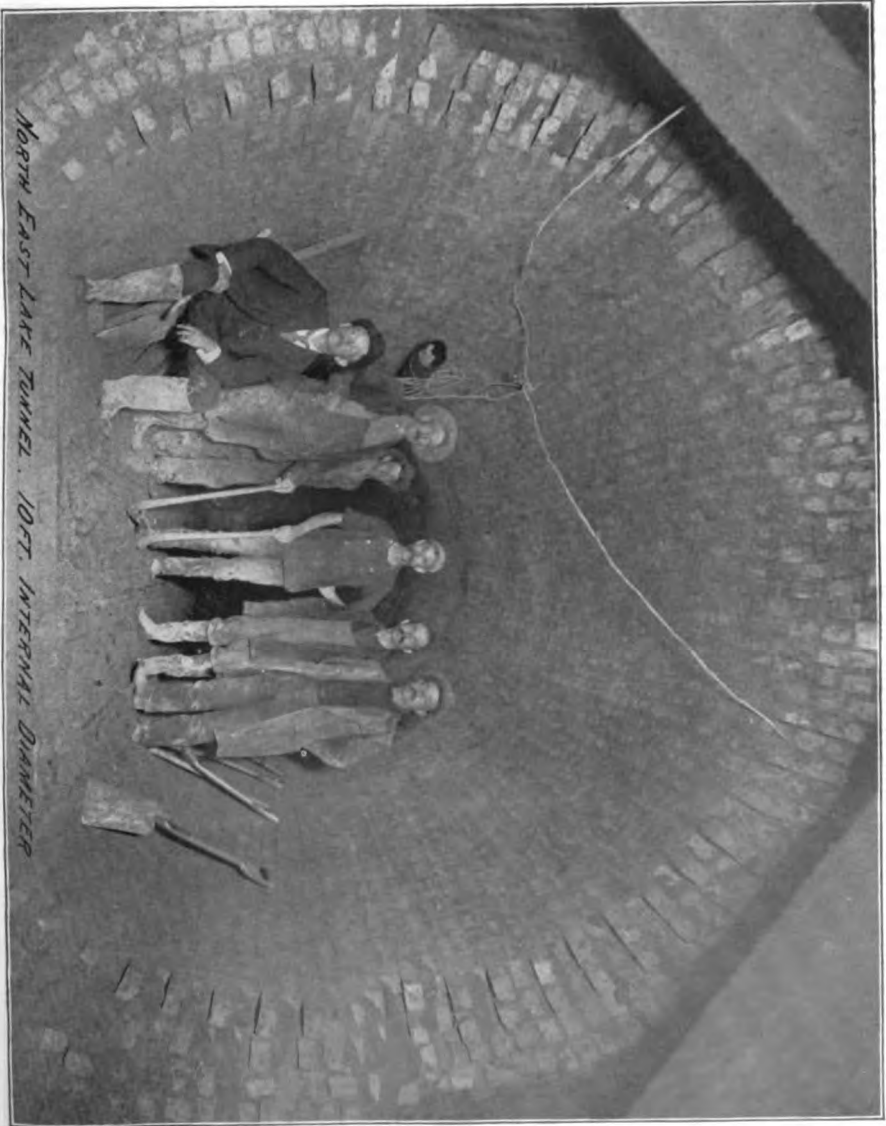
Mr. W. D. Barber was assistant engineer in charge of this section until August 25, 1898, at which time he was succeeded by Mr. G. F. Samuel as assistant engineer, who was assisted by Mr. Frank Holmes.

NORTHEAST LAKE TUNNEL.

OAK STREET SHAFT.

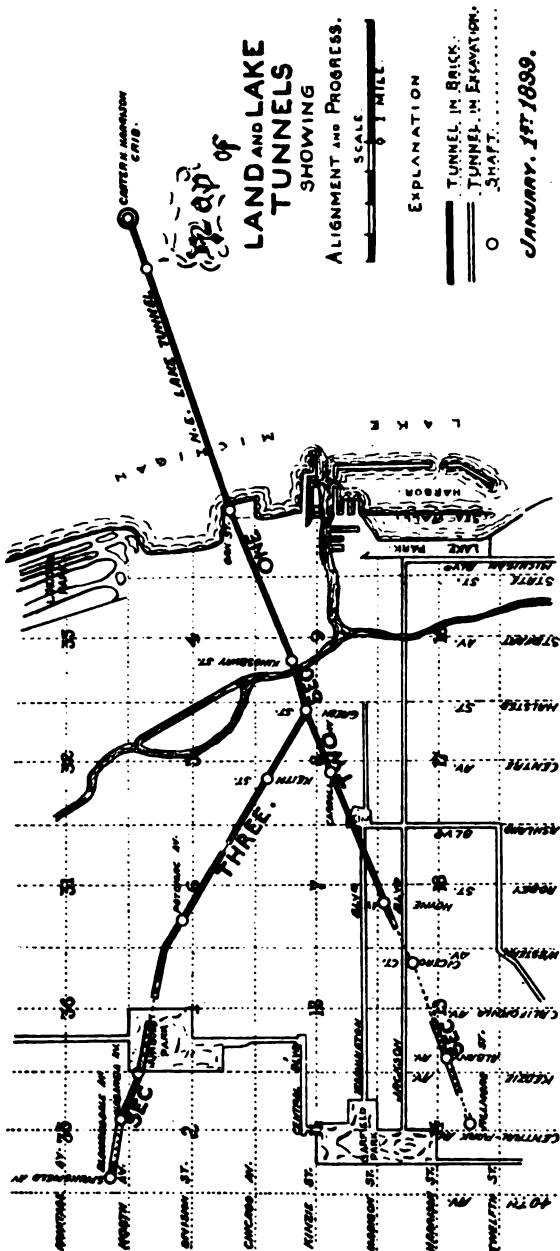
DRIFT No. 2.—At the close of the year 1897, there was completed in this drift, running eastward from the Oak street shaft, 5,379 lineal feet. On account of difficulties met with, owing to the character of the material encountered, no work was done in this drift from November 28, 1897, to March 23, 1898. On the latter date, the contractors commenced the installation of a compressed air plant and an air lock was constructed in the tunnel 5,050 feet from the shaft. This lock had a capacity of six dump cars. By the 6th of May this lock was completed and in such shape as to withstand a pressure equal to that of the inflowing water, sand and gas. For seventeen days thereafter work was prosecuted under air pressure for a distance of 73 feet.

During June drifting was prosecuted for fourteen days under air pressure, making a total length of 81 feet. The contractors were again



NORTH EAST LAKE TUNNEL. 10 FT. INTERNAL DIAMETER

INTERIOR VIEW, LAKE TUNNEL.



THE FOLLOWING TABLE SHOWS IN DETAIL THE NUMBER OF LINEAL FEET OF EXCAVATION AND BRICK WORK DONE ON THIS SECTION (3) UP TO DECEMBER 31, 1898:

YEAR.	Drift No. 1.		Drift No. 2.		Drift No. 3.		Drift No. 4.		Drift No. 5.		Drift No. 6.		Drift No. 7.		Drift No. 8.		Drift No. 9.	
	Excav.	Brick Lining.	Excav.	Brick Lining.	Excav.	Brick Lining.	Excav.	Brick Lining.	Excav.	Brick Lining.	Excav.	Brick Lining.	Excav.	Brick Lining.	Excav.	Brick Lining.	Excav.	Brick Lining.
1896.....	1181.0	667.0	1134.5	407.0	698.0	304.0	735.6	241.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
1897.....	2147.2	2640.0	1918.5	1908.8	1546.0	1915.0	1812.4	1698.0	1883.0	669.0	1627.0	679.5	502.0	450.0	163.0	.....	151.0	.....
1898.....	.....	21.2	408.0	1140.7	1088.8	765.0	771.0	1298.5	507.0	776.5	309.0	1248.5	.....	.....	1466.0	.....	569.3	702.8
Totals..	3328.2	3328.2	3461.0	3456.5	3332.8	2984.0	3319.0	3237.5	1990.0	1445.5	1936.0	1928.0	502.0	450.0	1629.0	.....	720.3	702.8

obliged to use air pressure for a period of seven days in July, from July 7th to 14th, during which time a length of 74 feet was driven. During the intervals between the times in which air pressure was used, excavation was carried on under ordinary conditions. The highest pressure maintained at any time was two atmospheres, the average being one and one-half atmospheres at the lock, which was located 329 feet from the working face and at the end of one mile of 3-inch air pipe. The remainder of the drift was completed without encountering any abnormal conditions, the clay being quite hard, interspersed with small boulders and gravel.

Work in this drift was discontinued September 5th at a point 6,694 feet from the Oak street shaft, of which 1,315 lineal feet was constructed during the year 1898. Connection between this drift and Drift No. 3, running westward from the intermediate crib, was made later by way of the latter drift.

In Drift No. 2, the average daily progress over the entire length was 15.90 feet, progress being retarded on account of the necessity of using air pressure at times, as before stated.

INTERMEDIATE CRIB.

DRIFT No. 3.—Previous to the year 1898, 2,111 lineal feet had been completed. Progress in this drift was continued uninterruptedly during 1898 until September 19th, when connection was made with Drift No. 2, thus completing that section of the lake tunnel between the Oak street shaft and the intermediate crib, a total distance of 12,504 lineal feet.

No particular difficulties were met with in this drift, the material passed through being hard clay interspersed with gravel and boulders, and for the greater portion of the entire length, this hard clay was overlaid with a stratum of sandy loam close to the normal section of the excavation and varying in thickness from a few inches to an unknown number of feet. In consequence, the backfilling required at times was considerably above the normal.

The total length of this drift was completed in 321 working days, showing an average daily progress of 18.1 feet. During the month of March there was constructed 512 feet in twenty-five working days, an average daily progress of 20.48 feet.

This shows an unusual progress in work of this kind, and is principally due to the excellent system and management under which operations were conducted by the contractors.

DRIFT No. 4.—At the close of 1897, 1,424 lineal feet of this drift had been completed bringing the face to within 105 feet of the intake shaft, which remained to be constructed. After the completion of this shaft, details of which will be given further on, operations were resumed in this

drift November 16th. On the 24th of the same month, connection between the intake shaft and this drift was effected, thus completing the entire length of 14,108 feet of the 10-foot tunnel, as called for by the contract dated July 6, 1896.

CARTER H. HARRISON CRIB.

The construction of the substructure for this crib was embraced in the contract under date as before stated. By December 20, 1898, the entire work on this crib, as called for by the contract, was completed, bringing the general level of the crib to an elevation of 17.13 feet above Chicago datum.

In July, contracts were let for the superstructure at a total cost of \$32,000. This work will not be commenced until spring, owing to the delay in completing the intake shaft.

Work on the intake shaft, by which the system of new land tunnels is to be supplied with water, was begun in June by pumping out the well and commencing the cutting through of the six-foot timber bottom, through which the cast-iron shaft is to pass. Considerable time and labor was expended in cutting this hole. November 2d the cylinder had reached the required depth, the total length being sixty-one feet, the top being eight feet above Chicago datum and the bottom sixteen feet below the bottom of the lake. This cylinder is $2\frac{1}{2}$ inches thick and 12 feet outside diameter, provided with three gates with necessary screens, etc. Below the cylinder, the shaft was constructed by underpinning process, that portion being 11 feet inside diameter and lined with four rings of brickwork. The extreme bottom of the shaft is at 99.00 feet below Chicago datum. The center of drift 4 at its connection with this shaft is at -88.50 C. D. The whole shaft was completed November 15th.

By virtue of an agreement made with the contractors, a second intake shaft was put into the well of this crib immediately after the completion of the first one.

These two shafts are entirely alike, both as to diameter and depth, as well as in manner of construction. From this second shaft a stub tunnel, $91\frac{1}{2}$ feet in length and 10 feet internal diameter, is to be constructed, of which seventy-five feet was completed at the close of the year. The second shaft is intended as a future intake for the three tunnels at present receiving their water from the old two-mile crib. Plans are now in preparation for the connection of the three two-mile tunnels and their extension in one tunnel to the Carter H. Harrison crib, thus doing away with the old two-mile crib.

In September, 1897, a contract was let for the construction of a landing at the new intake crib. This landing is composed of piling, cut off at the water level and cribbed up to an elevation of eight feet above Chicago

datum with 12x12 timbers, the spaces in the cribbing being filled with rip-rap. The top is decked with six-inch oak plank and the sides sheathed with three-inch oak plank to a depth four feet below Chicago datum. Work on this landing was not commenced until the spring of 1898, and it was completed August 30th.

At the close of the year 1898, the work on the Northeast lake tunnel was practically completed, the intermediate crib and shaft remaining to be removed. The superstructure for the crib is yet to be constructed. This, however, is to be done under separate contracts.

Mr. E. W. Jackson was assistant engineer in charge until April, when, having resigned, Mr. H. H. Jackman, assistant engineer, succeeded him.

RECAPITULATION.

SECTION ONE.

Total number of shafts constructed.....	8
Total number of feet of tunnel constructed.....	8,666
Total number of feet of tunnel unfinished.....	0

SECTION TWO.

Total number of shafts constructed.....	5
Total number of feet of tunnel completed.....	9,898.8
Total number of feet of tunnel excavated but not lined.....	4,703.4
Total number of feet of tunnel unfinished.....	5,254.5

SECTION THREE.

Total number of shafts constructed.....	5
Total number of feet of tunnel completed.....	17,532.5
Total number of feet of tunnel excavated but not lined.....	2,675.8
Total number of feet of tunnel unfinished.....	1,974.7

NORTHEAST LAKE TUNNEL.

Total number of shafts constructed.....	8
Total number of feet of tunnel completed.....	14,033
Total number of feet of tunnel unfinished.....	0

SIXTY-EIGHTH STREET TUNNEL EXTENSION.

The work called for by the contract for this extension consisted of the construction of about 5,000 feet of seven-foot tunnel from a shaft located at the intersection of Yates avenue and Sixty-eighth street to the stub end of the existing seven-foot tunnel running westward from the Two-mile crib. This extension was also to continue by means of a five-foot tunnel from this shore shaft to the existing Yates avenue shaft at the Sixty-eighth street pumping station.

For the purpose of hastening the completion of the work, the contract included the construction of a temporary pile-crib and working shaft, to be located about 3,500 feet from shore. The contractor was also required to

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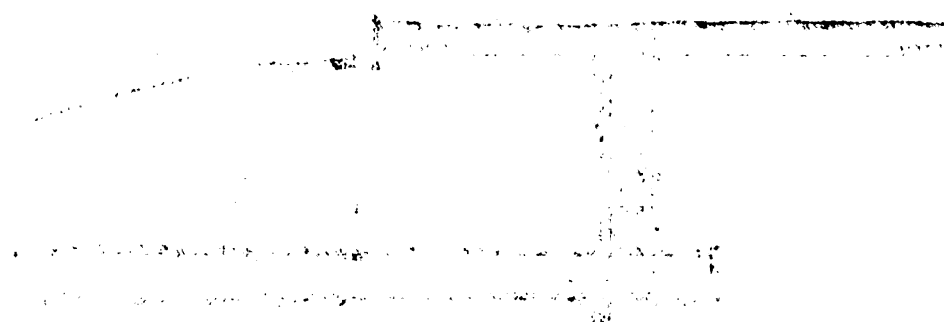
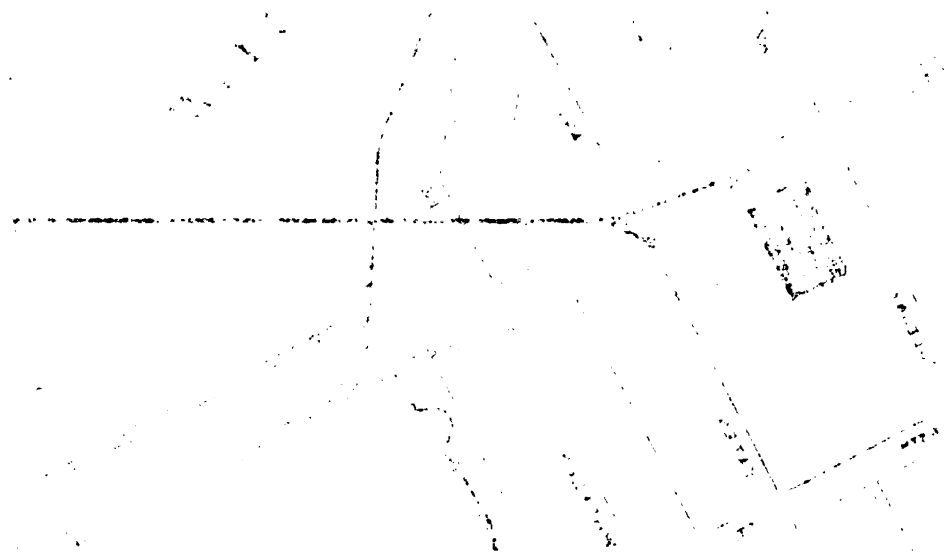
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isolate and drain the old seven-foot tunnel, in order to make proper connection with the new tunnel.

The contract for this work was let to Ross & Ross, September 1, 1896, and actual work on the shaft was commenced September 7th. Work on the pile-crib was commenced September 20th, but on account of unfavorable weather the crib was not ready for occupancy until December 15th, at which time work on the shaft was commenced.

At the close of the year 1896 there had been constructed as follows:

Drift No. 1 running east from shore shaft.....	2,014.0 feet.
Drift No. 2 running west from lake shaft.....	68.0 "
Drift No. 3 running east from lake shaft.....	38.0 "
Back drift running west from shore shaft.....	16.0 "
Lineal feet of shore shaft constructed.....	68.6 "
Lineal feet of lake shaft constructed.....	69.5 "

The back-drift above mentioned is a stub tunnel 7 feet in diameter and 240 feet in length, running west from the shore shaft towards the pumping station and designed to connect at some future time with a new suction well.

The work was carried on satisfactorily in Drifts Nos. 1 and 3 through a hard, seamy clay and dry loam with occasional pockets of quicksand, until February 9, 1897, when, in Drift No. 3, at a point 730 feet east of the lake shaft, water, sand and gas were encountered in the upper quarter in sufficient quantity to drive out the workmen.

February 22d, after working through this bad ground for a distance of 29 feet, the lake broke in and in twenty minutes Drifts 2 and 3 and the shaft were filled with water.

Work was then suspended at the crib until March 18th, when, with the aid of a diver, a hole in the bottom of the lake directly over the tunnel was located. Into this cavity 1500 cubic yards of clay were dumped. March 23d work was stopped in Drift 1, 3784 lineal feet east of the shore shaft, as there remained only 97 feet between Drifts 1 and 2, the latter being filled with water. March 29th the contractors commenced to pump out the lake shaft and Drifts 2 and 3. This was accomplished by April 13th, and a brick bulkhead was put in Drift 3 at a point 110 feet east of the shaft. It was then decided to abandon Drift 3 and to make a detour to the north until a point 150 feet from the original line was reached, thence to run in a direction parallel to the original line and finally connect with the existing tunnels at the junction of the seven and five-foot tunnels. Drift No. 4 was started on this line May 19th. In the meantime connection was made between Drifts 1 and 2. During April the back drift was extended to a point 240 feet west of the shore shaft. In May a cast-iron gate was placed in the shore shaft to shut off the back drift.

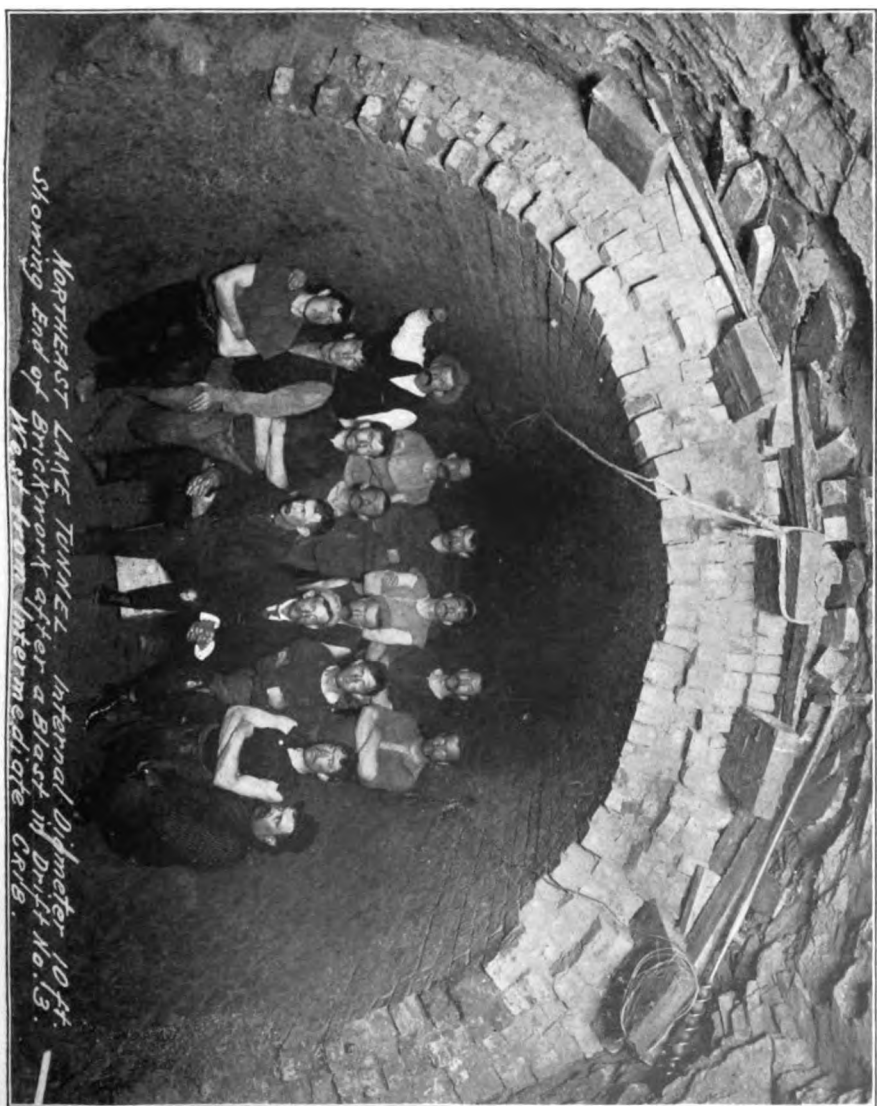
Work progressed satisfactorily in Drift No. 4 until June 22d, 715 feet having been built. At this time the contractors were ordered to put in an air lock and install a complete air plant, so as to be prepared to adopt the pneumatic method of tunneling in case bad ground should be encountered. These orders the contractors refused to obey unless an extra price was paid, claiming that they had built the number of lineal feet of tunnel called for by their contract. Work in this drift was then suspended. At this time 5694 feet of tunnel had been completed.

On account of the breaking in of the lake in Drift 3, it was found impracticable to proceed on the line as originally planned, and the detour was made as heretofore outlined. By this plan the length of the seven-foot tunnel would be increased about 970 feet beyond the 5300 feet called for by the specifications and contract.

On July 12, 1897, the City Council passed an order authorizing and directing the Mayor and Commissioner of Public Works to make all necessary arrangements for the completion of the seven-foot tunnel from a point 5758 lineal feet west of the Two-mile crib to the Yates avenue shaft at Sixty-eighth street, as per order of Council of July 27, 1896. Necessary appropriation was also made for this work.

In accordance with the Council order, a contract, dated August 3, 1897, was entered into by the City and Ross & Ross, by which the latter were to construct 1450 lineal feet, more or less, of seven-foot tunnel at the rate of \$27 per lineal foot, according to the specifications, which had governed the work done under the original contract, all other work to be completed according to the terms and at the prices of the original contract. In July, 84 feet of the five-foot tunnel to connect the shore shaft with the existing Yates-avenue shaft was constructed. Ten feet of this tunnel remained to be done. Immediately after the signing of the second contract, work was commenced on an air lock in Drift No. 4. This lock was completed August 18th, and work in this drift was resumed. At station 9+58 the stratum of torpedo sand was again encountered. Air pressure did not prove effectual, as the air escaped through the sand and thence to the shaft through the abandoned Drift 3. A safety bulkhead was put in at station 9+52, this bulkhead being provided with a door to be closed in case of emergency. This torpedo sand continued in the roof until September 16th, when at station 10+47 the lake again broke in. The door in the bulkhead was closed and the tunnel to the west of the bulkhead was saved.

Another detour to the north was then decided on, beginning at station 8+60. On this line the work continued without any trouble until station 19+39 was reached, where the torpedo sand was again encountered. Another safety bulkhead was then constructed at station 19+24. This time the air did not escape and very little trouble was experienced.



*NORTHEAST LAKE TUNNEL. Internal diameter 10 ft.
Showing End of Brickwork after a Blast in Drift No. 3.
Made from Intermediate C&Ss.*

BRICKWORK, N. E. LAKE TUNNEL.

On December 23d the work was reaching a point where it was deemed advisable to discontinue operations in the seven-foot tunnel, until the old tunnels had been pumped out. The contractors were accordingly notified on that date not to carry the seven-foot tunnel closer than 100 feet from the point where necessary connection with the old tunnels would be made. They were also given certain instructions as to the methods to be pursued in isolating and draining the existing tunnels.

The following day, December 24th, without previous notice, the contractors bulkheaded the face at station 20+03, and suspended all operations, claiming that the number of lineal feet called for by their second contract had been constructed, although there yet remained to be completed under the second contract 147 lineal feet of seven-foot tunnel to connect with the old tunnel and under the first contract, 10 feet of five-foot tunnel to connect with the Yates-avenue shaft. They refused to proceed with the work unless the City agreed to pay an additional price for the work remaining to be done. •

On January 8th, the contractors were formally notified to proceed with their work and complete same as provided by the specifications and contracts. The contractors refusing to comply with the orders of the Commissioner of Public Works, the City took possession of the tunnel and plant January 18th, in accordance with an order passed January 17th by the City Council, which authorized the Commissioner of Public Works to take possession of the tunnel and the contractors' plant, employ necessary labor and complete the work. Preparations were at once made at the intake crib to pump out the tunnels then in use, which was necessary before connection between the new and existing tunnels could be made.

On January 26th the gate in the five-foot tunnel at the shore end was closed and the attempt was made to take water through the submerged intake, 5,000 feet from shore. On account of the large amount of ice, this was found impracticable and the five-foot gate was raised and water again taken from the crib. It was then decided to wait until the ice was out of the lake before another attempt should be made. Later, the old seven and five-foot tunnels were isolated and after considerable difficulty drained, so that on April 17th the miners began excavating, and the connection was completed without further difficulty, on April 29th. The tunnel was then cleaned out and the shaft at the intermediate crib domed over. May 21st, the five-foot shore connection was completed. The tunnel was allowed to fill with water to the lake level and the brick-work cut out of the Yates avenue shaft by a diver, thus allowing the water to pass through the new system of tunnels to the pumping station.

The shore shaft was then domed over and the iron bulkhead put in place, and the old submerged intake entirely isolated. Later, under another

contract, the intermediate working crib was entirely removed by October 1st. The total number of lineal feet of seven-foot tunnel constructed was 7316.4 and of the five-foot tunnel 102 lineal feet. The entire water supply of the Sixty-eighth street pumping station is now taken from the Sixty-eighth street crib and there is at present ample tunnel capacity, so that the submerged intake can be permanently abandoned.

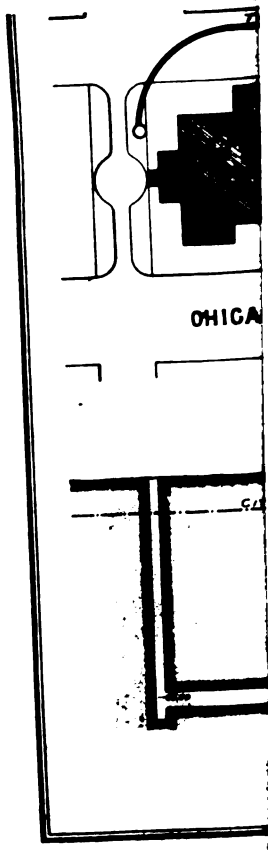
Mr. R. B. Wilcox, assistant engineer, was in charge of this work until March, 1898, when, having resigned, Mr. Paul G. Brown, assistant engineer, was given charge and under his immediate supervision the work was completed.

CHICAGO AVENUE TUNNEL EXTENSION.

This extension is a connection between the new 10-foot tunnel and the present Two-mile tunnel system at the Chicago avenue pumping station. This connection is designed to be used to relieve the Two-mile tunnels by furnishing water, in case of emergency, by way of the Carter H. Harrison crib to the pumps at the Chicago avenue pumping station, and, incidentally, to lower the head pumped against at the Central, West and Fourteenth street stations. If necessary, the Northeast lake tunnel can supply, in addition to what is required by the two new pumping stations at Central Park avenue and at Springfield avenue, at least half of the capacity of the Chicago avenue station.

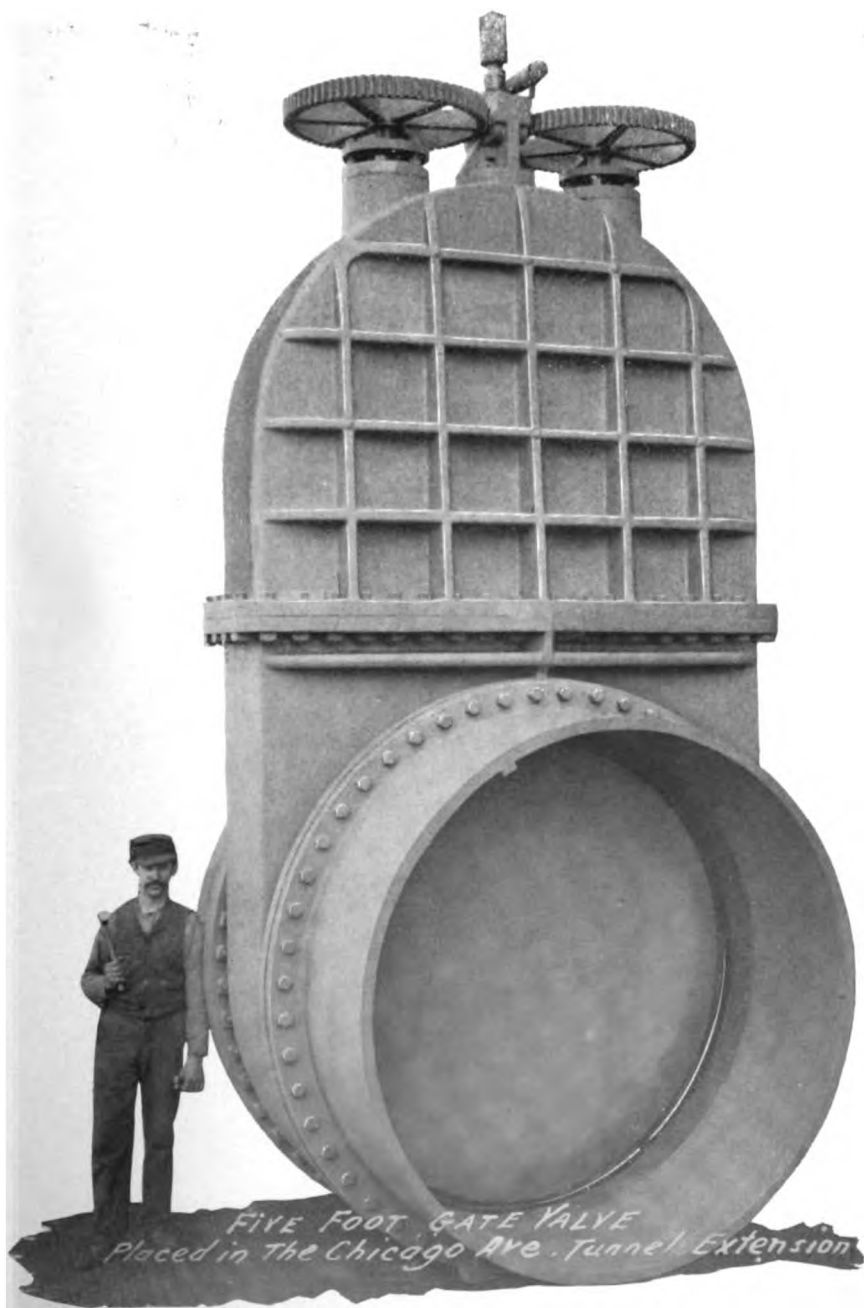
Plans for the installation of modern engines in this station and the remodeling of the tunnel system at this point are now being matured.

This tunnel extension was done entirely by City labor. On July 5th, after the necessary plant had been put in place, the construction of a 10-foot shaft, known as Shaft No. 1, on LaFayette place, was commenced. A steel shell was used in sinking the shaft and lined with a 9-inch brick wall. Below the shell, the brick lining was made 12 inches thick and the shaft sunk to a depth of 107.5 feet below street grade, the elevation at the bottom being 94.25 feet below Chicago datum. After the completion of this shaft, a 7-foot tunnel, lined with three rings of brick, was run northward from this point to a connection with the 10-foot land tunnel, at a point about 420 feet west of the Oak street shaft. This connection was made September 8th. This 7-foot tunnel was then continued southward from this shaft, and connection made on October 4th with a shaft built on the north side of Pearson street and known as Shaft No. 2. The elevation of the top of arch of the 7-foot tunnel at Shaft No. 1, on LaFayette place, is -83.29 C. D. At the connection with the 10-foot tunnel, it is -82.28, and at the junction with Shaft No. 2, it is -83.34. The total length of this 7-foot tunnel is 960 feet. The average daily progress during the forty-



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FIVE-FOOT GATE VALVE.

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seven working days was 20.4 feet, although very little dynamite, and at times none, was used.

On August 5th a gate shaft, known as Shaft No. 3, was started on the south side of Pearson street, 330 feet east of Lincoln Park boulevard. This was also 10 feet in diameter, and a steel shell was used in connection with it. After completing this shaft, the extreme bottom being 66.5 feet below the street grade, the eye was turned for a 5-foot drift to connect with a well now in use and 91.5 feet distant in the rear of the pumping station. The elevation of the top of the arch of this 5-foot tunnel is 45.1 feet below datum. After completing it to within 9.5 feet of the well, an 8-inch brick bulkhead was built at the face and work carried on in the opposite direction to connect with Shaft No. 2 on the north side of Pearson street. The latter shaft is the termination of the 7-foot tunnel and the starting point of the 6-foot tunnel built later.

Excavation on Shaft No. 2 was commenced September 12th, and carried to a depth 108.6 feet below street grade, its elevation at the bottom, after brickwork was put in, being -95.6 C. D. A steel shell was also used in its construction, as in the other shafts. The 6-foot drift connecting this shaft with the 12-foot shaft, sunk in front of the pumping station immediately adjacent to Lincoln Park boulevard, was started October 7th, at an elevation of 62.78 feet below Chicago datum, and connection with the latter shaft (Shaft No. 4), was made November 5th, the total distance being 518 feet. An average daily progress of 22.5 feet was maintained, no explosives being used.

The character of the ground encountered in this drift was for the greater part of its length medium hard blue clay. At a distance 84 feet from Shaft No. 2, a pocket of coarse sand and rotten loam, carrying water, was encountered, and gave out a considerable amount of gas, which ignited and burned for several hours, during which time no work could be done at the face. During the next five working days, the loam and sand continued in the bottom and north side, while the roof and south side remained hard. From that time on, the soft ground was found only in the bottom quarters, and finally ran out at station 2+86.

The 12-foot shaft (Shaft No. 4) on the boulevard was commenced October 3d. It was made larger than the other shafts, as it is to be used as a suction well for a new engine to be installed later in this pumping station. A shell was used here also, and the excavation was carried to a point 89.5 feet below the surface. The wall of the shaft below the shell was 17 inches thick, and the bottom is 74.2 feet below datum. The top of the shaft was arched over and provided with a wooden manhole cover. In Shaft No. 3, on Pearson street, a 5-foot gate valve was built in line with the 5-foot tunnel and covered over with 5 feet of concrete. The

necessary lifting gear and floor to operate the valve was also put in and the top of the shaft arched over. The LaFayette shaft (No. 1) was provided with a 7-foot tunnel gate and an iron manhole cover put over the shaft at the established street grade. At the close of the year, the 5-foot connection with the well at the rear of the pumping station remained to be made.

The following shows the total lineal feet of tunnel and shafts constructed.

Seven-foot tunnel.....	859.66	lineal feet.
Six-foot tunnel.....	518.77	" "
Five-foot tunnel.....	127.00	" "
Total lineal feet of tunnel.....	1,504.83	" "
Shaft No. 1.....	104.08	lineal feet.
Shaft No. 2.....	108.60	" "
Shaft No. 3.....	64.90	" "
Shaft No. 4.....	86.72	" "
Total lineal feet of shafts.....	359.30	" "

The whole work was done with City labor. Exceptionally good progress was made, and at a minimum of cost, considering the fact that wages paid by the City to the various classes of labor employed averaged forty per cent. higher than that paid by contractors for similar work.

The whole work was carried on under the supervision of Mr. Paul G. Brown, assistant engineer, assisted by Mr. E. P. Scott.

KEDZIE AVENUE PIPE TUNNEL.

This tunnel is to be used in connection with the new pipe distribution system laid during the year, to carry a 36-inch main under both the Drainage canal and the Illinois and Michigan canal. It will extend from a shaft just north of the Drainage canal to a shaft in Thirty-sixth street, south of the Illinois and Michigan canal, running about 100 feet east of and parallel to Kedzie avenue. The erection of a plant was commenced November 25th, and work on an intermediate shaft (No. 2) was begun December 3d. At a depth of 23 feet below the surface, a seam of black sand, 12 inches in thickness, was encountered. This was followed by hard blue clay, mixed with small stones and gravel, making progress extremely difficult. On the 17th, when a depth of 50 feet below the surface had been reached, a spring of water opened up, making it necessary to lower a pump into the shaft before the length could be bricked in. When excavation was again resumed, it was found that a stratum of quicksand underlay the shaft, and after removing about 5 feet of this it was decided to put in the brickwork for the bottom and sides at once, and begin work on the two drifts. The shaft is 10 feet internal diameter, lined with three rings of

brick. The surface elevation at this shaft is +13 C. D. The elevation of the bottom of the sump is -41 C. D.

DRIFT No. 1.—The eye for this drift, running north from Shaft No. 2, was cut on December 19th. At the close of the year, 40 lineal feet had been completed in three working days, or an average daily progress of 13.3 feet. The ground in this drift has thus far been a very hard blue clay, mixed with small stones, having an unusually hard stratum some two feet thick running horizontally at the spring line. The elevation of the top of the eye is -31.01 C. D.

DRIFT No. 2.—This drift, running south from Shaft No. 2, was commenced December 21st. At a distance of 32 feet from the center of the shaft, a grade upwards of one in forty was begun, to bring the tunnel above the line of rock, found at elevation -33. At the close of the year, 122 lineal feet had been completed, with an average daily progress of 20.3 feet. The elevation of the top of eye is -30.75 C. D.

SHAFT No. 1.—This shaft is the northern terminus of the tunnel, and has an inside diameter of 10 feet, lined with three rings of brickwork. The erection of a head house was begun December 17th, and at the close of the year, 15 feet had been excavated, of which $11\frac{1}{2}$ feet was bricked up. The total length of this tunnel will be 1554.75 feet. The entire work is being done by City labor under the supervision of Mr. Paul G. Brown, assistant engineer, with Mr. E. P. Scott as sub-assistant.

SPRINGFIELD AVENUE PUMPING STATION.

At the beginning of the year 1898, the excavation for the engine pit had been carried to an average depth of 13 feet below the surface and 7,888 cubic yards of earth had been removed. The work of excavation has been carried on continuously during the year and is now about 40 feet deep, ninety per cent. being completed. The masonry work on the retaining walls was commenced July 16, 1898, and was carried on continuously to the close of the year. The main retaining walls are very nearly completed, with the exception of the north half of the west wall. The extension walls for the offices are completed to a point 7 feet 8 inches below grade. The concrete walls which are to support the boilers have been carried up to an elevation of +19. C. D. A coal track was laid from a connection with the C., M. & St. P. R. R., near Wabansia avenue to the east line of the pumping station property. Near the close of the year, excavation for the stack was commenced. About fifty per cent. of the backfilling has been done.

Mr. F. G. Ewald, assistant engineer, was in local charge of this work until October 1st, when, having resigned, Mr. G. F. Samuel, assistant engineer, assumed charge.

CENTRAL PARK AVENUE PUMPING STATION.

Work on this station was commenced October 5, 1897, and for some months, or until May 10, 1898, excavation only was undertaken. The material was handled prior to April 1st with teams, scrapers, etc. After April 1st, one, and after May 15th two boom derricks with skips were used. On April 28th, excavation for the pump pit had reached a depth over the entire area of about four feet below Chicago datum, after which the method of excavation was changed to that of trenching, of sufficient width to admit the retaining walls.

The core remaining in the pit was removed between September 15th and November 12th, after the walls were well advanced. The banks above the elevation of -4.0 C. D. were allowed to assume their natural slope. The trenches were braced by timber bents without sheeting.

Concrete footings for the retaining walls were started June 6th. The rubble masonry for same was commenced June 15th and finished on October 4th, a total of about 5,300 cubic yards being laid.

The concrete foundation for the chimney was commenced on May 10th and finished May 23d. Bricklaying began May 25th and continued until June 10th, when work on the stack was stopped until August 2d, awaiting the arrival of cut stone. The entire chimney was finished October 8th, the iron cap remaining to be set. The construction of the building walls proper began with the foundation walls of pump-room on June 21st. Since the completion of the masonry in foundations and retaining walls, bricklayers have worked continuously during favorable weather on the upper walls. Back filling is practically finished to the original surface, and part of the grading to +21 C. D. is in place.

The wet-well is excavated and its brick lining nearly finished. The engine foundations will be built after the building is enclosed. At the close of the year, the building is well under way, and with favorable weather should be ready for the roof trusses by February 1st.

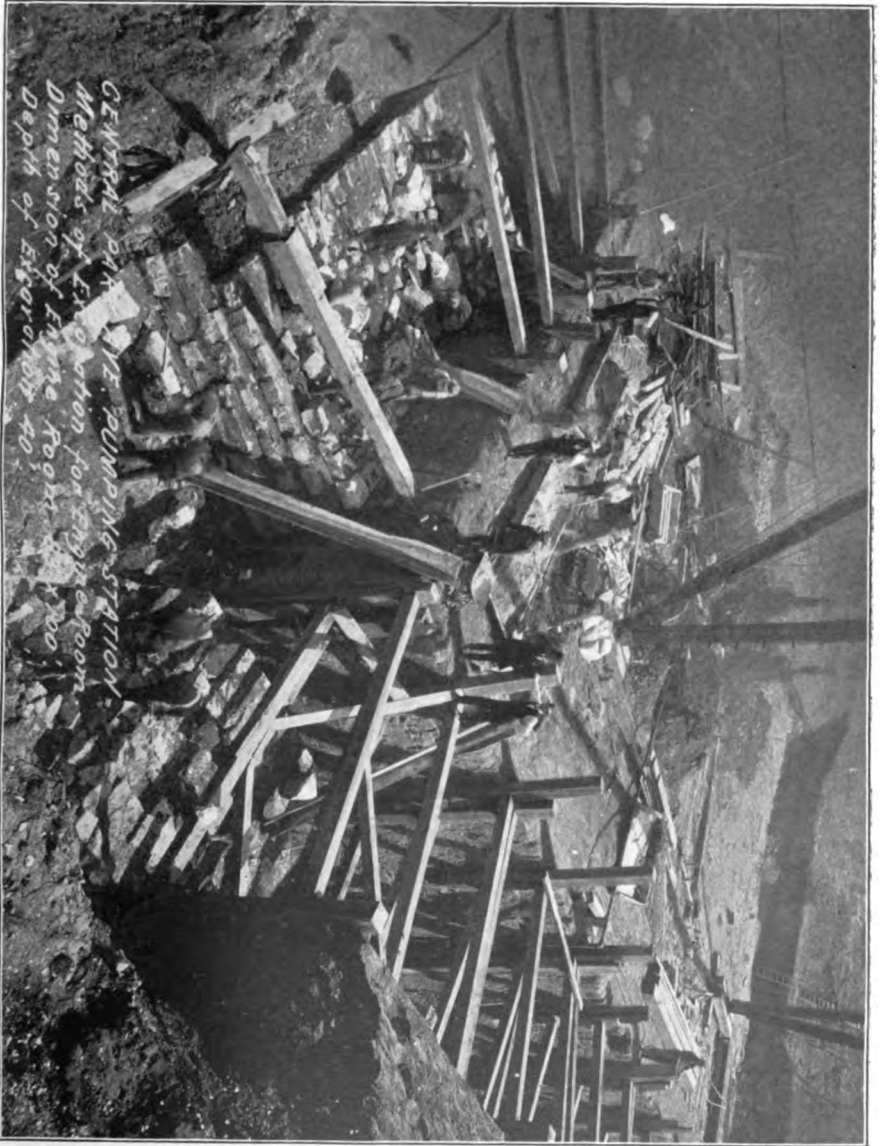
Mr. C. L. Crabbs, assistant engineer, is in local charge, assisted by Mr. Iver Horgen.

DIVISION OF WATER PIPE EXTENSION.

MR. FRANK J. RYAN, Superintendent; MR. H. C. ALEXANDER, Assistant Engineer.

During the year, 199,282 feet of mains of the following dimensions were laid:

2,337 feet.....	4 inch.
148,946 feet.....	6 inch.
37,005 feet.....	8 inch.
10,494 feet.....	12 inch.
500 feet.....	16 inch.



NEW PUMPING STATION—CONSTRUCTION.

Of this amount 64,175 feet of mains of different sizes have been laid under contract by special assessment, and 11,874 feet of pipe, costing \$8,621.38 have been laid at the expense of private parties. The City agrees to refund all moneys advanced for water pipe, when the annual revenue from it pays ten cents per foot frontage. During the year, 123,233 feet of different size pipe have been laid on revenue and for circulation.

The following work was done during 1898, which is not included in our report of pipe laid and valves set:

For the private supply of City electric light stations at southeast corner of Lincoln and Rice streets, at Blue Island avenue and Halsted street, there was laid 439 feet of six-inch pipe, 38 feet of four-inch pipe, two six-inch valves, and one four-inch valve.

Owing to the construction of intercepting sewers, there was considerable pipe taken up, which was relaid upon completion of sewers, thereby leaving the water system unchanged.

Eleven hundred and six brick hydrant and valve basins, costing \$30,-415.00, were built by contract during the year.

During the year, fire cisterns were built at the following locations:

Newberry avenue, 300 feet south of Fifteenth street.

Nineteenth street, west line of State street.

Twenty-five thousand seven hundred and ninety-two feet of water mains, of which 24,479 feet are four-inch pipe, have been taken up or abandoned in the following streets, and other mains put in:

Abbott court, from Diversey avenue to 315 feet north.

Arlington place, from Orchard street to Clark street.

Chestnut street, from 70 feet west of Princeton avenue to 240 feet east of Stewart avenue.

Chestnut street, crossing State street.

Clark street, from Kinzie street to Chicago avenue.

Cortez street, from Western avenue to Campbell avenue.

Deming court, from Orchard street to Clark street.

Elm street, crossing State street.

Englewood avenue, from Wentworth avenue 115 feet west.

Erie street, crossing May street.

Erie street, crossing Center avenue.

Fifty-eighth street, crossing Stewart avenue.

Greenwood avenue, from Seventy-sixth street to Seventy-ninth street.

Harvard avenue, from Sixty-third street to Sixty-sixth street.

Hoyne avenue, from School street to Belmont avenue.

Kemper place, from Orchard street to 304 feet west of Larrabee street.

La Salle street, from Sixty-third street 120 feet north.

Melrose street, from Racine avenue to Herndon street.

Orchard street, from Fullerton avenue to Dewey court.

Pearson street, crossing State street.

Sangamon street, from Van Buren street to Washington boulevard.

School street, crossing Hoyne avenue.

Sixtieth street, under P., F. W. & C. R. R. subway.

Sixtieth place, from 48 feet west of west line of Stewart avenue 204 feet eastward.

Sixty-first street, from 100 feet west of Dearborn street to La Salle street.

Sixty-second street, from 55 feet east of Princeton avenue to 290 feet eastward.

State street, from Sixty-third street to 800 feet southward.

Stewart avenue, from Sixtieth place to Sixty-first street.

Strand street, from 280 feet north of Eighty-ninth street to 42 feet north.

Surf street, from Lake View avenue to Evanston avenue.

Twenty-first street, from State street to Michigan avenue.

Twenty-third street, crossing Indiana avenue.

Twenty-third street, from Prairie avenue to 218 feet east of South Park avenue.

Walton place, crossing State street.

Yale avenue, from Sixty-third street to Sixty-seventh street.

Yale avenue, from Sixty-seventh street to 240 feet southward.

The elevation of the tracks of various railroads during the year 1898 necessitated the lowering of water mains in the following streets:

Belmont avenue, under C. & N. W. R. R. subway.

Campbell avenue, under C. & N. W. R. R. subway.

Central Park avenue, under C. & N. W. R. R. subway.

Fifty-seventh street, under P., F. W. & C. R. R. subway.

Fifty-ninth street, under P., F. W. & C. R. R. subway.

Fifty-ninth street, under L. S. & M. S. R. R. subway.

North Fortieth avenue, under C. & N. W. R. R. subway.

Fullerton avenue, under C. & N. W. R. R. subway.

Kedzie avenue, under C. & N. W. R. R. subway.

Le Moyne street, under C., M. & St. P. R. R.

Leavitt street, under C. & N. W. R. R. subway.

Robey street, under C. & N. W. R. R. subway.

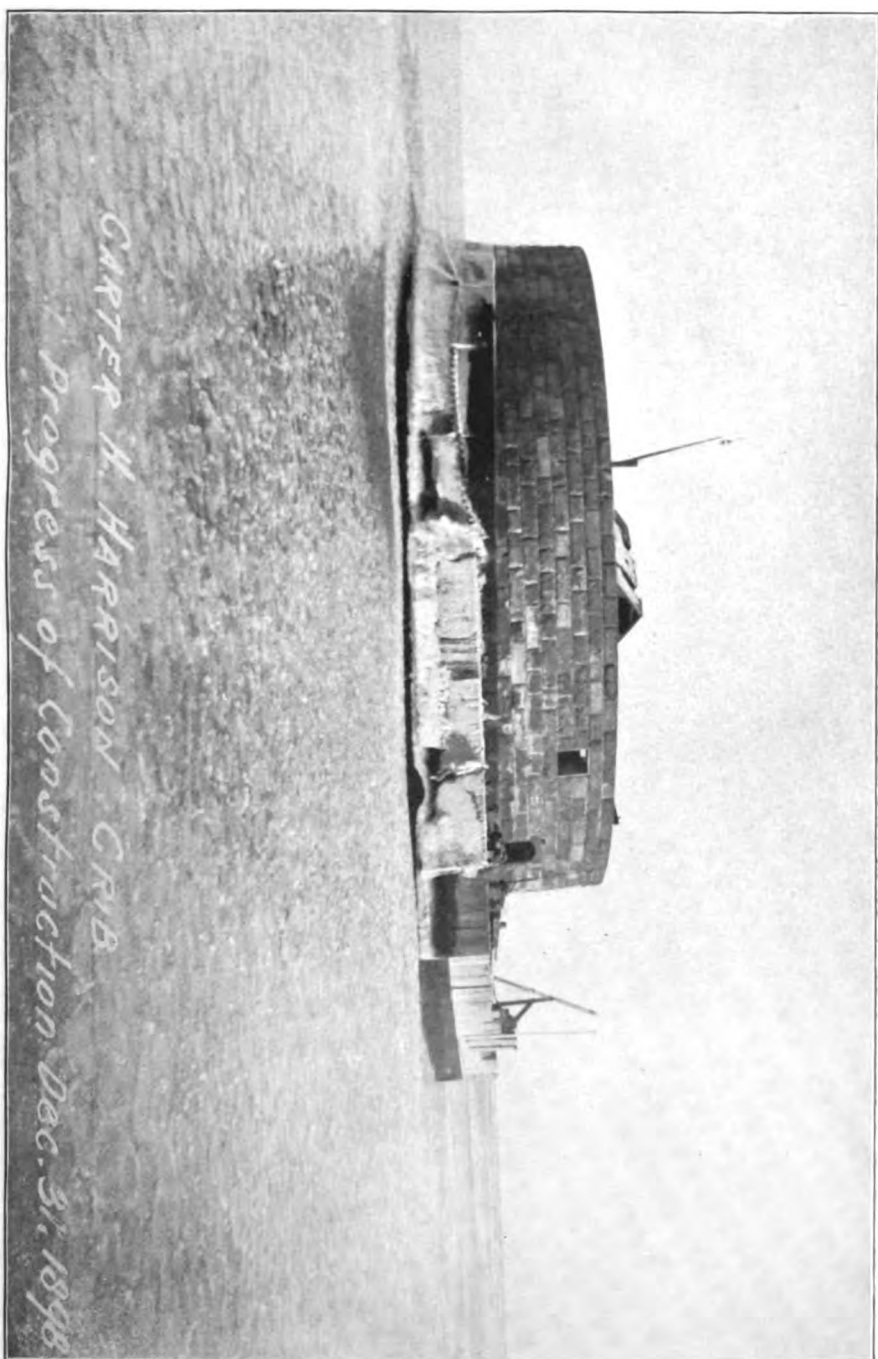
Ross avenue, from Wentworth avenue to 160 feet southward.

Sixty-third street, from State street to Wentworth avenue.

Sixteenth street subway at Clark street.

State street, from Ontario street to Chicago avenue.

State street, under P., F. W. & C. and L. S. & M. S. R. R. subways.



CARTER H. HARRISON CRIB.

Washtenaw avenue, from Diversey avenue to 250 feet south of George street.

Western avenue, under C. & N. W. R. R. subway.

Webster avenue, under C. & N. W. R. R. subway.

Wentworth avenue, from Sixty-fifth street to 502 feet southward.

Wood street, under C. & N. W. R. R. subway.

WORK IN DETAIL.

The following tables show in detail the work of this Division:

HYDRANTS PLACED IN 1898.

DIVISION.	2½-inch Single.	2½-inch Double.	4-inch Double.	Total.
North.....		5	1	6
South.....	4	8		12
West.....	36	71		107
Hyde Park.....	16	21	1	38
Lake View.....	27	39		66
Lake.....	68	86	1	155
Jefferson.....	19	30		49
Calumet.....	16	12		28
Totals.....	186	272	3	461

HYDRANTS TAKEN OUT IN 1898, WHICH WERE REPLACED BY HYDRANTS OF DIFFERENT SIZES.

DIVISION.	2½-inch Single.	2½-inch Double.	Total.
North.....	5		5
South.....	2		2
West.....	5		5
Hyde Park.....	1	2	3
Lake View.....	12		12
Lake.....	3	11	14
Jefferson.....			
Calumet.....			
Totals.....	28	13	41

TOTAL NUMBER OF FIRE HYDRANTS AT THE CLOSE OF 1898.

DIVISION.	2½-Inch Single.	2½-Inch Double.	4-Inch Double.	2½-Inch Double, with one 4-Inch Single.	Totals.
North	401	527	133	.....	1,061
South	786	1,063	193	.....	2,042
West	1,658	4,177	237	.....	6,072
Hyde Park	425	1,802	12	605	2,844
Lake View	266	1,111	.....	1	1,378
Lake	287	916	2	1,596	2,801
Jefferson	250	1,166	4	.....	1,420
Calumet	167	471	.....	55	693
Totals	4,240	11,233	581	2,257	13,311

Above table includes hydrants placed by Special Water Pipe Extension Division.

STOP-VALVES PUT IN DURING THE YEAR 1898.

DIVISION.	SIZE OF VALVES.					Totals.
	4-Inch.	6-Inch.	8-Inch.	12-Inch.	16-Inch.	
North	1	10	2	.....	.....	13
South .....	.....	5	.....	.....	.....	5
West	2	60	32	5	2	101
Hyde Park .....	.....	27	11	.....	.....	38
Lake View .....	.....	39	6	1	.....	46
Lake	1	60	13	6	.....	80
Jefferson	1	35	6	4	.....	46
Calumet .....	.....	10	3	.....	.....	13
Totals	5	246	73	16	2	342

During the year 1898, there were taken out in the North Division seven 4-inch valves in the West Division six 4-inch valves, in the Hyde Park District two 8-inch and one 12-inch valves, in the Lake View District thirteen 4-inch valves and in the Lake District five 4-inch and two 6-inch valves, all of which were replaced by valves of different size.

**TOTAL NUMBER AND SIZE OF VALVES IN USE AT THE
CLOSE OF 1898.**

DIVISION.	SIZE OF VALVES.													Totals.
	3-inch.	4-inch.	6-inch.	8-inch.	10-inch.	12-inch.	14-inch.	16-inch.	18-inch.	20-inch.	24-inch.	30-inch.	36-inch.	
North		143	454	306	....	32	....	13	....	....	12	....	3	963
South.....		161	737	668	....	89	....	25	....	....	37	2	16	1,735
West.....		580	2,441	1,298	....	303	....	75	....	....	33	....	21	4,751
Hyde Park		85	1,175	313	20	82	4	59	....	1	24	....	9	1,772
Lake View 1		223	809	174	....	39	3	12	....	3	12	1	5	1,282
Lake		121	1,269	400	2	87	14	31	2	....	25	4	2	1,957
Jefferson		23	690	391	....	75	....	11	....	....	30	3	1	1,224
Calumet		5	244	80	....	9	....	2	....	....	1	....	....	341
Totals ..	1	1,341	7,819	3,630	22	716	21	228	2	4	174	10	57	14,025

Above table includes valves placed by Special Water Pipe Extension Division.

WORK IN DETAIL.

The following shows in detail the total amount and diameter of pipe laid during 1898 :

NORTH DIVISION.

STREET.	FROM	TO	Length of Pipe in feet.	Diameter in inches.
Chestnut	33 ft. W. of E. line of State.	6 ft. E. of E. line of State...	39	6
Chestnut	33 ft. E. of W. line of State.	3 ft. W. of W. line of State..	36	6
Elm	Crossing	E. line of State.....	42	6
Elm	Crossing	W. line of State.....	36	6
Kemper place	Orchard.....	304 ft. W. of Larrabee.	335	6
Loneragan.....	Lincoln avenue	28 ft. N. of Wisconsin	108	6
Pearson.....	Crossing	State	87	6
Walton place	Crossing	State	40	6
Total			723	6
Add Branch Pipe for Hydrants.....			72	
Total feet of pipe in North Division....			795	

SOUTH DIVISION.

STREET.	FROM	TO	Length of Pipe in feet.	Diameter in inches.
*Claremont avenue.....	120 ft. S. of Bross av.	Thirty-fifth.....	1,368	6
Gage	Crossing	Thirty-seventh.....	70	6
Twenty-first	Wabash avenue.....	Michigan avenue....	366	6
Twenty-first	State	Wabash avenue.....	320	6
Twenty-third	Connecting	Indiana avenue.....	25	6
Twenty-third	Prairie avenue.....	218 ft. E. of S. Park av.	1,037	6
Total			3,186	4
Add Branch Pipe for Hydrants.....			48	
Add Branch Pipe for Hydrants.....			96	
Total feet of pipe laid in South Division,			3,330	

*Laid by Special Assessment.

WEST DIVISION.

STREET.	FROM	TO	Length of Pipe in feet.	Diameter in inches
Adams.....	S. Forty-seventh ave.	197 ft. E. of 48th ave..	476	6
*Avers avenue.....	Chicago avenue.....	Augusta.....	1,327	6
†Beach avenue.....	N. Forty-seventh ave.	Eastward.....	320	6
*Central Park boulevard.	Augusta.....	Grand ave.....	809	6
Central Park avenue....	Connecting.....	Augusta.....	23	6
*Carroll avenue.....	40 ft. N. of Augusta	Chicago avenue.....	1,327	6
Central Park avenue....	Connecting.....	Douglas boulevard...	10	8
*Carroll avenue.....	99 ft. W. of N. Forty-fifth avenue	N. 46th avenue.....	471	6
Central Park avenue....	Crossing.....	Potomac avenue.....	52	8
*Central Park boulevard.	Grand avenue.....	Sacramento square...	2,250	6
Central Park avenue....	Potomac avenue.....	318 ft. S. of Hirsch...	360	8
*Central Park avenue....	Twenty-sixth.....	Twenty-Seventh.....	622	8
*Central Park avenue....	Twenty-eighth.....	Thirtieth.....	672	8
Central Park avenue....	Twenty-eighth.....	Northward.....	70	8
*Central Park avenue....	Twelfth.....	Douglas boulevard...	1,158	8
Central Park avenue....	Connecting.....	Whipple.....	17	6
Chicago avenue.....	Connecting.....	Central Park avenue..	38	6
Cortez.....	Western avenue.....	Campbell avenue....	640	6
Crystal.....	Connecting.....	Kedzie avenue.....	4	6
*Division.....	Kedzie avenue.....	Westward.....	315	12
Division.....	16 ft. E. of C. M. & St. P. R. R.	17 ft. W. of C. M. & St. P. R. R.	156	12
*Division.....	160 ft. E. of N. Fortieth avenue	Springfield avenue...	460	12
*Drake avenue.....	Ohio.....	Huron.....	642	6
Evergreen avenue.....	Connecting.....	Kedzie avenue.....	25	6
Erie.....	Crossing.....	Center avenue.....	53	6
Erie.....	Crossing.....	May.....	70	6
Fifteenth.....	Crossing.....	Millard avenue.....	72	6
Fifteenth.....	Crossing.....	Ridgeway avenue....	76	6
N. Fiftieth court.....	115 ft. N. of Kinzie...	96 ft. S. of Ontario...	1,015	6
N. Fiftieth avenue.....	Indiana.....	Ohio.....	332	6
N. Fiftieth avenue.....	Indiana.....	Southward.....	204	6
S. Fiftieth avenue.....	Washington bd.....	Madison.....	417	8
N. Fifty-first court....	Indiana.....	Northward.....	412	6
N. Fifty-first avenue....	Chicago avenue.....	Augusta.....	1,282	6
N. Fifty-first avenue....	Kinzie.....	Indiana.....	536	6
N. Fifty-second avenue..	Chicago avenue.....	Augusta.....	1,283	8
*S. Fifty-second avenue..	Fulton.....	Park avenue.....	443	8
Flournoy.....	Connecting.....	S. Fortieth avenue....	21	6
S. Fortieth avenue.....	Colorado avenue....	60 ft. N. of Lexington	419	8
S. Fortieth avenue.....	Crossing.....	Harvard.....	85	8
S. Fortieth avenue.....	Crossing.....	Lexington.....	35	6
S. Fortieth avenue.....	Crossing.....	Polk.....	81	8
*N. Forty-first avenue..	Hirsch.....	North avenue.....	1,213	6
*N. Forty-second avenue.	North avenue.....	Hirsch.....	1,210	8
S. Forty-third avenue...	Lexington.....	Northward.....	113	6
S. Forty-third avenue...	Madison.....	Washington.....	361	6
S. Forty-fifth avenue...	Gladys avenue.....	Southward.....	180	6
S. Forty-fifth avenue...	Fifteenth.....	Sixteenth.....	637	6
*S. Forty-sixth avenue..	Crossing.....	Monroe.....	87	6
*N. Forty-seventh court.	Connecting.....	North avenue.....	41	6
†N. Forty-seventh court..	North avenue.....	Hirsch.....	1,332	6
†N. Forty-seventh ave...	Alley N. of Hirsch...	Alley S. of North ave.	938	6
Grand avenue.....	Connecting.....	W. 1 ft. of Homan ave	38	8

WEST DIVISION—Continued.

STREET.	FROM	TO	Length of Pipe in feet.	Diameter in inches
Grand avenue.....	C.M.&St.P.Ry.subway	at Homan avenue....	507	8
Grand avenue.....	C.M.&St.P.Ry.subway	at Homan avenue....	500	16
Harvard.....	Connecting.....	S. 40th ave., west side	29	6
Harvard.....	Connecting.....	S. 40th ave., east side.	50	6
*Harvard.....	Douglas boulevard...	Springfield avenue...	674	6
†Hirsch.....	133 ft. W. of Forty-seventh court	285 ft. E. of 47th ave..	817	6
Hirsch.....	Connecting.....	Kedzie avenue.....	27	8
Hirsch.....	Crossing.....	Monticello avenue...	305	8
Homan avenue.....	C.M.&St.P.Ry.subway	at Grand avenue....	126	8
Homan avenue.....	C.M.&St.P.Ry.subway	at Grand avenue....	125	8
Homan avenue.....	28 ft. S. of 28th.....	Southward.....	200	8
*Homan avenue.....	140 ft. S. of 28th.....	Thirtieth.....	462	8
Huron.....	Crossing.....	Albany avenue.....	42	6
*Humboldt.....	Cornelia.....	Grand avenue.....	738	6
Huron.....	Hamlin avenue.....	Eastward.....	211	6
Indiana.....	N. Fiftieth avenue...	N. Fifty-first avenue.	674	6
Indiana.....	Connecting.....	N. Fiftieth avenue...	37	6
Indiana.....	N. Fifty first avenue.	N. Fifty-second court	319	6
Kamerling avenue.....	N. Fortieth avenue...	Westward.....	264	6
*Kedzie avenue.....	Beach avenue.....	39 ft. S. of N. line of Division..	1,631	8
*Lawndale avenue.....	LeMoyne.....	Southward.....	193	6
Lawndale avenue.....	361 ft. S. of North ave.	LeMoyne.....	269	6
LeMoyne.....	Crossing.....	Lawndale avenue....	275	6
*Lexington.....	S. Forty-third avenue	S. Forty-fourth ave..	623	6
†LeMoyne.....	Forty-seventh court..	Forty-seventh avenue	583	6
*Lincoln.....	Sixty-first.....	Sixty-third.....	1,300	6
Madison.....	S. Fiftieth avenue...	1087 ft. W. of S. 50th avenue..	1,112	8
May.....	Connecting.....	Erie.....	40	6
*Monroe.....	Connecting.....	S. Forty-sixth ave....	21	6
*Monroe.....	S. Forty-sixth avenue.	S. Forty-eighth ave..	1,312	6
Monroe.....	Crossing.....	Sangamon.....	66	6
Monticello avenue.....	Augusta.....	Northward.....	265	8
Monticello avenue.....	C.M.&St.P.Ry.subway	at Hirsch.....	236	6
Monticello avenue.....	Hirsch.....	Southeast.....	225	6
Monticello avenue.....	Potomac avenue.....	Northward.....	300	8
*Monticello avenue.....	Thomas.....	206 ft. N. of Augusta.	426	8
Nineteenth.....	Southwestern bd.....	Eastward.....	314	6
*North avenue.....	Connecting.....	N. 47th court.....	52	12
Ohio.....	Crossing.....	Albany avenue.....	40	12
Ohio.....	Connecting.....	N. Fiftieth avenue...	37	6
Ogden avenue,north side	Ridgeway avenue....	Lawndale avenue....	336	6
Park avenue.....	Ashland avenue.....	Robey.....	2,747	6
†Pierce avenue.....	N. Forty-seventh ave.	Eastward.....	272	6
*Polk.....	S. Fortieth avenue...	Westward.....	21	6
*Polk.....	S. Fortieth avenue...	S. Forty-first avenue..	689	6
Polk.....	S. Forty-seventh ave.	Eastward.....	384	6
Potomac avenue.....	Crossing.....	Central Park avenue.	265	6
Potomac avenue.....	Connecting.....	Kedzie avenue.....	14	6
Rockwell.....	Augusta.....	Cornelia.....	246	12
Rockwell.....	Cornelia.....	Rice.....	535	12
Sangamon.....	Van Buren.....	Washington blvd....	2,372	6
Sacramento avenue.....	Twenty-third.....	Southward.....	160	6
*Scott.....	Homan avenue.....	Turner avenue.....	293	6

WEST DIVISION—Continued.

STREET.	FROM	TO	Length of Pipe in feet.	Diameter in inches
†Sacramento avenue.....	90 ft. S. of 23d	Twenty-fourth.....	500	6
*Sixteenth.....	Hamlin avenue.....	Homan avenue.....	2,243	8
Sixteenth.....	S. Forty-fourth court.	S. Forty-fifth avenue.	341	8
Southwestern boulevard	150 ft. S. of 22d.....	Southward	280	6
*Spaulding ave. west side	Chicago avenue.....	Ohio	1,240	6
†Southwestern boulevard	231 ft. S. of 24th.....	Twenty-fourth	231	6
*Twentieth	41 ft. W. of Albany ave	Eastward	687	6
†Twenty-third place.....	Washtenaw avenue...	California avenue....	675	6
Twenty-seventh	Troy.....	Eastward	295	6
Twelfth place.....	St. Louis avenue.....	Eastward	422	6
*Van Buren	S. Forty-fifth court...	S. Forty-seventh ave..	825	6
Whipple.....	Central Park avenue.	Southward	343	6
Wood	Crossing	C. & N. W. R. R.....	157	8
Total			57,230	
Add Branch Pipe for Hydrants.....			482	4
Add Branch Pipe for Hydrants.....			852	6
Total feet of pipe laid in West Division.....			58,514	

*Laid by Special Assessment.

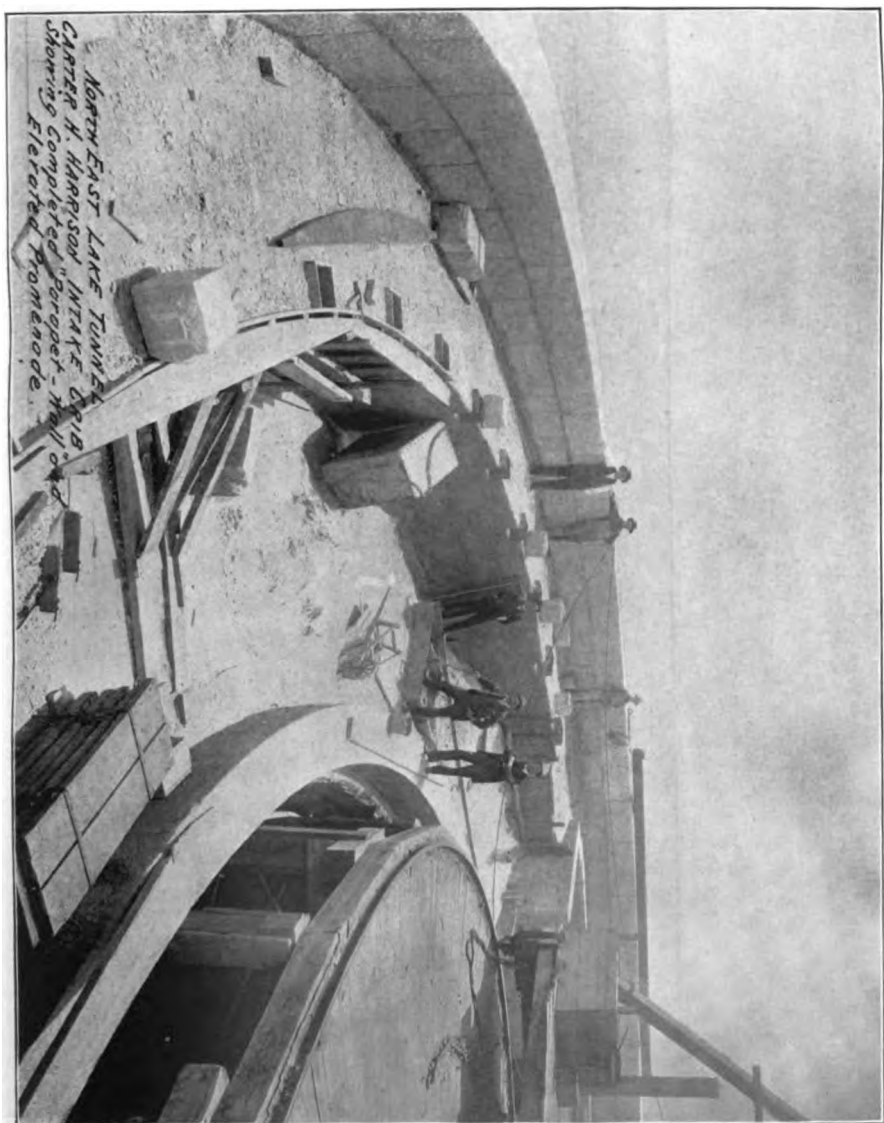
†Laid by Deposit.

HYDE PARK DISTRICT.

STREET	FROM	TO	Length of Pipe in feet	Diameter in inches
1st Alley N. E. of C. & W. I. & R.	Vincennes avenue ..	Ninety-second place	156	6
†1st Alley West of Drexel Boulevard	Forty-sixth	Southward	364	6
1st Alley N. of 53d	222 ft. W. of Drexel av	Cottage Grove avenue	379	6
*1st Alley S. of 60th	Cottage Grove avenue	Egandale avenue ...	1,317	6
*1st Alley S. of 60th	Greenwood avenue ..	Lexington avenue ...	446	6
Avenue G	One Hundred and Third ..	104th	640	6
Buffalo avenue	Crossing	107th	24	6
Calumet avenue	Sixty-first	Northward	276	6
*Champlain avenue	Sixtieth	Southward	26	6
Champlain avenue	Sixty-eighth	Southward	528	6
Champlain avenue	Crossing	Sixty-ninth	27	6
Colfax avenue	Connection	So. Chicago avenue ..	40	4
Colfax avenue	Connection	So. Chicago avenue ..	12	6
Eighty-first	Bond avenue	Ontario avenue	332	6
Fifty-fourth place	Ellis avenue	Greenwood avenue ..	430	6
Green Bay avenue	One Hundred and Eighth ..	109th	665	6
Greenwood avenue	Seventy-sixth	Seventy-ninth	2,023	8
Indiana avenue	Sixty-seventh	Northward	418	6
*Indiana avenue	Ninety-ninth	100th	680	6
Indiana avenue	One Hundred and Eighth ..	148 ft. South of 107th	508	6
Jackson avenue	Sixty-fourth	Sixty-fifth	684	6
Jefferson avenue	Seventy-seventh	So. Chicago avenue ..	872	6
*Langley avenue	Forty-ninth	Fiftieth	695	6
*Langley avenue	Connecting	Sixtieth	26	6
Lexington avenue	Ninety-third	Northward	570	6
*Ninety-second	St. Lawrence avenue	C. & W. I. right of way	1,040	6
Ninety-second place	Palmer avenue	Westward	280	6
*Ninety-second place	St. Lawrence avenue	C. & W. I. right of way	546	6
Ninety-ninth	Connecting	Indiana avenue	58	2
One Hundred and Sixth ..	Ewing avenue	Avenue L	332	18
One Hundred and Seventh ..	Buffalo avenue	Superior avenue	334	6
Prairie avenue	Crossing	Fifty-fifth place	68	6
Prairie avenue	Sixtieth	Sixty-first	616	6
Ridgeland avenue	Ninety-third	Southward	306	6
Seventy-sixth place	Washington avenue ..	Stony Island avenue	564	5
Seventy-seventh street ..	Adams avenue	Stony Island avenue	908	6
*Sixtieth	Langley avenue	Champlain avenue ..	323	6
Sixty-fourth place	Crossing	Jackson avenue	24	6
*South Chicago avenue ..	Eighty-seventh	Manistee avenue	3,276	8
State	Sixty-third	Subway	100	8
State	Subway	P. F. W. & C. Ry ..	208	8
State	Subway	P. F. W. & C. Ry ..	24	2
*St. Lawrence avenue ..	Ninety-third	1st Alley N. of 93d ..	150	16
Superior avenue	One Hundredth and Seventh ..	108th	653	6
*Vincennes avenue	Ninety-second	C. & W. I. Ry	239	6
*Vincennes avenue	Sixty-seventh	Northward	346	6
Wabash avenue	116th	Northward	245	6
Woodlawn avenue	Ninety-third	366 ft. N. of line of 92d ..	1,048	6
Total			23,724	
Add Branch Pipe for Hydrants			192	4
Add Branch Pipe for Hydrants			264	6
Total feet of Pipe laid in Hyde Park District			24,180	

*Laid by Special Assessment.

†Laid by Deposit.



NORTH EAST LAKE TUNNEL
CARTER H. HARRISON INTAKE CRIB
Showing Completed "Forecast" Hall and
Elevated Promenade

CARTER H. HARRISON CRIB—PARAPET.

LAKE VIEW DISTRICT.

STREET	FROM	TO	Length of Pipe in feet.	Diameter in inches.
Abbott court.....	Diversey avenue....	Northward.....	585	6
1st Alley E. of E. Ravenswood Pk.	Cullom avenue.....	Northward.....	290	6
1st Alley E. of E. Ravenswood Pk.	Connection.....	Montrose avenue....	18	6
*1st Alley E. of E. Ravenswood Pk.	Catalpa avenue.....	Bryn Mawr avenue....	666	6
†Ainslie.....	Oakley avenue.....	Irving avenue.....	294	6
Arlington place.....	Orchard.....	Clark.....	1,358	6
*Ashland avenue.....	Catalpa avenue.....	Bryn Mawr avenue....	701	6
†Aubrey avenue.....	Lincoln avenue.....	Robey.....	769	6
†Beach court.....	Irving Park avenue..	Southward.....	385	6
Belle Plaine avenue....	Connection.....	W. Ravenswood Pk..	18	6
Bernice avenue.....	Connection.....	W. Ravenswood Pk..	18	6
Byron.....	Connection.....	W. Ravenswood Pk..	18	6
*Catalpa avenue.....	Ashland avenue.....	1st Al. E. of E. Ravensd Pk.	1,184	6
Cullom avenue.....	Ashland avenue.....	Westward.....	198	6
Cuyler avenue.....	Connection.....	W. Ravenswood Pk..	18	6
Deming court.....	Orchard.....	Clark.....	1,148	6
*Edgewater Terrace.....	Ashland avenue.....	1st Al. E. of E. Ravensd Pk.	1,150	6
E. Ravenswood Park.....	Cemetery drive.....	Southward.....	852	6
Evanston avenue.....	Granville avenue.....	Devon avenue.....	1,286	8
Gault.....	Connection.....	Halsted.....	42	6
Halsted.....	Montrose avenue....	Northward.....	489	6
Hamilton avenue.....	Wellington avenue..	Noble.....	672	6
Hoyne avenue.....	School.....	Belmont avenue.....	690	6
*Lakewood avenue.....	Granville avenue.....	Devon avenue.....	1,254	6
Lincoln place.....	Graceland avenue..	Southward.....	546	6
Melrose.....	Racine avenue.....	Herndon.....	657	6
Oakley avenue.....	Connecting.....	Ainslie.....	42	6
*Oakley avenue.....	Lawrence avenue.....	Ainslie.....	621	6
Orchard.....	Fullerton avenue....	Dewey court.....	2,205	6
†Paulina.....	Thome avenue.....	178 ft. S. of Devon av.	645	6
*Paulina.....	Catalpa avenue.....	Bryn Mawr avenue....	669	6
†Ridge avenue.....	Magnolia avenue....	Wayne avenue.....	654	6
School.....	Crossing.....	Hoyne avenue.....	66	6
Surf.....	Lake View avenue....	Evanston avenue....	1,312	8
Victoria.....	Clark.....	Eastward.....	489	6
Warner avenue.....	Connecting.....	W. Ravenswood Pk..	18	6
Waterloo court.....	Wellington avenue..	Northward.....	296	6
*Wayne avenue.....	Granville avenue.....	Devon avenue.....	1,252	6
W. Ravenswood Park.....	Byron avenue.....	Bernice avenue.....	324	6
W. Ravenswood Park.....	Irving Park avenue..	Cuyler avenue.....	342	6
W. Ravenswood Park.....	Warren avenue.....	Belle Plaine avenue..	330	6
Wrightwood avenue....	Ashland avenue.....	Eastward.....	258	8
Wrightwood avenue....	Clark.....	Orchard.....	936	12
Wrightwood avenue....	Clybourn avenue....	Eastward.....	207	6
Total.....			25,867	
Add Branch Pipe for Hydrants.....			324	4
Add Branch Pipe for Hydrants.....			468	6
Total feet of Pipe laid in Lake View District.....			26,659	

*Laid by Special Assessment.

†Laid by Deposit.

LAKE DISTRICT.

STREET	FROM	TO	Length of Pipe in feet	Diameter in inches.
Albany avenue.....	Crossing.....	Forty-third.....	24	6
Albany avenue.....	Sixty-third.....	186 ft. S. of 64th.....	846	6
Armour avenue.....	Crossing.....	Sixty-first.....	48	6
Central Park avenue.....	Fifty-ninth.....	Sixty-seventh.....	5,200	12
Chestnut.....	249 ft. E. of Stewart ave.....	70 ft. W. of Princeton.....	280	6
*Emerald avenue.....	Eightieth.....	42 ft. S. of N. line of 81st.....	711	6
*Emerald avenue.....	Crossing.....	Seventy-third.....	26	6
Englewood avenue.....	25 ft. E. of w. line of Wentworth av.....	108 ft. W. of Wentworth ave.....	133	6
Fifth avenue.....	260 ft. N. of 59th.....	Northward.....	124	6
Fiftieth.....	Crossing.....	Paulina.....	66	6
Fiftieth.....	Crossing.....	Wood.....	66	6
Fifty-eighth.....	79 ft. E. Stewart ave.....	83 ft. W. of Stewart.....	223	6
Forty-third.....	25 ft. E. of west line of Albany ave.....	Westward.....	627	8
Forty-sixth place.....	105 ft. W. of C. R. I. & P. Ry.....	Westward.....	105	4
*Forty-eighth.....	Hoyne ave.....	Leavitt.....	588	6
Forty-eighth.....	Lincoln.....	Westward.....	120	6
Forty-eighth.....	Robey.....	Eastward.....	485	6
Forty-eighth.....	Crossing.....	Wood.....	25	6
Forty-ninth.....	Crossing.....	Paulina.....	66	6
Forty-ninth.....	Crossing.....	Wood.....	66	6
Hamlin avenue.....	Sixtieth.....	Sixty-first.....	668	8
Harvard avenue.....	27 ft. N. of S. line 63d.....	Sixty-sixth.....	1,950	6
Harvard avenue.....	Connecting.....	Sixty-sixth.....	12	6
*Hermitage avenue.....	Sixty-first.....	Sixty-second.....	690	6
La Salle.....	29 ft. N. of S. line of 63d.....	173 N. of N. line of 63d.....	210	8
Lawndale avenue.....	Sixty-first place.....	Sixty-second.....	336	6
*Lincoln.....	Sixty-first.....	Sixty-third.....	1,300	6
*Loomis.....	45 ft. N. of N. line of 56th.....	Fifty-ninth.....	2,036	6
*Lowe avenue.....	163 ft. S. of S. line of 59th.....	38 ft. S. of N. line of 60th.....	708	6
*Lowe avenue.....	Connecting.....	Seventy third.....	26	6
Robey.....	180 ft. S. of 46th.....	Southward.....	60	8
St. Louis avenue.....	Sixtieth.....	Sixtieth place.....	836	6
St. Louis avenue.....	Connecting.....	Sixty-fifth.....	36	6
Sixtieth.....	Central Park ave.....	Hamlin ave.....	1,275	6
Sixtieth.....	114 ft. E. of P. F. W. & C. R. R.....	69 ft. W. of P. F. W. & C. R. R.....	241	6
Sixtieth.....	50 ft. of C. R. I. & P. R. R.....	50 ft. E. of C. R. I. & P. R. R.....	204	6
Sixtieth.....	Spaulding ave.....	St. Louis ave.....	1,300	6
Sixtieth place.....	Hamlin ave.....	Central Park ave.....	1,265	6
Sixtieth place.....	Homan ave.....	Central Park ave.....	1,212	6
Sixtieth place.....	48 ft. W. of Stewart av.....	Eastward.....	204	6
Sixty-first.....	100 ft. W. of Dearborn.....	La Salle.....	524	6
Sixty-first.....	300 ft. W. of Hamlin av.....	Spaulding ave.....	3,655	8
*Sixty-first.....	25 ft. E. of W. line of Hermitage av.....	Eastward.....	71	6
Sixty-first place.....	St. Louis ave.....	Lawndale ave.....	1,338	6
Sixty-second.....	Central Park ave.....	Homan ave.....	1,253	6
Sixty-second.....	Lawndale ave.....	Central Park ave.....	60	6
Sixty-second.....	55 ft. E. of Princeton av.....	Eastward.....	296	6
Sixty-second place.....	Homan ave.....	Central Park ave.....	1,250	6
Sixty-third.....	Central Park ave.....	Homan ave.....	1,234	6
Sixty-third place.....	Kedzie ave.....	Central Park ave.....	2,593	6
Sixty-fourth.....	Central Park ave.....	Homan ave.....	1,262	6
Sixty-fourth.....	Yale ave.....	Wentworth ave.....	450	6
Sixty-fourth place.....	Homan ave.....	Central Park ave.....	1,262	6

LAKE DISTRICT—Continued.

STREET.	FROM	TO	Length of Pipe in feet.	Diameter in inches
Sixty-fifth	Homan ave	Central Park ave....	1,262	8
Sixty-fifth	37 ft. E. of Wentworth ave...	60 ft. W. of Stewart av	1,345	6
Sixty-fifth place	300 ft. E. of St. Louis av	Central Park ave....	956	6
Sixty-sixth	Central Park ave....	Homan ave	1,267	6
Sixty-sixth place	317 ft. E. of Central Park ave.	18 ft. W. of Central Park ave.	834	6
*Seventy-third	Lowe ave	Emerald ave	815	6
Stewart avenue	9 ft. N. of 58th	6 ft. N. of N. line of 58th...	130	6
Stewart avenue	9 ft. N. of S. line of 58th	112 ft. S. of S. line of 58th...	121	6
Stewart avenue	24 ft. N. of S. line of 59th...	48 ft. S. of N. line of 60th...	688	6
Stewart avenue	26 ft. N. of S. line of 60th...	33 ft. S. of S. line of 60th pl.	331	6
Stewart avenue	Sixtieth place	40 ft. S. of N. line of 61st...	296	6
Throop	Sixty-third	Northward	631	6
*Tremont	275 ft. W. of Butler..	Wallace	300	6
*Union avenue	25 ft. N. of S. line of 73d	Northward	26	6
Western avenue	397 ft. N. of 50th....	Northward	70	6
Yale avenue	Sixty-third	Sixty-seventh	2,582	6
Yale avenue	Sixty-seventh	Southward	200	6
Total			51,038	
Add Branch Pipe for Hydrants			816	4
Add Branch Pipe for Hydrants			1,044	6
Total feet of pipe laid in Lake District..			52,898	

* Laid by Special Assessment.

† Laid by Deposit.

JEFFERSON DISTRICT.

STREET	FROM	TO	Length of Pipe in feet.	Diameter in inches.
Albany avenue	Subway	Avondale avenue	150	6
*Argyle	N. 52nd avenue	N. 58d avenue	650	6
Avers avenue	Crossing	Diversey avenue	33	6
*Belden avenue	N. 49th avenue	N. Fiftieth avenue	714	6
Central Park avenue	Crossing	Diversey avenue	48	8
Central Park avenue	Mariana avenue	Southward	140	8
†Central Park avenue	390 ft. N. of Wrightwood	Northward	80	8
*Columbia	Lawndale avenue	Hamlin avenue	312	6
Courtland	Crossing	N. 44th avenue	76	8
*Cortland avenue	Durham avenue	Eastward	195	6
Drake avenue	Crossing	Diversey avenue	33	6
*Durham	Homer	Cortland avenue	323	6
†Drake avenue	Belle Plaine avenue	Northward	156	6
†Eberley avenue	150 ft. S. of Belle Plaine ave.	125 ft. N. of Belle Plaine ave.	345	6
Fletcher	310 ft. W. of Western ave.	Campbell avenue	200	6
N. Forty-third avenue	Elston avenue	125 ft. S. of Sunnyside ave.	1,030	6
N. Forty-third court	130 ft. N. of Cullom ave.	241 ft. S. of Montrose ave.	230	8
†N. Forty-third court	Montrose avenue	Sunnyside avenue	568	8
N. Forty-fifth court	Grand avenue	Southward	469	6
N. Forty-sixth avenue	Grand avenue	Northward	397	6
N. Forty-sixth avenue	300 ft. N. of Sunnyside ave.	214 ft. S. of Wilson ave.	84	6
N. Forty-eighth avenue	530 ft. S. of Grand ave.	Southward	84	8
*Follansbee	Catalpa court	1st Alley E. of Humboldt blvd.	407	6
*Fullerton avenue	Sawyer avenue	Central Park avenue	2,105	12
*Francisco avenue	299 ft. S. of Diversey ave.	Humboldt boulevard	865	6
*Fullerton avenue	Humboldt boulevard	Sawyer avenue	372	12
*Fullerton avenue	Connection	Humboldt boulevard	33	8
Francisco avenue	75 ft. S. of George	197 ft. N. of George	338	6
George	Central Park avenue	Westward	387	6
Hamlin avenue	Armitage avenue	Northward	127	8
*Hamlin avenue	George	Diversey avenue	622	8
Hamlin avenue	Mariana avenue	Southward	234	8
Harding avenue	Crossing	Diversey avenue	50	6
Homan avenue	Subway	C. & N.-W. R. R.	228	6
*Humboldt avenue	Kimball avenue	49 ft. W. of E. line of Ballou.	492	6
Irving Park boulevard	N. Forty-first court	N. 42d avenue	380	8
Kedzie avenue	Crossing	Diversey avenue	38	8
Lawndale avenue	Crossing	Wrightwood avenue	38	6
Lawndale avenue	Crossing	Diversey avenue	48	6
Lawndale avenue	Dunning	Southward	163	6
*Lawndale avenue	Diversey avenue	George	681	6
Lawndale avenue	1,150 ft. N. of Wabansia ave.	Northward	235	6
Lydia place	Milwaukee avenue	148 ft. E. of Carpenter court.	565	6
*Lyndale avenue	Kimball avenue	Ballou	450	6
Monticello avenue	Crossing	Diversey avenue	48	6
Monticello avenue	Diversey avenue	Southward	156	6
Monticello avenue	65 ft. S. of Mariana ave.	Southward	172	6
Monticello avenue	240 ft. S. of Mariana ave.	Southward	88	6
†Monticello avenue	Wrightwood avenue	Northward	300	6
*Montrose avenue	N. 48th court	N. Fiftieth avenue	995	8
*Mozart	Humboldt boulevard	Schubert avenue	574	6
Ridgeway avenue	Crossing	Wrightwood avenue	84	6

JEFFERSON DISTRICT—Continued.

