

## CONCORD WATER BOARD.

Date of election and length of service of members.

Abraham G. Jones, *ex officio* . 1872—three months.  
John M. Hill\* . . . 1872—1878.  
Benjamin A. Kimball . . . 1872—1878.  
Josiah Minot\* . . . 1872. Resigned Jan. 10, 1874.  
David A. Warde\* . . . 1872—1874.  
Edward L. Knowlton\* . . . 1872. Resigned Sept. 25, 1875.  
Benjamin S. Warren\* . . . 1872—1873.  
John Kimball, *ex officio* . 1872—1876.  
John Abbott\* . . . 1873—1876.  
John S. Russ\* . . . 1874—1877.  
Abel B. Holt\* . . . 1874—1877.  
Samuel S. Kimball\* . . . 1875. Resigned July 1, 1891.  
Geo. A. Pillsbury,\* *ex officio* . 1876—1878.  
Luther P. Durgin\* . . . 1876—1885.  
John Kimball . . . 1877. Resigned July 1, 1891.  
William M. Chase . . . 1877. Resigned July 1, 1891.  
Horace A. Brown, *ex officio* . 1878—1880.  
James L. Mason\* . . . 1878—1893.  
James R. Hill\* . . . 1878. Died 1884.  
Geo. A. Cummings, *ex officio* . 1880—1883.  
Edgar H. Woodman,\* *ex officio* . 1883—1887.  
Joseph H. Abbot\* . . . 1884—1893.  
George A. Young . . . 1885—1894.  
John E. Robertson, *ex officio* . 1887—1889.  
Stillman Humphrey,\* *ex officio* . 1889—1891.  
Henry W. Clapp,\* *ex officio* . 1891—1893.  
Willis D. Thompson . . . 1891—1895.  
William P. Fiske . . . 1891—1902.  
James H. Chase\* . . . 1891. Died in 1893.  
John Whitaker . . . 1892. Now in office.  
Henry E. Conant . . . 1892. Resigned Jan. 8, 1895.

\*Deceased.

Parsons B. Cogswell,\* *ex officio* 1893-1895.  
 Solon A. Carter . . . . 1893. Now in office.  
 Frank D. Abbot . . . . 1893-1901.  
 William M. Mason . . . . 1893-1899.  
 William E. Hood . . . . 1894-1902.  
 Henry Robinson, *ex officio* . 1895-1897.  
 Ebenezer B. Hutchinson . 1895. Resigned Jan. 10, 1899.  
 Edson J. Hill . . . . 1895. Now in office.  
 Albert B. Woodworth, *ex officio* 1897-1899.  
 Nathaniel E. Martin, *ex officio* 1899-1901.  
 Henry E. Conant . . . . 1899. Now in office.  
 Timothy P. Sullivan . . . . 1899. Resigned May 14, 1901.  
 Harry G. Sargent, *ex officio* . 1901. Now in office.  
 Obadiah Morrill . . . . 1901. Now in office.  
 George D. B. Prescott . . . 1901. Now in office.  
 Harry H. Dudley . . . . 1902. Now in office.  
 Nathaniel E. Martin . . . . 1902. Now in office.

---

PRESIDENTS OF THE BOARD.

Josiah Minot\* . . . . 1872. Resigned Jan. 10, 1874.  
 Benjamin A. Kimball . . . . 1874-1875.  
 Edward L. Knowlton\* . . . . 1875. Resigned Sept. 25, 1875.  
 John Kimball . . . . 1875-1876.  
 Benjamin A. Kimball . . . . 1876-1878.  
 John Kimball : . . . . 1878. Resigned July 1, 1891.  
 William P. Fiske . . . . 1891-1902.  
 Solon A. Carter . . . . 1902. Now in office.

\*Deceased.

## SUMMARY STATISTICS.

---

### CONCORD, NEW HAMPSHIRE, WATER-WORKS.

---

Population of the city by census of 1900 . . . . .	19,632
Population of that portion of the city included within the water precinct, estimated . . . . .	17,000

Date of construction, 1872 ; additions since.

Works are owned by the city.

Source of supply, Penacook lake, a natural body of water containing 265 acres, situated about three miles and a half from the state house, and about 125 feet higher than Main street in front of the state house.

Mode of supply, gravity and pumping to reservoir.

## FINANCIAL.

### MAINTENANCE.

Receipts.	Expenditures.
From consumers, mostly for domestic uses \$62,996.54	For care and maintenance . . . \$3,816.41
From rents . . . 109.97	For repairs on cement-lined pipe . . . 431.74
From sundries . . . 529.95	For new service-pipes . . . 2,197.89
	For new distribution pipes . . . 14,812.00
	For inspection . . . 660.00
	For maintenance of pumping station . . . 2,157.24
	For meter account . . . 987.08
	For work at Penacook lake . . . . . 273.35
	For repairing buildings at Penacook lake . . . 1,879.38
	For land at Penacook lake . . . . . 5,910.36
	For incidental expenses . . . 469.71
	For abatements . . . 105.61
	<u>\$33,700.77</u>
	Amount required to pay interest on bonded indebtedness . . . 25,450.00
	Balance . . . . . 4,485.69
<u>\$63,636.46</u>	<u>\$63,636.46</u>

### CONSTRUCTION.

Cost of land damages, flowage, and water rights :

Paid B. F. & D. Holden, for water rights \$60,000.00	
Concord Manufacturing Co., for water rights . . . . . 83,000.00	
W. P. Cooledge, for mill privilege and land . . . . . 5,500.00	
Humphrey & Farnum, for kit-shop privilege . . . . . 5,000.00	

Paid flowage rights around Penacook	
lake . . . . .	\$4,375.61
W. P. Cooledge, Hutchins house and lot . . . . .	2,250.00
Mary C. Rowell, for land . . . . .	1,500.00
Moses H. Bradley, " . . . . .	5,000.00
Joseph B. Walker, " . . . . .	2,214.00
John G. Hook, " . . . . .	370.00
A. S. Ranney, " . . . . .	1,350.00
Alfred Roberts, " . . . . .	1,275.00
Charles E. Ballard, " . . . . .	2,500.00
Mary G. Carter, " . . . . .	1,250.00
Elizabeth Widmer, " . . . . .	1,564.50
A. L. Proctor, " . . . . .	450.00
Robert Crowley, " . . . . .	3,000.00
Miles Hodgdon, " . . . . .	2,200.00
heirs of Lowell Brown, " . . . . .	1,032.55
Coffin & Little, " . . . . .	800.00
O. F. Richardson, " . . . . .	100.00
M. H. & C. R. Farnum, " . . . . .	4,500.00
Cook & Hood, " . . . . .	1,750.00
Charles H. Farnum, " . . . . .	1,410.36
C. H. Amsden, water and flowage rights . . . . .	5,000.00
Cost of property and rights of Torrent	
Aqueduct Association . . . . .	20,000.00
dam, gate-house and appurte- nances . . . . .	30,756.17
conduit and gate-houses . . . . .	29,484.05
mains (low service main and pump main from the dam to Penacook street, force main from the pump to the reservoir, fire main through North and South Main streets, and supply main from near the dam to Stark street) . . . . .	160,960.92
distribution pipe . . . . .	309,999.38

Cost of service-pipe . . . . .	\$45,853.18
reservoir . . . . .	42,460.09
pumping-station, shop, stable and storehouse . . . . .	22,000.00
pumping machinery . . . . .	10,215.00
engineering and superintendence .	14,913.12
incidentals . . . . .	6,531.19
	<hr/>
Cost of works, January 1, 1903 . . . .	\$890,565.12

Bonds of the city have been issued to pay a part of said cost,  
of which the following are still outstanding :

When due.	Rate.	Amount.
Jan. 1, 1903,	4,	\$10,000.00
Jan. 1, 1904,	4,	10,000.00
Jan. 1, 1905,	4,	10,000.00
Jan. 1, 1906,	4,	10,000.00
Jan. 1, 1907,	4,	10,000.00
Jan. 1, 1908,	4,	10,000.00
Jan. 1, 1909,	4,	10,000.00
Jan. 1, 1910,	4,	5,000.00
Jan. 1, 1910,	3,	5,000.00
Jan. 1, 1911,	4,	5,000.00
Jan. 1, 1911,	3,	5,000.00
Oct. 1, 1912,	4,	45,000.00
Jan. 1, 1913,	4,	10,000.00
Jan. 1, 1914,	4,	10,000.00
Jan. 1, 1915,	4,	10,000.00
Jan. 1, 1916,	4,	10,000.00
Jan. 1, 1917,	4,	10,000.00
Jan. 1, 1918,	4,	10,000.00
Jan. 1, 1919,	4,	10,000.00
Jan. 1, 1920,	3,	10,000.00
Jan. 1, 1921,	3,	5,000.00
Mar. 1, 1922,	3½,	20,000.00
Jan. 1, 1923,	4,	400,000.00
		<hr/>
		\$640,000.00

## REPORT OF WATER COMMISSIONERS.

---

*To the City Council :*

The Board of Water Commissioners has the honor to submit the following report for the year 1902 :

The accompanying report of the superintendent contains the details of the work of the department for the year and renders an extended report from the board unnecessary.