STREET.	FROM	TO	Length of Pipe in feet.	Diameter in inches
Ridgeway avenue.....	Crossing	Diversey avenue....	78	6
Ridgeway avenue.....	Fullerton avenue ..	Southward	478	6
*Ridgeway avenue.....	Dunning avenue	Wrightwood avenue..	601	6
Sacramento avenue	Subway	Avondale avenue....	198	8
Spaulding avenue.....	Crossing	Fullerton avenue ..	42	6
Springfield avenue.....	Diversey avenue....	Northward	326	8
Troy	Diversey avenue....	Mariana avenue	592	6
*Troy	Roscoe	Elston avenue	728	6
Wabansia avenue	Crossing	N. 44th avenue	48	6
Wilson avenue.....	N. 45th avenue	Eastward	295	8
Winona avenue	Lincoln avenue.....	Western avenue	834	6
*Wisner avenue	523 ft. N. E. of Milwaukee ave.	Wellington	509	6
Wisconsin avenue.....	Elston avenue	Westward	583	6
*Wolfram	Central Park avenue	Lawndale avenue....	620	6
Wolfram	Crossing	Lawndale avenue....	43	6
Wolfram	400 ft. E. of Western ave ..	Oakley avenue	188	6
Wrightwood avenue....	Crossing	Hamlin avenue	18	8
Total			23,713	
Add Branch Pipe for Hydrants			228	4
Add Branch Pipe for Hydrants			860	6
Total feet of pipe laid in Jefferson District			24,801	

* Laid by Special Assessment.

† Laid by Deposit.

CALUMET DISTRICT.

STREET	FROM	TO	Length of Pipe in feet.	Diameter in inches.
*Butler	N. line of 91st	Northward	265	6
Carpenter	Eighty-ninth	Ninety-first	1,338	6
Center avenue	250 ft. N. of 88th	Northward	179	8
Eighty-ninth	Ashland avenue	Westward	1,200	8
Harvard avenue	117th	119th	1,284	6
Lowe avenue	Eighty-ninth	177 ft. N. of 90th	459	6
Marshfield avenue	Eighty-seventh	Southward	472	6
100th	Prospect avenue	Westward	629	6
102nd	Wood	Eastward	645	6
108th place	State	Westward	371	6
State	Connection	116th	12	6
*Wallace	103rd	Southward	639	8
Winchester avenue	Eighty-eighth	Eighty-ninth	776	6
Total			8,269	
Add Branch Pipe for Hydrants			192	4
Add Branch Pipe for Hydrants			144	6
Total feet of pipe laid in Calumet District.			8,605	

* Laid by Special Assessment.

RECAPITULATION OF PIPE LAID DURING 1898, INCLUDING HYDRANT BRANCHES.

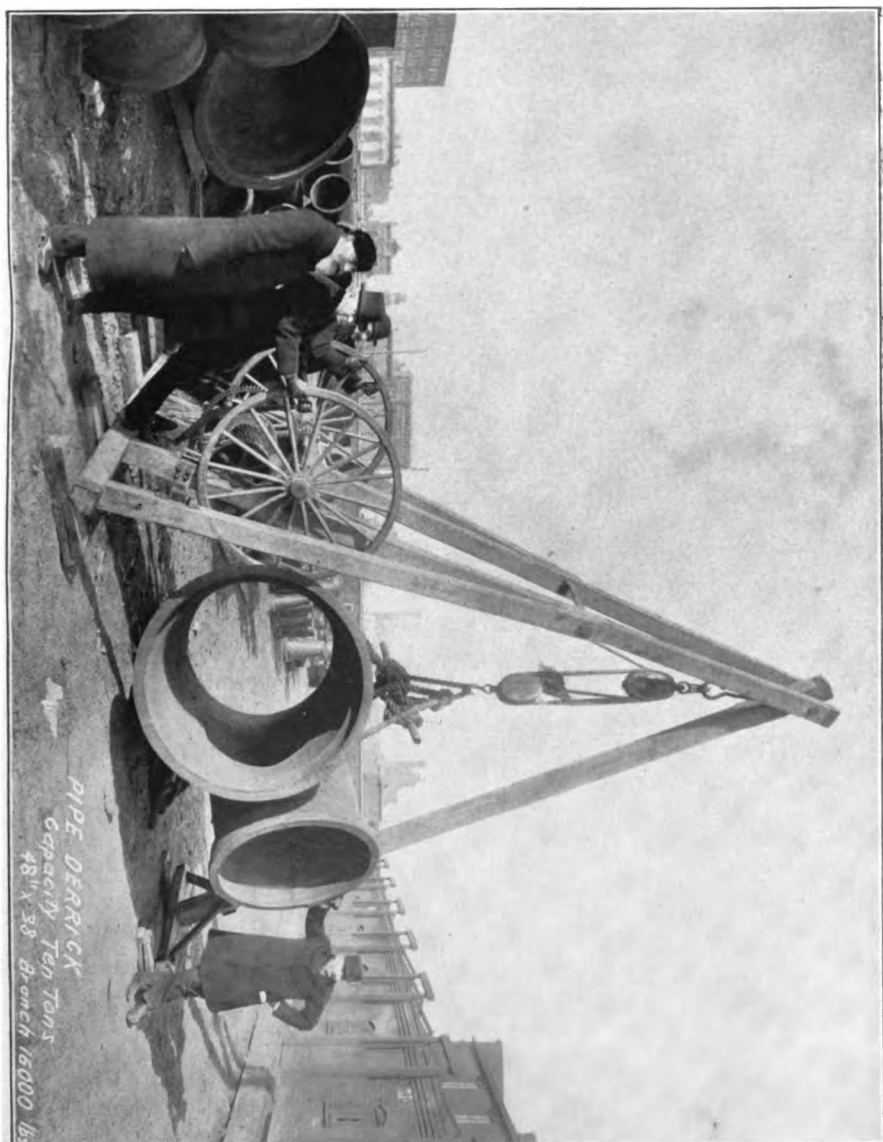
DIVISION.	DIAMETER OF PIPE IN INCHES.					Total Length of Pipe in feet.
	4-inch.	6-inch.	8-inch.	12-inch.	16-inch.	
North .....	.....	759	36	.....	.....	795
South	48	3,282	.....	.....	.....	3,880
West	432	40,631	15,147	1,804	500	58,514
Hyde Park	192	17,933	5,979	77	.....	24,180
Lake View	334	22,543	2,856	936	.....	26,659
Lake	921	40,295	6,482	5,200	.....	52,898
Jefferson	228	17,109	4,487	2,477	.....	24,301
Calumet	192	6,305	2,018	.....	.....	8,605
Totals in feet	2,337	148,946	37,005	10,494	500	199,283

**TABLE SHOWING AMOUNT OF PIPE IN THE CITY OF CHICAGO AT
THE CLOSE OF 1898.**

DIAMETER OF PIPE.	1897	1898.			
	Amount in Use in Feet.	Amount Taken Up or Abandoned in Feet.	Amount Laid in Feet.	Grand Total in Feet in Use at the close of 1898.	Grand Total in Miles.
48	1,855	.....	1,518	2,873	0.0000
36	117,937	.....	72,680	190,617	36.0000
30	5,851	.....	27,890	33,241	0.0000
28	160	.....	.....	160	0.0000
24	292,371	.....	37,405	329,776	62.0000
20	7,931	.....	.....	7,931	0.0000
18	1,000	.....	.....	1,000	0.0000
16	239,746	.....	55,995	295,741	56.0000
14	22,552	.....	.....	22,552	4.0000
12	522,593	.....	11,034	533,627	101.0000
10	26,860	.....	.....	26,860	5.0000
8	1,925,619	842	40,018	1,964,795	372.0000
6	4,904,898	471	151,371	5,055,298	957.0000
4	1,059,808	24,479	2,337	1,037,166	196.0000
3	8,996	.....	.....	8,996	0.0000
Total in feet....	9,136,177	25,792	400,248	9,510,633	.....
Total in miles	1,780.1111	4.0000	75.0000	1,801.1111	1,801.1111

Above table includes pipe laid by Special Water Pipe Extension Division.

Amount of wooden pipe in use in Norwood Park, 16,618 feet of 4-inch and 325 feet of 6-inch, not included in above.



NEW PIPE DERRICK.

DIVISION OF SPECIAL WATER PIPE EXTENSION.

MR. JAMES WALLACE, Superintendent. MR. W. R. NORTHWAY, Assistant Engineer in Charge.

This division of the Bureau of Engineering was organized in November, 1897, for the purpose of constructing a system of large feeder mains throughout the City, in connection with the new pumping stations now under construction at Central Park avenue and at Springfield avenue, and in order better to supply the smaller mains at a distance from the pumps, thus avoiding a large amount of unnecessary friction and giving a better head of water to the many districts that were suffering from lack of pressure.

Careful examinations were made as to best location of the pipe, so that the greatest benefit might be had from it, before routes were decided upon. In March, 1898, gangs were organized and pipe-laying began. Ground was broken March 7th, and March 9th the first pipe was laid at Sixty-seventh street and Stony Island avenue.

The work of laying pipe was continued without interruption until December 31, 1898, when, on account of the depth of frost in the ground, the work was entirely suspended. A large amount of work was done by this division that is chargeable to other divisions, some of which is mentioned as follows:

A line of 16-inch pipe was laid in Greenwood avenue from Forty-third street to Forty-seventh street, thence in Forty-seventh street to Woodlawn avenue, thence south in Woodlawn avenue to Fifty-fifth street, where it was enlarged to 24-inch and continued to Sixty-sixth street, at which point a junction was made with the new 36-inch pipe. This has greatly reinforced the pressure in the territory between Fifty-fifth street and Thirty-ninth street and Lake avenue and Cottage Grove avenue.

Two cast-iron sewers were built for the Fourteenth street pumping station, with catch-basins and all connections. Extensive street repairs were made on Twenty-first street, following the building of the new sewer.

On the large pipe line, work has been done as shown by the accompanying tables and map.

Either hydrants or air-cocks have been placed at all high points on the line, and at the low points blow-offs have been inserted in order that the pipes may, when necessary, be emptied into the sewers.

Chicago Lawn, a district containing about 4,000 inhabitants, was practically without water. To supply this district a 16-inch main was extended in Sixty-third street from the circulation line at Western avenue to Central Park avenue, where connections were made with the north and

south lines in Central Park avenue and from them to the east and west lines, supplying the district. This line is at present fed from the Stock Yards district and gives a good water supply.

In other districts, where the old system has been connected with the new large pipe, great relief has been obtained. In many cases tanks on tops of houses into which water had to be pumped from the mains, have been entirely abandoned, and I am well satisfied that when our connections are completed and the new pumping stations in operation, there will be a good supply of water for years to come.

I desire to state that we are indebted to the courtesy of the South Park Commissioners for their permission to lay pipe inside of the park line on Stony Island avenue and through the Lake Park from Park Row to the Art Institute, as well as for other courtesies. We are also under obligations to the West Park Commissioners for similar favors on Hamlin avenue and the boulevard, the expense of laying pipe in both cases being materially lessened.

In the repaving of improved streets where we have laid pipe, a portion of the work has been done by contract and the remainder by day labor, the City furnishing material.

A line of 30-inch pipe was laid from the 36-inch pipe in Michigan avenue through Harrison street and connected with the old 36-inch pipe at Harrison street and Fifth avenue, thus making a direct connection between the Fourteenth street pumping station, the Chicago avenue station and the Central station on West Harrison street, and through the 36-inch main in Blue Island avenue to the Twenty-second street station, thereby increasing the pressure at all points and greatly improving the condition as regards the water supply in some districts.

This was a very difficult and costly line, as Harrison street is full of all kinds of pipes and conduits, more especially at the intersections of other streets, the worst point being at the intersection at Wabash avenue, where, owing to the network of pipes and conduits, we were compelled to go below the sewer, making a cut about 17 feet deep and supporting all pipes above.

The amount of expenditures for this division is as follows:

Salaries and labor.....	\$ 882,897.88
Addyston Pipe & Steel Company (pipe).....	546,598.73
Pittsburgh Testing Laboratory Co.....	4,124.68
James B. Clow & Son (valves).....	8,961.55
Teaming.....	7,236.41
Lead.....	87,286.39
All office expenses, except salaries.....	1,021.40
Bills for repaving, including material.....	25,816.66
Vaults, sewers, and catch-basins.....	85,481.20

Removal of surplus earth.....	\$18,788.75
Plumbing work.....	1,646.89
Supporting R. R. tracks.....	858.19
Park Commissioners (repairs of boulevards)...	1,955.66
Sundries.....	2,239.82
Special castings and small pipe less than 16-in.	24,506.29
Small valves less than 80-inch.....	14,779.80
Tools, coal, lumber, and supplies for gangs....	9,180.45
	\$1,117,210.75

CREDITS.

Amount of work done for other divisions.....	\$155,814.54	
Pipe on hand.....	69,714.81	
Miscellaneous stock on hand...	5,490.61	
		230,519.96
Net amount expended....		
		\$ 886,690.79

On May 1st Mr. A. W. Cooke, assistant engineer, who was in charge of this division from the beginning of its organization, resigned, and was succeeded by Mr. G. F. Samuel, who, being transferred to other duties on August 24th, was succeeded by Mr. W. R. Northway.

THE FOLLOWING TABLE SHOWS IN DETAIL THE NUMBER OF LINEAL FEET OF PIPE LAID DURING 1898.

STREET	FROM	TO	Length of Pipe in feet.	Diameter in inches.
Fourteenth	14th St. Pump. Sta..	Michigan avenue...	280	48
Fourteenth	14th St. Pump. Sta..	Michigan avenue...	50	86
Michigan avenue	Fourteenth	Twelfth	1,238	48
Michigan avenue	Fourteenth	Twelfth	60	24
Michigan avenue	Twelfth	Harrison	2,555	36
Michigan avenue	Harrison	Adams	1,865	24
Michigan avenue	Harrison	Adams	200	12
Adams	Michigan avenue...	Wabash avenue...	430	24
Harrison	Michigan avenue...	Fifth avenue	2,720	30
Courtland	Springfield avenue..	California avenue..	7,920	36
Courtland	California avenue..	Western avenue...	2,675	24
Lexington	Central Park avenue	Douglas boulevard..	1,220	36
Douglas boulevard	Lexington	Madison	3,280	36
Douglas boulevard	Lexington	Madison	110	24
Hamlin avenue	Madison	Iowa	6,020	36
Iowa	Hamlin avenue	Springfield avenue..	670	36
N. Springfield avenue...	Iowa	North avenue	4,560	36
Taylor	Ashland avenue	Central Park avenue	13,390	36
Forty-seventh	Emerald avenue	Union avenue	360	16
Union avenue	Forty-seventh	Fifty-eighth	7,325	16
Fifty-eighth	Union avenue	Halsted	660	16
S. Halsted	Fifty-eighth	Sixty-sixth	5,280	16
S. Ashland avenue	Sixty-seventh	Seventy-fifth	5,130	16
S. Ashland avenue	Seventy-fourth	Seventy-fifth	565	8
S. Western avenue	Fifty-first	Sixty-third	8,025	16
Fifty-first	Prairie avenue	South Park	925	16
South Park avenue	Fifty-first	Sixty-third	8,030	16
Sixty-third	South Park avenue ..	Vernon avenue	330	16
Vernon avenue	Sixty-third	Sixty-sixth	1,990	16
Sixty-sixth	South Park avenue ..	Stony Island avenue..	7,950	36
Stony Island avenue	Sixty-sixth	Sixty-seventh	660	36
Sixty-seventh	Stony Island avenue..	Oglesby avenue	4,780	36
South Park avenue	Sixty-sixth	Sixty-seventh	585	36
Sixty-seventh	Indiana avenue	L. S. & M. S. R. R..	740	36
Indiana avenue	Sixty-sixth	Sixty-seventh	750	36
Sixty-sixth	Indiana avenue	State	1,380	36
Sixty-sixth	State	Bishop	8,030	30
Bishop	Sixty-third	Sixty-sixth	1,970	30
Sixty-third	Bishop	Ashland avenue	1,040	30
Sixty-third	Ashland	Western avenue	5,300	24
Sixty-third	Western avenue	Central Park avenue	7,890	16
Greenwood avenue	Forty-third	Forty-seventh	2,680	16
Forty-seventh	Greenwood avenue ..	Woodlawn avenue ..	660	16
Woodlawn avenue	Forty-seventh	Fifty-fifth	5,310	16
Woodlawn avenue	Fifty-fifth	Sixty-sixth	7,280	24
N. Ashland avenue	Edgewater avenue ..	Bryn Mawr venue ..	900	16
N. Ashland avenue	Bryn Mawr avenue ..	Catalpa avenue	565	24
N. Ashland avenue	Montrose boulevard.	497 ft. N. of Lawrence ave.	3,130	24
S. California avenue	Thirty-sixth	Fifty-first	9,920	24
N. Springfield avenue	Courtland	Marianna	4,800	30
Marianna	Springfield avenue..	Central Park avenue.	2,010	30
N. Central Park avenue ..	Marianna	Grace	7,320	30

NUMBER OF LINEAL FEET OF PIPE LAID DURING 1898—Continued.

STREET.	FROM	TO	Length of Pipe in feet.	Diameter in inches
S. Central Park avenue..	Twelfth	Twenty-eighth.....	9,280	36
Twenty-eighth.....	Central Park avenue	Kedzie avenue.....	2,690	36
Kedzie avenue.....	Twenty-eighth.....	Ill. Cent. R. R.....	2,150	36
Thirty-sixth	Kedzie avenue.....	California avenue ..	2,650	36
Thirty-sixth	California avenue...	Oakley avenue	3,830	24
Oakley avenue.....	Thirty-sixth	Archer avenue.....	280	24
Archer avenue.....	Oakley avenue	Thirty-sixth	480	24
Thirty-sixth	Archer avenue.....	138 ft. E. of Winchester ave.	1,980	24
			195,753	12
Add for Hydrants, Blow-offs and Branches.....			340	8
			2,448	6
			2,425	
Grand Total.....			200,966	
Summary by Sizes.....			1,518	48
			72,680	36
			27,890	30
			37,405	24
			55,495	16
			540	12
			8,013	8
			2,425	6
			200,966	
=38 $\frac{22}{100}$ Miles.				

The above summary is included in the report of the Division of Water Pipe Extension under the head of "Total amount of pipe in the City of Chicago at the close of the year 1898."

STATEMENT OF VALVES PLACED.

STREET.	FROM	TO	VALVES.								Totals.
			6-inch.	8-inch.	12-inch.	16-inch.	24-inch.	30-inch.	36-inch.	48-inch.	
Fourteenth ... }	14th Street Pump. Sta. ...	Michigan av. ...	1						1		2
Michigan av. ...	Fourteenth ...	Adams ...	4		2		2		1		9
Adams.	Michigan av. ...	Wabash av.	2				1				3
Harrison ...	Michigan av. ...	Fifth av.	1	1				2			4
Courtland ...	Springfield av .	Western av.	7	16		2	2				28
Douglas blvd. ...	Lexington ...	Madison.		2					1		3
Hamlin av.	Madison.	Iowa ...	6	2	4				2		14
N. Springfield av.	Iowa ...	North av.		4	2				1		7
Taylor ...	Ashland av.	Cen. Park av . .	7	9	3				3		22
Forty-seventh . .	Emerald av.	Union av.		2		1					3
Union av.	Forty-seventh .	Fifty-eighth ...	3	3	2	2					10
Halsted ...	Fifty-eighth ...	Sixty-sixth ...	8	2		3					13
S. Ashland av. ...	Sixty-seventh .	Seventy-fifth . .	5	6		3					14
S. Western av. ...	Fifty-first ...	Sixty-third ...	6	5	1	5					17
Fifty-first ...	Prairie av.	South Park av. .				1					1
South Park av. .	Fifty-first ...	Sixty-third ...	7			3					10
Vernon av.	Sixty-third ...	Sixty-sixth.	1			1					2
Sixty-sixth ...	South Park av. .	Stony Island av.	1	1		1			1		4
Sixty-seventh . .	Stony Island av.	Oglesby av.	1	1					1		3
South Park av. .	Sixty-sixth ...	Sixty-seventh . .	1				1		1		3
Sixty-seventh . .	Indiana av.	L.S. & M.S. R.R. .		1							1
Sixty-sixth ...	Indiana av.	Bishop ...	8	3	1	1		4			17
Sixty-third ...	Bishop ...	Cen. Park av . .	17	20	6	3	3				49
Greenwood av. ...	Forty-third ...	Forty-seventh. .	4	1		2					7
Woodlawn av. ...	Forty-seventh .	Sixty-sixth ...	7	8	3	2					22
N. Ashland av. .	Montrose blvd .	Edgewater av. .	2	3		1	1				7
S. California av.	Thirty-sixth. ...	Fifty-first ...	8		1		5				14
N. Springfield av.	Courtland ...	Marianna.	1	1				1			3
Marianna.	Springfield av. .	Cen. Park av . .	6	2				1			9
N. Cen. Park av.	Marianna.	Grace.	6	3				1			10
S. Cen. Park av. .	Twelfth ...	Twenty-eighth. .	4	8					2		14
Twenty-eighth. .	Cen. Park av . .	Kedzie av.		4	1						5
Kedzie av.	Twenty-eighth. .	Ill. Cent. R. R. .	1	3					1		5
Thirty-sixth ...	Kedzie av.	Oakley av.	6	3			2		1		12
Thirty-sixth.	Archer av.	Winchester av. .	1	4			1				6
Totals.			132	118	26	31	20	9	17		353

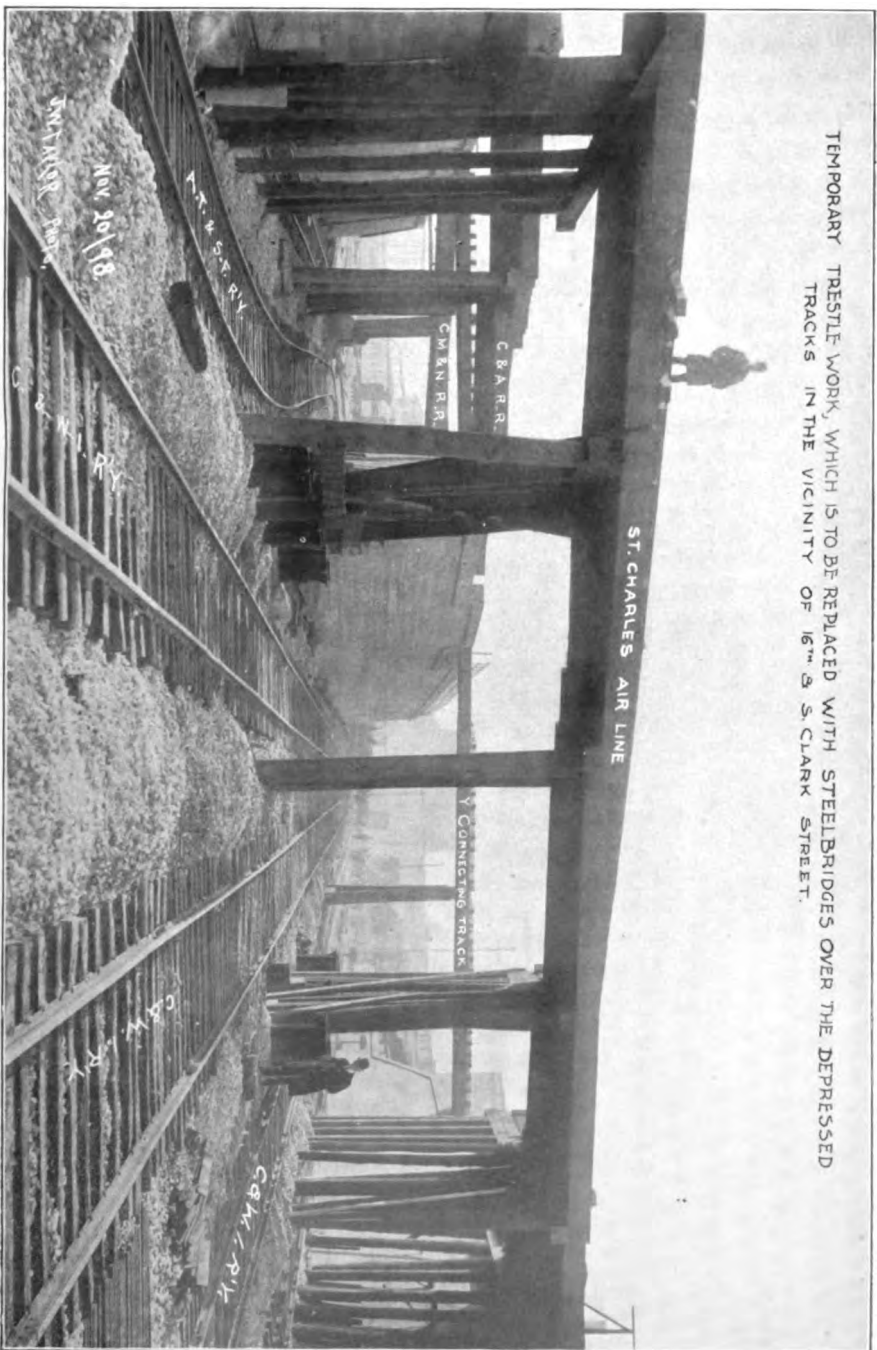
STATEMENT OF HYDRANTS PLACED.

LOCATION.	2½-inch Single.	2½-inch Double.	4-inch Double.	Total.
S. W. cor. Twelfth st. and Michigan av.....		1	.....	1
S. E. cor. Adams st. and Michigan av		1	.....	1
S. S. Adams st. Alley, bet. Michigan av. and Wabash av..		1	.....	1
N. W. cor. Courtland st. and Western av.....		1	.....	1
N. E. cor. Courtland st. and California av		1	.....	1
N. W. cor. Courtland st. and Kimball av.....		1	.....	1
S. E. cor. Hamlin av. and Washington st.....		1	.....	1
S. E. cor. Hamlin av. and Ohio st.....	1	.....	.....	1
N. W. cor. Taylor st. and Ashland av	1	.....	.....	1
S. E. cor. Taylor st. and Western av.....	1	.....	.....	1
S. E. cor. Taylor st. and California av.....		1	.....	1
N. E. cor. Union av. and Fifty-first st		1	.....	1
E. S. Union av., bet. Fifty-fourth pl. and Fifty-fifth st....		1	.....	1
S. E. cor. Halsted st. and Fifty-eighth st		1	.....	1
N. E. cor. Halsted st. and Fifty-ninth st.....		1	.....	1
N. E. cor. Halsted st. and Sixtieth st		1	.....	1
S. E. cor. Halsted st. and Englewood av.....		1	.....	1
S. E. cor. Halsted st. and Sixty-third st.....		1	.....	1
N. E. cor. Halsted st. and Sixty-sixth st.....		1	.....	1
S. E. cor. Ashland av. and Sixty-seventh st.....		1	.....	1
S. E. cor. Ashland av. and Seventy-first st		1	.....	1
S. E. cor. Western av. and Fifty-first st.....		1	.....	1
N. W. cor. Western av. and Fifty-fifth st		1	.....	1
S. E. cor. Western av. and Fifty-ninth st.....		1	.....	1
S. E. cor. South Park av. and Fifty-first st.....	1	.....	.....	1
N. E. cor. South Park av. and Fifty-seventh st.....		1	.....	1
S. E. cor. Stony Island av. and Sixty-sixth st.....		1	.....	1
N. E. cor. Stony Island av. and Sixty-seventh st.....		1	.....	1
S. W. cor. South Park av. and Sixty-sixth st.....		1	.....	1
N. W. cor. State and Sixty-sixth st.....		1	.....	1
S. E. cor. Sixty-sixth st. and Yale av		1	.....	1
S. E. cor. Sixty-sixth st. and Loomis st.....		1	.....	1
N. E. cor. Sixty-third st. and Ashland av		1	.....	1
N. W. cor. Sixty-third st. and Ashland av.....		1	.....	1
N. W. cor. Sixty-third st. and Robey st.....		1	.....	1
N. W. cor. Sixty-third st. and Western av.....		1	.....	1
N. W. cor. Sixty-third st. and California av.....		1	.....	1
N. W. cor. Sixty-third st. and Kedzie av.....		1	.....	1
N. W. cor. Forty-seventh st. and Greenwood av		1	.....	1
N. W. cor. Woodlawn av. and Fifty-first st.....		1	.....	1
N. W. cor. Woodlawn av. and Fifty-fifth st.....		1	.....	1
S. W. cor. Woodlawn av. and Sixtieth st.....		1	.....	1
N. W. cor. Woodlawn av. and Sixty-sixth st		1	.....	1

STATEMENT OF HYDRANTS PLACED—Continued.

LOCATION.	2½-inch Single.	2½-inch Double.	4-inch Double.	Total.
W. S. Ashland av., bet. Bryn Mawr av. and Olive av.	1	.....	1	1
S. E. cor. California av. and Thirty-sixth st.	1	.....	1	1
S. E. cor. California av. and Thirty-ninth st.	1	.....	1	1
S. W. cor. California av. and Forty-third st.	1	.....	1	1
S. E. cor. California av. and Forty-seventh st.	1	.....	1	1
S. E. cor. Springfield av. and Fullerton av.	1	.....	1	1
N. E. cor. Marianna st. and Lawndale av.	1	.....	1	1
N. E. cor. Central Park av. and Belmont av.	1	.....	1	1
Cor. S. Central Park av. and Sixteenth st.	1	.....	1	1
Cor. S. Central Park av. and Twenty-sixth st.	1	.....	1	1
W. S. Kedzie av. bet. 31st st. and S. B. Chicago River.	1	.....	1	1
S. E. cor. Kedzie av. and Thirty-sixth st.	1	.....	1	1
N. E. cor. Thirty-sixth st. and California av.	1	.....	1	1
Cor. Thirty-sixth st. and Artesian av.	1	.....	1	1
S. E. cor. Thirty-sixth st. and Robey st.	1	.....	1	1
Totals	4	54	.....	58

TEMPORARY TREESTLE WORK, WHICH IS TO BE REPLACED WITH STEEL BRIDGES OVER THE DEPRESSED TRACKS IN THE VICINITY OF 16TH & S. CLARK STREET.



TEMPORARY TREESTLING.

DIVISION OF BRIDGE AND VIADUCT CONSTRUCTION.

MR. A. G. RITER, Bridge Engineer in Charge. MR. THOS. G. PIHLFELDT, Assistant Engineer.

As very little work in the way of bridge and viaduct construction was done, owing to the lack of appropriation, other work was assigned to this division.

CARTER H. HARRISON CRIB.

Plans and specifications were prepared for the superstructure of this crib. Contracts for this work were let July 6, 1898, but on account of the delay in sinking the intake shafts the contractors will not begin operations until early in the coming spring.

NEW PUMPING STATIONS.

Plans and specifications were prepared for various appurtenances pertaining to the machinery and buildings of the new pumping stations at Central Park avenue and Springfield avenue.

Plans were prepared and contracts were let for two electric traveling cranes, each with a lifting capacity of fifteen tons and a span of eighty-three feet.

Plans were also prepared and contracts let for two coal handling and storage plants, storage bins to have in each case a capacity of 500 tons; also two steam heating plants for new pumping stations.

Plans and specifications have also been prepared for the necessary electric light installation.

SIXTY-FIRST STREET VIADUCT.

On account of track elevation, the old viaduct and approaches on Sixty-first street, between Wentworth avenue and State street, were razed by and at the expense of the L. S. & M. S. and C. R. I. & P. railroads. The iron trestle approaches were sold to the Suburban Railway Company and a contract let for removing the three pony truss spans and re-erecting them, with suitable pile and timber piers, abutments and trestle approaches, at three points over the north branch of the Chicago River: at Addison street, at Lawrence avenue and at North Kedzie avenue. The old wooden bridge at North Kedzie avenue was removed to North Fifty-ninth street, or Foster avenue, and the North branch. The timber and iron work will be finished February 1, 1899. The coming spring it will be necessary to do the additional work of filling and planking the approaches to the same.

NEW FIRE ENGINE HOUSE.

Plans and specifications were prepared for the structural steel and iron work for the new fire engine house at Michigan avenue and Washington street, to be completed in February, 1899.

SIXTY-EIGHTH STREET PUMPING STATION.

Plans and specifications were prepared for the roof trusses and girders for the extension of the Sixty-eighth street pumping station, work to be completed in the spring of 1899.

JACKSON STREET BRIDGE AND VIADUCT.

A contract was let for the entire replanking and repairing of the roadways and the rebuilding of the sidewalks of the above named bridge and viaduct. This will be completed in February, 1899.

SNOW DUMP.

Plans and specifications were made for a large timber trestle snow dump, located on the filled portion of the lake front east of the Illinois Central tracks.

WELLS STREET VIADUCT.

This structure will be erected during the coming spring. It is 93 feet long and 80 feet wide, and the cost of construction will be borne by the Northwestern Elevated railroad and the C. & N. W. R. R. companies.

CHANGING BRIDGES AND LOWERING TUNNELS.

Plats, sections, profiles, and estimates were prepared for the changing of all of the bridges between Rush street and Madison street from the swing to the bascule type. Estimates of the cost of lowering the three traffic tunnels were also made.

PIPE DERRICKS.

As the results of investigations made by Mr. James Wallace, Superintendent of Special Water Pipe Extension, as to the methods and tools employed in laying large pipe, in various cities, this division designed and superintended the construction of a number of tripod pipe derricks of 5 and 10 tons respective capacity. The derricks have worked admirably and greatly facilitated the work of pipe laying. The crank axle of each derrick is provided with a pair of ordinary 48-inch wagon wheels instead of cranks, which wheels, when slipped out of mesh with the drum gear, are used in transporting the derrick from place to place.

ONE HUNDREDDTH STREET BRIDGE—CALUMET.

In compliance with an order of the City Council, plans and estimates were furnished for a new bridge at One Hundredth street over the Calumet River.

REPAIRS TO GALLERY.

The gallery over the fourth floor at the south end of the City Hall was found to be in a dangerous condition and was suitably reinforced under the direction of this division.

CLARK AND SIXTEENTH STREET VIADUCT.

The double roadway plate girder viaduct over the depressed tracks at Clark street, near Sixteenth street, which was built by the Joint Track Elevation Commission, was opened for traffic November 16, 1898, the street having been closed to traffic since April 25, 1898. The total cost was paid by the railroad companies interested.

In addition to the above mentioned work, the general routine of the office included the checking of track elevation plans, the general supervision of those portions of this work in which the Bureau of Engineering is interested, and also the supervision of the construction of elevated roads.

DIVISION OF BRIDGE AND VIADUCT MAINTENANCE AND REPAIRS.

MR. PATRICK WHITE, Superintendent. MR. A. G. RITER, Engineer in Charge.

The appropriation for this division for the year 1898 was \$85,000, which amount was expended during the first eight months of the year. An emergency appropriation of \$13,500 was granted by the Council for the urgently needed repairs on the Archer avenue, Erie street, Fuller street, Harrison street, Kinzie street, North avenue, Twenty-second street and Ninety-second street bridges.

The total amount of the appropriations and receipts was \$109,401.83, which includes the following items: \$1,768.21 collected from vessel owners for damages done to various bridges; \$239.98 collected from the Pennsylvania R. R. Co. for damage done to Twelfth street viaduct; \$115.18 paid by the Northwestern "L" R. R. Co. for repairs on Wells street bridge, and \$1,745.43 for one-third of maintenance of Lake street bridge, paid by the Lake Street "L" R. R. Co.

Following is a detailed statement showing the total expenditures for each bridge and viaduct in the City of Chicago on which work was done during the year:

BRIDGES.

Adams street.....	\$ 4,570.03
Archer avenue.....	848.59
Ashland avenue (canal).....	255.98
Ashland avenue (river).....	788.64

Belmont avenue.....	\$ 78.45
Canal street.....	2,045.28
Chicago avenue.....	685.92
Chittenden street.....	240.95
Clark street.....	1,570.88
Clybourn place.....	897.52
Carpenter road.....	42.58
Dearborn street.....	1,788.27
Deering street.....	476.96
Diversey avenue.....	125.80
Division street (canal).....	78.60
Division street (river).....	97.81
Erle street.....	704.05
Eighteenth street.....	1,402.94
Forest Glen.....	121.87
Fuller street.....	960.08
Fullerton avenue.....	1,506.65
Halsted street (basculc).....	1,545.65
Halsted street (canal).....	532.70
Halsted street (lift).....	5,267. 1
Harrison street.....	1,133.60
Indiana street.....	206.45
Jackson boulevard.....	1,817.28
Kinzie street.....	2,695.76
Lake street.....	1,964.14
Laurel street.....	825.88
Lawndale avenue.....	20.11
Madison street.....	1,216.00
Main street.....	491.78
Ninety-second street.....	2,171.54
Ninety-fifth street.....	865.78
North avenue.....	2,990.54
106th street.....	81.00
Polk street.....	276.71
Randolph street.....	2,861.71
Riverdale.....	146.79
Rush street.....	3,437.81
State street.....	12,980.64
Taylor street.....	946.04
Twelfth street.....	2,661.79
Twenty-second street.....	4,994.51
Thirty-fifth street.....	380.89
Van Buren street.....	2,644.08
Washington street.....	2,406.15
Webster avenue.....	96.40
Weed street.....	487.54
Wells street.....	422.97
Western avenue, south.....	28.80
Western avenue, north.....	1,126.83
General bridges.....	29,850.79

VIADUCTS.

Ashland avenue.....	\$ 146.50
Blue Island avenue.	26.40
Center avenue.....	126.45
Eighteenth street.....	266.51
Erie street.....	12.80
Fifth avenue.....	66.60
Indiana street.....	6.40
Jackson boulevard.....	227.10
Milwaukee avenue.....	164.78
Taylor street.....	84.05
Twelfth street.....	871.65
Thirty-fifth street.....	45.15
Washington street.....	20.40
Western avenue.....	19.20
Pratt street approach.....	594.91
Total	\$ 109,820.97

BRIDGES.—This division has under its supervision 61 bridges—swing, lift, bascule and fixed, divided as follows: Lift 1, bascule 2, swing 40, jackknife 2, pontoon 1, fixed 15. All of the important and heavy movable bridges are being equipped with electricity as rapidly as possible.

VIADUCTS.—The viaduct systems number 37, of which all of the Twelfth street viaduct east of the river, East Eighteenth street viaduct, part of the Sangamon street viaduct, and a portion of the Halsted street-Chicago avenue viaduct was repaved and painted by the railroad companies interested. That portion of the Blue Island avenue-Throop street viaduct, and Twelfth street bridge floor between the rails, were repaved by the W. C. St. R. R. Co.

The bridges operated by electricity are the following: Adams street, Clark street, Dearborn street, North Halsted street bascule, Jackson street, Randolph street, Rush street, State street, Van Buren street, Washington street, Lake street, and Wells street.

For these bridges the W. C. St. R. R. Co. and the N. C. St. R. R. Co. furnish the current at a cost of \$50.00 per month, with the exception of Lake street and Wells street bridges, for which the power is furnished by the "L" railways crossing them, free of cost, and Rush street bridge, which costs \$100.00 per month for the reason that no trolley line crosses the bridge.

The bridges operated by steam power are: Canal street, Madison street, Eighteenth street, South Halsted street, and Twelfth street bridges. The cost of coal for these bridges is at an average of \$63.00 per month, except the South Halsted street lift bridge, the coal bill for which amounts to over \$200.00 every month. This plainly shows the necessity of having the steam bridges equipped with electricity as soon as possible.

The bridges operated by hand are as follows:

Ashland avenue, river	Erle street	Riverdale
Ashland avenue, canal	Fuller street	S. Western avenue
Archer avenue	N. Halsted street, canal	Taylor street
Belmont avenue	Harrison street	Weed street
Chicago avenue	Indiana street	Webster avenue
Chittenden street	Kinzie street	Twenty-second street
Clybourn place	Laurel street	Thirty-fifth street
Deering street	Main street	Ninety-second street
Diversey street	N. Western avenue	Ninety-fifth street
Division street, river	North avenue	106th street.
Division street, canal	Polk street	

REPAIRS AND MAINTENANCE.

The following is a statement of the more important work done in the nature of repairs, etc.:

STATE STREET BRIDGE.—The old masonry center pier having partially given way, throwing the bridge out of level so that it could only be swung one way, it became necessary to reinforce the old pier, which was done by driving a close row of piles all around the center pier and capping and banding the same. The bridge was jacked up and the top of the pier torn away, after which a new sub-center step was placed in position, with deep radial girders running therefrom to the caps on the new pile circles. Upon this frame-work the bridge and turntable were lowered and bolted. This relieved the bridge and took over half the weight off the old center pier so that the bridge now swings in a proper manner, for the present at least, but it is only a question of time until the timber work will rot away and throw all of the weight back onto the old pier again.

ADAMS STREET BRIDGE.—This bridge was fitted with one of the simplest and most perfect electrical equipments of all bridges so far equipped. The current was turned on October 21st. The bridge swings 20 per cent. faster than by the old steam plant, and the speed can be still further increased by shunting the motor, if it be found necessary.

WASHINGTON STREET BRIDGE.—This bridge was equipped with electricity and the current turned on April 15th. This bridge formerly swung by steam.

FULLERTON AVENUE BRIDGE.—This bridge was also equipped with electricity, but only a few preliminary swings were made for testing purposes, as the current will not be turned on permanently until January 1, 1899. This bridge formerly swung by hand and took ten to twelve minutes to make a quarter turn, which can now be made in from thirty-five to forty seconds.

EAST EIGHTEENTH STREET VIADUCT.—The west end of the large span has been jacked up and the pier repaired, and a nest of I-beams, to

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better distribute the weight, is being placed under the west end shoe of the north truss, as was done last year with the west end shoe of the south truss. A large number of pile clumps will have to be driven to protect the pier from any further collisions.

TWELFTH STREET BRIDGE.—This bridge was entirely repaved with pine blocks. New end rollers are to be placed under the same as soon as possible and the latch repaired. Electricity will be placed upon this bridge during the ensuing year.

SOUTH HALSTED STREET BRIDGE.—Both of the compensating chains at the north end of the bridge broke loose from their fastenings and came down by the run, doing considerable damage to the lattice work of the towers. The breaks were due to the corrosion of the small attaching chains, which were almost completely rusted away. New and larger chains have been provided with new eye bolts, rendering the chain attachments secure. The lifting cables are in need of renewal, as they are badly stranded and have had new short sections spliced in several times.

The enormous coal bills for this bridge render it imperative that a proper electrical equipment be placed in position at the earliest possible moment, a work which is contemplated for the ensuing year.

MADISON STREET BRIDGE.—This bridge should be electrically equipped as soon as possible and new end rollers provided; also some minor repairs are needed.

EIGHTEENTH STREET BRIDGE.—This bridge should be electrically equipped.

NORTH HALSTED STREET BRIDGE. (River.)—The track box girders upon which the segments roll must be tied back to the rear anchored portions of the structure and the front and anchorage piers well tied together. New lead submarine cables were placed in the river to take the place of the old ones, which are grounded, and new heaters provided for the motors and grease tanks.

ERIE STREET BRIDGE.—The west pier was moved south bodily 16 inches by a collision with the steamer, "Charles Eddy," and the entire girder span bent south about 9 inches. The north fender clump of spring piles was also destroyed and the viaduct sidewalk smashed. Temporary repairs have been made. New pile clumps and new piles in the protection have been ordered. Nothing was done with the east approach, as the United States Government is about to dredge the east draw and cut off the projecting angle in the adjacent property to widen the draw. This will necessitate the entire rebuilding of all of the east approach and the erection of a new east pier.

HARRISON STREET BRIDGE.—The east approach was repaired and a

number of new piles driven in spring clumps and the south end of the protection, all ready for the caps and wales.

TWENTY-SECOND STREET BRIDGE.—Extensive planking was done on the bridge and approaches, the latch repaired and end rollers shimmed up. The center pier was temporarily overhauled, new racks put in and new top pier planking provided.

Very extensive repairs will have to be made to this bridge, including an entirely new pile center pier. A new bascule bridge is badly needed at this point.

ARCHER AVENUE BRIDGE.—The approaches were repaired and the west abutment rebuilt.

CANAL STREET BRIDGE.—The machinery was overhauled and the railing repaired, together with some general repairs.

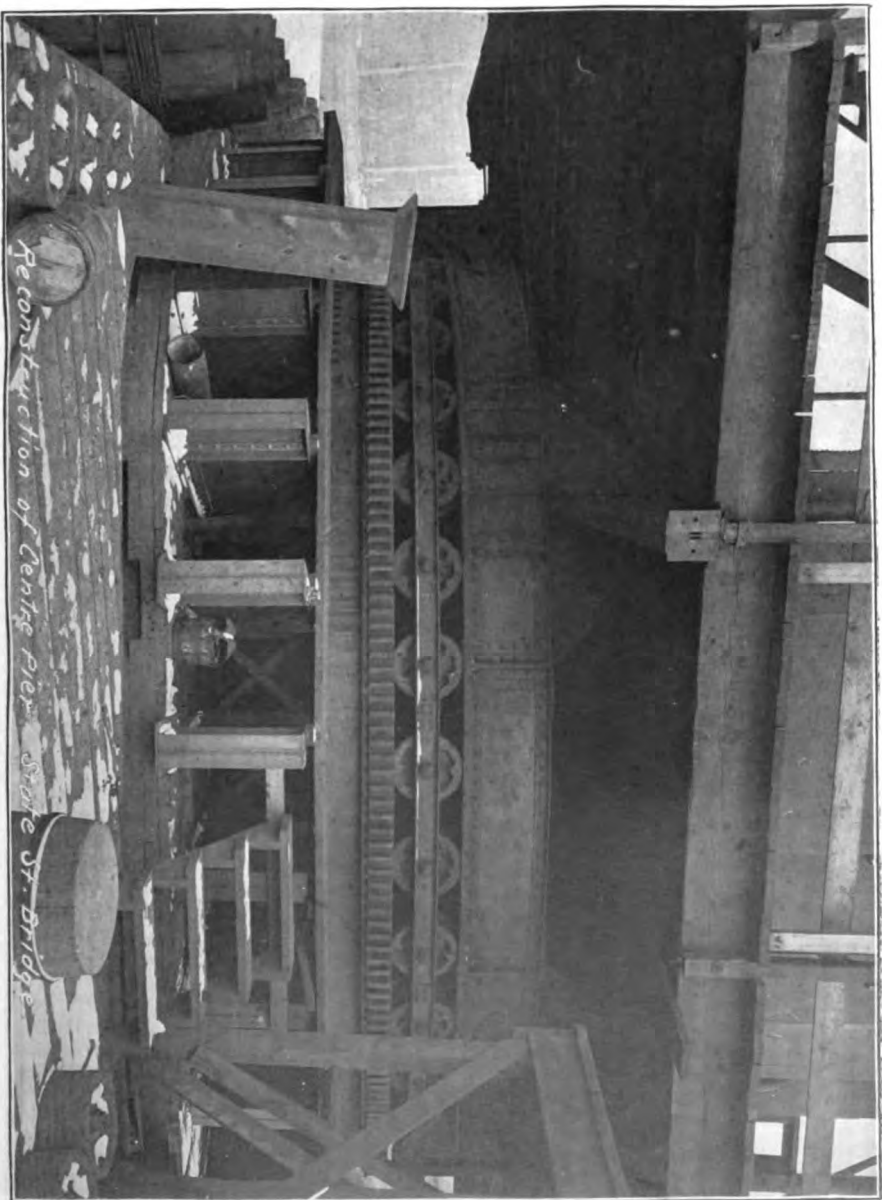
KINZIE STREET BRIDGE. The east approach was replanked, new stringers put in and piles ordered for west abutment, for spring clumps and west side of protection. A new bridge is badly needed.

NORTH AVENUE BRIDGE.—The bridge was jacked up, the center bearing taken out and replaced by a new one. The turntable was also repaired and new wheels and end rollers put in. The approaches underwent extensive repairs, so that the bridge is now swinging in the proper manner.

IN GENERAL.

About all of the work done on the bridges and viaducts is of the patch-work order, as it was impossible to do much more with such an inadequate appropriation as we had this year and have had for several years previous.

Unless a proper appropriation be made this year, it will be absolutely necessary to close some of the bridges and viaducts to traffic, before some appalling and fatal accidents occur which will cost the City more for damages to persons and property than several new bridges and viaducts would cost.



CENTER PIER, STATE STREET BRIDGE.

DIVISION OF HARBORS.

CONSISTING OF THE CHICAGO RIVER AND BRANCHES, AND THE CALUMET RIVER AND BRANCHES.

RICARD O'S. BURKE, Assistant Engineer in Charge.

CAPT. JOHN ROBERTS, Harbor Master.

THOMAS J. ELDERKIN, Vessel Dispatcher.

The work in the North branch of the Chicago river, made necessary in order to comply with the requirements of the permit for the construction of the bridge at Diversey avenue, was done by the contractors, Lydon & Drews Company, as follows:

Lineal feet of dock removed and cost.....	386.4 feet, \$	946.68
Cubic yards of dredging removed and cost, 244,657 cubic yds.,		41,847.08
Total cost.....		\$42,293.71
Payment for land taken.....		18,600.00

Under contracts with the United States, the work of dredging the Chicago river, both branches, has been continued with the following result:

IN THE MAIN AND SOUTH BRANCHES.—The work in the main and south branches of the river, under contract with the Green's Dredging Company, was continued from the year 1897 and completed on the 29th of July of this year, with the following result:

Work done during the year 1898.....	89,630 cubic yards
Work done previous to 1898.....	539,358 cubic yards
Total work done under the contract.....	628,988 cubic yards

IN THE NORTH BRANCH.—The work in the North branch of the river, under contract with the Lydon & Drews Company, was continued during the year until stopped by the severe weather, at the close of the month of November. The channel was practically completed to a depth of not less than 17 feet below City datum, up to the North Western avenue bridge. No re-dredging has been done in this branch as yet. The following amounts were removed, viz.:

During the year 1898.....	444,867 cubic yards
Previously	563,693 cubic yards
Total under the contract.....	1,008,560 cubic yards

The work to be done under this contract is not yet completed.

Aggregate amount:

Work in both branches in 1898.....	534,497 cubic yards
Work in both branches previous to 1898.....	1,103,051 cubic yards
Total under both contracts.....	1,637,548 cubic yards

No dredging has been done in the Calumet river by the United States during the year. Dredging of the South branch has been continued by the Sanitary District of Chicago during the year, cutting to a depth of 22½ feet below datum at Robey street and the west fork of the South branch, with a rising grade to the forks of the main river at Lake street, where the cut is two feet less. The total amount of work done, including 386,344 cubic yards done on old contract and 13,987 cubic yards of widening of the South branch in front of the Nation elevator, is 505,546 cubic yards at nineteen cents per yard.

Private dredging to the amount of 96,000 cubic yards in the Chicago river has been done under seventy-two permits, paying fees amounting to \$356.00.

In the Calumet river, 133,000 cubic yards have been dredged by private parties (dock owners), amounting in fees to \$532.00 for twenty-three permits.

Dock permits were issued during the year as follows:

CHICAGO RIVER.

Number of permits and fees, 92 permits.....	\$2,825.74
Lineal feet of dock repaired.....	5,987
Lineal feet of dock renewed.....	6,786
Lineal feet of dock, new construction.....	8,805

CALUMET RIVER.

Number of permits and fees, 11 permits.....	\$420.85
Lineal feet of dock repaired.....	90
Lineal feet of dock renewed.....	1,968
Lineal feet of dock, new construction.....	100

During the year many notices have been served on dock owners or occupiers to repair their docks, or to remove dock obstructions to navigation, with an unsatisfactory result. In accordance with orders, the names of those who have failed to comply with the City ordinances in this regard will be given to the Law Department for prosecution.

The total present dock frontage in the Chicago river and the Calumet river is 52 miles approximately. The following miscellaneous work is included in the permits issued during the past year:

Fifty feet of new bridge protection, Calumet, L. S. & M. S. R. R. Co.

Coffer-dam sewer outfall at Fourteenth street and South branch.

Coffer-dam sewer outfall at Twenty-first street and South branch.

To lay 24-inch drainage pipes, joint elevation of tracks, Sixteenth street, South branch.

To repair center pier, C. & N.-W. R. R. bridge near Kinzie street.

Reconstruct east side of protection of C. & N.-W. R. R. bridge by Kinzie street.

Repair protection of bridge of Chicago Terminal Transfer R. R. Co., south of Taylor street, South branch.

Laying electric cable at Eighteenth street bridge, South branch.

By-pass for Sanitary District work by Adams street, construction pending.

Strengthening protection clumps, Calumet and Blue Island R. R. bridge, Calumet.

Repairing piling, Illinois Central R. R. bridge, Main Chicago river. Laid electric cables at Halsted street bridge, South branch.

Laid electric cables at Ashland avenue bridge.

Intake for fire protection, Santa Fe elevator, West fork, South branch.

Strengthening fender piling dock, South Chicago Elevator Co., Calumet.

Fender piling, dry dock of Chicago Ship Building Co., Calumet.

Water intake, Twenty-seventh street and Lake Michigan.

A slight improvement in the level of Lake Michigan appears from the following:

TABLE SHOWING ELEVATION OF WATER IN LAKE MICHIGAN.
BY MONTHS, YEAR 1898.

MONTHS, 1898.	ELEVATION OF WATER (MONTHLY MEANS).				REMARKS.
	FOUR-MILE CRIB.				
	Max.	Min.	Mean.	Range	
January.....	1.015	-1.25	0.027	2.265	Maximum, Jan. 25; Minimum, Jan. 2
February.....	1.050	-0.75	0.043	1.800	" Feb. 20; " Feb. 15
March.....	1.050	-0.50	0.230	1.550	" March 22; " March 4
April.....	1.050	-0.00	0.612	1.050	" April 24; " April 17
May.....	1.025	0.56	0.868	0.465	" May 1; " May 18
June.....	1.070	0.37	0.942	0.700	" June 17; " June 25
July.....	1.070	0.35	0.944	0.720	" July 2; " July 20
August.....	1.090	0.46	0.868	0.630	" Aug. 24; " Aug. 28
September.....	0.920	0.22	0.542	0.700	" Sept. 9; " Sept. 14
October.....	1.075	0.15	0.520	0.925	" Oct. 14; " Oct. 11
November.....	1.075	-0.10	0.173	1.175	" Nov. 10; " Nov. 2
December.....	0.750	-1.20	-0.132	1.950	" Dec. 4; " Dec. 26
MEAN YEAR, 1898.	.....	.....	0.470	2.340	

**MAXIMUM, MINIMUM AND MEAN ELEVATION OF WATER IN LAKE
MICHIGAN FOR EACH YEAR FROM 1854 TO 1898.**

YEAR.	LAKE MICHIGAN.			YEAR.	LAKE MICHIGAN.		
	Max.	Min.	Mean.		Max.	Min.	Mean.
1854.....			1.83	1877.....	3.56	1.04	2.81
1855.....	3.45	0.15	1.56	1878.....	3.14	0.51	2.00
1856.....	3.05	0.42	1.60	1879.....	2.51	-0.49	1.06
1857.....	4.35	0.60	2.42	1880.....	2.81	-0.99	1.16
1858.....	4.69	1.33	2.00	1881.....	3.01	-2.19	1.26
1859.....	4.45	1.31	2.98	1882.....	3.01	-0.99	2.00
1860.....	3.53	1.30	2.54	1883.....	3.81	-0.99	2.10
1861.....	4.40	1.20	2.56	1884.....	3.31	-0.01	2.24
1862.....	3.80	0.70	2.50	1885.....	3.71	-0.01	2.48
1863.....	3.80	-0.80	2.10	1886.....	4.41	0.01	2.64
1864.....	2.80	-0.40	1.57	1887.....	3.11	0.01	1.96
1865.....	3.66	-1.08	1.80	1888.....	3.01	0.01	1.20
1866.....	2.50	0.00	1.07	1889.....	2.51	-0.79	0.77
1867.....	2.60	-0.41	1.49	1890.....	2.21	-0.99	0.63
1868.....	2.58	-1.00	1.01	1891.....	1.61	-2.39	0.05
1869.....	2.13	0.41	1.13	1892.....	1.30	-3.60	-0.17
1870.....	3.25	-0.30	2.09	1893.....	1.70	-0.30	0.69
1871.....	2.80	-0.40	1.77	1894.....	1.80	-1.80	0.51
1872.....	1.80	-0.74	0.81	1895.....	0.00	-1.57	-0.49
1873.....	2.70	-0.76	1.40	1896.....	0.00	-1.70	-0.58
1874.....	2.80	-0.20	1.67	1897.....	1.60	-1.30	0.33
1875.....	3.01	-0.34	1.45	1898.....	1.09	-1.25	0.47
1876.....	4.31	-0.34	2.56				

COMMERCE BY LAKE AND CANAL—CITY OF CHICAGO.

From 1848 to 1898, by years, with population 1881 to 1898. Compiled from official records of the Department.

Year.	VESSELS BY LAKE.			BY ILL. & MICH. CANAL.			POPULATION.	REMARKS.
	Total No.	Total Tonnage.	Average, Cargo, Ton.	Boats, No.	Tonnage.	Tolls, Dollars.		
1848						87,890	20,023	
1849						118,375	23,047	
1850						125,504	28,296	
1851						173,300	34,000	
1852						168,577	38,734	
1853						173,372	60,662	
1854						198,326	65,872	
1855						180,519	80,023	
1856						184,310	86,000	
1857						197,830	98,000	
1858						197,171	84,000	
1859						132,147	94,000	
1860				201	367,437	138,554	109,460	
1861				194	547,295	218,040	120,000	
1862	14,687	3,847,246	262	211	673,590	264,647	137,030	
1863	17,135	4,333,832	252	240	619,599	210,386	150,000	
1864	17,762	4,339,770	244	228	510,286	156,607	161,288	
1865	20,179	4,199,135	208	228	616,140	300,810	178,492	
1866	22,199	4,620,092	208	230	746,815	202,958	200,418	1831 60
1867	24,370	5,101,203	209	209	746,954	252,231	225,000	1832 600
1868	26,399	6,005,403	265	218	737,827	215,720	252,054	1833 350
1869	27,602	6,273,346	227	219	817,738	238,759	280,000	1834 1,800
1870	25,172	6,033,207	239	179	585,970	149,635	298,700	1835 3,265
1871	24,632	6,178,336	251	186	628,975	159,050	334,270	1836 4,000
1872	25,353	6,077,542	239	173	783,641	165,874	367,396	1837 4,179
1873	23,734	6,564,542	239	172	849,533	166,641	380,000	1838 4,000
1874	21,547	6,329,711	294	152	712,020	144,831	395,400	1839 4,200
1875	21,095	6,279,055	298	142	676,025	107,081	407,000	1840 4,470
1876	19,245	6,167,736	320	146	691,946	113,293	420,000	1841 5,500
1877	20,517	6,585,415	321	145	605,912	96,913	439,776	1842 6,590
1878	20,984	7,239,673	345	140	598,792	84,330	450,000	1843 7,580
1879	23,873	7,757,395	325	136	669,559	89,064	475,000	1844 8,000
1880	25,520	9,154,351	345	133	751,360	92,296	503,298	1845 12,088
1881	26,005	8,762,247	337	133	826,133	85,130	540,000	1846 14,169
1882	26,977	9,754,949	362	132	1,011,287	85,947	560,693	1847 16,859
1883	23,982	7,790,337	325	132	925,575	77,975	580,000	
1884	22,826	7,508,696	330	134	956,721	77,102	630,000	
1885	21,542	7,306,222	339	135	827,355	66,800	664,634	
1886	22,372	7,877,080	352	130	808,019	62,516	704,000	
1887	23,972	8,749,852	365	132	742,074	58,024	760,000	
1888	22,095	8,890,658	402	127	751,055	56,028	830,000	
1889	21,788	10,267,831	471	114	917,047	60,605	1,100,000	
1890	20,133	10,116,051	502	104	742,392	65,112	1,200,000	
1891	19,680	10,862,898	522	97	641,156	49,557	1,320,000	
1892	21,123	11,790,393	565	95	783,288	54,937	1,450,000	
1893	17,044	10,788,029	692	82	529,816	38,702	1,600,000	
1894	16,202	10,284,178	635	85	617,811	44,928	1,640,000	
1895	18,232	12,631,180	693	83	591,407	39,106	1,725,000	
1896	16,999	12,965,812	763	67	446,762	34,543	2,000,000	
1897	17,865	14,277,235	799	64	600,000	41,000	2,100,000	
1898	18,512	15,116,426	817	64	395,017	38,570	2,105,000	

CITY OF CHICAGO—SUMMARY OF COMMERCE BY LAKE.

ENTRANCES.	No.	Tons.	Totals, No.	Tons.
Chicago River	7,624	5,285,559	9,189	7,498,929
Calumet River	1,565	2,208,370		
CLEARANCES.				
Chicago River	7,763	5,466,321	9,823	7,622,497
Calumet River	1,560	2,156,176		
City of Chicago—Totals.....	.....	.....	18,512	15,116,426

Average Cargo, Chicago River, 699 tons.

Average Cargo, Calumet River, 1,397 tons.

Average Cargo, City of Chicago, 817 tons.

TABLE SHOWING MOVEMENTS OF COMMERCE BY LAKE, IN PERIODS FROM 1862 TO 1898, BOTH INCLUSIVE.

PERIOD.	YEARLY AVERAGE TONNAGE.			YEARLY AVERAGE NO. VESSELS.			YEARLY AVERAGE CARGO.		
	Tons.	Increase or Decrease		No.	Increase or Decrease.		Tons.	Increase or Decrease.	
		Tons.	Per Cent.		No.	Per Cent.		Tons.	Per Cent.
1862 to 1870.	4,972,582	.....	.....	21,723	.....	.....	229	.....	.....
1871 to 1880.	6,833,376	+1,860,794	37.4	22,650	+ 927	+ 4.8	302	+ 73	32.0
1881 to 1890.	8,702,698	+1,869,317	27.4	23,169	+ 519	+ 2.3	376	+ 74	24.4
1891 to 1898.	12,338,269	+3,635,576	41.8	18,207	-4,962	-21.4	678	+302	80.1

Our trade by the lake for the ten years ending 1880 averaged annually 37.4 per cent. more than the annual average from 1862 to 1870. During the next decade, 1881 to 1890, a smaller increase on the preceding one prevails, as it is only 27.4 per cent., but a marked increase is noticed in the average annual tonnage for the years 1891 to 1898, it being an average annual increase of 3,636,269 tons, or 41.8 per cent. over the average annual tonnage from 1881 to 1890. These tables emphasize the fact of the increase in the capacity of the vessels that carry our lake trade, the average annual cargo for the eight years, 1891 to 1898, being 80.1 per cent. greater

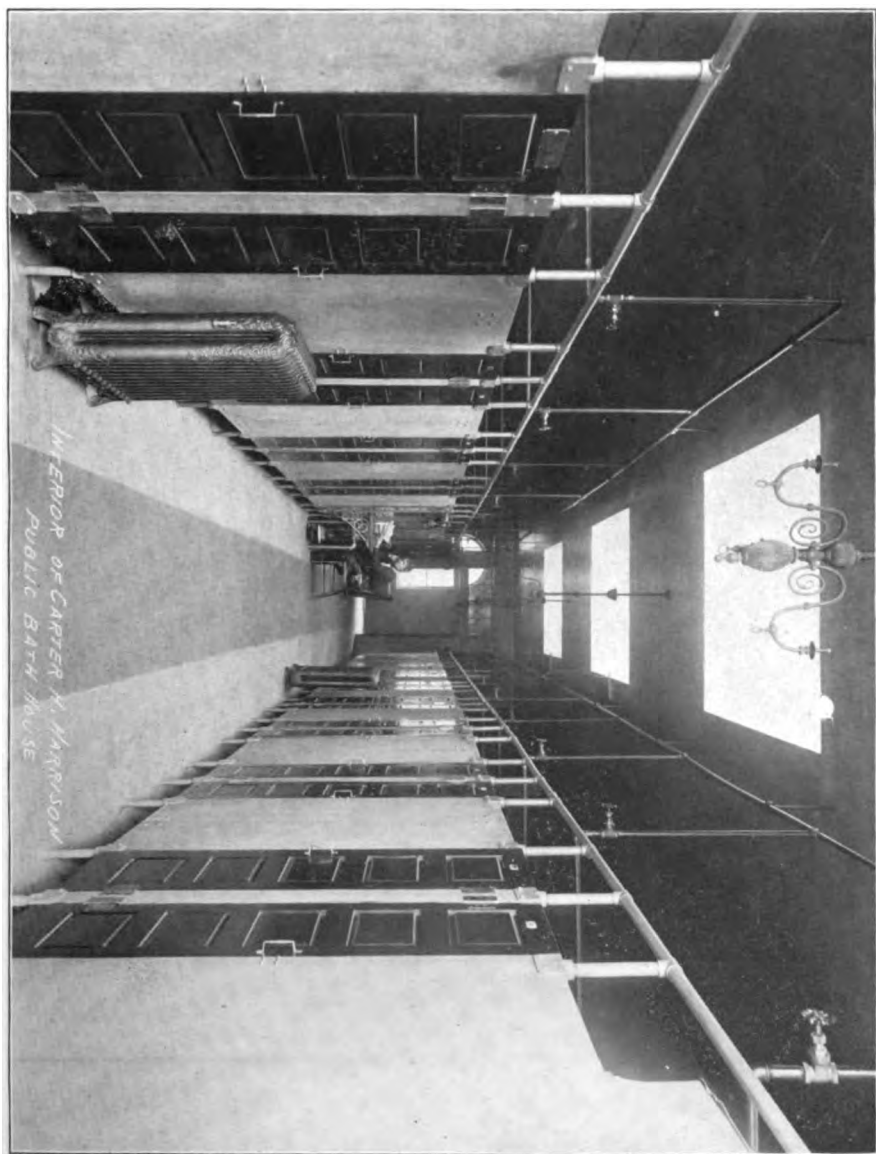
than the average annual cargo for the ten years, 1881 to 1890, and 196 per cent. greater than the average annual cargo for the period 1862 to 1870.

Notwithstanding the increase in the capacity of the vessels engaged in our trade by lake, it is to be noted that their number has also increased during 1898, as in that year there were 647 vessels more than in 1897, though the harbor conditions had but slightly improved over those that obtained in 1897.

During the past thirty-six years, the greatest number of vessels engaged in the commerce of the port of Chicago during any one year was in 1869, when it was 27,602, carrying 6,273,346 tons; and the least number was inside that period, in the year 1862, when it was 14,687 vessels, carrying 3,847,246 tons, with an average cargo for that year of only 262 tons.

PORT OF CHICAGO—COASTWISE SHIPMENTS—1898.

COMMODITIES.	Chicago River.	Calumet River.	Total.
	Quantity.	Quantity.	Quantity.
Merchandise	pkgs. 3,355,648	132,016	8,487,659
Flour	bbls. 1,444,040	675	1,444,715
Wheat	bush. 23,196,929	1,553,568	24,750,497
Corn	" 62,480,108	16,905,390	79,385,498
Oats	" 20,030,241	7,713,386	27,743,627
Flaxseed	" 1,986,799	66,000	2,052,799
Rye	" 2,928,453	296,167	3,224,620
Barley	" 1,276,753	1,244,000	2,520,753
Grass Seeds	sacks 116,117	.....	116,117
Millstuffs	" 1,075,811	7,225	1,083,035
Gluten Meal	" 174,825	.....	174,825
Glucose	bbls. 151,348	.....	151,348
Malt	sacks 220,270	.....	220,270
Oil Cake	" 169,371	2,473	171,844
Spelter	plates 168,914	.....	168,914
Lead	pigs 723,743	3,584	727,327
Soap	boxes 24,053	.....	24,053
Starch	pkgs. 101,997	.....	101,997
Lard	" 57,217	.....	57,217
Lard	tierces 77,786	.....	77,786
Coffee	sacks 11,911	.....	11,911
Tea	chests 15,485	.....	15,485
Sugar	bbls. 128,440	.....	128,440
Syrup	" 9,334	.....	9,334
Groceries	pkgs. 376,371	1,550	377,921
Canned Goods	" 83,140	.....	83,140
Cured Meats	" 2,625	.....	2,625
Pork	bbls. 19,933	.....	19,933
Beef	" 1,215	.....	1,215
Oatmeal	" 32,008	.....	32,008
Cornmeal	" 5,756	.....	5,756
Broom Corn	bales 6,085	.....	6,085
Nails	kegs 1,400	.....	1,400
Iron (manfd.)	tons 3,720	15,790	18,910
Potatoes	bush. 3,610	.....	3,660
Vinegar	bbls. 6,992	.....	6,992
White Lead	pkgs. 33,879	1,000	34,879
Hides	bales 68,781	.....	68,781
Tallow	bbls. 37,762	500	38,262
Liquors	pkgs. 4,456	.....	4,456
Salt	bbls. 1,765	.....	1,765
Oils	" 12,620	85,770	48,390
Coal	tons 2,782	23,250	26,032
Lumber	M. 2,375	.....	2,375
Wool and Hair	sacks 17,188	.....	17,188
Steel Rails	tons 4,751	176,088	180,839
Rags	bales 6,472	.....	6,472
Hay	tons 1,061	.....	1,061
Glass	"	260	260



INTERIOR OF CARTER K. HARRISON
PUBLIC BATH HOUSE

LOCATION, MATHER STREET, NEAR HALSTED.

PORT OF CHICAGO, COASTWISE RECEIPTS, 1898.

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COMMODITIES.	Chicago River. Quantity.	Calumet River. Quantity.	Total. Quantity.
Merchandise.....pkgs.	3,551,983	4,837	3,556,820
Canned Goods....."	641,761	1,000	642,761
Dry Goods....."	109,610	.....	109,610
Hardware....."	568,180	1,700	569,880
Groceries....."	595,649	1,170	596,819
Paper....."	241,699	2,575	244,274
Lumber.....M.	789,676	65,811	855,487
Shingles....."	138,461	7,025	145,486
Lath....."	22,952	.....	22,952
Posts.....pieces	1,387,473	50,780	1,438,253
Railroad Ties....."	2,165,808	72,600	2,238,408
Telegraph Poles....."	50,072	44,386	94,458
Wood.....cords	16,661	1,514	18,175
Bark....."	5,947	.....	5,947
Green Fruits.....pkgs.	6,005,195	3,102	6,008,297
Coal.....tons	1,231,851	310,800	1,542,651
Cordage.....bales	74,638	.....	74,638
Hemp, Jute, etc....."	60,257	.....	60,257
Salt.....bbls.	731,933	845,916	1,577,849
Iron Ore.....tons	63,934	2,212,032	2,275,996
Boots and Shoes.....pkgs.	217,897	.....	217,897
Drugs....."	111,282	.....	111,282
Caustic Soda.....drums.	23,363	.....	23,363
Soda.....boxes	9,564	.....	9,564
Rosin, Tar, etc.....bbls.	3,743	.....	3,743
Sugar....."	1,052,502	.....	1,052,502
Syrup....."	8,576	.....	8,576
Flour....."	98,975	.....	98,975
Potatoes.....bush.	424,830	35,950	460,780
Cheese.....pkgs.	21,373	.....	21,373
Coffee.....sacks	248,467	1,300	249,767
Tea.....chests	3,554	.....	3,554
Oils.....bbls.	13,135	.....	13,135
Peas.....sacks	108,419	.....	108,419
Beans....."	14,941	.....	14,941
Vinegar.....bbls.	7,906	.....	7,906
Fish.....tons	2,562	107	2,669
Nails.....kegs	44,440	.....	44,440
Copper.....bars	35,355	1,000	36,355
Sulphur.....bbls.	17,670	.....	17,670
Dried Fruits.....boxes	19,128	.....	19,128
Plaster.....bbls.	24,762	109,388	184,150
Cement....."	650,018	.....	650,018
Whiting....."	49,398	5,800	55,198
Asphalt....."	33,052	.....	33,052
Stone.....tons	2,740	.....	2,740
Marble, etc.....blks.	5,258	.....	5,258
Paint.....pkgs.	11,071	.....	11,071
Wool and Hair.....sacks	9,227	.....	9,227
Green Hides.....bales	15,452	.....	15,452
Leather....."	91,969	.....	91,969
Furniture.....pieces	145,337	.....	145,337
Soap.....boxes	67,152	.....	67,152
Rice.....sacks	36,019	.....	36,019
Liquors.....pkgs.	27,098	.....	27,098
Crockery, etc....."	5,632	.....	5,632
Pig Iron, etc.....tons	16,096	61,435	77,531
Starch.....pkgs.	1,125	.....	1,125
Grass Seeds.....sacks	12,368	.....	12,368
Barley.....bush.	10,000	.....	10,000
Flaxseed....."	217,051	75,000	292,051
Oats....."	1,000	.....	1,000
Rye....."	40,400	.....	40,400
Wheat....."	1,631,068	.....	1,631,068

**DUTIES COLLECTED ON IMPORTED MERCHANDISE AT CHICAGO, ILL.,
DURING YEARS 1894 TO 1898, INCLUSIVE, BY MONTHS.**

MONTHS.	1894	1895	1896	1897	1898
January	\$ 530,244.84	\$ 703,708.75	\$ 650,189.97	\$ 452,517.88	\$ 508,808.18
February	427,803.73	508,577.45	443,857.14	332,951.26	401,324.98
March	449,003.75	512,432.22	402,874.08	631,631.38	515,640.99
April	347,068.40	480,240.25	323,309.81	907,732.13	841,974.75
May	369,610.71	415,127.01	297,549.03	219,576.20	304,303.86
June	352,102.94	339,151.54	332,056.72	399,039.11	373,032.41
July	369,535.54	571,726.48	424,271.35	444,066.85	530,800.22
August	647,403.15	603,112.91	378,830.35	193,652.48	544,701.36
September	532,731.02	502,615.40	347,159.25	267,730.13	491,172.82
October	465,939.86	452,020.29	294,123.32	272,585.11	441,920.76
November	375,875.78	400,609.24	306,821.60	312,583.94	456,812.45
December	427,929.95	480,844.48	345,151.62	335,473.37	497,544.02
Totals	\$5,295,249.17	\$5,920,166.02	\$4,546,144.24	\$4,769,539.84	\$5,298,086.70

SHIPMENTS OF GRAIN FROM CHICAGO, 1898.

COASTWISE AND IN TRANSIT THROUGH CANADA FOR AMERICAN PORTS AND FOR EXPORT.

CHARACTER OF SHIPMENT.	BARLEY. Bushels.	CORN. Bushels.	FLAXSEED. Bushels.	OATS. Bushels.	RYE. Bushels.	WHEAT. Bushels.
Coastwise....	2,520,753	76,687,031	2,052,799	24,782,580	3,324,620	24,488,479
In Transit....	.....	2,698,467	.....	2,961,047	.....	312,018
For Export...	223,928	18,193,803	181,760	276,525	394,090	2,110,110
Total	2,744,682	97,579,301	2,234,559	28,020,152	3,618,710	26,860,607

Grand total..... 161,058,011 bushels.

Extract from the report of W. S. Chance, supervising special agent of the Treasury Department, dated June 30, 1898, showing comparative statement of entrances and clearances for year ending June 30, 1898.

	ENTRANCES.	CLEARANCES.	TOTAL.	Per cent. of Total of Nation.
Baltimore	2,608	3,167	5,770	2.41
Boston	2,846	2,947	5,793	2.42
New Orleans.....	1,854	1,863	2,717	1.18
Philadelphia	1,731	1,926	3,657	1.58
San Francisco.....	1,056	1,453	2,509	1.05
Group Total.....			20,446	
Chicago	9,576	9,617	19,193	8.01
New York.....	7,805	7,140	14,445	6.08
Chicago over New York.			4,748	

The importance of Chicago as a factor in the contribution to the national revenue is, in part, set forth in this report of the supervising special agent in the statement of merchandise transported without appraisement, under Section 1 of the Act of June 10, 1880, and forwarded to the following ports under Section 7 of the same Act of Congress, viz.:

PORTS.	PACKAGES.	INVOICE VAL.	ESTIMATED DUTY.
Baltimore	47,545	\$ 819,546.00	\$ 264,304.22
Boston	115,833	1,880,832.00	1,279,270.65
Chicago.....	572,297	9,755,477.12	6,463,772.88
New York.....	1,031,003	9,497,181.00	1,366,457.77
New Orleans.....	23,644	104,003.00	47,169.29
Philadelphia	83,328	3,278,862.00	2,696,933.71
San Francisco.....	110,664	1,905,597.00	1,413,469.38

This shows that of the total quantity of merchandise transported under the law referred to, during the fiscal year, the City of Chicago had 20.74 per cent. of the number of packages, 25.4 per cent. of the gross invoice valuation, and the estimated duty on the goods so transported to Chicago was 30.27 per cent. of the gross estimated duty on these goods for the whole nation.

A consideration of the growth and magnitude of the trade of the Great Lakes presents many strong reasons for the improvement of the harbors on these waters, for from the same report already quoted, covering the fiscal year ending June 30, 1898, we find the arrivals and clearances of sixteen selected ports on the Great Lakes amount to 147,846, or 61.84 per cent. of the whole entrances and clearances of the nation.

TONNAGE OF THE DISTRICT OF CHICAGO, 1898.

ENTRANCES.

PORTS.	COASTWISE TRADE.						FOREIGN TRADE.					
	STEAM.			SAIL.			STEAM.			SAIL.		
	No.		Tons.		No.		No.		Tons.		No.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
Chicago	5,927	4,564,318	1,548	521,178	7,475	5,085,498	118	190,233	81	9,890	149	200,063
South Chicago	991	1,447,024	544	725,619	1,535	2,172,648	15	26,951	15	8,776	30	35,727
Michigan City	188	48,888	51	14,890	289	68,286					239	63,286
Totals	7,106	6,060,238	2,143	1,261,187	9,249	7,821,425	133	217,184	46	18,666	179	238,790
											9,428	7,557,215

CLEARANCES.

PORTS.	COASTWISE TRADE.						FOREIGN TRADE.					
	STEAM.			SAIL.			STEAM.			SAIL.		
	No.		Tons.		No.		No.		Tons.		No.	
	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.	No.	Tons.
Chicago	5,986	4,619,744	1,522	529,392	7,458	5,119,186	216	270,014	89	47,171	305	317,185
South Chicago	879	1,272,854	529	709,369	1,408	1,982,223	112	145,109	40	28,844	152	178,853
Michigan City	189	49,102	50	14,849	299	68,951					239	63,951
Totals	7,054	5,941,700	2,101	1,253,610	9,165	7,164,310	328	415,123	129	76,015	457	491,138
											9,562	7,686,448

ANNUAL REPORT ON OBSTRUCTIONS REMOVED FROM THE CHICAGO RIVER AND
OTHER CAUSES OF DELAY TO STEAMERS NAVIGATING THE RIVER.

April 20, 1898, schooner Annie Thorine sunk at North Halsted street bridge in the North branch of the Chicago river, and being an obstruction to navigation it was towed to Lake Michigan and pulled on shore.

September 20, 1898, schooner Charlotte Raab sunk at Kinzie street bridge, west side of river. It was towed to Lake Michigan by tugs and pulled on shore.

July 12, 1898, steamer George Williams grounded on La Salle street tunnel at 10 A. M. Released by tugs at 6 P. M. of same day.

August 14, 1898, steamer Bulgaria grounded on Washington street tunnel at 10 P. M. Released by tugs at 4 P. M., August 15th.

August 25, 1898, steamer City of Paris grounded on Washington street tunnel at 9 A. M. Released by tugs at 6 P. M. of same day.

September 3, 1898, steamer German grounded on Washington street tunnel at 12 M. Released by tugs September 5th at 6 P. M.

September 20, 1898, steamer America grounded on Washington street tunnel at 10 P. M. Released by tugs September 21st at 7 P. M.

October 10, 1898, steamer Robert Mills grounded on La Salle street tunnel at 9 A. M. Released by tugs at 10 P. M. of same day.

November 15, 1898, steamer Charles S. Parnell grounded on La Salle street tunnel at 8 P. M. Released by tugs at 10 A. M., November 16th.

MOVEMENT OF VESSELS IN CHICAGO RIVER.

BRIDGES.	NUMBER.				AVERAGES.					PERCENTAGE OF TIME.	
	Days in Service.	Hours Open.	Vessels Passed	Swings of Bridges	No. of Vessels per Day.	No. of Swings per Day.	Time Open per Swing.	Time Open per Hour	Time Open per Day.	Closed.	Open.
Rush street..	259	438.33	12,871	10,160	49.69	39.22	2.58	4 21	101.59	92.95	7.05
Dearborn St.	227	302.45	9,188	7,704	40.47	34.38	2.35	3.32	80.02	94.45	5.55
Wells street..	241	298.17	8,926	7,405	37.04	30.72	2.88	3.04	73.02	94.93	5.07
Lake street..	255	329.22	7,508	6,246	29.42	24.49	3.16	3.23	77.49	94.63	5.37
Harrison St..	229	370.08	6,632	5,309	28.95	23.18	4.18	4.04	97.10	92.25	6.75
12th street...	229	290.44	6,420	5,392	28.03	23.54	3.23	3 17	76.17	94.71	5.29
18th street...	257	254.54	5,350	4,626	20.81	18.00	3.80	2.47	59.51	95.87	4.13
22d street....	229	260.40	4,904	4,061	21.41	17.73	3.85	2.84	68.29	95.25	4.75
Kinzie street.	221	391.57	8,136	6,200	36.81	28.05	3.79	4.43	106.41	92.60	7.40

NOTE.—This table gives time only for actual service per telephone operator at the designated bridges, night and day. Night and day report is given to November 15th, excepting Rush, Wells, Lake and Eighteenth street bridges. Day and night report is given for the above named bridges until December 1st and day report to December 15th.

YEAR 1898 DETAILS OF VESSEL MOVEMENTS PASSING BRIDGES BY MONTHS.

MONTHS.	Rush St.			Dearborn Street.			Wells St.			Lake St.			Harrison St.			12th St.			18th St.			22d St.			Kinzie St.		
	No. Vessels.	No. Swings.	Minutes Open.	No. Vessels.	No. Swings.	Minutes Open.	No. Vessels.	No. Swings.	Minutes Open.	No. Vessels.	No. Swings.	Minutes Open.	No. Vessels.	No. Swings.	Minutes Open.	No. Vessels.	No. Swings.	Minutes Open.	No. Vessels.	No. Swings.	Minutes Open.	No. Vessels.	No. Swings.	Minutes Open.	No. Vessels.	No. Swings.	Minutes Open.
April.....	915	798	2119	727	662	1704	744	665	1655	570	528	1942	556	501	2234	537	489	1877	409	375	1293	425	373	1768	508	395	1796
May.....	1554	1236	3055	1238	1062	2635	1210	975	2619	1066	873	2805	1051	825	3515	958	805	2629	785	655	2408	716	578	2239	1088	820	3277
June.....	1877	1454	3696	1274	1048	2682	1219	985	2472	1000	827	2518	905	741	3485	963	774	2478	722	590	1989	706	587	2224	1107	865	3346
July.....	2068	1558	4221	1368	1186	1751	1222	1009	2357	1000	880	2482	921	742	2821	890	749	2299	695	595	1875	675	552	2067	1126	911	3428
August.....	2162	1582	4340	1526	1248	3007	1372	1085	2604	1116	883	2917	1022	788	3206	1017	826	2615	822	707	2275	786	644	2418	1568	1128	4089
September.....	1641	1339	3455	1237	1042	2609	1210	1020	2367	1015	827	2660	876	686	2928	865	735	2222	714	622	1966	674	570	2051	1231	927	3318
October.....	1490	1203	3010	1213	1003	2499	1175	985	2108	930	777	2375	824	658	2657	795	686	2120	628	536	1728	603	496	1890	1015	778	2915
November.....	965	829	2040	605	513	1278	640	545	1127	696	609	1799	417	368	1362	415	348	1204	497	484	1485	319	261	983	493	381	1355
December.....	174	161	377	.....	.....	.....	134	126	288	110	94	264	.....	.....	.....	.....	.....	.....	78	62	275	.....	.....	.....	.....	.....	.....

OPERATION OF BRIDGES, YEAR 1898.

	Average Time of Each Swing. Minutes.	Average No. of Swings Each Month.	Total Number of Swings Annually.
HAND BRIDGES.			
Ashland avenue. (Canal).....	0	0	0
Ashland avenue. (River).....	8	420	5,040
Archer avenue.....	5 $\frac{1}{4}$	120	1,488
Belmont avenue.....	10	8	85
Chicago avenue.....	5	249	2,912
Chittenden street. (Low bridge).....	10	21	250
Clybourn place.....	5 $\frac{1}{4}$	265	3,163
Deering street. (Low bridge).....	4 $\frac{1}{4}$	716	8,599
Diversey street.....	9	17	205
Division street. (Canal).....	4	228	2,711
Division street. (River).....	8 $\frac{3}{4}$	434	5,206
Erie street.....	5 $\frac{1}{2}$	266	3,190
Fuller street.....	5 $\frac{1}{2}$	161	1,981
Halsted street. (Canal).....	5	279	3,345
Harrison street.....	4 $\frac{3}{4}$	442	5,309
Indiana street.....	4 $\frac{1}{4}$	279	3,185
Kinzie street.....	4	517	6,200
Laurel street.....	....	0	0
Main street. (Low bridge).....	5	666	7,992
North Western avenue.....	10	9	107
North avenue.....	4 $\frac{1}{2}$	291	3,490
Polk street.....	4 $\frac{1}{2}$	450	5,398
Riverdale.....	9	0	8
South Western avenue.....	5 $\frac{1}{2}$	106	1,273
Taylor street.....	5	489	5,869
Weed street.....	9 $\frac{1}{2}$	79	949
Webster avenue.....	6	185	2,218
Twenty-second street.....	5 $\frac{1}{4}$	339	4,061
Thirty-fifth street.....	7 $\frac{1}{2}$	98	1,173
Ninety-second street.....	6 $\frac{1}{2}$	244	2,927
Ninety-fifth street.....	5 $\frac{1}{2}$	159	1,909
One Hundred and Sixth street.....	8 $\frac{1}{4}$	62	745
Fullerton avenue.....	7 $\frac{1}{2}$	65	779
STEAM BRIDGES.			
Canal street.....	8 $\frac{1}{2}$	406	4,878
South Halsted street.....	8 $\frac{1}{2}$	846	4,150
Madison street.....	8	549	6,586
Twelfth street.....	8 $\frac{3}{4}$	450	5,398
Eighteenth street.....	8 $\frac{1}{2}$	885	4,626
ELECTRIC BRIDGES.			
Adams street.....	8 $\frac{1}{2}$	585	6,421
Clark street.....	1 $\frac{1}{2}$	741	8,890
Dearborn street.....	2 $\frac{1}{4}$	642	7,704
North Halsted street. (Bascule).....	8	201	2,409
Jackson street.....	4	646	7,751
Randolph street.....	8	555	6,664
Rush street.....	2 $\frac{3}{4}$	847	10,160
State street.....	2 $\frac{1}{2}$	741	8,891
Van Buren street.....	3 $\frac{1}{2}$	526	6,317
Washington street.....	8	554	6,651
Lake street.....	8 $\frac{1}{2}$	520	6,246
Wells street.....	2 $\frac{1}{2}$	617	7,405

The tables of the movement of vessels in the harbors of Chicago are compiled from the records of the Vessel Dispatcher's office and of the Bridge Department. They show that of our total commerce by lake, the Calumet River received 16.9 per cent. as against 15.1 per cent. last year; the Chicago River receiving 83.1 per cent. as against 84.9 per cent. in 1897. Of the vessels that used the Chicago River this year, 16.35 per cent. stopped east of Rush street bridge as against 15.8 per cent. last year. Of all that passed Rush street bridge, 30.65 per cent. remained east of Wells street, 36 per cent. went up the North branch, and 33.35 per cent. went down the South branch. Of the vessels that went down the South branch 65.4 per cent. passed south of Twenty-second street bridge, as against 76 per cent. last year. Trade during the year has increased in the North branch. 52.1 per cent. of all vessels that passed west of Wells street went up that branch as against 49 per cent. last year, while only 47.9 per cent. went down the South branch as against 51 per cent. last year. Of the movement of vessels from branch to branch without going east of Wells street, the North branch has also gained, as there are 3,492 entries for that branch as against 2,468 entries last year, while the South branch has 3,221 this year as against 2,566 entries in 1897.

Table showing Precipitation and Mean Temperature and Mean Barometric Pressure in inches, and in degrees Fahr., over the basin of upper lakes, and Mean Water in Lake Michigan in inches, by years, from 1871 to 1898, both inclusive, with the annual increase or decrease.

YEAR	BASIN OF UPPER LAKES.									LAKE MICHIGAN.		
	Precipitation.	Difference with Preceding Year		Mean Temp.	Difference with Preceding Year		Pressure.	Difference with Preceding Year		Levels of Mean Water.	Difference with Preceding Year	
	Inches.	Inc.	Dec.	Deg's.	Inc.	Dec.	Inches.	Inc.	Dec.	Inches.	Inc.	Dec.
1871	30.75			47.2			29.26			21.24		
1872	29.59		1.16	44.2		3.0	29.26	0.00	0.00	9.62		11.62
1873	32.49	2.90		44.3	0.1		29.25		.01	16.80	7.18	
1874	29.56		2.93	46.3	2.0		29.31	.06		20.04	3.24	
1875	33.06	3.50		42.0		4.3	29.26		0.5	17.40		2.64
1876	28.93		4.13	45.1	3.1		29.25		0.1	30.72	13.32	
1877	36.23	7.30		47.5	2.4		29.28	.03		27.72		3.00
1878	38.35	2.12		49.2	1.7		29.22		.06	24.00		3.72
1879	35.51		2.84	46.5		2.7	29.30	.08		12.72		11.28
1880	38.36	2.85		47.0	0.5		29.28		.02	13.92	1.20	
1881	42.42	4.06		47.1	0.1		29.29	.01		15.12	1.20	
1882	37.28		5.14	48.2	1.1		29.29	.00	.00	24.00	8.88	
1883	32.66		4.62	44.4		3.8	29.28		.01	25.20	1.20	
1884	34.31	1.65		46.2	1.8		29.28	.00	.00	28.88	1.68	
1885	32.99		1.32	43.8		2.4	29.26		.02	28.56	1.68	
1886	30.56		2.43	45.8	2.0		29.28	.02		31.68	3.12	
1887	29.63		0.93	45.5		0.3	29.29	.01		23.52		8.16
1888	27.57		2.06	43.8		1.7	29.31	.02		15.60		7.92
1889	28.65	1.08		45.9	2.1		29.29		.02	9.24		6.36
1890	34.58	5.93		46.0	0.1		29.30	.01		7.56		1.68
1891	29.62		4.96	46.4	0.4		29.30	.00	.00	0.60		6.96
1892	34.15	4.53		44.7		1.7	29.31	.01		-2.04		2.64
1893	31.46		2.69	43.8		0.9	29.26		.05	-2.35		0.31
1894	29.51		1.95	46.9	3.1		29.28	.02		6.00	8.35	
1895	26.03		3.48	44.9		2.0	29.29	.01		-5.88	0.00	11.88
1896	31.59	5.56		46.1	1.2		29.30	.01		-6.96	0.00	1.08
1897	30.36		1.23	45.9		0.2	29.31	.01		+3.96	10.62	
1898	31.32	0.76		46.2	0.3		29.27		0.04	+5.64	1.68	

BY LAKE PERIODS.

YEAR	BASIN OF UPPER LAKES.									LAKE MICHIGAN						ANNUAL.	
	Precipitation.	Difference with Preced'g Year			Mean Temp.	Difference with Preced'g Year			Pres-sure.	Difference with Preced'g Year			Levels of Mean Water.	Difference with Preceding Year			
	Inches.	Inc.	Dec.	Deg's.	Inc.	Dec.	Inches.	Inc.	Dec.	Inches.	Inc.	Dec.	Inches.	Inc.	Dec.		
1871 to 1898	32.72	.....	.....	45.8	.....	.....	29.26	.....	.....	.....	.....	.....	20.03	.....	.....	Means 1871-1879	
	35.71	2.99	.....	46.1	0.3	.....	29.28	.02	.....	.....	.....	.....	23.91	3.88	.....	" 1880-1886	
	30.81	.....	4.90	46.6	0.5	.....	29.29	.01	.....	.....	.....	.....	7.45	.....	16.46	" 1887-1893	
	29.76	.....	1.05	46.0	.....	0.60	29.29	.00	.....	.00	.....	.....	0.55	6.90	.....	" 1894-1898	
	32.41	.....	.....	45.7	.....	.....	29.28	.....	.....	.....	.....	.....	14.38	.....	.....	" 28 Years.	

From the climatic data over the basin of the upper lakes during 1897 and the conditions that obtained in January, 1898, it was inferred that

some slight improvement in elevation of water in Lake Michigan was probable during 1898. There is but a slight increase in precipitation over the lake basin in 1898; and, as against this, there is an increase of mean temperature and a decrease of pressure during the year, both calculated to nullify the advantages that, under favorable circumstances, would follow from an increased rainfall. These conditions do not afford any material encouragement for expecting any improvement of lake level during 1899. From data covering twenty-eight years, it appears that a mean annual rainfall over the basin of the upper lakes of 32.41 inches, with a mean annual temperature of 45.7 degrees and a mean actual barometric pressure of 29.28 inches, will give a level of water in Lake Michigan of 14.38 inches above datum.

THE LAKE FRONT SUBMERGED LANDS.

Before the decision of the Illinois Supreme Court of June 18, 1898, in the claims of the Illinois Central Railroad Company to the submerged lands on the lake front, many rulings of the Supreme Court of the United States were given on this important matter. On December 5, 1892, that court decided that :

"The ownership of and dominion and sovereignty over lands covered by tide waters within the limits of the several States belong to the respective States within which they are found, with the consequent right to use or dispose of any portion thereof, when that can be done without substantial impairment of the interest of the public in the waters, and subject always to the paramount right of Congress to control their navigation as far as may be necessary for the regulation of commerce with foreign nations and among the States.

"The same doctrine as to the dominion and sovereignty over and ownership of lands under the navigable waters of the Great Lakes applies, which obtains at the common law as to the dominion and sovereignty over and ownership of lands under tide waters on the borders of the sea, and the lands are held by the same right in the one case as in the other, and subject to the same trusts and limitations. * * *

"The Act of the Legislature of Illinois of April 16, 1869, granting to the Illinois Central Railroad Company, its successors and assigns, 'all the right and title of the State of Illinois in and to the submerged lands constituting the bed of Lake Michigan, and lying east of the tracks and breakwater of the Illinois Central Railroad Company for the distance of one mile, and between the south line of the south pier extended eastwardly, and a line extended eastward from the south line of lot 21, south of and near to the roundhouse and machine shops of said company, in the South Division of said City of Chicago,' cannot be invoked so as to extend riparian rights, which the company possessed from its ownership of lands in sections 10 and 15 on the lake; and, as to the remaining submerged lands, it was not competent for the Legislature to thus deprive the State of its ownership of the submerged lands in the harbor of Chicago, and of the consequent control of its waters; and the attempted cession by the Act of April 16, 1869, was inoperative to affect, modify or in any respect to control the sovereignty and dominion of the State over the lands, or its ownership thereof, and any such attempted operation of the Act was annulled by the repealing Act of April 15, 1878, which, to that extent, was valid and effective.

"The fee of the made or reclaimed land between Randolph street and Park Row, embracing the ground upon which rests the tracks and the breakwater of the railroad company south of Randolph street, is in the City, and subject to the right of the railroad company to its use of the tracks on ground reclaimed by it and the continuance of the breakwater, the City possesses the right of riparian ownership, and is at full liberty to exercise it."

These decisions ought to be binding on all interests, yet last year the same matter was again raised, as the Illinois Central Railroad Company filed a bill alleging that "the City of Chicago, without right or authority, interferes with and prevents the Illinois Central Railroad Company from filling in the land within the lines of the breakwater between Twenty-fifth and Twenty-seventh streets on the front of Lake Michigan," and prayed for an injunction to restrain the City from interfering with the company. The Superior Court of Cook County denied the application for an injunction and dismissed the bill, and the Illinois Central Railroad Company appealed. The State Supreme Court, on June 18, 1898, confirmed the action of the court below in the following language:

"Section 3 of the Act of 1851, incorporating the Illinois Central Railroad Company, granting a strip of land 200 feet wide for right of way, and providing that the company may take possession of 'any lands, streams and materials' for depots, etc., does not extend to lands lying outside the right of way and submerged by Lake Michigan, as such lake is not a 'stream.'

"Section 3 of the Act incorporating the Illinois Central Railroad Company, which provides that all 'lands, waters, privileges and materials belonging to the State are hereby granted to said corporation' for road purposes, does not empower such corporation to use for such purposes land lying outside its right of way and submerged by the waters of Lake Michigan, as the State holds such lands in trust for the public, and cannot dispose of the same for private use, except in parcels for navigation improvement, where such disposition will not impair the public interest in what remains."

In addition to these clear illustrations of the rights of the State and of the City as regards this important question set forth in the decision of December 5, 1892, the United States Supreme Court then proceeded to say:

"But the decree below, as it respects the pier, commenced in 1872, and the piers completed in 1880 and 1881, marked 1, 2 and 3, near Chicago river, and the pier and docks between and in front of Twelfth and Sixteenth streets, is modified so as to direct the court below to order such investigation to be made as may enable it to determine whether those piers erected by the company, by virtue of its riparian proprietorship of lots formerly constituting part of section 10, extend into the lake beyond the point of practical navigability, having reference to the manner in which commerce in vessels is conducted on the lake; and, if it be determined upon such investigation that such piers, or any of them, do not extend beyond such point, then that the title and possession of the railroad company to such piers shall be affirmed by the court; but, if it be ascertained and determined that such piers, or any of them,

do extend beyond such navigable point, then the said court shall direct the said pier or piers, to the excess ascertained, to be abated and removed, or that other proceedings relating thereto be taken on the application of the State, as may be authorized by law, and also to order that similar proceedings be taken to ascertain and determine whether or not the pier and dock, constructed by the railroad company in front of the shore between Twelfth and Sixteenth streets, extend beyond the point of navigability, and to affirm the title and possession of the company if they do not extend beyond such point, and, if they do extend beyond such point, to order the abatement and removal of the excess, or that other proceedings relating thereto be taken on application of the State, as may be authorized by law."

The mandate of the Supreme Court was filed in court below April 12, 1893, and directed such execution and further proceedings to be had in conformity with the opinion and decree of the Supreme Court. On October 27, 1893, the cause was referred to a master to take testimony and report. Testimony was taken and reported to Circuit Court, which court, on May 26, 1896, decreed:

"That the piers and docks referred to in the aforesaid judgment and mandate of the Supreme Court and there described as piers 1, 2 and 3, near Chicago river, and the piers and docks constructed by said railroad company in front of the shore between Twelfth street and Sixteenth street, all in the City of Chicago, in the State of Illinois, do not extend, nor does either of them extend into the lake beyond the point of practical navigability, having reference to the manner in which commerce in vessels is conducted on the lake."

It was further decreed that the title and possession of the Illinois Central Railroad Company to the said piers and each of them and every part thereof, was affirmed. From this decree an appeal was taken by the People of the State of Illinois.

In discussing this mandate of the United States Supreme Court the United States Circuit Court of Appeals, Seventh District, stated as follows:

"On September 22, 1890, the Secretary of War approved the recommendation of Major Adams, corps of engineers, in charge of the matter, that the harbor line beyond which no wharves or other structures should be built, should be adopted as follows:

" 'Commencing at a point on the south side of the United States south pier of the entrance to Chicago river and 1,200 feet west of the west line of the easterly break-water, outer basin, and running due south till it intersects the prolongation of the north line of Randolph street, thence due west 800 feet, thence due south to the southern limit of the outer harbor.'

"On July 24, 1895, the Secretary of War granted a permit reciting that the City of Chicago had applied for permission to fill in for the purpose of a public park, established by an ordinance of the City Council of that City, passed June 27, 1895, a portion of the outer harbor at Chicago as far out as the harbor line established by the Secretary of War, September 22, 1890. The Secretary granted permission accordingly to fill in to the outer harbor

line so established upon the following conditions, among others: That there should be constructed along the dock line and entirely enclosing the area to be filled before any deposit whatever should be made, a substantial and tight bulkhead or retaining wall, extending not less than 6 feet above extreme low water mark in Lake Michigan, and so constructed that it should allow dredging to the depth of 20 feet against it and of sufficient mass to act as retaining wall against a back filling reaching to its top.

"On October 21, 1895, the Common Council of the City of Chicago passed an ordinance, which was approved on October 23, 1895, reciting the original decree in this cause in the Court below, the decision of the Supreme Court thereon, and the permission obtained from the Secretary of War; and ordained that for the purpose of providing suitable public landing places for steam vessels and other craft employed in navigation on Lake Michigan, the public grounds of the City of Chicago, known as Lake Park, lying east of Michigan avenue and between the south line of Randolph street and the north line of Lake Park place, formerly known as 'Park Row,' should be extended east to the tracks and grounds of the Illinois Central Railroad Company by enclosing and filling all that space in the shallow waters of Lake Michigan within the outer harbor, so-called, included within the lines specified, which were the harbor lines adopted by the Secretary of War.

* * * * *

"In consideration of certain rights granted or supposed to be granted to the Illinois Central Railroad Company, many duties were imposed upon that company with respect to filling and the construction of abutments and other works upon the proposed Lake Park, and the work so authorized has been and is being, by the City and the Illinois Central Railroad Company, diligently prosecuted. It is enough to say that the harbor line so adopted by the United States Government at the request of the City of Chicago is on a line with the outer line of the pier at Thirteenth street extended, now complained of, and extends north to the piers at the north of Randolph street extended.

"Without undertaking to say to what extent these proceedings of the City of Chicago were authorized as between it and the People of the State of Illinois, it is sufficient to say that these things have been done without any adverse action on the part of the State of Illinois. If they have no other effect, they tend to strengthen, if support be needed, the general drift of all the evidence in this case, that the necessities of the commercial marine of the Great Lakes require substantially a depth of water of 20 feet to float the larger class of vessels, and indicate that the depth at the present time marks "the point of practical navigability having reference to the manner in which commerce in vessels is conducted on the lake."

It is conceded that the piers in question do not intrude into the waters of the lake to that extent, and that that depth of water can be obtained at them only by dredging. Conceding then, as we must, the right of the railroad company to reach that point of practical navigability, these structures were not and are not unlawful, and its rights to them must be sustained.

"The title to submerged lands resting in the State are held in trust in aid of navigation. Courts have at all times been diligent to protect and enforce rights of navigation, in aiding and protecting whatever may tend to build up and encourage commerce upon the seas.

"It does not comport with our sense of duty in the protection of a mere naked legal title to submerged land, to deny a conceded riparian right, conceded because so declared by the ultimate tribunal, when that bare legal title is held in trust for the very purpose to which these structures are devoted, viz.: the accommodation of the commerce of the lake. To compel the abatement or removal of these structures to the extent demanded, or to any extent, in view of the establishment of the harbor line as indicated, would be to render them useless for the accommodation of the commerce of the lakes and to practically deny to the appellee a substantial and valuable riparian right to which the Supreme Court has determined it is entitled."

In addition, this Court said:

"We take it that the riparian right to penetrate the waters of the lake to the point of navigability, which is recognized by the decision of the Supreme Court in this case, is not a right that is concluded and exhausted by the single exercise of it; but that the owner has a right at all times to reach the point of practical navigability as it may exist from time to time."

* * * * *

From the opinion of the United States Circuit Court of Appeals, Justice Woods dissented. He says:

"I agree that our present duty is simply to determine whether the decree below is in accord with the mandate of the Supreme Court, and that mandate, speaking as it does in the present tense, I also agree, must be deemed to refer to the date of the opinion (December 5, 1892) in pursuance of which it was issued; but it does not seem to me to follow that no consideration may be given to the later cases of

Shively vs. Bowlby, and *Revell vs. The People*, to which reference has been made. These cases, I think, put it beyond doubt that if the question were yet open the Supreme Court would not hold, as it did, that the Illinois Central Railroad Company had any right by virtue of its ownership of riparian lands to build piers into the lake to the point of navigability, and we are therefore dealing with a nakedly technical right, which exists only because it has been adjudged to exist. But for the judgment on which it rests it has not even the merit of the celebrated stipulation for a pound of flesh. The mandate for its allowance having passed, and not having been recalled or modified, must be enforced to the full extent of its necessary scope, but its scope should be determined by a strict construction rather than by the liberal rule enlarged upon in the opinion of the majority.

"It may be that the riparian right ordinarily is not concluded or exhausted by a single exercise of it, and that 'the owner has the right at all times to reach the point of practical navigability as it may exist from time to time,' but the Supreme Court has not said so of this case, and we need not, and, as I think, should not say it. On the contrary, the opinion of the Supreme Court and its mandate are too specific in one respect to admit of the liberal construction which the court favors. 'To the point' of practical navigability is the specific limitation, and 'the excess beyond such point' is to be removed or abated. These are expressions which make irrelevant any argument or citation of authority to show that 'to reach sometimes means to penetrate,' or that to reach navigable water reasonably implies some 'intrusion into it.'

"Equally irrelevant seems to me the suggestion that a pier would be of no use without navigable water alongside of it. If not outside of the enquiry commanded, the proposition would be unavailing for the purpose of the argument, because the necessary depth at the sides of a pier extending 'to the point' of navigability is only a matter of dredging, from the cost of which the railroad company should not be relieved at the expense of the State. The mandate seems to me to leave room for differences of opinion only in respect to the meaning of the expression 'practical navigability, having reference to the manner in which commerce in vessels is (was then) conducted on the lake.' The question, I agree, is one of fact, but it is to be determined according to the meaning of that expression. The Court below was not only at liberty, it could not escape the duty, to determine the meaning of the words, and if there was doubt, it had the right, and this Court now has the right, to favor, and, as it seems to me, in view of the later opinion of the Supreme Court and the ruling of the highest Court of the State, ought to favor the public title, which is just and clear, rather than the private claim, which is technical and should not be enlarged by implication, either of law or fact.

"The evidence, as I recall it, shows that the piers for the greater part, if not for their entire length, were erected in water varying in depth from 8 to 18 feet, and for many boats on the lake that is and always has been navigable water.

"The very interesting facts and figures in relation to the growth of commerce, and the increased size and draft of boats brought into use is of little significance, unless the mandate is to be interpreted as meaning that the question of navigability is to be determined with reference solely to boats of the greatest, or at least those of more than the average draft. It is undeniable that there is now, and since Chicago was founded there has been in actual use upon the lake a large, though in recent years, diminishing, number of vessels drawing nine feet or less, and I should be unable to agree that these piers do not extend beyond the point of navigability, within the meaning of the mandate, even if the riparian right involved was one of the highest equity. The title to the land under the piers certainly was once in the State, and never by accretion of soil or recession of the waters has there been an appreciable shifting of the boundary line between the land and the water. Neither had there been before the building of the piers any change in the depth of water of a character to affect the question of navigability where the piers stand or in the neighborhood, and it would be difficult, I think, by the evidence, or on general information, to specify the time, either by year or by decade, when by change in commerce as conducted in vessels on the lake, the title of the State was divested, or became subject to occupation by a riparian owner for the construction of piers, conceding such a right to exist in non-navigable water.

"It was certainly not within the power of the Illinois Central, by putting larger boats on the Lake than had been in use before, to take from the State what by the

decision of the Supreme Court in this case the state had not power, even by an act of its Legislature, to grant to that company; and if the larger boats were brought into use by others, for whose action the Railroad Company was in no sense responsible, the conclusion is not affected. The essential fact is that water from six to thirteen feet is navigable to vessels yet engaged in commerce on the lake, and these piers extend far beyond the point where, but for their presence, there would be a depth of ten feet or more.

"There has been and doubtless will be demands for channels and harbors of increased depth, but that does not mean, theoretically or practically, that waters once sufficient for the largest boats in use have ceased to be navigable, though there are now boats for which they are inadequate.

"The establishment by the Government of a harbor line and the ordinances and contracts for the construction of Lake Park have in respect to this case just this significance and no more: that, instead of ordering that the piers in question be abated or removed, we should direct, as the mandate permits, that 'other proceedings relating thereto be taken on application of the State as may be authorized by law.' The land under the piers—a considerable part of it upon any reasonable view of the case, as I see it—belongs to the State. It should be surrendered or paid for. It is not, as the opinion of the Supreme Court in this case demonstrates, 'a mere naked title' which the State has; nor is it held only 'for the very purpose to which these structures are devoted, namely, commerce on the lake.' This Company holds possession for its own private purposes, and to that extent we have an example to the contrary of the belief declared in the opinion of the Supreme Court—'that no instance exists where the harbor of a great city and its commerce have been allowed to pass into the control of any private corporation.' The State, if restored to its rights, would hold for the benefit of the public, and could alienate only 'in these instances mentioned of parcels used in the improvements of the interest thus held, or when parcels can be disposed of without detriment to the public interest in the lands and waters remaining.' So said the Supreme Court in this case. We should not say otherwise."

**PRECIPITATION AT CHICAGO, ILL., IN INCHES BY MONTHS, SEASONS
AND YEARS, FROM 1843 TO 1898, INCLUSIVE.**

Year.	MONTHLY TOTALS.												TOTALS, SEASONS AND YEARS.					Year.
	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Spring.	Summer.	Autumn.	Winter.	Annual.	
1843	2.0	1.9	3.0	4.5	4.0	4.6	1.4	2.4	3.0	1.2	5.1	2.4	11.5	8.4	9.3	.....	35.50	1843
1844	2.8	1.3	1.76	2.76	6.0	5.5	5.0	4.2	0.8	1.6	0.7	0.7	10.52	14.7	3.1	6.5	33.12	1844
1845	2.0	0.5	2.2	6.5	2.0	3.8	3.5	1.2	4.4	1.4	3.3	1.5	10.7	8.5	9.1	3.2	32.30	1845
1846	4.9	1.8	2.6	7.8	2.4	4.3	2.9	1.0	5.0	0.8	1.5	5.0	12.8	8.2	7.3	8.2	40.60	1846
1847	2.8	3.5	1.5	3.1	3.3	1.5	2.8	2.0	3.2	4.6	4.8	1.2	6.9	6.3	12.6	10.8	32.80	1847
1848	1.6	2.4	4.5	4.3	3.8	4.4	3.4	5.1	2.2	3.2	2.1	8.4	11.6	12.9	7.5	5.2	44.40	1848
1849	5.5	1.0	4.7	1.8	3.8	3.6	3.5	3.5	2.6	2.8	1.4	1.2	10.3	9.4	6.8	14.9	34.20	1849
1850	2.1	0.7	2.0	3.8	1.9	3.1	2.1	6.4	1.4	2.0	3.2	1.7	7.7	11.6	7.0	4.0	30.40	1850
1851	1.6	3.8	0.8	4.2	6.7	5.3	3.8	3.1	3.2	2.3	2.3	1.6	11.7	12.2	7.8	7.0	38.60	1851
1852	2.0	1.2	5.5	4.8	2.4	2.5	9.4	0.6	2.3	6.8	4.0	3.3	12.7	6.5	13.1	4.8	38.80	1852
1853	1.4	2.2	1.8	2.8	4.4	4.9	6.1	2.2	4.2	2.0	2.1	2.3	9.0	14.2	9.3	6.9	36.40	1853
1854	1.3	1.9	2.1	2.1	3.1	2.6	9.0	0.9	1.6	3.6	1.0	1.4	7.3	6.5	6.2	5.5	24.60	1854
1855	8.0	0.6	2.6	1.4	2.5	3.7	5.8	3.2	2.3	2.0	2.2	2.0	6.5	12.7	6.5	10.0	36.30	1855
1856	0.9	1.8	0.6	2.6	4.8	4.5	2.1	1.3	2.5	2.1	3.3	3.8	8.0	6.9	8.5	4.7	29.04	1856
1857	1.09	5.43	2.5	2.19	6.33	4.14	3.0	5.0	2.2	4.0	2.7	1.2	11.02	12.14	8.9	10.38	30.83	1857
1858	1.3	1.4	3.0	3.1	7.8	6.3	5.9	3.2	4.0	4.6	4.5	2.0	13.9	15.4	13.1	3.9	47.10	1858
1859	1.4	1.8	5.2	3.4	3.6	1.7	0.9	0.4	2.2	4.1	2.8	1.8	12.2	3.0	9.1	5.2	29.30	1859
1860	1.6	1.6	1.0	2.8	4.6	3.5	5.3	2.6	2.8	4.1	2.3	4.2	8.4	11.4	9.2	5.0	36.40	1860
1861	1.4	3.0	3.4	4.7	3.7	2.1	4.3	2.4	3.4	7.5	1.5	1.9	11.8	8.8	12.4	8.6	39.30	1861
1862	4.0	0.7	2.0	5.2	4.3	2.9	6.7	3.6	5.6	2.92	1.2	1.3	11.5	13.2	9.72	6.6	40.42	1862
1863	2.8	2.6	2.1	2.1	5.1	1.3	2.3	4.2	1.6	4.0	1.9	3.6	9.8	7.8	7.5	6.7	33.60	1863
1864	1.6	0.4	2.1	3.2	1.9	2.1	6.4	1.1	2.1	1.9	3.1	2.5	7.3	9.6	7.1	5.6	28.40	1864
1865	0.4	3.1	3.1	3.8	1.5	5.1	6.1	7.2	4.8	4.0	0.5	0.6	8.4	18.5	9.3	6.0	40.20	1865
1866	2.8	1.6	2.2	2.2	2.0	4.4	4.7	4.2	4.6	2.8	0.8	3.4	7.0	13.3	8.2	5.0	36.30	1866
1867	1.93	2.22	1.58	1.70	4.42	1.86	1.62	2.33	0.57	1.28	1.89	1.11	7.70	5.71	3.74	7.55	22.41	1867
1868	1.28	0.92	5.24	3.00	3.74	3.11	2.87	3.55	7.08	1.69	2.60	1.40	11.98	9.45	11.37	3.31	36.48	1868
1869	1.97	2.23	1.33	4.30	5.69	5.03	3.26	1.32	0.89	1.10	2.42	2.03	11.22	10.61	4.41	5.60	31.57	1869
1870	1.95	0.86	1.81	1.15	0.80	1.70	3.71	2.07	2.82	2.43	1.16	2.46	3.76	7.48	6.41	4.84	22.92	1870
1871	4.13	1.45	2.66	3.79	3.90	5.56	2.52	2.01	0.74	1.88	3.62	3.44	10.35	10.10	12.24	8.04	35.61	1871
1872	0.68	0.84	3.79	3.03	3.24	3.45	3.09	2.59	6.43	0.65	1.06	0.22	10.06	9.13	8.14	5.14	29.07	1872
1873	2.56	0.47	0.89	6.22	7.20	1.44	4.04	1.58	3.53	2.43	1.61	4.44	14.31	7.06	7.57	3.25	36.41	1873
1874	3.47	1.51	2.15	2.67	2.08	3.25	0.58	3.15	3.76	2.55	2.83	0.63	6.90	6.98	9.14	9.42	28.63	1874
1875	0.96	1.99	1.43	2.32	3.64	5.17	7.18	3.28	4.89	4.32	0.75	2.62	7.39	15.60	9.46	3.58	38.06	1875
1876	3.22	3.90	4.04	2.07	1.85	5.96	3.11	3.68	3.74	1.20	3.25	0.48	7.96	12.73	8.29	9.74	36.88	1876
1877	1.91	0.06	5.37	2.42	1.81	6.04	2.98	3.06	2.02	6.15	6.08	2.75	9.60	12.08	14.25	2.45	41.01	1877
1878	1.31	2.12	4.39	5.57	5.22	8.02	6.09	3.66	1.99	5.17	0.83	2.58	15.18	12.77	7.99	6.18	41.95	1878
1879	0.54	1.47	2.37	1.93	3.89	3.18	5.58	0.45	1.18	2.72	4.93	2.47	8.19	9.21	8.83	4.59	30.71	1879
1880	3.53	2.91	2.25	5.20	4.97	3.50	3.07	4.47	2.25	3.19	0.87	1.11	12.42	10.04	6.31	8.91	37.32	1880
1881	0.87	5.98	2.99	1.84	1.85	5.93	4.31	0.54	4.34	6.89	5.97	2.67	6.68	10.78	17.21	8.06	44.18	1881
1882	1.55	2.24	3.43	6.72	5.52	5.71	3.43	4.96	0.91	3.40	1.48	1.99	15.67	14.00	5.97	6.46	41.34	1882
1883	1.74	4.74	0.42	3.72	7.32	5.61	5.53	1.21	1.36	1.36	5.26	1.59	11.46	12.35	13.98	8.47	45.86	1883
1884	1.39	3.27	5.16	3.05	1.53	2.11	3.71	2.50	2.29	3.59	1.80	4.21	9.74	8.32	9.68	6.25	34.61	1884
1885	3.18	2.01	0.67	4.00	3.17	5.20	2.44	11.28	2.97	3.87	2.33	3.35	7.74	18.92	9.17	9.40	44.77	1885
1886	3.56	1.51	1.79	1.29	1.00	0.94	1.53	3.38	6.93	1.42	1.66	1.76	4.08	5.85	10.01	8.42	26.77	1886
1887	3.13	5.10	0.89	0.46	1.38	1.63	1.05	3.35	4.03	2.03	2.41	3.67	2.63	6.03	4.47	9.99	29.13	1887
1888	1.56	1.51	2.99	2.13	6.22	1.66	3.93	2.10	0.98	2.95	2.89	1.94	9.14	7.69	6.72	6.74	30.86	1888
1889	1.64	1.31	1.43	2.35	5.38	2.33	9.56	0.39	2.75	1.82	3.49	1.90	11.38	12.88	8.06	4.09	34.95	1889
1890	2.98	2.42	2.10	3.23	5.13	3.25	2.57	2.58	1.39	4.20	1.59	1.25	10.46	8.40	7.18	7.30	32.69	1890
1891	1.99	1.96	2.13	3.14	2.09	2.42	2.47	4.52	0.32	0.36	2.83	1.32	7.36	9.41	4.51	5.19	26.54	1891
1892	1.99	1.57	2.21	2.17	6.77	10.58	2.23	1.85	1.34	1.54	2.68	1.63	11.15	14.66	5.56	4.88	36.56	1892
1893	2.08	2.44	1.69	4.16	1.93	3.59	8.08	0.18	1.98	1.75	2.45	2.14	7.78	6.85	6.18	6.16	27.47	1893
1894	1.55	2.15	2.66	2.65	3.35	1.96	0.60	0.60	8.28	0.84	1.18	1.66	8.66	3.16	10.30	5.84	27.46	1894
1895	2.15	1.60	1.32	0.86	1.99	1.79	2.42	6.49	0.89	0.51	5.06	6.76	4.17	10.70	7.00	5.41	32.38	1895
1896	1.12	3.48	1.26	2.79	4.16	2.83	3.61	3.52	6.70	1.36	2.16	1.06	8.21	9.96	10.22	11.36	33.14	1896
1897	4.53	2.22	3.56	2.23	0.84	3.60	1.47	1.70	0.84	0.18	3.06	1.62	6.63	6.77	4.08	6.91	25.85	1897
1898	3.54	2.59	4.60	0.76	2.28	5.30	1.94	3.03	3.16	3.26	2.25	1.11	7.59	10.27	8.67	7.75	33.77	1898

**MONTHLY MEAN BAR. PRESSURE—ANNUAL MEANS, FROM
1873 TO 1898—FOR CHICAGO.**

YEAR.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
1873.....	29.13	29.14	29.14	29.05	29.02	29.10	29.13	29.17	29.17	29.15	29.11	29.21	29.13
1874.....	.21	.22	.18	.19	.11	.09	.13	.13	.16	.21	.19	.22	.17
1875.....	.31	.19	.10	.10	.06	.10	.12	.10	.17	.10	.17	.03	.13
1876.....	.16	.15	.10	.09	.10	.02	.12	.16	.12	.06	.10	.18	.11
1877.....	.22	.27	.14	.07	.15	.04	.09	.09	.14	.11	.14	.19	.14
1878.....	.14	.05	.04	28.91	.06	.06	.11	.04	.18	.12	.15	.16	.08
1879.....	.23	.19	.18	29.13	.16	.13	.10	.11	.21	.25	.18	.19	.17
1880.....	.13	.16	.19	.06	.11	.10	.12	.16	.18	.18	.28	.21	.16
1881.....	.23	.21	.00	.13	.15	.07	.15	.15	.09	.20	.18	.21	.15
1882.....	.23	.13	.16	.15	.11	.02	.15	.12	.21	.14	.25	.20	.16
1883.....	.23	.35	.15	.07	.06	.06	.12	.20	.20	.22	.19	.19	.17
1884.....	.25	.13	.13	.07	.07	.16	.06	.17	.15	.24	.19	.20	.15
1885.....	.22	.10	.18	.13	.05	.15	.10	.11	.16	.11	.09	.15	.13
1886.....	.15	.17	.08	.17	.09	.12	.11	.11	.17	.30	.13	.27	.16
1887.....	.16	.23	.18	.07	.11	.11	.10	.14	.20	.17	.17	.16	.15
1888.....	.31	.14	.20	.25	.04	.05	.16	.16	.19	.09	.24	.17	.17
1889.....	.03	.21	.11	.13	.07	.10	.10	.20	.14	.25	.18	.15	.14
1890.....	.23	.16	.18	.21	.14	.11	.14	.19	.23	.06	.17	.20	.16
1891.....	.16	.11	.14	.12	.23	.07	.16	.12	.25	.22	.17	.14	.16
1892.....	.20	.20	.17	.15	.02	.06	.20	.15	.21	.18	.17	.20	.16
1893.....	.08	.19	.11	.01	.03	.10	.10	.15	.12	.13	.14	.18	.11
1894.....	.17	.20	.11	.12	.07	.13	.16	.17	.17	.06	.17	.19	.14
1895.....	.10	.22	.14	.12	.13	.17	.14	.08	.14	.18	.21	30.00	.25
1896.....	29.23	29.04	29.16	29.14	29.07	29.11	29.15	29.16	29.15	29.17	29.21	29.27	29.16
1897.....	29.20	29.16	29.13	29.17	29.14	29.10	29.08	29.13	29.29	29.20	29.18	29.17	29.16
1898.....	29.12	29.18	29.20	29.18	29.08	29.13	29.17	29.12	29.15	29.13	29.15	29.16	29.09

**TABLE OF MAXIMUM DAILY TEMPERATURE, CHICAGO,
YEAR 1898.**

DATE.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1.....	20	9	34	48	69	80	92	72	90	67	61	35
2.....	31	10	31	39	71	69	91	73	91	73	56	42
3.....	34	20	30	40	49	77	81	75	92	75	63	36
4.....	38	38	29	39	42	80	68	71	84	66	67	31
5.....	45	35	39	32	45	76	73	75	74	66	60	27
6.....	38	34	46	37	47	84	80	84	74	60	43	29
7.....	41	43	50	40	61	79	86	80	65	58	56	20
8.....	41	45	59	56	68	68	75	74	72	61	50	20
9.....	36	47	64	49	73	70	74	70	64	66	40	18
10.....	38	60	51	46	69	81	66	77	59	74	36	26
11.....	45	55	52	52	68	82	68	81	62	64	41	34
12.....	55	37	35	65	55	79	72	72	68	54	44	32
13.....	33	48	47	58	70	74	73	73	65	54	38	16
14.....	33	34	50	47	60	76	76	78	78	46	42	26
15.....	33	35	61	50	54	63	82	83	75	56	43	34
16.....	28	26	68	76	55	63	91	83	67	69	43	42
17.....	35	48	47	64	52	70	88	75	75	60	45	39
18.....	42	40	53	43	76	85	89	68	80	44	46	36
19.....	36	33	62	44	75	70	94	68	69	45	44	36
20.....	37	33	50	53	66	81	83	80	67	49	52	35
21.....	35	28	52	57	78	61	71	82	74	44	66	34
22.....	32	29	62	56	68	76	73	90	70	47	50	35
23.....	30	27	32	42	78	78	76	93	71	55	22	33
24.....	33	20	44	45	70	88	84	73	78	66	24	26
25.....	33	24	55	46	57	82	84	77	71	57	32	29
26.....	29	28	57	47	63	77	73	70	77	37	26	33
27.....	22	28	63	63	79	79	90	68	64	42	28	32
28.....	35	29	42	56	63	66	91	82	77	54	34	33
29.....	24	.....	43	58	50	90	80	74	87	54	34	46
30.....	30	.....	35	61	57	89	70	90	74	42	29	39
31.....	29	.....	40	.....	74	.....	76	90	.....	45	.....	13

TABLE OF MINIMUM DAILY TEMPERATURE, CHICAGO,
YEAR 1898.

DATE.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1.....	12	-3	27	34	55	62	74	67	74	64	40	18
2.....	6	-5	27	32	47	58	76	66	75	63	38	33
3.....	19	- 8	24	31	39	57	68	63	75	64	43	27
4.....	23	18	22	28	37	65	62	60	72	62	54	15
5.....	25	23	21	19	38	66	63	65	65	53	43	12
6.....	28	18	32	27	39	64	64	66	54	51	32	20
7.....	24	30	36	34	41	62	69	70	49	54	34	9
8.....	26	39	42	36	54	60	70	70	52	54	40	5
9.....	30	40	48	42	55	58	63	67	55	54	36	2
10.....	32	39	33	38	53	56	59	63	55	54	33	4
11.....	33	32	33	44	50	68	60	66	57	50	28	17
12.....	33	30	32	45	48	65	61	63	54	44	31	16
13.....	28	29	29	39	48	63	66	63	58	33	33	3
14.....	26	26	36	38	47	59	68	65	58	34	33	1
15.....	28	18	37	38	47	56	70	62	61	40	30	14
16.....	20	20	45	48	45	55	73	65	61	51	31	26
17.....	21	26	35	42	44	60	73	64	63	43	36	25
18.....	28	28	35	39	49	60	71	63	63	38	39	24
19.....	31	28	41	40	60	58	64	59	64	38	38	29
20.....	33	26	37	35	48	53	64	63	62	39	37	32
21.....	30	20	34	42	48	52	65	69	59	39	49	32
22.....	30	25	32	41	58	59	67	71	61	40	13	30
23.....	19	20	26	39	59	63	68	69	62	32	10	24
24.....	16	12	26	40	53	70	70	69	62	50	9	16
25.....	28	8	35	39	51	65	70	63	60	34	18	26
26.....	15	15	44	38	49	65	68	64	64	32	2	15
27.....	10	25	42	42	56	63	70	63	59	30	11	13
28.....	19	24	26	50	50	58	67	60	58	36	23	11
29.....	12	.....	26	45	46	63	67	69	67	42	29	33
30.....	17	.....	29	50	48	71	62	65	61	38	16	7
31.....	6	.....	28	.....	51	.....	64	73	.....	34	.....	0

TABLE OF MEAN DAILY TEMPERATURE, CHICAGO,
YEAR 1898.

DATE.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1	16	3	30	41	62	71	83	70	82	66	50	26
2.....	18	2	29	36	59	64	84	70	83	68	47	38
3.....	26	6	27	36	44	67	74	69	84	70	53	32
4.....	30	28	26	34	40	72	65	66	78	64	60	23
5.....	35	29	30	26	42	71	68	70	70	60	52	20
6.....	33	26	39	32	43	74	72	75	64	56	38	24
7.....	32	36	43	37	51	70	78	75	57	56	45	14
8.....	34	42	50	46	61	64	74	72	62	58	45	12
9.....	33	44	56	46	64	64	68	68	60	60	38	10
10.....	35	50	42	42	61	68	62	70	57	64	34	15
11.....	39	44	42	48	59	75	64	74	60	57	34	26
12.....	44	34	34	55	52	72	66	68	61	49	38	24
13.....	30	38	38	48	59	68	70	63	62	44	36	10
14	30	30	43	42	54	68	72	72	68	40	38	14
15.....	30	26	49	44	50	60	76	72	68	48	36	24
16.....	24	23	56	62	50	59	82	74	64	60	37	34
17.....	28	37	41	53	48	65	80	70	69	52	40	32
18.....	35	34	44	41	62	72	80	66	72	41	42	30
19.....	34	30	52	42	68	64	79	64	66	42	41	32
20.....	35	30	44	44	57	67	74	72	64	44	44	34
21.....	32	24	43	50	63	56	68	76	66	42	58	33
22.....	31	27	47	48	63	68	70	80	66	44	32	32
23.....	24	24	29	40	68	70	72	81	66	44	16	28
24.....	24	16	35	42	62	79	77	71	70	58	16	21
25.....	30	16	45	42	54	74	77	70	66	46	25	28
26.....	22	22	50	42	56	71	70	67	70	34	14	24
27.....	16	26	52	52	68	71	80	66	62	36	20	22
28.....	27	26	34	53	59	62	79	71	68	45	28	22
29.....	18	.....	34	52	48	76	74	72	77	48	32	40
30.....	24	.....	32	56	52	80	66	79	68	40	22	23
31.....	18	.....	34	.....	62	.....	70	82	.....	40	.....	6

TABLE OF DAILY PRECIPITATION, CHICAGO,
YEAR 1898.

DATE.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1.....	.00	.00	.02	.08	.07	trace	.00	.00	.00	.30	.00	.04
2.....	trace	.03	.05	.00	.02	.00	.00	.04	trace	.08	.00	trace
3.....	.00	.00	trace	.00	.04	.00	.00	.87	.00	trace	.00	.00
4.....	.00	.00	.00	trace	.00	.00	.00	.05	.01	.01	trace	trace
5.....	.00	.01	.00	trace	.52	.00	.00	.00	1.20	trace	.24	trace
6.....	.00	.00	.00	.00	.00	.00	.00	.00	.26	.00	.00	trace
7.....	.00	.00	.00	.00	.00	.71	.00	trace	.00	.22	.00	.02
8.....	.00	.00	.00	.00	.00	.13	trace	.00	.00	trace	.12	.00
9.....	.11	trace	.04	.43	.04	.24	.00	.00	.00	.00	.14	.00
10.....	trace	.22	.03	trace	trace	.82	.00	.00	.00	.16	1.18	.00
11.....	.01	.36	.60	.00	trace	.03	.00	.10	.00	.04	.02	.00
12.....	.70	.04	.32	.00	.00	.22	.00	.00	.00	trace	.00	.08
13.....	.12	.06	.11	.02	.00	.33	.00	trace	.07	.02	.14	trace
14.....	.00	.16	.00	.01	.01	.00	.00	.00	.15	.28	.00	.00
15.....	.16	.10	.10	.00	.07	trace	.00	.75	.35	.00	.00	.00
16.....	trace	trace	.00	.00	.00	.03	.00	.38	.07	.00	.00	.00
17.....	.00	.03	.00	trace	.00	.00	.00	trace	.00	.15	.14	.00
18.....	.00	trace	.23	.02	.13	.00	trace	.00	.00	.09	.07	.00
19.....	.00	.72	1.62	.14	.21	.00	trace	.00	.00	.06	.02	.36
20.....	1.13	.40	.00	.00	.32	.00	.40	trace	.00	.85	.00	.03
21.....	.00	.32	.06	trace	.32	.29	.00	.06	.00	trace	trace	trace
22.....	.40	.07	.05	.01	trace	.00	.00	trace	.77	trace	.01	.42
23.....	.25	.05	trace	.00	.00	trace	.00	.00	.20	.00	trace	trace
24.....	.00	.02	.00	.00	.00	.00	.00	.64	.02	trace	.00	trace
25.....	.50	.00	.00	.00	.00	2.50	.14	.00	.00	.68	.04	.05
26.....	.09	.00	.16	.00	.00	.00	.00	.14	.00	.20	.08	.00
27.....	.00	trace	1.21	.00	trace	.00	.00	.00	.00	.00	.00	.00
28.....	.00	trace	.00	trace	.45	.00	.32	.00	.00	.00	.05	.00
29.....	.00	.....	.00	.00	trace	.00	.90	.00	.00	.04	trace	trace
30.....	trace	.....	.00	.05	.03	.00	.18	.00	.06	.08	.00	.11
31.....	.07	.....	.00	.....	.00	.....	.00	.00	.....	trace	.....	trace

The diagram accompanying this report is a graphic exhibit of the conditions affecting the harbors of the City of Chicago and the catchment area of the upper lakes.

The City is indebted to William P. Nixon, United States Collector of the Port, for the information on which the tables on lake commerce are compiled; and for climatic data to Professor Cox, the local forecast official of the weather bureau, and to the officers of that bureau at various selected stations over the catchment area of the upper lakes.

DIVISION OF ARCHITECTURE.

MR. HENRY SIERKS, City Architect.

The following buildings have been designed and their construction supervised by this division during the year 1898:

BUREAU OF ENGINEERING.

SPRINGFIELD AVENUE AND CENTRAL PARK AVENUE PUMPING STATIONS.—Plans were made and contracts let for these pumping stations in 1897. A detailed account of the progress of construction is given under the head of "Tunnel and Crib Construction."

SIXTY-EIGHTH STREET PUMPING STATION.—Plans were made and contracts let for the alterations and additions to the Sixty-eighth street pumping station. The front of this addition is to be of pressed brick with stone entrance and trimmings. The building is now in progress. This addition is intended to accommodate a future engine. The cost of this work will be \$33,219.00.

CHICAGO AVENUE PUMPING STATION.—Plans were made for certain repairs to the various turrets on the Chicago avenue pumping station. This work is now in progress.

POLICE DEPARTMENT.

COTTAGE GROVE AVENUE POLICE STATION.—Plans were made and contracts let in October, 1897. This building, complete in every respect for the purpose designed, was finished early in 1898. A description of its general design and arrangement was given in the report for 1897. The total cost was \$20,000.00.

FORTY-SEVENTH STREET POLICE STATION.—This station, contracts for which were let in 1897, and a general description of which was given in the annual report for 1897, was completed September 1, 1898, at a total cost of \$10,545.00.

SHEFFIELD AVENUE POLICE STATION.—Plans were made for alterations and additions to the brick building located on Sheffield avenue near Diversey avenue. Sixty feet were added to the rear of the building, provid-



COTTAGE GROVE AVE. POLICE STATION.



COTTAGE GROVE AVE. POLICE STATION.
SOUTH PARK AVE. ENTRANCE.

ing for a cellroom, patrol barn and courtroom. One story was added on the front part, making it three-story with a basement. The basement contains a boiler-room, coal and storerooms. The first story contains the sergeant's room, captain's room, squad room, cellroom and patrol barn. The second story contains the dormitories, courtroom, etc., toilet and bathroom, and hay loft, and the third story is occupied by dormitories and toilet-rooms. The building will be completed by April 1, 1899, at a total cost of \$12,500.00.

FIRE DEPARTMENT.

MICHIGAN AVENUE ENGINE-HOUSE.—Plans were made for a three-story and basement brick building, located at the corner of Michigan avenue and Washington street. The basement will contain a boiler-room, storeroom and hose dry-room. The first story contains an apparatus-room and barn. The second story contains dormitories for men, and officers' sitting and toilet-rooms, and a hay loft, and the third story, a gymnasium and bathrooms. This will be an exceptionally well appointed engine-house and will be completed June 1, 1899, at a total cost of \$20,000.00.

LAWDALE AVENUE ENGINE-HOUSE.—Plans were made for a two-story and basement brick building to be located at the corner of Lawndale avenue and Huron street. The basement contains boiler, coal and store-rooms. The first story contains apparatus and barn, and the second story dormitories for men and officers, toilet and bathrooms, and hay-loft. The whole building will be completed May 1, 1899, at a cost of \$6,490.00.

CUYLER AVENUE ENGINE-HOUSE.—Plans were made for a two-story frame building to be located at Nos. 15 and 17 Cuyler avenue. The general arrangement is the same as for the Lawndale avenue engine-house. The building will be completed by April 1, 1899, at a cost of \$2,950.00.

HEALTH DEPARTMENT.

CARTER H. HARRISON PUBLIC BATH-HOUSE.—Plans were made for certain additions and alterations to the public bath-house located on Mather street near Halsted street. All galvanized iron partitions were taken out and slate substituted. The swimming pool was removed and shower-baths put in place. The laundry was placed in the basement and the building in general remodeled. This house now has 34 showers, doubling its former capacity. The alterations were completed October 1, 1898, at a total cost of \$4,640.00.

MARY McDONALD PUBLIC BATH-HOUSE.—Plans were perfected for a one-story and basement brick building to be located in the Twenty-ninth ward. The basement contains a boiler-room and laundry. The first story contains a waiting-room and a bathroom, having fifteen showers, one tub

bath, water-closet, and towel-room. The building will be heated with steam and completed within forty days after the location is decided on.

HOUSE OF CORRECTION.—Plans were made during 1897 for a cell-house addition to the John Worthy school. This building, a general description of which was given in the report for 1897, was completed September 1, 1898, at a total cost of \$50,000.00.

CITY HALL ALTERATIONS.

BUREAU OF ENGINEERING.—Plans were made and the work completed for a general rearrangement of the City Engineer's office, including office fixtures, tile floor, iron railings, and the removal of partitions. The total cost was \$1,200.00.

DEPARTMENT OF HEALTH.—Plans were made for office fixtures, railings, etc., for a laboratory on the fourth floor of the City Hall. This work was completed at a cost of \$2,085.00.

LA SALLE STREET ENTRANCE.—Plans were drawn up for the removal of the La Salle street portico, making an entrance on the ground floor on a level with the sidewalk, and thus providing office room for the Secretary of Police south of the entrance and for the City Electrician north of the entrance. This improvement added a large space on the first floor, now occupied by the Water Office. The total cost of this improvement was \$7,193.00.

BUREAU OF WATER.—Plans were made for office fixtures, desks, etc., for the Cashier's office on the first floor in the space formerly taken up by the La Salle street entrance. This work was completed during the year at a cost of \$1,780.00. Plans were made, also, for office fixtures, desks, etc., for the general office of this bureau on the first floor, giving better ventilation and more room. These changes were completed at a cost of \$2,496.00.

COUNCIL COMMITTEE ROOMS.—Plans were made for office fixtures, tile floor etc., for the Council Committee rooms on the fourth floor of the City Hall. This work was completed April 1, 1898, at a cost of \$1,480.00.

CITY COMPTROLLER'S OFFICE.—Steel file cases were installed in the Comptroller's vault at a cost of \$2,295.00.

MAP DEPARTMENT.—Plans were made for the fixtures, etc., and for the construction of a two-story vault for the office of the Map Department on the fourth floor of the City Hall at a cost of \$2,242.00.

The office space allotted to the Bureau of Engineering is inadequate for the proper filing of records and the performance of the ever increasing work, but considerable relief was obtained during the year by the addition to the office of the two small rooms formerly occupied by the Division of Chemistry of the Health Department. The partition wall between the office of the Water Pipe Extension and these rooms was removed and

improvements made, which places at least one division of the bureau in a condition to handle the work properly, as far as office facilities are concerned.

In conclusion, permit me to express to you my appreciation of your hearty co-operation and valuable suggestions, which have so materially aided me to discharge the duties of this office in an acceptable manner.

I am also under obligations for the courtesy extended to me by other City officials, with whom my duties have brought me in contact.

The loyal support and faithful services of the heads of the various subdivisions and other employes of this bureau, on which the success of the various constructions and the administration of the affairs of the bureau so much depend, are appreciated and commended.

Very respectfully,

JOHN ERICSON,
City Engineer.

ANNUAL REPORT
Bureau of Water
CITY OF CHICAGO
1898

H. O. NOURSE
SUPERINTENDENT

WATER OFFICE REPORT.

HON. LAWRENCE E. MCGANN,
Commissioner of Public Works.

DEAR SIR: Please find herewith the annual report for the year 1898, detailing the conduct of affairs in this Bureau.

The report comprises 28 tables, and instead of lengthening this communication with explanations, I have made such explanations as are deemed important at the foot of each table. The tables follow in the order in which the revenue of the bureau is produced and disposed of.

The United States and Pacific Express Companies have made the following collections during the year:

From January 12 to July 13, 1898, they collected.....	83,256 water bills, amounting to.....	\$187,047.55
From July 13 to January 5, 1899, they collected.....	89,956 water bills, amounting to.....	198,820.99
Making a total for the year of.....		78,712 water bills, amounting to.....
		\$385,868.54

TABLE No. I.

SHOWING AMOUNTS UNCOLLECTED DECEMBER 31, 1896, DECEMBER 31, 1897, AND DECEMBER 31, 1898, IN COMPARISON.

	1896	1897	1898
Amount standing as uncollected on the ward ledgers	\$651,993.66	\$689,961.84	\$424,431.86
Amount standing as uncollected on the meter rate ledgers	131,889.30	153,660.37	84,252.41
Amount standing as uncollected on the meter mechanical ledgers	*	4,237.26	3,642.56
Total	\$783,882.96	\$847,859.47	\$512,326.83

*Not accounted for in the table for 1896, being shown in statement corresponding to Table No. 16 as \$4,102.75.

TABLE NO. II.
SHOWING BUILDINGS EXAMINED BY THE DIVISION OF INSPECTION.

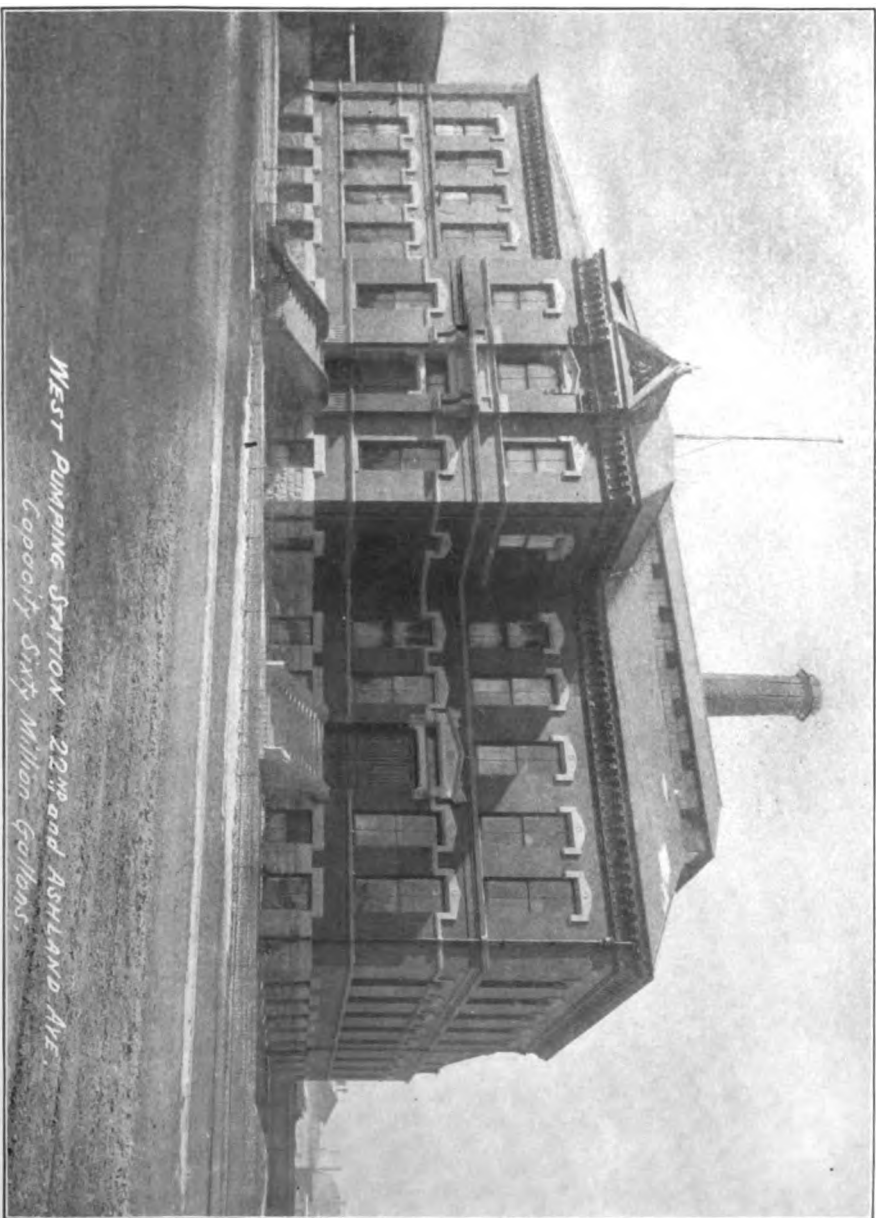
1898.	One-Story.	Two-Story.	Three-Story.	Four-Story.	Five-Story.	Six-Story.	Seven-Story and Over.	Special Examinations.	New Buildings Examined.	Examination Vacancies.	Examination for Frontage.	Total per Month.	Pipe Pottions and Pipe De-nations.
January.....	300	987	620	79	46	1	.....	2,912	748	369	.....	4,029	25
February.....	847	2,557	1,456	106	19	.....	.....	616	926	102	.....	3,637	18
March.....	621	1,873	1,621	342	44	5	.....	1,420	625	56	.....	7,086	30
April.....	81	206	79	3	.....	.....	.....	1,354	925	31	.....	6,816	30
May.....	.....	.....	.....	.....	.....	.....	.....	3,290	626	458	.....	4,643	28
June.....	.....	.....	.....	.....	.....	.....	.....	5,174	434	1,054	.....	6,662	69
July.....	75	321	520	211	28	8	.....	1,554	294	504	.....	3,515	57
August.....	396	711	785	198	41	3	3	738	476	168	.....	3,519	21
September.....	781	1,976	697	290	17	3	.....	1,036	504	78	.....	5,382	17
October.....	31	117	87	86	.....	.....	.....	8,622	308	51	.....	4,252	18
November.....	.....	.....	.....	.....	.....	.....	.....	3,544	425	680	.....	4,649	26
December.....	.....	.....	.....	.....	.....	.....	.....	2,408	402	1,550	.....	4,399	39
TOTAL.....	3,132	8,898	5,865	1,265	195	20	3	27,668	6,593	5,101	.....	58,579	373
TOTAL, 1897.....	1,744	8,050	6,065	2,561	548	120	278	14,675	5,994	3,147	4,269	47,451	478
TOTAL, 1898.....	7,593	17,051	8,322	2,782	506	89	.....	8,410	3,418	961	.....	49,182	599

NOTE.—The result of the work performed by the Division of Inspection will be better understood by examining Tables Nos. 10 and 23. Table No. 23 shows the amount of decreases occasioned by the ordinance going into effect May 1, 1898, to have been \$145,075.00. Table No. 10 shows a net loss in the assessments of \$29,960.98.

But for the change effected by the new ordinance, the result of the work of the Inspection Division would have shown an increase between the amount of decreases shown as a result of the new ordinance under table 23, and the net loss in increases in Table 10. This represents \$112,114.02, and is a most excellent result in consideration of the following facts:

The operation of the ordinance going into effect May 1, 1898, made it obligatory to examine a great number of residences throughout the city, which were affected in the way of decreases by the ordinance. (See column headed "Special Examinations.")

The new ordinance requires that inspections for vacancy be made (see column headed "Examinations for Vacancy"), and in consideration of the increased work put upon the Inspection Division it was impossible to make any annual examinations of specific wards, as is usually done. Beginning with the first of the coming year, the Division of Inspection will devote a large portion of its force to annual examinations, and it is believed that the result, while decreasing the assessments against residences and buildings affected under the ordinance taking effect May 1, 1898, will be beneficial to the Bureau in increasing the revenue, the effect of the ordinance of May 1, 1898, to the contrary notwithstanding.



*WEST PUMPING STATION, 224th and ASHLAND AVE.
Capacity Sixty Million Gallons.*

A SIXTY-MILLION GALLON PUMPING STATION.

TABLE No. III.

LIST OF STREETS ORDERED FOR IMPROVEMENT, WITH ESTIMATED NUMBER AND COST OF WATER SERVICE PIPES RETURNED TO BOARD OF LOCAL IMPROVEMENTS DURING THE YEAR 1898, BY WATER ASSESSOR.

STREET	FROM	TO	Number of Pipes.	Amount.
Adams avenue...	Seventieth.....	Seventy-first.....	14	\$ 280.50
Central Park ave.	Twenty-sixth...	Twenty-eighth...	90	1,440.00
Central boulevard.	Augusta.....	Grand avenue...	57	712.50
Front.....	115th.....	116th.....	Notified.....	
Fifty-fifth place..	Indiana avenue..	S. Park avenue..	Notified.....	
Grace.....	Vedder.....	Division.....	Notified.....	
Harvard.....	115th.....	Kensington ave..	Notified.....	
Hermitage avenue	Irving Park ave..	Berteau.....	Notified.....	
Lexington.....	Lawndale avenue	Douglas boul'd..	No Main.....	
Lafayette P'k Way	Sheridan Road...	Lake Michigan...	44	660.00
Lowe avenue....	Fifty-ninth.....	Sixtieth.....	Notified.....	
Millard avenue..	Sixteenth.....	Douglas Park bvd.	61	1,087.00
Monroe ave.....	Fifty-third.....	Fifty-fifth.....	Notified.....	
Michigan avenue.	103d.....	119th.....	391	5,865.00
111th.....	Michigan avenue.	C. & E. I. R. R...	118	2,124.00
112th.....	Michigan avenue.	Wentworth ave..	Rescinded.....	
113th.....	Michigan avenue.	Wentworth ave..	72	1,224.00
115th.....	State.....	Wentworth ave..	43	731.00
119th.....	Michigan avenue.	Wentworth ave..	62	1,054.00
103d.....	Michigan avenue.	C. R. I. & P. R. R.	505	7,827.50
Pearson.....	Lincoln Park bvd.	Lake Shore Drive	48	528.00
Ridge avenue....	Clark.....	Evanston avenue.	Street Paved...	
Sixty-ninth place.	Stony Island ave.	Madison avenue.	55	880.00
Sixty-ninth.....	Stony Island ave.	Madison avenue.	46	736.00
Sixty-ninth.....	S. Chicago avenue	Cottage Grove ave.	Notified.....	
S. Chicago avenue	Ninety-first.....	Ninety-second...	Notified.....	
Ward.....	Waveland avenue	Addison avenue..	Notified.....	
Washington ave..	Seventieth.....	Seventy-first....	8	120.00

Total number of streets for which estimates were made.....29

Total number of pipes returned for assessment.....1,614

Total amount for pipes.....\$25,219.50

TABLE No. IV.

WATER SERVICE PIPES LET AND LAID BY CONTRACT DURING THE YEAR ENDING DECEMBER 31, 1898,
SHOWING THE NUMBER OF PIPES, TOTAL AMOUNT OF CONTRACT, COST OF LAYING AND
AMOUNT CREDITED TO WATER FUND FOR TAPS AND ASSESSOR'S COSTS.

STREET.	FROM	TO	No. of Pipes.	Laying.	Taps.	Assessor's Costs.	Total Cost.
Asbland avenue.....	Sixty-third.....	Sixty-ninth.....	106	\$1,954.39	\$ 581.00	\$ 250.09	\$2,785.48
Avenue L.....	Ninety-fifth.....	110th.....	505	4,632.64	1,771.00	.759.21	7,162.85
Avenue M.....	102d.....	800 ft. S. of 104th.....	78	729.22	266.00	114.18	1,109.40
Aberdeen.....	Sixty-Seventh.....	Sixty-ninth.....	69	548.24	220.50	88.63	867.27
Adams avenue.....	Seventieth.....	Seventy-first.....	14	178.86	49.00	21.06	248.92
Belden avenue.....	Central Park avenue.....	Kimball avenue.....	45	479.57	157.50	67.50	704.57
Carroll avenue.....	Forty-fifth avenue.....	Forty-sixth avenue.....	34	288.16	119.00	51.21	453.36
Christiana avenue.....	Division.....	Grand avenue.....	37	331.31	129.50	55.69	516.50
Columbia.....	Lawndale avenue.....	Hamlin avenue.....	28	314.86	98.00	42.08	454.44
Dickens avenue.....	Central Park avenue.....	Kimball avenue.....	64	1,162.00	.....	.....	1,162.00
Forty-second avenue.....	Twenty-sixth.....	Thirty-first.....	12	107.40	42.00	18.24	167.64
Francisco.....	Fullerton avenue.....	Diversey avenue.....	48	499.94	173.50	72.00	745.44
Forty-eighth avenue.....	Chicago avenue.....	Lake.....	80	725.28	280.00	120.32	1,125.60
Forty-eighth avenue.....	North avenue.....	Fullerton avenue.....	45	413.34	157.50	67.60	638.34
Forty-first avenue.....	Madison.....	Kinzie.....	4	60.90	11.10	.....	72.00
Forty-fourth place.....	Wallace.....	Stewart avenue.....	18	185.90	63.00	27.18	226.08
Forty-first court.....	Colorado avenue.....	Harvard.....	25	334.35	87.50	28.15	450.00
Fiftieth court.....	Armitage avenue.....	Humboldt avenue.....	79	826.11	276.50	118.50	1,231.11
Huron.....	Fortieth avenue.....	Central Park avenue.....	9	57.42	31.50	13.50	102.42
Harvard.....	Fortieth avenue.....	Forty-second avenue.....	48	552.04	168.00	72.44	792.48
Humboldt.....	Diversey.....	C. & N. W. R. R.....	57	691.16	199.50	85.75	976.41
Harvard.....	Douglas boulevard.....	Fortieth avenue.....	77	574.15	269.50	115.77	959.42
Humboldt avenue.....	Central Park avenue.....	Kimball avenue.....	88	694.00	.....	.....	694.00
Jeffery avenue.....	Seventy-third.....	Seventy-ninth.....	216	2,219.28	756.00	325.20	3,800.48
Lexington.....	Fortieth avenue.....	Forty-first avenue.....	18	228.60	28.40	.....	252.00
Langley avenue.....	Forty-ninth.....	Forty-first.....	20	234.50	70.00	27.00	331.50
Lawndale avenue.....	C. B. & Q. R. R.....	Twenty-fifth.....	31	235.25	108.50	46.54	390.29
Lawndale avenue.....	Armitage avenue.....	North avenue.....	80	713.84	280.00	123.00	1,118.84
Monticello avenue.....	Chicago avenue.....	Grand avenue.....	106	917.41	371.00	159.55	1,447.96
Mozart.....	Fullerton avenue.....	Diversey avenue.....	105	845.90	367.50	157.90	1,371.30

TABLE No. IV.—Continued.

STREET	FROM	TO	No. of Pipes.	Laying.	Taps.	Assessor's Costs.	Total Costs.
Ninety-first.....	Exchange avenue.....	S. Chicago avenue.....	16	\$ 243.25	\$ 56.00	\$ 20.75	\$ 320.00
115th place.....	Michigan avenue.....	Front.....	47	486.77	164.50	70.65	721.92
Prairie avenue.....	Fifty-fifth.....	Sixty-first.....	52	860.54	182.00	81.00	1,123.54
Robey.....	Archer avenue.....	Thirty-ninth.....	37	198.43	129.50	55.50	378.43
Ridgeway avenue.....	Armitage avenue.....	Wabasha avenue.....	14	106.77	49.00	21.00	176.77
Ridgeway avenue.....	Chicago avenue.....	Division.....	107	778.02	374.50	161.44	1,313.96
Robey.....	Roscoe.....	Montrose boulevard.....	99	1,006.40	846.50	148.50	1,600.40
Racine avenue.....	Roscoe.....	Clark.....	51	624.27	178.50	76.50	879.27
Seventy-fifth.....	Cottage Grove avenue.....	I. C. R. R.....	44	686.84	154.00	39.16	880.00
Sawyer avenue.....	C. & N. W. R. R.....	Chicago avenue.....	101	860.61	363.50	152.32	1,366.43
Sixty-ninth.....	Madison avenue.....	Stony Island avenue.....	45	536.51	157.50	25.93	720.00
Sixty-ninth place.....	Madison avenue.....	Stony Island avenue.....	54	594.07	189.00	80.93	864.00
Sawyer avenue.....	Diversey avenue.....	Belmont avenue.....	38	264.02	183.00	57.00	454.09
Throop.....	Sixty-second.....	Sixty-third.....	34	226.58	119.00	51.00	396.58
Van Buren.....	Forty-sixth avenue.....	Forty-seventh avenue.....	46	317.04	161.00	69.00	547.04
Wrightwood avenue.....	Logan Square.....	Kimball avenue.....	62	644.03	217.00	93.00	964.03
Wisner avenue.....	Milwaukee avenue.....	Wellington.....	56	483.49	193.00	84.35	763.84
Wrightwood avenue.....	Clybourn avenue.....	Southport avenue.....	24	124.62	84.00	36.00	244.62
Washington avenue.....	Seventieth.....	Seventy-first.....	8	59.72	28.00	12.04	99.76
Wrightwood avenue.....	Central Park avenue.....	Hamlin avenue.....	70	850.60	245.00	105.60	1,201.20
Totals.....			3,149	\$31,617.09	\$10,645.00	\$4,466.82	\$46,728.91

Average cost per pipe under contract let in 1897.....

\$12.80¹/₂

Average cost per pipe under contract let in 1898.....

* 14.83¹/₂

Cost per pipe in 1898 over 1897.....

\$2.53¹/₂

* The increased cost for laying service pipes for the year 1898 grows out of the fact that there were 102 service pipes laid in solid rock streets, where it was necessary to blast, at an average cost of \$21.50. In 1897 there was no work of this kind at all. The cost is augmented again by virtue of the fact that the pipes in some of the avenues were of extra length. There were eight wide avenues of this kind in which service pipes were laid during the year.

TABLE No. V.
DIVISION OF PERMITS.

SCREW FERRULES INSERTED DURING THE YEAR 1898.

MONTHS.	$\frac{3}{4}$ -Inch Ferrules Inserted.	$\frac{3}{4}$ -Inch Ferrules Inserted.	1-Inch Ferrules Inserted.	Total of Screw Ferrules Inserted.
January	85	120	15	220
February	35	117	4	156
March	78	254	16	348
April	99	225	12	336
May	134	959	11	1,104
June	132	1,210	11	1,353
July	214	525	11	750
August	350	506	13	869
September	457	330	27	814
October	179	238	16	433
November	329	378	18	725
December	46	259	5	310
TOTAL	2,188	5,121	159	7,418
1897	2,059	8,705	109	10,873

The number of ferrules inserted during the year 1898 is 3,455 less than were inserted for the year 1897, which is explained by the fact that the Board of Local Improvements did not approve the special assessments made to as great an extent as was the case in 1897.

Comparisons of Table III for the years 1897 and 1898, will show that there were a much less number of streets ordered for improvement during the last year than during the year preceding.

TABLE No. VI.

RE-TAPS INSERTED DURING 1898.

1-Inch	20
$\frac{3}{4}$ -Inch	238
$\frac{5}{8}$ -Inch	953
TOTAL	1,211

The number of applications made at this office for ferrules to water service pipes during the past year (exclusive of city contracts and re-taps) were as follows:

Inserted in old part of City	536
Inserted in Town of Lake	381
Inserted in Lake View	350
Inserted in Cicero	248
Inserted in Calumet	242
Inserted in Jefferson	594
Inserted in Hyde Park	666
GRAND TOTAL	3,017

TABLE NO. VII.

PERMITS.

Permits were issued during the year 1898 as follows:

For tapping water mains for pipes to inside curb for future use	8,190
For tapping water mains for service pipes to houses not previously supplied ..	8,017
For connection to service pipes inside curb lines	606
For 8-inch cast iron pipes to be used as service pipes	1
For 6-inch cast iron pipes to be used as service pipes	6
For 4-inch cast iron pipes to be used as service pipes	15
For 3-inch cast iron pipes to be used as service pipes	4
For 2-inch cast iron pipes to be used as service pipes	84
For miscellaneous or special permits	210

GRAND TOTAL..... 7,183

TABLE NO. VIII.

TABULATED STATEMENT SHOWING THE NUMBER OF FERRULES
INSERTED EACH YEAR FOR THE LAST NINETEEN YEARS,
AND THE TOTAL NUMBER IN USE DECEMBER 31, 1898.

Year.	Original Town.	*Lake View.	*Hyde Park.	*Town of Lake.	*Calumet	*Cicero.	*Jeffer- son.	Total.
a1880	63,510							63,510
1880	4,439							4,439
1881	5,678							5,678
1882	5,213							5,213
1883	6,656							6,656
1884	6,637							6,637
1885	6,555							6,555
1886	8,083							8,083
1887	8,808							8,808
1888	10,089							10,089
1889			68,775					8,775
1889	7,617	889	1,730	1,286				11,522
1890	10,127	3,440	3,833	3,951	152	289	20	21,812
1891	10,237	2,458	5,658	4,165	234	59	570	23,381
1892	7,224	3,173	4,813	3,882	271	63	2,146	21,572
1893	7,990	2,334	3,586	4,223	308	153	1,435	20,029
1894	6,642	2,271	2,770	1,922	392	843	1,044	15,884
1895	5,015	2,262	3,152	1,750	410	750	1,326	14,665
1896	3,551	1,927	2,792	1,838	292	1,663	869	12,932
1897	2,607	851	891	2,552	197	1,004	1,837	9,939
1898	1,183	527	1,765	662	242	516	1,312	6,207
Total	187,861	20,132	39,765	26,231	2,498	5,340	10,559	292,386

* Number of ferrules inserted in suburbs previous to annexation unknown.

a Number of ferrules inserted previous to 1880.

b Number of ferrules inserted in Hyde Park previous to annexation.

TABLE No. IX.

DIVISION OF PERMITS—INCOME ACCOUNT.

DEBIT.

Stock account January 1, 1898, per inventory.....		\$ 1,819.11
Amount paid for ferrules.....	\$ 3,807.67	
Amount paid for valves, washers, etc.....	681.28	
Amount paid for lumber.....	4.18	
		<u>4,498.18</u>
Amount paid for printing and stationery.....	\$ 147.50	
Amount paid for transportation.....	657.21	
Amount paid for tools, tapes, etc.....	38.54	
Amount paid for repairs to tapping machines, etc.	303.75	
Amount paid for miscellaneous.....	586.65	
		<u>1,728.65</u>
Salaries of clerks.....	\$ 3,531.06	
Salaries of inspectors.....	10,567.17	
Salaries of tappers.....	14,174.94	
Salaries of expressmen.....	10,311.00	
Salaries of foremen.....	900.00	
Salaries of laborers.....	5,487.25	
		<u>44,971.44</u>
		\$ 58,019.38

CREDIT.

Amount received for inserting ferrules.....	\$ 10,371.50	
For street improvements collected through Bureau of Special Assessments	24,177.58	
Stock on hand as per inventory.....	2,800.86	
		<u>37,349.94</u>
Net loss to the department		\$ 15,762.39

A lesser number of streets ordered for improvement during the year 1898 than was the case for 1897, is the occasion for the shortage shown in this table for the present year.

For street improvements collected through the Bureau of Special Assessments in 1897, the amount represented was \$51,389.90.

The amount collected for the present year, from the same source, was \$24,177.58.

TABLE NO. X.
DETAILED STATEMENT OF ASSESSOR'S INCREASE AND DECREASE CHECKS FOR THE YEAR 1898.

INCREASE.				DECREASE.				
1898.	Current Tax.	Back Tax.	Shut-off.	Total.	Current Tax.	Back Tax.	Draw-Back.	Total.
January.....	\$ 4,702.64	\$ 195.25	\$ 493.40	\$ 5,390.29	\$ 3,790.76	\$ 2,664.55	\$ 1,543.86	\$ 7,999.17
February.....	4,452.48	132.13	124.55	4,709.16	2,569.98	1,579.50	64.51	4,213.99
March.....	8,117.32	120.00	242.09	8,479.41	11,151.06	3,745.76	133.03	15,029.85
April.....	1,625.63	187.22	940.89	2,753.73	1,805.01	1,354.47	52.71	3,712.19
May.....	10,080.78	296.57	584.52	10,941.87	12,725.75	5,474.64	3,768.34	21,968.73
June.....	8,053.14	636.45	1,990.40	10,679.99	19,626.47	6,176.56	4,882.38	30,685.41
July.....	12,619.26	382.70	1,052.76	14,054.72	11,868.66	4,646.09	1,300.74	17,815.49
August.....	10,102.06	367.25	1,606.01	12,075.32	5,002.62	3,148.44	108.16	8,454.22
September.....	7,212.56	235.22	1,640.75	9,088.53	4,846.54	2,364.96	66.91	7,278.41
October.....	4,896.51	579.00	230.50	5,696.01	11,362.44	23,331.59	164.76	34,868.79
November.....	6,544.48	400.30	143.51	6,753.53	10,811.61	10,246.11	6,019.35	27,077.07
December.....	4,704.71	500.57		5,540.04	88,828.46	10,750.06	6,405.35	105,983.87
Total.....	\$ 78,101.56	\$ 4,032.66	\$ 8,968.38	\$ 91,102.60	\$ 184,389.36	\$ 75,982.73	\$ 24,705.10	\$ 285,077.19
1897.....	107,426.59	12,083.60	4,553.39	124,063.58	109,660.23	27,726.50	20,725.73	158,112.46
				*\$ 82,960.98				†\$ 126,964.73

*Net loss in increases for 1898

†Net loss in decreases for 1898

Net loss for 1898

Net loss for 1898

Of the \$184,389.36 decreases shown in column under "Current Taxes," the ordinance going into effect May 1, 1898, is responsible for \$145,075.00; \$95,847.97 represents the amount of decreases under Section 24 of the ordinance, providing for decreasing taxes in municipal, charitable and religious institutions. These two items aggregate \$249,922.97.

The same explanation for the lack of increase in this statement may be made as is shown under Table 2. (See note under Table 2.)

TABLE NO. XI.

DETAIL OF GENERAL ASSESSMENT FROM MAY, 1898, TO MAY, 1899.

Ward.	Frontage.	Water Closets.	Urinals.	Baths.	Wash Basins.	Extra Rooms and Persons.	Saloons.	Hose Trough and Fountain.	Laundries.	Steam Heating and Engines.	Stables.	Miscellaneous.	Total Assessment.
1	\$ 18,025.00	\$10,064.50	\$1,206.50	\$ 873.25	\$ 5,116.25	\$ 5,809.00	\$ 1,141.00	\$ 353.00	\$ 162.75	\$ 2,866.00	\$ 1,255.00	\$ 2,846.50	\$ 49,718.75
2	27,680.00	8,466.00	387.00	2,702.50	8,116.00	4,298.25	463.50	2,035.00	186.50	708.75	3,096.50	861.75	64,060.75
3	33,723.50	8,754.50	274.50	3,615.00	2,426.00	4,366.50	347.00	2,850.50	148.00	472.25	2,200.00	995.50	59,973.25
4	40,082.00	14,719.00	355.00	6,353.50	5,780.00	3,904.00	346.00	3,573.00	167.00	520.20	2,369.75	993.50	79,087.95
5	35,493.50	8,001.00	322.00	1,607.00	1,046.50	10,893.50	585.00	439.00	63.00	808.00	1,823.00	1,162.75	67,470.25
6	47,838.00	5,863.00	307.50	1,092.50	1,004.00	7,906.00	804.00	629.50	33.00	488.00	1,735.00	67,968.00	77,968.00
7	23,746.50	5,088.50	221.50	598.00	1,012.50	10,307.75	833.00	199.00	78.00	511.00	1,630.00	799.40	44,774.65
8	21,427.00	5,272.50	185.50	648.00	711.00	11,845.00	438.00	280.00	44.00	385.00	1,125.50	690.50	48,052.00
9	24,750.00	8,028.50	814.50	1,819.50	1,245.00	13,439.00	559.00	397.00	78.00	1,139.00	1,969.00	859.50	59,658.00
10	64,886.00	13,977.50	363.50	5,814.00	2,587.50	11,952.50	861.00	1,528.50	75.00	452.50	1,725.25	1,023.50	105,246.45
11	30,273.00	12,189.00	167.00	4,585.00	4,737.50	4,544.50	350.00	2,133.00	179.00	469.30	3,224.50	860.00	72,716.80
12	83,922.00	26,761.50	437.00	14,360.50	8,784.00	4,849.50	580.00	4,327.00	96.00	513.00	3,816.75	1,596.25	164,021.50
13	61,108.00	10,600.50	433.50	5,925.50	2,637.50	4,869.00	463.00	1,713.00	96.00	715.00	2,085.00	766.00	80,513.00
14	56,300.50	16,240.25	428.00	6,372.50	3,022.50	11,843.25	547.00	1,737.00	48.00	326.00	1,968.50	985.25	89,789.75
15	68,475.00	11,616.50	440.00	8,918.50	2,108.50	7,551.25	698.00	2,583.00	71.00	790.00	1,974.75	1,146.25	101,295.25
16	32,881.00	11,572.00	360.00	1,061.50	1,111.50	22,116.00	672.00	333.00	127.00	740.00	1,251.00	1,304.50	46,756.75
17	17,500.50	5,872.50	283.00	641.50	1,085.50	7,495.50	622.00	374.00	84.00	740.00	1,337.00	1,146.25	36,571.50
18	23,697.00	7,880.50	409.00	2,178.50	2,963.00	3,076.25	783.00	645.00	163.00	720.00	1,686.00	831.50	63,548.50
19	33,361.50	7,857.50	251.00	2,244.00	1,610.50	9,827.50	620.00	418.00	102.00	4,725.00	1,686.00	1,507.75	59,190.00
20	25,011.00	9,298.00	218.00	3,710.50	1,821.00	6,172.50	353.00	1,477.00	65.00	341.00	1,071.00	591.25	59,190.00
21	22,972.50	11,039.50	284.50	4,635.50	2,703.25	5,699.00	277.10	1,973.00	65.00	221.00	1,539.00	591.25	59,190.00
22	22,963.00	10,347.50	281.00	4,635.50	2,703.25	5,699.00	277.10	1,973.00	65.00	221.00	1,539.00	591.25	59,190.00
23	22,963.00	10,347.50	281.00	4,635.50	2,703.25	5,699.00	277.10	1,973.00	65.00	221.00	1,539.00	591.25	59,190.00
24	31,017.50	11,499.00	410.50	5,061.00	1,252.00	8,336.50	586.00	333.00	51.00	840.50	1,901.00	843.00	64,358.25
25	54,317.00	18,015.50	319.50	10,474.50	5,156.50	4,899.50	451.00	2,341.50	96.00	789.50	1,891.00	1,240.00	62,541.70
26	70,129.00	14,464.50	433.00	5,484.00	3,017.00	7,022.00	378.00	9,342.50	123.00	276.25	2,917.50	645.75	106,855.00
27	37,762.50	3,201.50	137.00	5,484.00	847.00	804.00	240.00	633.00	109.00	546.75	3,284.00	1,257.00	112,775.25
28	30,492.50	3,027.00	118.00	1,310.00	847.00	804.00	240.00	633.00	109.00	546.75	3,284.00	1,257.00	112,775.25
29	35,732.00	5,029.50	362.00	2,115.00	1,943.50	6,734.00	713.00	483.00	3.00	83.00	1,355.00	288.00	47,606.00
30	19,253.50	5,029.50	362.00	1,464.00	1,184.25	6,178.25	713.00	483.00	3.00	83.00	1,355.00	288.00	47,606.00
31	69,238.50	18,109.50	771.00	9,294.00	5,105.00	9,530.00	964.00	5,137.00	28.00	448.30	2,388.50	873.50	64,189.05
32	61,362.50	28,388.75	330.00	5,746.50	3,873.50	1,696.00	369.00	7,610.00	115.00	510.50	3,451.75	1,622.65	102,506.55
33	41,136.75	4,682.50	308.50	14,740.50	10,613.00	4,049.75	927.00	10,175.00	101.50	1,110.50	4,209.25	839.00	142,624.95
34	80,872.50	16,159.50	848.50	2,234.00	1,632.00	3,689.25	567.00	1,622.50	18.00	812.50	883.25	628.50	168,109.25
Total	\$1,475,055.25	\$372,827.00	\$12,536.00	\$147,340.75	\$101,994.50	\$230,364.25	\$18,048.50	\$ 82,704.00	\$2,971.75	\$27,676.45	\$70,864.50	\$39,249.50	\$2,865,185.50
1897.	1,437,077.50	360,141.75	10,500.25	141,616.00	101,994.50	252,364.25	30,878.00	105,663.50	3,265.75	27,676.45	69,817.00	33,174.45	2,619,021.90
													33,896.40

Decrease for 1898.

TABLE No. XII.
DETAILED STATEMENT OF ASSESSOR'S MISCELLANEOUS
RECEIPTS.

1898.	Inspection.	Leak and Waste.	Shut-Off.	Sprinkling.	Tug.	Miscella- neous.	Total.
January	\$243.50	.....	\$ 10.63	.....	.....	\$ 30.00	\$ 284.13
February	93.00	.....	.....	.....	.....	12.15	105.15
March	64.50	.....	6.75	.....	.....	1.44	72.69
April	47.00	\$10.39	17.00	\$ 200.00	.....	7.65	282.04
May .....	.....	.....	21.38	1,320.50	.....	181.50	1,523.88
June .....	.....	12.50	12.75	1,750.00	.....	71.95	1,847.20
July .....	.....	3.00	7.88	1,650.00	.....	83.95	1,744.88
August .....	.....	.....	10.12	1,525.00	.....	.....	1,535.12
September .....	.....	.....	20.25	1,475.00	.....	43.75	1,539.00
October .....	.....	.....	15.88	622.50	.....	.....	638.88
November .....	.....	.....	7.88	.....	.....	47.00	54.88
December .....	.....	.....	16.00	25.00	.....	.....	41.00
Total	\$448.00	\$25.89	\$146.02	\$8,568.00	.....	\$479.39	\$9,667.30

TABLE NO. XIII.
METER MECHANICAL DIVISION.

Number of meters in service December 31, 1897.....	5,896
Number of meters set in new location during 1898.....	478
Total number of meters in service during 1898.....	5,874
Number of meters removed—property assessed, during 1898.....	24
Number of meters removed—supply cut off, during 1898.....	18
Total number of meters removed permanently during 1898.....	87
Total number of meters in use December 31, 1898.....	5,887
Total number of meters in use December 31, 1897.....	5,896
Increase in number of meters in use year ending December 31, 1899.	441
Number of meters set in new location during 1898	478
Number of meters set replacing others during 1898.....	85
Total number of meters set during 1898.....	518
Number of meters in stock January 1, 1898.....	80
Number of meters bought from manufacturers during 1898.....	578
Number of meters bought from private parties during 1898.....	24
Number of meters furnished by private parties during 1898.....	11
Illinois meters removed and replaced.....	....
Total number of meters on hand during 1898.....	688
Total number of meters set during 1898.....	518
Number of meters on hand January 1, 1899.....	125
Number of meters repaired during 1898, for which bills were rendered.....	1,370
Number of meters removed to shop during 1898 for repairs and reset.....	166

TABLE NO. XIV.
NAMES AND SIZES OF WATER METERS IN USE DECEMBER 31, 1898.

MAKE	SIZE									TOTAL	
	¼-inch	⅜-inch	½-inch	¾-inch	1-inch	1½-inch	2-inch	3-inch	4-inch		6-inch	10-inch
Worthington.....	5	254	414	1,310	994	935	482	31	3	.....	4,328
Thompson.....		1	15	14	41	26	14	15	7	.....	133
Crown.....		4	110	132	96	115	43	90	21	.....	611
Hersey.....		1	25	43	73	109	59	50	16	.....	376
Gem.....						15	8	10	10	2	45
Nash.....		10	30	33	12	.....	.....	.....	.....	.....	85
Empire.....				1	.....	.....	.....	.....	.....	.....	1
Westinghouse.....				1	.....	.....	.....	.....	.....	.....	1
Pittsburg.....		8	47	111	50	85	4	2	.....	.....	257
Total.....	5	278	641	1,545	1,266	1,335	610	198	57	2	5,837

TABLE No. XV.**SHOWING WATER METERS IN USE AND HOW DISTRIBUTED.**

Flats and stores.....	864
Business houses.....	1,087
Residences and apartment buildings.....	944
Railroads.....	440
Manufactories.....	1,134
Breweries.....	135
Liveries.....	159
Packing houses.....	114
Laundries.....	109
Hotels.....	231
Office Buildings.....	233
Theaters.....	25
Miscellaneous.....	291
Charitable institutions.....	71
Total.....	5,837

TABLE NO. XVI.
METER MECHANICAL DIVISION.
INCOME ACCOUNT.

DEBIT.

Stock account, per inventory, January 1,
 1898—

Comprising material	\$ 5,914.87	
and bills receivable	4,287.26	\$ 10,151.68
Amount paid for meters	\$ 21,004.65	
Amount paid for covers	725.83	
Amount paid for couplings	1,349.35	
Amount paid for fittings	575.55	
Amount paid for lumber	693.90	
Amount paid for repairs	2,348.77	26,632.55
Amount paid for printing and stationery	87.75	
Amount paid for transportation	72.83	
Amount paid for horse feed, etc.	361.75	
Amount paid for tools	27.01	
Amount paid for matches, oil, etc.	12.83	
Amount paid for sawdust, nails, etc.	8.55	570.22
Salary of superintendent	\$ 1,500.00	
Salary of foreman	1,200.00	
Salary of clerks	1,846.22	
Salaries of meter setters	6,427.50	
Salaries of laborers	1,897.62	
Salaries of expressmen	2,853.00	15,744.34
		\$ 53,098.74

CREDIT.

Cash received for meters, 2 inches and over	\$ 8,883.40	
Cash received for meters under 2 inches	\$ 17,038.30	
Cash received for repairs to meters	6,657.40	23,690.70
Amount due and uncollected for repairs	\$ 3,642.56	
Stock on hand, as per inventory	8,426.27	12,068.83
		\$ 44,642.93
Net loss of the Division		\$ 9,455.81

The Meter Mechanical Division universally shows that it is conducted at a loss.

For 1896 the loss was	\$ 11,812.57
For 1897 the loss was	11,703.05
For 1898 the loss was	8,455.81

Showing a decided improvement in the conduct of this Division of the Bureau.

TABLE No. XVII.
ANALYSIS OF LEDGER—ASSESSED RATES ACCOUNT.

WARD.	DEBIT.					CREDIT.					
	Balance Jan. 1, 1898	General Assessments.	Increases.	Refunds.	Discounts.	Total.	Decreases.	Discounts.	Collections.	Balance Dec. 31, 1898	Total.
1.....	\$15,290.04	\$ 49,718.75	\$ 2,218.65	\$ 277.73	\$ 33.43	\$ 67,538.60	\$ 10,058.75	\$ 5,325.09	\$ 42,162.38	\$ 9,992.38	\$ 67,538.60
2.....	17,496.61	54,080.75	1,451.17	77.04	11.48	73,097.05	11,479.35	5,583.03	45,216.44	10,818.23	73,097.05
3.....	5,890.28	59,973.25	8,600.62	101.53	13.04	74,618.77	6,585.08	7,029.94	53,122.91	7,880.84	74,618.77
4.....	19,008.63	79,087.95	1,904.73	290.61	37.69	100,029.61	14,636.22	8,792.08	63,086.35	13,512.86	100,029.61
5.....	9,183.41	62,790.25	700.96	38.71	6.79	72,661.12	4,795.93	8,063.15	52,896.04	6,906.04	72,661.12
6.....	16,811.49	67,968.00	1,221.55	90.47	11.66	86,103.17	8,115.41	8,237.15	68,657.60	11,092.55	86,103.17
7.....	9,962.62	44,774.65	562.38	64.63	6.03	55,370.21	4,398.49	6,161.22	39,043.02	5,767.48	55,370.21
8.....	8,735.61	43,062.00	382.90	31.91	4.12	52,206.44	2,455.09	6,213.24	38,618.24	4,919.87	52,206.44
9.....	10,409.31	59,658.00	995.18	94.05	13.75	71,110.29	6,088.78	8,406.66	62,132.87	4,481.98	71,110.29
10.....	21,561.53	105,246.45	4,353.56	169.58	19.96	131,351.07	7,046.08	9,551.32	65,524.54	10,652.95	131,351.07
11.....	18,700.67	72,716.80	969.60	229.33	21.28	92,627.68	11,526.65	20,576.38	142,228.64	19,969.08	92,627.68
12.....	38,575.85	80,513.00	1,767.51	101.37	47.48	194,800.76	7,870.00	10,646.62	75,489.64	13,694.22	194,800.76
13.....	25,281.13	99,780.75	3,526.63	160.35	26.98	121,143.15	7,221.48	13,182.53	94,617.49	16,376.48	121,143.15
14.....	17,648.44	101,205.25	3,120.31	202.02	25.39	131,431.36	7,255.36	14,256.73	94,617.49	16,376.48	131,431.36
15.....	26,878.89	73,478.50	698.41	44.55	7.37	83,920.76	3,907.86	10,403.27	64,618.56	5,001.09	83,920.76
16.....	9,691.95	36,571.50	456.78	76.13	11.46	67,137.69	3,276.82	4,799.05	31,709.66	7,748.41	67,137.69
17.....	20,421.07	45,766.75	908.30	105.15	15.35	80,947.43	5,998.08	5,458.23	40,065.83	15,615.55	80,947.43
18.....	16,606.88	63,548.50	779.92	96.63	15.50	80,947.43	10,557.08	7,909.77	62,776.60	9,703.98	80,947.43
19.....	6,656.01	50,796.25	1,698.82	86.37	8.46	59,185.91	4,815.64	6,792.41	42,983.95	4,644.01	59,185.91
20.....	6,645.21	59,901.00	860.64	104.81	14.71	78,396.45	15,690.40	7,865.10	51,412.14	3,468.81	78,396.45
21.....	17,515.29	62,541.70	1,289.21	126.86	3.85	83,167.37	4,947.35	7,002.04	45,482.39	7,219.73	83,167.37
22.....	7,853.96	59,596.00	1,054.85	85.88	15.71	64,577.87	7,809.67	7,529.44	56,182.59	9,545.87	64,577.87
23.....	19,188.67	106,855.00	2,720.87	171.45	26.34	127,835.25	9,505.46	14,067.13	96,083.62	8,179.54	127,835.25
24.....	26,191.87	112,775.25	5,434.22	266.58	26.33	145,656.25	12,713.62	14,550.87	101,946.62	13,444.14	145,656.25
25.....	34,402.82	47,606.00	6,674.78	170.12	19.94	87,873.16	11,346.40	6,484.41	48,282.42	22,760.93	87,873.16
26.....	18,077.99	38,928.75	3,712.90	123.31	11.49	60,854.44	5,392.66	4,891.42	39,382.85	11,247.51	60,854.44
27.....	22,698.40	54,189.06	1,494.93	109.83	10.80	78,438.04	7,018.49	6,139.63	47,707.41	7,607.51	78,438.04
28.....	22,698.40	154,340.40	5,440.40	317.24	88.40	198,996.69	13,634.77	19,087.16	141,864.28	24,289.88	198,996.69
29.....	46,890.00	102,505.55	4,806.36	829.20	82.79	154,555.96	10,187.51	11,411.51	97,287.70	35,669.27	154,555.96
30.....	22,837.07	142,629.96	8,523.03	724.51	99.81	183,026.36	19,440.33	17,887.90	129,703.62	16,498.51	183,026.36
31.....	59,090.66	58,109.25	2,665.72	249.35	26.27	68,791.24	9,458.31	6,833.81	51,587.17	15,961.95	68,791.24
Total.....	\$999,361.94	\$2,586,135.50	\$101,941.89	\$6,132.81	\$ 764.41	\$3,383,936.45	\$280,946.43	\$87,696.61	\$2,384,901.50	\$424,431.86	\$3,383,946.45

TABLE No. XVIII.
SHOWING NET COLLECTIONS FROM ALL SOURCES FOR THE YEAR 1898
AS COMPARED WITH 1897.