The present condition of our system is highly satisfactory, both as regards the quantity and quality of the supply and physical condition.

The work of replacing the original cement-lined pipe with cast-iron has been continued, and the coming year will practically mark the completion of that work in the territory bounded on the north by Pleasant, on the east by South Main, on the south by West and on the west by South Spring streets, besides relaying a section on North Main street, north of Chapel street.

The cottage near the dam has been moved to the east side of the dam and the old barn removed and the grounds graded, thus removing the appearance of danger of contamination of the supply from that source.

The policy of the board has been to preserve the purity of the supply in every possible way and to continue the work of laying cast-iron pipe where most needed as far as the means at its disposal would permit.

It is hoped that in the future the earnings of the system will pay the expenses of maintenance, the interest on the water bonds, allow the expenditure of ten or fifteen thousand dollars annually for renewals and extensions, and pay the instalments of the bonds as they mature.

The board desires to express its commendation of the faithful service of the superintendent and his assistants in each and every department.

Respectfully submitted,

HARRY H. DUDLEY,  
NATHANIEL E. MARTIN,  
SOLON A. CARTER,  
OBADIAH MORRILL,  
JOHN WHITAKER,  
HENRY E. CONANT,  
EDSON J. HILL,  
GEORGE D. B. PRESCOTT,  
HARRY G. SARGENT, *ex officio*,

*Water Commissioners.*

## REPORT OF THE SUPERINTENDENT.

*To the Board of Water Commissioners :*

I herewith present to you the thirty-first annual report of the operations of this department, showing the receipts, expenditures, and abatements, together with a statement of extensions and improvements made during the year ending December 31, 1902.

### RECEIPTS.

For water, from consumers by fixed rates . . . . .	\$29,314.64
For water, from consumers by meter rates . . . . .	33,514.50
From delinquents . . . . .	59.66
For water used for building purposes . . . . .	107.74
For rents . . . . .	109.97
For horse sold . . . . .	130.00
For hay, apples, etc. . . . .	96.00
For old iron and brass sold . . . . .	67.93
For pipe sold . . . . .	130.02
For shutting off and turning on water . . . . .	6.00
	<hr/>
	\$63,536.46
Deduct abatements . . . . .	105.61
	<hr/>
Net receipts for 1902 . . . . .	\$63,430.85

### EXPENDITURES.

#### General Expenses.

Paid pay-rolls, salaries and labor . . . . .	\$9,811.18
Nathaniel White, Jr., rent of office and heating . . . . .	350.00
S. G. Sanborn, rent of shop in Penacook . . . . .	24.00
Rumford Printing Co., printing and books . . . . .	123.45

Paid Ira C. Evans Co., printing . . .	\$64.73
Frank L. Sanders, books and supplies . . . . .	4.95
John F. Swanney, book . . . . .	3.00
Frank P. Mace, office supplies . . . . .	8.60
Library Bureau, office supplies . . . . .	3.00
Concord Light and Power Co., gas . . . . .	15.60
N. E. Telephone and Telegraph Co., telephones . . . . .	142.40
J. M. Stewart & Sons Co., wall paper . . . . .	5.33
Thompson & Hoague, hardware . . . . .	84.82
W. L. Jenks & Co., hardware . . . . .	37.67
Humphrey-Dodge Co., hardware . . . . .	2.55
Joseph T. Walker, hay . . . . .	119.21
A. C. Sanborn, hay and dynamite . . . . .	19.84
D. Waldo White, grain . . . . .	116.05
Batchelder & Co., oil, etc. . . . .	25.47
C. H. Martin & Co., lard, oil, etc. . . . .	5.87
Woodworth & Co., cement . . . . .	58.05
Dickerman & Co., cement . . . . .	43.60
James R. Hill & Co., harnesses . . . . .	30.50
Portland Water Co., pump . . . . .	12.00
John C. Thorne, rubber boots . . . . .	28.00
W. A. Thompson, rubber boots . . . . .	3.50
William P. Ford & Co., funnel . . . . .	5.25
C. W. Dadmun, electrical supplies and repairs . . . . .	20.98
Sewall & Day Cordage Co., jute packing . . . . .	52.91
A. W. Chesterton & Co., packing . . . . .	1.80
Page Belting Co., leather valves . . . . .	6.30
L. M. Ham & Co., steel beams . . . . .	43.20
M. J. Drummond & Co., cast-iron pipe . . . . .	7,036.72
Builders Iron Foundry, castings . . . . .	15.85