SOURCES.	1897	1898	Increase.	Decrease.	Net Increase.
Assessed rates.....	\$2,132,205.89	\$2,325,436.38	\$ 193,230.49	.....	.....
Meter rates.....	937,654.61	1,087,858.31	150,203.70	.....	.....
Permits	65,605.60	34,449.08	.....	\$ 31,156.52	.....
Assessor's miscellaneous...	13,368.83	9,073.00	.....	4,295.83	.....
Meter mechanical department	28,871.90	32,574.10	3,702.20	.....	.....
Total.....	\$3,177,706.83	\$3,489,390.87	\$ 311,684.04	\$ 35,452.35	\$ 311,684.04

The decreases in permits are occasioned largely for the reasons set forth under Table 5.

TABLE NO. XIX.
DETAILED STATEMENT OF CASH COLLECTED DURING 1898.
 (NET.)

1898	Assessed Rates.	Meter Rates.	Permits.	Assessor's Miscellaneous.	Meter Mechanical Division.	For Large Meters.	For Ferrules by Special Assessment Bureau.	Total.
January.....	\$ 92,814.00	\$ 86,112.84	\$ 359.40	\$ 280.13	\$ 1,864.80	.....	.....	\$ 181,431.17
February.....	85,361.89	85,598.04	351.90	105.15	1,167.25	.....	.....	122,584.23
March.....	34,440.27	102,955.64	781.10	57.19	2,369.15	.....	.....	140,603.35
April.....	28,483.04	89,724.56	916.40	263.54	3,112.80	.....	.....	122,500.34
May.....	353,146.19	90,474.44	1,245.80	1,391.58	2,643.90	.....	.....	448,901.91
June.....	617,496.26	97,199.76	939.10	1,698.20	1,549.80	.....	.....	718,883.12
July.....	149,935.29	89,260.74	1,091.90	1,593.33	669.80	.....	.....	282,601.06
August.....	58,725.13	86,178.60	1,201.20	1,432.12	1,401.65	.....	.....	148,938.70
September.....	42,172.02	90,043.50	1,004.40	1,533.00	2,577.10	.....	.....	137,330.02
October.....	14,935.48	87,527.49	933.40	633.38	2,691.80	.....	.....	106,721.55
November.....	314,800.23	90,515.91	1,018.90	44.38	1,877.15	.....	.....	408,316.56
December.....	593,016.59	92,266.79	428.00	41.00	1,775.50	.....	.....	687,517.88
Total.....	\$ 2,325,436.88	\$ 1,087,858.31	\$ 10,271.50	\$ 9,073.00	\$ 23,690.70	*\$ 8,883.40	†\$ 24,177.58	\$ 33,060.98
1897.....	\$ 2,132,205.89	\$ 937,654.61	\$ 14,215.70	\$ 13,368.83	\$ 20,392.80	\$ 8,579.60	\$ 51,389.90	\$ 3,177,706.83
Increase.....	193,230.49	150,203.70	.....	.....	3,398.40	803.80	.....	311,684.04
Decrease.....	.....	.....	3,944.20	4,295.83	.....	.....	27,212.32	.....

*This item was collected by the Cashier of the Department of Public Works.

†This item was collected by the Bureau of Special Assessment.

TABLE NO. XX.
WATER OFFICE—DETAILED STATEMENT OF PAY ROLLS FOR THE YEAR ENDING DECEMBER 31, 1898.

MONTHS.	DEPARTMENTS.									
	Assessor's.	Collection.	Inspection.	Meter Rates.	Meter Mechanical.	Permit.	Shut Off.	Total.		
January	\$ 1,767.32	\$ 4,261.66	\$ 3,061.99	\$ 2,752.63	\$ 1,261.00	\$ 2,698.86	\$ 2,472.38	\$ 18,295.84		
February	1,641.07	4,327.71	2,896.88	2,389.25	1,037.50	2,622.91	2,433.88	17,548.70		
March	3,254.75	10,378.99	5,751.60	3,151.12	1,598.00	4,919.84	3,581.94	32,585.54		
April	2,279.40	8,815.83	3,770.00	3,399.50	1,370.25	3,783.01	3,392.00	26,809.99		
May 1st to May 15th	1,062.05	5,553.46	1,850.21	1,260.73	600.75	1,756.28	1,449.25	13,532.73		
May 15th to June 15th	2,482.76	6,304.68	3,772.98	2,927.48	1,267.75	3,898.44	3,386.00	24,040.09		
June 15th to July 15th	2,535.98	5,361.10	3,900.00	2,661.00	1,251.37	3,376.18	2,606.00	22,191.63		
July 15th to August 15th	2,520.23	5,348.06	3,937.50	2,856.19	1,215.75	3,987.30	2,951.00	22,766.03		
August 15th to September 15th	2,359.61	4,927.17	3,879.44	2,986.50	1,410.35	3,854.73	3,116.00	22,538.80		
September 15th to October 15th	2,610.98	5,205.99	3,870.00	2,869.50	1,317.58	3,858.13	3,008.00	22,740.18		
October 15th to November 15th	2,555.33	5,315.24	3,862.54	2,955.39	1,326.17	3,905.86	2,978.75	22,899.28		
November 15th to December 15th	2,235.98	5,255.77	3,847.50	2,933.61	1,191.00	3,937.30	2,657.00	22,058.16		
December 15th to December 31st	1,153.61	2,860.43	1,910.08	1,415.50	811.87	2,022.60	1,423.00	11,597.09		
Total	28,459.07	73,916.09	\$46,810.72	\$31,558.40	\$15,879.84	\$44,971.44	\$35,454.00	\$ 279,549.06		

TABLE No. XXI.
SHOWING DETAILS OF MISCELLANEOUS EXPENSES OF THE
WATER OFFICE FOR THE YEAR 1898.

MONTHS.	Binding Vouchers	Postage	Railroad Tickets	Street Car Tickets	Stationery	Sundries	Shut-Off Tools	TOTAL
January...	\$ 2.25	.....	\$27.57	\$251.68	\$984.80	\$112.75	.....	\$1,879.05
February...	.....	\$ 500.00	11.04	322.40	271.12	36.03	\$ 13.26	1,153.85
March.....	66.93	.....	23.59	324.48	114.08	98.90	40.60	668.53
April.....	2.25	1,000.00	22.32	243.36	590.80	47.15	.....	1,905.88
May.....	.....	1,000.00	32.01	301.60	387.39	10.15	2.28	1,783.43
June.....	.....	.....	29.88	393.12	267.40	61.07	.....	751.47
July.....	8.00	.....	51.61	299.52	84.61	233.08	.....	676.82
August....	11.50	200.00	24.63	332.80	594.02	14.50	.....	1,177.45
September.	34.50	1,300.00	16.56	226.72	470.63	80.02	.....	2,128.43
October...	4.00	1,000.00	12.51	239.20	70.88	7.27	.....	1,333.86
November.	.....	1,000.00	15.25	282.96	151.99	140.61	.....	1,540.81
December.	2 00	.....	.....	264.16	45.26	144.24	123.33	578.99
Total..	\$131.43	\$6,000.00	\$266.97	\$3,432.00	\$4,032.98	\$985.77	\$179.47	\$15,028.63

TABLE No. XXII.
SHOWING WORK PERFORMED BY THE LEAK, WASTE AND
SHUT-OFF DIVISION.

1896	Leak and Waste Notices Served.	Bills and Shut-Off Notices Delivered and Served.	Shut Off for Back Taxes.	Shut Off by Request of Owner.	Shut Off for Leaks.	Water Turned on and Permits Issued.	Water Turned on by Request of Owner.	Charges for Shutting Off Water.	Complaints Investigated.
January	104	2,705	288	.....	10	169	.....	\$ 515.00	48
February	40	8,403	223	.....	14	134	.....	390.00	57
March	300	600	474	.....	16	270	.....	956.00	65
April	360	800	383	.....	19	239	.....	768.00	84
May	640	5,407	163	196	17	105	6	320.00	95
June	900	9,600	1,309	232	9	675	23	2,099.00	160
July	957	11,700	1,280	144	18	715	10	2,125.00	218
August	720	412	1,678	58	21	941	28	2,504.50	237
September	614	718	1,023	5	15	584	32	1,551.00	115
October	590	1,614	104	30	16	109	23	163.00	124
November	480	8,400	166	98	18	62	12	406.00	117
December	215	2,700	228	252	25	72	4	352.00	98
Total	5,920	48,059	7,319	1,015	198	4,075	138	\$12,149.50	1,418
1897	5,916	138,935	1,972	.....	199	809	.....	\$4,070.37	1,468

TABLE No. XXIII.
ACCOUNTING DIVISION.
INCOME ACCOUNT.

REVENUE.			
General Assessment, May 1, 1898.....	\$	2,585,135.50	
Increase to back tax.....		3,012.66	
Increase to current tax.....		78,101.56	
Increase to shut-off.....		8,968.88	
			\$2,675,218.10
Less—			
Discounts allowed.....	\$	826,903.20	
Erroneous assessments refunded		3,332.31	
Decreased on account of municipal and public build- ings.....		52,547.14	
Decreased, account of charitable, educational and relig- ious institutions.....		43,800.83	
Decreased, account of overpayments, as per affidavits and special examinations, removals and destruction of buildings, changes to meter control, and other causes		19,449.12	
Decreased, account of reductions made by the operation of the ordinance passed May 1, 1898.....		145,075.00	
Allowance on current bills to cover drawbacks on amounts previously paid on vacant property in ac- cordance with City ordinances passed January 14, 1895, and May 1, 1898.....		24,705.10	615,811.70
Net revenue from assessed rates.....			\$ 2,059,906.40
Charges as per meter readings.....			1,018,450.35
Assessor's miscellaneous charges for sprinkling wagons, tugs, skating rinks, etc.....	\$	9,667.80	
Less—			
Inspection fees refunded in accordance with ordinance passed January 14, 1895, amended May 10, 1897....		594.30	9,073.00
			\$ 3,087,429.75
Less—			
Net cost of operating Division of Permits. (See Table No. IX)	\$	15,762.39	
Net cost of operating Meter Mechanical Division. (See Table No. XVI).....	•	8,455.81	24,218.20
			\$ 3,068,211.55

EXPENSES

Binding vouchers.....	\$	181.43	
Postage		6,000.00	
Railroad transportation.....		266.97	
Street car tickets.....		3,482.00	
Printing and stationery.....		4,082.98	
Shut-off tools, etc.....		179.47	
Miscellaneous		985.77	
Pay rolls (Meter Mechanical and Permit Divisions omitted)		218,698.28	233,726.90
Net income Bureau of Water.....			\$ 2,329,484.65

TABLE NO. XXIV.
BALANCE SHEET.

DEBIT.

Balance uncollected, December 31, 1897.....	\$	847,859.47	
Inventory Meter Mechanical Divisions.....		5,914.37	
Inventory Division Permit.....		1,819.11	
Cash from Comptroller, 1898, for merchandise.....		28,885.16	
Cash from Comptroller, 1898, for expenses.....		298,982.07	
Net income, 1898, as per income account.....		2,329,484.65	4,012,944.83

CREDIT.

Debit balance against Coptroller, December 31, 1898....	\$	3,456,329.89	
Amount charged Cashier, Department of Public Works..		8,888.40	
Amount charged Bureau of Special Assessments.....		24,177.58	
Inventory Meter Mechanical Division.....		8,426.27	
Inventory Division of Permits.....		2,800.86	
Balance uncollected assessed rates.....		424,481.86	
Balance uncollected meter rates.....		84,252.41	
Balance uncollected Meter Mechanical Division.....		3,642.56	4,012,944.83

TABLE NO. XXV.
MAKING A COMPARISON OF DISCOUNTS, COLLECTIONS, TOTAL CREDITS TO ASSESSED RATES AND PER CENT. OF DISCOUNTS TO TOTAL CREDITS TO ASSESSED RATES FOR 1897 AND 1898.

MONTHS.	DISCOUNTS.				WARD COLLEC- TIONS.		TOTAL CREDIT TO WARDS.		PER CENT. OF DISCOUNT TO TOTAL CREDITS TO ASSESSED RATES.			
	1897.	1898.	In- crease.	De- crease.	1897.	1898.	1897.	1898.	1897.	1898.	In- crease.	Conse- quent Saving.
January.....	\$ 15,332.20	\$ 9,302.05	.....	\$6,030.20	\$ 133,525.74	\$ 93,526.53	\$ 143,857.94	\$ 102,828.53	.1029+	.0905—	.....	.....
February.....	731.24	623.84	.....	107.40	24,057.83	35,301.80	24,789.07	35,985.73	.0235—	.0173+	.....	.....
March.....	475.82	438.88	.....	41.99	15,814.61	34,084.54	16,250.43	35,118.37	.0232+	.0124—	.....	.....
April.....	1,874.70	374.29	.....	1,500.41	21,172.21	28,913.28	23,046.91	23,287.57	.0813+	.0128—	.....	.....
May.....	50,683.41	51,752.05	\$4,118.64	.....	300,744.83	353,820.04	351,378.24	408,572.09	.1441+	.1340+	.....	.....
June.....	99,076.15	94,961.31	.....	4,114.84	568,045.73	619,153.09	687,121.88	714,114.40	.1442—	.1330—	.....	.....
July.....	11,676.31	13,013.04	1,336.73	.....	93,898.77	141,570.85	105,575.08	154,583.89	.1106—	.0842+	.....	.....
August.....	804.28	759.20	.....	45.08	33,488.54	59,831.00	34,232.77	60,590.20	.0284+	.0124—	.....	.....
September.....	518.33	377.00	.....	141.33	33,359.54	43,187.34	33,317.87	43,554.34	.0152+	.0087—	.....	.....
October.....	876.08	574.11	.....	201.97	30,556.08	15,381.41	31,472.16	16,005.52	.0278+	.0421+	.0143+	.....
November.....	43,916.21	53,700.62	.....	.....	272,247.16	316,026.39	316,163.37	369,727.01	.1389+	.1453—	.0084—	.....
December.....	97,825.10	98,686.27	.....	.....	559,692.07	598,485.14	691,017.17	692,190.41	.1408+	.1425+	.0017+	.....
Total.....	\$323,289.76	\$327,686.61	.....	.....	\$2,140,636.11	\$2,384,901.50	\$2,463,972.89	\$2,662,568.11	.13118	.12306	.....	\$18,959.40

TABLE No. XXVI.

SHOWING A COMPARISON OF GENERAL ASSESSMENT FOR THE
YEARS 1895-1896-1897-1898.

	1895.	1896.	1897.	1898.
Frontage.....	\$1,848,042.00	\$1,419,187.75	\$1,437,077.50	\$1,475,055.25
Water Closets.....	321,237.00	345,825.75	360,141.75	372,827.00
Urinals.....	9,457.00	9,589.50	10,500.25	12,586.00
Baths.....	120,828.00	136,857.75	141,616.00	147,840.75
Wash Basins.....	93,269.75	102,403.25	104,550.50	101,904.50
Extra Rooms and Persons.....	257,759.50	279,020.25	292,580.75	239,954.25
Saloons.....	27,757.00	27,712.00	30,878.00	18,048.50
Hose, Trough and Fountains..	75,773.00	106,808.50	105,568.50	82,704.00
Laundries.....	4,389.25	3,228.00	3,265.75	2,971.75
Steam Heating and Engines ..	36,878.00	34,084.70	27,856.45	27,679.40
Stables.....	68,329.50	68,595.75	69,817.00	70,864.50
Miscellaneous.....	33,925.90	34,021.70	35,174.45	33,249.60
Total.....	\$2,892,640.90	\$2,566,834.90	\$2,619,021.90	*\$2,585,135.50

*The decrease is occasioned by the operation of the new ordinance, which went into effect May 1, 1898.

TABLE No. XXVII.

SHOWING NET RECEIPTS AND EXPENSES, AND PER CENT. OF
EXPENSES TO COLLECTIONS, FOR THE YEARS
1891 TO 1898, INCLUSIVE.

YEAR.	RECEIPTS.	EXPENSES.	PER CENT.
1891	\$ 2,331,286.20	\$ 303,879.86	13
1892	2,592,111.67	336,956.79	13
1893	2,837,827.35	294,968.60	10 $\frac{1}{10}$
1894	3,010,259.92	287,306.92	9 $\frac{1}{10}$
1895	3,215,137.10	309,273.30	9 $\frac{1}{10}$
1896	3,003,692.61	288,497.34	9 $\frac{1}{10}$
1897	3,177,706.83	281,378.72	8 $\frac{1}{10}$
1898	3,489,390.87	298,982.07	8 $\frac{1}{10}$

TABLE NO. XXVIII.

MAKING A COMPARISON OF METER RATES IN SOME OF THE LARGE CITIES; ALSO SHOWING AMOUNT OF TAX AGAINST AN EIGHT-ROOM TWO-STORY DWELLING, SUPPLIED WITH BATH, CLOSET, WASH-BASIN, KITCHEN SINK, LAUNDRY TUBS, AND HOSE FOR SPRINKLING PURPOSES.

NAMES OF CITIES.	Meter Rates per 1,000 Gallons.	Water Tax for Average Eight-room Residence.
Boston.....	.18 $\frac{2}{3}$	\$22.00 (d)
Brooklyn		22.00
Cincinnati.....	.15	20.25
Kansas City.....	.36	26.50
Milwaukee.....	.20	24.50
New York	.13 $\frac{1}{2}$	18.00 (e)
Omaha.....	.30	.....
Philadelphia		18.00
Pittsburg.....		26.50
St. Louis	.30	27.00
Chicago	.10 (a)	.....
Chicago	.08 (b)	.....
Chicago	.04 (c)	11.50

- (a) Rate for first 165,000 gallons used on one premises in one month.
 (b) Rate for all in excess of 165,000 gallons used on one premises for one month.
 (c) Rate for all in excess of 5,000,000 gallons used on one premises for one month.
 (d) Sprinkling prohibited unless under meter control.
 (e) Sprinkling or use of hose prohibited altogether.

During the summer of 1898, you approved of a plan submitted to you for the rearrangement of the Collection Division of this bureau.

The work of rearrangement was completed during the month of October, at the exact cost stipulated in the contract, viz., \$2,496.

The result of this change has been most pleasing and satisfactory, not only to the employes of the office, because of the improved sanitary conditions, but to the public as well.

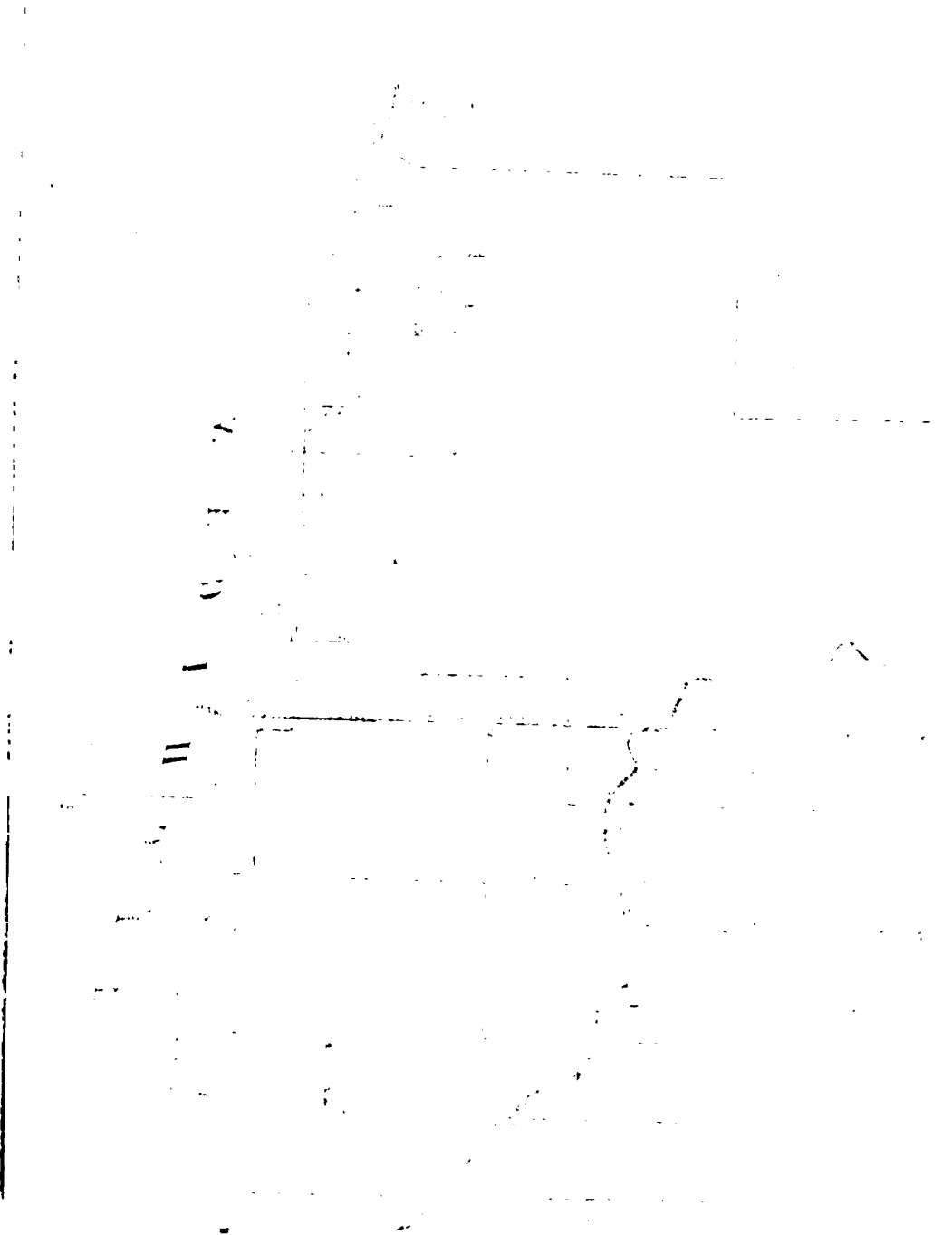
During the collection period just closed, thousands of patrons complimented the arrangement most favorably, and I am pleased to say that on no day during what is called the "rush period" was the office in any way overcrowded.

In conclusion, permit me, on behalf of the employes of this bureau, to extend to His Honor the Mayor and to yourself, our sincere thanks for the hearty co-operation we have enjoyed at your hands.

Very respectfully,

H. O. NOURSE,

Superintendent of Water.



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ANNUAL REPORT
Bureau of Sewers
CITY OF CHICAGO
1898

F. E. DAVIDSON
SUPERINTENDENT

BUREAU OF SEWERS.

HON. LAWRENCE E. MCGANN,

Commissioner of Public Works.

DEAR SIR:—I have the honor to submit herewith the Annual Report of the Bureau of Sewers for the year ending December 31, 1898, being the Twenty-third Annual Report of this Bureau under the Department of Public Works, and the Forty-third Annual Statement of the work done in connection with the sewers of the City.

The amount of money expended in the several divisions of the Bureau of Sewers during the year was as follows:

INTERCEPTING SEWERS.

Construction	\$405,944.67	
Real estate.....	77,000.00	
Salaries of engineers and inspectors, and miscellaneous expenses.....	53,733.00	
		<u>\$536,677.67</u>

CONSTRUCTING SEWERS AND CATCH-BASINS.

By special assessment.....	\$245,860.15	
Ordered by the City Engineer on account of pumping stations	8,571.98	
Where all costs were paid by parties having work done.....	23,572.58	
		<u>278,004.71</u>

SEWER FUND.

Cleaning sewers and catch-basins.....	\$92,961.88	
Repairing sewers and catch-basins.....	68,190.29	
Constructing catch-basins.....	3,279.72	
		<u>164,431.89</u>
Adjusting to grade manholes and catch-basins on streets being improved, paid out of receipts from special assessments	32,795.77	
Constructing house drains by special assessment.....	19,843.53	
Office expenses, Division of House Drains.....	1,000.00	
Salaries, Division of House Drains.....	44,104.77	
Office salaries appropriated for.....	9,909.08	
Office expenses.....	271.20	
Maintenance of sewerage pumping stations.....	39,303.50	
Canal Pumping Station, water fund.....	69,715.53	
Fullerton Avenue Pumping Station, appropriation fund....	12,586.27	
Bridgeport Locks, water fund.....	4,298.99	
Bench monuments and salaries of engineer and rodmen....	5,049.10	
Engineering and inspection, sewers and drains under Board of Local Improvements.....	47,912.88	
Total expenditures.....		<u>\$1,260,904.86</u>

**NEW SEWERS AND CATCH-BASINS BUILT DURING THE YEAR 1898
AND THE COST OF THE SAME.**

Length in feet.	Size, feet.	Average Cut.	Average Price Per foot.	Cost.
194	$\frac{3}{4}$	8.0	\$0.48	\$ 9,312
116,799	1	8.8	.98 $\frac{7}{10}$	115,308.84
260	*1	14.5	3.00	780.00
63,501	$1\frac{1}{4}$	10.0	1.16 $\frac{1}{4}$	73,764.74
306	$1\frac{1}{2}$	15.5	2.56 $\frac{1}{2}$	785.00
15,872	2 Single ring.	10.5	1.83	29,064.22
9,116	2 Double invert.	12.7	2.36	21,517.85
2,434	2 Double ring.	12.0	2.86	6,956.46
1,981	$2\frac{1}{2}$ Single ring.	9.2	1.90 $\frac{1}{3}$	3,770.60
2,642	$2\frac{1}{2}$ Double invert.	10.8	2.19 $\frac{2}{3}$	5,805.09
2,224	$2\frac{1}{2}$ Double ring.	15.0	3.00	6,672.00
3,423	3	9.7	2.70 $\frac{2}{3}$	9,266.79
50	*3	13.8	6.29	314.50
1,303	$*3\frac{1}{4}$	10.5	5.15	6,710.45
817	*4	12.5	8.09	6,609.53
200	$*4\frac{1}{4}$	11.5	6.90	1,380.00
1,778	$*4\frac{1}{2}$	10.0	6.33	11,254.74
2,000	$*4\frac{3}{4}$	14.0	7.75	15,500.00
1,372	*5	12.0	6.75	9,261.00
6,389	$*5\frac{1}{4}$	16.0	8.42	53,795.38
1,075	$*5\frac{1}{2}$	15.6	9.09	9,771.75
7,059	*6	14.5	9.26	65,366.34
2,692	$*6\frac{3}{4}$	11.8	9.26	24,927.92
2,640	*7	11.8	9.73	25,687.20
2,661	$*7\frac{1}{2}$	12.7	10.41	27,701.01
2,458	$*7\frac{3}{4}$	14.5	12.08	29,692.64
4,764	*8	16.75	12.59	59,978.76
158	*16	Tunnel.	40.63	6,419.54
450	*20	38.0	66.34	29,853.00
*Concreting invert 22nd St., 861 feet.			3.00	2,580.00
*Retaining wall at 39th St. and Halsted St.				18,360.91
256,618				\$678,949.39

*Intercepting sewers.

**TOTAL NUMBER OF MANHOLES AND CATCH-BASINS IN PLACE
DECEMBER 31, 1898, WITHIN THE CITY LIMITS.**

	Total Number Built Previous to 1898.	Total Number Built During 1898.	Manholes Abandoned.	Total Number in Place December 31, 1898.
Catch-basins . . .	47,626	1,812	.....	49,438
Manholes	49,704	1,916	215	51,405

**TOTAL COST OF THE CONSTRUCTION OF SEWERS AND CATCH-BASINS,
AND MAINTAINING SAME, SINCE THE ESTABLISHMENT OF THE
SEWERAGE SYSTEM IN 1855 TO JANUARY 1, 1899.**

Year.	Lineal feet of Sewers Built.	No. of Catch- Basins Built.	No. of Man- holes Built.	No. of House Drains Put in.	Cost of Clean- ing Sewers and Catch-Basins.	Street Inter- sections and Repairs of Sewers.	Cost of Construction.
Previous to 1861	283,586	1,174	2,102	2,194	\$ 5,619.48	No amts. found on reports.	\$ 665,188.46
1861.....	2,826	18	33	243	1,715.60	\$ 2,951.76	3,617.31
1862.....	15,676	72	66	365	4,897.24	3,024.07	57,036.42
1863.....	39,605	192	204	536	5,065.40	2,058.11	169,527.38
1864.....	25,021	189	183	512	9,417.81	4,597.63	87,221.48
1865.....	29,948	223	168	1,288	13,818.07	7,493.56	137,645.02
1866.....	48,127	327	271	3,732	28,445.16	773.65	225,564.53
1867.....	89,681	418	555	3,703	26,540.81	9,581.42	416,730.51
1868.....	47,841	480	293	3,261	26,954.06	11,287.08	197,152.92
1869.....	139,705	771	928	3,979	26,015.68	7,527.16	654,141.26
1870.....	78,166	626	468	5,187	21,464.30	10,954.74	258,664.70
1871.....	50,716	277	357	3,093	17,415.46	42,557.72	153,295.36
1872.....	47,342	245	341	1,435	21,484.16	16,975.40	173,255.76
1873.....	146,702	897	1,015	4,691	31,229.27	29,781.97	450,222.90
1874.....	222,322	1,054	1,474	6,292	36,884.57	21,996.72	537,507.38
1875.....	120,971	958	789	3,365	32,098.23	28,107.40	342,932.89
1876.....	15,248	155	75	1,172	29,345.41	19,803.29	79,545.28
1877.....	64,666	363	431	1,822	35,763.33	16,959.44	291,829.33
1878.....	88,031	492	603	1,544	25,704.37	19,259.49	37,264.97
1879.....	145,381	820	1,043	2,953	29,286.67	10,649.69	130,840.50
1880.....	79,128	271	554	4,196	25,561.48	25,068.11	92,544.08
1881.....	132,076	548	917	4,810	34,512.15	30,967.89	452,310.06
1882.....	98,515	792	725	5,677	83,969.35	26,618.05	224,450.16
1883.....	75,364	835	497	5,963	34,749.74	25,140.81	232,084.33
1884.....	101,547	751	654	5,957	43,678.03	37,893.29	258,020.91
1885.....	113,647	796	854	6,325	46,532.18	45,333.02	203,188.03
1886.....	103,193	734	723	7,441	51,110.46	50,707.64	177,647.24
1887.....	90,584	756	605	8,100	50,264.65	43,789.60	186,496.98
1888.....	104,903	816	674	8,152	52,422.41	53,782.97	228,567.57
1889.....	171,023	1,351	1,190	4,303	61,503.01	63,459.25	350,234.54
Annexed Districts } previous to 1890 }	993,573	6,102	8,620	Estimated cost of construction, cost of maintenance not known.		.....	2,614,224.75
1890.....	379,203	2,986	2,604	9,279	107,873.34	83,388.08	826,718.67
1891.....	546,918	3,979	3,736	11,312	123,620.44	95,906.75	1,532,990.44
1892.....	549,258	3,866	3,714	12,562	142,720.52	70,747.83	1,290,017.98
Norwood and Rogers Park annexed previous to 1893	96,697	326	231	No. of house drains and cost of construction not known.		.....	172,846.30
1893.....	708,176	4,811	4,325	14,198	132,633.51	114,702.78	1,606,720.09
1894.....	350,944	2,597	2,259	8,928	154,225.45	130,749.03	1,014,489.86
1895.....	196,349	1,515	1,409	1,621	134,424.44	93,713.66	356,950.01
1896.....	303,172	2,201	1,990	6,161	96,901.65	91,339.54	721,869.88
1897.....	206,450	1,842	1,550	8,241	91,414.89	90,651.29	446,249.53
1898.....	256,618	1,812	1,916	2,635	92,961.88	100,986.06	682,229.10
Totals	*7,363,899	49,438	*51,646	187,228	\$1,940,244.66	\$1,548,285.95	\$18,790,033.17

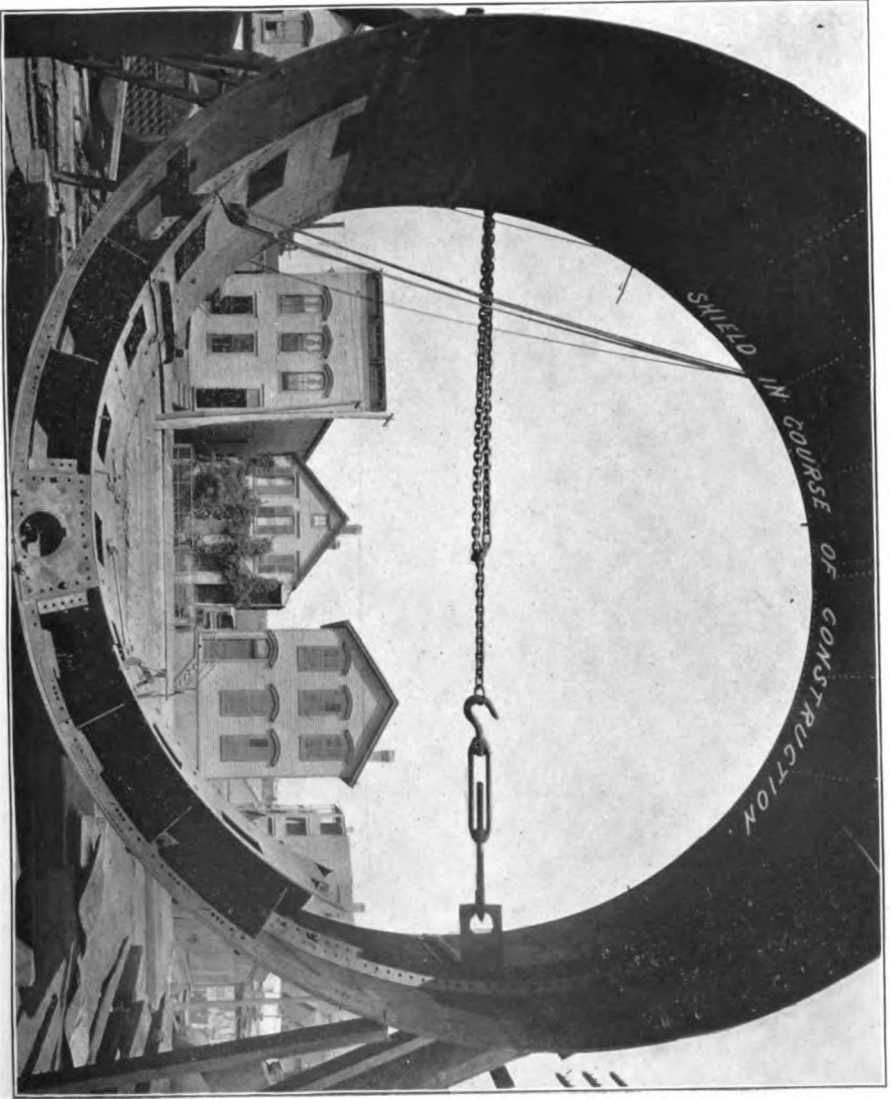
*Of this amount, 33,198 feet have been taken up and replaced by sewers of larger size, leaving in place January 1, 1899, 7,330,701 feet, or 1,388.39 miles.

†Of this number, 241 manholes have been abandoned, leaving in place January 1, 1899, 51,405.

Of the above 1,388.39 miles, 527.238 miles are of brick construction and 861.107 miles are of vitrified pipe.

SIZE AND LENGTH OF SEWERS CONSTRUCTED IN THE DIFFERENT WARDS OF THE CITY DURING THE
YEAR 1898.

WARDS.	SIZE OF SEWERS IN FEET.										
	3/4.	1.	1 1/4.	1 1/2.	2.	2 1/4.	3.	3 3/4.	4.	4 1/4.	4 3/4.
1st.....											
2d.....									400	200	
3d.....			338						417	200	
5th.....		370					50				
6th.....		708	624								
10th.....		5,301	2,055		3,339	1,315	2,326				
12th.....		850									
13th.....		4,716	335								
14th.....		1,015									
15th.....		2,412	2,424								
16th.....		1,921	476								
20th.....		1,921	2,028		202			1,303		200	1,378
25th.....		2,323			858		1,097				2,000
26th.....		3,028	1,073		2,728						
27th.....		20,497	14,083		4,387	666					
28th.....		32,443	19,175								
29th.....		3,616	1,293								
30th.....		1,694	660								
31st.....		12,720	9,015		3,670	2,642					
32d.....		1,128									
33d.....	194	2,328	1,546		1,226						
34th.....		19,489	8,376	306	11,012	2,324					
Total.....	194	117,059	68,501	306	27,422	6,847	3,478	1,303	617	300	1,778
											2,000



SHIELD IN USE, 39TH STREET CONDUIT.

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SIZE AND LENGTH OF SEWERS CONSTRUCTED IN THE DIFFERENT WARDS OF THE CITY DURING THE YEAR 1898.—Continued.

WARDS.	SIZE OF SEWERS IN FEET.											
	5.	5½.	5%.	6.	6¾.	7.	7¼.	7½.	8.	16.	20.	TOTAL.
1st												600
2d									2,287			8,096
3d		3,599	1,075	518								888
5th									1,000		225	1,595
6th												1,332
10th												14,336
12th												850
13th												5,051
14th												1,015
15th												4,836
20th												2,397
25th	1,372	2,790		6,541	2,692	2,640	2,661	2,458	1,477			82,565
26th												6,056
27th										158		37,466
28th												56,671
29th												5,134
30th											225	2,354
31st												28,047
32d												1,128
33d												5,294
34th												41,407
Total	1,372	6,389	1,075	7,059	2,692	2,640	2,661	2,458	4,764	158	450	266,618

LENGTH AND INTERIOR DIAMETER OF SEWERS IN PLACE DECEMBER 31, 1898, IN THE DIFFERENT
WARDS OF THE CITY.

Ward.	6 Inch.	9 Inch.	12 Inch.	15 Inch.	18 Inch.	20 Inch.	22 Inch.	2 Feet.	2 $\frac{1}{2}$ Feet.	2 $\frac{3}{4}$ Feet.	3 Feet.	3 $\frac{1}{4}$ Feet.	3 $\frac{1}{2}$ Feet.	3 $\frac{3}{4}$ Feet.	4 Feet.	4 $\frac{1}{4}$ Feet.
1st	...	...	66,572	1,870	...	...	...	15,210	6,077	17,033	11,877	...	...	...	2,326	...
2d	...	...	41,081	1,320	985	...	...	25,369	282	13,730	8,198	...	...	...	1,087	...
3d	...	...	37,861	6,242	8,720	...	...	22,750	...	14,692	718	...	...	...	1,670	...
4th	...	1,889	43,481	10,462	6,156	...	...	28,117	...	24,784	5,057	...	916	...	1,061	...
5th	...	...	50,315	16,249	5,288	...	...	33,217	...	5,690	6,966	...	1,600	...	4,180	...
6th	...	...	76,151	37,719	10,128	1,625	...	54,867	...	24,672	10,446	...	1,855	...	4,975	...
7th	...	...	32,167	3,686	...	...	...	21,572	...	3,683	4,137	...	2,958	...	5,040	...
8th	...	242	36,601	4,403	...	...	...	20,085	...	2,545	1,863	...	2,323	...	4,000	...
9th	...	...	40,987	18,726	125	...	...	13,013	...	971	4,214	...	3,972	...	4,035	...
10th	...	140	180,357	120,730	667	...	...	53,820	...	17,133	14,454	...	11,088	...	12,856	...
11th	...	...	45,789	3,925	999	...	...	34,093	...	2,225	1,582	...	...	...	9,541	...
12th	...	2,434	151,306	89,443	10,665	...	...	81,637	...	10,725	14,080	...	10,480	...	10,260	...
13th	...	860	107,786	54,357	4,761	...	...	27,930	...	7,555	333	...	9,975	...	11,950	...
14th	...	116	116,904	60,952	4,230	...	...	51,178	...	8,329	4,604	...	3,045	...	5,217	...
15th	...	...	126,895	118,293	380	...	...	60,588	...	16,776	5,444	...	1,626	...	2,399	...
16th	...	...	29,271	9,371	...	...	...	16,778	...	382	2,265	...	...	...	5,275	...
17th	...	...	21,043	650	...	...	...	35,074	...	...	4,315	...	...	...	6,755	...
18th	...	...	41,529	...	...	...	...	32,845	...	...	...	...	...	...	...	...
19th	...	...	42,811	1,114	...	...	...	36,055	...	...	1,023	...	...	...	9,390	...
20th	...	...	41,385	14,336	5,010	...	...	23,619	...	7,333	3,168	...	2,739	...	3,000	...
21st	...	...	47,213	6,848	1,275	...	...	16,900	...	12,010	515	...	1,020	...	2,510	...
22d	...	...	35,182	789	1,526	...	...	22,449	...	7,525	2,179	...	...	...	660	...
23d	...	...	33,146	1,726	...	...	...	25,833	...	3,841	1,962	...	...	...	8,157	...
24th	...	...	36,071	5,357	661	...	...	44,997	...	1,441	4,531	...	...	...	2,591	...
25th	...	47,475	184,429	87,136	19,310	2,604	...	32,805	4,817	15,074	11,580	...	4,500	2,188	7,591	200
26th	...	2,520	171,770	96,068	3,380	...	...	37,869	...	11,192	13,605	...	11,218	...	11,965	...
27th	970	...	107,564	165,161	433	...	...	30,520	...	8,791	7,614	...	8,039	...	10,253	...
28th	...	...	175,713	86,245	...	3,100	...	42,784	...	20,868	14,918	...	...	...	2,336	...
29th	...	225	37,456	38,198	12,392	1,300	...	9,343	...	6,842	7,023	...	740	...	6,880	...
30th	...	1,913	174,946	133,592	24,151	...	...	47,891	...	12,117	6,689	...	7,982	...	9,440	...
31st	16,270	32,337	115,946	98,300	13,862	330	261	36,045	...	23,807	14,711	...	8,425	...	7,771	...
32d	...	770	91,193	57,447	4,119	520	...	112,168	...	5,377	4,726	...	6,754	...	19,917	...
33d	...	194	41,398	39,909	658	...	...	20,597	...	6,392	5,885	...	5,661	...	3,970	...
34th	769	32,627	174,228	103,692	7,865	...	...	97,470	8,113	32,784	6,569	1,372	5,992	...	11,778	...
Totals	18,009	124,748	2,757,147	1,494,316	142,686	9,479	261	1,265,433	19,289	345,679	211,729	4,488	112,688	2,188	204,326	200

LENGTH AND INTERIOR DIAMETER OF SEWERS IN PLACE DECEMBER 31, 1898, IN THE DIFFERENT WARDS OF THE CITY.—CONTINUED.

Ward.	4½ Feet.	4¾ Feet.	5 Feet.	5½ Feet.	5¾ Feet.	6 Feet.	6½ Feet.	6¾ Feet.	7 Feet.	7½ Feet.	7¾ Feet.	8 Feet.	8½ Feet.	9 Feet.	9¾ Feet.	10 Feet.	10½ Feet.	16 Feet.	20 Feet.	Totals.
1st	200		247																	121,412
2d.	200		4,255	3,599	1,075	1,998						2,287								100,466
3d.																				86,653
4th	1,261		1,058			704														124,946
5th	2,600					1,680						1,000								130,145
6th	3,532		8,018			3,112	2,132			497									225	239,784
7th	280		5,750																	79,273
8th	3,955																			76,017
9th	3,675					2,651								1,625						93,984
10th	6,114		3,380			1,463	1,300					5,161		11,638						450,149
11th	18,440																			118,577
12th	4,075																			389,303
13th	1,995		2,809																	240,162
14th	7,030		11,194						2,702	3,972		1,320								283,013
15th			6,823			7,359			2,125	6,630		3,952		5,865						369,094
16th			5,210			1,494														70,046
17th	6,940		6,817			1,296														89,490
18th	4,011		10,775																	89,160
19th	10,130		9,305																	109,828
20th	2,220																			102,810
21st	2,843																			91,134
22d.	665		2,765																	73,740
23d.			5,583			753														76,001
24th	2,615		5,537			3,301														107,102
25th	2,713	2,000	4,227	2,790		6,541			2,640	2,661	2,458	1,477								454,043
26th	2,648		11,555			6,660			2,692											382,812
27th	12,133		9,212			14,685	2,660		7,998									158		398,291
28th	1,350		1,458			1,532			2,011											390,664
29th	2,650	3,933	7,070			4,730			5,290	497		5,449	11,375	21,525					225	148,509
30th	7,812		2,984			2,635	3,965		4,010			5,339	5,300	4,715						453,370
31st	4,116		15,847			6,552	3,942		4,005											407,392
32d.	2,200		1,950																	309,592
33d.	2,358		1,676			9,410	3,936													143,442
34th	8,797		5,637			4,734	1,325		2,656											536,297
Totals	120,548	5,933	152,502	6,389	43,152	89,584	19,340	2,692	36,882	14,257	2,458	25,985	16,675	47,371	4,650	5,300	5,285	158	450	7,330,701

SEWERS CONSTRUCTED IN THE WEST DIVISION DURING THE YEAR 1898.

STREET.	FROM	TO	Diam. in feet.	Length.	NAME OF CONTRACTOR.
W. Adams.....	S. Forty-eighth avenue....	S. Forty-seventh avenue....	1	653	John Hitt.
*N. Albany avenue.....	W. Byron.....	W. Grace.....	1	668	William Rundall.
*N. Albany avenue.....	Irving Park boulevard.....	W. Byron.....	1 1/4	655	William Rundall.
Alley bet. Walnut & Fulton.	N. Homan avenue.....	N. Kedzie avenue.....	1	1,340	E. A. Barker.
*Alley N. of Blue Island av.	S. Robey.....	S. Winchester avenue.....	1	306	Thomas O'Neill.
*Ballou.....	W. Dunning.....	W. Wrightwood avenue....	1	675	Henry Breyer.
*Ballou.....	W. Fullerton avenue.....	W. Dunning.....	1 1/4	655	Henry Breyer.
W. Belden avenue.....	Ballou.....	280 ft. east.....	1	254	Simon Ryan.
W. Belden avenue.....	N. Central Park avenue....	Ballou.....	1	905	John Hitt.
*Bloomington road.....	N. Branch Chicago River....	N. Ashland avenue.....	1 1/4	1,200	Adolph Anderson.
W. Byron.....	N. Fortieth avenue.....	N. Springfield avenue.....	1	666	Edward Connor.
Costello avenue.....	N. Kimball avenue.....	Hancock avenue.....	1	894	H. D. Hallet.
North Side Central blvd....	N. Homan avenue.....	100 ft. E. of Sawyer avenue.	1	1,121	Ed. O'Donnell.
West Side Central blvd....	75 ft. S. of N. side Sacramento square.	900 ft. N. of Ohio.....	1	1,485	Ed. O'Donnell.
South Side Central blvd....	N. Homan avenue.....	300 ft. east.....	1 1/4	335	Ed. O'Donnell.
South Side Central blvd....	300 ft. E. of Homan avenue.	N. Spaulding avenue.....	1	335	Ed. O'Donnell.
N. Central Park avenue....	W. Fullerton avenue.....	Lyndale avenue.....	1	985	William Tobin.
N. Central Park avenue....	Lyndale av.....	Humboldt avenue.....	1 1/4	350	Nash Bros.
S. Central Park avenue....	W. Fork of South Branch....	W. Thirty-first.....	3	975	M. J. Healy.
S. Central Park avenue....	W. Thirty-first.....	W. Twenty-eighth.....	2	1,340	M. J. Healy.
S. Central Park avenue....	W. Twenty-eighth.....	W. Twenty-seventh.....	1 1/4	670	M. J. Healy.
S. Central Park avenue....	W. Twenty-seventh.....	W. Twenty-sixth.....	1	682	M. J. Healy.
W. Chicago avenue.....	N. Forty-eighth avenue....	N. Twenty-sixth avenue....	1 1/4	618	John Hitt.
W. Chicago avenue.....	N. Forty-seventh avenue....	N. Forty-sixth avenue....	1	610	John Hitt.
Colorado avenue.....	S. Forty-seventh avenue....	S. Forty-sixth avenue....	1	636	Edward Connor.
Cortez.....	S. Forty-seventh avenue....	485 feet west.....	1 1/4	658	Simon Ryan.
Dakin avenue.....	N. Kedzie avenue.....	N. Fortieth avenue.....	1	525	McNulty & McCarthy.
*Drake avenue.....	N. Springfield avenue.....	W. Berteau avenue.....	1	681	Edward Connor.
*Drake avenue.....	Belle Plaine avenue.....	W. Berteau avenue.....	1	660	D. Cleary & Co.
W. Erie.....	Irving Park boulevard.....	Belle Plaine avenue.....	1 1/4	656	D. Cleary & Co.
W. Erie.....	N. Forty-eighth avenue....	N. Forty-seventh avenue....	1 1/4	616	McNulty & McCarthy.
Flournoy.....	N. Forty-seventh avenue....	N. Forty-sixth avenue....	1	612	McNulty & McCarthy.
S. Fortieth court.....	S. Forty-seventh avenue....	S. Forty-eighth avenue....	1 1/4	650	William Tobin.
S. Fortieth court.....	W. Thirty-first.....	368 ft. N. of W. Thirtieth..	1 1/4	1,072	Edward Connor.
S. Fortieth court.....	368 ft. N. of W. Thirtieth..	W. Twenty-seventh.....	1	997	Edward Connor.

S. Forty-first avenue	W. Thirty-first	363 ft. N. of W. Thirtieth ..	1 1/4	1,073	Edward Connor.
S. Forty-first avenue	363 ft. N. of W. Thirtieth ..	W. Twenty-seventh	1	1,005	Edward Connor.
S. Forty-first court	W. Thirty-first	363 ft. N. of W. Thirtieth ..	1 1/4	1,072	Edward Connor.
*N. Forty-second avenue	W. Fullerton avenue	W. Twenty-seventh	1	997	Edward Connor.
*N. Forty-second avenue	W. Belden avenue	W. Twenty-seventh	1 1/4	661	M. J. Healy.
S. Forty-second court	W. Thirty-first	Humboldt avenue	1	679	M. J. Healy.
S. Forty-second court	364 ft. N. of W. Thirtieth ..	364 ft. N. of W. Thirtieth ..	1 1/4	1,069	Nash Bros.
S. Forty-third avenue	W. Thirty-first	W. Twenty-seventh	1	951	Nash Bros.
S. Forty-third avenue	364 ft. N. of W. Thirtieth ..	364 ft. N. of W. Thirtieth ..	1 1/4	1,069	Nash Bros.
S. Forty-third avenue	Ogden avenue	W. Twenty-seventh	1	946	Nash Bros.
N. Forty-fourth avenue	W. Belle Plaine avenue	W. Twenty-second	1	745	T. J. Burke.
N. Forty-fourth court	W. Wilson avenue	C. & N. W. R. R.	1	605	Jackson & Hogan.
N. Forty-fifth avenue	W. Sunnyside avenue	W. Sunnyside avenue	1	683	Simon Ryan.
N. Forty-fifth court	W. North avenue	W. Cullom avenue	1 1/4	1,334	Simon Ryan.
E. side of S. Forty-eighth av.	W. North avenue	Grand avenue	1 1/4	445	William F. Healy.
E. side of S. Forty-eighth av.	W. North avenue	Grand avenue	1 1/4	635	William F. Healy.
E. side of S. Forty-eighth av.	Lexington avenue	W. Harrison	1	660	William Tobin.
N. Fiftyeth avenue	Harvard	Lexington	1	668	William Tobin.
S. Fiftyeth avenue	Colorado avenue	Harvard	1	880	Simon Ryan.
N. Fiftyeth court	W. Ontario	W. Ohio	1	336	Morrison & McNichols.
N. Fiftyeth court	W. Lake	Alley N. of Fulton	1	205	Thomas Burke.
N. Fiftyeth court	W. Kinzie	W. Ohio	1	885	Nash Bros.
N. Fiftyeth court	W. Kinzie	332 ft. N. of Indiana	1	900	Nash Bros.
N. Fiftyeth court	Armitage avenue	Humboldt avenue	1 1/4	1,335	Edward Connor.
N. Fifty-first avenue	W. Ontario	332 ft. N. of Indiana	1	365	Morrison & McNichols.
N. Fifty-first avenue	330 ft. N. of Indiana	W. Erie	1	693	Morrison & McNichols.
N. Fifty-first avenue	Fulton	Park avenue	1	445	Jackson & Hogan.
N. Fifty-first court	W. Kinzie	330 ft. N. of Indiana	1	897	Nash Bros.
S. Fifty-first court	W. Kinzie	535 ft. N. of Indiana	1	1,105	Nash Bros.
S. Fifty-first court	Fulton	Park avenue	1	445	Jackson & Hogan.
S. Fifty-second avenue	W. Lake	Alley N. of Fulton	1	248	Thomas Burke.
E. side of S. Fifty-second av.	W. Lake	Alley N. of Fulton	1	285	Thomas Burke.
N. Fifty-second avenue	Fulton	Park avenue	1	435	Jackson & Hogan.
N. Fifty-second avenue	W. Ontario	218 ft. N. of W. Ontario ..	1	248	Morrison & McNichols.
Fulton	W. Kinzie	525 ft. N. of W. Indiana	1	1,097	Nash Bros.
Fulton	S. Forty-eighth avenue	S. Forty-seventh avenue	1 1/4	665	Ed. A. Barker.
Fulton	S. Forty-seventh avenue	S. Forty-sixth avenue	1	650	Ed. A. Barker.
Fulton	S. Forty-eighth avenue	S. Fiftyeth avenue	2	1,333	Jackson & Hogan.
Fulton	S. Fiftyeth avenue	S. Fifty-first court	1 1/4	983	Jackson & Hogan.

*Sewers constructed by private contract.

SEWERS CONSTRUCTED IN THE WEST DIVISION DURING THE YEAR 1898—CONTINUED.

STREET.	FROM	TO	Diam. in feet.	Length.	NAME OF CONTRACTOR.
Fulton.....	S. Fifty-first court.....	S. Fifty-second avenue.....	1	335	Jackson & Hogan.
*W. George.....	N. Albany avenue.....	N. Whipple.....	1	247	Wm. Rundall.
Gladys avenue.....	S. Forty-seventh avenue.....	S. Forty-sixth avenue.....	1	646	M. J. Joyce.
Grand avenue.....	N. Forty-fourth avenue.....	N. Forty-fifth court.....	1	1,142	Wm. F. Healy.
Grand avenue.....	N. Forty-fifth court.....	Belt Line railway.....	1 1/4	378	Wm. F. Healy.
Grand avenue.....	N. Forty-seventh avenue.....	N. Forty-eighth avenue.....	2	740	Wm. Hilliard.
Grand avenue.....	N. Forty-seventh avenue.....	Belt Line railway.....	1 1/4	670	Wm. Hilliard.
*N. Hancock avenue.....	W. Dunning.....	W. Wrightwood avenue.....	1	505	Henry Breyer.
*N. Hancock avenue.....	W. Fullerton avenue.....	W. Dunning.....	1 1/4	655	Henry Breyer.
N. Harding avenue.....	Wabansia avenue.....	Bloomington road.....	1	640	Ed. O'Donnell.
W. Harrison.....	Centre S. Forty-seventh av.	W. line S. Forty-seventh av.	1	36	J. H. McCarthy.
Hayes.....	W. line S. Forty-seventh av.	S. Forty-eighth avenue.....	1	622	J. H. McCarthy.
S. Homan avenue.....	Kimball avenue.....	Alley east of Ballou.....	1	495	Nash & Dowdle.
Humboldt avenue.....	W. Thirty-first.....	W. Thirtieth.....	2 1/2	632	M. J. Healy.
W. Huron.....	N. Central Park avenue.....	Ballou.....	1	900	Nash Bros.
W. Huron.....	N. Forty-seventh avenue.....	N. Forty-sixth avenue.....	1	622	McNulty & McCarthy.
*W. Huron.....	N. Forty-eighth avenue.....	N. Forty-seventh avenue.....	1 1/4	613	McNulty & McCarthy.
*W. Huron.....	N. Forty-ninth avenue.....	N. Forty-ninth avenue.....	1 1/4	660	D. Cleary.
W. Indiana.....	N. Forty-ninth avenue.....	N. Fiftieth avenue.....	1	660	D. Cleary.
W. Indiana.....	N. Forty-eighth avenue.....	N. Fiftieth court.....	2	1,714	Nash Bros.
W. Indiana.....	N. Fiftieth court.....	N. Fifty-first court.....	1 1/4	662	Nash Bros.
W. Jackson.....	N. Fifty-first court.....	N. Fifty-second avenue.....	1	335	Nash Bros.
*South side of Kinzie.....	S. Forty-eighth avenue.....	S. Forty-seventh avenue.....	1	658	A. F. Delfosse.
*South side of Kinzie.....	S. Forty-seventh avenue.....	S. Forty-seventh avenue.....	1 1/4	670	D. Cleary.
North side of Lake.....	Forty-eighth avenue.....	S. Forty-sixth avenue.....	1	650	D. Cleary.
South side of Lake.....	Forty-eighth avenue.....	Forty-sixth avenue.....	1	1,328	R. R. Whiteman.
South side of Lake.....	Forty-eighth avenue.....	Forty-sixth avenue.....	1	1,330	John Hitt.
South side of Lake.....	Centre of 51st av. produced	Centre of 51st av. produced.	1 1/4	2,010	Thos. Burke.
Lyndale avenue.....	Centre of 51st av. produced	Fifty-second avenue.....	1	669	Thos. Burke.
South side Madison.....	N. Central Park avenue.....	Ballou.....	1	900	Nash Bros.
Medill avenue.....	S. Forty-seventh avenue.....	S. Forty-sixth avenue.....	1	617	R. R. Whiteman.
Medill avenue.....	Central Park avenue.....	Ballou.....	1	900	Nash Bros.
Medill avenue.....	N. Forty-eighth avenue.....	N. Forty-ninth avenue.....	1 1/4	665	Edward Connor.
W. Monroe.....	N. Forty-ninth avenue.....	N. Fiftieth avenue.....	1	675	Edward Connor.
W. Monroe.....	S. Forty-sixth avenue.....	S. Forty-seventh avenue.....	1	625	R. R. Whiteman.

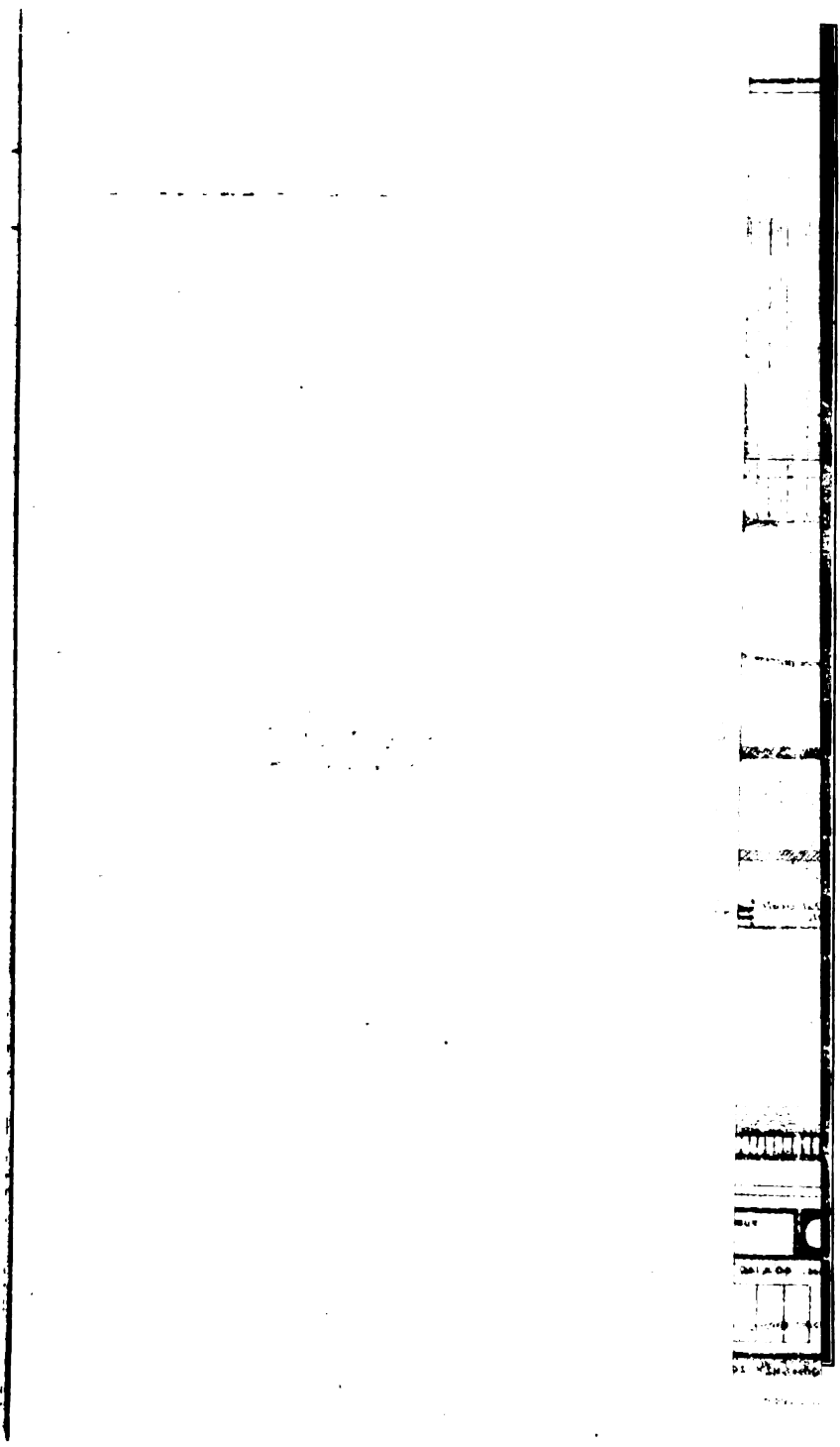
W. Monroe.....	S. Forty-seventh avenue.....	S. Forty-eighth avenue.....	1	655	R. R. Whiteman.
Monticello avenue.....	W. Diversey avenue.....	Schubert avenue.....	1 1/4	660	John Hitt.
Monticello avenue.....	Schubert avenue.....	141 ft. N. of W. Wrightwood avenue.	1	504	John Hitt.
W. North avenue.....	N. Forty-fourth avenue.....	N. Forty-fifth court.....	2	930	W. F. Healy.
W. North avenue.....	N. Forty-fifth court.....	Belt Line railway.....	1 1/4	832	W. F. Healy.
W. North avenue.....	N. Forty-eighth avenue.....	1050 ft. E. of N. 48th avenue	2	1,058	Byrne & Shortall.
O'Brien avenue.....	Grand avenue.....	Wabansia avenue.....	1	745	Edward Connor.
O'Brien avenue.....	W. North avenue.....	Wabansia avenue.....	1	671	Byrne & Shortall.
*W. Ohio.....	N. Forty-eighth avenue.....	N. Forty-seventh avenue.....	1 1/4	641	Dennis Cleary.
*W. Ohio.....	N. Forty-eighth avenue.....	N. Forty-ninth avenue.....	1 1/4	664	Dennis Cleary.
W. Ohio.....	N. Forty-ninth avenue.....	N. Fiftieth avenue.....	1	670	Dennis Cleary.
W. Ontario.....	N. Forty-eighth avenue.....	N. Fiftieth avenue.....	2	1,340	Morrison & McNichols.
W. Ontario.....	N. Fiftieth avenue.....	N. Fifty-first avenue.....	1 1/4	665	Morrison & McNichols.
W. Ontario.....	N. Fifty-first avenue.....	N. Fifty-second avenue.....	1	660	Morrison & McNichols.
Parker avenue.....	N. Fifty-first avenue.....	480 feet west.....	1	480	Nash & Dowdle.
W. Polk.....	Kimball avenue.....	S. Forty-eighth avenue.....	1 1/4	650	Wm. Tobin.
South side of Randolph.....	S. Forty-seventh avenue.....	S. Forty-sixth avenue.....	1	645	R. R. Whiteman.
North side of Randolph.....	S. Forty-seventh avenue.....	S. Forty-sixth avenue.....	1	645	R. R. Whiteman.
South side of Randolph.....	S. Forty-eighth avenue.....	S. Forty-seventh avenue.....	1 1/4	670	R. R. Whiteman.
North side of Randolph.....	S. Forty-eighth avenue.....	S. Forty-seventh avenue.....	1 1/4	670	R. R. Whiteman.
*S. Sacramento avenue.....	W. Diversey avenue.....	W. George.....	1 1/4	661	Wm. Rundall.
*S. Sacramento avenue.....	W. George.....	W. Wellington.....	1	665	Wm. Rundall.
S. St. Louis avenue.....	W. Twenty-seventh.....	W. Twenty-sixth.....	1	642	M. J. Healy.
S. St. Louis avenue.....	W. Twenty-eighth.....	W. Twenty-seventh.....	1 1/4	655	M. J. Healy.
S. St. Louis avenue.....	W. Thirty-first.....	W. Twenty-eighth.....	2	1,326	M. J. Healy.
N. Seventieth avenue.....	364 feet north of Dunning.....	Schubert avenue.....	1	837	A. Maloney.
N. Seventieth avenue.....	W. Fullerton avenue.....	364 ft. north of Dunning.....	1 1/4	1,183	A. Maloney.
N. Seventieth avenue.....	W. Fullerton avenue.....	C. M. & St. P. railway.....	1	726	John Hitt.
*Smalley court.....	W. Dunning.....	W. Wrightwood avenue.....	1	675	Henry Breyer.
*Smalley court.....	W. Fullerton avenue.....	W. Dunning.....	1 1/4	655	Henry Breyer.
East side of Southwest Bd.	W. Twenty-second.....	333 ft. south of W. 23d pl.	1	1,266	Jackson & Hogan.
S. Spaulding avenue.....	W. Madison.....	W. Adams.....	1	423	Nash & Dowdle.
S. Spaulding avenue.....	W. Twenty-seventh.....	W. Twenty-sixth.....	1	505	M. J. Healy.
S. Spaulding avenue.....	W. Twenty-eighth.....	W. Twenty-seventh.....	1 1/4	664	M. J. Healy.
S. Spaulding avenue.....	W. Thirtieth.....	W. Twenty-eighth.....	2	673	M. J. Healy.
W. Superior.....	N. Forty-eighth avenue.....	368 ft. west of N. 49th av.	1 1/4	1,055	A. Maloney.
W. Superior.....	363 ft. west of N. 49th av.	N. Fifty-first avenue.....	1	936	A. Maloney.
Thomas.....	N. Kedzie avenue.....	485 feet west.....	1	490	A. Maloney.
N. Troy.....	Irving Park boulevard.....	W. Byron.....	1 1/4	658	R. R. Whiteman.

*Sewers constructed by private contract.

SEWERS CONSTRUCTED IN THE WEST DIVISION DURING THE YEAR 1898—CONTINUED.

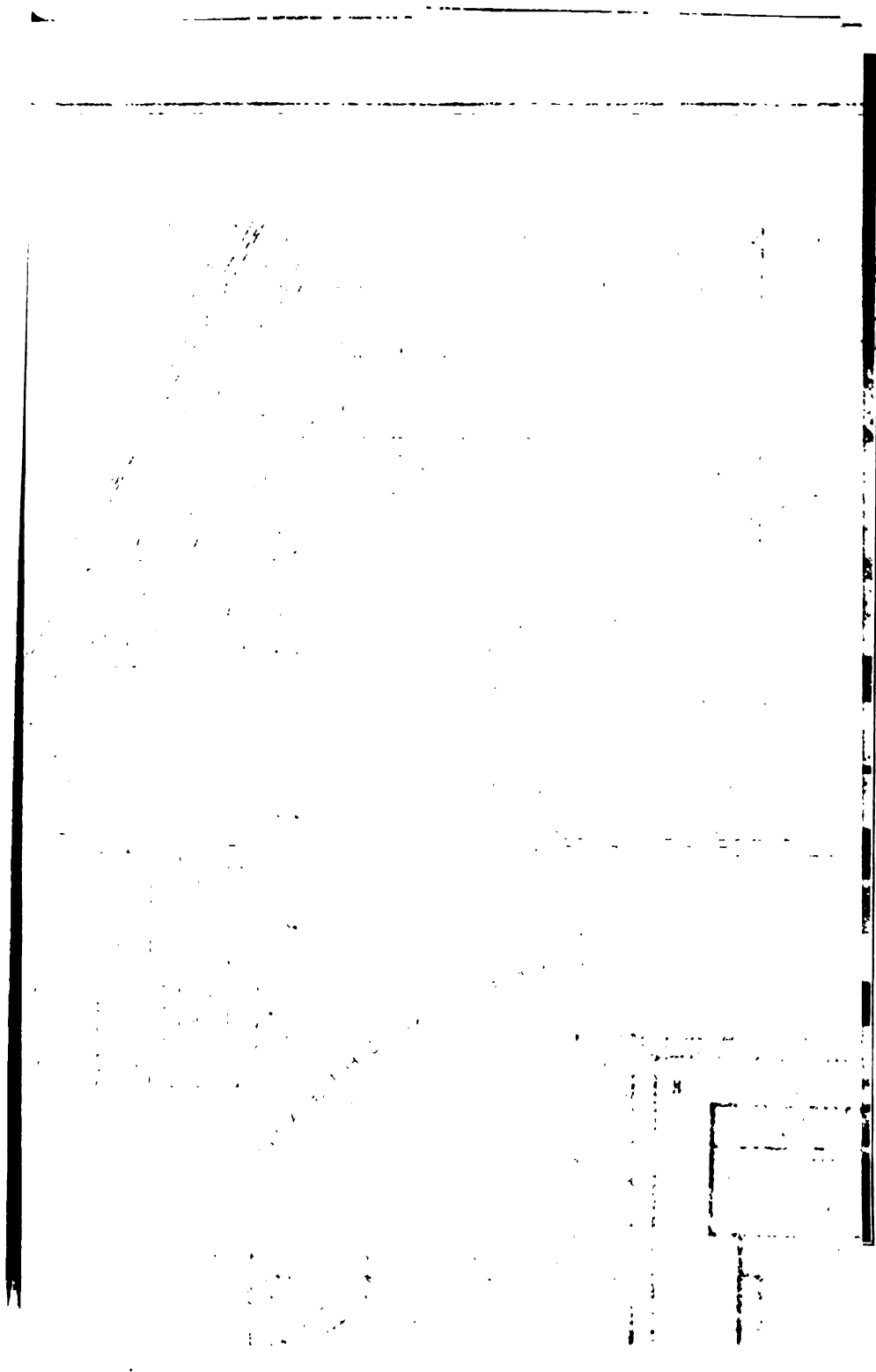
STREET.	FROM	TO	Diam. in feet.	Length.	NAME OF CONTRACTOR.
N. Troy	W. Byron	W. Grace	1	672	R. R. Whiteman.
W. Twentieth	S. Albany avenue	630 feet east	1	670	Thos. J. Burke.
*W. 23d place	S. California avenue	S. Washtenaw avenue	1	634	Thos. Burke.
*W. 25th	Panhandle R'y	140 ft. E. of Rockwell	1	596	Wm. Dee.
W. 30th	S. Homan avenue	S. Spaulding avenue	2½	683	M. J. Healy.
W. 31st	S. Central Park avenue	S. Homan avenue	3	1,351	M. J. Healy.
W. 31st	S. Forty-second avenue	S. Forty-third avenue	2½	666	Nash Bros.
N. Washtenaw avenue	W. Belmont avenue	W. Noble	1¼	563	Edward Connor.
N. Washtenaw avenue	W. Noble	80 ft. south	1	129	Edward Connor.
S. Washtenaw avenue	W. Van Buren	N. Harrison	1	427	Nash & Dowdle.
W. Wellington	Humboldt	N. Whipple	1	678	Edward Connor.
*N. Whipple	W. Byron	W. Grace	1	675	Wm. Rundall.
*N. Whipple	Irving Park boulevard	W. Byron	1¼	656	Wm. Rundall.
N. Whipple	Sacramento square	20 ft. N. of Kinzie	1	395	Nash & Dowdle.
*N. Whipple	W. Wellington	Alley N. of George	1	509	Wm. Rundall.
*S. Winchester avenue	Alley N. of Blue Island av.	Alley S. of W. 23d	1	184	Thos. O'Neil.

* Sewers constructed by private contract.



SEWERS CONSTRUCTED IN THE WEST DIVISION DURING THE YEAR 1898—CONTINUED.

STREET.	FROM	TO	Diam. in.	Length ft.	NAME OF CONTRACTOR



SEWERS CONSTRUCTED IN THE WEST DIVISION DURING THE YEAR 1898—CONTINUED.



OPEN CUT, THIRTY-NINTH STREET CONDUIT—INTERCEPTING SEWERS.

SEWERS CONSTRUCTED IN THE SOUTH DIVISION DURING THE YEAR 1898.

STREET.	FROM	TO	Diam. in feet.	Length.	NAME OF CONTRACTOR.
Avenue J.....	Ninety-ninth.....	100th.....	1½	710	Wm. Davidson.
Avenue K.....	102d.....	103d.....	1	674	Michael J. Joyce.
Avenue K.....	104d.....	104th.....	1½	662	Michael J. Joyce.
Alley N. of I. C. R'y.....	Madison avenue.....	300 ft. S. of 104th.....	1	842	Michael J. Joyce.
Bishop.....	W. Sixty-seventh.....	W. Sixty-eighth.....	1	860	James Murphy.
Bishop.....	W. Sixty-eighth.....	W. Sixty-ninth.....	1	672	M. L. O'Brien.
Bishop.....	W. Sixty-ninth.....	W. Seventieth.....	1½	659	M. L. O'Brien.
Bishop.....	W. Seventy first.....	W. Seventieth.....	1	663	Edward Connor.
Brewery avenue.....	Twenty-seventh.....	392 ft. south.....	1	673	Joy & Co.
Butler.....	W. Ninety-seventh place.....	W. Ninety-seventh.....	1½	838	Edward Connor.
Butler.....	W. Ninety-ninth.....	W. Ninety-seventh.....	1	806	Cogan & Pound.
Butler.....	W. 117th.....	Alley S. of W. 116th.....	1½	985	Cogan & Pound.
Butler.....	W. 118th.....	W. 117th.....	1	495	A. Maloney.
Calumet avenue.....	119 ft. S. of Sixtieth.....	Fifty-seventh.....	1½	665.	A. Maloney.
S. Canal.....	Archer avenue.....	30 ft. N. of 22d place.....	1	2,063	H. N. Nelson.
S. Claremont avenue.....	W. Thirty-fifth.....	W. Thirty-fourth.....	1	870	Nash & Dowdle.
S. Claremont avenue.....	W. Thirty-fourth.....	Alley S. of Bross avenue.....	1½	624	Ed. O'Donnell.
Curtiss avenue.....	W. 114th place.....	293 ft. N. of 113th.....	1	708	Ed. O'Donnell.
Eggleston avenue.....	W. 117th.....	Alley S. of W. 116th.....	1	1,825	John Hitt.
Eggleston avenue.....	W. 118th.....	W. 117th.....	1	479	Joy & Co.
Eggleston avenue.....	W. 118th.....	W. 119th.....	1½	664	Joy & Co.
Elizabeth.....	W. Fifty-eighth.....	W. 119th.....	1½	642	James Healy.
Elizabeth.....	W. Sixty-second.....	Panhandle R'y.....	1	274	Nash & Dowdle.
Evans avenue.....	Forty-ninth.....	W. 63d.....	1½	660	Murphy & Wraggs.
Fair avenue.....	120 ft. S. of Sixty-eighth.....	Fiftieth.....	1	684	Ed. O'Donnell.
Fair avenue.....	Seventieth.....	Sixty-eighth.....	1	96	Byrne & Shortall.
†Fourteenth.....	South Br. Chicago River.....	120 ft. S. of Sixty-eighth.....	2	1,226	Byrne & Shortall.
Forty-sixth.....	Greenwood avenue.....	State.....	5½	1,075	J. H. Roach.
Forty-sixth.....	Laflin.....	486 ft. east.....	1	494	Nash & Dowdle.
Forty-sixth.....	Ladlin.....	Loomis.....	1	579	Nash & Dowdle.
Fifty-fifth place.....	Indiana avenue.....	South Park avenue.....	1	1,823	M. J. Joyce.
Fifty-eighth.....	South Park avenue.....	Calumet avenue.....	1	443	H. N. Nelson.
Harvard avenue.....	W. 119th.....	Alley S. of W. 118th.....	1½	480	A. Maloney.
*Jackson avenue.....	Sixty-fourth.....	Sixty-fifth.....	1	617	Ed. Barker.
Justine.....	W. Fifty-ninth.....	W. Sixty-first.....	1	1,360	Michael Doran.

SEWERS CONSTRUCTED IN THE SOUTH DIVISION DURING THE YEAR 1898—CONTINUED.

STREET.	FROM	TO	Diam. in feet.	Length.	NAME OF CONTRACTOR.
Justine.....	W. Sixty-eighth.....	W. Sixty-seventh.....	1	878	Simon Ryan.
Justine.....	W. Sixty-ninth.....	W. Sixty-eighth.....	1 1/4	653	Simon Ryan.
Justine.....	W. Sixty-ninth.....	W. Seventieth.....	1	660	Ed. Connors.
Justine.....	W. Seventy-first.....	W. Seventieth.....	1	673	Joy & Co.
Lafayette avenue.....	W. 115th.....	233 ft. N. of W. 116th.....	1 1/4	747	Cogan & Pound.
Lafayette avenue.....	233 ft. N. of W. 116th.....	340 ft. S. of W. 116th.....	1	648	Cogan & Pound.
Lafin.....	W. Sixty-eighth.....	W. Sixty-seventh.....	1	872	Simon Ryan.
Lafin.....	W. Sixty-ninth.....	W. Sixty-eighth.....	1 1/4	656	Simon Ryan.
Lafin.....	W. Sixty-ninth.....	W. Seventieth.....	1	665	Edward Connors.
Lafin.....	W. Seventy-first.....	W. Seventieth.....	1	673	Joy & Co.
La Salle.....	W. 115th.....	153 ft. N. of W. 116th.....	1	826	Cogan & Pound.
Lincoln.....	W. Forty-third.....	W. Forty-fourth.....	1 1/4	670	Edward Connor.
Lincoln.....	W. Forty-fourth.....	W. Sixty-sixth.....	1	1,380	Edward Connor.
Loomis.....	W. Eighty-eighth.....	W. Ninetieth.....	2 1/2	1,323	James Healy.
Loomis.....	W. Ninetieth.....	W. Ninety-second.....	2	1,329	James Healy.
Loomis.....	W. Ninety-second.....	W. Ninety-third.....	1 1/4	667	James Healy.
Loomis.....	W. Ninety-third.....	W. Ninety-fourth.....	1	668	James Healy.
Lowe avenue.....	Root.....	W. Forty-second.....	1	426	Nash & Dowdle.
Lowe avenue.....	W. Ninety-ninth.....	W. 100th.....	1 1/4	657	Ed. O'Donnel.
Lowe avenue.....	W. 100th.....	Alley N. of 103d.....	1	1,827	Ed. O'Donnel.
Madison avenue.....	140 ft. N. of Sixty-third.....	Sixtieth.....	3	1,777	James Murphy.
Madison avenue.....	Sixty-third.....	140 ft. N. of Sixty-third.....	1 1/2	173	James Murphy.
Michigan avenue.....	102d.....	102d place.....	1	344	Thomas Burke.
Michigan avenue.....	102d place.....	103d.....	1 1/4	380	Thomas Burke.
Michigan avenue.....	103d.....	107th.....	2	2,665	Thomas Burke.
Michigan avenue.....	107th.....	109th.....	1 1/4	1,388	Thomas Burke.
Michigan avenue.....	109th.....	110th.....	1	673	Thomas Burke.
Michigan avenue.....	110th.....	111th.....	1	671	Wm. F. Healy.
Michigan avenue.....	111th.....	112th place.....	1 1/4	990	Wm. F. Healy.
Michigan avenue.....	112th place.....	113th place.....	2	657	Wm. F. Healy.
Michigan avenue.....	113th place.....	115th.....	1 1/4	992	Wm. F. Healy.
Michigan avenue.....	115th.....	Michigan avenue.....	2 1/2	2,324	Thomas Burke.
*103d.....	Under the Penny's R. R.....	97 ft. W. of Wentworth ave.....	1 1/4	175	Wm. Dee & Co.
W. 105th place.....	Wentworth avenue.....	97 ft. W. of Wentworth ave.....	1 1/4	185	Thomas Burke.
W. 105th place.....	97 ft. W. of Wentworth ave.....	Right of way of C. & E. I. Ry.....	2	1,125	Thomas Burke.

W. 106th	Wentworth avenue	97 ft. W. of Wentworth ave.	1 1/4	138	Thomas Burke.
W. 106th	97 ft. W. of Wentworth ave.	Right of way of C. & E. I. Ry	2	1,129	Thomas Burke.
W. 111th	Wentworth avenue	7 ft. W. of Wentworth ave.	1 1/4	42	James Healy.
W. 111th	Wentworth avenue	Stewart avenue	2	1,240	James Healy.
W. 118th	Wentworth avenue	7 ft. E. of Wentworth ave.	1 1/4	40	Wm. F. Healy.
W. 118th	Wentworth avenue	Michigan avenue	2	1,819	Wm. F. Healy.
W. 118th	Lafayette avenue	40 ft. W. of State	1	271	Cogan & Pound.
W. 118th	Perry avenue	Lafayette avenue	1 1/4	325	Cogan & Pound.
W. 118th	Wentworth avenue	7 ft. E. of Wentworth ave.	1 1/4	40	Cogan & Pound.
W. 118th	7 ft. E. of Wentworth ave.	Perry avenue	2	600	Cogan & Pound.
W. 118th	Lafayette avenue	115 ft. E. of Lafayette ave.	1	145	Cogan & Pound.
W. 117th	Eggleson avenue	Wallace	1	958	A. Maloney.
W. 118th	Harvard avenue	Wallace	1	1,610	James Healy.
W. 118th	Wentworth avenue	Harvard avenue	1 1/4	988	James Healy.
Parnell avenue	W. Ninety-ninth	W. 101st	1 1/4	1,319	Cogan & Pound.
Parnell avenue	W. 101st	Alley N. of W. 108d	1	1,154	Cogan & Pound.
Parnell avenue	W. 118th	W. 118th	1	647	James Healy.
S. Paulina	W. Forty-sixth	W. Forty-fifth	1	661	John Hitt.
S. Paulina	W. Forty-seventh	W. Forty-sixth	1 1/4	623	John Hitt.
Perry avenue	W. 115th	158 ft. N. of W. 116th	1	826	Cogan & Pound.
Princeton avenue	W. 119th	Alley S. of W. 118th	1	479	A. Maloney.
Prospect avenue	768 ft. S. of W. Ninety-fifth	W. Ninety-fifth	1 1/4	764	J. McCarthy.
Prospect avenue	650 ft. N. of W. Ninety-ninth	768 ft. S. of W. Ninety-fifth	1	1,281	J. McCarthy.
Prospect avenue	W. Ninety-ninth	650 ft. N. of W. Ninety-ninth	1 1/4	667	J. McCarthy.
Sixty-first	210 ft. W. of Prairie avenue	150 ft. E. of Calumet avenue	1	840	Nash & Dowdle.
*Sixty-fourth place	Jackson avenue	308 ft. East	1	308	Ed. Barker.
W. Sixty-eighth	Centre avenue	May	1	295	Nash & Dowdle.
Sixty-eighth	Fair avenue	110 ft. E. of Fair avenue	1	140	Byrne & Shortall.
Sixty-eighth	110 ft. E. of Fair avenue	200 ft. E. of Fair avenue	1/4	194	Byrne & Shortall.
290 ft. 8. and parallel with Sixty-eighth	Fair avenue	350 ft. E. of Fair avenue	1	276	Byrne & Shortall.
W. Seventy-first	Ashland avenue	Bishop	2	1,006	Joy & Co.
Seventy-fourth	Coles avenue	Bond avenue	1	458	Joy & Co.
*Seventy-fourth	Kingston avenue	Railroad avenue	1	342	Geo. Kirkpatrick.
*N. side of Seventy-fifth	Kimberk avenue	Alley E. of Kimbark ave.	1	140	John M. Healy.
N. side of Seventy-fifth	Langley avenue	Cottage Grove avenue	1	454	Nash & Dowdle.
N. side of Seventy-fifth	Stony Island avenue	Washington avenue	1	562	Thos. J. Burke.
*State	Fourteenth	Twelfth	5 1/4	1,280	J. H. Roach.
*State	Twenty-first	Twenty-second	6	518	J. H. Roach.

* Sewers constructed by private contract.

† Intercepting system of sewers.

SEWERS CONSTRUCTED IN THE SOUTH DIVISION DURING THE YEAR 1898—CONTINUED.

STREET.	FROM	TO	Diam. in feet.	Length.	NAME OF CONTRACTOR.
State	112th	112th place	1	300	Thos. Burke.
Stewart avenue	W. 119th	Alley S. of W. 118th	1	465	A. Maloney.
Throop	W. Eighty-eighth	W. Ninetieth	2½	1,319	McNulty & McCarthy.
Throop	W. Ninetieth	W. Ninety-second	2	1,335	McNulty & McCarthy.
Throop	W. Ninety-second	W. Ninety-third	1¼	666	McNulty & McCarthy.
Throop	W. Ninety-third	W. Ninety-fourth	1	672	McNulty & McCarthy.
*Twelfth	State	Wabash avenue	4½	400	J. H. Roach.
*Twelfth	Wabash avenue	I. C. R'y	4	817	J. H. Roach.
*Twenty-first	S. Branch Chicago river	State	8	3,287	J. H. Roach.
*Twenty-first and Prairie av	State	Twenty-second	5½	2,227	Byrne & Shortall.
*Twenty-second and State	 Intersection .....	.....	5¼	92	Byrne & Shortall.
*Thirty-ninth	 Intersection .....	.....	3	50	Byrne & Shortall.
*Thirty-ninth	Halsted	Butler	20	450	Chicago Star Construction & Dredging Co.
Wallace	Halsted	Butler	1	260	Chicago Star Construction & Dredging Co.
Wallace	W. Ninety-ninth	W. 101st	1¼	1,322	Ed. O'Donnell.
Yale avenue	W. 101st	Alley N. of W. 108d	1	1,161	Ed. O'Donnell.
Yale avenue	W. 119th	Alley S. of W. 118th	1	480	A. Maloney.

* Intercepting system of sewers.

SEWERS CONSTRUCTED IN THE NORTH DIVISION DURING THE YEAR 1908.

STREET.	FROM	TO	Diam. in feet.	Length.	NAME OF CONTRACTOR.
*Abbott court.....	290 ft. N. of Diversey ave..	North	1	800	William Dee.
N. Ashland avenue	Catalpa avenue.....	Edgewater terrace.....	1	844	Rascher & Naef.
N. Ashland avenue	Edgewater terrace	Hollywood avenue	1 1/4	927	Rascher & Naef.
N. Ashland avenue	Hollywood avenue	Edgewater terrace	1	307	Rascher & Naef.
*Beach court.....	Irving Park boulevard	300 ft. south	1	376	Nash & Dowdle.
*Bryn Mawr avenue	Forest avenue	N. Clark	1	560	M. J. Healy.
Bryn Mawr avenue	N. Hermitage avenue	N. Ashland avenue.....	2	888	Rascher & Naef.
Bryn Mawr avenue	E. Ravenswood Park av	N. Hermitage avenue	3	437	Rascher & Naef.
+Clarendon avenue.....	Montrose avenue	Lake Shore drive	5 1/4	2,790	Cogan & Pound.
+Graceland avenue.....	Irving Park boulevard	Byron	1 1/2	743	A. Maloney.
+Pine Grove avenue.....	N. Western avenue	N. Campbell avenue	1 1/4	845	John Hitt.
Cullom avenue	Belmont avenue	285 ft. south	1	287	Simon Ryan.
East court.....	N. Paulina.....	Alley W. of N. Ashland av.	1	490	Rascher & Naef.
Edgewater terrace	E. Ravenswood Park av	Alley W. of N. Paulina	1	465	Rascher & Naef.
Edgewater terrace	N. Branch Chicago River..	Beacon.....	16	188	Nash & Dowdle.
+Lawrence avenue	Addison.....	Melrose avenue	4 1/2	200	Cogan & Pound.
+Lake Shore drive.....	Pine Grove avenue	Addison	4 3/4	2,000	Cogan & Pound.
+Lake Shore drive	Lawrence avenue	Argyle	1	1,300	R. R. Whiteman.
Magnolia avenue	Sheffield avenue	Willow	1 1/4	476	Ed. O'Donnell.
Marcy	Willow	Clybourne place	1	1,921	Ed. O'Donnell.
Murphy	Rodgers avenue	Birchwood avenue	1 1/4	1,101	W. F. Healy.
*Oakdale avenue	N. Ashland avenue	Perry	1	628	M. J. Healy.
N. Oakley avenue	Montrose avenue	Alley N. of Cullom avenue.	1	490	Simon Ryan.
N. Paulina	Bryn Mawr avenue	Edgewater terrace	1 1/4	380	Rascher & Naef.
N. Paulina	Edgewater terrace.....	Catalpa avenue	1	343	Rascher & Naef.
E. Ravenswood Park av ..	Catalpa avenue	Bryn Mawr avenue	3	660	Rascher & Naef.
Rogers avenue	Central	Murphy avenue.....	3	202	W. F. Healy.
School	N. Western avenue	Alley W. of N. Oakley av ..	1	451	Nash & Dowdle.
+Sheridan road	Armore avenue	Granville avenue	7	2,640	Nash & Dowdle.
+Sheridan road	Argyle	Balmoral avenue	7 3/4	2,458	Nash & Dowdle.
+Sheridan road	Balmoral avenue	Ardmore avenue	7 1/2	2,661	Nash & Dowdle.
+Sheridan road	Devon avenue	Pratt avenue.....	6	2,641	Nash & Dowdle.

SEWERS CONSTRUCTED IN THE NORTH DIVISION DURING THE YEAR 1898—CONTINUED.

STREET.	FROM	TO	Diam. in feet.	Length.	NAME OF CONTRACTOR.
†Sheridan road.....	Granville avenue.....	Sheridan road.....	6¾	2,892	Nash & Dowdle.
†Devon avenue.....	Lawrence avenue.....	Argyle.....	8	1,477	Nash & Dowdle.
†Sheridan road.....	Lawrence avenue.....	Montrouze avenue.....	6	3,900	Cogan & Pound.
†Lakeside avenue.....	Lunt avenue.....	Touhy avenue.....	4¾	1,878	Nash & Dowdle.
†Clarendon avenue.....	Pratt avenue.....	Lunt avenue.....	5	1,872	Nash & Dowdle.
†Sheridan road.....	Touhy avenue.....	Bryan avenue.....	3¾	1,808	Nash & Dowdle.
†Sheridan road.....					

*Sewers constructed under private contract.

†Intercepting system of sewers.

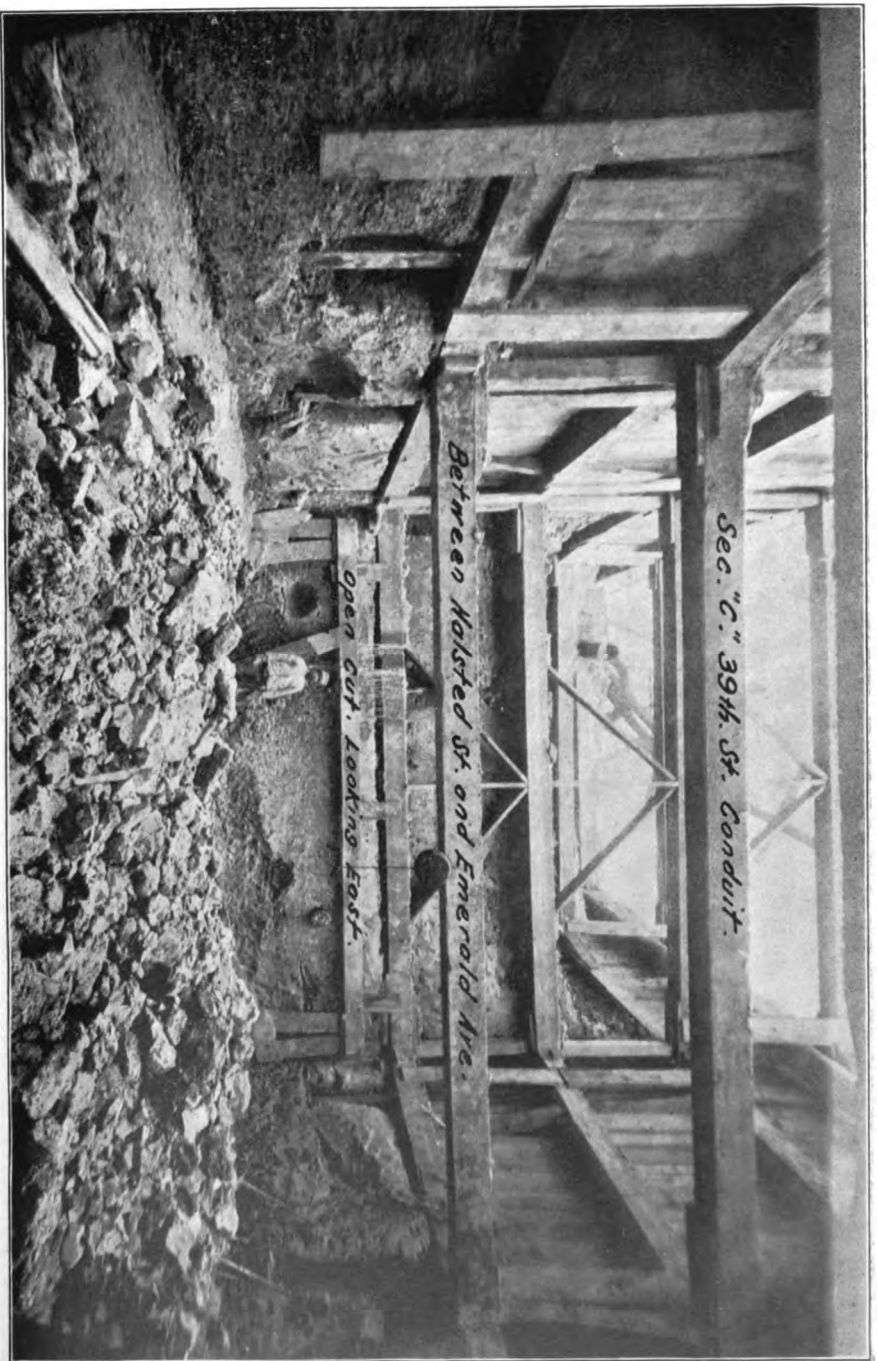
No.	DESCRIPTION OF WORK DONE.	Cement.	Brick.	Iron Covers.	Wood Covers.	Straight Pipe.		Curved Pipe.		Junctions.		9-inch Traps.	Cost.		TOTAL COST.
						9-in.	12-in.	15-in.	9-in.	12-in.	9x12.		9-in.	12-in.	
1,886	Manholes raised to grade	1,580	376,800	576	125	2,722	60	51	2	6		12	\$25,724.17	\$7,071.60	\$82,795.77
1,764	Catch-basins " "														

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No.	REMARKS.	Ce-ment.	Brick.	Covers.		Straight Pipe.		Curved Pipe.		Junctions.		Traps.	Bot-toms.	Labor and Teaming.	Material.	Total Cost.
61	North Side	564	173,000	176	7	2,612	53	120	8	4	14	183		\$1,269.67	\$2,010.05	\$3,279.72
77	South Side															
45	West Side															
183														Average cost per basin. \$18.00		

**SEWERS AND CATCH-BASINS CLEANED IN THE THREE DIVISIONS OF THE CITY
DURING THE YEAR 1898.**

METHOD.	South Division.		West Division.		North Division.		Total.		Average Cost per 100 feet.
	Feet Cleaned.	Cost.	Feet Cleaned.	Cost.	Feet Cleaned.	Cost.	Feet Cleaned.	Cost.	
Flushing	432,411	\$ 5,068.90	281,905	\$2,968.78	203,655	\$2,845.02	917,971	\$10,882.70	\$1.19
Iron Scraper.....	355,578	18,750.39	21,355	1,316.97	34,080	4,155.06	411,013	24,222.42	5.90
Wood Scraper	43,946	759.09	288,024	4,869.45	57,566	2,236.72	394,536	7,865.26	2.00
Total.....	830,935	\$24,578.38	591,284	\$9,155.20	295,301	\$9,236.80	1,723,520	\$42,970.38	
Opening Inlets to Catch-basins, attending complaints, etc.....								\$ 5,284.22	
Total								\$48,254.60	
Catch-basins cleaned	No. of.	Cost.	No. of.	Cost.	No. of.	Cost.	Total No. of.	Cost.	Average Cost per Basin.
	5,659	.....	3,414	.....	2,921	.....	11,994	\$89,071.55	\$3.26
Cost of Cleaning Sewers and Catch-basins								\$87,326.16	
Miscellaneous Bills, Tools, Supplies, etc.....								5,685.73	
Total Cost.....								\$93,011.88	



OPEN CUT, THIRTY-NINTH STREET CONDUIT—INTERCEPTING SEWERS.

WING SEWERS CONSTRUCTED IN THE CITY DURING THE YEAR 1898.

STREET.	FROM	TO	Diam. in feet.	Length.
W. Twenty-seventh ..	S. Central Park ave..	West	1½	83
W. Twenty-eighth ...	S. Central Park ave..	West	1½	83
Central boulevard ...	Sewer	S. line of Central blvd.	1	40
Total number of feet .....			.....	106

RECEIPTS OF DIVISION OF HOUSE DRAINS DURING THE YEAR 1898.

DIVISION.	PERMITS ISSUED.								Net Receipts.
	No. of Per- mits Issued.	No. of Permits Issued on Streets under Assessment for Drains.	No. of Junctions Set.			No. of Per- mits Rebated.	No. of Assess- ments Re- bated.	No. of Junc- tions Rebated	
			6-inch.	9-inch.	12-inch.				
North	408	20	25	14	1	9	.....	1	\$2,127.50
South.....	1,687	293	58	29	1	45	2	4	8,788.50
West	1,534	159	11	26	2	20	1	8	7,898.00
Totals	3,624	472	94	69	4	74	3	8	\$18,809.00
Receipts from drain layers' licenses									1,630.00
Receipts from special assessments.....									13,053.99
Total receipts.....									\$33,492.99
No. of permits issued for which no fees were collected. 6,222									

HOUSE DRAINS CONSTRUCTED BY CONTRACT DURING THE YEAR 1898.

DIVISION.	Total num- ber of drains	Total length of drains in feet.	Total cost of drains.	Average Cost per drain.	Average length per drain in feet.	Average Cost per foot.
West	1,618	47,034	\$12,162.10	\$7.52	29.07	.2586
South	977	26,843	7,341.71	7.51	27.47	.2735
North	40	876	339.72	8.49	21.90	.3878
Totals	2,635	74,753	\$19,843.53	\$7.53	28.37	26.54

Making a total of 14.16 miles of 6-inch drains laid by contract and paid for by special assessment during the year 1898.

EXPENSE ACCOUNT OF SEWERAGE PUMPING STATIONS FOR 1898.

ITEMS.	Kensington Station.	68th Street Station.	Woodlawn Station.	70th Street Station.	73d Street Station.	79th Street Station.	Totals.
Salaries.....	\$4,080.19	\$4,302.96	\$4,428.43	\$4,131.58	\$4,455.45	\$993.43	\$22,392.09
Coal	1,729.16	1,915.35	5,896.44	1,378.16	988.48	92.00	11,499.59
Oil, Grease, etc.....	53.19	55.18	69.19	64.52	51.32	3.20	296.60
Light	195.00	105.20	192.50	245.00	163.23	.....	900.93
Repairs Engines and Boilers.	164.32	1,593.27	523.99	115.89	210.57	113.66	2,721.70
Tools.....	9.23	87.42	11.07	.....	17.06	15.80	90.57
Teaming	24.09	28.79	.66	.....	3.29	32.85	89.68
Miscellaneous	223.90	198.56	412.14	260.52	162.43	54.79	1,812.34
Totals.....	\$6,479.07	\$8,236.73	\$11,034.42	\$6,195.67	\$6,051.83	\$1,305.78	\$36,303.50

SEWAGE PUMPING STATIONS.

CANAL PUMPING STATION.

MR. P. E. McDONNELL, Engineer in Charge.

Without doubt the Canal pumping station is the most important of any of the sewage pumping stations in the City of Chicago, its function being to prevent all the sewage at present emptying into the Chicago river and its branches from flowing into Lake Michigan. Owing to the increased pollution of the Chicago river, due to the increase of manufactories and the natural increase in population, and also to the fact that all the sewage heretofore flowing into the lake north of Thirty-first street is now emptied into the South branch of the Chicago river, it has been necessary to run this station at its maximum capacity during the latter part of the year.

On March the 11th, by your orders as Commissioner of Public Works, the control of this station was transferred from the Bureau of Engineering to the Bureau of Sewers, it being properly a sewage pumping station.

Since that time, a great many important repairs have been made, which have increased its efficiency at least fifteen per cent.

I found, on assuming control of this station, that the breaking of the crank pins of the engines was a monthly occurrence and that usually one and sometimes two of the crank shafts were in the repair shops at the same time. To obviate this, a special jackscrew, having a ball-bearing end plate, was put in between the pump shafts, they being on line all the way from end to end, thus throwing the strain of the pumps on these ball bearings. Since this improvement has been made, we have had no difficulty whatever with the breaking of crank pins, and careful tests have demonstrated that the reduced friction permits the engines to run at a velocity of 95 revolutions as against 85 with the same steam cut off.

During the early part of the year, the appearance of this station was greatly improved by setting out some 1,500 square yards of sodding, the rebuilding of the wagon road and the general cleaning up of the plant.

I have not attempted to prepare a statement of the amount of water and sewage pumped during the year, for the reason that I find that no provision was ever made for the automatic recording of the pumpage, and without automatic recording gauges, it would certainly be foolish to attempt an approximation of the amount pumped, as the head of the water in the canal, as well as in the river, continually varies. But, judging from the condition of the river and from the increased speed maintained, I believe I am safe in stating that the station is doing at least fifteen per cent. more to-day than ever before.

In this connection I would call your attention to the fact that during such times as the wind blows from the southwest or from the south, it is

impossible to get the full duty from the pumps at this station, as a great mistake was made when this plant was erected in building the top of the intakes of the pumps too near City datum, and when the wind blows from the southwest the river at this point frequently recedes to below City datum. The pumps under these conditions cannot do their duty, as they do not have a full supply.

During the year there has been expended

For salaries.....	\$22,945.86
For repairs.....	5,578.84
For coal.....	28,041.11
For miscellaneous supplies.....	19,149.94
Total	<u>\$69,715.55</u>

FULLERTON AVENUE PUMPING STATION.

MR. AUSTIN GIBBONS, Engineer in Charge.

On June 15th of this year, by your direction as Commissioner of Public Works, the control of this station was transferred from the Bureau of Engineering to the Bureau of Sewers. The function of this station is to flush the North branch of the Chicago river and to aid our sewage disposal system.

During the past few months, this station has not been run at its full capacity for the reason that, owing to the construction of the Twelfth street and Twenty-first street intercepting sewers, the pollution of the South branch was increased to such an extent that it was impossible for the Canal Pumping Works, even running at its maximum capacity, to keep the sewage from flowing into the lake without the shutting down of the Fullerton avenue pumping station during a greater part of the time.

During the year 1898 there was expended

For salaries.....	\$ 6,268.41
For coal.....	2,743.89
For repairs.....	1,080.09
For miscellaneous supplies.....	2,498.88
Total	<u>\$12,586.27</u>

SEWERAGE PUMPING STATIONS.

WILLIAM DONLAN, Supervising Engineer.

WOODLAWN PUMPING STATION.—This plant has been in service about eleven years, but no formal record or report exists previous to this year. This plant contains three Gordon-Maxwell sewage pumps. No. 1 has a capacity of 1,500,000 gallons per day; Nos. 2 and 3 have a capacity of

3,000,000 gallons each. The plant also contains one Southwark centrifugal pump of a daily capacity of 6,000,000 gallons.

During the year Pump No. 2 was thoroughly overhauled and is now in good condition. Pump No. 3 is in bad shape. The plunger and sleeves are working badly. The centrifugal pump also needs overhauling. Many repairs were necessary upon the boilers, as little or no repairs had been made for the past ten years.

SIXTY-NINTH STREET STATION.—This plant contains one Southwark compound condensing engine, connecting with one centrifugal pump of a capacity of 6,000,000 gallons per day; also one duplex air compressor and two Shone ejectors with a capacity of 1,728,000 gallons per day.

During the year the engine, centrifugal pump, air compressor and Shone ejectors were thoroughly overhauled and are in better condition than they have been for several years.

I would recommend that this station be abandoned and turned over to the Electrical Department for an electric light plant, and that a submerged centrifugal pump be put in the well now occupied by the Shone ejectors at the corner of Sixty-ninth street and Halsted street, the same to be operated by a dynamo from the proposed electrical station.

I have estimated that this can be done at an expense of about \$4,000.00, and the annual cost of maintenance would be less than one-third of the cost of maintaining the present station. In addition to this the service will be improved at least 50 per cent.

SEVENTIETH STREET STATION.—This plant contains two Southwark triple expansion condensing engines and vertical centrifugal pumps. Pump No. 1 has a capacity of 15,000,000 gallons, and Pump No. 2, a capacity of 28,000,000 gallons per day.

This plant is in good condition, practically no repairs being necessary during the past year.

SEVENTY-THIRD STREET STATION.—This plant contains two Allis triple expansion condensing engines, connected with submerged centrifugal pumps. One pump has a capacity of 12,000,000 gallons per day, and Pump No. 2, a capacity of 24,000,000 gallons per day. But few repairs have been necessary during the year. Engines, boilers and plant are all in first class condition.

KENSINGTON PUMPING STATION.—This plant contains two Westinghouse compound condensing engines, connected with two vertical centrifugal pumps having a capacity of 5,000,000 gallons per day each. The boilers, engines and plant are in first-class condition.

The tabulated statement, page 202, shows the expenses incurred at the various sewerage pumping stations during the past year.

STREET GRADES AND MONUMENTS.

W. H. HEDGES, Bench Engineer.

Great difficulty and considerable loss of time and money has for some time been experienced by the Law Department and the Department of Public Works, under the special assessment system for street and sewer improvements, because of the fact that the old method of entering the street grades on the maps of the Bureau of Sewers, when established by Council ordinance, did not also record the date and page of ordinance. And now there are hundreds of street grades on our maps for which it is impossible to find the ordinance establishing them, when that question is raised in court by the opponents of any street improvement measure. The courts in considering the point, rule that the figures on the sewer maps cannot be accepted as official, and will only accept the ordinance itself, which it may be impossible to find.

It was therefore necessary to devise a new method of recording street grades that should show, in tabulated form, the grade, the date of ordinance and the page of Council proceedings containing the ordinance. For this purpose two large "Street Grade Record" books were made (19½x24 inches). Book No. 1 to provide for all that part of the City north of Thirty-ninth street, and Book No. 2 to provide for all that part of the City south of Thirty ninth street, and the work was begun of transcribing into these books the street grade figures already on our sewer maps. When transcribed, those grades for which no ordinance can be found will be sent to the Council for a new ordinance. These books are well under way, but it is a matter that will require months of very careful work. However, it can be done during the time when the weather is such that we cannot run the exact levels required in establishing our new benches and bench monuments.

During the year we have also prepared and sent to the City Council 386 new street grades, that have been duly established by Council ordinances.

As shown in the annual report of the Department of Public Works for 1897, fifty concrete "Standard Bench Monuments" were built in the fall of that year. The running of the exact levels to determine the elevations for these standard bench monuments was commenced on April 15, 1889, starting from the old Lind block bench, with a new elevation therefor 15.659 feet above City datum. The necessity for this new elevation given the Lind block bench, as a starting point for these exact levels, was set forth in a report and proposed ordinance, presented to the City Council on June 6, 1898 (see page 306 of Council proceedings), and the recommendation for the adoption of the new elevation was finally accepted by the

Council and established by ordinance on July 11, 1898 (see pages 566 and 567). The levels commenced on April 15th were continued as the weather would permit, until the end of June. The Bureau of Sewers then directed the building of thirty-four more bench monuments in addition to the fifty built in the fall of 1897.

The location of all of these 84 standard bench monuments is shown by a small black square on a map accompanying this report. The locating of the points at which these additional monuments should be placed, and the running of the necessary levels to determine the depth from the surface of the ground at which the bottom of each monument should be placed, was completed July 19th. On July 20th the work of building the monuments was commenced by contractors Nash & Dowdle, and was completed August 23d. Where it was possible, these monuments were placed in the parks and along the boulevards, but they are mostly located in the area or parkway space between the street curb and the sidewalks, and all were built under the close and immediate supervision of the bench engineer and his assistant. Like those built in 1897, they are of the best concrete formation, 16 inches square at the top, 42 inches square at the bottom, and 6 feet from top to bottom of concrete. In the center of the top of the concrete is set a hardened copper rod one-half inch in diameter, two feet long, and upset at the bottom. The top of the rod is conic, coming one-sixteenth of an inch above the concrete. An iron cover 8 inches square on the inside and 16 inches square on the flange bottom, is set on top of the concrete, to protect the copper point on which the elevation of the bench is to be established. The top of the cover is 7 inches above the copper point, and comes just level with the street curb, showing a cover surface in the grass plat of 10x11½ inches. The lid is locked by a self-acting weight lock, for which any surveyor or civil engineer can have a key, by applying at the Bureau of Sewers and paying the sum of \$1.00 therefor.

When the new monuments were completed (August 23d), the work of running exact levels was resumed and has been regularly continued, unless interrupted by the weather or by demands for the running of levels to establish street grades. At the writing of this report, the elevations for twenty monuments have been established, which are shown on the accompanying map, by a circle around the small black square. The number and elevation given each of these monuments is also shown on the map close to each circle. As these figures were determined, they were presented to the Council in the form of an ordinance giving the exact location, number and elevation of each monument. On September 12, 1898, the Council thus established the first eight of these standard bench monuments (see page 592). This ordinance also contained a clause repealing "All ordinances or parts of ordinances heretofore passed," establishing elevations on

what had been known and described as "Standard Bench Marks." This repealing clause referred to points on buildings established as standards some years ago by act of the City Council and which, of late years, have been found to be very inaccurate. On September 12th, the Council also passed an ordinance (page 593) providing for the preservation of the new standard monuments and establishing a penalty of not less than \$50.00 or more than \$200.00 against any person who shall cover up, destroy, or in any way injure any of the standard monuments. The Council ordinances establishing twelve more of these standard monuments are to be found on page 650 (September 26, 1898), and on page 1164 (December 12, 1898). Of the eighty-four monuments built, twenty are completed, the elevations being established by exact leveling, leaving sixty-four monuments now awaiting a similar completion. We cannot hope to get these all completed within the next year, so that no recommendation is made at this time looking to the completion of the system.

The exact levels by which the elevations of these standard monuments have been determined, have been run with a Y level, and the most careful and exact tests and comparisons prove not only that in all cases they are well within the "limit of discrepancy," set for precise levels as a "fair measure" by the "European Geodetic Association," (viz.: 0.01 into the square root of the distance in miles), but that they are mostly within the limit set by that association as a "measure of high precision" (viz.: 0.0053 into the square root of the distance in miles). This standard of the "limit of discrepancy" is the smallest required by any authority on precise levels, and is, I believe, much smaller than the limit allowed by the United States Government in any of its precise level surveys. Such results cannot be rapidly obtained, and are only possible by the use of great care and accuracy at every step of the work, but when once obtained are good for all time, unless destroyed or disturbed by some natural convulsion. The progress made must depend very much upon the weather, as fine work in exact leveling cannot be done in windy weather, or when it is very cold or very hot.

In running the lines of levels for establishing the elevations of the bench monuments, 161 ordinary bench marks, on the best points which could be found for that purpose, were established along those lines. These bench marks are not reported to the City Council for confirmation, and are in no way official in their character. In any case of disagreement, or in any question of importance, these bench marks are subject of reference to the standard bench monuments about them.

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Plan of 95th Street. Low Level Sewerage District.

Sept. 26th, 1895.
J. S. Davidson,
Supt. Sewers.



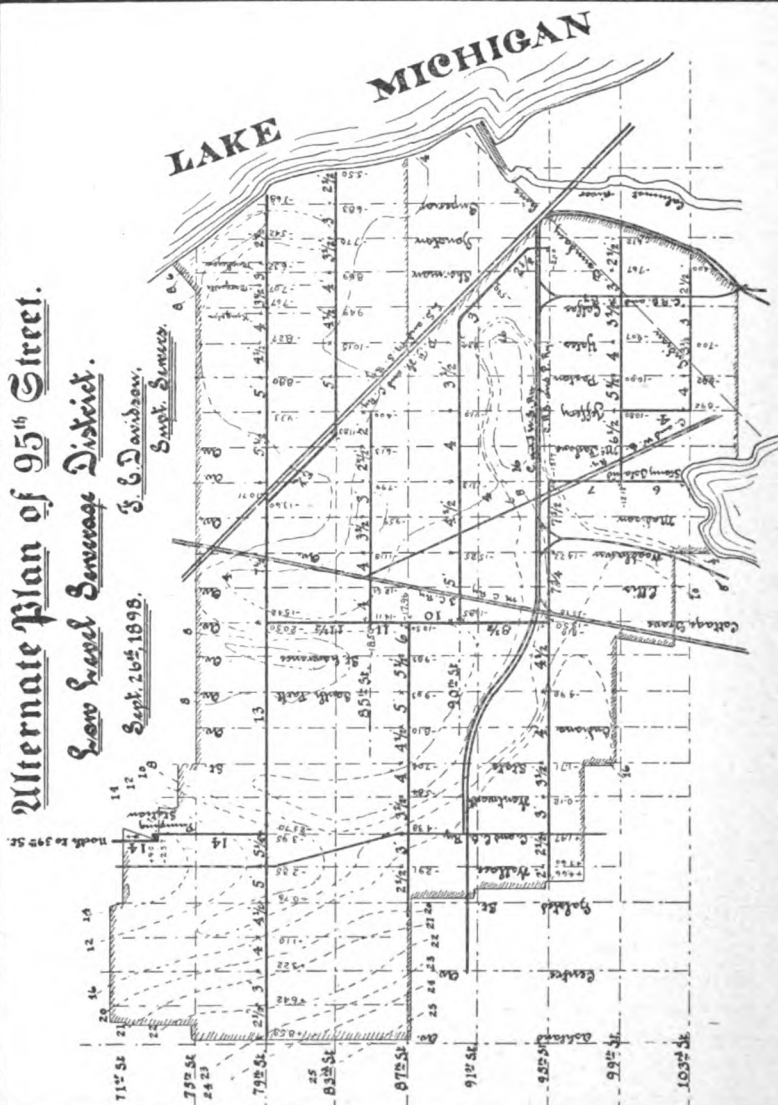
Alternate Plan of 95th Street.

Low Level Sewerage District.

Sept. 26th 1898.

J. C. Davidson,

Supt. Sewer.



SPECIAL ASSESSMENT DIVISION.

C. D. HILL, Chief Engineer.

During the year, plans were prepared for the following drainage districts:

West Addison street district, West Lawrence avenue district and the Ninety-fifth street district.

The West Addison street sewer when completed will drain all that part of the city from Grace street on the north to Roscoe street on the south as far west as North Forty-eighth avenue. The district comprises 800 acres and the main outlet is estimated to cost \$68,000.00.

The West Lawrence avenue sewer will drain a tract of land extending one-quarter of a mile on each side of it from the river to West Sixtieth avenue. This main sewer will drain 1,286 acres, and will cost approximately \$111,000.00.

The proposed Ninety-fifth street sewerage district embraces the territory lying south of Seventy-fifth street and north of One Hundred and Third street not at present provided with drainage. The territory embraces some 10,900 acres, and the greater part lies less than 6 feet above City datum, or within the range of high water of Lake Michigan. It is therefore obvious that whatever plan may be adopted must embrace what is known as the low level system of drainage. (See plans preceding.)

The original plan for draining this district called for a network of large trunk sewers which would converge to a point at the intersection of Ninety-fifth street and Houston avenue, near which point it was designed to establish a large sewage pumping station which would convey the flow from the sewers to the Calumet river at Ninety-fifth street. The estimated cost of this system of sewers was \$1,500,000.00.

By resolution of the Board of Local Improvements, the ordinance for this latter system will not be presented to the City Council until after the Calumet District has been annexed to the Sanitary District of Chicago, or organized into a separate drainage district.

It is to be hoped that the public-spirited citizens of Chicago, as well as those interested in the Calumet region, will very early see the urgent need of proper legislation, which will result in the adoption of some plan for the reversing of the flow of the Calumet river. This improvement, in connection with the construction of the main drainage canal and the completion of the City's system of intercepting sewers, will solve for all time the question of a pure water supply for the City of Chicago. The Calumet Harbor being one of the finest natural harbors on the Great Lakes, and the Calumet river being unobstructed by tunnels and practically unobstructed by center pier bridges, the construction of the proposed canal to the Sag

would undoubtedly be aided by the Federal Government, as this proposed canal is the natural terminus of the Hennepin Canal. If this be done, it would mean much to the commercial interests of Chicago, and would also mean the rapid development of the now sparsely settled Calumet territory.

When the Ninety-fifth street system of sewers is built, if built as planned, it will relieve that part of the City of Chicago in the Thirty-first ward south of Seventy-first street and east of Ashland avenue, where the present sewers and drains are absolutely inadequate to do the work required, and, in fact, are a disgrace to a city as public spirited as Chicago, being a constant menace to the health of the City. Practically every sewer in the district must at an early date be abandoned.

The most important sewer built during the year by special assessment, is the one in Madison avenue from Sixtieth street to Sixty-third street, built to replace a small defective sewer which had been a constant source of expense to the City and a cause of great damage to the property owners residing on this avenue.

It is a matter of regret that the department was not able to get bids within the amount of the assessment for the construction of sewers in Kimbark avenue and in Washington avenue, south of Sixty-third street, to replace other sewers upon which the City has spent more money for repairs than it would cost to build new ones.

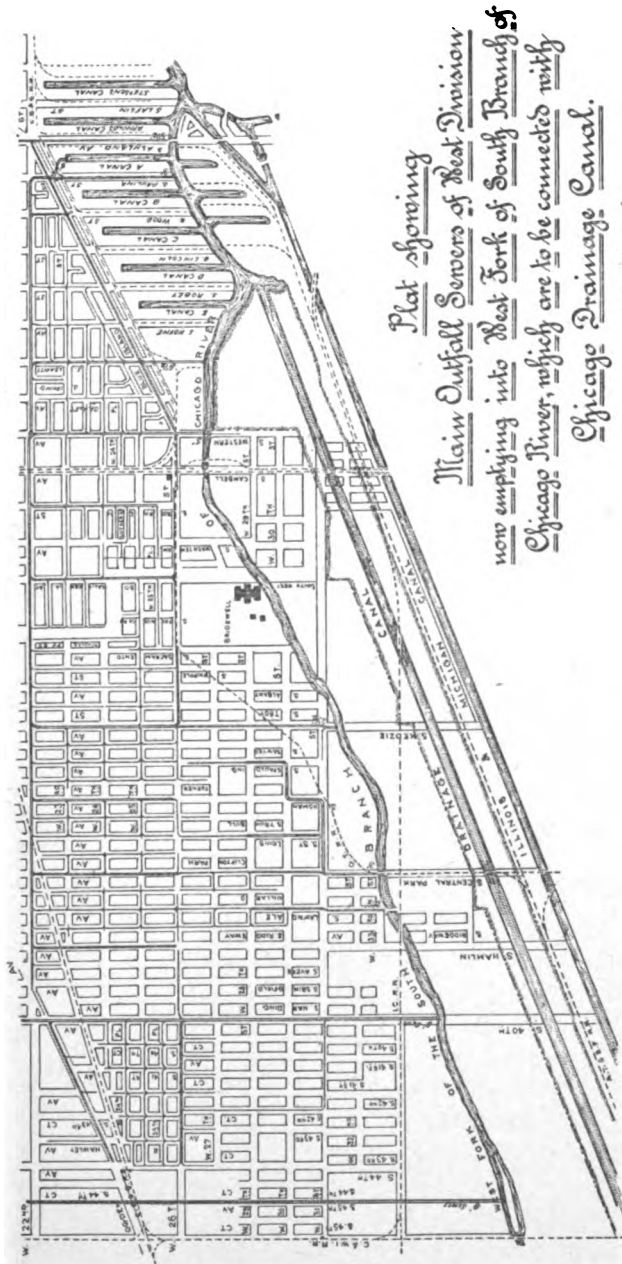
The tabulated statements of this report (see pages 182 and 183) show a slight increase in the amount of work done. There is also an increase in the cost per foot of the sewers built. This is partially due to the increase in the cost of material and very greatly to the better quality of the work required.

DIVISION OF INTERCEPTING SEWERS.

WILLIAM LOWE, Engineer in Charge. W. S. MACHARG, Consulting Engineer.

The most important event in the Bureau of Sewers during the past year has been the commencement of work on the construction of a system of intercepting sewers, which is designed to divert the flow of all sewage now being emptied into Lake Michigan so that it will be carried into the Chicago river and thence into the main Drainage Canal of the Sanitary District. The great importance of this work will be appreciated by any one who takes into consideration the historical development of the sewerage system of the City of Chicago.

In spite of the fact that this system was inaugurated nearly fifty years ago, when this City was but sparsely settled and when no one could have foreseen its enormous growth and development, this system of sewers has, in the main, been admirably designed and well executed. The tabulated statements herewith given show that about 33,000 feet of sewers have been



taken up and replaced by larger sewers. Of this amount, over 26,000 feet have been taken up during the past year on account of the construction of the intercepting sewers, and nearly all of the balance were small sewers laid in outlying towns and villages prior to their annexation to Chicago. The credit for the great wisdom shown in the early designs for the sewers of the City of Chicago is due to Mr. E. S. Chesbrough, the first City Engineer of Chicago, and his assistant, Mr. W. H. Clarke, under whose supervision 225 miles of sewers were built up to the time of his death in 1878.

February 14, 1855, a Board of Sewerage Commissioners, William B. Ogden, J. D. Webster and Sylvester Lind, were appointed to design a system of sewerage for the City, and Mr. E. S. Chesbrough was appointed by them as Chief Engineer of the Board. Surveys were made and it was found that the natural surface of the ground near the river was only 4 or 5 feet above the level of the water, rising to a height of 10 or 12 feet at a distance of 1 or 2 miles. On account of the low level of the surface of the City, it was found to be impracticable to lay the sewers at a sufficient grade to render them entirely self cleansing, and precautions were taken to protect the sewers as much as possible by a system of public and private catch-basins, which would exclude street dirt and grease from kitchens. The grades were laid so as to give a velocity of about 2 feet per second when the sewers were flowing half full. The sewers were nearly all planned to flow into the river. Up to 1889 there were only three sewers in the City emptying into Lake Michigan, these being in Twelfth street, Twenty-second street and Thirty-first street.

The general design of the sewers laid out by Mr. Chesbrough is well illustrated by the system of sewers in the streets of the West side, which are now in the most densely populated portion of the City. In every alternate street running westward from the river there is a large trunk sewer 5 feet in diameter at the outlet and about $2\frac{1}{2}$ feet in diameter at a distance of $2\frac{1}{2}$ miles from the river. Smaller sewers were built in the intersecting streets, and into these, 12-inch tile sewers in the intermediate streets emptied. The 5-foot sewers were laid at a grade of .04 per 100 feet, which would give a discharge of about 55 cubic feet per second. These sewers drain on an average about 275 acres each and have sufficient capacity to take care of the entire rainfall of $4\frac{1}{2}$ inches in twenty-four hours, besides the sewage from the houses at the rate of 5,000 gallons per acre per twenty-four hours.

The territory through which these 5-foot sewers run is densely settled and the streets are all paved, but there have been very few complaints of back water from these sewers and in all cases the complaints came from property that is drained by the twelve-inch lateral sewers, and the back

water was due more to the extreme depth of the basements than to the incapacity of the sewers.

The central business portion of the City, the surface of which is now entirely covered with pavements and buildings, was provided with a system of sewers which has three times the capacity per acre of the system we have just been considering, and consisted of main sewers in the east and west streets emptying into the river, with 12-inch laterals in the north and south streets. There have been quite a number of complaints from this district, but they are entirely due to the very deep basements and to the great amount of water that is used by the enormous office buildings that have made Chicago famous.

Before the City of Chicago was deprived of the services of Mr Chesbrough, he outlined a general design, which was afterwards carried out by his successors, for the drainage of the extreme western portion of the City. A great deal of this territory is sparsely settled and the capacity of these sewers is sufficient to carry off in twenty-four hours one-half the rainfall of three and one-half inches. This department has, since then, planned nearly all sewers on the same basis, making provision for carrying off in twenty-four hours one-half the rainfall of three to four inches, together with the sewage from the houses at the rate of 100 gallons per capita, estimating the population at not less than 50 persons per acre.

In 1889 the area of Chicago was increased from 44 square miles to 174 square miles, and in the succeeding years 11 more square miles have been added by annexation. At that time there were in the old City of Chicago 267 miles of brick sewers and 276 miles of tile sewers, which had been built at a cost of over \$7,500,000.00, paid by general taxation and the issuance of sewer bonds to the amount of \$2,622,500.00.

In the territory which was annexed in 1889, there were already built 122 miles of sewers. Since then there have been enough sewers built to make a grand total of 1,388 miles. Of these sewers, there were eleven emptying into Lake Michigan from Twelfth street to Seventy-third street and eighteen sewers emptying into the lake from Fullerton avenue to the north City limits. When these sewers were first built, the territory was sparsely settled and most of the discharge from the sewers was seepage and rainwater. This statement is not correct, however, as to the sewers from Twelfth street to Forty-third street, as those sewers discharged a large amount of sewage into the lake and seriously contaminated the water supply. As this evil was growing rapidly and was becoming serious in the case of all the sewers emptying into the lake, Mayor George B. Swift, in September, 1896, appointed a Commission consisting of Messrs. William Sooy Smith, George H. Benzenberg, Lyman E. Cooley, Samuel G. Artingstall and Joseph Downey, "to report a plan for the construction of any and

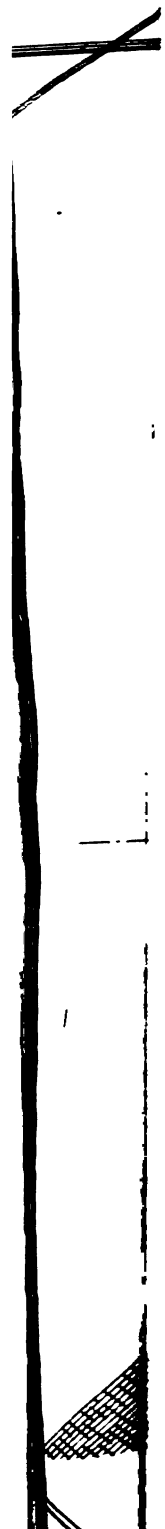
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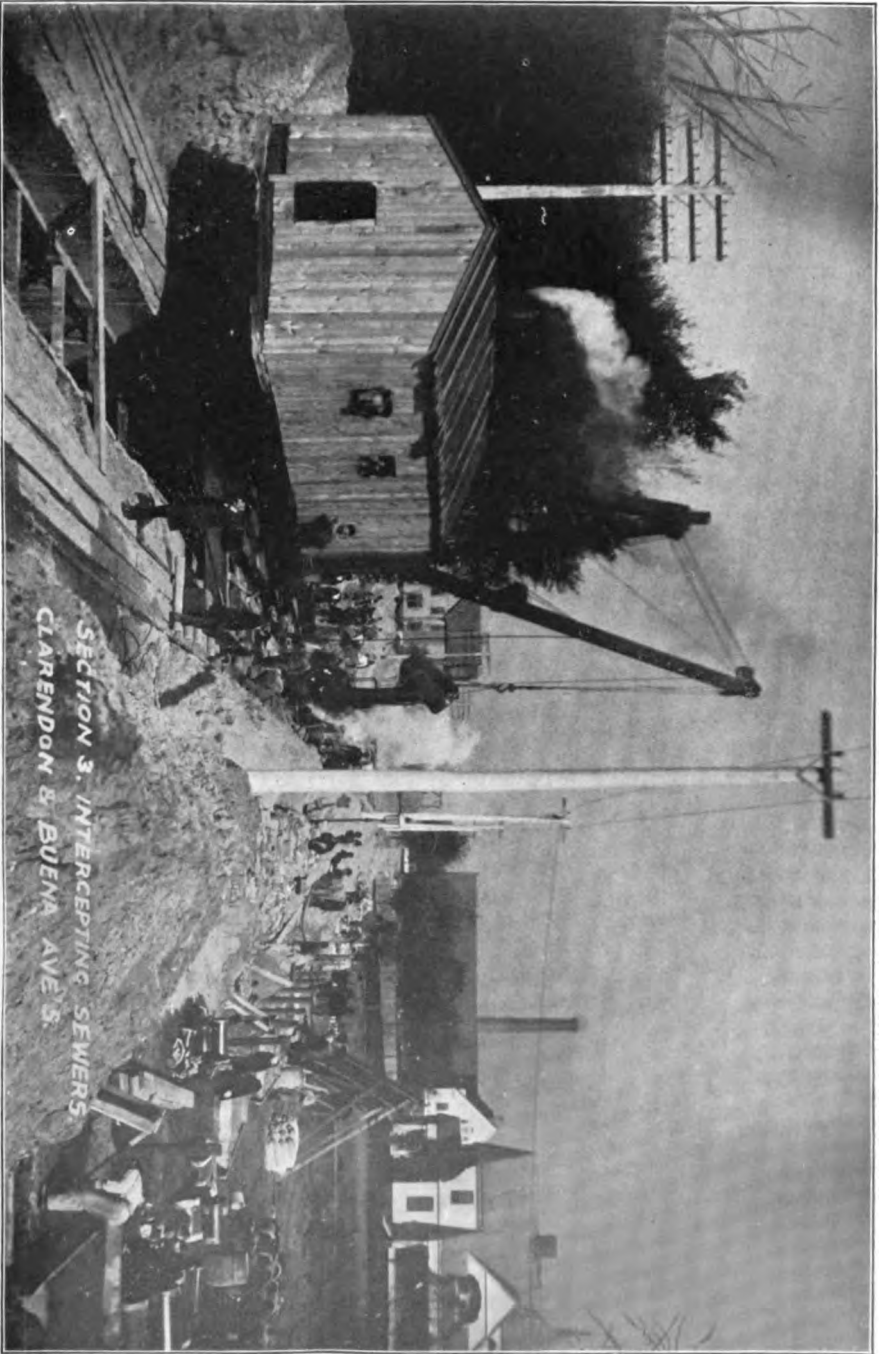
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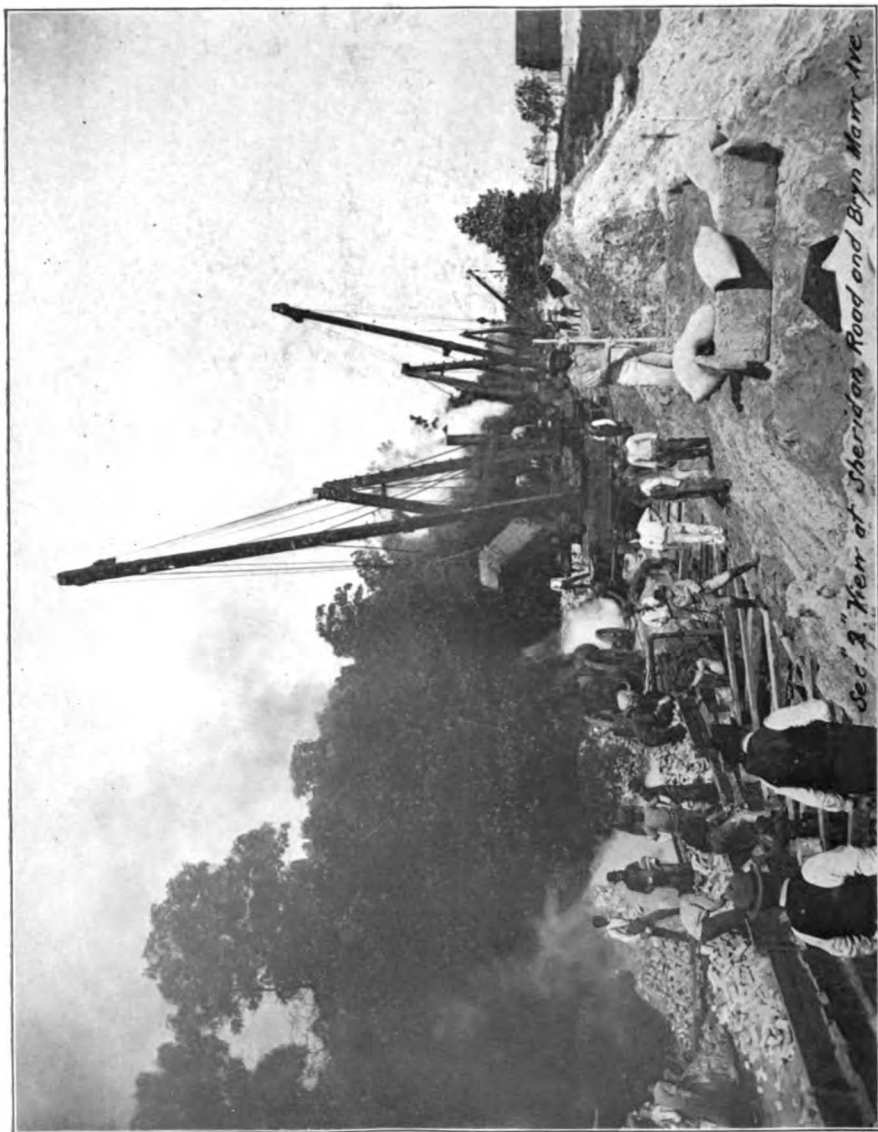
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INTERCEPTING SEWERS—CONSTRUCTION.



INTERCEPTING SEWERS—CONSTRUCTION.

all such intercepting sewers as shall be necessary to divert the sewage of the City into the Drainage Canal when the same shall be completed." This Commission, after a very careful consideration of the matter, made a report in which they recommended that the sewers in Twelfth street and Twenty-second street be rebuilt with the grades reversed, so as to empty into the river; that an intercepting sewer be built along the lake shore from Thirty-fifth street to Seventy-third street, which sewer should empty into a large conduit in Thirty-ninth street that should flow westward and empty into the Stock Yards slip of the South branch of the Chicago river, and that another intercepting sewer should be built along the lake shore from near the north end of Lincoln park, extending northward to the north City limits and emptying into a large conduit in Lawrence avenue that should drain westward into the North branch of the Chicago river. The members of the Commission disagreed as to the necessary capacity of the intercepting sewers, and the majority report, signed by Messrs. Downey, Artingstall and Cooley, recommended that provision be made for a rainfall at the rate of two inches in twenty-four hours for the northern district, the same provision for the territory between Thirty-ninth street and Sixty-third street, and one and one-half inches in the territory south of Sixty-third street.

Practically the same conclusion was reached by the "Drainage and Water Supply Commission," of which Commission Mr. Rudolf Herring was chief engineer, appointed in 1886 by the Mayor, the late Carter H. Harrison.

This Commission made an exhaustive study of all the then practicable methods of sewage disposal and reported in favor of a system of sewage dilution and the reversing of the flow of the Chicago river by the "construction of a canal down the Desplaines river to carry 600,000 feet per minute," and the construction of "a separate system of sewers to collect the sewage now discharging into the lake and to carry it into the river."

It also recommended the construction of "a canal from Lake Calumet to Sag" to reverse the flow of the Calumet river and to prevent the pollution of the water supply from that source.

The plan of the Pure Water Commission is also generally in accord with the system which it had been foreseen would be necessary from the adoption of the first comprehensive plan for sewerage Chicago, as set forth in the report of Mr. E. S. Chesbrough, city engineer, to the Board of Sewer Commissioners in 1857. In Mr. Chesbrough's report, however, as no water supply tunnels were then contemplated, the opinion was advanced that intercepting sewers would at some time be built on each side of the river and its branches, discharging toward the lake and carried to the mouth of the river with outfalls in some unobjectionable place. This opinion was doubtless based upon the main drainage works of London, which

were then in process of construction and which had been visited by Mr. Chesbrough in the preparation of his report.

The great growth of the City, the building of the water tunnels and present construction of the Drainage Canal have, of course, changed the original conditions, and the natural outfall is now to the river, in which a flow to the Drainage Canal will be set up.

Under these circumstances, a plan which intercepts the sewage on the entire lake front of the City and transfers it to the river where it may mingle with a large quantity of uncontaminated water serves the double purpose of protecting the water supply and removing the miasmatic character of the river water. There can be no doubt that hereafter Chicago Harbor will be one of the cleanest of the great ports of the world.

Whether the discharge of raw sewage into fresh water will continue to meet public approval, is a question which, under the law, we have had to consider only to the extent of adapting the plan of the Pure Water Commission, so that a change may be readily made in the plant in the future, allowing the dry weather flow to be separated from the lake water, which will always be needed at the points selected, for the maintenance of a good condition of the river.

Bids were solicited in March, 1897, for intercepting sewers as follows:

On Lawrence avenue from the lake to the North branch of the Chicago river and along the lake shore on Surf street to Pratt avenue. Contracts had not been awarded, however, when the present administration came into power in April of 1897.

Mayor Harrison at once took up the question of intercepting sewers, and determined that it would be unwise for the City to proceed as per the plans of the Pure Water Commission, knowing that the Drainage Trustees must construct a lateral canal in the vicinity of Thirty-ninth street on the south and Lawrence avenue on the north, to obtain the amount of pure water provided by law. That, if work was proceeded with, the spectacle would be presented of the City and the Drainage Trustees constructing separate channels at or near the same place; that, if this were done, it would be an extravagant waste of money, and that an arrangement should be made with the Drainage Trustees so that one conduit be built on the North side and one on the South side, which would not only serve as outlets for the City sewage, but would also afford channels to supply the greatly needed water to the Drainage Canal. Accordingly, on May 20, 1897, he addressed the following letter to the Board of Trustees of the Sanitary District:

May 20, 1897.

THOMAS KELLY, ESQ.,

*President of the Board of Trustees of the
Sanitary District of Chicago.*

DEAR SIR: One of the most pressing problems of the hour confronting the people of Chicago is the question of a pure water supply. The people have manifested in various ways from time to time their anxiety on the subject. They have made it plain that no outlay would be considered too large that would result in obliterating the dangers from pollution that have existed and that unfortunately continue to exist. They have signified repeatedly their willingness to bear any financial burden that would bring relief. Popular feeling in regard to the necessity for a better water system has been shown in the agitation in favor of diverting the flow of sewage from Lake Michigan, in the appointment of the Herring Commission and in the organization by the people of the Chicago Drainage Board, which has accomplished truly wonderful results. Now, while the people of Chicago have been alert and active, the corporation of Chicago as a municipality has not up to this time, it must be confessed, participated in the labor of securing pure water for its citizens. It is now desirous, however, I can say, with the force of official authority, to proceed with whatever work may be necessary to change the conditions as they now stand, and to obtain at the earliest possible day whatever benefits may be derived from the Drainage Canal. The plans for the City's portion of the work in taking advantage of the canal, must of necessity remain in abeyance until all the minor channels designed for the purposes of dilution and for carrying the amount of water required by the statutes shall have been located by the trustees. No plan for intercepting sewers, for instance, can be prepared that can be economically and successfully constructed and operated without duly considering the lateral auxiliary channels necessary to the completion of the scheme mapped out by the Drainage Trustees. On this point I will ask you for particulars which I will specify later on.

You are of course aware that about twenty per cent. of the population of the Drainage district are supplied with water taken from the lake about two miles from the shore at Sixty-eighth street. The territory supplied from this source is known as Hyde Park and Town of Lake. The people of that territory are in a state of constant fear of serious consequences, owing to the fact that the Calumet river empties into the lake at Ninety-second street. The pollution resulting from this is appalling and is said to be progressing at a rate equivalent to a population of 700,000. It is evident that the flow of this river must be diverted from the lake, if the lives of the people are to be protected. In this connection, I would draw attention to the fact that the government of the United States is improving the Calumet river from its mouth to a point half a mile east of Hammond, which is the main source of the pollution. The government authorities are proceeding on a plan authorized by law in 1888. In 1890, and with a view no doubt to amend the former plan, a survey and estimate were authorized for a canal from a point on the Calumet river at about One Hundred and Tenth street, southwest through Lake Calumet and via Little Calumet feeder to the Sag bridge. Why should not the Mayor and the City Council of Chicago—the corporation of Chicago—and the Board of Drainage Trustees join forces and bring pressure to bear upon Congress with a view to carrying out this plan and securing the construction of the canal referred to for the purposes of defense and navigation? Under the treaty of 1817, as you of course are aware, we cannot build or maintain a gunboat on the lakes. We cannot place one on the lakes except via the Wel-

land canal, and that canal is controlled by the British government. It ought not to be difficult to bring our government to a realization of the disadvantages of such a condition, particularly when the amount involved in remedying it is so small compared with the certain damage in the event of hostile developments. Coming nearer home, the construction of the canal provided for in the plans of 1890 would solve the problem of diverting the flow of the sewer-polluted mass now brought into the lake through the Calumet river. Your board is surely morally, if not legally bound, to help in securing relief from great danger to such a large percentage of our population as mentioned, and I am convinced that you will assist in bringing pressure to bear on the Illinois delegation in Congress, urging them to have the 1890 plan given effect. The Indiana delegation in Congress, I have no doubt, would gladly give their earnest assistance, and there is no reason, to my mind, why the object sought should not be speedily secured. I have endeavored to be very brief in stating to you some of the considerations that occurred to me in connection with this matter of mutual interest as regards the Sanitary District and the City of Chicago, and I trust that such harmonious efforts of both bodies can be planned as will lead to securing for Chicago the water system it ought to have and at the earliest possible moment.

In order to bring matters to a head and to give definiteness to the discussion of the situation, I would be obliged to you for an expression on the following points:

- 1st. As to the location of the lateral or auxiliary canals.
- 2d. If open, what will be their depths and widths?
- 3d. If closed, what would be their diameter?
- 4th. Will canals have a flow by gravitation or will they require artificial power to move the water?
- 5th. What provisions have been made to divert the sewage of the Calumet from Lake Michigan?

Feeling sure that you share with me a consciousness of the seriousness of the situation, I remain,

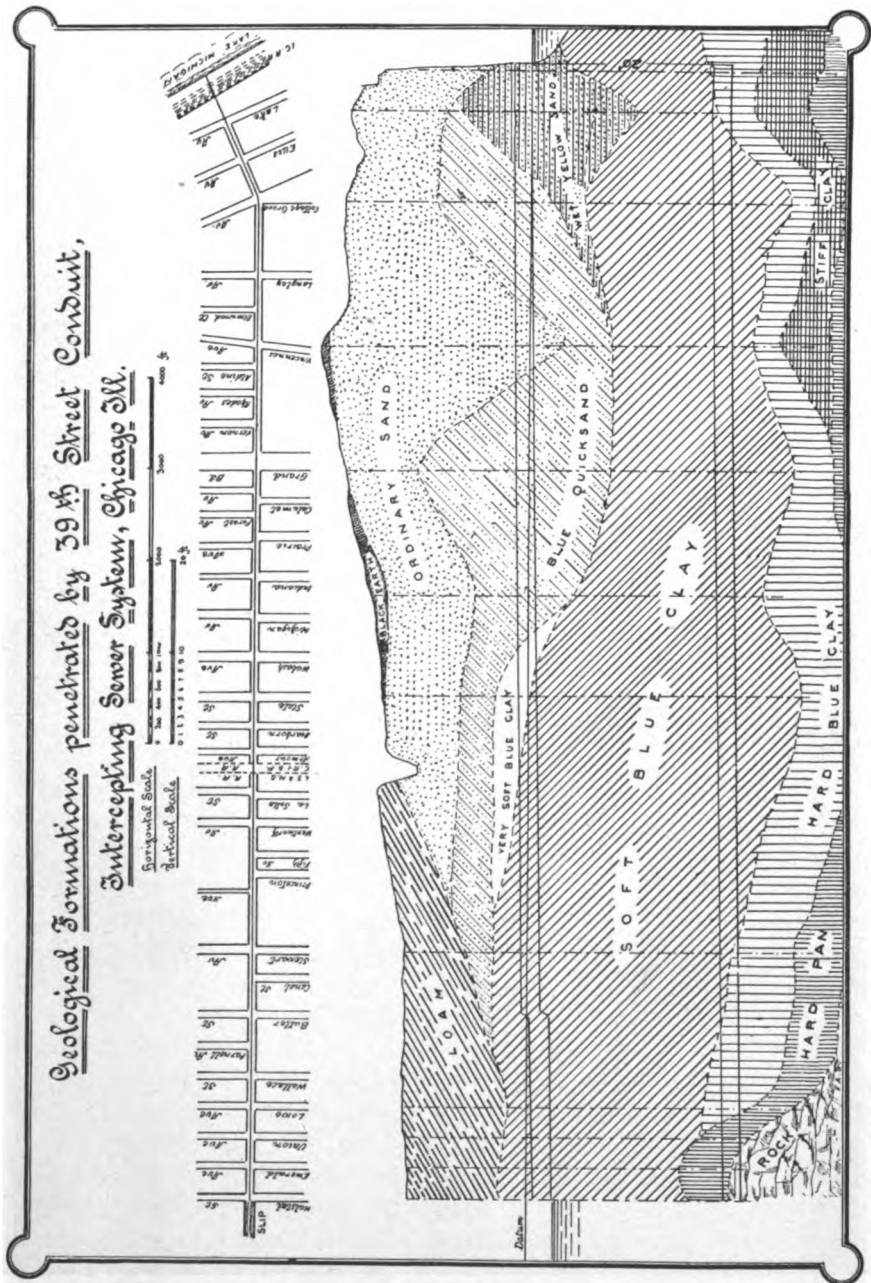
Yours truly,

CARTER H. HARRISON, Mayor.

This communication brought about the arrangement which finally was incorporated in the proceedings of both corporations, whereby the City contracted to construct these conduits of increased capacity, over that recommended by the Pure Water Commission, and the Drainage Trustees contracted to maintain the same perpetually.

Through the Thirty-ninth street conduit, there is to be delivered a minimum of 40,000 cubic feet per minute of lake water, and ultimately, when the district is fully built up, 7,000 cubic feet per minute of sewage. Through the Lawrence avenue conduit, 35,000 cubic feet per minute of lake water, and 3,000 cubic feet per minute of sewage are to be delivered.

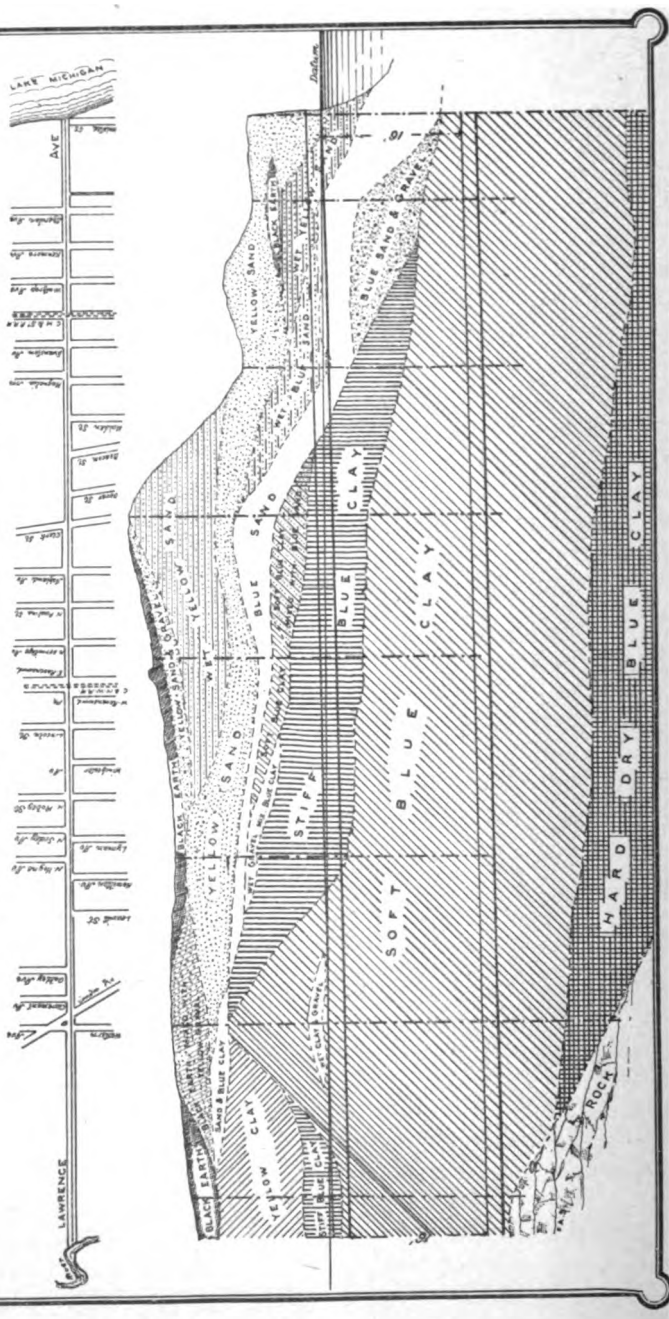
The first general question which arose in regard to the larger part of the system as designed, was as to whether the main conduits in Thirty-ninth street from the lake to the Stock Yards slip, and in Lawrence avenue from the lake to the North branch of the river, should be built in open cut or by tunneling. These conduits are each about two miles long, and, by



Geological Formations penetrated by Lawrence Avenue Conduit,
Intercepting Sewer System, Chicago Ill.

Graphic Scale

Vertical Scale



the terms of the agreement between the City and the Drainage Trustees, that in Thirty-ninth street is 20 feet in diameter, and that in Lawrence avenue 16 feet.

By reference to plats, the character of the soil through which they are being built may be seen, as well as their depth. The depth and width of trench in a street of ordinary width made it, over a greater portion of the length of each conduit, very questionable whether they could be built in open cut without danger to adjacent structures. The conduits are much larger than any tunnels heretofore constructed in Chicago, and there is no record that could be found of tunnels built as these would have to be—largely with the upper half in wet sand. The Fullerton avenue conduit, in fact, when it was found necessary to change from the open cut (in which the western section was built) to tunnel, was dropped abruptly so as to secure a clay roof. This depression it was desired to avoid, and a careful study of the use of shields in tunneling brought conviction that a shield which succeeded in penetrating sand pockets and soft spots in ordinary tunneling, might be adapted to continuous tunneling with a wet sand roof. About 9,000 feet of each conduit admitted this method of construction and it was therefore decided that it should be so specified. Present indications are that the work commenced will be successful and that in addition to greater safety, traffic in the streets will be uninterrupted.

Owing to new conditions of flow upon the opening of the Drainage Canal, the level of the water in the river at the junction of the south and west forks of the South branch will be permanently lower than the water surface of the lake. On the North branch, however, the surface of the river will always be higher than the lake.

It is evident that in the case of the Thirty-ninth street conduit, with the water in the river perhaps one and one-half feet lower than in the lake, there will be a flow through the conduit from the lake of more than 40,000 cubic feet of water per minute. The sewage from the south, however, will be delivered at Thirty-ninth street at a much lower level and must under all circumstances be pumped. It was therefore deemed advisable to locate the pumping station at the lake, where the intercepting sewer from the south, a sewer four and one-half miles long, will connect, and by pumping, make this a sewer of free delivery, reducing sedimentation to a minimum during dry weather flow, and in case of storm keeping down the flow line in the southernmost sewer.

On Lawrence avenue, as all water must be pumped into the river, which is higher than the lake, it has been considered preferable to make the intercepting sewers, which are much shorter than in the case above, submerged sewers, and to admit to them enough water from the lake at

different points in their length to maintain a proper velocity, and to locate the pumping station at Lawrence avenue and the river.

In the case of both pumping plants, there will be short periods during each year of extreme variation in the head on the pumps.

At Thirty-ninth street, the delivery of storm water from the intercepting sewers will approach in quantity the lake water which is to be delivered, including the dry weather flow, and under some circumstances it may be considered necessary to pump lake water. It is therefore designed to install the engines necessary, so that they can pump either the prescribed 40,000 cubic feet per minute of lake water or the storm water from the intercepting sewers to nearly the same amount. Gates are arranged so that either water may be pumped as necessary. The lift, however, is considerably increased in the case of the storm water over that necessary for water taken from the lake, owing to the necessity of keeping down the flow line in the most southerly intercepted sewers.

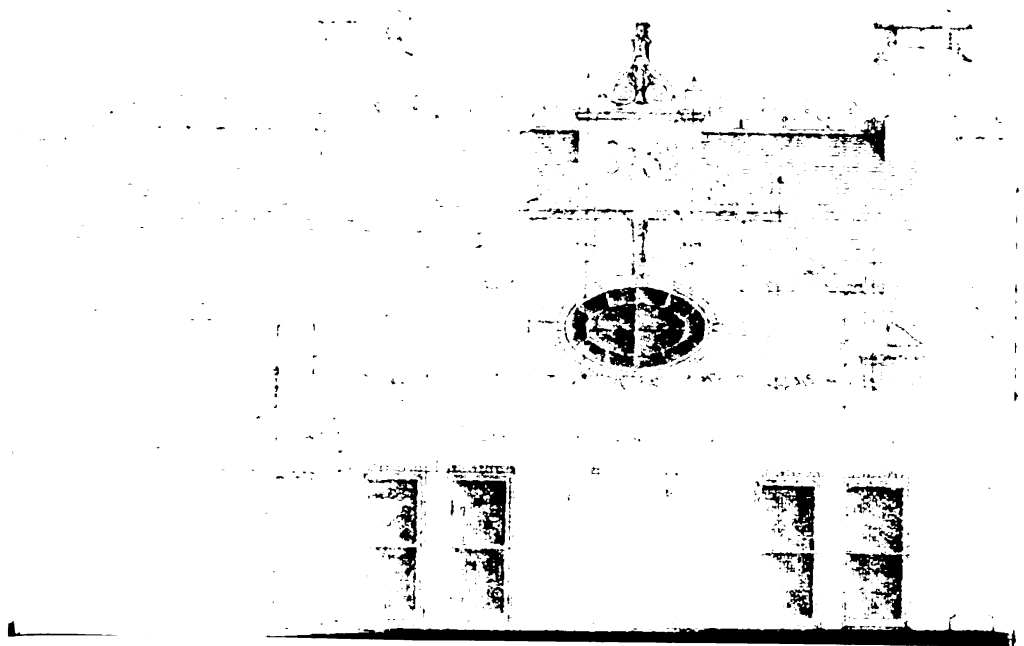
To meet this condition, it is designed to install vertical engines, each with two direct connected centrifugal pumps, both of which may be operated during the greater part of the time for the regular function of lifting lake water. In case of storm, when the water in the well must be lowered, one pump will be thrown out of service on each engine and the whole power of the engine used to deliver the lesser quantity of water against the greater head. This variation is, of course, within the limits of the engines and meets the conditions of quantity and head.

Separate smaller engines are used to pump the dry weather flow of sewage, with much greater lift.

In the case of the Lawrence avenue plant, the variation is due to short periods of flood in the river and will be met in the same manner, the amount of water pumped being regulated at will.

The extremely high water which occurs at present in the North branch at Lawrence avenue is due to the unimproved condition of the river north of Belmont avenue. The river bottom at the present time at Lawrence avenue is four feet higher than the present water surface of the lake, and the channel between these points is tortuous. By straightening the channel, as provided in Council order of March 8, 1895, with a partial improvement by dredging, the actual rise of the flood water above city datum may be reduced to less than one-half the present rise, and the height of ordinary water to one-third the present height.

It is evident that a greater saving would accrue, both in first cost of engines and in operation, if the channel were improved. The saving in first cost will nearly equal the cost of dredging, and as successful steps have been taken to adjust the present river lines to those established by





Open Cut Intercepting Sewer 21st Looking North



Open Cut Intercepting Sewer Lawrence Ave.
Near River



Location of Shaft For Tunnel 39th St. & Calumet Ave.

INTERCEPTING SEWERS—CONSTRUCTION.



Cut Intercepting Sewer 21st and Prairie Ave.



Intecepting Sewer at Intersection
of 14th St. and Clark



Open Cut Looking South
on Prairie Ave.

INTERCEPTING SEWERS—CONSTRUCTION.

the Council, by gift of the land by property owners interested, it is likely that the improvement may be commenced next spring.

The inlets to the conduits at Thirty-ninth street and Lake Michigan and at Lawrence avenue and Lake Michigan have been designed, as shown in plats, in order to make them more accessible than would be the case with submerged cribs, and because, in each case, it is very possible that it may be necessary to extend them in the future. At Lawrence avenue, the Lincoln Park Commissioners have the right to build a driveway 1,000 feet from the present shore line, using the intermediate space for a park. In that case the inlet may have to be extended with a new arrangement of intake.

On September 1, 1897, the Division of Intercepting Sewers was established within the Bureau of Sewers, and William Lowe placed in charge, and in December, 1897, Mr. W. S. McHarg was appointed consulting engineer.

The object of the division was to carry into effect the order of the City Council, passed March 22, 1897, for the construction of intercepting sewers in accordance with the report of the Pure Water Commission previously made to the City Council.

Work was at once commenced on surveys and plans. Those for the turning of the Twelfth street and Twenty-second street sewers, involving a comparatively small amount of work, were first ready. Investigation of the route proposed showed that it was preferable, both for economy and practicability, to change the lines of these sewers from Twelfth street to Fourteenth street and from Twenty-second street to Twenty-first street, as shown on maps.

Work on these sewers was commenced in March, 1898, and both sewers were completed and in operation in July, 1898.

Surveys and plans for the main conduits in Thirty-ninth street and in Lawrence avenue from Lake Michigan to the branches of the Chicago river, were also made and the work on each let in May, 1898.

The work so far let has been approved by the Drainage Trustees, and plans for engine-houses, engines, and inlet from the lake, together with those of the intercepting sewers from Thirty-fifth street to Thirty-ninth street and from Seventy-third street to Thirty-ninth street, necessary to complete the work in the South Division and Hyde Park, have been made on the lines generally outlined. These conduits and sewers and proposed location of engine-house at the lake is shown on the accompanying maps, with details of the work proposed.

Construction on the Thirty-ninth street conduit has been completed as follows: The retaining wall across the end of the Stock Yards slip, containing 2,096 cubic yards of concrete with a Bedford stone facing, has

been completed and is shown in the plans. About 500 feet of the main conduit has been built in open cut, from the retaining wall east. At Thirty-ninth street and Calumet avenue, a working shaft has been sunk, steel shields have been constructed, together with the headhouse and machinery-house with all necessary machinery. The shields have been moved into position and 40 feet of conduit built in tunnel to receive the air-locks which are now being set.

The following is a description of shield used:

The shield, known as the Chicago shield, used in the Thirty-ninth street conduit, is the invention of Mr. Thomas Murphy, who was superintendent of excavation, during the construction of the St. Clair tunnel.

As shown by the accompanying sketch, the Chicago shield is 24 feet 10 inches external diameter and 14 feet long over all, including the tail plate, or hood.

The main, or working portion of the shield, shown in plate, is 10 feet in length, and consists of an outer shell (a) of one-inch metal and an inner shell (b) of one-half-inch metal. The outer shell has its front or cutting edge bevelled, and the front portion of the inner shell is curved as shown at (C) and riveted to the outer shell just back of the cutting edge.

The outer shell (a) consists of sixteen sheets (eight in circumference and two in length), riveted together by means of angle irons (i) at the circumferential and longitudinal joints.

The inner shell (b) consists of eight sheets secured together by angle irons at the longitudinal joints and having two angle irons riveted to the outer shell, the curved portion (C) consisting of twenty-four sheets riveted to each other and to inner shell (C) by means of $\frac{3}{4}$ x6-inch butt straps.

The space between the outer and inner shell is divided into twenty-four compartments by separating plates (i) of one-half-inch metal, riveted the entire length to outer and inner shell by means of angle irons.

These compartments are closed at the rear by twenty-four separating plates (d) of one-inch metal, each plate being provided with a hole for the reception of a hydraulic jack (j) and securely riveted to the outer and inner shells and to longitudinal separators (i) by means of angle irons. Lateral separating plates (E) (in two pieces for convenience in setting in place) of one-half-inch metal are riveted in a similar manner by means of angle irons at a point about three feet and six inches forward of plate (d) in each compartment, and serve to support the release end of jacks.

These separators d, e and i, together with the angle irons which occur circumferentially on both outer and inner shells, make the working portion of the shield rigid, thus rendering the use of bracing timbers unnecessary.

The tail plate (m) of one-half-inch metal consists of eight sheets in

1892

circumference and four feet in length, having the same external diameter as the outer shell (a), and are secured to the working portion of shield by means of angle irons riveted to shoulder plates (d).

The tail plate, or "hood," is slotted as shown for the purpose of reducing the resistance and lessening the strain when it becomes necessary to change the direction of the shield at curves. The tail plate forms a protection and guide in the construction of the tunnel-tubbing and masonry.

The hydraulic jacks (j) are arranged as shown around the rear circumference of the working part of shield, one in each compartment, the face plate of jack being securely fastened to shoulder plates (d) by tap bolts, and the release end being supported by plates (E) through which the release cylinder passes.

Hand-holes (g) are provided in inner shell, one for each compartment, as shown, for convenience in setting jacks in place and making the necessary connections. They are about 16x24 inches, and are provided with covers (h) of one-half-inch metal secured by tap bolts.

The working portion of the shield is divided into sixteen compartments by three horizontal and three vertical partitions (f) of one-half-inch metal, securely riveted and bolted to angle irons at each joining and intersection as shown.

These partitions are flush with front and extend back 8 feet 6 inches, or within 1 foot and 6 inches of the rear end of shield. They are provided with holes at rear edge for securing bulkheads in case it becomes necessary to close up one or more of the compartments.

The power to push the shield forward is applied to the twenty-four hydraulic jacks (j), which are secured as shown to shoulder plates (d), and have a piston movement of 26 inches.

The jacks are controlled by two groups of twelve three-way valves, secured to brackets (n), one group on each side of the shield. Each valve is connected to one of the jacks, thus making it possible to use each jack separately if desired.

The feed pipes from the hydraulic pump are connected to each group by means of a flexible elbow, which enables the shield to be pushed forward 15 feet before it becomes necessary to add another length of pipe.

In the St. Clair tunnel, the outer lining was formed of cast-iron segments 2 inches thick by 18 inches lengthwise of tunnel, provided with 4-inch flanges for bolting together. This outer lining of cast-iron, being perfectly rigid, formed an excellent footing against which to operate the jacks.

In the Thirty-ninth street conduit, the outer lining is formed of 2-inch plank 6 inches in width, cut to shape and spiked together.

Against this lining the bearing plates (k) on the piston heads of the jacks will be operated.

The plates (k) are 14x24x1 inches and engage about two-thirds of the circumference of the outer lining, thus distributing the pressure over practically the entire surface of the outer wood lining.

While each jack has a capacity of about 125 tons under a pump pressure of 5,000 pounds per square inch, it is thought that 1,200 pounds pressure, or about thirty tons to each jack or a total of 720 tons, will be sufficient to operate the Chicago shield.

The Lawrence avenue system will carry the sewage and storm water intercepted by lateral sewers already in process of construction near the lake shore, together with 35,000 cubic feet per minute of lake water from Lake Michigan to the North branch of the Chicago river. The pumping station will be built at the west end of the conduit with a discharge conduit about 1,000 feet long to the river.

At the west end of the system, there have been completed about 160 feet of the 16-foot conduit east of the proposed location for the pumping station, on curve leading to center line of Lawrence avenue. All machinery, headhouse, etc., are in place. The shield and excavator to be used on the work is about ready to be set up.

The description of the shield which it is proposed to use is as follows:

The machine consists essentially of two parts. The shield proper, with its extension tail piece, which supports the roof until the complete brick lining is in place, and, secondly, of the excavating and self-propelling machinery, contained within the outer shield.

The shield proper consists of massive cast-iron rings, supporting in suitable sockets the outer envelope, which is of steel I-beams, placed almost in close contact, and with their webs on radial lines from the center of the bore. There are 234 of these beams arranged in eighteen sets of thirteen beams each. In each set there are twelve 5-inch I-beams and one 7-inch I-beam. These eighteen 7-inch beams, arranged symmetrically about the shield, are permanently fastened to the cast-iron supporting rings, but the 216 5-inch I-beams are so arranged in their connection to the inner rings that they can be advanced longitudinally, by the mechanism contained within the supporting rings.

Within the rings supporting the outer envelope of the shield, is a large internal gear wheel, without hub or spokes, but supported by anti-frictional rollers within the shield rings. This master wheel carries the cutter head, supported by a tripod, the feet of which are properly attached to this master wheel. The legs of this tripod can be lengthened or shortened as may be desired, thus hanging the head of the tripod and its cutter from the periphery to the center of the bore. The path of the cutter, as it is carried around by the revolutions of the master wheel, is a modified spiral,

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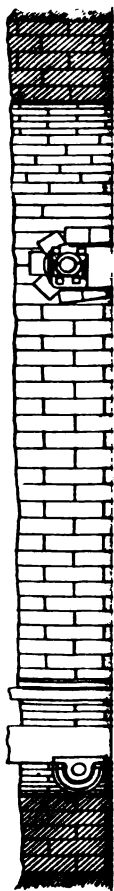
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extending from the outer edge to the center of the bore. The width and depth of cut can be modified at the will of the operator to suit the character of the material to be excavated.

By an ingenious arrangement of cams, the 216 5-inch I-beams are advanced forward by the revolutions of the master wheel to a predetermined extent, up to about 4 inches. By thus moving forward, one I-beam at a time, the resistance is reduced to a minimum, and when all the 5-inch beams have been moved forward by successive revolutions of the master wheel, the total frictional resistance of this whole envelope is made use of to draw forward the internal rings and their contained mechanism to a new position.

By an arrangement of the large master wheel within the outer rings of the shield, there is left a central opening through which the material excavated is conveyed to the rear by mechanical means.

The power for driving the machinery of the shield is to be conveyed, in this instance from the headhouse, by wire rope transmission, arranged with a tension carriage to permit advance of the shield.

In plate showing the construction of the shield and excavator, independent engines are shown, for operation of which, engines are omitted if rope transmission of power is used.

This same wire rope drive serves also as a motive power to carry forward and back a number of small cars which bring in the brick and mortar for the tunnel lining and carry out the excavated material.

The material cut from the face of the bore in advance of the shield, is gathered up from the floor by two buckets attached to the face of the master wheel and dumped into the hopper of the conveyor, which is hung a short distance below the upper part of the shield and extends far enough to the rear to deposit the earth into small cars, which carry it back to the shaft.

Should an obstruction, like a boulder, be met in the line of excavation, the movement of the cutter head can be so modified as to remove the earth adjacent to the boulder and then pull it out from its resting place. If the boulder is not too large, it will be carried to the rear by the conveyor, but if of considerable size, it can be hung up on chain slings supported by a trolley, and thus conveyed back to the dirt cars for removal to the shaft. There is sufficient flexibility in the construction of the shield that, when desired, it can be driven forward in a curvilinear path, upward or downward, to the right or left, as well as following a right line.

Regarding this shield I would state that it is being constructed entirely at the risk of the contractor and without the formal approval of this bureau. Its successful operation is yet to be demonstrated.

Sections 2 and 3 of the Lawrence avenue system, being north and south branches from Lawrence avenue, as shown in plat, were let in May, 1898, upon plans prepared by the Pure Water Commission, proposals for which were received March 25, 1897.

The north arm, from Lawrence avenue to Pratt avenue, with extension to Bryan avenue (let in November, 1898), has been completed ready for connection with the main conduit. The south arm, from Lawrence avenue to Surf street, is about three-fourths completed and will be finished in the early spring.

In the West Division of the City, the following systems should be connected with the Drainage Canal: The South Forty-sixth avenue, South Fortieth avenue, Lawndale avenue, Central Park avenue, Kedzie avenue, Western avenue, Leavitt street, and Paulina street systems.

Plans for intakes for the Lawrence avenue and Thirty-ninth street conduits have been approved by the Secretary of War and permission granted to build same.

The survey, plans, etc., for the proposed improvement of the North branch of the Chicago river from Belmont avenue to Lawrence avenue are about completed.

This improvement consists of straightening the channel as provided in Council order of March 8, 1895, which order called for a channel 180 feet wide. It is proposed to cut a channel 80 feet wide (40 feet each side of center line) to a depth of 11 feet below datum, which will give an average depth of 12 feet from Belmont avenue to Lawrence avenue.

The present flood height at Lawrence avenue is about 13 to 14 feet above datum. Straightening the channel and making a clear waterway will reduce this to about six feet above datum. Ordinary water is now about five feet above datum and will be reduced to one foot six inches or two feet with present lake stage. The advantage to be gained in the operation of the pumping plant on the main conduit in Lawrence avenue is obvious.

A careful review of the foregoing statement of the work designed during the past two years will show that the plans of the Pure Water Commission have been materially altered, that in fact a study of the plan has shown it to be advisable to make radical changes and to unite interests for general public benefit.

The Lawrence avenue conduit has been increased in size from 9½ to 16 feet in diameter. The Commission recommended that where all sewers four feet in diameter and over are crossed, provision be made for overflow into the lake during times of storm, while we have planned to make the main intercepting sewers submerged sewers at all times, with intakes from the lake at suitable points to provide for their proper flush-

ing. The intake to the main conduit at Lawrence avenue as well as the subsidiary intakes are to be provided with controlling gates, so that in time of storm the supply of water from the lake may be regulated within the limit of the capacity of the pumping plant.

On the South Side it was also necessary to make many changes. It was found more practicable and cheaper to construct a sewer in Fourteenth street from the river to State street, and from Fourteenth street to Twelfth street, than to construct a sewer in Twelfth street from the river to State street. It was also found more advantageous to construct a sewer on Twenty-first street from the river to Prairie avenue, with an arm in State street from Twenty-first street to Twenty-second street and in Prairie avenue from Twenty-first street to Twenty-second street, to tap the Twenty-second street sewer, than to construct the sewer as per the report of the Commission; Twenty-first street being unimproved over the greater distance, not encumbered with car tracks, viaducts or bridge abutments, nor having any large main sewer, the flow of which would of necessity have to be handled during the period of construction.

On Thirty-ninth street, as we have seen, the diameter of the main conduit was changed from 12½ to 20 feet in diameter. The Pure Water Commission recommended that the main pumping station of the South side system be located at the intersection of Halsted street and Thirty-ninth street, as previously mentioned. The new conditions prevailing, owing to the greatly increased volume of water which the Sanitary Trustees asked to have passed through this conduit, made it necessary radically to change this plan, and accordingly on January 31, 1898, Mayor Harrison submitted the following ordinance to the City Council, which was unanimously adopted:

AN ORDINANCE TO MODIFY THE PLANS OF THE PURE WATER COMMISSION, ACCEPTED MARCH 1, 1897.

"Be it Ordained by the City Council of the City of Chicago:

SECTION 1. That the Commissioner of Public Works, in completing the system of intercepting sewers for which tentative plans were heretofore made by the Pure Water Commission and accepted by the City Council March 1, 1897, is hereby authorized to modify said plans by increasing the size of the Thirty-ninth street and Lawrence avenue conduits to the following dimensions, viz.:

A twenty-foot conduit on Thirty-ninth street, from Lake Michigan to the Halsted street slip.

A sixteen-foot conduit on Lawrence avenue, from Lake Michigan to Chicago river.

By changing the course of the intercepting sewers intended for the drainage of the territory tributary to the Twelfth street and Twenty-second street sewers to or

upon or in such other street or streets as in the judgment of said Commissioner shall be most effective to accomplish the object in view.

By changing the gradients in such manner and at such points as shall be deemed by said Commissioner most effective to accomplish the drainage proposed.

By changing the location of the pumping stations as proposed, or by locating any required pumping station at such point or points as said Commissioner shall deem advisable.

By making such other changes in said tentative plans as the said Commissioner shall deem necessary to effect the success of said system of intercepting sewers.

SECTION 2. The Commissioner of Public Works is also hereby authorized to turn over to the Sanitary District of Chicago all pumping stations and all machinery and fixtures connected therewith which shall be constructed to make said intercepting sewer system effective; upon the condition that thereafter said Sanitary District of Chicago shall permanently maintain said pumping stations and make all improvements and repairs and increase in capacity if any thereafter required, at the expense of said Sanitary District of Chicago; and he is also hereby authorized to enter into such contract or contracts on behalf of the City of Chicago with said Sanitary District of Chicago, as shall be necessary to effect the above result.

SEC. 3. This ordinance shall take effect and be in force from and after its passage."

This ordinance was accepted by the Sanitary Trustees on February 4, 1898, by the following ordinance:

" Now, therefore, be it ordained by the Board of Trustees of the Sanitary District of Chicago:

SECTION 1. That, in consideration of the terms and conditions of the above ordinance, and subject to the faithful compliance therewith by the said City of Chicago, and its corporate authorities, and all agents in its behalf, the condition imposed upon the Sanitary District of Chicago by said ordinance is hereby accepted, and the Sanitary District of Chicago hereby specifically agrees that after the completion of said system of intercepting sewers and conduits and the completion and delivery to the Sanitary District of Chicago of said pumping stations and machinery and fixtures connected therewith, located respectively at a site to be agreed upon at or near Thirty-ninth street, and with a minimum pumping capacity of 40,000 cubic feet of water per minute, and at a site to be agreed upon at or near Lawrence avenue, and with a minimum pumping capacity of 35,000 cubic feet of water per minute, the Sanitary District of Chicago will permanently maintain and operate said pumping stations and make all improvements and repairs and increase in capacity, if any thereafter be required, at the expense of said Sanitary District of Chicago; provided, however, the pumping plants and the site and all plants therefor, and the intakes, shall be provided and constructed in a manner satisfactory to the Sanitary District of Chicago. The President and Clerk of the Board of Trustees are hereby authorized and directed to enter into such contract or contracts on behalf of the Sanitary District of Chicago with said City of Chicago as shall be necessary to effect the above result.

SEC. 2. This ordinance shall take effect and be in force from and after its passage."

A careful survey of the south arm of this system showed that, with the pumping station located at the lake end of the main conduit, the inter-

mediate station recommended at Sixty-third street could be omitted. The new arrangement also made it possible and preferable, to make the south intercepting sewer, a sewer of free delivery, omitting the overflow sewers recommended in the Commission's report. It was also determined, if it was possible to obtain an easement from the Illinois Central Railway Company, that this sewer could be constructed within their right-of-way north of Fifty-first street at a greatly reduced cost. After several months of negotiations with the said corporation, a deed of easement was secured, granting to the City of Chicago the right to construct and maintain in its right-of-way from Thirty-fifth street to Fifty-first street the said intercepting sewer, and on December 5, 1898, the following communication and ordinance were submitted to the City Council:

To the Honorable, the Mayor and the City Council of the City of Chicago:

GENTLEMEN: The report of the Pure Water Commission, submitted to your honorable body March 1, 1897, and approved March 22, 1897, provided for the construction of intercepting sewers along the line of Lake avenue, from Thirty-fifth street to Fifty-sixth street, and along Stony Island avenue, from Fifty-sixth street to Seventy-third street, with a pumping station at Stony Island avenue and Sixty-third street.

The construction of the intercepting sewer along this route would necessitate the removal of all the sewers, drains, water service pipes, gas pipes and electrical conduits in Lake avenue, and greatly discommode the traveling public during the period of construction, and would also require a large expenditure of money outside of the actual sewer construction. Seeking to avoid this inconvenience to the public, and the unnecessary expenditure of money, a plan was prepared for the construction of this intercepting sewer east of the tracks of the Illinois Central Railroad Company in their right-of-way. Said plans were submitted to the Illinois Central Railroad Company and approved by them, and a deed has been recorded, ceding to the City of Chicago an easement for the construction and maintenance of said sewers and pumping stations.

I submit herewith for your consideration an order prepared by the City Law Department authorizing the construction of the intercepting sewers in accordance with the foregoing plans, and ask that the same be passed.

Respectfully submitted,

L. E. McGANN,

Commissioner of Public Works.

WHEREAS, The Illinois Central Railroad Company has granted to the City of Chicago a site for a pumping station at Thirty-ninth street, and certain easements connected therewith, permitting said City to locate and construct portions of the intercepting sewers under the right-of-way of said railroad company, both north and south from Thirty-ninth street, which enables the said City more economically to do said work; now, therefore, it is hereby

ORDERED, That the route of said intercepting sewers be and hereby is changed so that the same shall be in the right-of-way of said Illinois Central Railroad Company, from Thirty-fifth street to Fifty-first street; in Fifty-first street to Cornell ave-

nue; in Cornell avenue to Fifty-sixth street; in Fifty-sixth street to Stony Island avenue, and in Stony Island avenue to Seventy-third street, according to plans and specifications therefor on file in the office of the Commissioner of Public Works.

At a cost of \$74,000 the City purchased a block of land east of Lake avenue at the end of Thirty-ninth street, 165 feet by 270 feet, as the site for the required pumping station, but during the negotiations with the Illinois Central Railroad Company for the easement above referred to, it was determined that an effort should be made to secure from the said corporation a quit-claim deed for any right that they may have to a strip of submerged land 300 feet in width on a line with Thirty-ninth street produced, east of their right-of-way, and an effort made to secure the consent of the State Legislature to the erection of the pumping station on this submerged land. The deed was secured and a bill has been prepared for introduction to the State Legislature as soon as it is in session.

The benefits to be derived are many; the City will save the cost of the land already purchased, and it will be practicable to erect a less pretentious building than good taste would have demanded, should the station have been erected on Lake avenue in the midst of handsome, palatial residences. It will be more accessible to transportation, as both the Illinois Central and Lake Michigan may be utilized in furnishing supplies, and more space is given for extensions probably required by the Sanitary Trustees.

The more recent expectation of the Sanitary Trustees, that it will be necessary to pump 120,000 cubic feet of water per minute through the Thirty-ninth street conduit, will compel another change in the plan outlined by the Pure Water Commission. Instead of the intercepting sewer from Thirty-fifth street to Thirty-ninth street flowing by gravity into the main conduit, the increased volume pumped will raise the "head" at the lake end so as to make this impossible. It was, therefore, necessary to prepare a plan which will permit the sewer to discharge into a well at the pumping station and be there pumped into the main channel.

It will thus be seen that most of the changes made have been made necessary by the uniting of the interests of the Sanitary District and the City of Chicago in harmonious relations, whereby a joint plan was adopted, and great credit is due to Mayor Harrison for the position taken by him so early in his administration, and indicated in his letter to the Sanitary Trustees, which has resulted in saving to the taxpayers of our City at least \$2,000,000, and in very greatly increasing the efficiency of the system of intercepting sewers.

INTERCEPTING SEWERS BUILT IN 1898.

SECTION "A."

STREET.	FROM	TO	Inside Diameter in feet.	Length, feet.
Fourteenth	Chicago River	State	5½	1,075
State	Fourteenth	Twelfth	5¼	1,280
Twelfth	State	Wabash avenue	4½	400
Twelfth	Wabash avenue	Ill. Cent. Ry	4	817

SECTION "B."

STREET.	FROM	TO	Inside Diameter in feet.	Length, feet.
Twenty-first	Chicago River	State	8	8,287
Twenty-first and Prairie avenue.	State	Twenty-second	5¼	2,227
State	Twenty-first	Twenty-second	6	518
Intersection	{ Prairie avenue & } { Twenty-second .. }	.....	5¼	92
Intersection	{ State and } { Twenty-second .. }	.....	8	50
Twenty-second	Prairie avenue	Ill. Cent. Ry	Invert concreted.	861

SECTION "C."

STREET.	FROM	TO	Inside Diameter in feet.	Length, feet.
Retaining Wall at Halsted st. Slip....				
Thirty-ninth	Halsted	Butler	20	450
Thirty-ninth	Halsted	Butler	1	260

SECTION "D."

STREET.	FROM	TO	Inside Diameter in feet.	Length, feet.
Lawrence avenue	Chicago river	Beacon	16	158

SECTION "2."

STREET.	FROM	TO	Inside Diameter in feet.	Length, feet.
Sheridan road	Lawrence avenue	Argyle	8	1,477
Sheridan road	Argyle	Balmoral avenue	7¾	2,458
Sheridan road	Balmoral avenue	Ardmore avenue	7½	2,661
Sheridan road	Ardmore avenue	Granville avenue	7	2,640
Sheridan road	Granville avenue	Sheridan road	6¾	2,692
Devon avenue		Pratt avenue	6	2,641
Sheridan road	Devon avenue			

EXTENSION OF SECTION "2."

STREET.	FROM	TO	Inside Diameter in feet.	Length, feet.
Sheridan road.....	Pratt avenue	Lunt avenue.....	5	1,372
Sheridan road.....	Lunt avenue.....	Touhy avenue.....	4 $\frac{1}{2}$	1,378
Sheridan road.....	Touhy avenue.....	Bryan avenue.....	3 $\frac{3}{4}$	1,303

SECTION "3."

STREET.	FROM	TO	Inside Diameter in feet.	Length, feet.
Sheridan road.....	Lawrence avenue	Montrose avenue.....	6	3,900
Lakeside avenue ..				
Clarendon avenue..				
Graceland avenue..	Montrose avenue	Lake Shore drive.....	5 $\frac{1}{4}$	2,790
Pine Grove avenue..				
Lake Shore drive.....	Pine Grove avenue...	Addison	4 $\frac{3}{4}$	2,000
Lake Shore drive.....	Addison	Melrose	4 $\frac{1}{4}$	200

**LENGTH, SIZE AND COST OF INTERCEPTING SEWERS BUILT
IN 1898.**

Length, in feet.	Size.	Average Cut.	Average Price per foot.	Total.
260	1.0	14.5	\$ 3.00	\$ 780.00
50	3.0	13.8	6.29	314.50
1,303	3¾	10.5	5.15	6,710.45
817	4.0	12.5	7.09	5,793.53
200	4¼	11.5	6.80	1,360.00
1,778	4½	10.0	6.33	11,254.74
2,000	4¾	14.0	7.25	14,500.00
1,372	5.0	12.0	6.75	9,261.00
7,297	5¼	16.0	7.93	57,792.24
1,075	5½	15.6	8.59	9,234.25
7,059	6.0	14.5	9.03	63,742.77
2,692	6¾	11.8	9.26	24,927.92
2,640	7.0	11.8	9.73	25,687.20
2,661	7½	12.7	10.41	27,701.01
2,458	7¾	14.5	12.08	29,692.64
4,764	8.0	16.75	12.59	59,978.76
158	16.0	Tunnel	40.63	6,419.54
450	20.0	38.0	66.34	29,853.00
For concreting invert of the 22d street sewer 861 ft. @ \$3.00.....				2,580.00
Retaining wall at Thirty-ninth and Halsted streets				18,360.91
39,034 feet = 7 $\frac{274}{100}$ miles.				\$405,944.67

CEMENT TESTS.

During the past six months, there has been in operation in this department a complete cement-testing laboratory. The cements at present used are the "Utica Blackball" and the "American Portland Giant." The following is the summary of the tests made of these two cements:

**UTICA BLACKBALL—AVERAGE FINENESS THROUGH NO. 74 SIEVE, 83
PER CENT.**

7 days.	Neat average tensile strength in lbs. per square inch	....	194½
7 "	1 to 1 " " " " " "	....	170½
7 "	2 to 1 " " " " " "	....	99
14 "	1 to 1 " " " " " "	....	180¾
28 "	Neat " " " " " "	....	213
28 "	1 to 1 " " " " " "	....	208
28 "	2 to 1 " " " " " "	....	150
3 mos.	Neat " " " " " "	....	265
3 "	1 to 1 " " " " " "	....	262
3 "	2 to 1 " " " " " "	....	168

GIANT PORTLAND—AVERAGE FINENESS THROUGH NO. 100 SIEVE, 93
PER CENT.

7 days.	Neat	Average	tensile	strength	in	lbs.	per	square	inch	....	449 $\frac{3}{4}$
7	"	3 to 1	"	"	"	"	"	"	"	....	206
28	"	Neat	"	"	"	"	"	"	"	....	585
28	"	3 to 1	"	"	"	"	"	"	"	....	284
3 mos.	3 to 1	"	"	"	"	"	"	"	"	....	361

On March 29, 1898, the Seventy-ninth street pumping station was totally destroyed by fire. Its function was to raise into the Seventy-ninth street conduit all the surface water accumulating in the low lands south of Seventy-fifth street west of the Illinois Central Railroad.

Surveys were at once made which demonstrated that by the expenditure of less than \$5,000.00, the Stony Island avenue ditch, from Lake Calumet to Seventy-ninth street, could be deepened and widened sufficiently to drain this territory by gravity, and on November 28th the City Council ordered the work proceeded with. Contracts were therefore let and the work will be completed as soon as the weather permits.

This bureau is seriously handicapped in the matter of the proper maintenance of our sewer system by inadequate appropriations. All sewers have necessarily been constructed on a minimum grade, and, while street catch-basins have been constructed on all sewers to prevent street dirt from clogging the mains, yet all main sewers require frequent cleaning. The old sewers, constructed prior to annexation, in the towns of Lake and Hyde Park, require particular attention. Attention was called in a previous report to the condition of the sewers in these towns. In many streets the mains are too small and have been constructed of poor materials and in a faulty manner. The wholly inadequate appropriation for the past year for street cleaning has more than doubled the work to be done the coming year in the cleaning of street basins. When streets are not regularly cleaned, the street dirt at every rain is carried into the basins which requires that they should be frequently cleaned or become ineffectual for the purpose for which they were designed.

The following tabulated statement shows the amount expended per mile per year, for the past twelve years, in cleaning sewers and catch-basins:

YEAR.	Miles of Sewer to Maintain.	Cost of Cleaning Sewers and Catch-basins.	Cost per Mile of Cleaning Sewers and Catch-basins per Year.
1887	474	\$ 50,264.65	\$ 106.04
1888	492	53,422.41	108.55
1889	712	61,503.01	86.88
1890	765	107,873.34	137.42
1891	688	123,620.44	139.21
1892	992	142,720.52	143.87
1893	1,145	132,633.51	115.84
1894	1,211	154,225.45	127.35
1895	1,248	134,424.44	107.71
1896	1,306	96,901.65	74.20
1897	1,345	91,414.89	67.96
1898	1,388	92,961.88	66.98

A very important matter to be considered in connection with the near completion of the intercepting sewer system is the necessary abandonment of the Woodlawn, Seventieth street and Seventy-third street sewage pumping stations.

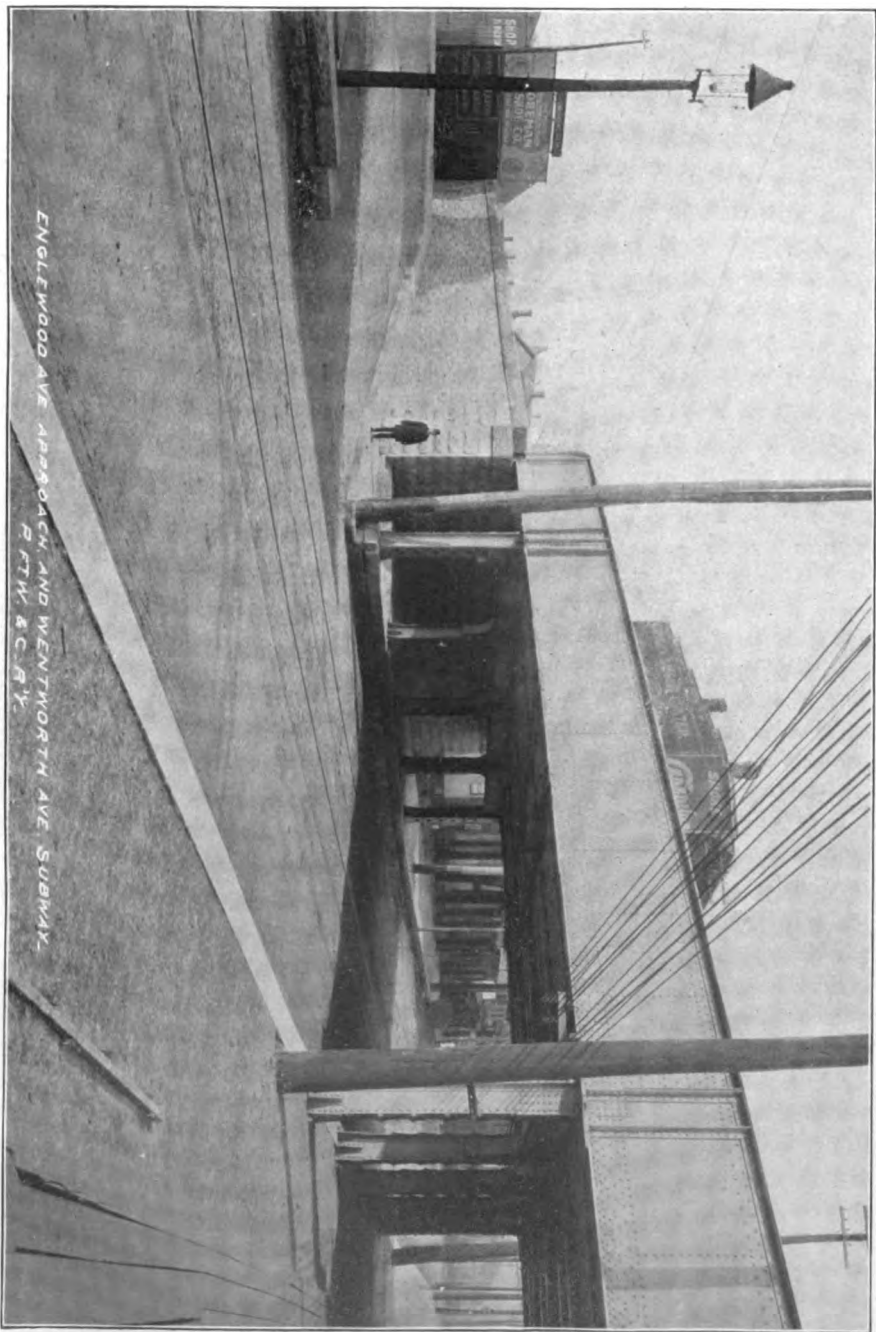
I would suggest that these plants be turned over to the Electrical Department to be adapted for electric light and power stations. The only thing necessary to be done is to take out the pumps and install engines and dynamos. The rest of the equipment can be adapted at a small expense. If this is done, municipal lighting can be extended in this division of the City at a minimum cost to the municipality.

In conclusion, permit me to acknowledge my obligations to you for your co-operation and support in all matters pertaining to the bureau, and to express my appreciation of the uniform courtesy and assistance extended me during the past year by all the officials of the various bureaus of the department in the discharge of the duties of this office.

I also take great pleasure in certifying to the faithful services rendered by the engineers and my other assistants in the several divisions of the bureau. Their loyal support has made it possible for me to carry out your instructions and thereby render acceptable service to the public.

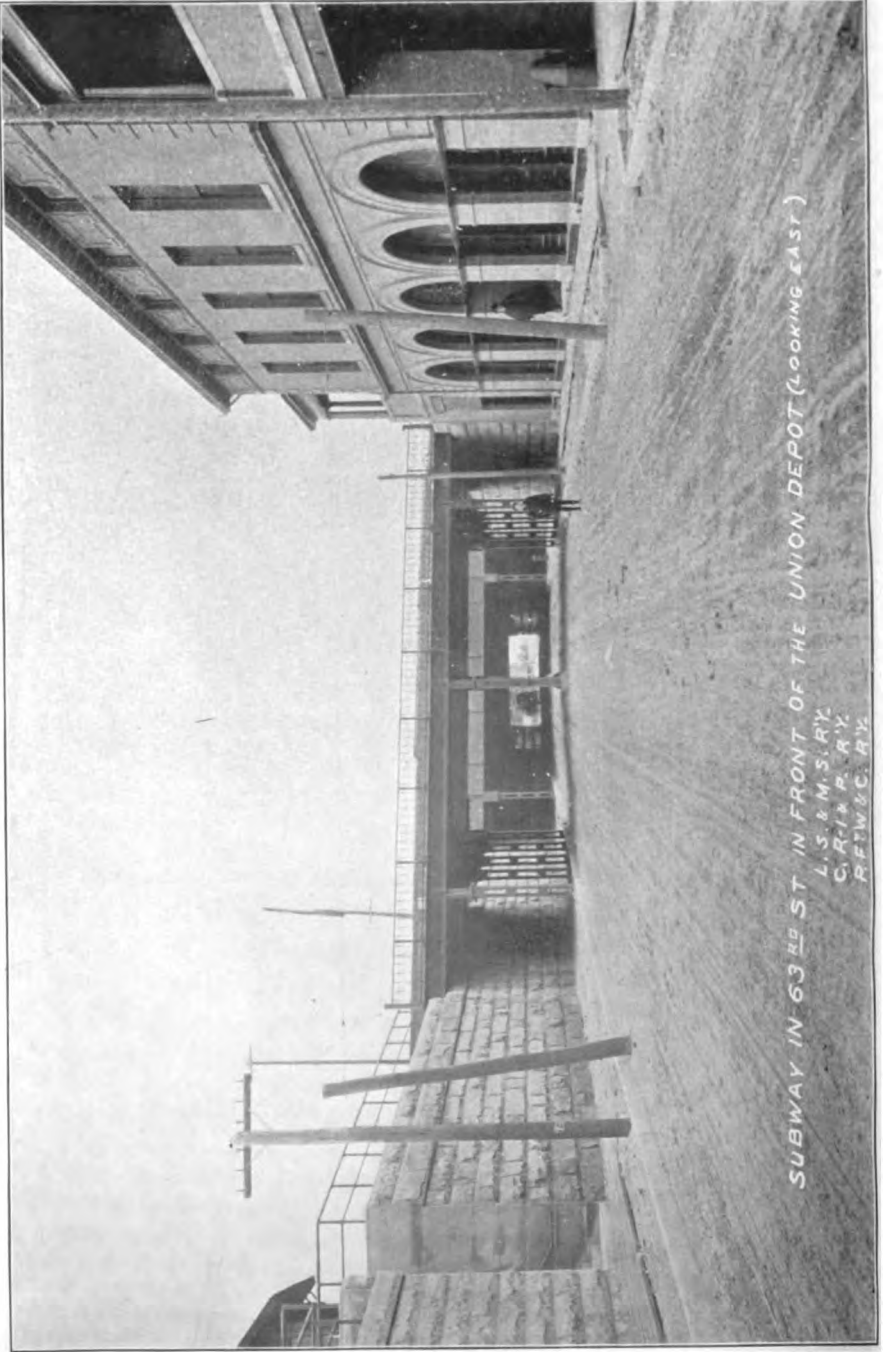
Respectfully submitted,

F. E. DAVIDSON,
Superintendent Bureau of Sewers.



ENGLEWOOD AVE. APPROACH, AND WENTWORTH AVE. SUBWAY.
R. T. H. & C. R. Y.

ENGLEWOOD AND WENTWORTH AVENUES.



SUBWAY IN 63RD ST. IN FRONT OF THE UNION DEPOT (LOOKING EAST)
L.S. & M.S. R.R.
C.R. & P. R.R.
R.F. & C. R.R.

63RD STREET AT NEW SUBURBAN DEPOT.

ANNUAL REPORT
Bureau of Streets
CITY OF CHICAGO
1898

M. J. DOHERTY
SUPERINTENDENT

BUREAU OF STREETS.

HON. L. E. MCGANN,

Commissioner of Public Works.

DEAR SIR: I have the honor to submit herewith the "Twenty-third Annual Report" of the Bureau of Streets for the year ending December 31, 1898:

FINANCIAL STATEMENT.

(Appropriation for 1898).

STREET CLEANING AND REPAIRS.

Repairing and cleaning improved streets and alleys.....	\$399,728.56
Repairing unimproved streets and alleys.....	100,000.00
Removal and disposition of garbage, compensation of those employed in said work, supplies, repairs, etc.....	417,060.28
Office salaries and salaries and transportation of thirty-four Ward Superintendents.....	65,210.00

SIDEWALK REPAIRS.

For building and repairing intersections and general repairs	55,000.00

PUBLIC PARKS.

For maintenance of twenty public parks.....	12,300.00

MISCELLANEOUS RECEIPTS.

From dumps.....	3,568.45
For repairs for openings and other miscellaneous.....	24,465.90
House moving permits.....	1,272.00
Grand total.....	\$1,078,605.19

DISBURSEMENTS.

The amount expended for repairing streets amounted to \$196,419.71, of which \$133,162.52 was done by requisitions of the Superintendent; on the theory that by having a reliable paving firm to do the work, the City would secure prompt, economical, and efficient service. All of this work was performed to the satisfaction of the Bureau. The amount of appropriation for street repairs was not sufficient to make more than two per cent. of the repairs needed, the balance, \$63,257.19, was done

by day labor under the supervision of the Ward Superintendents. The expenditure for cleaning streets and alleys, including the removal of snow, which was done by day labor, amounted to \$212,545.24. The sum of \$99,987.11 was spent for ditching, labor, and material in building culverts, crossings, and the improvement of dirt roads. There was expended, under special appropriation, for the Hegewisch road, \$4,830.34. The amount expended on garbage was \$421,202.21; of this amount, \$55,936.53 was spent under supplemental contracts during the months of January and February. The balance of the service was performed by day labor. The amount expended for labor and material for the repairing of sidewalks, etc., was \$55,836.25. For maintaining the different parks throughout the City, \$11,808.99 was expended. For stationery and other miscellaneous office expenses, \$1,234.72; Ward Superintendents and office salaries, \$64,210.00; salary of house moving inspector, \$1,223.70; making a total expended of \$1,069,288.27 and leaving a balance of \$9,316.92, which was turned back into the general fund.

STREET AND ALLEY CLEANING.

On March 1, 1898, the Bureau of Street and Alley Cleaning was merged into this bureau. The work of collecting and removing garbage during the months of January and February was performed under supplemental contracts, pending the final decision of the Supreme Court as to the validity of the five-year contract.

Mr. W. E. Crossette, appointed Assistant Superintendent of Streets, was in charge of this Division.

PLAN OF ORGANIZATION.

In carrying into effect the plan of organization, Ward Superintendents were appointed to take charge of the work in the respective wards, which were divided into districts according to the population and the necessities of same, as nearly as could be approximated. A laborer and a garbage team were assigned to each district, the first to broom up the streets and put the dirt into piles, the second to collect and remove such street dirt and all garbage, ashes and waste. This excellent way of dividing the wards into districts had two aims: First, to eliminate the old and objectionable method of working a large number of men in gangs; and second, of fixing an individual responsibility for the character of work performed by the laborer and garbage team. The wisdom of this new departure has been fully demonstrated during the ten months it has been in operation, especially in the collection of garbage, ashes and waste, which, up the 15th day of September, was beyond question as satisfactory as the City ever had. The garbage teamster soon became conversant with his district and the needs of

same, and if he was the owner of the team, as in the majority of cases he was, did his best to keep his district in a sanitary condition and hold his job. The hired driver who neglected his work was soon replaced by a better man and the service generally was performed in a regular and systematic manner. Unfortunately the amount of unexpended appropriation would not permit the continuance of this service for the balance of the year, and on the day above stated, the 15th of September, the force was reduced about one-third; the result, of course, being a slight increase in the number of complaints, which were magnified several times over by sensational articles in some of the daily papers. The number of complaints for the entire year amounted to fourteen per ward, per month, which, in comparison with twenty-one in 1896 and twenty-two in 1897, demonstrates beyond question an improvement in the service and the injustice of the sensational criticisms above referred to.

AMOUNT OF GARBAGE REMOVED AND COST PER CAPITA.

There was removed during the year 201,957 loads of garbage and ashes, aggregating 1,010,682 cubic yards. Assuming the average cubic yard of garbage to weigh 1,000 pounds this would amount to 1,010,682,000 pounds, or 546 pounds per capita for the 1,852,000 inhabitants of the City. The cost of this service to each individual including the final disposition at the City dumps, was twenty-two cents. The per capita quantity and cost of this same service in St. Louis was 277 pounds and twenty-eight cents; Buffalo, 245 pounds and forty cents; Philadelphia, 332 pounds and forty-eight cents; Boston, 946 pounds and ninety-five cents.

When it is remembered that in most of the cities mentioned, some modern plan is in operation for the disposal of garbage, and that the only means of getting rid of the accumulation in this City is by hauling the same on an average five miles to a dump, the wonder is the City has been able to get as good service as it has.

DEAD ANIMALS REMOVED.

Thirty-two thousand nine hundred and ninety-nine dead animals were removed by the contractor without expense to the City.

STREET CLEANING.

Chicago has 2,547 miles of streets, of which 1,134 miles are paved, or were once, and 1,372 miles of alleys, of which 114 miles are paved, making a total mileage of streets and alleys of 3,946. Mileage of improved streets and alleys, 1,248, and of unimproved streets and alleys, 2,698.

The work of cleaning the streets and alleys during the past year has

been so closely interwoven with the garbage and repair work done by the City, that it is difficult to determine accurately the exact service in this direction. The reports of the Ward Superintendents, however, show that there was a total of 18,941 miles of streets and alleys cleaned, at an expense of \$157,430.00, or about \$8.31 per mile. This cost would be slightly augmented by the cost of the work in removing a considerable portion of the dirt by garbage wagons, of which no separate account was kept.

WRETCHED CONDITION OF PAVEMENTS.

Of the 1,134 miles of streets accounted "improved," there is a majority that are in such a wornout condition that it is impossible to clean them. Take for example these very important business thoroughfares as an illustration: Chicago avenue, North Clark street, Wabash avenue, State street, Jefferson street, Lake street, South Clinton street and Fullerton avenue. It is estimated by the Engineering Department that fully 60 per cent. of the so-called "improved streets and alleys" need immediate repaving. The above named streets are in such condition as absolutely to preclude the possibility of machine sweeping, and as for cleaning by hand, it would cost the City a much larger percentage of its pittance of appropriation than it could afford, if, indeed, it were practicable.

CHICAGO AND NEW YORK—COMPARISON.

Commissioner Waring's book gives 433 miles of streets cleaned in 1896 in New York. As there are no alleys in that city, this service included removal of garbage and ashes, as well as street dirt.

In a letter from Hon. Thomas A. Doe, Chief Clerk of the Department of Street Cleaning in New York, dated December 6, 1898, he states that the expense of this service during the year 1896, including the removal of snow, was \$3,201,317.35. The item of snow cleaning alone was \$424,598.75. The force of men employed was 3,500. Compare this with the amount Chicago had to expend in the year just closed, \$675,510.00, and calmly ask the question, which is frequently propounded, why the 1,248 miles of improved streets and alleys and the 2,698 of unimproved streets and alleys of the City cannot be kept as clean as are the 433 miles of streets of New York, and then complain that they are not. Give Chicago \$7,393.00 per mile, that it cost New York, instead of \$172.00 per mile expended in 1898 in this City, and then it would be pertinent and just to make a comparison.

CHICAGO AND OTHER CITIES—COMPARISON.

It is unfortunately a fact that as the City of Chicago increases in size the amounts of money appropriated for cleaning the streets and alleys grow less. The expense per capita for the removal of garbage and ashes, and

maintaining and cleaning of streets and alleys in Chicago for the last five years is as follows :

		Per capita expense for removal of garbage and ashes.	Per capita expense for maintaining and cleaning of streets and alleys.
Chicago.....	1894	28c	87c
Chicago.....	1895	25c	73c
Chicago.....	1896	22c	58c
Chicago.....	1897	18c	51c
Chicago.....	1898	22c	50c
		Per capita expense for removal of garbage and ashes.	Per capita expense for maintaining and cleaning of streets and alleys.
Boston.....	1896	95c	\$2.07
Philadelphia.....	1897	46c	1.40
St. Louis.....	1896	28c	1.10
Buffalo.....	1896	40c	.92

STREET AND ALLEY IMPROVEMENT.

In addition to attending to the work under construction, seven lettings were prepared and advertised, making 104 contracts, amounting to \$865,309.43. Twelve surveys for the opening and widening of streets and alleys were made, and 573 preliminary estimates were returned to the Bureau of Special Assessments.

Of the 36.18 miles of pavement laid during 1898, 52.3 per cent. was cedar block, 23.4 per cent. was asphalt, 1.7 per cent. was granite, 18 per cent. was macadam, 4.7 per cent. was brick. During the past five years the percentage of cedar block and macadam pavements of the total mileage has been decreasing; that of granite has remained about the same, while that of asphalt and brick are two and one-half and eleven times as great, respectively, as in 1894.

An important advance has been made in the method of street improvements by the abandoning of the old specifications in use for the past twenty years and the substituting of forms demanding a much higher grade of workmanship, material and finish.

Under the old system, granite blocks were set on a foundation of crushed stone, and brick and asphalt upon a shallow layer of natural hydraulic cement concrete.

With crushed stone, it is impossible to secure a true and uniform surface and, in consequence, water and filth collect in the depressions. Granite block formerly laid had joints ranging from three-quarters of an inch to one and one-half inches, which, taken together with the irregular surface, resulted in a pavement which was noisy, rough and difficult of cleaning. The granite blocks as specified now, are dressed so as to lay joints less than three-eighths of an inch, have smooth tops and, being set upon Portland

cement foundations carefully placed, give a smooth pavement capable of sustaining the heaviest City traffic. It is not an exaggeration to state that the new specifications result in a granite pavement which is but one-fourth as noisy as the old, cleaned with one-fourth the effort, four times as smooth, twice as durable, and all with an increased cost of but 50 cents per square yard.

Although rough and noisy granite block has been the only durable pavement for the business district, with these defects practically obviated, it is expected that the pavement will come into greater use and favor.

For the foundations of asphalt, brick and granite pavements, the best quality of American Portland cement has been specified, in lieu of natural hydraulic cement, because it quickly acquires the strength which the operation of laying the wearing surface requires. This is particularly so with asphalt pavements, in the working operation of which heavy rollers are used at a time when the concrete is in its weakest state, and because an applied load is transmitted directly to the foundations, and not spread over an area of twenty or thirty square inches as in brick or granite pavements. The strength of Portland cement concrete is five times that of natural cement, a sufficient justification for its use.

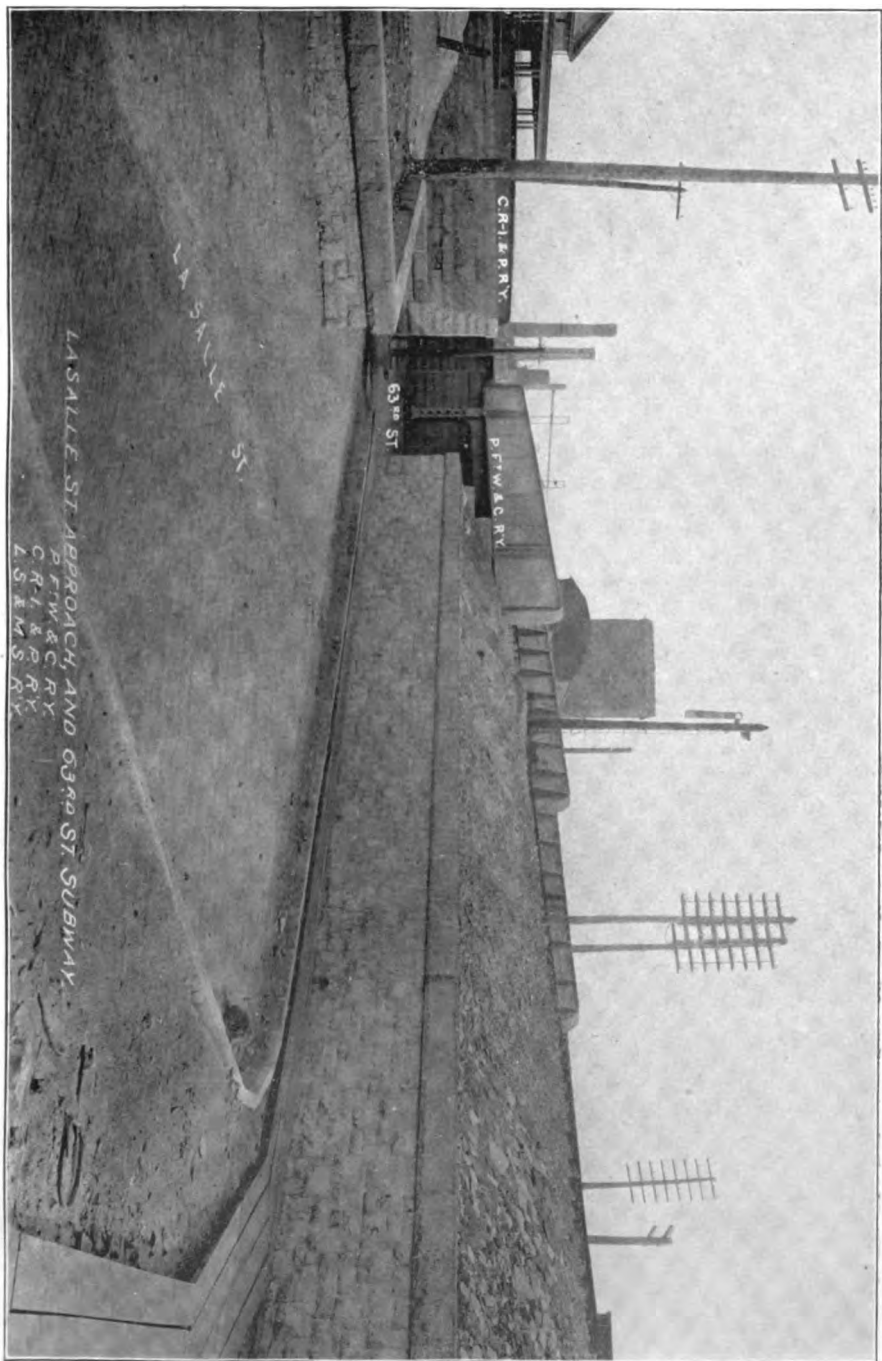
The vitrified brick we have specified are the best obtainable, but, being a manufactured article, unevenness of texture in many of the brick submitted is of frequent occurrence. Rigid inspection and ample guarantee will reduce this annoyance to a minimum. On the streets having light or medium traffic, brick is a very desirable pavement, being easier repaired and, unlike cedar and asphalt, does not decay.

From my experience with cedar block I can deduce evidence and prove to the satisfaction of any sensible person that they should not be used for paving purposes. Soft and pervious to fluids, they soon wear to a rough surface and rapidly become impregnated with animal matter and are a constant menace to health.

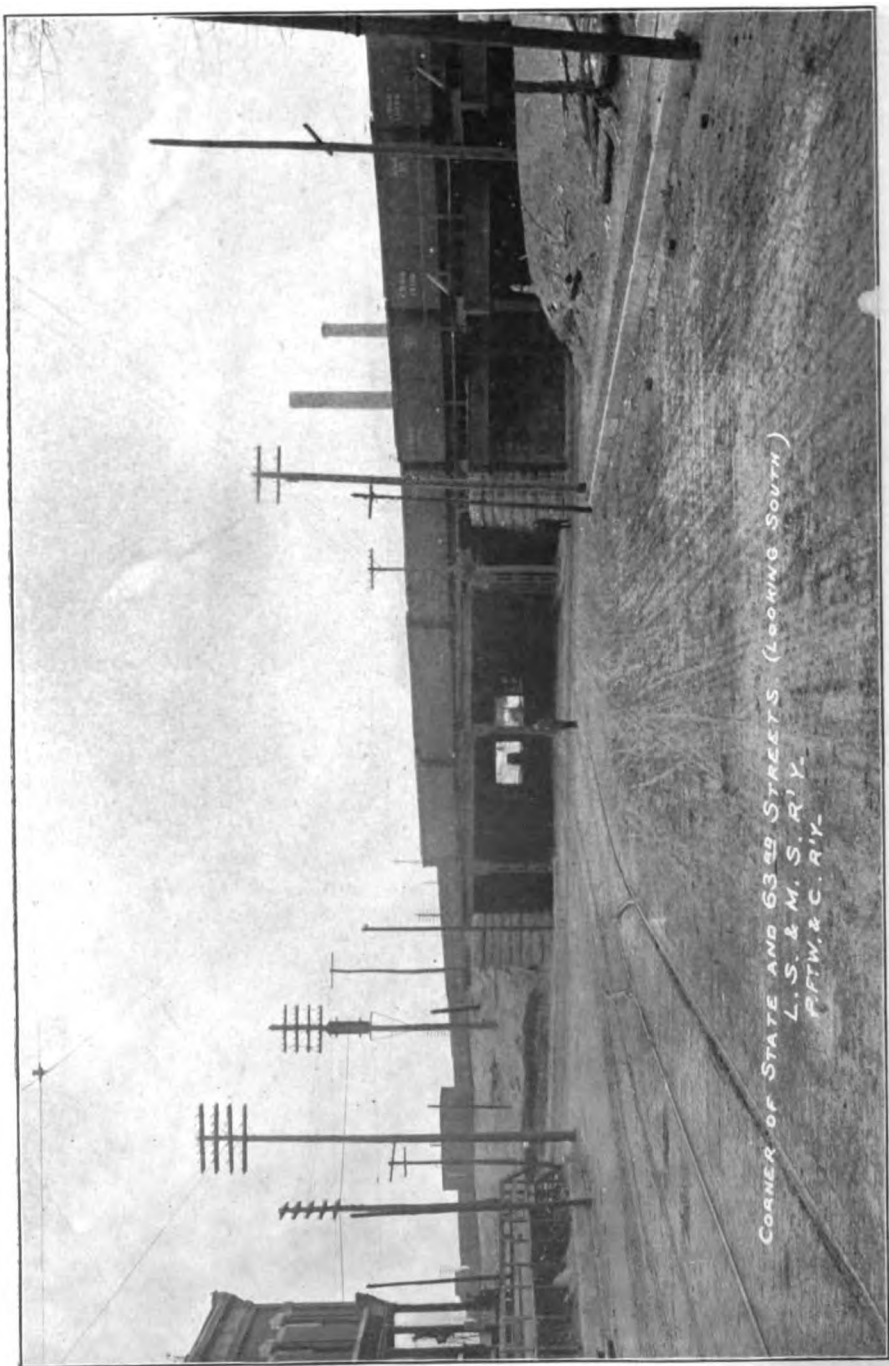
In addition to the above, they are short-lived and are a general nuisance throughout their existence, and the only excuse for their use is the cheap first cost.

The macadam pavement specified is the best we know how to build, but must be systematically cared for, otherwise it soon becomes a nuisance. It is a waste of money to build such pavements except in the best suburban territory where they will receive proper attention and sprinkling.

Among the most important improvements during the year are the asphalt pavements of Thirty-fifth street from Michigan boulevard to South Park avenue, State street from Kinzie street to Division street, also Wells street from Illinois street to Division street; the brick pavement on Dearborn street from Jackson boulevard to Polk street and the special granite



LA SALLE AND 63RD STREET.



CORNER OF STATE AND 63RD STREETS. (LOOKING SOUTH)
L. S. & M. S. R. Y.
F. F. W. & C. R. Y.

STATE AND 63RD STREETS.

block pavement laid on Michigan street from Rush street to St. Clair street.

A survey has been made in a direct line for opening Ogden avenue from its present terminus at Union park to Lincoln park, a distance of two and one-half miles through a well built up part of the City. As a basis for this survey, a carefully measured traversed line was run over the entire distance, using instruments of precision obtained especially for this survey. This base line followed the street in a broken course, crossing the line of the proposed opening as often as convenient. From this base line were located all the blocks, lots and buildings in a strip a quarter of a mile wide, to allow for shifting of the final location of the opening so as to avoid large factories, office buildings, school houses and other expensive structures. Triangulation was resorted to wherever possible, as in the "Goose Island" district. While the survey and estimate have not yet been completed, it is roughly estimated that the opening and improving will cost about \$3,000,000.00.

Although an expensive undertaking, there is no doubt that the proposed street would be a great convenience and benefit to the citizens of the North and West sides.

ALLEYS IMPROVED

NAME	FROM	TO	Commenced
*Alleys, all	Lake to Fulton	Jefferson and Desplaines	Oct. 28, 1898
Alley	Kinzie to Austin avenue	Union and Halsted	Sept. 19, 1898
Alley	Wood to Lincoln	Rice and Chicago ave..	May 28, 1898
Alley	Congress to Harrison...	First west of Sacramento avenue..	Sept. 1, 1898
Alleys, all	Flournoy to Polk	Western ave. and Campbell ave ..	Aug. 1, 1898
*Alley	Gladys avenue to Van Buren	First west of Rockwell.	May 20, 1898
Alleys, all	Webster avenue to Garfield avenue.	Osgood and Sheffield av.	May 9, 1898
Alley	Bissell to Willow	Dayton and Fremont...	May 16, 1898
Alley	Webster avenue to Garfield avenue.	Racine ave. and Lewis..	May 18, 1898
Alley	Wrightwood ave. to Diversey ave..	Pine Grove ave. and Hampden et..	Aug. 11, 1898
*Alley	Florimond to Eugenie..	North Park av. and Crilly	.....
Alley	Franklin to Orleans	Michigan and Kinzie...	.....
Alley	Oakwood boul. to 39th.	Lake ave. and Ellis ave.	April 1, 1898
*Alley	Halsted to Green	55th and 56th	July 15, 1898

* Private Contract.

STREETS IMPROVED

NAME	FROM	TO	Commenced
*Abbott court	300 ft. N. of Diversey av.	North Terminus .....	.....
Ada	Forty-seventh	Forty-ninth	July 7, 1898
Ada	Fifty-ninth	Sixty-third	June 20, 1898
Albany avenue	Chicago avenue	Ohio .....	.....
Ashland avenue	Twenty-second	South Branch River	June 1, 1897
Avers avenue	Twenty-second	C, B. & Q. R. R.	June 1, 1898
Ballou	Armitage avenue	McLean avenue	June 1, 1898
*Beach court	Irving Park avenue	South Terminus .....	.....
Berenice avenue	Lincoln avenue	W. Ravenswood Park...	Aug. 11, 1898
Bishop	Sixty-third	Sixty-fifth	Aug. 18, 1898
Bonney avenue	Douglas boulevard	Ogden avenue	Aug. 1, 1894
Broom	Grand avenue	Ohio	Aug. 1, 1898
Brost avenue	Evanston avenue	Southport avenue	Oct. 14, 1898
*Canal, E. $\frac{1}{2}$	Harrison	Polk	Aug. 25, 1898
*Canal, E. $\frac{1}{2}$	Judd	Wilson	Oct. 26, 1898
*Carroll avenue	Robey	Hoynes avenue	Oct. 31, 1898
Carroll avenue	Fortieth avenue	Forty-sixth avenue	July 14, 1898
*Cass	Kinzie	100 feet north .....	.....
*Castlewood terrace.	Sheridan road	Lake Michigan .....	.....
Catalpa court	Edgewood avenue	Humboldt boulevard...	June 15, 1898
Central Park ave.	Armitage avenue	McLean avenue	June 1, 1898
Clark	Division	North avenue .....	.....
Clifton Park ave.	Douglas boulevard	Ogden avenue	June 30, 1897
*Clinton, W. $\frac{1}{2}$	Van Buren	Alley south of Congress	July 10, 1898
*Clinton, W. $\frac{1}{2}$	Madison	Washington	Nov. 27, 1898
Cornelia	Western avenue	Rockwell	June 21, 1898
Cornelia	Rockwell	Washtenaw avenue	July 1, 1898
Cortez	Western avenue	California avenue	June 21, 1898
Craft	Aldine	Belmont avenue	May 13, 1898
Crescent place	Halsted	Evanston avenue	April 16, 1898
Dearborn	Jackson	Polk	June 28, 1898
Diversey avenue	Milwaukee avenue	Fortieth avenue	July 14, 1898
E. Ravenswood Park	Lawrence avenue	Atnalle	Aug. 11, 1898
Eighteenth	Western avenue	California avenue	Dec. 1, 1897
Evans avenue	Sixty-seventh	Sixty-ninth	July 27, 1898

* Private Contract.

DURING 1898.

Finished	Contractor.	Nature of Improvement.	Square Yards.	Lineal Feet.
Nov. 23, 1898	Gaffney & Long.....	Granite	1,000	486
Sept. 22, 1898	Sackley & Peterson.....	Cedar.....	661	340
June 6, 1898	Smith, Moss & Brown.....	Cedar.....	1,018	611
Oct. 28, 1898	Henry Rath.....	Cedar.....	660	330
Oct. 18, 1898	Henry Rath.....	Cedar.....	2,546	1,570
June 20, 1898	Smith, Moss & Brown.....	Brick.....	341	256
May 14, 1898	Smith, Moss & Brown.....	Cedar.....	1,225	721
June 10, 1898	Smith, Moss & Brown.....	Cedar.....	822	428
June 7, 1898	Henry Rath.....	Cedar.....	921	609
Aug. 20, 1898	C. M. Netterstrom.....	Cedar.....	1,222	783
.....	Barber Asphalt Paving Co.	Asphalt.....	350	210
.....	Henry Rath.....	Granite	600	320
April 21, 1898	R. F. Conway Company.....	Cedar.....	360	235
July 25, 1898	Thomas Byrnes.....	Cedar.....	470	262

DURING 1898.

Finished	Contractor.	Nature of Improvement.	Square Yards.	Lineal Feet.
.....	R. F. Conway Company...	Macadam.....	880	270
Sept. 1, 1898	Naugle, Holcomb & Co....	Cedar.....	5,601	1,327
Oct. 30, 1898	M. J. LaBounty & Co.....	Macadam.....	9,296	2,790
.....	J. B. Smith.....	Curb and fill.....	.....	1,320
June 21, 1898	Sackley & Peterson.....	Cedar.....	12,231	2,502
Sept. 8, 1898	R. F. Conway Company...	Cedar.....	2,350	705
Sept. 29, 1898	R. F. Conway.....	Cedar.....	1,200	350
.....	C. M. Netterstrom.....	Macadam.....	1,080	360
Sept. 28, 1898	Assyrian Asphalt Company	Asphalt.....	2,052	739
Oct. 15, 1898	R. F. Conway Company...	Cedar.....	4,412	1,324
Aug. 10, 1898	Bermudez Asph. Paving Co.	Asphalt.....	4,400	1,300
Sept. 30, 1898	Henry Rath.....	Cedar.....	1,481	476
Nov. 23, 1898	R. F. Conway Company...	Cedar.....	5,496	1,302
Sept. 25, 1898	Sackley & Peterson.....	Brick.....	1,701	957
Nov. 18, 1898	Gaffney & Long.....	Granite	640	364
Nov. 30, 1898	Bermudez Asph. Paving Co.	Asphalt.....	2,290	615
Sept. 30, 1898	Standard Paving Company	Asphalt.....	12,818	4,271
.....	James Conlan.....	Granite	425	100
.....	Dolese Bros.....	Macadam.....	3,000	1,000
Aug. 17, 1898	Jas. Lyman & Co.....	Macadam.....	5,271	1,355
Sept. 29, 1898	R. F. Conway.....	Cedar.....	1,500	350
.....	Barber Asphalt Paving Co.	Asphalt.....	10,161	2,840
Aug. 23, 1898	Bermudez Asph. Paving Co.	Asphalt.....	8,471	2,824
Aug. 9, 1898	Western Electric Co.....	Brick.....	1,200	670
Dec. 8, 1898	Dillon & Conlan.....	Granite	750	400
July 7, 1898	R. F. Conway Company...	Asphalt.....	4,074	1,358
Oct. 5, 1898	R. F. Conway.....	Macadam.....	2,365	608
July 26, 1898	R. F. Conway Company...	Asphalt.....	8,417	2,806
June 17, 1898	John C. O'Connell.....	Macadam.....	1,741	690
June 11, 1898	R. F. Conway.....	Macadam.....	2,498	609
Aug. 19, 1898	Dillon & Conlan.....	Brick.....	7,118	1,987
Oct. 12, 1898	Sackley & Peterson.....	Cedar.....	18,126	4,290
Oct. 8, 1898	James Lyman & Co.....	Macadam.....	3,488	981
Aug. 19, 1898	R. F. Conway.....	Cedar.....	10,162	2,640
Nov. 16, 1898	M. J. LaBounty & Co.....	Cedar.....	4,530	1,365

STREETS IMPROVED

NAME	FROM	TO	Commenced
Evanston avenue.	Lawrence avenue.....	Foster avenue.....	May 3, 1898
Forty-first avenue	Madison.....	Van Buren.....	June 1, 1898
Forty-first avenue	Van Buren.....	Harrison.....	Sept. 15, 1898
Forty-second ave.	Twenty-sixth.....	Twenty-seventh.....	June 10, 1898
Forty-second pl..	Princeton avenue.....	Stewart avenue.....	July 1, 1898
Forty-fourth ave.	North avenue.....	Armitage avenue.....	Sept. 6, 1898
Forty-sixth.....	Greenwood avenue.....	Woodlawn avenue.....	June 18, 1898
*Forty-eighth ave.	Lake.....	Chicago avenue.....	.....
Forty-ninth.....	State.....	Michigan avenue.....	Sept. 22, 1898
*Fifty-second (E. 1-2) ave.	Madison.....	Fulton.....	.....
Greenleaf avenue.	Western avenue.....	Alley west of Ridge ave.	June 2, 1898
Hamlin avenue..	Armitage avenue.....	McLean avenue.....	June 1, 1898
Hancock.....	Armitage avenue.....	McLean avenue.....	June 1, 1898
Harvard avenue..	Sixty-third.....	Sixty-sixth.....	Sept. 16, 1898
Harvard.....	Douglas boulevard	Fortieth avenue.....	June 1, 1898
Harvard.....	Fortieth avenue.....	Forty-second avenue..	May 10, 1898
Hermitage ave...	Armitage avenue.....	Paulina.....	June 18, 1898
Hermitage ave...	Forty-seventh.....	Fifty-first.....	Oct. 1, 1897
Herndon.....	Belmont avenue.....	Roscoe.....	Mar. 30, 1898
*Hoyne (E. ½) ave.	Fulton.....	Kinzie.....	Oct. 31, 1898
*Jefferson.....	Lake.....	Fulton.....	.....
Justine.....	Sixty-third.....	Sixty-fifth.....	Aug. 18, 1898
*Kennesaw terrace	Halsted.....	400 feet east.....	.....
Kimball avenue..	Wrightwood avenue...	Diversey avenue.....	May 5, 1898
Kimball (Homan) av.	Armitage avenue.....	McLean avenue.....	June 1, 1898
Lafin.....	Sixty-third.....	Sixty-fifth.....	Aug. 18, 1898
*Langdon.....	Uhland.....	Clybourn avenue.....	June 20, 1898
Langley avenue..	Sixty-seventh.....	Sixty-ninth.....	July 27, 1898
Lawndale avenue	Armitage avenue.....	McLean avenue.....	June 1, 1898
Leavitt.....	Chicago avenue.....	Division.....	Sept. 16, 1897
Loomis.....	Sixty-third.....	Sixty-fifth.....	Aug. 18, 1898
McLean avenue..	Kimball avenue.....	Hamlin avenue.....	June 1, 1898
Marvin (24th pl.)	Oakley avenue.....	Western avenue.....	May 1, 1898
*Michigan.....	Rush.....	St. Clair.....	.....
Monroe avenue..	Fifty-third.....	Fifty-fifth.....	Aug. 30, 1898
Morgan.....	Thirty-first.....	Thirty-ninth.....	April 1, 1898
Morgan.....	Van Buren.....	Twelfth.....	Aug. 15, 1898
Noble avenue....	Ashland avenue.....	Wood.....	July 18, 1898
Oak.....	Larrabee.....	Wells.....	Aug. 11, 1898
*Oakwood avenue.	Lake avenue.....	I. C. R. R.....	Sept. 15, 1898
120th.....	Halsted.....	Clinton.....	June 2, 1898
Otto.....	Robey.....	C. & N. W. R. R.....	Aug. 23, 1898
Paulina.....	Forty-seventh.....	Fifty-first.....	June 7, 1898
Perry.....	Devon avenue.....	Pratt avenue.....	.....
Phillips.....	Sangamon.....	Green.....	Aug. 1, 1898
Racine avenue..	Roscoe.....	Addison.....	.....
Ridge avenue....	Evanston avenue.....	Southport avenue.....	.....
Rockwell.....	Chicago avenue.....	Augusta.....	Aug. 15, 1898
*St. Clair.....	Michigan.....	Illinois.....	.....
Sangamon.....	Lake.....	Van Buren.....	Aug. 1, 1898
*Sheldon.....	Lake.....	Randolph.....	Oct. 29, 1898
Sixty-fourth.....	Stewart avenue.....	Wentworth avenue.....	Sept. 16, 1898
Sixty-fourth.....	Ashland avenue.....	Loomis.....	Aug. 18, 1898
Sixty-fifth.....	Ashland avenue.....	Loomis.....	Aug. 18, 1898
Sixty-fifth.....	Stewart avenue.....	Wentworth avenue.....	Sept. 16, 1898
Sixty-sixth.....	Stewart avenue.....	Wentworth avenue.....	Sept. 16, 1898
Sixty-seventh....	Stewart avenue.....	Wentworth avenue.....	Sept. 16, 1898

* Private Contract.

DURING 1898—CONTINUED.

Finished	Contractor.	Nature of Improvement.	Square Yards.	Lineal Feet
Aug. 29, 1898	Dolese Bros.....	Brick.....	13,612	2,829
July 25, 1898	Smith, Moss & Brown..*	Cedar.....	5,676	1,675
Unfinished..	R. F. Conway Company...	Curbed.....		600
June 26, 1898	William Carden.....	Cedar.....	2,764	700
Sept. 18, 1898	R. F. Conway Company...	Cedar.....	2,571	610
Oct. 30, 1898	Smith, Moss & Brown.....	Cedar.....	11,910	2,818
Aug. 20, 1898	James Bairstow & Bro....	Macadam.....	2,328	655
.....	Cicero & Proviao Ry. Co...	Cedar.....	9,000	3,000
Oct. 22, 1898	Naugle, Holcomb & Co....	Cedar.....	3,132	740
.....	Cicero & Proviao Ry. Co...	Cedar.....	2,800	2,100
Aug. 23, 1898	Henry Rath.....	Slag Macadam..	6,926	1,988
Sept. 29, 1898	R. F. Conway.....	Cedar.....	1,500	350
Sept. 29, 1898	R. F. Conway.....	Cedar.....	1,200	350
Dec. 15, 1898	James Lyman & Co.....	Macadam.....	6,000	1,800
Sept. 9, 1898	R. F. Conway Company...	Asphalt.....	4,134	1,378
Aug. 20, 1898	Standard Paving Company	Asphalt.....	4,101	1,367
Aug. 18, 1898	Smith, Moss & Brown.....	Cedar.....	1,569	471
June 11, 1898	Naugle, Holcomb & Co....	Cedar.....	11,067	2,727
May 31, 1898	R. F. Conway.....	Cedar.....	4,587	1,086
Nov. 30, 1898	Bermudez Asph. Paving Co.	Asphalt.....	1,120	526
.....	Bermudez Asph. Paving Co.	Granite.....	2,050	880
Oct. 15, 1898	R. F. Conway Company...	Cedar.....	4,412	1,324
.....	James Bairstow & Bro....	Macadam.....	1,200	400
Aug. 15, 1898	John C. O'Connell.....	Macadam.....	4,847	1,454
Sept. 29, 1898	R. F. Conway.....	Cedar.....	1,200	350
Oct. 15, 1898	R. F. Conway.....	Cedar.....	4,412	1,324
Aug. 2, 1898	Henry Rath.....	Cedar.....	762	286
Nov. 16, 1898	M. J. LaBounty & Co.....	Cedar.....	4,530	1,365
Sept. 29, 1898	R. F. Conway.....	Cedar.....	1,500	350
May 21, 1898	R. F. Conway.....	Cedar.....	11,708	2,774
Oct. 15, 1898	R. F. Conway Company...	Cedar.....	4,412	1,324
Sept. 29, 1898	R. F. Conway.....	Cedar.....	10,653	2,523
Aug. 16, 1898	R. F. Conway Company...	Cedar.....	2,699	639
.....	Gaffney & Long.....	Granite.....	3,527	690
Nov. 18, 1898	Assyrian Asphalt Company	Asphalt.....	4,110	1,610
June 1, 1898	Smith, Moss & Brown.....	Cedar.....	13,080	5,300
Nov. 19, 1898	Thatcher & Burke.....	Cedar.....	14,656	3,471
Sept. 13, 1898	Naugle, Holcomb & Co....	Cedar.....	5,809	1,376
Oct. 1, 1898	Thatcher & Burke.....	Cedar.....	10,893	2,628
Sept. 30, 1898	Dolese Bros.....	Macadam.....	1,320	270
Aug. 6, 1898	Gaffney & Long.....	Macadam.....	8,826	3,923
Oct. 24, 1898	E. J. Wetterstrom.....	Cedar.....	4,661	1,311
Aug. 11, 1898	R. F. Conway Company...	Cedar.....	11,040	2,615
Unfinished..	Gaffney & Long.....	Macadam.....	9,200	2,760
Aug. 31, 1898	Naugle, Holcomb & Co....	Cedar.....	1,140	513
Unfinished..	C. M. Netterstrom.....	Cedar.....	5,600	1,330
Unfinished..	C. M. Netterstrom.....	Macadam.....	7,200	1,600
Oct. 16, 1898	Henry Rath.....	Cedar.....	4,742	1,581
.....	Gaffney & Long.....	Brick.....	1,013	240
Nov. 9, 1898	William Carden.....	Cedar.....	9,088	3,407
Nov. 15, 1898	Barber Asphalt Paving Co.	Asphalt.....	1,366	420
Dec. 15, 1898	James Lyman & Co.....	Macadam.....	4,350	1,305
Oct. 15, 1898	R. F. Conway Company...	Cedar.....	4,412	1,324
Oct. 15, 1898	R. F. Conway Company...	Cedar.....	4,412	1,324
Dec. 15, 1898	James Lyman & Co.....	Macadam.....	4,350	1,305
Dec. 15, 1898	James Lyman & Co.....	Macadam.....	4,350	1,305
Dec. 15, 1898	James Lyman & Co.....	Macadam.....	4,350	1,305

STREETS IMPROVED

NAME.	FROM	TO	Commenced.
Sixty-ninth	Cottage Grove avenue..	South Chicago avenue..	July 27, 1898
Spaulding avenue..	Madison	Jackson boulevard.....	July 10, 1898
Spaulding avenue..	Twenty-fourth.....	Twenty-sixth	July 15, 1898
State	Kinzie	Division .....	.....
*Stewart avenue..	Fifty-fifth	Fifty-seventh.....	Aug. 1, 1898
*Stewart avenue..	Fifty-seventh.....	Fifty-ninth.....	Aug. 1, 1898
*Stewart avenue..	Fifty-ninth.....	Sixty-first.....	Aug. 1, 1898
Throop.....	Archer avenue	Thirty-first.....	April 1, 1898
*Throop.....	Twenty-second	South branch of river..	Aug. 9, 1898
Troy	Kinzie	Ohio.....	July 1, 1898
Troy.....	Ohio.....	Chicago avenue.....	Aug. 15, 1898
Twelfth	Forty-fourth avenue...	Forty-sixth avenue....	May 1, 1897
Twenty-first.....	Western avenue.....	Pan Handle R. R.....	Aug. 15, 1898
*Twenty-third pl..	Washtenaw avenue....	California avenue.....	Oct. 14, 1898
Twenty-sixth	Fortieth avenue.....	Forty-second avenue....	June 10, 1897
Twenty-ninth	State	Lake Park avenue.....	Sept. 21, 1898
*Thirty-third.....	Michigan avenue.....	Armour avenue.....	Aug. 1, 1898
*Thirty-fourth.....	Cottage Grove avenue..	Rhodes avenue.....	Oct. 14, 1898
*Thirty-fifth.....	Michigan avenue.....	South Park avenue....	Aug. 1, 1898
Thirty-seventh...	Cottage Grove avenue..	Ellis avenue.....	May 27, 1898
Thirty-seventh...	Halsted.....	Morgan	July 1, 1898
Union	Erie	Austin avenue.....	.....
Van Buren.....	Canal	South branch of river..	June 15, 1898
Wabansia avenue..	Kedzie avenue.....	Central Park avenue...	July 26, 1898
Ward	Addison	Waveland avenue.....	Aug. 17, 1898
*Wellington.....	Perry	Ashland avenue.....	.....
Wells.....	Illinois	Chicago avenue.....	June 6, 1898
Wells.....	Chicago avenue.....	Division	June 17, 1898
Western avenue..	Madison	Harrison.....	July 20, 1898
Wilcox avenue...	Western avenue.....	Rockwell.....	Aug. 15, 1898
Wood.....	Forty-seventh.....	Fifty-first.....	April 7, 1898
Wrightwood ave..	Logan Square.....	Kimball avenue.....	July 1, 1898
Wrightwood ave..	Hamlin avenue.....	Central Park avenue...	Oct. 15, 1898
Yale avenue.....	Sixty third.....	Sixty-seventh.....	Sept. 16, 1898

*Private Contract.

DURING 1898—CONTINUED.

Finished	Contractor.	Nature of Improvement.	Square Yards.	Lineal Feet.
Nov. 16, 1898	M. J. LaBounty & Co.....	Cedar.....	5,280	1,250
Sept. 6, 1898	William Carden.....	Cedar.....	3,062	1,102
Sept. 6, 1898	R. F. Conway Co.....	Cedar.....	5,902	1,398
Unfinished..	Barber Asphalt Paving Co.	Asphalt.....	8,200	3,900
Aug. 30, 1898	Chicago Ballast Co.....	Cedar.....	3,620	1,400
Aug. 30, 1898	Chicago Ballast Co.....	Brick.....	3,400	1,200
Aug. 30, 1898	Chicago Ballast Co.....	Cedar.....	3,620	1,400
April 15, 1898	R. F. Conway.....	Cedar.....	6,961	2,380
Aug. 29, 1898	Smith, Moss & Brown.....	Cedar.....	3,285	1,612
July 28, 1898	Sackley & Peterson.....	Macadam.....	3,442	1,033
Sept. 6, 1898	Standard Paving Co.....	Asphalt.....	3,720	1,240
July 27, 1898	R. F. Conway.....	Cedar.....	3,816	1,320
Sept. 30, 1898	Sackley & Peterson.....	Cedar.....	1,965	553
Nov. 1, 1898	Sackley & Peterson.....	Curb and fill.....	.....	600
June 26, 1898	William Carden.....	Cedar.....	4,000	1,500
Nov. 8, 1898	R. F. Conway Co.....	Asphalt.....	14,291	3,672
Oct. 6, 1898	Barber Asphalt Paving Co.	Asphalt.....	6 556	1,725
Oct. 29, 1898	Barber Asphalt Paving Co.	Asphalt.....	2,592	780
Sept. 1, 1898	Western Paving & Sup. Co.	Asphalt.....	9,461	1,980
June 3, 1898	Assyrian Asphalt Co.....	Asphalt.....	1,311	310
Nov. 15, 1898	R. F. Conway Co.....	Cedar.....	5,731	1,360
Unfinished..	Henry Rath.....	Brick.....	4,500	820
Aug. 9, 1898	Dillon & Conlan.....	Granite.....	1,342	549
Unfinished..	Henry Rath.....	Cedar.....	6,750	2,025
Sept. 24, 1898	Henry Rath.....	Cedar.....	2,602	616
.....	Jas. Bairstow & Bro.....	Macadam.....	2,530	600
Aug. 11, 1898	R. F. Conway Co.....	Asphalt.....	8,245	2,290
Aug. 20, 1898	R. F. Conway Co.....	Asphalt.....	10,708	3,000
Nov. 23, 1898	R. F. Conway Co.....	Asphalt.....	7,800	2,800
Nov. 10, 1898	Thatcher & Burke.....	Cedar.....	4,291	1,287
May 28, 1898	Naugle, Holcomb & Co...	Cedar.....	11,070	2,622
July 21, 1898	Sackley & Peterson.....	Macadam.....	3,925	1,178
Dec. 3, 1898	R. F. Conway.....	Macadam.....	5,055	1,516
Dec. 15, 1898	James Lyman & Co.....	Macadam.....	8,000	2,400

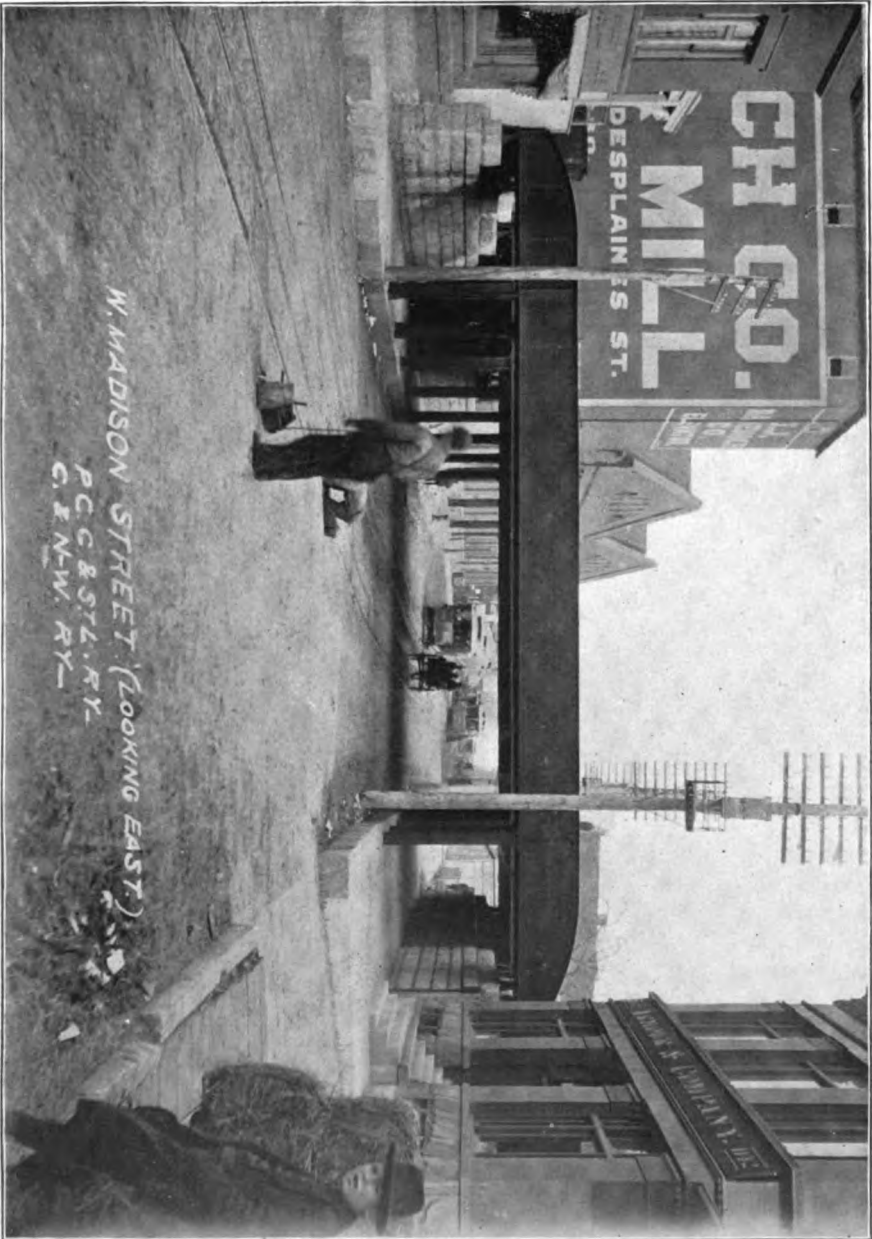
SUMMARY.

Total lineal feet of cedar block pavement in streets.....	93,522 or 17.71 miles
Total lineal feet of asphalt pavement in streets.....	44,751 " 8.48 "
Total lineal feet of macadam pavement in streets.....	34,460 " 6.52 "
Total lineal feet of granite pavement in streets.....	2,483 " 0.47 "
Total lineal feet of brick pavement in streets.....	8,703 " 1.65 "
Total lineal feet of curbing and filling.....	2,520 " 0.48 "
Total lineal feet of cedar block pavement in alleys.....	5,839 " 1.11 "
Total lineal feet of asphalt pavement in alleys.....	210 " 0.04 "
Total lineal feet of granite pavement in alleys.....	806 " 0.15 "
Total lineal feet of brick pavement in alleys.....	256 " 0.05 "

Totals.....1,930,050 or 36.66 miles

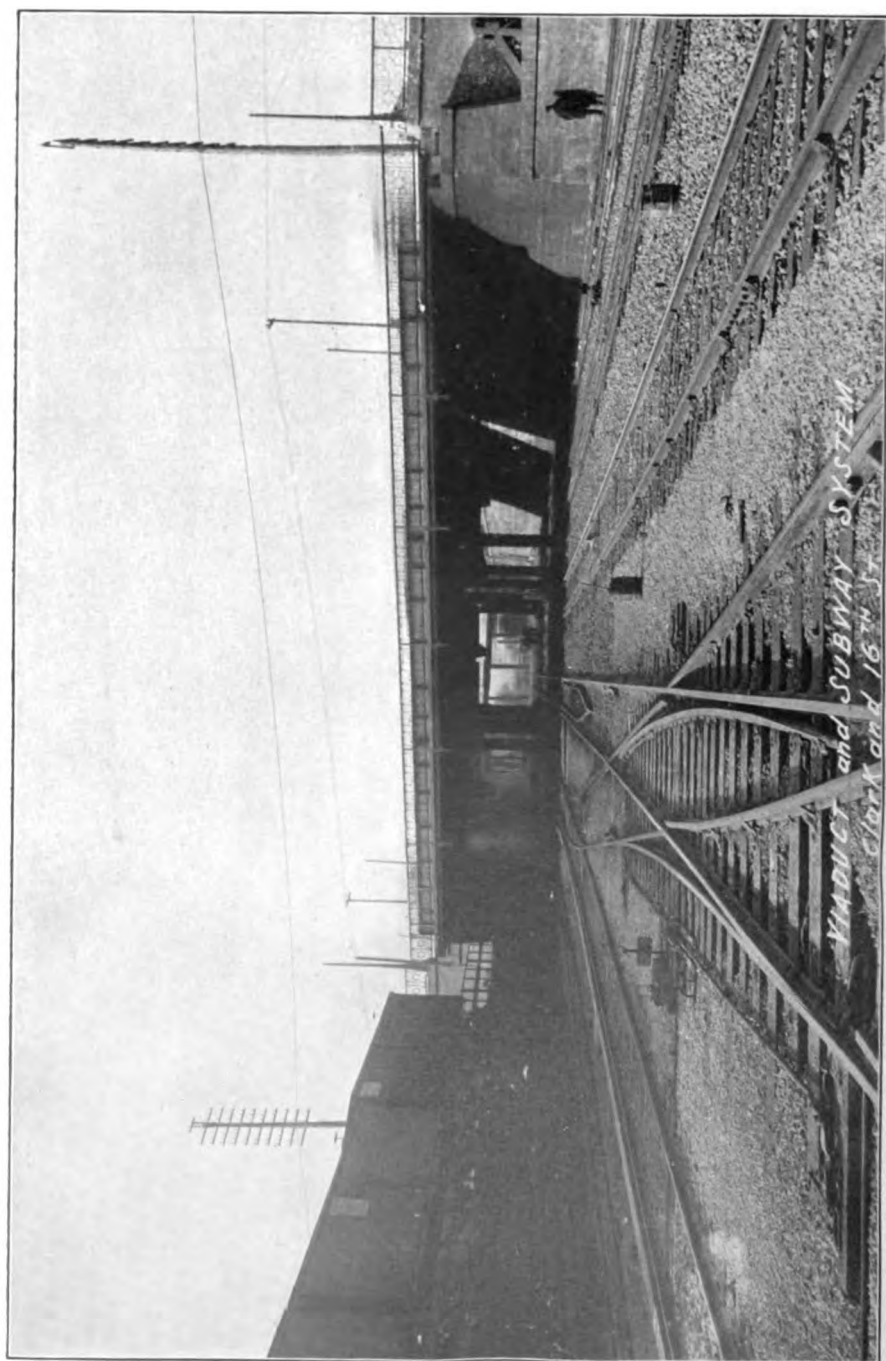
SUMMARY OF STREETS IMPROVED DURING 1898.

PAVEMENT.	NORTH DIVISION, Including Lake View and Rogers Park.			SOUTH DIVISION, Including Hytle Park and Lake.			WEST DIVISION, Including Jefferson and Cicero.			TOTALS.				
	Square Yards.	Lineal Feet.	Miles.	Square Yards.	Lineal Feet.	Miles.	Square Yards.	Lineal Feet.	Miles.	Square Yards.	Lineal Feet.	Miles Streets.	Miles Alleys.	Total.
Cedar.....	44,600	12,426	2.35	119,135	34,902	6.61	178,811	52,033	9.86	342,546	99,361	17.71	1.11	18.82
Asphalt.....	42,716	13,979	2.65	38,321	10,077	1.91	62,706	20,905	3.96	143,713	44,961	8.48	0.04	8.52
Granite.....	36,743	10,258	1.94	53,170	17,053	3.23	24,905	7,144	1.35	114,818	34,460	6.52	.....	6.52
Macadam.....	4,552	1,110	0.21	.....	.....	.....	5,782	2,179	0.41	10,334	3,289	0.47	0.15	0.62
Brick	14,625	3,069	0.59	10,518	3,187	0.60	7,742	2,703	0.51	32,885	8,569	1.65	0.05	1.70
Totals.....	143,236	40,842	7.74	221,144	65,224	12.35	279,946	84,964	16.09	644,326	191,030	84.83	1.35	86.18
Curbed and Filled.....	.....	.....	.....	.....	.....	.....	.....	2,520	0.48	.....	2,520	0.48	.....	0.48
Grand Totals.....	143,236	40,842	7.74	221,144	65,224	12.35	279,946	87,484	16.57	644,326	193,550	85.31	1.85	86.66



W. MADISON STREET (LOOKING EAST.)
P.C. & S.T.L. RY.
C. & N.W. RY.

WEST MADISON AND ROOKWELL STREETS.



CLARK AND 16TH STREETS.

TABLE SHOWING PERCENTAGE OF EACH CLASS OF PAVEMENT.

PAVEMENT.	1898		1897		1896		1895		1894	
	Miles.	Per Cent.	Miles.	Per Cent.	Miles.	Per Cent.	Miles.	Per Cent.	Miles.	Per Cent.
Cedar.....	774.92	62.09	765.43	62.49	752.68	62.59	726.01	64.62	705.07	64.90
Macadam.....	360.10	28.86	357.17	29.17	344.31	29.09	332.14	29.56	324.69	29.89
Medina stone....	2.29	0.18	2.29	0.19	2.43	0.21	2.49	0.22	2.58	0.24
Granite.....	26.31	2.11	25.69	2.10	25.27	2.13	23.31	2.07	22.90	2.11
Sheet asphalt....	63.78	5.12	55.26	4.51	45.94	3.88	30.75	2.74	24.99	2.29
Block asphalt....	2.97	0.23	2.97	0.24	3.05	0.26	3.59	0.32	3.59	0.33
Brick.....	16.50	1.32	14.30	1.21	8.88	0.75	4.17	0.37	1.31	0.12
"Foundation"....	1.08	0.09	1.08	0.09	1.08	0.09	1.08	0.10	1.08	0.10
Burnt clay.....	.....	.....	.....	.....	.....	.....	.....	.....	0.23	0.02
Totals.....	1,247.95	100	1,224.69	100	1,183.64	100	1,123.54	100	1,086.44	100

DISTRIBUTION OF KINDS OF PAVEMENT.

DIVISION.	Cedar.	Macadam.	Medina Stone.	Granite.	Sheet Asphalt.	Block Asphalt.	Brick.	"Foundation."	Totals.
North	160.31	66.99	0.49	1.02	8.97	.....	4.43	1.08	243.29
South.....	218.70	263.33	1.41	20.52	18.80	2.97	7.78	.....	533.51
West	395.91	29.78	0.39	4.77	36.01	.....	4.29	.....	471.15
Totals	774.92	360.10	2.29	26.31	63.78	2.97	16.50	1.08	1,247.95

From 1835 to 1844, the work on the streets consisted of grading only; from 1844 to 1855 improvements were made by planking, after which the more substantial forms of paving came into use—cedar blocks in 1874, asphalt in 1882, and brick in 1891. The following table shows the amount of paving laid each year since the introduction of pavements in 1855:

YEAR.	MILES.	YEAR.	MILES.	YEAR.	MILES.		
					Alleys.	Streets.	Totals.
1855	1.72	1868	5.46	1881	0.13	24.39	24.52
1856	0.26	1869	18.32	1882	0.58	24.87	24.95
1857	2.62	1870	19.96	1883	1.96	20.53	22.49
1858	7.20	1871	25.63	1884	1.60	32.92	34.52
1859	5.70	1872	1.82	1885	1.16	36.90	38.06
1860	....	1873	10.19	1885	1.51	42.15	43.66
1861	0.69	1874	9.07	1886	2.60	34.15	36.75
1862	2.57	1875	11.49	1888	2.19	52.14	54.33
1863	2.00	1876	10.50	1889	.....	.....	*146.54
1864	2.40	1877	12.29	1890	8.78	103.90	107.68
1865	2.03	1878	11.01	1891	8.50	91.22	99.72
1866	8.87	1879	6.83	1892	12.86	104.73	117.59
1867	11.37	1880	16.84	1892	14.26	93.71	107.97
				1893	.....	.....	*6.91
				1894	31.36	106.10	137.46
				1894	16.94	75.01	91.95
				1895	5.27	42.48	47.75
				1896	4.33	78.32	82.65
				1897	4.33	51.66	56.04
				1898	1.35	34.83	36.18
Totals					114.76	1,089.51	1,524.56

* The mileage in heavy type opposite the years 1889 and 1893 gives the total amount of paved streets prior to those years in the annexed territories of Hyde Park, Lake and Lake View, and of Rogers Park and West Ridge, respectively.

Of this amount, 276.61 miles have been repaved during the same period, which reduces the actual amount of paved streets and alleys within the corporate limits on December 31, 1898, to 1,247.95 miles (streets, 1,133.81; alleys, 114.14). To this may be added 1,440.19 miles of unimproved streets and 1,257.86 miles of unimproved alleys, which makes a total of 3,946 miles of streets and alleys in Chicago at this date.

RECAPITULATION.

STREETS.	Streets, Miles.	Alleys, Miles.	Total Miles.
Improved	1,133.81	114.14	1,247.95
Unimproved	1,440.19	1,257.86	2,698.05
Total miles	2,574.00	1,372.00	3,946.00

DIVISION OF PERMITS.

(REPAVING.)

The following shows the number of permits for street openings issued to the various corporations, City Bureaus, etc., with the receipts and expenditures thereof:

ISSUED TO	Number of-	Deposits.	Charges.	Rebates.
Peoples Gas Light and Coke Co..	10,408	.....	.....	.....
Chicago Edison Co	445	.....	.....	.....
Chicago Telephone Co.....	83	.....	.....	.....
Commonwealth Electric Co.....	16	.....	.....	.....
Cosmopolitan Electric Co.....	5	.....	.....	.....
Ogden Gas Co.....	6	.....	.....	.....
Mutual Fuel Gas Co.....	9	.....	.....	.....
Hyde Park Gas Co.....	17	.....	.....	.....
Calumet Gas Co.....	2	.....	.....	.....
Chicago Sectional Underground Co.....	4	.....	.....	.....
Mutual Union Telegraph Co.....	1	.....	.....	.....
Postal Telegraph Co.....	3	.....	.....	.....
Western Union Telegraph Co ..	5	.....	.....	.....
Western Light and Power Co.....	4	.....	.....	.....
Peoples Light and Power Co.....	1	.....	.....	.....
Water Pipe Extension Division	1,276	.....	.....	.....
Water Assessors Division .....		.....	.....	.....
Bureau of Sewers .....		.....	.....	.....
Dep't Electricity.....		.....	.....	.....
Dep't City Telegraph.....	2,195	.....	.....	.....
Individual Opening		\$16,688.00	\$4,748.40	\$8,902.27
Permit for the use of Streets....	492	18,717.00	1,579.75	8,971.75
Miscellaneous Permits.....	3,292	.....	.....	.....
Unimproved, Corporations	1,432	.....	.....	.....
Unimproved, Individuals	2,394	.....	.....	.....
Street Privileges.....	1,882	8,069.25	8,069.25	.....
Totals.....	23,862	\$43,469.25	\$14,897.40	\$17,864.02

The Peoples Gas Light and Coke Company, on which no deposit was made for openings, did their own work (under the supervision of the General Corporation Inspectors, whose salaries were charged to them) amounting to 119,647 square yards, divided as follows:

Cedar.....	97,245 square yards.
Macadam.....	16,071 " "
Stone	30 " "
Granite.....	565 " "
Asphalt	533 " "
Brick	112 " "

All other repair work was done under contract by the City and under the supervision of the General Corporation Inspectors, and was charged to the various corporations.

SIDEWALKS.

During the year 1898 there was constructed by the City a grand total of 252.71 miles of sidewalk, divided as follows:

Plank sidewalk	148.49 miles.
Concrete sidewalk	98.88 miles.
Stone sidewalk	5.31 miles.
Concrete walk, constructed by the various Park Boards	2.81 miles.
Total	255.62 miles.

ORDINANCES PASSED DURING THE YEAR WERE AS FOLLOWS:

For plank walk	198 (1 repealed.)
For cement walk	218 (7 repealed.)
For stone walk	4 (1 repealed.)
Total	420 (9 repealed.)

Making a total of 420 ordinances, with 9 repealed.

Under the new law, inspections have been made and estimates prepared for the Board of Local Improvements for the following:

For plank walks	501 streets.
For cement walks	413 streets.
For stone walks	3 streets.
Total	917 streets.

Making a total of 917 estimates prepared during the year.

The number of complaints of defective sidewalks registered, reported on by Inspectors, and for which notices were sent to property owners, was 18,639; 85 per cent. of the number notified complied with the notices and put walks in proper condition.

Four hundred and eighty miles of sidewalk have been inspected and condemned during the year and estimates have been prepared by this Bureau for walks so condemned. Of the above, about 200 miles have been inspected twice, and 100 miles, three times.

The following table shows in detail the amount of sidewalks constructed during the year :

**NUMBER OF MILES OF WOOD, STONE AND CONCRETE SIDEWALKS
BUILT DURING 1898.**

DIVISION.	Wood, Miles.	Stone, Miles.	Concrete, Miles.	Total Miles.	Sidewalks Repaired.	Total Miles.
North	13.25	1.20	27.81	42.26	6.18	48.44
South	72.89	1.82	39.85	114.56	18.06	132.62
West	68.35	2.32	31.22	95.89	21.02	116.91
Total	148.49	5.34	98.88	252.71	45.26	297.97

The following table gives the number of miles of sidewalk under control of the City and the different Park Boards :

UNDER CONTROL OF	MATERIAL.			
	Wood, Miles.	Stone, Miles.	Concrete, Miles.	Total Miles.
City.....	4,200.81	242.14	786.93	5,229.88
South Park Commissioners....	.....	20.00	30.78	50.76
West Park Commissioners ....	.....	11.05	55.60	66.65
Lincoln Park Commissioners ..	.....	2.17	5.79	7.96
	4,200.81	275.36	978.18	5,354.35

The amount of money paid for constructing sidewalks under special assessment was \$24,715.25.

The amount of money to be paid for sidewalks under construction, for which contracts have been let, will be about \$25,000.00.

HOUSE MOVING.

Five hundred and fifty permits to move buildings were granted, of which 484 were for frame; 82 for brick and 1 for stone; the total mileage amounting to 117.19 lineal feet. By divisions of the City, these permits were distributed thus: North, 149; South, 225; West, 193. Two hundred and ninety-six were one story buildings; 263 were two stories in height, and eight were three stories in height.

The total cash receipts were \$1,258.00, a sum totally inadequate to pay the expenses of this Division of the Bureau of Streets. This is not an unusual condition, but has been the result for years past. Permit me again to urge the advisability of an early revision of the City ordinances pertaining to this work, both as to restrictions and to proper fees for clerical expenses and cost of repairs.

HOUSE MOVING, 1898.

MONTHS.	Permits Issued.	MATERIAL.			STORIES HIGH.			DIVISION.				FEES.		Cash Receipts.	REMARKS.
		Frame.	Brick.	Stone.	One.	Two.	Three.	Frontage Lineal Feet.	North.	South.	West.	\$1.00	\$5.00		
January	20	17	2	1	10	9	1	441	5	10	5	12	8	\$ 52.00	Permit 15,766 void, spolled.
February	22	17	5	..	15	7	..	434	7	9	6	16	6	46.00	Permit 15,792, eight houses.
March	80	75	12	..	53	33	1	1,672	25	36	26	61	22	171.00	Permit 15,923 void.
April	92	78	14	..	51	40	1	1,858	26	29	87	72	20	172.00	Permit 16,000 void.
May	71	64	7	..	30	41	..	1,440½	21	22	28	50	21	155.00	Permit 16,065, two buildings
June	43	40	4	..	18	26	..	942	8	21	15	29	15	104.00	
July	38	32	6	..	24	13	1	761	15	13	10	26	12	86.00	
August	47	44	12	..	26	29	1	1,296	6	30	20	30	25	155.00	Permit 16,121 void 16,138, 3 buildings, 16,139, 8 buildings.
September	49	41	8	..	31	17	1	1,026	8	23	18	35	14	105.00	
October	39	32	7	..	20	17	2	823	14	9	16	24	15	99.00	Permit 16,245 void.
November	33	28	5	..	14	19	..	696	10	15	8	22	11	77.00	
December	16	16	0	..	4	12	..	330	4	8	4	11	5	86.00	Permit 16,237 held for back water tax.
Total	550	494	82	1	296	263	8	11,719	149	225	193	388	174	1,258.00	

LUMBER.

The following construction and repair work was done by City employes under the direction of the Ward Superintendents. The statement also shows the quantities of new and old lumber and other material required in such construction and repair:

	Built New.	Repaired.	New Lumber.	Old Lumber.
Aprons	142	321	15,902	6,560
Crossings	489	419	84,888	11,187
Culverts	191	457	78,780	15,912
Drain boxes	60	66	10,904	1,536
Steps and rails	76	180	8,154	3,499
General repairs	...	...	69,890	12,258
Total lumber	...	...	268,518	50,897

SIDEWALKS.

	New.	Repaired.	New Lumber.	Old Lumber.
Intersections	167	1,099	77,007	42,498
General repairs .....	...	....	570,937	411,885
Total lumber .....	...	....	647,944	454,333

TOTAL AMOUNT OF REPAVING DONE IN THE CITY DURING 1898.

New cedar	264,757 square yards.
Old cedar	27,092 square yards.
Granite	167,171 square yards.
Macadam	21,508 square yards.
Asphalt	1,100 square yards.
Brick	903 square yards.
Total	482,532 square yards.

UNIMPROVED STREETS.

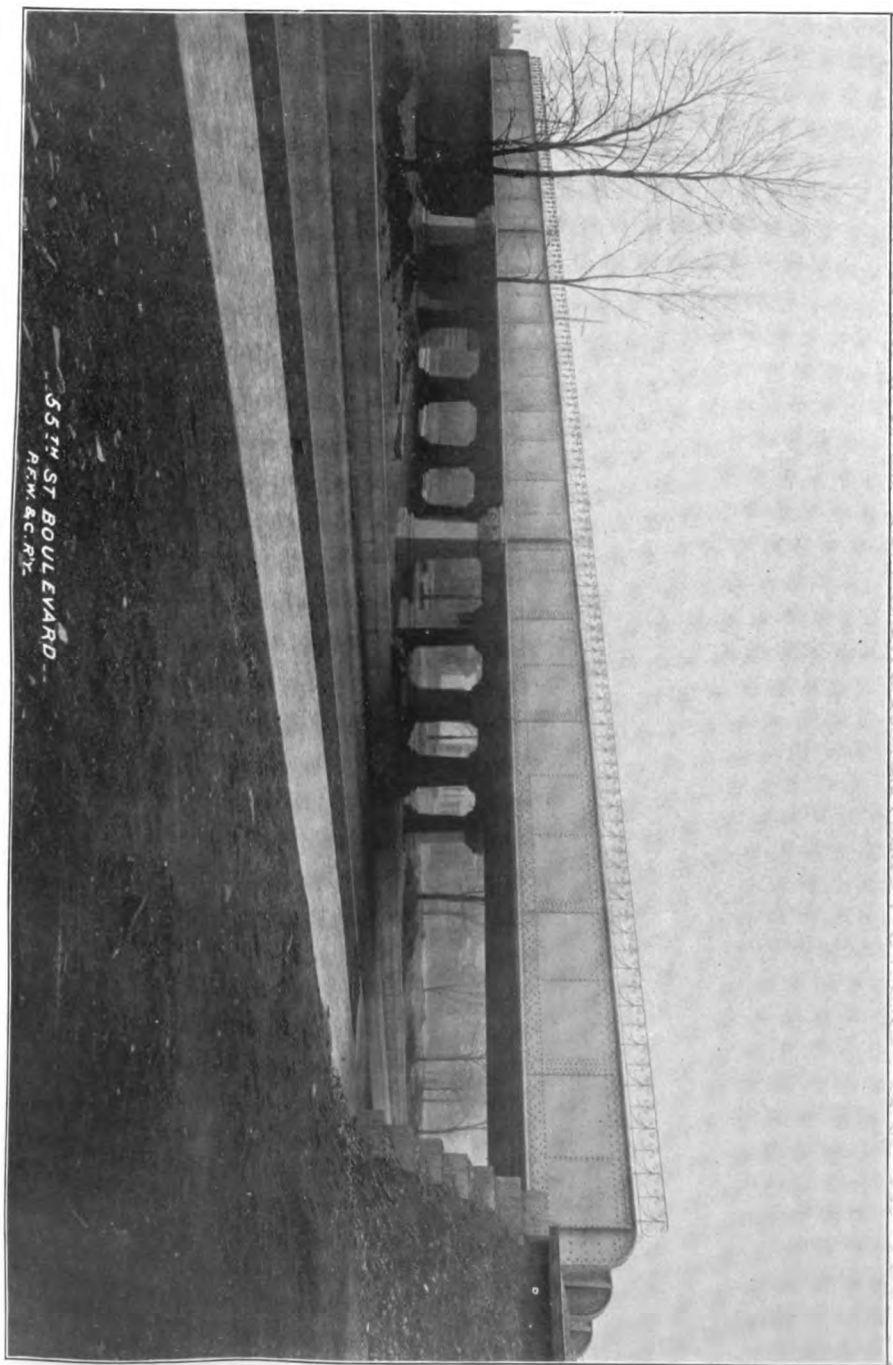
Grading	104.09 miles.
Ditching	83.02 miles.

In conclusion, I desire to thank the Commissioner of Public Works and other officers for their courtesy and co-operation in all matters relating to the Bureau of Streets; also the engineers and other employes of this Bureau for their faithful and efficient services.

Very respectfully,

M. J. DOHERTY,

Superintendent of Streets.



55TH STREET BOULEVARD—LOOKING NORTHEAST.



SUBWAY IN 55TH ST. BOULEVARD
P.E.T.W. & C.R.Y.

55TH STREET BOULEVARD—LOOKING WEST.

ANNUAL REPORT
Department of Track Elevation
CITY OF CHICAGO
1898

JOHN O'NEILL
SUPERINTENDENT

THOS. P. McDONOUGH
ENGINEER

TRACK ELEVATION, 1898.

The year of 1898 has been the most remarkable year in the history of Chicago for the elevation of railroad tracks, and the most gratifying results have been attained, as will be seen from the following :

The Lake Shore & Michigan Southern Railway Company and the Chicago, Rock Island & Pacific Railway Company have completed their work under ordinance passed July 9, 1894, elevating about three miles of tracks, removing the viaduct at Sixty-first street and eliminating thirteen grade crossings, viz. : On the Lake Shore & Michigan Southern Railway at Sixtieth street, Sixty-first street, Sixty-third street and State street ; on the Chicago, Rock Island & Pacific Railway at Sixtieth street, Sixty-first street, Sixty-third street, Sixty-fifth street, Wentworth avenue, Sixty-sixth street, Sixty-seventh street, Sixty-eighth street and Sixty-ninth street, besides raising the entire yards of the Lake Shore & Michigan Southern Railway Company in the vicinity of Sixty-third street and State street, containing about 20.7 miles of side tracks which covered an area of about fifty-two acres. The tracks were raised to an average height of ten feet, at an estimated cost of about \$1,500,000.

The subways at Sixty-third street and State street were constructed, not according to the original ordinance passed July 9, 1894, but according to the revised ordinance passed December 29, 1897, which raised the floor of the subway four feet higher than in the original ordinance, thus making it possible to remove the east walls of the north approach so as to depress the entire approach in Sixty-third street and State street, making a larger entrance to the subway and giving more light in the same, as will be seen from illustration. On the Chicago, Rock Island & Pacific Railway, the subways at Sixty-fifth street and Wentworth avenue were also constructed under revised ordinance passed November 1, 1897, which raised the floors of the subways about two feet higher than in the original ordinance, and the lines of Sixty-fifth street were diverted slightly to the north, making a larger entrance into the subway approach in Wentworth avenue.

On January 17, 1898, a supplemental ordinance was passed for the elevation of the tracks of the Chicago, Rock Island & Pacific Railway Company, from Sixty-ninth street southeasterly to Seventy-ninth street, a distance of about one mile, and contemplates the elimination of eight grade crossings, viz. : Seventieth street, Seventy-first street, Stewart avenue,

Seventy-second street, Seventy-third street, Seventy-fourth street, Seventy-fifth street and Seventy-sixth street, at an estimated cost of about \$200,000.

The Lake Shore & Michigan Southern Railway Company, the Chicago, Rock Island & Pacific Railway Company, and the Pittsburg, Fort Wayne & Chicago Railway Company and its lessee, the Pennsylvania Company, have jointly built a brick union depot just south of Sixty-third street, midway between State street and Wentworth avenue, and several freight houses in the same vicinity; and the Lake Shore & Michigan Southern Railway Company has erected a very fine four-story brick office building on the south side of Sixty-third street, just east of State street. The erection of these buildings has cost the railway companies interested, in the neighborhood of \$250,000. It is the intention of the several railway companies mentioned above, next year, to beautify and adorn the ground around and in the neighborhood of the depot and their freight houses at an expense of about \$75,000. These improvements and the passenger depot have been built for the comfort and convenience principally of the residents in the neighborhood of Englewood, and will be, without doubt, a commercial benefit to the immediate neighborhood. All of this work was brought about by the elevation of the roadbed and tracks of these companies.

The Pittsburg, Fort Wayne & Chicago Railway and its lessee, the Pennsylvania Company, have completed their work of elevation, under ordinance passed July 27, 1896, elevating about two and one-half miles of tracks and eliminating thirteen grade crossings, viz.: Fifty-fifth street, Fifty-seventh street, Fifty-eighth street, Fifty-ninth street, Sixtieth street, Maple street, Sixty-first street, Chestnut street, Princeton avenue, Sixty-second street, Wentworth avenue, Sixty-third street and State street, besides raising a portion of their Fifty-fifth street yards, all at an estimated cost of about \$1,000,000, of which \$250,000 was expended in work performed in 1897, by the construction of retaining walls and foundations of abutments of subways at the intersection of streets.

The said companies, in addition to the elevation of the roadbed and tracks, have procured and dedicated for the purpose of a public street, a strip of ground thirty-three feet in width west of and adjoining the west line of Stewart avenue and extending from the south line of Fifty-fifth street to the north line of Maple street, thence curving in a southeasterly direction to a connection with Stewart avenue. This street was graded, curbed and paved with cedar block pavement, sewers and water pipes were provided and all done at the expense of the railway companies.

The Pittsburg, Cincinnati, Chicago & St. Louis Railway Company has constructed, this year, the east retaining wall parallel with Rockwell street elevation, and extending from Harvard street to Monroe street, on the west side of Rockwell street.



WASHINGTON BOULEVARD --
CEILING OF SUBWAY-
P.C. & S.T.L. RY-
C & N-W. RY-

VIEW—NEAR ROCKWELL STREET LOOKING WEST.

The Chicago & Northwestern Railway Company completed the work of the elevation of its tracks, under ordinance passed March 30, 1896, on the Wisconsin Division, from Clybourn Junction to Mayfair, a distance of about 4.7 miles, eliminating forty-nine grade crossings, viz.: Paulina place, North Wood street, Girard street, North Lincoln street, Webster street, North Robey street, North Seeley avenue, North Hoyne avenue, West Fullerton avenue, Snow street, West Dunning street, North Leavitt street, Humboldt Park boulevard, Western avenue, Artesian avenue, North Campbell avenue, West Marianna street, North Maplewood avenue, North Rockwell street, West Diversey avenue, North Talman avenue, North Washtenaw avenue, North Fairfield avenue, George street, North California avenue, West Wellington avenue, North Sacramento avenue, Whipple street, North Albany avenue, North Troy street, West Belmont avenue, North Kedzie avenue, Kimball avenue, Drake street, Central Park avenue, West Addison street, North Fortieth avenue, West Byron street, North Forty-first avenue, North Fifty-first court, North Forty-second avenue, Irving Park boulevard, North Forty-second court, North Forty-third avenue, West Belle Plaine street, North Forty-third court, West Berteau avenue, North Forty-fourth avenue, and North Forty-fourth court, at an estimated cost of about \$1,000,000. The same company, on the Milwaukee Division, acting under an ordinance passed December 29, 1897, for the elevation of its roadbed and tracks from Diversey avenue southwardly to Chicago avenue, expended during the year about \$500,000 in the construction of retaining walls and foundations of abutments of subways at the intersection of streets. In this ordinance is included the elevation of the grade crossing of the Chicago, Milwaukee & St. Paul Railway in Bloomingtondale road, which will eliminate two grade crossings, viz.: North Ashland avenue and Elston avenue.

The most dangerous grade crossing in the United States, if not in the entire world, has been removed by the elevation of the St. Charles Air Line, with its proprietary road, extending from the connection with the Illinois Central Railroad tracks on the lake front, southwesterly and westerly to Stewart avenue; also by the elevation of the Lake Shore & Michigan Southern Railway, and the Chicago, Rock Island & Pacific Railway tracks, and the depression of the Atchison, Topeka & Santa Fe Railway Company's two main tracks, and of the Chicago & Western Indiana Railway Company's four main tracks, making in all three miles of single track elevated and depressed, eliminating eight grade crossings, viz.: on the St. Charles Air Line at Indiana avenue, Michigan avenue, Wabash avenue, State street, Dearborn street, and South Clark street; on the Atchison, Topeka & Santa Fe Railway and the Chicago & Western Indiana Railways at South Clark street, and on the Lake Shore & Michigan Southern

Railway, and the Chicago, Rock Island & Pacific Railway, at Eighteenth street, all at an estimated cost of about \$2,000,000.

The roadbed and tracks of the above mentioned companies formerly crossed and recrossed each other at different angles at this point, said lines of railroad tracks intersecting each other about the center of Clark street, in which was located two street car tracks that extend from Washington street on the north to Seventy-ninth street and Halsted street on the south, with all of the intermediate feeding lines, and carrying more passengers across the point of these grade crossings just north of Sixteenth street than are carried on the State street and Wabash avenue lines combined. So that this deadly grade crossing, after a persistent and stubborn fight between the City and the railroad companies of more than five years, is now a thing of the past.

In addition to the above grade crossings eliminated by ordinance passed May 17, 1897, for the elevation and depression of the tracks in the vicinity of Sixteenth street and Clark street, where the work was in progress this year, there were eliminated the grade crossings of the tracks of the Lake Shore & Michigan Southern Railway, the Chicago, Rock Island & Pacific Railway and the St. Charles Air Line, with the Atchison, Topeka & Santa Fe Railway and the Chicago & Western Indiana Railway, the tracks of the first three companies being elevated and the last two companies' tracks being depressed, thereby eliminating seventy single track crossings of these important trunk line railroads at this point.

The Chicago, Milwaukee & St. Paul Railway Company is acting upon an ordinance passed February 21, 1898, for the elevation of its roadbed and tracks, from a point north of West Chicago avenue northwesterly to a point north of Irving Park boulevard, a distance of about six miles, and also of its branch line at Pacific Junction in Bloomingdale road, a distance of about one mile, and, in conjunction with the above ordinance, a provision is made for the elevation of the Chicago & North-Western Railway Company's Mayfair Cut-off Branch, from a point near West Addison avenue northwardly to a point north of Irving Park boulevard, a distance of about three-quarters of a mile. This plane of elevation will eliminate in all about thirty-nine grade crossings, at an estimated cost of \$2,630,000. During the year the Chicago, Milwaukee & St. Paul Railway Company completed about four miles of this work, at a cost of about \$1,000,000, eliminating fifteen grade crossings, viz.: North Spaulding avenue, Augusta street, North Homan avenue, Grand avenue, West Division street, Central Park avenue, Potomac avenue, Hirsch street, LeMoyné street, West North avenue, Wabansia avenue, Courtland street, North Lawndale avenue, North Springfield avenue, and North Fortieth street.

The Chicago, Burlington & Quincy Railroad Company is acting upon

an ordinance passed January 24, 1898, for the elevation of its roadbed and tracks from a point near Campbell avenue, southwesterly to West Forty-sixth street, a distance of about two and three-quarter miles, which is estimated to cost about \$500,000, and provides for the elimination of twenty-one grade crossings, viz.: Rockwell street, Washtenaw avenue, Fairfield avenue, California avenue, West Nineteenth street, West Twentieth street, Douglas Park boulevard, Albany avenue, West Twenty-first street, Troy street, Kedzie avenue, Sawyer avenue, Spaulding avenue, Turner avenue, Homan avenue, Trumbull avenue, West Twenty-second street, St. Louis avenue, Clifton Park avenue, Central Park avenue, Millard avenue, Lawndale avenue, Ridgeway avenue, Hamlin avenue, Avers avenue, Springfield avenue, South Fortieth avenue, South Forty-first avenue, South Forty-second avenue, and South Forty-fourth avenue.

During the year the same company has expended about \$150,000 in the construction of the retaining walls and foundations for the abutments of the several subways at the intersection of streets, and this railroad company contemplates the completion of the entire work during the year 1899, which, from present indications, promises to be a greater year in the elevation of railway tracks than any period of track elevation in this City.

TABLE No. 1.

TABLE SHOWING LENGTH OF MAIN TRACKS, SIDE TRACKS, YARD TRACKS AND OTHER TRACKS ELEVATED AND DEPRESSED FROM JANUARY 1st, 1892, TO DECEMBER 31st, 1898, INCLUSIVE.

TRACKS ELEVATED.

NAME OF COMPANY.	Main Tracks.	Side Tracks.	Yard Tracks.	Other Tr.	Total.
C. & A. R. R.	0.61	.....	.....	.....	0.61
C. & N. W. R'y, Milwaukee Div.	11.25	.....	0.40	0.40	12.05
C. & N. W. R'y, Galena Div.	12.71	.....	4.28	0.85	17.29
C. & N. W. R'y, Wisconsin Div.	13.53	.....	2.28	0.25	16.06
C. & N. W. R'y, Rockwell St. Div.	5.64	0.45	.....	0.76	6.85
C. M. & St. P. R'y, Chicago Div.	6.32	.....	1.14	.....	7.46
C. M. & St. P. R'y, C. & C. B. Div.	2.53	.....	.....	0.30	2.83
C. R. I. & P. R'y.	20.86	.....	14.08	1.08	36.02
C. T. T. R. R.	1.74	.....	.....	0.24	1.98
I. C. R. R., Main Line.	20.24	.....	.....	.....	20.24
I. C. R. R., St. Charles Air Line.	8.36	.....	.....	0.23	3.59
I. C. R. R., C. M. & N. R. R.	0.61	.....	.....	.....	0.61
L. S. & M. S. R'y.	20.48	.....	25.88	3.00	49.36
P. C. C. & St. L. R'y.	4.20	.....	.....	1.08	5.87
P. Ft. W. & C. R'y.	10.00	.....	9.00	1.16	20.16
Totals.	134.17	0.45	57.01	8.85	200.48

TRACKS DEPRESSED.

NAME OF COMPANY.	Main Tracks.	Side Tracks.	Yard Tracks.	Other Tr.	Total.
A. T. & S. Fe R'y.....	1.06	.....	1.12	.....	2.18
C. & W. I. R'y.....	2.28	.....	2.01	0.96	5.25
I. C. R. R.	50.24	.....	.....	.....	50.24
Totals.....	53.58	.....	3.13	0.96	57.67

SUMMARY OF WORK DONE IN 1898.

Balance of miles of track elevation unfinished as per last report	26.7
Total miles of track elevation as per ordinances passed 1898.....	3.8
Total miles of tracks yet to be elevated	30.5
Total miles of tracks elevated during the year 1898	16.2
Total miles of tracks yet to be elevated	14.3
Balance of grade crossings as per last report.....	155
Total grade crossings to be eliminated as per ordinance passed in 1898.....	29
Total grade crossings to be eliminated.....	184
Total grade crossings eliminated in 1898.....	96
Total grade crossings yet to be eliminated.....	88
Approximate balance estimated cost as per last report.....	\$10,080,000
Approximate total estimated cost as per ordinances passed in 1898.....	800,000
Approximate total estimated cost yet to be expended.....	\$10,880,000
Approximate total estimated cost of elevation in 1898	6,650,000
Approximate total estimated cost of work yet to be done.....	\$ 4,230,000

RECAPITULATION.

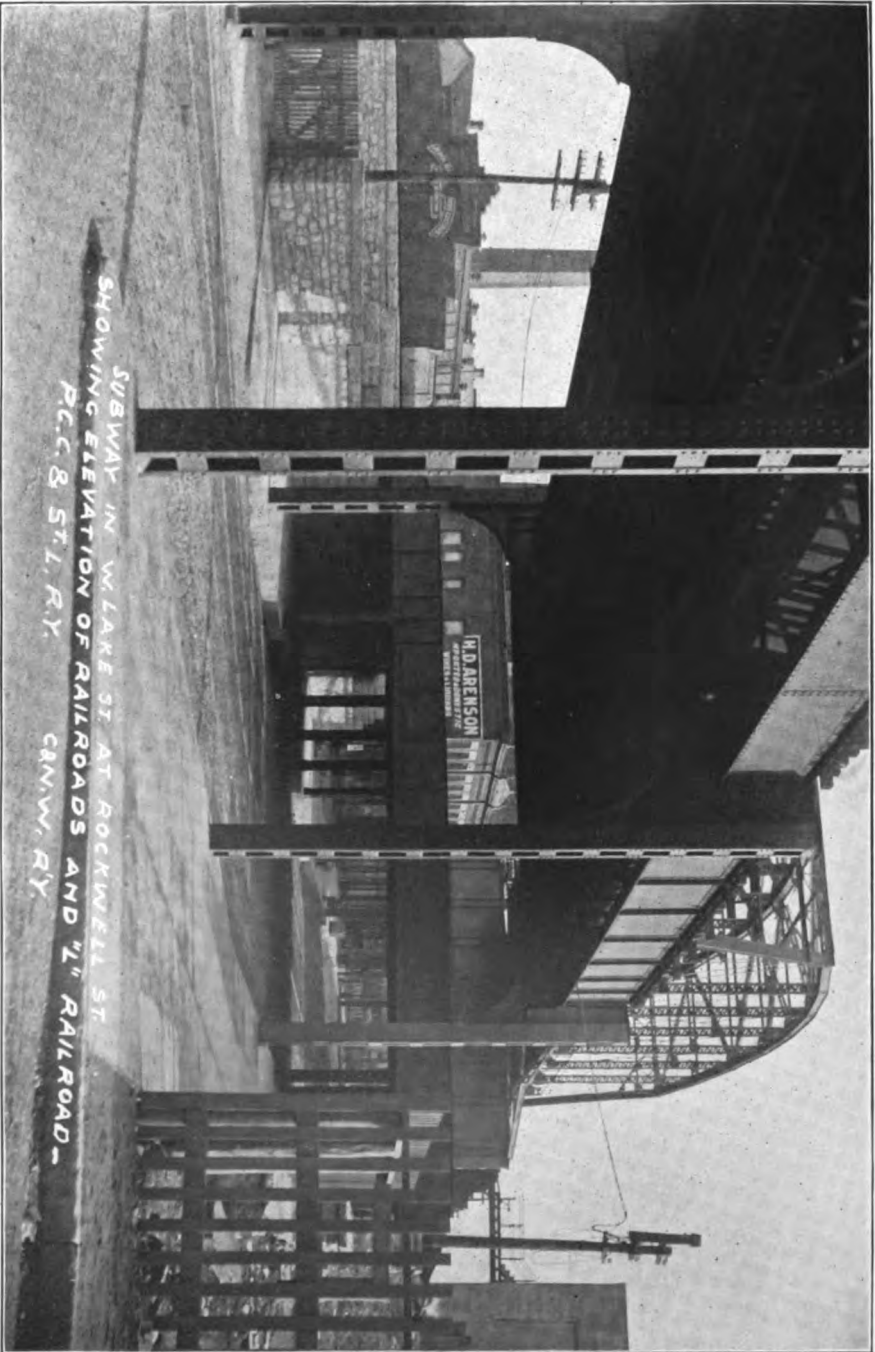
Total miles of tracks elevated as per ordinances passed.....	49.5
Total miles of tracks elevated and completed to December 31, 1898.....	35.2
Total miles of tracks yet to be elevated.....	14.3
Total grade crossings to be eliminated as per ordinances passed.....	272
Total grade crossings eliminated by completed elevation.....	184
Total grade crossings yet to be eliminated as per ordinances passed.....	88
Total approximate estimated cost as per ordinances passed.....	\$16,930,000
Total approximate amount expended to December 31, 1898.....	12,700,000
Total approximate estimate of amount yet to be expended.....	\$ 4,230,000

In conclusion, the number of grade crossings eliminated has been greater than in all former years, and the cost of the work has been more. The local engineers in charge of track elevation of the several railroads stated that there were employed directly and indirectly about 25,000 men in the elevation of tracks during the year 1897, and that employment was given to fully 40,000 men during the year 1898.

Respectfully submitted,

JOHN O'NEILL,

Superintendent Track Elevation.



WEST LAKE AND ROCKWELL STREETS.

ANNUAL REPORT
Bureau of Special Assessments
CITY OF CHICAGO
1898

JOHN A. MAY
SUPERINTENDENT

BUREAU OF SPECIAL ASSESSMENTS.

HON. L. E. MCGANN,
Commissioner of Public Works.

DEAR SIR:—I present herewith the annual statement of special assessments levied and prosecuted in the courts to confirmation by this Bureau, during the year ending December 31, 1898.

Owing to the fact that the entire work of the year was conducted under the direction and guidance of my predecessor (I assuming the duties of this office January 16, 1899), I submit, without comment, a tabulated report of the work done, but desire in connection therewith to call your attention to a few existing conditions in reference to the affairs of this office.

For years past, dating back almost to the enactment of what is known as the old special assessment law, rebates have been declared and entered upon the books of this office in anticipation of the collection of assessments, and upon the theory that the same would be collected in full. During the process of collection, however, large amounts have been defeated by the courts at the time of application for judgment and order for sale, or by appeals to the Supreme Court, with the result that a large part, and, in many instances, the whole of the supposed excess was never collected. In cases, where after the payment of the expenses and costs of the work, there remained any surplus to the credit of the warrant, the property owners who first presented their tax receipts to this office were given rebate vouchers in accordance with the declaration of rebate erroneously declared, until such time as the fund to the credit of the warrant was exhausted, after which time, others, who according to the books of this office are entitled to the same amount of rebate, were informed that there was no money to the credit of that warrant and that the City could issue no more vouchers against the same. In many instances, public benefits were assessed against the City, and the neglect of the City to make any provision for the payment of the amount assessed against it, tended, to the extent of the public benefits assessed, to create this deficiency.

In hundreds of cases, reductions of such magnitude were made, either by the courts or the law department, in favor of individual property owners, as to entirely wipe out any excess which would otherwise have been to

the credit of the warrant and subsequently rebated to the owners of the property assessed. The effect of this was that those who were not thus favored were compelled to bear the entire cost of the improvement, while those who had had their assessments cancelled or reduced received the same benefit from the improvement but without cost or expense to themselves.

In the first instance cited, where employes of the City have heretofore erroneously declared a rebate due, before a certainty existed as to the amount of the same, and some property owners have been paid according to the rebate thus declared, the City should provide some means by which the further amount due the balance of the property owners can at once be paid in full. The remedy in the courts has in most cases been fully exhausted, and little, if any, assistance can be looked for from that source.

I have submitted to you three lists, not contained in detail in this report, covering these several warrants, the first being warrants where the rebates, as shown by our books, can be paid in full. Second, where there is some money to the credit of the warrant, but not sufficient to pay the full amount due thereon. Third, a list in which is set forth the warrants now overdrawn, yet on which our books show rebates still due the property owners. In each of these last two lists I have set forth the amount necessary to be placed to the credit of the several warrants in order to enable the payment of the amounts due thereon in full, and suggest as a remedy for this condition that the attention of the Common Council be called to the facts as they exist, and that it be requested to appropriate and place to the credit of these different warrants an amount sufficient to pay the rebates, as shown by the books of this office to be now due and payable.

The conditions above set forth refer only to assessments levied under the old law and prior to the passage of the Board of Local Improvement Act in June, 1897. Since July 1, 1897, when the so-called new law went into effect, no reductions have been made in assessment proceedings, either by the courts or by the law department, and all property owners have been placed upon an equal plane.

In some instances the ordinances have been found to be technically faulty, but in every case where this has occurred the entire proceedings have been dismissed and new ordinances drawn, the error of the former ordinance corrected and each property owner reassessed his just proportion of the cost of the improvement, thereby distributing the burden of the assessment in proportion to the benefits received, according to the equities which the law contemplates.

Prior to the time of my taking charge of this office, the estimates prepared for proposed improvements were in many instances too high, and, apparently acting under a misapprehension of the law, these estimates

contained items of charges against the property owners which I considered excessive and unjust. In order to correct this, I have in each case prepared and filed with the County Court a report, made by me as secretary of the Board of Local Improvements, eliminating these excessive and unjust charges and reducing the assessment to the contract price, plus ten per cent., reserved for contingencies, and six per cent. for the cost of making, levying and collecting the assessment as provided by law, so that in no case has a property owner been compelled to pay more for the improvement than he would have paid had these charges never been made.

The Board of Local Improvements has adopted resolutions in reference to the engineer's estimated cost of improvements and which is now being followed and acted upon in the preparation of all estimates. This reduces the estimated cost of any contemplated improvement to the lowest possible basis upon which proceedings could be commenced with safety.

The effects of too high estimates, in my opinion, is to frighten people who own property, and who really desire to have the same improved, into opposing assessments through fear that the new law affords them no better protection than did the old one, and I believe that a strict adherence to the policy of the board as adopted, and under which it is now operating in reference to estimates, will result in the property owners presenting majority petitions for improvements to such an extent as greatly to increase the business of this department the coming year. When owners of property have once learned that the old system of assessments and rebates which worked such hardship upon them is no longer in force, and when they become convinced that the Board of Local Improvements is honestly and justly assessing them only the exact cost of a proposed improvement, and that at no time will they be compelled to pay into the public treasury more than their proportionate share of the absolute cost of an improvement, with the lowest necessary costs of making and collecting the same added thereto, public improvements of all kinds will increase, not through force of law, but by request of those interested, and the general public will at the same time be benefited accordingly.

Respectfully submitted,

JOHN A. MAY,

Superintendent of Special Assessments.

WOOD BLOCK PAVEMENT.

No. of Warrant	NATURE OF IMPROVEMENT.	ON	FROM	TO	AMOUNT.
23159	C. F. and P.	Fifty-first	Wood	Leavitt	\$ 24,239.80
23161	C. F. and P.	Thirty-seventh	Halsted	Morgan	8,548.98
23179	C. G. and P.	Forty-first avenue	W. Madison	W. Van Buren	10,339.98
23183	C. G. and P.	Avers avenue	W. Twenty-second	C. B. & Q. R. R.	4,500.00
23200	C. F. and P.	Washtenaw avenue	W. Harrison	W. Van Buren	4,378.49
23225	C. G. and P.	N. Forty-fourth avenue	Armstrong avenue	North avenue	18,048.52
23245	C. G. and P.	Noble avenue	Ashland avenue	Wood	6,594.01
23252	C. G. and P.	Otto	Robey	C. & N. W. Ry.	7,000.00
23256	C. G. and P.	Ward	Waveland avenue	Addison	4,490.18
23257	C. G. and P.	Carroll avenue	Green	May	12,081.20
23258	C. F. and P. System	Francisco avenue, Lee avenue	Francisco avenue, Warsaw avenue and	Center street	41,000.00
23260	C. F. and P.	Spaulding avenue	Twenty-fourth	Twenty-sixth	9,011.00
23273	P. C. W. G. and P.	W. Washington	Desplaines	Halsted	6,523.44
23281	C. G. and P.	Forty-first avenue	Colorado avenue	W. Sixteenth	80,901.43
23299	C. G. and P. System	69th st. from S. Chicago av.	to Cottage Grove av., Langley	avenue and Evans avenue	28,230.14
23306	C. G. and P.	Racine avenue	Roscoe	N. Clark	18,778.05
23308	C. F. and P.	Diversey	Milwaukee avenue	Crawford avenue	28,709.84
23309	C. F. and P.	W. Twenty-first	Western avenue	514 feet west	5,587.87
23312	C. G. and P.	S. Morgan	W. Van Buren	W. Twelfth	22,286.08
23313	C. F. and P.	Central Park avenue	W. Twenty-sixth	W. Twenty-ninth	12,356.70
23327	C. G. and P.	Forty-ninth	State	Michigan avenue	4,071.14
23332	C. and P.	Wilcox avenue	Western avenue	S. Rockwell	5,748.05
23334	C. F. and P. System	May st., Aberdeen st., Carpen	ter st. from Sixty-seventh st.	to Sixty-ninth	38,302.06
23366	C. G. and P.	Oak	Larrabee	Wells	10,851.60
23366	C. G. and P.	S. Forty-first avenue	W. Van Buren	W. Harrison	8,500.00
23544	C. G. and P.	W. Adams	S. Western avenue	S. Rockwell	6,500.00
23550	C. G. and P.	W. Congress	S. Desplaines	S. Halsted	3,889.27
23551	C. G. and P.	S. Washtenaw avenue	W. Harrison	Lexington	2,988.02
23552	C. G. and P.	N. Hoyne avenue	Belmont avenue	Roscoe	7,684.46
23557	C. G. and P.	Farragut avenue	E. Ravenswood Park	N. Ashland avenue	5,455.48
23641	C. G. and P.	Barry avenue	Evanston avenue	Lake View avenue	4,691.60
23643	C. G. and P.	Austin avenue	Jefferson	May	22,775.07
23650	C. F. and P.	Armour avenue	Fifty-ninth	562 feet north	4,442.07
23652	C. G. and P.	N. Fortieth avenue	Madison	Lake	9,027.85
23708	C. G. and P.	Justine	W. Fifty-first	W. Fifty-third	8,128.81
23710	C. G. and P.	N. Twenty avenue	Lawrence avenue	Almslie	2,251.85
Total					\$ 489,822.54

ASPHALT PAVEMENTS.

No. of Warrant	NATURE OF IMPROVEMENT.	ON	FROM	TO	AMOUNT.
23152	C. F. and P.	Millard avenue.	Sixteenth	Douglas Park boulevard	\$ 12,034.80
23157	G. and P.	Thirty-seventh	Cottage Grove avenue.	Ellis avenue.	2,406.24
23170	C. F. and P.	Harvard	Douglas boulevard.	Forteth avenue.	13,581.85
23173	C. F. and P.	Albany avenue.	Chicago avenue.	Ohio.	13,567.15
23300	C. G. and P.	Berenice avenue.	Lincoln avenue.	W. Ravenswood Park.	6,000.00
23307	C. G. and P.	Western avenue.	W. Madison	W. Harrison.	23,015.16
23323	F. and P.	Wells	Chicago avenue.	Division.	29,000.00
23337	C. G. and P.	Monroe avenue.	Fifty-third	Fifty-fifth.	11,500.00
23355	C. G. and P.	N. State	Kinzie	Division.	53,500.00
23357	C. G. and P.	Twenty-ninth.	Lake Park avenue.	State	51,000.00
23358	C. G. and P.	N. Clark.	Division.	North avenue.	33,500.00
23359	C. G. and P.	Sixty-ninth.	Calumet avenue.	South Park avenue.	6,058.70
23500	C. F. and P.	Lexington.	Fortieth avenue.	Forty-first avenue.	6,363.85
23501	C. F. and P.	N. Hermitage avenue.	Irving Park boulevard.	Berteau avenue.	13,759.83
23529	C. F. and P.	W. Van Buren.	S. Fortieth avenue.	S. Forty-fifth court.	49,000.00
23530	G. and P.	Cottage Grove avenue.	Thirty-ninth.	Oakwood boulevard.	5,000.00
23533	C. G. and P.	S. Ashland avenue.	W. Twelfth.	W. Twenty-second.	53,500.00
23537	C. G. and P.	Oak.	N. Clark.	Lincoln Park boulevard.	21,500.00
23543	C. G. and P.	Schiller.	N. Clark.	N. State.	7,000.00
23546	C. G. and P.	Sixty-third.	Westworth avenue.	Stewart avenue.	11,500.00
23553	C. G. and P.	Thirty-seventh place.	State	Wabash avenue.	5,000.00
23584	C. and P.	Vernon avenue.	Fortieth.	R. of way of the U. St. Ida. & T. R. R.	2,320.00
23642	C. G. and P.	Lexington	S. Central Park avenue.	Douglas boulevard.	13,000.00
23707	C. G. and P.	Vernon avenue.	Twenty-ninth.	236 feet north.	3,271.94
	Total.				\$ 446,579.52

VITRIFIED BRICK STREETS.

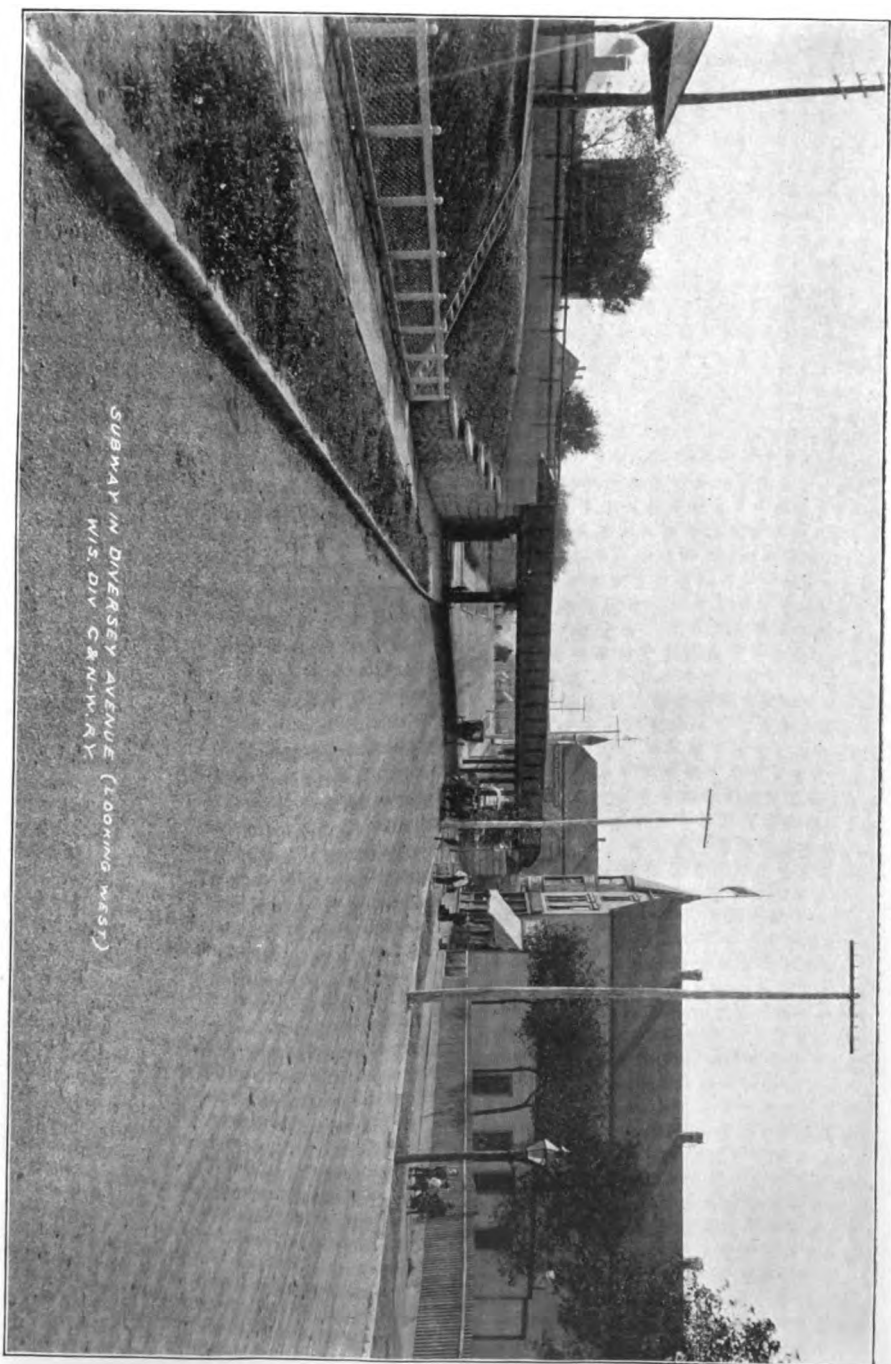
No. of Warrant	NATURE OF IMPROVEMENT.	ON	FROM	TO	AMOUNT.
23180	C. F. and P.	W. Lake.	Crawford avenue.	W. Forty-sixth.	\$ 44,000.00
23338	G. and P.	Fifty-first.	State.	Stewart avenue.	9,716.21
23388	P. G. and P.	N. Union.	W. Erie.	Austin avenue.	15,500.00
23339	C. F. and P. system	{ Kensington ave. from Michigan avenue to Front street and Front st. from Kensington avenue to 116th street.			18,700.35
23353	C. G. and P.	Buffalo avenue.	Eighty-seventh.	Ninety-second.	56,908.68
23361	C. G. and P.	N. Paulina.	Adison	125 feet south.	1,032.23
23586	C. G. and P.	Illinois	N. Clark	Dearborn avenue.	3,110.89
	Total.				\$ 148,907.36

MACADAM PAVEMENT.

No. of Warrant	NATURE OF IMPROVEMENT.	ON	FROM	TO	AMOUNT.
23160	C. F. and M.	Ross avenue.	S. Park avenue.	Indiana avenue.	\$ 6,639.85
23168	C. F. and M.	Ada.	Fifty-ninth.	Sixty-third.	16,640.60
23182	C. F. and M.	Lowé avenue.	Fifty-ninth.	Sixteenth.	5,810.41
23191	C. G. and M.	E. Ravenswood park.	Lawrence avenue.	Alnslie.	4,101.88
23217	C. F. and M.	Perry.	Devon avenue.	Pratt avenue.	15,500.00
23222	C. G. and M.	Edwards avenue.	Eighty-second.	Eighty-third.	3,168.81
23249	C. F. and M.	Ridge avenue.	Evanston avenue.	Clark.	21,270.60
23287	Mac.	Yates avenue.	Seventy-first.	Seventy-second.	1,381.89
23288	C. G. and M.	S. Winchester avenue.	Ninety-third.	Ninety-fourth.	2,252.57
23326	C. F. and M.	Chestnut.	Pine.	Lake Shore Drive.	10,500.00
23335	Mac. System.	Harvard avenue, Yale avenue,	Sixty-third st., Sixty-fourth	st., Sixty-fifth st., etc.	23,500.00
23349	P. and M.	Wentworth avenue.	Forty-seventh.	Fifty-fifth.	14,048.90
23352	C. G. and M.	Lake View avenue.	Roslyn place.	to 173 feet south of Arlington place	2,766.37
23545	C. F. and M.	Throop.	W. Fifty-ninth.	W. Sixty-first.	9,131.25
23554	C. G. and M.	Monticello avenue.	W. North avenue.	Le Moyne.	3,244.10
23569	C. F. and M.	Aldine avenue.	{ E. line of S. Lot 30, Lake Shore Sub. of Lots 24 to 26 in Pine Grove } Subdivision Section 21-40-14.	Sheridan Road.	2,459.60
23667	Mac.	Princeton avenue.	Garfield boulevard.	W. Sixty-third.	11,849.94
23711	C. G. and Mac.	N. Francisco avenue.	W. Fullerton avenue.	W. Dunning.	3,250.23
	Total.				\$157,517.00

GRANITE BLOCK PAVEMENT.

No. of Warrant	NATURE OF IMPROVEMENT.	ON	FROM	TO	AMOUNT.
23526	C. and P.	Desplaines.	Madison.	Van Buren.	\$ 22,178.86
23585	C. G. and P.	N. Desplaines.	W. Lake.	96 ft. N. of Wayman place.	9,700.00
23540	C. G. and P.	W. Twelfth.	S. Canal.	S. Halsted.	21,000.00
23542	C. G. and P.	Meridian.	S. Desplaines.	S. Union.	4,007.12
23712	C. and P.	Brewery avenue.	Twenty-seventh.	820 ft. south.	4,891.97
	Total.				\$ 61,277.96



SUBWAY IN DIVERSEY AVENUE (LOOKING WEST)
WIS. DIV. C&N.W. RY.

DIVERSEY AVENUE AND C. & N.-W. TRACKS.



SUBWAYS IN 65TH ST AND WENTWORTH AVE [LOOKING SOUTH] C.R.-I.&P.R.Y

65TH STREET AND WENTWORTH AVENUE.

SLAG PAVEMENTS OF STREETS.

No. of Warrant	NATURE OF IMPROVEMENT.	ON	FROM	TO	AMOUNT.
28684	C. F. and P.....	Superior avenue.....	Ninety-second.....	Ninety-third.....	\$ 7,000.00
	Total.....				\$ 7,000.00

STREETS—CURBING AND FILLING.

No. of Warrant	NATURE OF IMPROVEMENT.	ON	FROM	TO	AMOUNT.
28687	C. and F.....	Bonaparte.....	Lock.....	Arch.....	\$ 1,867.76
28654	C. and F.....	S. Irving avenue.....	Bross avenue.....	Thirty-fifth.....	8,981.35
	Total.....				\$ 10,849.11

STREETS AND ALLEYS—OPENING AND WIDENING.

No. of Warrant	NATURE OF IMPROVEMENT.	ON	FROM	TO	AMOUNT.
28502	Widening.....	Fisk.....	Thirty-second place.....	108.55 feet South.....	\$ 2,101.00
28503	Opening.....	Thirty-second.....	Halsted.....	Emerald avenue.....	20,980.00
28541	Widening.....	Thirty-fourth.....	Ashland avenue.....	Paulina.....	4,476.45
28555	Opening.....	Perry avenue (Clark).....	One hundred and seventh.....	One hundred and eleventh.....	14,549.00
28556	Extending.....	Alley through Lot 6, Blk. 11, W. Ohio.....	of Rockwell's Addition to Homan avenue.....	Chicago.....	384.00
28587	Opening.....	Alley in Lot 8, Blk. 25, Johnston, Alley between Twenty-ninth st. and Thirtieth st. and Vernon avenue and South Park avenue.....	Roberts & Storrs' Addition to Chicago.....	Spaulding avenue.....	7,479.80
28679	Opening.....	Alley N. from S. line of Locust st. bet. Milton ave. and Townsend st.....			2,131.49
28680	Opening.....				2,110.00
	Total.....				\$ 75,140.47

ALLEYS—CEDAR BLOCK PAVEMENT.

No. of Warrant.	NATURE OF IMPROVEMENT.	BETWEEN	AMOUNT.
23146	C. G. and P.	Wrightwood avenue and Diversey avenue and Pine Grove avenue and Hampden court	\$1,388.02
23162	C. G. and P.	Wood street and Lincoln street and Rice street and W. Chicago avenue	1,747.00
23269	C. F. and P.	Austin avenue and Kinzie street and Union street and Halsted street	860.80
23356	C. G. and P.	Forty-seventh st. and Forty-eighth st. and Champlain ave. and Langley ave.	1,395.50
23365	C. G. and P.	Forty-fifth street and Forty-sixth street and Forrestville avenue and Vincennes avenue.	1,288.74
23495	C. G. and P.	Warren avenue and Madison street and Homan avenue and Kedzie avenue.	8,905.24
23504	C. G. and P.	From Orchard st. to its intersection with N. & S. alley bet. Wrightwood ave. & Deming ct.	2,656.32
23525	C. G. and P.	Alleys between North avenue, Sedgwick street, Blackhawk street and Hudson avenue.	1,907.02
23549	C. G. and P.	W. Chicago avenue, Clarinda street, N. Ashland avenue and N. Marshfield avenue.	415.10
23558	C. G. and P.	First alley east of S. Leavitt street from Jackson boulevard to W. Van Buren street.	880.14
23651	C. G. and P.	South alley and S. 50 feet of alley N. and adj. in blk. 3, Union Park addition to Chicago.	800.86
23653	C. G. and P.	Alleys between Washington boulevard, Warren avenue and Hoyne avenue and Leavitt st.	751.07
23655	C. G. and P.	First alley south of Jackson street from Throop street to Loomis street.	1,476.00
23668	C. G. and P.	First N. and S. alley E. of S. Ashland avenue, between Edgemont avenue and Elburn avenue	529.50
23669	C. G. and P.	Cottage Grove avenue and Groveland avenue and Thirty-second street and Thirty-third st.	1,005.31
23670	C. G. and P.	Alleys between Osgood street and Sheffield avenue and S. of Center street.	888.55
23709	C. G. and P.	Alleys between Wabash ave. and Michigan ave. and Thirty-seventh pl. and 329 ¹⁰ / ₁₀₀ feet S.	726.70
Total			\$22,317.87

ALLEYS—VITRIFIED BRICK PAVEMENT.

No. of Warrant.	NATURE OF IMPROVEMENT.	BETWEEN	AMOUNT.
23862	G. and P.	W. Madison street, W. Washington street and S. Jefferson street and S. Clinton street.	\$2,180.85
23863	G. and P.	W. Washington street, W. Randolph street and S. Jefferson street and S. Desplaines street	1,443.97
23964	C. G. and P.	W. Madison street, W. Monroe street and S. Green street and S. Halsted street.	1,363.42
23543	C. G. and P.	W. Lake street, N. Jefferson street and Fulton street and N. Desplaines street.	1,952.80
Total			\$6,931.04

ALLEYS—GRANITE BLOCK PAVEMENT.

No. of Warrant.	NATURE OF IMPROVEMENT.	BETWEEN	AMOUNT.
23354	C. G. and P.	Michigan street and Kinzie street and Orleans street and Franklin street.	\$2,070.96

WATER SUPPLY PIPES.

No. of Warrant.	ON	FROM	TO	AMOUNT.
23103	Prairie avenue.....	Garfield boulevard.....	Fifty-ninth.....	\$2,448.26
23108	N. Ridgeway avenue.....	W. Dunning.....	W. Wrightwood avenue.....	650.27
23109	W. Argyle.....	N. Fifty-second avenue.....	N. Fifty-third avenue.....	648.86
23110	Butler.....	Ninety-first.....	290 feet north.....	255.10
23111	S. Central Park avenue.....	W. Twelfth.....	Douglas Park boulevard.....	1,331.70
23112	S. Hermitage avenue.....	Sixty-first.....	Sixty-second.....	685.65
23113	Humboldt avenue.....	Kimball avenue.....	Ballou.....	806.66
23114	Lexington.....	S. Forty-third avenue.....	S. Forty-fourth avenue.....	662.30
23115	Scott.....	Homan avenue.....	Turner avenue.....	260.23
23116	N. Spaulding avenue.....	W. Chicago avenue.....	W. Ohio.....	1,085.86
23117	W. Van Buren.....	Forty-fifth court.....	Forty-seventh avenue.....	839.07
23118	Wolftram.....	N. Lawndale avenue.....	N. Central Park avenue.....	680.21
23147	S. Homan avenue.....	140 feet S. of Twenty-eighth.....	Thirtieth.....	560.88
23148	W. Twentieth.....	Albany avenue.....	640 feet ea. t.....	670.30
23154	Drake avenue.....	W. Huron.....	W. Ohio.....	682.76
23155	Prairie avenue.....	Sixtieth.....	Sixty-first.....	714.95
23181	S. Central Park avenue.....	W. Twenty-eighth.....	W. Thirtieth.....	1,114.07
23214	Lyndale avenue.....	Kimball avenue.....	Ballou.....	469.50
23215	S. Central Park avenue.....	W. Twenty-sixth.....	W. Twenty-seventh.....	720.77
23216	S. Claremont avenue.....	Alley S. of Bross avenue.....	Thirty-fifth.....	1,495.38
23233	N. Lawndale avenue.....	W. George.....	W. Diversey avenue.....	652.43
23234	Follansbee.....	Catalpa court.....	{ E. line of 1st alley E. of Hum- } boldt blvd. N. of Follansbee..... }	485.69
23235	W. Monroe.....	Belt Line R. R. of Chicago.....	S. Forty-eighth avenue.....	1,437.46
23286	Wallace.....	W. One Hundred and Third.....	584 feet south.....	785.46
23237	N. Forty-second avenue.....	W. North avenue.....	Hirsch.....	1,425.06
23241	W. Forty-eighth.....	S. Hoyne avenue.....	P. C. C. & St. L. R. R.....	620.41
23255	Durham avenue.....	Homer.....	Cortland.....	344.50
23271	Humboldt.....	Cornella.....	Grand avenue.....	1,062.63
23283	Columbia.....	N. Hamlin avenue.....	A point 280 ft. W. of N. Lawndale av.....	354.72
23298	Tremont.....	Wallace.....	300 feet east.....	346.44
23325	N. Forty-seventh avenue.....	W. Belle Plaine avenue.....	Hutchinson, etc.....	1,243.08
23367	S. Fifty-second avenue.....	Fulton.....	Park avenue.....	460.93
23368	W. Polk.....	S. Fortieth avenue.....	S. Forty-first avenue.....	662.50
23497	Humboldt boulevard, Logan Square, Palmer Square, etc.....			2,467.96

WATER SUPPLY PIPES—(CONTINUED).

No. of Warrant.	ON	FROM	TO	AMOUNT.
23498	Chestnut	Lake Shore Drive.....	A point 40 ft. E. of Lincoln Park blvd.	\$ 1,508.72
23499	Cornelia.....	Humboldt boulevard.....	Grand avenue.....	906.70
23505	N. Fortieth avenue.....	Potomac avenue.....	Augusta.....	1,827.44
23506	S. Forty-fifth avenue.....	Lexington.....	A point 200 ft S. of W. Harrison.....	4 2.06
23531	Aldine avenue.....	Sheridan road.....	A point 895 ft. E. of Evanston avenue.....	254.93
23559	Medill avenue.....	Kimball avenue.....	Ballou.....	349.59
23582	S. Forty-fourth avenue.....	W. Harrison.....	Colorado avenue.....	1,276.39
23589	S. Fifty-first court.....	Fulton.....	Park avenue.....	392.49
23590	Lexington.....	S. Lawndale avenue.....	299 feet west.....	229.96
23591	East court.....	Belmont avenue.....	290 feet south.....	358.05
23592	Wrightwood avenue.....	Perry.....	Bosworth avenue.....	425.10
23593	N. Forty-fifth avenue.....	W. North avenue.....	Grand avenue.....	414.75
23594	Fullerton avenue.....	100 feet W. of N. Fortieth avenue.....	N. Forty-eighth avenue.....	11,811.00
23600	W. Sixty-second.....	S. Lawndale avenue to S. Hamlin a.....	venue, etc.....	8.9.30
23608	Seventy-fourth.....	Railroad avenue.....	70 feet east of Coles avenue.....	860.17
23638	N. Sawyer avenue.....	W. Diversey avenue.....	W. Wellington.....	1,201.87
23657	(System) Vincennes avenue, Prospe.....	ct avenue, Ninety-fifth street, Ninety.....	y-ninth street, etc.....	11,614.00
	Total.....			\$63,698.07

WATER SERVICE PIPES.

No. of Warrant.	ON	FROM	TO	AMOUNT.
23106	Oakley avenue.....	Thirty-first.....	Thirty-fifth.....	\$ 508.80
23107	Carroll avenue.....	Forty-fifth avenue.....	Forty-sixth avenue.....	648.72
23132	Avenue M.....	102d.....	300 feet south of 104th.....	1,659.96
23133	Humboldt avenue.....	Central Park avenue.....	Kimball avenue.....	858.60
23134	Lawndale avenue.....	C. B. & Q. R. R.....	W. Twenty-fifth.....	696.98
23135	Seventy-fifth.....	Cottage Grove avenue.....	I. C. R. R.....	2,141.20
23136	Ninety-first.....	Exchange avenue.....	S. Chicago avenue.....	508.80
23137	Dickens avenue.....	Central Park avenue.....	Kimball avenue.....	1,231.12
23138	Clifton Park avenue.....	Ogden avenue.....	Douglas Park boulevard.....	3,014.64
23139	Layton.....	Wallace.....	Stewart avenue.....	457.98
23140	N. Forty-eighth avenue.....	North avenue.....	Fullerton avenue.....	5,343.40
23141	Columbia.....	Lawndale avenue.....	Hamlin avenue.....	607.60

23142	Christiana avenue.....	Division.....	Grand avenue.....	\$ 744.12
23143	Ridgeway avenue.....	Armitage avenue.....	Wabansia avenue.....	1,507.32
23144	Lawndale avenue.....	Armitage avenue.....	North avenue.....	1,755.86
23145	Aberdeen.....	Sixty-seventh.....	Sixty-ninth.....	1,135.26
23174	S. Ashland avenue.....	Sixty-third.....	Sixty-ninth.....	4,893.00
23175	Fifteenth court.....	Armitage avenue.....	Humboldt avenue.....	1,520.00
23176	N. Sawyer avenue.....	C. & N.-W. R. R.....	Chicago avenue.....	2,014.00
23177	Lexington.....	S. Fortieth avenue.....	S. Forty-first avenue.....	881.00
23184	Harvard.....	Fortieth avenue.....	Forty-second avenue.....	1,125.72
23192	115th place.....	Michigan avenue.....	Front.....	956.06
23193	N. Forty-eighth avenue.....	Lake.....	Chicago avenue.....	1,890.72
23194	Wrightwood avenue.....	Logan Square.....	Kimball avenue.....	1,202.04
23195	Jeffery avenue.....	Seventy-third.....	Seventy-ninth.....	4,140.36
23224	S. Forty-first court.....	Colorado avenue.....	Harvard.....	627.00
23261	N. Sawyer avenue.....	Diversey avenue.....	Belmont avenue.....	2,356.00
23292	Sixty-ninth place.....	Stony Island avenue.....	Madison avenue.....	932.80
23293	Washington avenue.....	Seventieth.....	Seventy-first.....	127.20
23294	Adams avenue.....	Seventieth.....	Seventy-first.....	296.80
23295	Sixty-ninth.....	Stony Island avenue.....	Madison avenue.....	780.16
23330	Farragut avenue.....	E. Ravenswood Park.....	Clark.....	455.00
23340	Sheridan Road.....	Montrose avenue.....	Foster avenue.....	1,701.00
23348	Wrightwood avenue.....	Central Park avenue.....	Hamlin avenue.....	1,411.92
23572	Chestnut.....	Pine street boulevard.....	Lake Shore Drive.....	1,060.00
23574	Castello avenue.....	Central Park avenue.....	Kimball avenue.....	1,221.12
23575	Belden avenue.....	Central Park avenue.....	Kimball avenue.....	992.16
23576	Medill avenue.....	Central Park avenue.....	Kimball avenue.....	1,125.72
23577	Sixty-seventh.....	Loomis.....	Ashland avenue.....	1,259.28
23595	Millard avenue.....	W. Sixteenth.....	Douglas boulevard.....	1,099.32
23658	Berwyn avenue.....	E. Ravenswood Park.....	Clark.....	473.50
23680	Seventy-fourth.....	Yates avenue.....	Bond avenue.....	1,596.00
23691	Lincoln.....	Forty-third.....	Forty-seventh.....	874.00
23693	Springfield avenue.....	Chicago avenue.....	Augusta.....	722.00
23693	Nelson.....	Blucher.....	Soult.....	186.50
23694	Colorado avenue.....	Fortieth avenue.....	Forty-seventh avenue.....	5,009.56
23695	Aldine av., from w. line of Lot 31, Blk. 3, in Lake	Shore Sub. in "Pine Grove," Sec. 21, T. 40, R. 14.....	Sheridan road.....	407.04
23696	Forty-sixth.....	Loomis.....	Robey.....	1,068.48
23719	119th.....	Michigan avenue.....	Wentworth avenue.....	1,163.74
23724	Monroe avenue.....	Sixty-eighth.....	Seventieth.....	540.60
Total.....				\$67,916.60

SEWERS.

No. of Warrant.	NATURE OF IMPROVEMENT.	ON	FROM	TO	AMOUNT.
23102	V. T. P.	N. Seventieth avenue.	W. Fullerton avenue.	Schubert avenue.	\$3,095.08
23119	V. T. P.	School.	N. Western avenue.	Alley W. of Oakley avenue.	512.50
23120	V. T. P.	Parker avenue.	Kimball avenue.	Alley E. of Ballou.	725.04
23121	V. T. P.	Thomas.	Kedzie avenue.	485 feet west.	815.40
23122	V. T. P.	Cortez.	Kedzie avenue.	485 feet west.	887.75
23123	V. T. P.	W. Chicago avenue.	N. Forty-sixth avenue.	N. Forty-eighth avenue.	2,254.45
23124	V. T. P.	Curtis avenue.	238 ft. N. of 113th.	114th place.	1,916.48
23125	V. T. P.	Butler.	Ninety-seventh.	Ninety-ninth.	2,357.38
23126	V. T. P.	W. Erie.	N. Forty-sixth avenue.	N. Forty-eighth avenue.	2,252.23
23127	V. T. P.	S. Elizabeth.	W. Sixty-second.	W. Sixty-third.	960.36
23128	V. T. P.	Gladys avenue.	S. Forty-sixth avenue.	S. Forty-seventh avenue.	1,008.85
23129	V. T. P.	W. Huron.	N. Forty-sixth avenue.	N. Forty-eighth avenue.	2,252.23
23130	V. T. P.	S. Paulina.	Forty-fifth.	Forty-seventh.	2,197.64
23131	V. T. P.	N. Whipple.	Sacramento avenue.	20 feet N. of Kinzie.	655.29
23134	V. T. P.	Seventy-fifth.	Stony Island avenue.	Washington avenue.	746.77
23150	V. T. P.	Hayes.	Kimball avenue.	Alley E. of Ballou.	584.32
23151	V. T. P. (N. S.)	Seventy-fifth.	Kimball avenue.	19 ft. W. of alley E. of Kimball avenue.	160.06
23156	V. T. P.	N. Forty-fourth avenue.	W. Irving Park avenue.	C. & N. W. R.	1,277.10
23158	Main sewer system.	Ninety-fifth Street, Ninety-	ninth street, 103d street, Hal-	sted street, etc.	5,000.00
23165	V. T. P.	N. Troy.	W. Irving Park avenue.	W. Grace.	1,959.94
23166	V. T. P.	S. Forty-first court.	W. Twenty-seventh.	W. Thirty-first.	3,143.00
23167	V. T. P.	S. Forty-first avenue.	W. Twenty-seventh.	W. Thirty-first.	3,130.20
23168	V. T. P.	S. Forty-first court.	W. Twenty-seventh.	W. Thirty-first.	3,175.85
23169	Main outfall.	S. Central Park avenue, W.	Thirtieth street, W. Thirty-fir-	st street, S. Homan avenue, etc.	22,055.25
23172	System in W. Thirty-	first street, S. Forty-second c-	ourt and S. Forty-third aven-	ue.	8,797.06
23178	System in Ontario St	reet, N. Fiftieth court, N. Fi-	fty-first avenue, N. Fifty-sec-	ond avenue.	8,680.47
23185	V. T. P.	N. Clark.	Irving Park boulevard.	Byron.	1,349.88
23186	V. T. P.	Magnolia avenue.	Lawrence avenue.	Argyle.	1,664.20
23187	V. T. P.	W. Twentieth.	Albany avenue.	630 feet east.	892.52
23188	V. T. P.	Seventy-fourth.	Bond avenue.	Colles avenue.	667.80
23190	V. T. P.	Lowe avenue.	Root.	W. Forty-second.	454.47
23197	V. T. P.	Monticello avenue.	W. Diversey avenue.	a point 111 feet N. of Wrightwood avenue.	1,948.80
23198	V. T. P.	S. Forty-third avenue.	Ogden avenue.	to first alley South of W. Twenty-second.	1,113.00
23201	V. T. P.	W. 111th.	Wentworth avenue.	Stewart avenue.	3,345.51
23202	B. and V. T. P.	Throop.	W. Eighty-eighth.	W. Ninety-fourth.	9,809.75
23203	B. and V. T. P.	Loomis.	W. Eighty-eighth.	W. Ninety-fourth.	9,855.28

23204	V. T. P.	Fifty-fifth place.	S. Park avenue.	Indiana avenue.	\$ 1,439.91
23205	V. T. P.	N. Fortieth avenue.	W. Wilson avenue.	W. Berteau avenue.	4,528.72
23206	V. T. P.	Justine.	Fifty-ninth.	Sixty-first.	1,656.44
23209	V. T. P.	Wallace.	W. Ninety-ninth.	Alley N. of W. 103d.	4,276.25
23210	V. T. P.	Lowe avenue.	W. Ninety-ninth.	Alley N. of W. 103d.	4,297.98
23212	V. T. P.	W. Lake.	S. Forty-sixth avenue.	S. Forty-eighth avenue.	1,790.99
23213	V. T. P.	W. Madison.	S. Forty-sixth avenue.	S. Forty-seventh avenue.	840.46
23218	V. T. P.	W. Kinzie.	N. Forty-sixth avenue.	N. Forty-eighth avenue.	1,886.99
23219	V. T. P.	W. Monroe.	S. Forty-sixth avenue.	S. Forty-seventh avenue.	952.14
23226	V. T. P.	Colorado avenue.	S. Forty-sixth avenue.	S. Forty-Seventh avenue.	660.80
23227	V. T. P.	Colorado avenue.	from S. 47th ave. to S. 48th ave. and thence in S. 48th ave. to Harard street.	S. Forty-eighth avenue.	1,635.94
23228	V. T. P.	W. Randolph.	S. Forty-sixth avenue.	S. Forty-eighth avenue.	2,157.57
23229	V. T. P.	W. Randolph.	S. Forty-sixth avenue.	S. Forty-eighth avenue.	2,215.80
23230	V. T. P.	W. Monroe.	S. Forty-seventh avenue.	S. Forty-eighth avenue.	1,025.61
23231	V. T. P.	W. Lake.	S. Forty-sixth avenue.	S. Forty-eighth avenue.	1,704.99
23232	System in E. Ravens	wood Park, Bryn Mawr, avenue, etc.	S. Forty-sixth avenue.	S. Forty-eighth avenue.	11,298.55
23251	V. T. P.	N. Oakley avenue.	Montrose ave.	Alley N. of Cullom avenue.	699.60
23259	V. T. P.	N. Forty-fourth court.	W. Wilson avenue.	W. Cullom avenue.	3,515.72
23265	V. T. P.	W. Byron.	N. Fortieth avenue.	N. Springfield avenue.	1,042.24
23282	V. T. P.	W. Superior.	N. Forty-eighth avenue.	N. Fifty-first avenue.	3,648.04
23284	V. T. P.	East court.	Belmont avenue.	285 feet South.	466.40
23285	V. T. P.	Justine.	W. Sixty-ninth.	W. Seventieth.	1,045.16
23286	V. T. P.	Lafin.	W. Sixty-ninth.	W. Seventieth.	1,015.74
23321	V. T. P.	S. Western boulevard.	W. Twenty-second.	333 ft. S. of Twenty-third pl.	2,298.89
23322	Brk. and V. T. P.	Madison avenue.	Sixtieth.	Sixty-third, etc.	7,122.09
23324	V. T. P.	W. Jackson.	S. Forty-seventh avenue.	S. Forty-eighth avenue.	1,007.15
23328	System in Fulton str	et, S. Forty-eighth avenue,	S. Fifty-first avenue, S. Fift	y-first court, etc.	6,500.00
23331	Brk. and V. T. P.	in O'Brien avenue and W. North avenue	N. Forty-eighth avenue.	1050 feet east.	4,070.98
23343	V. T. P.	W. Dakin avenue.	N. Fortieth avenue.	N. Springfield avenue.	1,096.57
23344	V. T. P.	Bishop.	W. Sixty-seventh.	W. Sixty-ninth.	2,157.86
23345	V. T. P.	Justine.	W. Sixty-seventh.	W. Sixty-ninth.	2,154.45
23346	V. T. P.	Lafin.	W. Sixty-seventh.	W. Sixty-ninth.	2,085.55
23347	System in Justine str	et, Lafin street, Bishop str	et, W. Seventieth street, etc	112th place.	6,528.27
23350	V. T. P.	State.	112th.	eth avenue, etc.	388.00
23351	System in W. Indiana	street, W. Kinzie street, N. F	orty-eighth avenue, N. Fifti	W. Ninety-fourth.	14,500.00
23369	Brk. and V. T. P.	Ada.	W. Eighty-eighth.	A point 130 feet N. W. of Maple avenue.	9,881.93
23370	Brk. and V. T. P.	Elston avenue.	W. Montrose avenue.	Avondale avenue.	3,289.89
23494	V. T. P.	N. Forty-fifth avenue.	W. Wilson avenue.	220 feet east.	8,410.67
23496	System in W. Lake str	et, S. Forty-eighth avenue	e, S. Fiftieth avenue, etc.		5,407.75
23507	V. T. P.	W. Belden avenue.	Ballou.		807.40

SEWERS—CONTINUED.

No. of Warrant.	NATURE OF IMPROVEMENT.	ON	FROM	TO	AMOUNT.
23508	V. T. P.	W. Harrison	S. Forty-seventh avenue	S. Forty-eighth avenue	\$ 999.58
23510	Brick	Washington avenue	Sixty-third	a point 125 feet N. of Jackson Park Terrace	2,843.98
23519	Brk. and V. T. P.	W. 106th	Wentworth avenue	E. line of Right of Way of C. & W. I. R. R.	2,943.75
23520	Brk. and V. T. P.	W. 105th place	Wentworth avenue	E. line of Right of Way of C. & W. I. R. R.	2,943.38
23521	V. T. P.	N. Irving avenue	Montrose avenue	first alley N. of Culloom avenue	677.52
23522	V. T. P.	N. Claremont avenue	Montrose avenue	first alley N. of Culloom avenue	677.52
23523	V. T. P.	Prospect avenue	W. Ninety-fifth	W. Ninety-ninth	4,088.00
23524	Brick	Kimbarck avenue	Sixty-third	a point 260 ft. S. of Sixty-fifth	4,147.25
23534	Sewer system in But	ler street, W. 102d street, W.	102d place, etc.	N. Fiftyfifth avenue	7,000.00
23560	V. T. P.	Cornelia	N. Forty-eighth avenue	N. Fiftyfifth avenue	2,475.42
23561	V. T. P.	Cornelia	N. Kedzie avenue	a point 115 feet W. of Humboldt boulevard	1,234.87
23562	Brk. and V. T. P.	Chestnut	Lincoln Park boulevard	Lake Shore Drive	3,252.08
23563	V. T. P.	Brewery avenue	Twenty-seventh	Southeasterly 310 feet	636.43
23564	V. T. P.	Flournoy	S. Forty-sixth avenue	S. Forty-seventh avenue	933.68
23565	V. T. P.	W. Harrison	S. Forty-sixth avenue	S. Forty-seventh avenue	980.50
23566	V. T. P.	W. Superior	S. Forty-sixth avenue	N. Forty-eighth avenue	2,257.00
23568	Brk. and V. T. P.	S. Canal	W. Ninety-ninth	first alley N. of W. 103d	5,000.00
23573	V. T. P.	Minerva avenue	Sixty-fifth	Sixty-seventh	2,216.46
23578	Brk. and V. T. P.	N. Hermitage avenue	Bryn Mawr avenue	first alley S. of Peterson ave.	5,455.60
23583	V. T. P.	W. Culloom avenue	N. Western avenue	N. Campbell avenue	1,135.00
23588	V. T. P.	N. Forty-sixth court.	W. Montrose avenue	W. Wilson avenue	2,000.00
23601	V. T. P.	Lexington	S. Lawndale avenue	280 feet west	586.60
23602	V. T. P.	S. Homan avenue	W. Twenty-sixth	W. Thirtieth	2,800.00
23603	V. T. P.	N. Forty-sixth avenue	W. Montrose avenue	W. Wilson avenue	1,995.00
23604	Sewer system in W.	Chicago avenue, N. Fifty-fir	at avenue, N. Fifty-first cou	rt, etc.	21,500.00
23606	V. T. P.	W. 11th place	Wentworth avenue	Perry avenue	927.68
23671	V. T. P.	N. Forty-eighth court.	Grand avenue	first alley S. of Fullerton ave.	2,000.00
23672	V. T. P.	W. Twenty-seventh	S. Kedzie avenue	S. Sawyer avenue, etc.	1,006.00
23713	V. T. P.	S. Hoyne avenue	W. Seventeenth	Alley S. of W. Seventeenth	177.64
23714	V. T. P.	W. 100th	Prospect avenue	Wood	1,500.00
23715	V. T. P.	N. Forty-first court.	Armitage avenue	Dickens avenue	964.32
23717	V. T. P.	W. Thirty-fifth place.	S. Oakley avenue	first alley E. of S. Western av.	353.00
23718	Brk. and V. T. P.	Wood	W. 108d	W. 107th	5,500.00
23723	V. T. P.	W. Fullerton avenue	N. Forty-sixth avenue	N. Forty-eighth avenue	2,054.52
Total					\$652,890.63



ILLINOIS CENTRAL RAILROAD BRIDGE, 55TH STREET.

DRAINS.

No. of Warrant	ON	FROM	TO	AMOUNT.
23105	Drake avenue.....	Elbridge avenue.....	Belmont avenue.....	\$ 536.76
23189	N. Forty-second avenue.....	Montrose boulevard.....	W. Berteau avenue.....	461.10
23196	S. Forty-first avenue.....	Van Buren.....	Harrison.....	127.20
23238	Lexington.....	S. Fortieth avenue.....	S. Forty-first avenue.....	413.40
23239	W. Polk.....	S. Fortieth avenue.....	S. Forty-first avenue.....	666.74
23240	Kensington avenue.....	Front.....	Michigan avenue.....	2,081.81
23243	Linden place.....	Humboldt boulevard.....	N. Sacramento avenue.....	576.00
23244	S. Forty-fourth avenue.....	W. Twelfth.....	N. Sixteenth.....	1,572.00
23246	Forty-first court.....	Columbus avenue.....	Harvard.....	396.00
23247	W. Huron.....	N. Rockwell.....	N. Washenaw avenue.....	228.00
23248	W. Kinzie.....	N. Fortieth avenue.....	N. Forty-sixth avenue.....	429.00
23274	Carroll avenue.....	N. Sacramento avenue.....	N. Kedzie avenue.....	1,032.00
23289	E. Ravenswood Park.....	Lawrence avenue.....	Ainslie.....	576.05
23303	Sixty-ninth court.....	Cottage Grove avenue.....	S. Chicago avenue.....	346.65
23304	Sixty-ninth.....	Cottage Grove avenue.....	S. Chicago avenue.....	280.50
23311	Homan avenue.....	Central Park boulevard.....	Chicago avenue.....	2,020.00
23509	N. Spaulding avenue.....	W. Ohio.....	W. Chicago avenue.....	1,214.23
23511	S. May.....	W. Sixty-ninth.....	W. Seventieth.....	521.52
23512	Loomis.....	W. Sixty-ninth.....	W. Seventieth.....	486.54
23513	Elizabeth.....	The alley south of Garfield boul.....	W. Fifty-seventh.....	958.77
23514	Central Park avenue.....	Douglas boulevard.....	W. Twelfth Street boulevard.....	837.93
23515	Berteau avenue.....	Lincoln avenue.....	N. Robey.....	356.16
23516	Avenue "M".....	102d.....	N. Robey.....	1,584.70
23517	Lawndale avenue.....	W. Twenty-fifth.....	A point 300 feet south of 104th.....	860.72
23518	W. Fullerton avenue.....	N. Fortieth avenue.....	R. of way of C. B. & Q. R. R.....	3,060.65
23528	N. Forty-first court.....	Montrose boulevard.....	N. Forty-fourth avenue.....	491.84
23536	N. Forty-second court.....	Berteau avenue.....	Irving Park boulevard.....	509.33
23539	N. Forty-fourth avenue.....	Wilson avenue.....	Montrose avenue.....	1,651.48
23570	Chestnut.....	Pine Street boulevard.....	Avondale avenue.....	786.52
23571	Sawyer avenue.....	Diversey avenue.....	Lake Shore drive.....	1,846.20
23596	Ridgeway avenue.....	W. Wrightwood avenue.....	Belmont avenue.....	1,150.10
23597	Halsted.....	117th place.....	W. Fullerton avenue.....	200.34
23598	South place.....	Magnolia avenue.....	118th.....	107.59
23599	S. Robey.....	Archer avenue.....	Thirtieth.....	147.87

DRAINS—CONTINUED.

No. of Warrant	ON	FROM	TO	AMOUNT.
23611	S. Forty-fifth avenue.....	Harrison.....	Lexington.....	\$ 486.54
23612	N. Lawndale avenue.....	Bloomington.....	W. North avenue.....	742.00
23628	Selpp avenue.....	Seventy-first.....	S. Forty-third.....	1,187.20
23629	Haddon avenue.....	N. Forty-second avenue.....	N. Forty-sixth avenue.....	2,566.79
23630	Vincennes avenue.....	Sixty-third.....	Sixty-fifth.....	833.78
23631	Vernon avenue.....	Sixty-seventh.....	Sixty-third.....	2,991.32
23632	Turner avenue.....	W. Twenty-sixth.....	W. Twenty-seventh.....	284.20
23633	W. Nineteenth.....	S. California avenue.....	S. Albany avenue.....	584.06
23673	Sixty-ninth.....	Madison avenue.....	Stony Island avenue.....	857.28
23674	Calumet avenue.....	Sixtieth.....	Sixty-first.....	675.72
23675	S. Paulina.....	W. Forty-fifth.....	W. Forty-seventh.....	1,494.66
23676	W. 119th.....	Wentworth avenue.....	State.....	1,159.00
23677	115th.....	Michigan avenue.....	R. of way of I. C. R. R.....	1,507.80
23721	Fifty-fifth place.....	Stewart avenue.....	Wallace.....	432.00
23733	S. Forty-fourth avenue.....	W. Madison.....	W. Twelfth.....	1,176.00
23735	Monroe avenue.....	Sixty-eighth.....	Seventieth.....	846.94
23726	Avenue "M".....	Ninety-fifth.....	102d.....	2,425.23
23727	S. Paulina.....	W. Fifty-second.....	W. Fifty-fourth.....	1,323.88
23728	Throop.....	Garfield boulevard.....	P. C. C. & St. L. R. R.....	2,121.06
23729	Lexington.....	S. Forty-sixth avenue.....	S. Forty-eighth avenue.....	1,891.25
23730	Harvard.....	S. Forty-sixth avenue.....	S. Forty-eighth avenue.....	1,332.25
23731	Michigan avenue.....	Sixty-sixth.....	Seventy-first.....	2,324.58
	Total.....			\$ 56,655.89

CEMENT SIDEWALK.

No. of Warrant.	ON	FROM	TO	AMOUNT.
23153	Van Buren.....	Centre avenue.....	Paulina.....	\$ 2,650.00
23164	Center.....	Clark.....	Southport avenue.....	1,636.00
23211	Ohio.....	N. Clark.....	St. Clair.....	375.00
23223	Fifty-fifth.....	Cottage Grove avenue.....	Cornell avenue.....	11,206.64
23278	Congress.....	Rockwell.....	California avenue.....	628.75
23279	Lincoln.....	Van Buren.....	Taylor.....	2,076.84
23310	Lunt avenue.....	Grand avenue.....	C. & N. W. R. R.....	1,981.80
23314	Indiana avenue.....	Fifty-fifth.....	Sixty-third.....	2,192.00
23315	Waveland avenue.....	Clark.....	Sheffield avenue.....	927.65
23316	Sixty-fifth.....	Cottage Grove avenue.....	Drexel avenue.....	957.87
23317	Craft.....	Aldine avenue.....	Belmont avenue.....	899.85
23318	Congress.....	California avenue.....	Homan avenue.....	4,479.00
23319	Homan avenue.....	Madison.....	Harrison.....	2,017.50
23320	Sixtieth.....	Cottage Grove avenue.....	S. Park avenue.....	754.90
23329	Bond avenue.....	Seventy-first.....	S. Park avenue.....	2,798.73
23391	Whipple.....	Van Buren.....	Seventy-ninth.....	167.52
23392	Sawyer avenue.....	Fifteenth.....	Colorado avenue.....	470.97
23393	Armour avenue.....	Thirty-fourth.....	Sixteenth.....	649.23
23394	Kedzie avenue.....	Douglas Park boulevard.....	Thirtieth.....	717.40
23395	Parnell avenue.....	Seventieth.....	Sixty-first.....	815.77
23399	W. Nineteenth.....	S. Sawyer avenue.....	S. Homan avenue.....	1,019.29
23401	Morse avenue.....	Clark.....	Forest.....	871.42
23403	Drexel avenue.....	Fifty-first.....	Fifty-fifth.....	2,983.67
23404	Brewery avenue.....	Twenty-seventh.....	To its southern terminus.....	336.27
23405	Bryn Mawr avenue.....	E. Ravenswood Park.....	N. Clark.....	1,509.10
23406	Magnolia avenue.....	Devon avenue.....	Granville avenue.....	350.04
23407	W. Polk.....	Douglas boulevard.....	Fortieth avenue.....	2,843.88
23408	Carpenter.....	Lake.....	Washington.....	412.48
23409	Fifty third.....	Jefferson avenue.....	R. of Way of I. C. R. R.....	1,147.17
23410	Ashland avenue.....	Morse avenue.....	Farwell avenue.....	204.53
23411	Touhy avenue.....	N. Clark.....	100 ft. W. of R. of Way of C. & N. W. R. R.....	138.22
23412	E. Ravenswood Park.....	Bryn Mawr avenue.....	Catalpa avenue.....	643.12
23413	Estes avenue.....	Ridge road.....	Grove.....	683.70
23414	Estes avenue.....	In front of Lots 3 to 9 Inclusive,	Bk. 21 of Rogers Park.....	530.53
23415	Fiftieth.....	Wabash avenue.....	Michigan avenue.....	375.05
23416	Forty-seventh.....	Champlain avenue.....	Langley avenue.....	99.72

CEMENT SIDEWALK—CONTINUED.

No. of Warrant.	ON	FROM	TO	AMOUNT.
23417	Sixty-second.....	Madison avenue.....	Lexington avenue.....	\$ 1,208.86
23418	Stewart avenue.....	Seventy-third.....	Seventy-fourth.....	325.18
23419	Seventy-first.....	Egleston avenue.....	R. of Way of C. R. I. & P. R. R.	264.21
23420	Sixty-sixth.....	Perry avenue.....	Lafayette avenue.....	227.29
23421	Carpenter.....	Sixtieth.....	Sixty-first.....	383.78
23422	Ellis avenue.....	Seventy-first.....	Seventy-second.....	593.84
23423	Ann.....	Madison.....	Lake.....	819.38
23424	Paulina.....	Bryn Mawr avenue.....	Catalpa avenue.....	1,261.82
23425	Sixty-sixth.....	Lowe avenue.....	R. of Way of C. & W. I. R. R.	97.20
23426	N. Ashland avenue.....	Greenleaf avenue.....	First alley south.....	182.52
23427	Perry avenue.....	Sixty-sixth.....	Sixty-seventh.....	417.21
23428	N. Clark.....	Estes avenue.....	243 feet north.....	247.27
23429	Greenleaf avenue.....	From East line of Lot 3, Blk. 22 of Rogers Park.	Ridge road.....	200.46
23430	Calumet avenue.....	Sixty-eighth.....	Sixty-ninth.....	597.02
23431	Illinois.....	Rush.....	Pine.....	544.51
23432	Woodlawn avenue.....	Fifty-fifth.....	Fifty-sixth.....	162.80
23433	Loomis.....	W. Harrison.....	W. Taylor.....	1,311.18
23435	Morse avenue.....	R. of Way of C. M. & St. P. R. R.	Lake Michigan.....	636.60
23436	Western avenue.....	W. Lake.....	W. Madison.....	906.91
23437	Prairie avenue.....	Thirty-eighth.....	Thirty-ninth.....	429.80
23438	Ems.....	Maplewood avenue.....	Powell avenue.....	314.77
23439	Elburn avenue.....	Ladin.....	Ashland boulevard.....	177.06
23440	Fillmore.....	Douglas boulevard.....	S. Fortieth avenue.....	8,189.97
23441	W. Van Buren.....	S. Paulina.....	S. Robey.....	1,990.87
23442	Edgewater terrace.....	N. Ashland avenue.....	E. Ravenswood Park.....	2,419.84
23443	Princeton avenue.....	Fifty-first.....	Fifty-eighth.....	1,658.02
23444	Kedzie avenue.....	W. Kinzie.....	W. Madison.....	2,927.26
23445	Thirty-seventh place.....	Wabash avenue.....	Ally between Wabash av. and Michigan av.	338.90
23446	Elm.....	La Salle avenue.....	Wells.....	258.82
23447	Flournoy.....	California avenue.....	Francisco.....	1,280.17
23454	W. Ravenswood Park.....	Lawrence avenue.....	Leland avenue.....	415.52
23455	Chestnut.....	Rush.....	Geary.....	624.87
23456	S. Morgan.....	W. Madison.....	W. Van Buren.....	598.61
23465	Seventy-first.....	R. of Way of I. C. R. R.	Woodlawn avenue.....	890.12
23466	Lunt avenue.....	Central.....	Ridge road.....	358.19

23467	Leavitt.....	Washington.....	Madison.....	\$ 154.08
23468	W. Monroe.....	Albany avenue.....	Kedzie avenue.....	191.64
23469	Evanson avenue.....	Addison avenue.....	Roscoe.....	212.00
23470	Woodlawn avenue.....	Seventy-second.....	Seventy-third.....	240.15
23471	Morse avenue.....	N. Ashland avenue.....	R. of Way of C. M. & St. P. R. R..	692.98
23472	Ashland avenue.....	Catalpa avenue.....	Bryn Mawr avenue.....	684.96
23473	Catalpa avenue.....	N. Ashland avenue.....	E. Ravenswood Park.....	1,353.72
23474	Sixty-ninth.....	Alley east of Oakwoods Cemetery..	R. of Way of I. C. R. R.....	360.32
23475	Wieland.....	North avenue.....	Schiller.....	788.68
23476	Winona.....	Southport avenue.....	Evanson avenue.....	257.00
23477	Lunt avenue.....	East line of Lot 3, Blk. 48 of Rogers Park...	Ridge Road.....	510.40
23478	Lunt avenue.....	First Alley west of N. Ashland avenue	A point 130 feet west of said alley..	149.24
23479	Winnemac avenue.....	Southport avenue.....	Evanson avenue.....	2,579.92
23488	Adams avenue.....	Seventy-fourth.....	Seventy-fifth.....	656.35
23489	Morgan.....	W. Lake.....	W. Madison.....	990.29
23490	Armour avenue.....	Fifty-eighth.....	Fifty-ninth.....	577.99
23491	Addison.....	Robey.....	Seeley avenue.....	626.84
23527	Calumet avenue.....	Fifty-ninth.....	W. Twelfth.....	1,831.48
23532	Francisco.....	W. Lake.....	Sixty-first.....	6,462.47
23567	N. Normal Park Way.....	Stewart avenue.....	R. of Way of C. R. I. & P. R. R.....	303.45
23579	Chauncey avenue.....	Sixty-ninth.....	Seventy-first.....	461.18
23580	Seventieth.....	Chauncey avenue.....	R. of Way of I. C. R. R.....	329.08
23581	Kimbark avenue.....	Sixty-ninth.....	Seventy-first.....	666.44
23613	Turner avenue.....	Douglas boulevard.....	R. of Way of C. B. & Q. R. R.....	1,819.16
23614	St. Lawrence avenue.....	Seventy-second.....	Seventy-fifth.....	1,812.13
23615	Lexington avenue.....	Fifty-fifth.....	Fifty-ninth.....	89.76
23616	Fifty-eighth.....	Cottage Grove avenue.....	Kimbark avenue.....	977.16
23617	Jefferson avenue.....	Seventy-fourth.....	Seventy-fifth.....	1,211.10
23618	Seventy-fourth.....	Yates avenue.....	Railroad avenue.....	510.00
23619	W. Fifty-fourth.....	Wallace.....	Union avenue.....	1,187.28
23620	N. Marshfield avenue.....	Addison.....	Waveland avenue.....	408.04
23621	S. Kedzie avenue.....	W. Twelfth.....	Douglas boulevard.....	451.84
23622	Wrightwood avenue.....	Diversey place.....	Racine avenue.....	208.08
23623	N. Campbell avenue.....	W. Chicago avenue.....	Augusta.....	882.32
23624	W. Monroe.....	S. Kedzie avenue.....	S. Homan avenue.....	635.13
23625	Millard avenue.....	W. Sixteenth.....	Douglas boulevard.....	2,419.35
23626	W. Fourteenth place.....	S. Kedzie avenue.....	S. Albany avenue.....	740.41
23627	Millard avenue.....	Ogden avenue.....	W. Twenty-second.....	483.48
23639	S. Marshfield avenue.....	Garfield boulevard.....	Sixty-third.....	3,200.41
23640	S. Lawndale avenue.....	W. Twelfth.....	Ogden avenue.....	3,369.90

CEMENT SIDEWALK—CONTINUED.

No. of Warrant.	ON	FROM	TO	AMOUNT.
23689	Wabash avenue.....	Sixty-sixth.....	Sixty-seventh.....	\$ 617 21
23698	Montrose boulevard.....	N. Fortieth avenue.....	N. Hamlin avenue.....	519 82
23699	Fifty-fourth.....	Cottage Grove avenue.....	Kimberly avenue.....	920 29
23700	Madison avenue.....	Sixty-seventh.....	Seventy-first.....	8,202 16
	Total.....			\$125,705 97

PLANK SIDEWALK.

No. of Warrant.	ON	FROM	TO	AMOUNT.
23171	Rockwell.....	Ogden avenue.....	Twelfth place.....	\$ 125 20
23253	Thirty-ninth.....	Long John.....	Western avenue.....	531 73
23262	One Hundred and Thirteenth.....	Butterfield.....	Wentworth avenue.....	386 00
23270	Crawford avenue.....	Madison.....	Twelfth.....	687 04
23272	Dobson avenue.....	Eightieth.....	Eighty second.....	476 52
23275	Melrose.....	Western avenue.....	Robey.....	489 20
23276	N. Fortieth avenue.....	North avenue.....	Diversey.....	1,492 40
23371	Nineteenth place.....	Johnson.....	Brown.....	173 95
23372	Sacramento avenue.....	Twenty second.....	Twenty-third.....	190 77
23373	Oakley avenue.....	Fullerton avenue.....	Station.....	57 83
23374	Seventieth.....	Aberdeen.....	Morgan.....	188 27
23375	Stony Island avenue.....	Ninety-second place.....	Ninety-third.....	62 91
23376	Collax avenue.....	Seventy-fifth.....	Seventy-seventh.....	122 55
23377	Ninety-ninth.....	Prospect avenue.....	First alley east.....	66 52
23378	Newberry avenue.....	Taylor.....	Twelfth.....	745 14
23379	Twenty-fifth.....	California avenue.....	Rockwell.....	269 49
23380	Thirop.....	Fifty-ninth.....	Sixty-first.....	567 61
23381	Burnside avenue.....	St. Lawrence avenue.....	Langley avenue.....	57 56
23382	Twenty-third.....	Whipple.....	Sacramento avenue.....	95 08
23383	Indiana avenue.....	Sixty-sixth place.....	Sixty-seventh.....	214 79
23384	Ninety-second place.....	Stony Island avenue.....	McFarlane avenue.....	167 54
23385	Spaulding avenue.....	Ogden avenue.....	Douglas boulevard.....	1,003 81

23386	Albany avenue.....	Grace.....	Addison.....	\$ 226.10
23387	W. Fifty-sixth.....	S. Halsted.....	S. Morgan.....	188.42
23388	Prospect avenue.....	Ninety-ninth.....	Sixty-six and one-half feet north.....	21.14
23389	Trumbull avenue.....	Eighteenth.....	Douglas boulevard.....	322.27
23390	Dauphin avenue.....	Eighty-seventh.....	Eighty-eighth place.....	255.33
23396	Ewing avenue.....	Ninety-second.....	One Hundred and Second.....	2,929.54
23397	Eighteenth.....	Halsted.....	Robey.....	3,935.82
23398	W. Nineteenth.....	S. Halsted.....	S. Robey.....	4,376.10
23400	Fillmore.....	S. Fortieth avenue.....	S. Forty-second avenue.....	156.11
23402	Sixty-third.....	Centre avenue.....	Ashland avenue.....	3,070.82
23434	Sixty-third.....	Lincoln.....	Ashland avenue.....	596.92
23448	Sixty-first.....	Central Park avenue.....	Lawndale avenue.....	243.57
23449	Central Park avenue.....	Sixty-third.....	Sixty-fifth.....	551.47
23450	Sixty-fifth.....	Homan avenue.....	Spaulding avenue.....	164.56
23451	One Hundredth.....	State.....	Michigan avenue.....	90.91
23452	Lime.....	Archer avenue.....	Twenty-seventh.....	374.53
23453	W. Twenty-fourth place.....	Oakley avenue.....	Western avenue.....	182.00
23457	Jeffery avenue.....	Ninety-second.....	Ninety-third.....	385.55
23458	Washington avenue.....	Ninety-first.....	Ninety-third.....	115.32
23459	W. Twenty-fifth.....	Rockwell.....	California avenue.....	121.80
23460	Eighty-seventh place.....	Cottage Grove avenue.....	Dauphin avenue.....	193.23
23461	Greshaw.....	S. Fortieth avenue.....	S. Forty-second avenue.....	310.24
23462	N. Forty-fifth avenue.....	W. Dunning.....	W. Fullerton avenue.....	92.60
23463	Indianapolis avenue.....	Avenue "K".....	One Hundred and Third.....	553.43
23464	Vincennes avenue.....	Eighty-seventh.....	Ninety-first.....	882.34
23480	Broom.....	Grand avenue.....	W. Ohio.....	293.07
23481	Leavitt.....	Wellington avenue.....	Oakdale avenue.....	101.18
23482	St. Lawrence avenue.....	Eighty-seventh.....	Nineteenth.....	483.23
23483	Seipp avenue.....	Ninety-second place.....	Ninety-third.....	39.19
23484	Avenue H.....	One Hundred and Second.....	One Hundred and Third.....	165.50
23485	Thirty-fifth place.....	Halsted.....	Morgan.....	336.78
23486	Eighty-eighth.....	Cottage Grove avenue.....	Dauphin avenue.....	507.78
23487	Osgood.....	Clybourn avenue.....	First alley east.....	46.64
23492	Wallace.....	Thirty-fifth.....	Thirty-ninth.....	1,779.68
23609	South Chicago avenue.....	Seventy-fifth.....	South Park avenue.....	5,673.16
23610	Twentieth.....	Robey.....	Halsted.....	4,228.13
23635	Shakespeare avenue.....	N. Humboldt.....	Humboldt boulevard.....	136.00
23644	Elston avenue.....	Kedzie avenue.....	Irving Park boulevard.....	226.54
23645	S. Ashland avenue.....	Garfield boulevard.....	W. Sixty-third.....	2,316.33
23646	Arch.....	Archer avenue.....	Lyman.....	228.80

PLANK SIDEWALK—CONTINUED.

No. of Warrant.	ON	FROM	TO	AMOUNT.
23647	S. May	W. Eighteenth	W. Twenty-second	\$1,027.15
23648	N. Linden avenue	Lot 13 of blk. 16, Irving Park Addition in Sec. 15-40-13	N. Forty-third avenue	264.81
23649	S. Wood	W. Ninety-ninth	W. One Hundred and Third	490.00
23681	S. Green	W. Sixty-sixth	W. Sixty-ninth	345.71
23682	N. Forty-fourth avenue	W. North avenue	Castello avenue	401.54
23683	S. Carpenter	W. Sixty-third	W. Sixty-ninth	2,060.37
23684	S. Wood	W. One Hundred and Third	W. One Hundred and Seventh	1,356.87
23685	Barber	Canal	Stewart avenue	52.82
23686	N. Washtenaw avenue	Elston avenue	W. Belmont avenue	254.67
23687	Schubert avenue	Ballou	Kimball avenue	817.12
23688	W. Twentieth place	S. Centre avenue	S. May	253.50
23690	Commercial avenue	Eighty-ninth	Ninety-first	1,278.20
23691	One Hundred and Ninth	Michigan avenue	Indiana avenue	210.90
23692	Chauncey avenue	Seventy-seventh	Seventy-ninth	302.30
23693	S. Centre avenue	W. Sixty-ninth	W. Seventy-third	1,090.65
23694	Wallace	W. Ninety-first	W. Ninety-fifth	608.35
23695	Thirty-fifth	S. Halsted	S. Morgan	321.55
23696	Thirty-seventh place	Butler	P. Ft. W. & C. R. R.	293.59
23697	Thirty-second	S. Halsted	S. Morgan	201.63
23701	Thirty-eighth place	S. Ashland avenue	S. Paulina	235.96
23702	Illinois avenue	Eighty-third place	Ontario avenue	661.58
23703	Poplar avenue	Archer avenue	Twenty-ninth	714.20
23704	W. Forty-seventh place	S. Centre avenue	S. Morgan	450.72
23705	S. Wood	W. Fifty-second	Garfield boulevard	217.98
23706	N. Rockwell	W. Huron	Augusta	754.62
23716	Ninetieth	Cottage Grove avenue	Vincennes avenue	274.28
23720	Crawford avenue	Madison	Twelfth	1,038.15
	Total			\$80,401.22

STONE SIDEWALKS.

No. of Warrant.	NAME OF STREET.	FROM	TO	AMOUNT.
23268	Monroe.....	Halsted	Centre avenue.....	\$ 7,322.80
23341	Lake	Canal	Ann	24,659.20
23342	Clinton	Madison.....	Van Buren.....	5,767.71
	Total.....			\$87,749.71

BOULEVARD LAMP POSTS.

No. of Warrant.	No. of Posts.	NAME OF STREET	FROM	TO	AMOUNT.
23941	17	Seventy-second	Merrill avenue.....	Yates avenue.....	\$ 603.50
23805	50	W. Jackson.....	W. Fortieth.....	W. Forty-sixth.....	1,700.00
23886	6	Washington Park Court.....	Forty-ninth.....	Fiftieth.....	159.00
		Total.....			\$2,462.50

GAS LAMP POSTS.

No. of Warrant.	No. of Posts.	NAME OF STREET.	FROM	TO	AMOUNT.
23263	43	N. Ashland avenue.....	Foster avenue	Edgewater avenue.....	\$1,053.50
23277	15	Evanston avenue.....	Lawrence avenue.....	Argyle	397.50
23280	27	Loomis.....	W. Fifty-ninth.....	W. Sixty-third	691.75
23290	11	Lawrence avenue	N. Clark	Evanston avenue.....	250.69
23191	2	Forty-fourth	Grand boulevard	Vincennes avenue.....	45.58
23607	16 and 12 con.	Forty-fifth.....	Woodlawn avenue.....	Vincennes avenue.....	689.40
23659	7	Monticello avenue	Ohio	Huron.....	185.50
		Total.....			\$3,303.92

SUMMARY.

STREETS.

Wooden Block Pavement:

North Division.....	\$ 67,676.73	
South Division.....	110,962.50	
West Division.....	255,183.81	
		\$ 433,822.54

Asphalt Pavement:

North Division.....	\$ 164,259.83	
South Division.....	98,256.88	
West Division.....	184,062.81	
		\$ 446,579.52

Vitrified Brick Pavement:

North Division.....	\$ 4,143.12	
South Division.....	85,324.24	
West Division.....	59,500.00	
		\$ 148,967.36

Macadam Pavement:

North Division.....	\$ 56,598.45	
South Division.....	94,424.22	
West Division.....	6,494.83	
		\$ 157,517.00

Granite Block Pavement:

South Division.....	\$ 4,391.97	
West Division.....	56,885.98	
		\$ 61,277.95

Slag Pavement:

South Division.....	\$ 7,000.00	
		\$ 7,000.00

ALLEYS.

Wood Block Pavement:

North Division.....	\$ 6,786.11	
South Division.....	4,416.25	
West Division.....	11,115.51	
		\$ 22,317.87

Vitrified Brick Pavement:

West Division.....	\$ 6,981.04	
		\$ 6,981.04

Granite Block Pavement:

North Division.....	\$ 2,070.98	
		\$ 2,070.98

SUMMARY.

MISCELLANEOUS.

Curbing and Filling Streets:

South Division.....	\$ 10,349.11	
		\$ 10,349.11

Opening and Widening Streets and Alleys:

North Division.....	\$ 23,060.22	
South Division.....	44,216.45	
West Division.....	7,863.80	
		\$ 75,140.47

Water Supply Pipes:

North Division.....	\$ 2,546.80	
South Division.....	20,545.12	
West Division.....	40,606.15	
		\$ 63,698.07

Water Service Pipes:

North Division.....	\$ 4,232.04	
South Division.....	25,039.42	
West Division.....	38,645.14	
		\$ 67,916.60

Sewers:

North Division.....	\$ 26,053.35	
South Division.....	121,509.51	
West Division.....	185,326.77	
		\$ 332,889.63

Drains:

North Division.....	\$ 1,825.32	
South Division.....	26,786.70	
West Division.....	28,043.87	
		\$ 56,655.89

Cement Sidewalks:

North Division.....	\$ 25,712.04	
South Division.....	50,059.73	
West Division.....	49,934.20	
		\$ 125,705.97

Plank Sidewalks:

North Division.....	\$ 704.85	
South Division.....	35,943.35	
West Division.....	23,753.02	
		\$ 60,401.22

Stone Sidewalks:

West Division.....	\$ 37,749.71	
		\$ 37,749.71

Boulevard Lamp Posts:

South Division.....	\$	762.50	
West Division.....		1,700.00	
			\$ 2,462.50

Gas Lamp Posts:

North Division.....	\$	1,701.69	
South Division.....		1,416.73	
West Division.....		185.50	
			\$ 3,303.92

RECAPITULATION.

Assessments

Prepared.....	\$	433,822.54
87 Street paving, wooden block.....		446,579.52
25 Street paving, asphalt.....		148,967.36
7 Street paving, vitrified brick.....		157,517.00
18 Street paving, macadam.....		61,277.95
5 Street paving, granite block.....		7,000.00
1 Street paving, slag.....		22,317.87
17 Alley paving, wooden block.....		6,931.04
4 Alley paving, vitrified brick.....		2,070.98
1 Alley paving, granite block.....		10,349.11
2 Curbing and filling streets.....		75,140.47
9 Opening and widening streets and alleys.....		63,698.07
51 Water supply pipes.....		67,916.60
50 Water service pipes.....		332,889.63
110 Sewers.....		56,655.89
57 Drains.....		125,705.97
115 Sidewalks, cement.....		60,401.22
89 Sidewalks, plank.....		37,749.71
3 Sidewalks, stone.....		2,462.50
3 Lamp posts, boulevard.....		3,303.92
7 Lamp posts, gas.....		
611	Total.....	\$2,122,757.35

LIST OF ASSESSMENTS FOR EACH YEAR SINCE 1861.

For the year ending April 1, 1862.....	\$	42,635.49
For the year ending April 1, 1863.....		46,493.67
For the year ending April 1, 1864.....		389,169.31
For the year ending April 1, 1865.....		103,576.35
For the year ending April 1, 1866.....		802,574.56
For the year ending April 1, 1867.....		317,206.18
For the year ending April 1, 1868.....		1,354,436.43
For the year ending April 1, 1869.....		2,395,683.03
For the year ending April 1, 1870.....		2,836,852.48
For the year ending April 1, 1871.....		2,359,835.89
For the year ending April 1, 1872.....		62,222.25
For the year ending April 1, 1873.....		

For the year ending April 1, 1874.....	\$ 749,460.27
For the year ending April 1, 1875.....	728,254.42
For the nine months ending December 31, 1875.....	60,585.72
For the year ending December 31, 1876.....	1,516,081.07
For the year ending December 31, 1877.....	124,498.48
For the year ending December 31, 1878.....	284,900.45
For the year ending December 31, 1879.....	588,963.44
For the year ending December 31, 1880.....	980,895.50
For the year ending December 31, 1881.....	1,227,169.71
For the year ending December 31, 1882.....	1,395,372.98
For the year ending December 31, 1883.....	2,232,757.04
For the year ending December 31, 1884.....	2,857,905.28
For the year ending December 31, 1885.....	2,889,544.80
For the year ending December 31, 1886.....	3,307,567.99
For the year ending December 31, 1887.....	3,160,474.67
For the year ending December 31, 1888.....	3,655,956.78
For the year ending December 31, 1889.....	4,220,869.93
For the year ending December 31, 1890.....	6,987,155.48
For the year ending December 31, 1891.....	8,790,443.29
For the year ending December 31, 1892.....	14,505,701.79
For the year ending December 31, 1893.....	6,001,445.65
For the year ending December 31, 1894.....	2,903,814.16
For the year ending December 31, 1895.....	4,387,214.44
For the year ending December 31, 1896.....	4,037,319.96
For the year ending December 31, 1897.....	2,102,951.45
For the year ending December 31, 1898.....	2,122,757.35
Total for thirty-eight years.....	\$92,525,747.79

ANNUAL REPORT
Bureau of Maps and Plats
CITY OF CHICAGO
1898

HUGO S. GROSSER
SUPERINTENDENT

BUREAU OF MAPS AND PLATS.

HON. LAWRENCE E. MCGANN,

Commissioner of Public Works.

DEAR SIR: I have the honor to submit to you the annual report of the Bureau of Maps for the year 1898. The work performed by this Bureau during the year was as follows:

PLATS FOR THE BUREAU OF SPECIAL ASSESSMENTS.

Street improvement and street and alley opening assessment.....	294
Street and alley opening and vacation ordinances.....	109
Lamp post ordinances.....	18
Lamp post orders.....	7
Lamp post assessment.....	6
Law Department and Corporation Counsel.....	139
Total.....	573

FOR THE BUREAU OF STREETS AND ALLEYS.

Street improvement estimates and street and alley surveys.....	498
Plats for Division of Sidewalks	1,508
Total.....	2,006
Department of Track Elevation.....	22
Water pipe extension, assessment.....	33
City Gas Inspector.....	100
City Council and Aldermen.....	33
Bureau of Street and Alley Cleaning.....	4
Bureau of Sewers.....	115
Miscellaneous purposes.....	150

ATLAS POSTINGS.

200 entries of.....	125 subdivisions.
29 entries of.....	19 vacations.
27 entries of.....	15 street openings.
• 14 entries of.....	9 alley openings.

Total 270 entries of.....168 documents.

Thirty-five pages have been completed of new atlas of the Town of Hyde Park, also six pages of a new atlas of Lake View, thirty-nine pages of which are near completion.

Three hundred and eleven frontage petitions for street and alley improvements were checked up for Board of Local Improvements. Eighteen frontage petitions for street railways were checked.

MILEAGE OF STREETS AND ALLEYS.

The combined length of all streets and alleys in the City of Chicago by wards was computed for the Bureau of Streets and is shown in the following table:

WARDS.	STREETS—Miles.	ALLEYS—Miles
1.....	18.22	8 01
2.....	17.14	9.14
3.....	16.00	10.86
4.....	21.27	12.56
5.....	26.10	14.10
6.....	51.86	30.78
7.....	18.16	8.89
8.....	14.42	8.54
9.....	19.91	11.41
10.....	98.95	58.16
11.....	19.16	14.85
12.....	62.77	41.04
13.....	43.50	28.16
14.....	59.63	38.92
15.....	71.15	50.72
16.....	16.78	10.02
17.....	16.00	5.17
18.....	11.87	6.11
19.....	19.89	9 94
20.....	20.81	10.75
21.....	15.96	7.68
22.....	13.19	5.80
23.....	15.75	7.11
24.....	21.25	6.30
25.....	102.46	58.28
26.....	110.25	64.62
27.....	355.75	153.13
28.....	110.06	60.48
29.....	54.13	29.16
30.....	196.76	117.30
31.....	353.24	170.83
32.....	58.16	31.27
33.....	269.25	132.82
34.....	254.24	139.76
Total.....	2,573.94	1,371.61

**MILEAGE OF STREETS AND ALLEYS ADDED TO THE CITY
IN 1898 BY SUBDIVISIONS AND CONDEMNATIONS.**

	STREETS.		ALLEYS.	
	Miles.	Feet.	Miles.	Feet.
Calumet.....				360
Hyde Park.....		257		958
Lake	1	1,465		5,130
Lake View.....	1	3,665	1	3,791
Roger's Park — West Ridge		1,000		775
Jefferson	3	2,625	3	2,285
West Town.....		2,130		3,025
Total increase.....	7	582	7	484

The following ward maps have been compiled:

Fifth Ward,
Thirtieth Ward,
Thirty-first Ward.

Thirty-second Ward,
Thirty-fourth Ward,

The names of the following street were changed during this year:

Vernon Park place, changed to *Oregon avenue*, from Centre avenue to Loomis street.

Seventy-sixth street, changed to *Patzack place*, from I. C. R. R. to Greenwood avenue.

Pacific avenue, changed to *Burhans avenue*, from Sanford avenue to Grant place.

South side of Fifty-first street, from Drexel boulevard to Cottage Grove avenue, named *Drexel square*.

About 1,000 house number notices were served on owners, agents, etc., of houses, and the corresponding house number certificates were furnished.

Respectfully submitted,

HUGO S. GROSSER,

Superintendent of Maps.

Bookkeeper's Statement.

BOOKKEEPER'S STATEMENT.

HON. LAWRENCE E. McGANN,

Commissioner of Public Works.

DEAR SIR:—I herewith respectfully submit statement in detail of the receipts and expenditures of the Department of Public Works for the year 1898:

WATER FUND RECEIPTS.

Balance to credit January 1, 1898.....\$	63,920.64	Amount received for scrap-iron, empty barrels, etc., Acc't Lake View Pump Works	\$ 252.87
Amount collected during the year for current water rents, assessed	2,334,890.43	Amount received as deposit for loan of hydrant wrenches, Acc't Hydrant Wrenches.....	918.00
Amount collected during the year for current water rents, meter measurement.	1,088,616.66	Amount received for brass borings, lead dross, scrap-iron, etc. Acc't Water Works Shop.....	143.79
Amount received for taps and permits, also plumbers' licenses and special assessment work, Acc't Water Permits	34,600.48	Amount received for lowering and repairing water pipe, Acc't Water Pipe Extension	25,109.08
Amount received for material and labor used in laying and repairing water supply pipes for elevators and general supply of water; also for changing location of hydrants and stop cocks, and repairing meters, Acc't Meters and Private Work.....	55,409.94	Rent of Rookery lot.....	35,000.04
Amount received for scrap-iron, empty barrels, etc., Acc't North Pump Works	175.28	From private parties to lay water mains.....	9,953.91
Amount received for scrap-iron, empty barrels, etc., Acc't South Pump Works.	27.72	From sale of water certificates.....	2,200,000.00
Amount received for scrap-iron, empty barrels, etc., Acc't Central Pump Works	194.27	Sale of brick house.....	324.00
Amount received for scrap-iron, empty barrels, etc., Acc't West Pump Works.	220.33	Stationery stock furnished business agent.....	665.83
Amount received for scrap-iron, empty barrels, etc., Acc't Sixty-eighth Street Pump Works.....	176.43	Miscellaneous items.....	180.80
Total receipts, Water Fund.....		Refund, Acc't Springfield Avenue Pump Works....	360.00
		Amount received for scrap-iron, old barrels, etc., Acc't Canal Pumping Station..	697.15
		Amount received for street car tickets furnished different divisions, Proportional Office Expense....	1,371.12
		Amount received from sale of pump, Acc't Sixty-eighth Street Tunnel Ext.	300.00
		Total receipts, Water Fund.....	\$5,853,508.77

WATER FUND EXPENDITURES.

Acc't Water Pipe Extension.			
Pay rolls.....	\$	205,726.20	
Public benefits.....		250,006.65	
Purchase of lots.....		32,720.00	
Hydrant basins built.....		25,689.84	
Office rent January 1, 1885, to December 31, 1898.....		25,316.25	
Services		15,138.12	
Labor and material.....		14,713.08	
Lead.....		14,340.71	
Repairing pavement.....		12,346.42	
Cleaning and filling hy- drant basins.....		9,775.50	
Brick.....		8,046.25	
Lumber.....		7,107.93	
Hydrant rubbers and valves			
Hydrant rings and covers..		7,389.67	
Teaming.....		6,907.95	
Sand and cement.....		4,749.45	
Pipe fitting, valves, spindles etc.....		3,094.54	
Horse board.....		2,482.00	
Connecting taps and pipe...		2,555.10	
Interest on deposits for lay- ing water pipe.....		2,639.03	
Laying pipe.....		3,336.60	
Plumbing		1,893.28	
Manhole covers and lids...		1,931.64	
Rope, gaskets.....		1,498.24	
Cleaning and filling catch basins.....		1,406.40	
Hardware		1,309.37	
Inspection of castings.....		1,248.14	
Cutting holes in sidewalk...		1,037.25	
Office supplies and furni- ture.....		894.77	
Engineers' supplies.....		857.36	
Coal		526.37	
Horseshoeing.....		402.28	
Paints, oil, glass, etc.....		520.58	
Inspection of house drains.		543.58	
Stationery and books.....		347.73	
Repairing tools.....		296.90	
Lanterns, brooms, pails, etc.		286.92	
Ice.....		261.60	
Derrick repairs.....		224.00	
Repairing streets.....		638.57	
Sewer and catch-basins....		713.00	
Sewer work.....	\$	345.35	
Repairing leaks.....		228.10	
Car tickets.....		220.89	
Inspecting lumber.....		215.61	
Telephone service.....		140.21	
Brass castings.....		328.80	
Horse, wagon, harness.....		332.20	
Kettles, melting pots, etc...		231.75	
Sewer pipe.....		353.58	
Rebate on reduction of wa- ter pipe.....		189.08	
Blocks, sheaves etc.....		120.94	
Stable supplies.....		121.09	
Blacksmithing.....		139.80	
Resetting curbs.....		125.82	
Sundries.....		215.98	
Rent of right of way.....		135.00	
Jute packing, waste, etc....		91.47	
Scale.....		84.50	
Washers and harness repairs		69.94	
Hose.....		62.50	
Hickory sticks.....		86.76	
Tar and roofing.....		50.00	
Picks, wrenches, etc.....		43.68	
Printing.....		36.75	
Leather.....		26.63	
Blue prints, tapes, etc.....		24.58	
Dynamite and fuses.....		22.38	
Filling openings.....		15.30	
Boiler tubes.....		16.00	
Cash requisitions.....		20.15	
Advertising		27.50	
Repairs.....		28.55	
Salt and soda.....		28.50	
Roach food, etc.....		18.75	
Labor.....		8.90	
Total.....	\$	675,121.76	
Acc't Water Pipe and Special Castings.			
Water pipe and special cast- ings.....	\$	689,244.46	
Acc't Repairs and Maintenance.			
Pay roll.....		402,417.87	
Teaming.....		19,914.46	
Water.....		3,967.12	
Carried forward.....	\$	426,299.45	

Brought forward.....	\$ 426,299.45
Lumber.....	1,653.89
Services.....	125.00
Calclmining.....	33.00
Total.....	\$ 428,111.34

Acc't North Pump, Operation.

Pay roll.....	\$ 47,684.02
Coal.....	77,252.36
Services.....	2,179.96
Oil, grease and packing....	1,570.61
Gas.....	1,112.60
Sundry supplies.....	338.79
Car tickets.....	220.60
Telephone service.....	125.00
Brooms, soap, etc.....	389.66
Polish.....	31.50
Ice.....	75.91
Bone dust.....	13.95
Toilet paper.....	4.50
Drugs.....	7.80
Total.....	\$ 131,057.26

Acc't North Pump, Maintenance.

Pay roll.....	\$ 20,562.97
Labor and material.....	5,313.57
Sand, cement, brick, etc....	4,437.95
Boller repairs.....	3,811.95
Hauling cinders.....	1,296.70
Pipe and fittings.....	1,265.28
Pump repairs.....	897.45
Repairing smoke stack.....	533.85
Pump supplies.....	401.74
Belting, hose, etc.....	366.73
Lumber.....	460.91
Castings, etc.....	321.49
Pipe covering.....	310.00
Steam fitting.....	718.20
Roofing and skylight.....	285.00
Repairing lawn.....	211.00
Engine repairs.....	186.50
Brass castings.....	231.03
Furnace repairs.....	192.75
Murphy grates.....	395.37
Iron, steel, etc.....	102.43
Hardware.....	144.73
Paint, glass, etc.....	233.92
Plumbing.....	83.87
Rent of regulator.....	47.50

Repairing tools.....	\$ 19.50
Steel plates.....	33.10
Flags.....	16.56
Derrick.....	50.00
Rope.....	84.87
Boiler compound.....	15.30
Inspecting lumber.....	8.83
Cash requisition.....	7.25
Furniture repairs.....	5.00
Total.....	\$ 43,053.30

Acc't West Pump, Operating.

Pay roll.....	\$ 38,040.09
Coal.....	35,688.07
Packing, oil, grease, etc....	1,614.60
Sundries.....	640.45
Services.....	600.96
Gas.....	263.10
Car tickets.....	220.75
Soap, brooms, etc.....	131.37
Telephone service.....	96.63
Ice.....	42.35
Towel supplies.....	11.25
Drugs.....	10.25
Polish.....	5.00
Total.....	\$ 77,364.87

Acc't West Pump, Maintenance.

Pay roll.....	14,187.78
Pump repairs.....	3,453.87
Boiler repairs.....	2,023.00
Building repairs.....	1,470.15
Valves, etc.....	1,278.49
Steam fitting.....	1,119.64
Lumber.....	538.33
Rubber valves.....	460.70
Paints, varnish, etc.....	458.32
Gas fitting.....	396.00
Pumps.....	393.51
Rewiring.....	246.00
Improving lawn.....	222.00
Radiators.....	293.55
Labor and material.....	371.50
Fence.....	169.80
Tank pump.....	160.00
Mason work.....	177.75
Pipe and fittings.....	121.19
Belting, hose, etc.....	131.09
Carried forward.....	\$ 27,677.67

Brought forward.....\$	27,677.67	Acc't Water Works Shops.	
Sand, cement, etc.....	301.95	Pay roll.....\$	60,545.96
Pump supplies.....	186.13	Castings.....	8,917.72
Hardware.....	126.54	Coal.....	5,930.84
Iron, steel, etc.....	35.32	Brass castings.....	1,781.02
Electrical supplies.....	14.90	Valves, etc.....	1,408.62
Oil pumps.....	80.00	Supplies.....	1,401.57
Arc lamps.....	81.00	Services.....	1,261.72
Pipe covering.....	72.58	Lead.....	1,002.35
Flags.....	11.34	Iron, steel, etc.....	780.17
Teaming.....	8.00	Electrical wiring.....	326.01
Inspecting lumber.....	8.62	Nuts, bolts, etc.....	316.74
Total.....\$	28,604.05	Labor and material.....	173.75
Acc't Springfield Ave. Pump, Construction.		Gaskets.....	853.86
Labor.....\$	5,015.81	Steam fitting.....	336.93
Construction of 20,000,000 gallon pumping engines and boilers.....	90,425.20	Rubber valves.....	162.75
Excavation and construction of building.....	39,119.90	Hydrants.....	141.73
Services.....	1,551.59	Repairs.....	122.00
Professional services.....	498.17	Dynamo and switchboard..	370.00
Advertising.....	134.90	Meter rings and boxes.....	182.92
Incidental expenses.....	85.46	Packing, etc.....	118.28
Cash requisition.....	33.05	Oil, etc.....	131.49
Paper and blue prints.....	33.04	Wrenches.....	87.30
Fire clay.....	24.24	Tools.....	74.23
Photographs.....	16.00	Copper wire.....	60.00
Crushed stone.....	13.50	Belting.....	54.62
Total.....\$	136,950.86	Pipe and fittings.....	84.40
Acc't Central Park Ave. Pump, Construction.		Lumber.....	40.84
Pay roll.....\$	6,716.42	Hose, etc.....	15.40
Excavation and construction of building.....	63,981.14	Drugs.....	14.25
Construction of pumping en- gine and boilers.....	14,006.99	Stationery.....	48.50
Purchase of real estate.....	11,400.00	Drills.....	85.00
Coal.....	967.64	Ice.....	26.05
Services.....	430.00	Solder, etc.....	28.61
Incidental expenses.....	85.46	Hickory rods.....	4.50
Advertising.....	72.90	Towel supplies.....	4.00
Car tickets.....	64.19	Roofing paper.....	1.25
Cash requisition.....	39.05	Paints, putty, etc.....	44.33
Drawing paper, etc.....	30.55	Hardware.....	812.05
Photographs.....	16.00	Total.....\$	87,701.83
Total.....\$	97,810.34	Credit for labor and material furnished water pipe ex- tension, new land tunnel, cribs, pumping stations, etc.	82,129.25
		Balance.....\$	55,572.58
		Acc't Norwood Park Pump, Operating.	
		Pay roll.....	\$2,838.25
		Carried forward.....\$	2,838.25

Brought forward.....\$	2,838.25
Coal.....	941.59
Sundry supplies.....	92.89
Cash item.....	45.75
Oil, etc.....	44.00
Car tickets.....	54.24
Ice.....	25.00
Waste.....	6.35

Total.....\$4,048.07

**Acc't Norwood Park Pump,
Maintenance.**

Pay roll.....	\$322.50
Boiler and repairs.....	614.27
Labor and material.....	608.21
Brick, sand, etc.....	243.30
Steam fitting.....	183.68
Water bond No. 29.....	118.00
Breeching.....	100.00
Exhaust head.....	20.50
Covering pipe.....	52.00
Teaming.....	22.45
Pipe and fittings.....	14.66
Hardware.....	5.50
Seed, etc.....	1.25

Total.....\$2,256.32

Acc't Two-Mile Crib.

Labor.....\$	14,230.17
Tug service.....	10,550.45
Stone, sand, cement, etc.....	815.90
Coal.....	233.75
Lumber.....	251.92
Labor and material.....	186.50
Supplies.....	130.82
Paints, oil, etc.....	99.67
Diving, pumping, etc.....	98.09
Carpet and linoleum.....	70.13
Packing, rope, waste, grease, etc.....	62.58
Repairs.....	50.00
Teaming.....	52.50
Stationery.....	30.25
Hardware.....	31.86
Repair of roof.....	25.00
Rubber goods.....	25.00
Castings.....	9.00
Glass.....	8.76

Pillows.....\$	5.10
Plates, bolts, etc.....	3.89
Cash requisitions.....	3.50
Electric supplies.....	3.20
Blue prints.....	.12
Cash item.....	1.25
Advertising.....	1.10

Total.....\$ 26,480.01

Acc't Lake View Crib.

Labor.....\$	5,884.92
Tug service.....	1,921.48
Removal.....	510.00
Diving supplies.....	98.08
Stone, sand and cement.....	68.57
Crib supplies.....	59.96
Coal.....	54.00
Teaming.....	46.00
Paints, oils, glass, etc.....	42.16
Stationery.....	25.75
Hardware.....	21.53
Furniture.....	8.50
Rubber goods.....	8.00
Lamps, etc.....	7.58
Lumber.....	3.75
Cash requisitions.....	2.10
Window sash.....	1.50
Advertising.....	1.10
Blue prints.....	.99

Total.....\$ 8,765.97

Acc't Sixty-Eighth Street Crib.

Labor.....\$	3,255.70
Tug service.....	1,798.07
Removal.....	1,500.00
Diving supplies.....	58.09
Coal.....	47.50
Crib supplies.....	47.29
Lumber.....	37.93
Paints, oils, waste, etc.....	34.51
Hardware.....	29.30
Stationery.....	25.50
Labor and material.....	16.28
Castings.....	8.84
Electrical goods.....	6.20
Smokestack.....	4.50
Advertising.....	1.10

Total.....\$ 6,870.81

Acc't Four-Mile Crib.

Labor	\$ 4,864.99
Tug service.....	1,924.47
Coal.....	188.50
Pressure tank.....	147.00
Windows and arches.....	143.80
Window guards.....	74.75
Crib supplies.....	65.60
Diving supplies.....	58.08
Teaming.....	49.00
Lumber.....	40.32
Paints, waste, oil and pack- ing.....	39.55
Stationery.....	25.75
Labor.....	19.00
Service.....	12.50
Cement and brick.....	12.07
Repair boat.....	12.00
Oil.....	11.09
Hardware.....	8.98
Blue prints.....	7.22
Forgings.....	5.70
Furniture.....	1.80
Advertising.....	1.10
Total	\$ 7,718.27

Acc't Four-Mile Crib, Construction.

Steam-heating	\$ 1,647.00

**Acc't Carter H. Harrison Crib,
Construction.**

Constructing landing.....	\$ 8,517.51
Steam heat.....	697.00
Blue prints.....	133.02
Printing.....	32.75
Total	\$ 9,380.28

Acc't Hydrant Wrenches.

Refund.....	\$ 420.00

Acc't Water Office, Salaries.

Collection department.....	\$ 73,896.74
Assessors "	28,459.07
Meter Rate "	34,558.40
Meter Mech'l "	15,879.34
Permit "	44,971.44
Inspection "	40,310.72
Shut off "	35,454.00

Acc't Canal Pump, Operating.

Pay roll.....	\$ 22,072.54
Coal.....	28,041.11
Oil, etc.....	1,349.70
Supplies.....	280.68
Services.....	185.24
Boiler compound, etc.....	132.60
Graphite.....	146.75
Hardware.....	102.65
Waste, rope, etc.....	167.27
Brooms, soap, brushes, etc..	91.61
Stationery.....	36.04
Ice.....	28.80
Teaming.....	35.04
Rubber goods.....	77.60
Use of sprinkling wagon....	10.00
Drugs.....	.25
Total	\$ 52,757.88

Acc't Canal Pump, Maintenance.

Pay roll.....	\$ 6,278.28
Labor and material.....	2,543.85
Engine repairs.....	2,099.87
Steam fitting.....	1,895.82
Pipe and fittings.....	898.05
Boiler repairs.....	718.25
Driving piles.....	491.50
Packing, etc.....	415.42
Covering pipe.....	329.00
Rubber goods.....	253.11
Lumber.....	189.39
Brick, fire clay, etc.....	153.50
Cutting hole.....	128.00
Sodding.....	134.82
Glass, paints, etc.....	108.44
Lever and manhole covers..	14.00
Blacksmithing.....	65.20
Iron, steel, etc.....	15.87
Stone cutting.....	68.00
Repair.....	59.10
Valves.....	77.92
Lime, stone, sand, cement, etc	74.93
Brass fittings.....	79.09
Grates.....	82.04
Gaskets, engineers' supplies.	69.97
Nickel plating.....	8.00
Anvil.....	8.05
Cash requisitions.....	2.35
Carried forward.....	\$ 16,661.82

Brought forward.....\$	16,661.82
Inspecting lumber.....	4.97
Fencing.....	7.00
Tar.....	5.63
Stove.....	6.27
Total.....\$	16,685.69

Acc't Bridgeport Locks.

Pay roll (repairs).....\$	283.70
Services of lock tender.....	2,799.96
Locks.....	1,191.33
Furniture.....	18.00
Supplies.....	6.00
Total.....\$	4,298.99

Acc't Water Office, Expense.

Postage stamps.....\$	6,000.00
Car tickets.....	5,370.47
Stationery.....	2,260.03
Books.....	1,192.35
Printing.....	695.80
Pipe fittings.....	414.17
Typewriters.....	199.40
Desk, chair, furniture, etc..	182.33
Labor and material.....	133.85
Supplies.....	108.18
Electric fixtures.....	100.33
Drawing material.....	97.25
Hardware.....	80.97
Binding vouchers.....	75.18
Telephone service.....	75.00
Repairs in Water Office....	45.62
Tapes.....	45.60
Iron railing.....	39.50
Wagon repairs.....	35.00
Paving.....	32.50
Filling boxes.....	27.00
Moving safe.....	30.00
Office fixtures.....	19.55
Map.....	18.00
Horse feed.....	18.00
Cash item.....	17.25
Lumber.....	17.50
Time service.....	5.50
Subscription.....	3.00
Shut-off keys.....	1.76
Permits.....	1.75
Total.....\$	17,342.84

Acc't Meter and Private.

Pay roll.....\$	35,518.28
Meters.....	20,616.45
Rebates.....	3,129.40
Nipples and unions.....	799.33
Valves.....	597.34
Lumber.....	571.36
Light covers.....	494.08
Pipe and fittings.....	315.05
Gate valves, etc.....	280.84
Chains.....	244.80
Counters.....	210.00
Meter blinds, etc.....	190.72
Services.....	80.00
Refund.....	69.95
Repair meter.....	60.50
Bolts, nuts, screws, etc.....	57.02
Sundries.....	39.38
Rubber.....	38.73
Crown pistons.....	37.50
Meter box.....	37.25
Horse feed.....	36.00
Reducers, etc.....	20.22
Discs.....	13.50
Pinions.....	13.20
Spindles.....	14.00
Wire spikes, nails, etc.....	7.60
Buggy repairs.....	5.00
Resetting tires.....	4.00
Inspecting lumber.....	2.95
Pick handles.....	1.25
Cash item.....	.30
Total.....\$	63,516.00

Acc't Commissioner's Office, Expense

Cash requisitions.....\$	509.39
Stationery.....	363.98
Services.....	46.50
Advertising.....	134.30
Supplies.....	96.15
Furniture.....	88.00
Car tickets.....	81.90
Printing.....	69.25
Books.....	42.95
Typewriters, rent and repairs	19.40
Binding, etc.....	15.00
Tin boxes.....	15.00
Horse feed.....	11.69

Carried forward.....\$ 1,493.51

Brought forward.....\$	1,493.51
Badges	8.85
Copying tank.....	7.50
Subscription.....	2.00
Electrical goods.....	1.00
Total.....\$	1,512.86

Acc't City Engineer's Office.

Car tickets	\$ 365.18
Transfer	788.89
Supplies.....	173.23
Drawing material and blue prints.....	275.49
Stationery	153.77
Telephone service.....	82.50
Horse feed.....	63.00
Printing and books.....	46.95
Cash requisitions.....	44.63
Specifications.....	30.45
Stamps.....	20.00
Telephone box.....	25.00
Water gates, etc.....	17.50
Office furniture.....	19.25
Surveying instruments.....	12.80
Photographs.....	27.00
Electrical goods.....	24.12
Typewriter repairs.....	14.50
Inspection.....	7.86
Hardware.....	6.45
Oil.....	.82
Total.....\$	2,199.39

Acc't Water, Proportional Office Exp.

Office fixtures	\$ 4,287.36
Printing.....	4,204.92
Postage and car fare.....	1,376.72
Services	653.61
Telephone service.....	488.60
Steel fixtures for vault.....	460.00
Lamps and electric fixtures	456.40
Labor and material.....	422.10
Steam fitting.....	298.89
Advertising.....	257.40
Calclmining.....	255.00
Sundries	215.16
Expert services	117.00
Blue prints, inks, etc.....	67.91
Stationery.....	33.90

Courts cost.....\$	26.00
Repairing.....	18.00
Total.....\$	13,638.97

Acc't Central Pumping, Maintenance.

Pay roll.....\$	9,845.21
Boiler repairs.....	2,280.18
Steam fitting.....	1,562.49
Pump repairs.....	834.63
Furnace repairs.....	682.53
Ventilators.....	413.00
Sand, cement, etc.....	369.77
Lumber.....	318.84
Valves, nipples, etc.....	232.87
Belting, etc.....	214.60
Roofing.....	283.00
Connecting pump	196.00
Pump and receiver.....	110.00
Pipe covering.....	129.86
Taking out generator.....	136.00
Iron, steel, etc.....	38.47
Hardware.....	24.74
Catch basins.....	29.75
Engine repairs.....	24.00
Blacksmithing.....	63.75
Flags.....	46.65
Plumbing.....	25.65
Pipe fittings.....	27.99
Boiler compound.....	17.15
Teaming.....	18.00
Polish.....	10.00
Inspecting lumber.....	.20
Total.....\$	17,935.38

Acc't Central Pump, Operating.

Pay roll.....\$	26,139.30
Coal.....	12,862.48
Packing, waste, etc.....	1,550.75
Gas.....	1,039.20
Sundries.....	226.64
Car tickets.....	220.69
Lumber.....	318.84
Brooms, brushes, etc.....	192.77
Pump supplies.....	151.89
Stationery	93.63
Ice.....	23.88
Boiler compound.....	17.85
Carried forward.....\$	42,887.93

Brought forward.....	\$ 42,837.92
Toilet supplies.....	4.50
Cash requisition.....	2.85
Total.....	\$ 42,845.27

**Acc't Fourteenth St. Pump,
Operating.**

Pay roll	\$ 39,838.28
Coal.....	23,488.77
Services.....	1,807.12
Oil.....	1,194.25
Gas.....	778.20
Supplies.....	765.64
Waste, rope, etc.....	498.23
Car tickets.....	220.63
Stationery.....	94.26
Boiler compound.....	69.44
Ice.....	30.65
Advertising.....	18.48
Polish.....	40.50
Brushes.....	30.06
Soap, etc.....	36.60
Incidental expenses.....	85.46
Towel supplies.....	10.50
Cash requisitions.....	9.85
Total.....	\$ 69,011.92

**Acc't Fourteenth St. Pump,
Maintenance.**

Pay roll.....	\$ 23,598.34
Brick, sand, etc.....	4,456.69
Steam fitting.....	2,418.49
Teaming.....	1,103.80
Lumber.....	702.41
Pipe and fittings.....	525.17
Repairs.....	493.82
Castings.....	369.75
Paints, oils, etc.....	266.98
Furnace repairs.....	221.00
Painting roof and repairing.....	220.00
Iron, steel, etc.....	156.85
Belting, hose, etc.....	229.95
Hardware.....	374.96
Valves, etc.....	349.42
Gas fitting.....	187.05
Covering steam pipe.....	128.50
Boiler repairs.....	615.16
Blacksmithing.....	92.30
Repairing tools.....	47.45
Air chamber.....	20.00

Truck boxes.....	\$ 32.00
Flags.....	41.18
Galvanized iron work.....	37.50
Oil tank.....	15.40
Sheet brass.....	13.93
Plumbing.....	33.79
Lime, etc.....	32.40
Glass.....	3.35
Sewer pipe.....	8.10
Total.....	\$ 36,795.74

**Acc't Fourteenth Street Pump,
Construction.**

30,000,000 gallon pumping engine and boilers.....	\$ 64,210.65
Pay roll.....	12,949.93
Total.....	\$ 77,160.58

**Acc't Sixty-Eighth St. Pump,
Maintenance.**

Pay roll.....	\$ 8,116.10
Boiler repairs.....	3,261.62
Pump valves.....	2,252.31
Brick, sand, etc.....	1,783.25
Equipping boilers.....	400.00
Teaming.....	385.00
Rubber valves.....	375.60
Sundries.....	371.34
Oil burners.....	400.00
Pipe covering.....	223.09
Pump repairs.....	467.90
Pump supplies.....	325.57
Hardware.....	162.10
Steam fitting.....	533.20
Pipe and fittings.....	253.84
Iron, steel, etc.....	147.59
Steam pump.....	232.98
Lumber.....	151.77
Dredging.....	156.00
Cleaning and repairing tank.....	150.00
Power and lamps.....	45.45
Cash requisitions.....	44.20
Polish.....	20.00
Roofing.....	73.00
Ferrules.....	33.75
Chart paper.....	10.70
Electrical goods.....	99.70
Advertising.....	4.40
Dynamite.....	17.08
Carried forward.....	\$ 20,497.54

Brought forward.....\$	20,497.54	Hose.....\$	89.00
Clay, cement, etc.....	47.00	Meals.....	65.00
Paints, putties, etc.....	55.50	Beds and bedding.....	59.07
Incidental expenses.....	86.45	Rod.....	45.95
Total.....\$	20,686.49	Sundry repairs, etc.....	28.14
		Blacksmithing.....	25.60
Acc't Sixty-Eighth St. Pump, Operating.		Cash requisitions.....	20.96
Pay roll.....\$	27,569.28	Teaming.....	16.45
Fuel oil.....	22,998.85	Rubber goods.....	14.40
Services.....	1,371.23	Beams.....	10.09
Oil, grease, compound, etc....	1,051.78	Hay and oats.....	9.18
Inspection.....	224.80	Lamps.....	9.15
Car tickets.....	220.65	Pipe.....	7.50
Rubber hose, etc.....	101.70	Gaskets.....	1.15
Brooms, brushes, etc.....	215.67	Blue prints.....	.90
Ice.....	51.20	Total.....\$	20,913.71
Coal.....	40.45		
Slabs.....	20.00	Acc't Lake View Pump, Construction.	
Toilet supplies.....	4.50	Construction of shaft.....\$	498.00
Total.....\$	53,868.11		
Acc't Sixty-Eighth St. Pump, Construction.		Acc't Lake View Pump, Operating.	
Construction of 14,000,000 gallon pumping engine and boiler.....\$	40,725.00	Pay roll.....\$	27,505.40
Construction of sewer, excavations and masonry.....	8,064.71	Coal.....	20,571.32
Pay roll.....	4,775.60	Oil, grease, gaskets, etc....	1,115.19
Total.....\$	58,565.31	Gas.....	395.20
Acc't Sixty-Eighth St. Tunnel.		Sundry supplies.....	284.85
Labor.....\$	13,706.64	Rawhide packing.....	237.30
Tug service.....	1,791.21	Car tickets.....	220.60
Coal.....	1,523.88	Brooms, brushes, soap, etc..	211.89
Services—Diving and supplies.....	637.32	Services.....	100.01
Pump repairs and supplies.....	631.96	Telephone service.....	62.50
Appropriation.....	750.00	Rent.....	51.00
Clay, cement, sand, lime....	303.31	Stationery.....	29.50
Rent of boiler.....	264.50	Polish.....	15.00
Proceeds of sale of scrap iron.....	300.00	Toilet supplies.....	5.00
Rope, waste, oil, soap and candles.....	176.00	Total.....\$	50,804.76
Services.....	144.56		
Hardware.....	143.02	Acc't Lake View Pump, Maintenance.	
Lumber.....	140.77	Pay roll.....\$	5,482.67
		Pump repairs.....	2,850.68
		Steam fittings.....	1,135.40
		Labor and material.....	842.40
		Boiler repairs.....	545.92
		Valves, nipples, etc.....	435.83
		Lumber.....	316.13
		Painting.....	309.00
		Pipe covering.....	254.00
		Carried forward.....\$	12,121.98

Brought forward.....	\$ 12,121.98
Pump supplies.....	272.36
Paints, glass, etc.....	251.29
Hardware.....	144.93
Painting engine, etc.....	380.00
Diver's services.....	320.00
Repairing furnace.....	161.97
Brick, sand, etc.....	86.43
Rubber valves, etc.....	69.53
Iron, steel, etc.....	32.63
Pipe fittings.....	35.47
Electrical goods.....	97.88
Truck wheels.....	60.80
Flags.....	29.14
Plumbing.....	28.30
Scale repairs.....	30.00
Tubes and bushings.....	18.00
Roof repairs.....	10.00
Oil tank.....	9.54
Total.....	\$ 14,110.25

**Acc't Washington Heights Pump,
Construction.**

Cisterns.....	\$ 8,587.91

**Acc't Washington Heights Pump,
Operating.**

Pay roll.....	\$ 3,945.50
Coal.....	1,447.13
Paints, oils, etc.....	103.67
Supplies.....	75.86
Car tickets.....	54.20
Services.....	14.29
Total.....	\$ 5,640.65

**Acc't Washington Heights Pump,
Maintenance.**

Pay roll.....	\$ 1,200.31
Pump.....	390.00
Steam fitting.....	224.44
Repairs.....	185.68
Boiler repairs.....	109.20
Smokestack.....	103.50
Pipe and fittings.....	101.65
Covering pipe.....	96.00
Vises, etc.....	53.06
Sand, brick, etc.....	57.94
Material.....	56.62
Rubber valves.....	17.54
Cash item.....	28.50

Hardware.....	\$ 11.39
Teaming.....	6.45
Flags.....	5.40
Hose.....	3.00
Blue prints.....	1.93
Total.....	\$ 2,657.61

Acc't New Land Tunnel.

Pay roll.....	\$ 34,650.21
Weir McKechney, contract..	250,914.28
Purchase of real estate....	12,720.00
Taxes.....	4,746.77
Tunnel gates.....	2,175.00
Rent.....	1,605.00
Services.....	1,408.41
Hydrant castings.....	1,103.55
Repairing pavement.....	996.23
Lumber.....	888.69
Labor and material.....	556.75
Note and interest.....	508.55
Telephone service.....	412.50
Brick, cement, etc.....	373.78
Teaming.....	166.85
Horse feed.....	117.00
Cement tester.....	108.65
Railroad transportation....	100.00
Hardware.....	99.51
Drawing material, etc.....	95.34
Sundries.....	83.93
Coal.....	79.75
Stationery.....	58.94
Blacksmithing.....	66.99
Iron railing.....	47.75
Cash requisition.....	52.55
Gas.....	42.30
Paints, oils, etc.....	32.14
Rubber goods.....	26.19
Waste, rope, etc.....	25.31
Water tax.....	12.25
Black earth.....	12.00
Blue prints.....	6.60
Office stools.....	5.00
Repairs.....	.50
Total.....	\$ 314,289.21

Acc't Intercepting Sewers.

Pay roll.....	\$ 38,484.02
Construction.....	378,420.80
Carried forward.....	\$ 416,904.82

Brought forward.....	\$ 416,904.82
Purchase of real estate.....	80,325.00
Transfer	10,000.00
Repairing pavement.....	3,951.78
Services.....	2,982.33
Labor and material.....	1,337.55
Driving piles.....	573.50
Examining sewers.....	542.90
Connecting service pipes...	430.58
Rebuilding sidewalk.....	425.90
Supplies	355.61
Labor.....	403.25
Blue prints, etc	416.41
Stationery	342.87
Sand, cement, etc.....	317.13
Revenue stamps.....	240.00
Reporting on North shore sewerage.....	200.00
Printing.....	155.10
Advertising.....	153.42
Car tickets.....	151.89
Horse feed.....	153.00
Current meter.....	198.50
Office furniture.....	124.38
Testing machine.....	135.00
Plumbing.....	92.02
Electrical goods.....	54.48
Filling bond.....	50.00
Livery	66.00
Tanks	44.75
Hardware.....	42.59
Scale.....	24.58
Hip boots.....	25.20
Repairs.....	10.50
Photographs.....	12.50
Rubber goods.....	16.00
Engineers' instruments....	3.50
Rent of typewriter.....	6.00
Lumber.....	7.32
Oil and paint.....	1.41
Teaming.....	8.76
Cash requisition.....	2.00
Total.....	\$ 521,288.53

Acc't Northeast Lake Tunnel.

Pay roll.....	\$ 13,144.63
Fitzsimons & Connel con- tract,.....	157,507.17
Tug service.....	2,554.12
Constructing landing.....	850.00

Services.....	\$ 243.33
Hardware	32.10
Scale.....	30.35
Photographs.....	29.00
Sundry supplies.....	23.74
Supplies	19.41
Stationery	8.95
Rubber goods.....	4.20
Repairs.....	.90
Total.....	\$ 174,447.90

Acc't Chicago Avenue Tunnel.

Pay roll.....	\$ 25,267.53
Brick, stone, etc.....	6,916.70
Water gate.....	1,934.00
Sections of shelves.....	1,345.00
Lumber.....	995.42
Insurance.....	800.00
Cylinders.....	630.00
Hardware.....	490.06
Sundries.....	449.93
Labor and material	452.12
Teaming	363.95
Pig iron.....	360.00
Coal	340.31
Steel, iron, etc.....	213.51
Inspecting lumber.....	139.36
Dynamite.....	134.55
Oil and grease.....	124.71
Blacksmithing.....	81.19
Repairs.....	73.25
Covering pipe.....	56.40
Cage.....	60.00
Windows and doors.....	20.00
Horse feed.....	18.00
Rubber goods.....	17.00
Pipe and fittings.....	17.90
Grate bars.....	10.64
Electrical supplies.....	19.38
Ice.....	18.38
Pump repairs.....	7.30
Paint, alcohol, etc.....	1.50
Blue prints.....	.53
Total.....	\$ 41,358.62

**Acc't Special Water Pipe Ex-
tension.**

Pay roll.....	\$ 271,927.10
Lead	35,898.84
Carried forward.....	\$ 307,825.44

Brought forward.....	\$ 307,325.44
Teaming	21,293.13
Repairing pavement.....	17,005.43
Masonry	13,926.75
Pumps and valves.....	10,014.46
Valve basins.....	8,329.11
Sewer work.....	4,695.45
Services.....	4,230.18
Pipe and fittings.....	3,528.22
Inspection of pipe and valves	3,265.01
Labor and material.....	2,818.10
Manholes.....	2,359.79
Sand, stone, cement, etc....	2,226.87
Steam roller and sprinkler..	2,141.16
Repairing water mains.....	1,995.75
Lumber	1,342.51
Plumbing.....	1,449.11
Engineer's supplies.....	982.66
Hardware.....	872.29
New catch-basins.....	819.60
Cedar blocks.....	776.20
Office furniture.....	612.35
Driving piles.....	475.00
Horse board	607.50
Sundry supplies.....	367.65
Horse and wagon.....	381.25
Sewer pipe.....	354.85
Stationery.....	357.95
Boring.....	398.50
Testing castings.....	316.17
Repairing roadway.....	282.00
Tees and crosses.....	236.00
Relaying macadam.....	217.50
Cement walk	270.40
Replacing lawn.....	270.00
Waste, packing, etc.....	129.47
Repairing tools.....	122.05
Picks, forks, etc.....	103.21
Brick	103.50
Protecting tracks.....	100.33
Car tickets.....	149.61
Curb stone.....	109.13
Blacksmithing.....	82.15
Repairing scale pit.....	67.50
Lamps	53.55
Blue prints.....	44.46
Flags	35.87
Coal.....	46.87
Repairs	80.10
Oil.....	29.86

Drawing material.....	\$ 26.18
Grading.....	35.00
Angle iron, etc.....	43.76
Printing.....	25.25
Sidewalk	20.00
Iron, steel, etc.....	10.15
Derrick repairs.....	8.00
Cash requisition.....	4.75
Telephone service.....	2.50
Total.....	\$ 417,926.84

Acc't Kedzie Avenue Pipe Tunnel.

Labor	\$ 5,412.25
Lumber	507.48
Hardware	125.57
Teaming	142.00
Shovels and picks.....	56.80
Rope, packing and gaskets..	42.98
Stock and dies.....	36.57
Oil	26.64
Blacksmithing.....	24.00
Roofing	15.00
Repairing	9.75
Boiler repairs.....	8.50
Printing and stationery....	4.50
Boring	3.00
Sundries	1.40
Cash requisitions.....	1.25
Blue prints.....	.24
Total.....	\$ 6,417.93

Other Expenses.

Refunding duplicate pay- ments, etc.....	\$ 6,599.06
Redemption of water certifi- cates	500,000.00
Water loan interest.....	202,326.38
Redemption Town of Lake water loan bonds.....	15,000.00
Miscellaneous items.....	5,270.57
Permit, mdse. and expense account	4,805.60
Dredging inspectors and harbor police.....	7,755.81
City engineer's office salary.	16,412.78
Commissioner's office salary.	16,829.80
Water office rent.....	60,879.00
Carried forward.....	\$ 835,878.45

Brought forward.....\$	835,878.45	Total expenditures, Water	
Advances for laying water		Fund.....	\$5,700,559.11
mains refunded.....	36,915.06	Balance to credit of water	
Total.....	\$ 872,793.51	fund, January 1, 1899.....	152,949.66
Total expenditures and balance, Water Fund			\$5,853,508.77

SEWER FUND RECEIPTS.

Amount received from house		Amount appropriated for	
drain permits.....\$	18,958.51	Woodlawn sewer pump...\$	8,235.00
Amount received from drain		Amount received from gen-	
layers' licenses.....	1,630.00	eral and other funds and	
Amount appropriated by		private parties for labor	
City Council for repairing		and material.....	26,176.29
and cleaning sewers and		Received from special assess-	
catch-basins.....	125,000.00	ment for work and inspec-	
Amount appropriated for		tion.....	64,634.61
sewer office salaries.....	10,880.00	Amount appropriated for re-	
Amount appropriated for		laying sewer in Fifth ave.	634.00
Lunt Ave. outfall.....	425.00	Amount appropriated for re-	
Amount appropriated for		moval of surplus earth	
Sixty-ninth street sewer		from Forty-eighth avenue	
pump.....	8,235.00	system of sewers.....	11,382.73
Amount appropriated for		Amount appropriated for	
Seventieth street sewer		repairing Seventy-third	
pump.....	7,735.00	street pile outfall.....	425.00
Amount appropriated for		Amount appropriated for	
Seventy-third street sewer		bench monuments.....	5,600.00
pump.....	7,735.00	Amount appropriated for	
Amount appropriated for		Seventy-ninth street sewer	
Kensington sewer pump..	7,735.00	pump	1,262.50
Total receipts, sewer fund.....			\$306,683.64

SEWER FUND EXPENDITURES.

House drains.....\$	43,145.79	Seventy-third street sewer	
Cleaning sewers and catch-		pump.....\$	5,830.05
basins.....	92,096.80	Seventy-ninth street sewer	
Repairing sewers and catch-		pump.....	1,330.91
basins.....	63,737.49	Woodlawn sewer pump....	10,914.52
Intersections.....	32,795.77	Kensington sewer pump....	6,411.11
Sewer office expense.....	1,226.57	Extending Lunt avenue out-	
Sewer office salaries.....	10,091.64	fall.....	425.00
Seventy-third street pile out-		Relaying sewer in Fifth ave-	
let	425.00	nue.....	634.00
Salaries of inspectors.....	3,839.94	Removing surplus earth	
Miscellaneous items.....	3,698.79	from Forty-eighth avenue	
Sixty-ninth street sewer pump	7,951.86	system of sewers.....	11,383.48
Seventieth street sewer pump	5,748.83	Bench monuments	4,996.09
Total Sewer Fund expenditures.....			\$306,683.64

APPROPRIATION FUND RECEIPTS.

**Acc't Cleaning and Repairing
Improved Streets.**

Amount appropriated	\$ 399,728.56
Other receipts	23,569.65
Total	\$ 423,298.21

Acc't Unimproved Streets.

Amount appropriated	\$100,000.00
Other receipts	32.50
Total	\$ 100,032.50

Acc't Scavenger Service.

Amount appropriated	\$417,060.28
Other receipts	3,568.45
Total	\$ 420,628.73

Acc't Public Buildings.

Amount appropriated	\$45,500.00
Other receipts	3,307.57
Total	\$ 48,807.57

Amount appropriated, Acc't Janitors' Salaries	\$43,598.20
Amount appropriated, Acc't Public Parks	12,300.00
Amount received from per- mits, Acc't House Moving Permits	1,272.00
Amount received for work on permits, Acc't Street Permits	21,185.75
Amount transferred from Electric Light Department, Acc't Street Lamp Repairs.	4,374.34

**Acc't Street Dep't Office Ex-
pense.**

Amount appropriated	1,000.00
Other receipts	30.00
Total	\$ 1,030.00

**Acc't City Engineer's Office
Expense.**

Amount appropriated	\$200.00
Other receipts	788.89
Total	\$ 988.89

Acc't Map Office Expense.

Amount appropriated	\$ 800.00
Other receipts	192.75
Total	\$ 992.75

**Acc't Commissioners' Office
Salaries.**

Amount appropriated	\$ 6,100.00
By transfer	33.55
Total	\$ 6,133.55

**Acc't Bureau of Streets, Office
and Ward Superintendents'
Salaries.**

Amount appropriated	64,210.00

**Acc't City Engineers' Office
Salaries.**

Amount appropriated	\$ 2,516.00
By transfer	2,552.73
Total	\$ 5,068.73

**Acc't Commissioner's Office
Expense.**

Amount appropriated	\$ 875.00

Acc't Chicago Harbor Salaries.

Amount appropriated	\$ 12,030.00

Acc't Bridge Repairs.

Amount appropriated	\$ 85,000.00
Other receipts	26,736.96
Total	\$ 111,736.96

Acc't Bridge Tenders' Salaries.

Amount appropriated	\$ 90,215.00

**Acc't Fullerton Avenue Con-
duit.**

Amount appropriated	\$ 14,510.00
Other receipts	39.94
Total	\$ 14,549.94

**Acc't Expense Street Railway
Investigating Committee.**

Amount appropriated	\$ 1,000.00

Acc't Miscellaneous Harbor Work.		Acc't Map Department Salary.	
Amount appropriated.....\$	65,781.30	Amount appropriated.....\$	15,690.00
Other receipts.....	4,462.92	Acc't Public Benefits.	
Total.....\$	70,244.22	Amount appropriated.....\$	7,460.00
Acc't Street Privileges.		Acc't Sidewalk Repairs.	
Receipt from street privileges.....\$	8,023.75	Amount appropriated.....\$	55,000.00
		Other receipts.....	833.75
		Total.....\$	55,833.75
Total receipts, Appropriation Fund.....			\$1,541,579.84

APPROPRIATION FUND EXPENDITURES.

Acc't Garbage.		Coal.....\$	112.45
Labor.....\$	356,680.70	Filling.....	78.00
Contract.....	55,936.53	Inspecting lumber.....	39.29
Lumber.....	5,262.60	Car tickets.....	32.83
Removing garbage.....	1,131.00	Hardware, supplies.....	23.69
Disinfectants.....	448.20	Cleaning vault.....	11.50
Labor and material.....	389.78	Glazing.....	1.25
Piles.....	268.38	Total.....\$	99,987.11
Horse feed.....	234.00		
Building plank road Forty-seventh street.....	234.00	Acc't Improved Streets.	
Pumping out clay hole.....	150.00	Labor.....\$	40,210.29
Teaming.....	123.85	Paving.....	137,657.72
Stationery.....	109.00	Crushed stone, cement, etc..	6,275.70
Moving buildings.....	77.00	Rent.....	2,766.00
Books, etc.....	42.50	Blocks.....	1,289.18
Telephone service.....	39.77	Teaming.....	1,171.36
Coal.....	30.00	Lumber.....	1,153.44
Hardware.....	34.70	Building bicycle path.....	848.65
Supplies.....	8.00	Car tickets.....	684.24
Cash requisition.....	2.20	Grading Greenwood avenue crossing.....	681.40
Total.....\$	421,202.21	Repairs.....	572.70
Acc't Unimproved Streets.		Cross walks.....	499.50
Labor.....\$	88,630.83	Supplies.....	325.41
Paving.....	8,601.88	Straightening and removing curbs.....	321.06
Lumber.....	681.70	Painting.....	287.07
Services.....	613.35	Horse feed.....	207.00
Slag and cinders.....	403.74	Material.....	201.29
Repairs.....	389.10	Catch-basins.....	186.84
Transfer to Street Department Office Acc't.....	250.00	Coal.....	186.40
Sprinkling.....	117.50	Carried forward.....\$	195,525.25

Brought forward.....	\$ 195,525.25
Pitch.....	179.01
Telephone service.....	169.76
Hardware.....	140.38
Cash requisitions.....	121.70
Building walls and repairs..	90.50
Roofing.....	59.00
Laying asphalt.....	33.00
Street sprinkling.....	30.00
Oil.....	21.81
Trees.....	11.25
Steeling picks.....	10.00
Sash and doors.....	9.95
Gas.....	7.40
Ramming rods.....	2.25
Glass.....	1.80
Blue prints.....	1.65
Total.....	\$ 196,419.71
Acc't Street Cleaning,	
Labor.....	\$ 138,475.04
Teaming.....	11,963.52
Services.....	1,176.41
Brooms.....	1,102.31
Supplies.....	1,017.20
Stove hardware.....	981.54
Disinfectant.....	804.64
Sweeping.....	534.09
Signs.....	329.40
Scoops.....	206.00
Lumber.....	176.69
Boarding horse.....	171.30
Coal.....	125.41
Gas.....	83.60
Curbstone repairs.....	69.16
Rent.....	55.00
Plumbing.....	36.84
Car tickets.....	31.95
Gasoline and oil.....	31.26
Cash requisitions.....	30.55
Salt.....	22.50
Printing.....	15.00
Stationery.....	7.45
Repairs.....	6.95
Bags.....	6.44
Inspecting lumber.....	4.58
Window sash.....	3.00
Use of blocks.....	1.75
Blue prints.....	.96
Total.....	\$ 157,430.54

Acc't Removal of Snow.

Pay rolls.....\$ 55,114.70

Acc't Street Office Salaries Including Ward Foremen.

Pay rolls and vouchers.....\$ 64,229.20

Sidewalk Repairs.

Labor.....	\$ 44,243.77
Lumber.....	8,038.79
Sidewalk.....	1,117.09
Repairing.....	747.25
Supplies.....	571.05
Hardware, nails and misc'l..	408.61
Rebuilding four bridges....	208.00
Straightening curbs.....	206.10
Inspecting lumber.....	140.61
Services.....	48.00
Spikes.....	45.00
Cement walk.....	22.50
Signs.....	17.40
Coal.....	5.50
Teaming.....	5.25
Cash requisitions.....	4.50
Wheelbarrow.....	1.83
Total.....	\$ 55,826.25

Acc't Public Buildings. (City Hall.)

Labor.....	\$ 1,862.88
Coal contract.....	23,892.80
Removing portico, elevator repairs, etc.....	6,740.00
Labor and material.....	4,608.12
Office fixtures in health dept.	1,750.00
Plumbing.....	1,676.17
Office fixtures in council com. room.....	1,480.00
Paints, painting and calcimining.....	1,257.39
Repairs.....	1,202.18
Electric light.....	1,120.38
Steam fitting.....	1,092.84
Ice.....	791.26
Electric work and supplies..	818.29
Skeleton ribs machinery....	755.62
Work in civil service rooms.	562.10
Railing.....	514.40
Carpet and linoleum.....	451.85

Carried forward.....\$ 50,075.28

Brought forward	\$ 50,075.28
Services.....	448.86
Lumber.....	434.41
Matches, candles, soap, salt, potash and soda.....	429.67
Oil and turpentine.....	373.52
Lamps.....	367.34
New floor and platform....	343.21
Plaster and calcimine.....	341.00
Shades, ventilators and sky- light.....	397.07
Hardware.....	305.56
Sponges, brushes, brooms, dusters, wiping rags and combs.....	216.11
Toilet paper, etc.....	167.50
Cement, sand and clay.....	127.95
Compound.....	129.34
Scale.....	148.50
Belting.....	110.00
Flag.....	103.77
Covering steam pipes.....	102.00
Mops and handles.....	107.79
Waste, packing and washers	103.91
Telephone boxes and cush- ions.....	99.50
Supplies.....	84.40
Expert cabinet inspector...	75.00
Polish.....	62.11
Repairing furniture.....	54.00
Cash requisitions.....	55.46
Cleaning carpets.....	57.87
Pipe.....	54.62
Glass.....	34.10
Disinfectant.....	32.50
Teaming.....	30.00
Decorating.....	21.83
Office furniture.....	24.98
Plugs, cord and rope.....	28.44
Printing.....	19.75
Wheelbarrow and flue clean- er.....	11.00
Camphor and acid.....	28.17
Hose and coupling.....	14.45
Horse board.....	9.00
Advertising.....	8.80
Wire.....	4.75
Sharp tools.....	2.35
Blue prints.....	.54
Total.....	\$ 55,646.41

Less vouchers returned acc't overdraft.....	\$ 7,728.33
	\$ 47,918.08

Acc't Janitors' Salaries.

Pay roll.....	\$ 42,064.70
Services.....	344.09
Total.....	\$ 42,408.79

Acc't Washington Square.

Labor.....	\$ 1,944.50
Trees.....	500.00
Sod.....	110.00
Services.....	32.00
Repairing.....	20.85
Rubber hose, lawn mowers..	18.00
Plants.....	30.00
Supplies.....	5.14
Seed.....	3.88
Total.....	\$ 2,664.37

Acc't Aldine Square.

Labor.....	\$ 975.00
Trees.....	80.00
Hose, etc.....	20.70
Hydrants.....	20.00
Plants.....	17.15
Seed.....	16.80
Repairing.....	12.45
Supplies.....	2.15
Brooms.....	1.63
Oil.....	.40
Total.....	\$ 1,146.28

Acc't Douglas Monument Park.

Labor.....	\$ 776.00
Trees.....	100.00
Sod.....	32.00
Supplies.....	31.35
Repairing.....	27.45
Grass seed.....	26.95
Hydrants.....	30.00
Hose.....	16.00
Hardware.....	3.39
Total.....	\$ 1,043.14

Acc't Ellis Park.

Labor	\$ 771.00
Repairing band stand.....	213.65
Trees	100.00
Hose	36.00
Hydrants	30.00
Seed.	29.25
Crushed stone.....	17.25
Hardware	16.24
Repairing.....	12.45
Sod.....	8.00
Street washer.....	5.00
Plants.....	5.00
Total	\$ 1,243.84

Acc't Bickerdike Park.

Labor	\$ 516.00
Hose	24.00
Repairing.....	16.65
Supplies	6.30
Grass seed	2.40
Total	\$ 565.35

Acc't Jefferson Park.

Labor	\$ 458.20
Supplies.....	1.13
Paint.....	.95
Total	\$ 460.28

Acc't Irving Park.

Fountain and slab	\$ 73.50

Acc't East End Park.

Pay roll.....	\$ 127.50

Acc't Green Bay Park.

Labor	\$ 200.00
Sod	210.10
Trees.....	50.00
Rubber hose, lawn mowers..	18.00
Repairing.....	9.45
Supplies.....	3.81
Grass seed	1.00
Total	\$ 492.36

Acc't Oak Park.

Labor	\$ 200.00
Sod.....	110.00

Trees.....	\$ 44.00
Rubber hose, lawn mowers..	17.00
Repairing.....	9.45
Supplies.....	5.00
Grass seed.....	1.50
Total	\$ 386.95

Acc't Holstein Park.

Pay roll.....	\$ 470.75

Acc't Gross Park.

Labor	\$ 699.50
Trees.....	270.00
Rubber hose	24.20
Supplies.....	4.27
Seed.....	1.75
Total	\$ 999.72

Acc't Shedd's Park.

Labor	\$ 143.25
Hose.....	24.00
Total	\$ 167.25

Acc't Eldred Park.

Labor	\$ 396.50
Lumber	6.60
Total	\$ 403.10

Acc't Lakewood Park.

Plants.....	\$ 4000
Sod	38.00
Services.....	30.00
Trees	15.00
Total	\$ 123.00

Acc't Norwood Park.

Labor	\$ 89.00
Hose	24.75
Supplies	10.60
Total	\$ 74.34

Acc't De Kalb Square.

Labor	\$ 156.00
Repairs	13.25
Flowers	10.00
Paint.....	7.50
Supplies	1.70
Total	\$ 188.45

Acc't Kedzie Park.

Trees	\$	15.00

Acc't Public Benefits.

Macadamizing	\$	286.59

Sewer		7,173.41

Total	\$	7,460.00

Acc't House Moving.

Labor	\$	1,194.50

Cash requisitions		10.00

Total	\$	1,204.50

Acc't Street Department, Office Expense.

Blank books and printing ..	\$	581.24

Stationery		242.87

Supplies		153.51

Car tickets		112.48

Office furniture		50.22

Cash requisitions		33.90

Coal		20.65

Typewriter repairs		13.85

Map		12.00

Rental		6.00

Repairing		3.00

Total	\$	1,234.72

Acc't City Engineer's Office Expense.

Car tickets	\$	734.96

Office furniture		55.00

Blue prints		47.47

Horse feed		40.00

Books and stationery		37.21

Paper and prints		36.39

Surveying		15.00

Drawing material		13.10

Supplies		5.56

Cash requisitions		2.00

Boxes		1.40

Hardware		.80

Total	\$	988.89

Acc't Map Department, Expense.

Drawing Material	\$	383.61

Supplies		107.71

Office furniture		67.63

Stationery, etc	\$	56.41

Car tickets		37.55

Mounting maps		10.49

Map 1		4.00

Printing		3.00

Blue prints		1.49

Dusters		1.00

Total	\$	672.89

Acc't Street Permits.

Labor	\$	4,008.36

Relaying pavement		23,534.65

Crushed stone		40.60

Removing lamp		4.00

Cash requisition		2.35

Total	\$	27,589.96

Acc't Street Lamp Repairs.

Labor	\$	4,373.50

Car tickets		.84

Total	\$	4,374.34

Acc't City Engineer's Office Salaries.

Labor	\$	4,482.80

Service		585.93

Total	\$	5,068.73

Acc't Map Office.

Salaries	\$	14,676.97

Acc't Commissioner's Office Salaries.

Labor	\$	5,845.00

Services		288.55

Total	\$	6,133.55

Acc't Proportional Office Expense.

Books and stationery	\$	219.11

Cash requisitions		91.45

Printing		56.25

Stationery		38.50

Supplies		29.27

Car tickets		15.25

Typewriter repairs		12.50

Stools		11.88

Desk light		10.50

Zinc etching		10.00

Carried forward	\$	494.71

Brought forward.....\$	494.71
Repairing.....	5.60
Blue prints.....	1.53
Total.....\$	501.84

Acc't Harbor Masters' Salaries.

Labor.....\$	13,309.18
Service.....	45.00
Total.....\$	13,354.18

Acc't Chicago Harbor.

Labor.....\$	3,938.30
Dredging and dock removal.....	42,293.71
Real estate.....	13,600.00
Tug service.....	1,263.70
Dock repairs.....	744.35
Supplies.....	139.00
Cash requisitions.....	36.75
Printing.....	13.50
Removing obstructions.....	12.00
Lamps.....	10.50
Pulling piles.....	10.00
Oil.....	1.08
Hardware.....	.82
Total.....\$	62,063.71

Acc't Bridge Repairs.

Labor.....\$	57,875.32
Pile driving.....	15,821.65
Coal.....	7,147.35
Lumber.....	7,092.33
Current.....	5,724.46
Structural iron.....	1,950.78
Machine work-shaft.....	1,877.86
Repairs.....	1,809.53
Labor and material.....	1,739.07
Supplies.....	1,250.91
Electric supplies, copper wires.....	1,140.96
Teaming.....	1,022.25
Paving and blocks.....	911.53
Bronze and steel castings, cast iron.....	753.63
Iron wheels and brackets.....	743.29
Pails, pipe, etc., hardware.....	662.53
Oil and grease.....	644.00
Steam fitting.....	579.44
Services.....	530.67

Cement, sand, stone, etc.....\$	449.18
Boarding horse and shoeing.....	301.60
Stationery.....	161.31
Lamp signs.....	152.85
Plumbing.....	94.66
Blue prints.....	90.23
Smokestack, ash-chute.....	82.00
Candles, salt, soap, etc.....	75.90
Gas.....	89.00
Boxes and braces.....	83.50
Steel plates.....	76.42
Tug service.....	56.00
Spikes and nails.....	53.05
Blocks and rope.....	44.64
Brooms and brushes.....	39.90
Crabs and keyways.....	43.75
Opening Clark street bridge.....	35.00
Hose.....	31.78
Inspecting lumber.....	31.08
Paints, varnish, whitening, lead.....	30.84
Glass.....	23.57
Brick.....	11.50
Asbestos packing and waste.....	11.60
Cash requisitions.....	9.75
Tracing cloth.....	6.15
Total.....\$	111,262.32

Acc't Bridge Tenders' Salaries.

Labor.....\$	89,865.57
Services.....	346.61
Total.....\$	90,212.18

Acc't Fullerton Avenue Pump, Maintenance.

Pay roll.....\$	61.48
Labor and material.....	888.04
Grates.....	435.20
Patent retort.....	400.00
Steam fitting.....	286.26
Tug service.....	355.00
Repairs and machinery.....	161.24
Covering pipe.....	88.00
Hose.....	36.00
Gaskets.....	10.00
Valves.....	24.95
Lumber.....	14.35
Teaming.....	42.00
Paints, varnish, etc.....	23.56
Carried forward.....\$	2,826.08

Brought forward.....\$	2,826.08	Acc't Street Privileges.	
Packing.....	29.99	Labor.....\$	6,458.47
Sand, cement, etc.....	22.60	Cash requisitions.....	276.75
Repairing scales.....	15.80	Total.....\$	6,735.22
Pipe and fittings.....	46.36	Acc't Street Railway Investi-	
Hardware, iron, etc.....	29.44	gating Committee.	
Brick.....	4.75	Services.....\$	999.98
Glass.....	10.73	Acc't Triangle Park.	
Cash requisitions.....	7.40	Sod.....\$	96.80
Flags.....	7.20	Acc't Improvement of Tem-	
Total.....\$	3,000.35	porary Play-grounds.	
Acc't Fullerton Avenue Pump,		Plumbing.....\$	67.00
Operating.		By Comptroller.....	1,000.00
Pay roll.....\$	6,100.15	Total.....\$	1,067.00
Coal.....	2,743.89	Acc't Hegewisch Road.	
Oil, grease, etc.....	204.74	Labor.....\$	3,082.13
Services.....	163.26	Slag.....	1,748.21
Gas.....	153.80	Total.....\$	4,830.34
Supplies.....	150.01	Acc't Miscellaneous.	
Ice.....	46.62	Sundry item.....\$	1,500.00
Soap.....	13.70	Total expense.....	1,525,796.17
Brooms.....	4.25	Transferred.....	15,783.67
Lime.....	5.50	Total expenditures and transfer, Appropriations Fund.....	\$1,541,579.84
Total.....\$	9,585.92		

BOARD OF LOCAL IMPROVEMENTS FUND RECEIPTS.

Acc't Office Salaries.		Acc't Street Engineer's Office	
Appropriation.....\$	54,580.00	Salaries.	
Receipts.....	812.80	Appropriation.....\$	34,760.00
Total.....\$	55,392.80	Receipts.....	100.00
Acc't Office Expenses.		Total.....\$	34,860.00
Appropriation.....\$	3,000.00	Appropriation, Sub-Paving	
Receipts.....	303.16	Inspectors.....	86,155.00
Total.....\$	3,303.16	Acc't Bureau of Sewers, Salaries.	
Acc't Expert Witness Fees, Court		Appropriation.....\$	50,665.00
Costs, Etc.		Receipts.....	397.00
Appropriation.....\$	27,500.00	Total.....\$	51,062.00
Receipts.....	126.07	Acc't Bureau of Sewers, Expense.	
Total.....\$	27,626.07	Appropriation.....\$	3,000.00
Appropriation, Law Depart-		Receipts.....	123.20
ment Salaries.....	13,000.00	Total.....\$	3,123.20
Appropriation, Sidewalk Of-		Acc't Extra, Clerks, City Col-	
fice and Inspectors' Force.	13,200.00	lector's Office.	
Total receipts, Board of Local Improvements.....	\$245,522.23	Appropriation.....	7,800.00

BOARD OF LOCAL IMPROVEMENT EXPENDITURE.

Acc't Office Expense.

County Treasurer.....	\$ 22,687.75
Stationery and postage.....	7,041.38
Advertising.....	1,610.67
Printing and binding.....	1,556.79
Photographs.....	1,333.75
Street car tickets.....	1,227.94
Typewriters and repairs....	380.50
Warrants Nos. 20124 and 22716.....	339.86
Office books.....	314.37
Office furniture and fixtures.....	236.39
Work on suspended gallery.....	195.00
Telephone service.....	175.00
Services.....	125.00
Drawing material and blue prints.....	122.30
Composition and electrotyping.....	91.00
Labor and material.....	55.24
Telescope and thermometer.....	49.80
Livery.....	47.00
Law books.....	36.30
Tabulator.....	25.00
Electrical supplies.....	24.82
Maps.....	20.00
Supplies.....	19.13
One truck.....	15.90
Wire panel.....	5.00
Total.....	\$ 37,735.89

Acc't Expert Witness Fees, Court Costs, Etc.

Court costs.....	\$ 11,671.63
Expert witness fees.....	8,826.50

Total expenditures and transfer, Board of Local Improvements.....\$245,522.23

Commissioners' services....	5,430.99
Pay rolls.....	4,521.30
Total.....	\$ 30,450.42

Acc't Board of Local Improvement, Sewer Expense.

Street car tickets.....	\$ 1,489.95
Advertising.....	1,277.28
Transfer.....	983.50
Horse board.....	396.00
Office furniture.....	112.00
Drawing mat and blue prints	51.33
Stationery.....	27.04
Lamps.....	19.95
Repairing boats.....	15.00
Candles.....	6.40
Team and driver.....	5.00
Total.....	\$ 4,383.45

Acc't Board of Local Improvement, Salaries.

Board of Local Improvement	
Office force.....	\$ 51,004.41
Law Department.....	4,160.35
Sidewalk Office and Inspection force.....	14,282.46
Street Engineer.....	26,916.25
Sub-Paving Inspectors.....	21,814.75
Bureau of Sewers.....	42,737.37
Extra Clerks City Collector's Office.....	2,735.25
Total.....	\$ 163,600.84

Total Expenditures for year.	236,170.60
Transferred.....	9,351.63

SPECIAL DEPOSIT FUND RECEIPTS.

Balance to credit January 1,		Street permit depositors.....\$	58,486.56
1898.....\$	31,783.76	Corporation account.....	36,023.82
Suspense account.....	6,611.81	Badge account.....	546.80
Total receipts, Special Deposit Fund.....			\$133,452.75

SPECIAL DEPOSIT FUND EXPENDITURES.

Refund — erroneous water		Refunds, Acc't Badge.....\$	896.30
tax payments. Acc't Sus-		Refunds, Acc't Sewer Con-	
pense.....\$	11,433.69	struction.....	2,970.00
Rebates, Acc't Street Permit		Total Exp. Special De-	
Depositors.....	49,091.24	posit Fund.....\$	107,820.70
Refunds, pay rolls of In-		Balance January 1, 1899....	25,632.06
spectors, etc., Acc't Cor-			
poration.....	43,929.47		
Total expenditures and balance, Special Deposit Fund.....			\$133,452.75

TRIAL BALANCE.

LEDGER, DEPARTMENT OF PUBLIC WORKS, CHICAGO,
DECEMBER 31, 1898.

	<i>Dr.</i>	<i>Cr.</i>
Water Fund.....	\$ 152,949.66	
Water Works.....	30,150,025.88	
Water Works, income.....		\$48,449,448.06
Water Fund, general taxes.....		2,718,878.53
Annexed territory.....		197,525.48
Water loan bonds, 4 per cent.....		3,191,500.00
Water loan bonds, 3 $\frac{4}{10}$ per cent.....		332,000.00
Water loan bonds, 3 $\frac{1}{2}$ per cent.....		333,500.00
Water loan bonds, cancelled.....		1,757,900.00
Water loan certificates 5 per cent.....		1,700,000.00
Water loan interest.....	8,299,101.65	
Water loan bonds, Hyde Park 5 per cent.....		50,000.00
Water loan bonds, Town of Lake 5 per cent.....		60,000.00
Water Works expense and repair account.....	20,582,545.05	
Water loan bonds, Lake View 4 per cent.....		50,000.00
Water loan bonds, Lake View 5 per cent.....		23,000.00
J. W. Lyons, cashier.....	2,000.00	
Meter Department, stock account.....	8,426.27	
Water Works shop, stock account.....	28,575.56	
Tapping Department, stock account.....	2,800.86	
Advances to lay water pipe.....		365,601.04
Hydrant Wrenches.....		2,076.82
Annexed territory, sewers.....		2,614,224.75
Sewers constructed by special assessment.....		7,421,063.11
Sewers, North Division.....	2,837,007.15	
Sewers, South Division.....	7,353,931.07	
Sewers, West Division.....	7,809,470.66	
Sewer loan bonds, 4 per cent.....		2,117,500.00
Sewer loan bonds, 4 $\frac{1}{2}$ per cent.....		489,500.00
Sewer loan bonds, cancelled.....		393,000.00
Sewerage Fund, general taxes and construction.....		4,933,532.48
Sewerage maintenance account.....		36,351.58
Sewer stock account.....	5,663.04	
Appropriation fund.....		1,500.00
L. E. Gosselin, cashier.....	1,500.00	
Special deposit fund.....	25,632.05	
Suspense account.....		7.45
Street Engineers' permit.....		134.00
Street permit depositors.....		8,706.91
Advances to construct sewers.....		8,113.37
Corporation account.....		7,611.32
Badge account.....		1,058.50
	<u>\$77,259,628.90</u>	<u>\$77,259,628.90</u>

Respectfully submitted,

LOUIS E. GOSSELIN,

Bookkeeper, Department of Public Works.

CHICAGO, 1898.

Area of City, square miles.....	187.14
Population of City, school census 1898.....	1,851,588
Americans.....	488,688
German, foreign and American born.....	490,542
Irish, " " " ".....	248,142
Swedish.....	111,190
Polish.....	96,858
Bohemian.....	89,280
Norwegian.....	45,690
English.....	44,223
Russian.....	38,987
Canadian.....	34,907
Colored.....	25,814
Italian.....	23,061
Scotch.....	22,942
French.....	21,830
Danish.....	21,761
Hollandish.....	19,148
Hungarian.....	4,452
Swiss.....	4,401
Welsh.....	3,784
Chinese.....	2,445
Belgian.....	2,011
Greek.....	1,644
Lithuanians.....	1,411
Spanish.....	568
Mexican.....	152
All Other Countries.....	1,713
Mixed foreign parentage.....	5,954
Total, all other nationalities as above.....	624,221
Equalized valuation of property in City, 1898.....	\$220,966,447.00
Money in City's Treasury, Dec. 31, 1897.....	2,592,456.05
Amount received to Dec. 31, 1898.....	33,160,967.66
Expenditures in 1898.....	33,316,184.00
Balance in Treasury, Dec 31, 1898.....	2,437,289.64
Total indebtedness of City, Dec. 31, 1898.....	19,457,904.00
Number of electric lamps on City circuit, each 2,000 candle power.....	2,263
Cost per year for each lamp, material and labor.....	\$62.44
Inventoried value of City electric lighting plants, Dec. 31, 1898.....	\$969,720.04
Number of street gas lamps in use.....	28,611
Number of gasoline lamps in use.....	10,107
Total cost of gas and gasoline lamps, for 1898.....	\$531,752.47
Average annual cost per lamp.....	\$18.73
Average annual cost of gas lamps, each 16 candle power.....	14.24
Average annual cost of gasoline lamps, each 16 candle power.....	12.21
*Average annual cost per 16 candle power by electric arc lights, City circuits..	.50
Number of miles of streets and alleys in City.....	3,946
Number of miles of paved streets.....	1,133.81
Number of miles of paved alleys.....	114.14
Number of miles of unimproved streets.....	1,440.19
Number of miles of unimproved alleys.....	1,257.86
Number of miles of sidewalks in City.....	5,354.35
Longest street in City, Western avenue.....	22 miles
Halsted street, next longest.....	21 1/3 miles
Amount expended for street cleaning and repairs in 1898.....	\$458,667.70
Amount expended for collection and disposal of garbage.....	421,202.21

*NOTE.—The electric lights are in use an average of 1 hour a day longer than the gas lights.

Number of public schools buildings owned by City.....	318
Number of school rooms rented.....	332
Number of pupils in public schools.....	236,239
Number of pupils in private and parochial schools.....	114,180
Amount expended for public schools, year ending June 30, 1898.....	\$6,785,501.00
Number of teachers employed in public schools.....	5,263
Number of men, uniformed service, police department.....	2,675
Number employes, police department, including janitors, drivers, matrons, etc.	3,294
Number of men in fire department, uniform service.....	1,109
Number of miles of sewers in City.....	1,388.35
Number of miles of lake tunnels in use.....	19.
Number of miles of lake tunnels under construction.....	2.66
Number of miles of land tunnels in use.....	6.03
Number of miles of land tunnels under construction.....	10.
Number of bridges in City ($2\frac{2}{3}$ miles).....	61
Number of viaduct systems ($3\frac{1}{10}$ miles).....	37
Number of miles of dock frontage in City.....	52
Number of vessels entering Chicago harbors in 1898.....	9,189
Number of vessels leaving Chicago harbors in 1898.....	9,323
Total entrances and clearances for 1898.....	18,512
Total entrances and clearances for year ending June 30, 1898.....	19,193
Same for port of New York, same period.....	14,445
Same for same period at the ports of Boston, Baltimore, Philadelphia and New Orleans, combined.....	17,937
Total lake freights.....	15,116,426 tons
Average cargo of vessels.....	817 tons
Duties collected at port of Chicago, 1898.....	\$5,298,036.70
Number of railroads entering City.....	39
Number of miles of railway tracks in city.....	1,515.39
Number of miles of railway tracks elevated.....	200.48
Number of miles of railway tracks depressed.....	57.67
Number of grade crossings removed by elevating or depressing tracks.....	272.
Assessed valuation of railway property, including Street Car Co.'s.....	\$12,563,882.00
Number of banks in City (number reporting).....	40
Capital Chicago banks, April 6, 1898.....	\$ 34,577,000.00
Deposits with same, April 6, 1898.....	208,123,280.00

CITY'S WATER SUPPLY SYSTEM.

(Owned and operated by City.)

Number of miles of lake and land tunnels in use or under construction.....	37.69
Number of miles of water mains and pipe in City.....	1,801.25
Number of gallons of water pumped in 1898.....	99,665,332,884
Gross revenue from water service, 1898.....	\$3,489,590.87
Revenue per 1,000 gallons, gross pumpage.....	$3\frac{1}{2}$ cents
Total cost to date of City's water supply system, including original purchase price.....	\$30,220,952.53
Total income from water service since owned and operated by City....	48,556,042.53

Total cost of operation and maintenance, including \$8,096,775.52 interest on bonded debt.....	28,766,298.89
Net revenue paid to City to Dec. 31, 1898, over all costs of operating and maintaining.....	19,689,443.23

PRIVATE CORPORATIONS.

(Operating public utilities.)

Number of miles of surface street car lines in City.....	775.50
Capital stock, all companies.....	\$ 49,460,000.00
Bonded capitalization.....	46,750,300.00
Total capitalization.....	\$96,210,300.00
Capitalization per mile, stock.....	\$ 63,778.00
Capitalization per mile, bonds.....	60,284.00
Total capitalization per mile.....	\$124,062.00

THE THREE PRINCIPAL COMPANIES (Chicago City R'y Co., West Chicago Street

R. R. Co. and the North Chicago Street R. R. Co.), miles operated. 584.49

Capital stock (outstanding).....\$36,859,000.00

(1) Bonded capitalization..... 34,494,500.00

Total capitalization.....\$71,353,500.00

Capitalization per mile, stock.....\$ 68,959.80

Capitalization per mile, bonds.. 64,536.20

Total capitalization per mile.....\$133,496.00

Gross receipts, 1897.....\$11,627,986.00

Operating expenses, including maintenance of way..... 6,158,572.00

(2) Annual interest charged off..... 1,725,217.00

(3) Cash dividends paid stockholders in 1897..... 3,844,968.00

"Water," in the capitalization on which dividends or interest is paid. 18,012,450.00

Over-capitalization above actual cost of construction at present prices..... 40,227,300.00

Market value, April 26, 1899, of the capital stock—six companies owned or controlled by the three principal companies..... \$75,086,850.00

Market value of bonds, at par, same date, including \$1,500,000 of W.

C. S. R. R. tunnel bonds (most of these bonds are above par)....\$ 31,718,500.00

Total market value of stocks and bonds..... 106,804,850.00

Par value of stocks and bonds..... 71,353,500.00

Unearned increment in market value, April 26, 1899..... 35,451,350.00

(4) Regular and extra dividends paid in six years ending 1897 by the three companies..... 21,612,968.00

(1) Amount named includes mortgage bonds of auxiliary or leased lines, both principal and interest on which are guaranteed by the operating companies.

(2) Includes interest on bonds of leased lines.

(3) Includes dividends of 30 per cent. on \$249,900.00 North Chicago City R'y stock; 35 per cent. on \$624,900.00 West Chicago Street R. R. stock, and 5 per cent. on \$560.00 Chicago Passenger R'y Co.'s stock.

(4) Includes guaranteed dividends; note (3), and extra dividend (\$2,250,000 in stock) of \$1,050,000.00 in South Side Rapid Transit stock by Chicago City Co. in 1893 and \$1,100,000.00 extra dividend by the North Chicago Street Railway Co. in 1895.

(^b) Interest charged off in the six years.....	6,998,271.00
(^c) Amount carried to surplus account over all costs, dividends, interest, operation, depreciation, maintenance, etc	2,463,414.00
Total profits over all costs of operation and maintenance in six years.	31,074,653.00
Total profits in six years, including unearned increment in market value of stocks and bonds, April 26, 1899.....	66,526,003.00
Assessed value of franchises and property of the three principal companies in 1896 (Harlan committee report).....	\$2,900,000.00
Taxes paid in 1896.....	254,286.00
Taxes that should have been paid, if assessed on same basis as other business property, 1896.....	877,148.00
Average yearly expenditure for car licenses and public improvements, including lights and bridge repairs.....	101,110.00
CAPITALIZATION OF THE THIRTEEN SURFACE ROADS, other than the three principal companies, yet in part leased by them, per mile {	stock..\$47,800.00 bonds. 35,900.00 total.. 83,700.00
MILES OF ELEVATED RAILROADS, May, 1898	41.73
Capital stock of same.....	\$56,323,800.00
Bonded capitalization of same.....	41,271,000.00
Total capitalization.....	97,594,800.00
Capitalization per mile {	stock..... 1,349,719.00 bonds..... 989,000.00 total..... 2,338,719.00
PEOPLES GAS LIGHT AND COKE Co. (Gas Trust).	
Capital stock (May, 1898).....	\$25,000,000.00
Bonded capitalization.....	34,246,000.00
Total capitalization.....	59,246,000.00
Market value of stock, April 26, 1899, (127).....	31,750,000.00
Number of 1,000 feet of gas sold.....	5,795,124
Gross receipts for year.....	\$7,303,059.00
Cost of operation and maintenance.....	3,868,596.00
Net receipts.....	3,436,463.00
Annual interest charged off.....	1,734,300.00
Annual dividends paid.....	1,500,000.00
Accumulated surplus.....	3,274,791.00
Average receipts per 1,000 feet of gas sold.....	1.27
Cost per 1,000 feet to manufacture and distribute.....	.68
Profit per 1,000 feet over costs of manufacture, operating, etc.	.59
Profit per 1,000 feet over all costs, interest on bonds included.	.27
THE UNIVERSAL GAS Co.	
Organized in the year 1893.	
Capital stock	\$1,500,000.00
Stock bought up in 1897 by Chicago Gas Trust, for.....	2,700,000.00
Profit to promoters in four years.....	1,200,000.00

(5) Does not include \$509,547.00 charged off by Chicago City Railway Co. for depreciation.

(6) This total is after deducting a deficit of \$762,794.00 in 1895 for the North Chicago Co. and a deficit of \$381,158.00 in 1893 for the West Chicago Co. Both deficits were occasioned by the distribution of extra dividends.

CHICAGO TELEPHONE CO.

Capital stock (outstanding).....	\$4,336,560.00
Market value of stock, April 26, 1899 (192 $\frac{1}{2}$).....	8,347,898.00
Bonded capitalization.....	none.
Net earnings, 1897.....	624,693.00
Dividends paid.....	520,380.00
Carried to surplus account.....	104,313.00

CHICAGO EDISON CO.

Capital stock (outstanding).....	\$4,975,900.00
Market value of stock, April 26, 1899 (173).....	8,708,307.00
Bonded capitalization.....	4,458,000.00
Total capitalization.....	9,433,900.00
Net earnings over operating and maintenance expenses, year ending Mar. 31, 1898.....	676,525.00
Annual interest paid.....	226,681.00
Stock earnings (10.37 per cent.).....	449,844.00
Dividends paid.....	398,072.00
Carried to surplus account.....	51,772.00

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