## WATER DEPARTMENT.

311

Paid Concord Foundry Co., castings . . . . .	\$16.69
Ludlow Valve Manufacturing Co., gates . . . . .	688.02
Sweet & Doyle, gates . . . . .	64.95
Coffin Valve Co., hydrants . . . . .	178.75
R. D. Wood & Co., hydrant sup- plies . . . . .	11.52
Richards & Co., pig lead . . . . .	414.51
Chadwick-Boston Lead Co., pig lead and lead pipe . . . . .	389.69
J. H. Cunningham Co., wrought- iron pipe . . . . .	148.52
Walworth Manufacturing Co., gate-boxes and tools . . . . .	102.24
Sumner-Goodwin Co., brass goods	119.86
The George Woodman Co., fittings	17.60
Brown & Wales, fittings . . . . .	13.33
Braman, Dow & Co., fittings . . . . .	3.99
Goodhue & Milton, fittings . . . . .	3.98
Perrin, Seamans & Co., tools . . . . .	17.10
Harold L. Bond & Co., tools . . . . .	13.30
Hays Mfg. Co., service boxes . . . . .	271.80
Thomson Meter Co., meters . . . . .	398.51
National Meter Co., " . . . . .	234.65
Neptune Meter Co., " . . . . .	47.50
E. B. Hanchay, smith-work . . . . .	125.71
Ross W. Cate, " . . . . .	17.50
Abbot-Downing Co., repairs . . . . .	10.75
W. E. Tenney, " . . . . .	10.75
J. D. Johnson & Son, " . . . . .	14.15
George D. Huntley, " . . . . .	1.50
Hood, Palmer & Bailey, " . . . . .	2.00
George L. Theobald, team work . . . . .	930.25
H. M. Richardson, " . . . . .	62.00
E. B. Hutchinson Building Co., repairing cottage, building barn, etc. . . . .	1,241.67

Paid Danforth & Forrest, lumber and labor . . . . .	\$23.62
Rowell & Plummer, mason-work	170.02
James Cookson, papering . . . . .	10.40
Benj. Bilborough, painting . . . . .	1.63
J. H. Rowell & Co., repairing concrete . . . . .	106.50
Frank Morrill, stone-work . . . . .	10.00
M. J. McGuire & Co., use of derrick . . . . .	6.00
Engineering News . . . . .	5.00
Morrill & Danforth, insurance . . . . .	269.20
Eastman & Merrill, " . . . . .	7.50
Boston & Maine Railroad, freight and repairing siding . . . . .	767.52
Town of Webster, taxes . . . . .	58.00
M. H. & C. R. Farnum, land at Penacook lake . . . . .	4,500.00
Charles H. Farnum, land at Penacook lake . . . . .	1,410.36
A. G. Cochran, cash paid out . . . . .	96.05
V. C. Hastings, " " . . . . .	19.21
Incidentals . . . . .	77.74
	----- \$31,437.92

Pumping Station Expenses.

Paid pay-rolls, engineer and fireman . . . . .	\$1,540.00
labor on fuel . . . . .	23.00
H. O. Marsh, coal . . . . .	261.92
C. H. Stevens & Co., coal . . . . .	30.63
H. H. Crowell, slab wood . . . . .	90.00
H. M. Richardson, drawing wood	20.00
Vacuum Oil Co., oil . . . . .	34.42
A. W. Chesterton & Co., packing	12.72
Walter L. Jenks & Co., hardware	1.16
Thompson & Hoague, " . . . . .	.30
Concord Foundry Co., castings . . . . .	3.92

## WATER DEPARTMENT.

313

Paid Greene, Tweed & Co., lubricators	\$50.00	
Rowell & Plummer, mason-work	2.10	
Locke Regulator Co., repairs	6.60	
Boston & Maine Railroad, freight and repairing siding	4.92	
Concord Light and Power Co., gas	5.55	
N. E. Telegraph and Telephone Co., telephone	45.00	
Morrill & Danforth, insurance	25.00	
		<u>\$2,157.24</u>
Total expenditures for 1902		\$33,595.16

The expenditures are divided as follows :

## General Expenses.

For care and maintenance	\$3,816.41	
repairs on cement-lined pipe	431.74	
new service-pipes	2,197.89	
new distribution-pipes	14,812.00	
inspection	660.00	
meter account	987.08	
work at Penacook lake	273.35	
repairing buildings at Penacook lake	1,879.38	
land at Penacook lake	5,910.36	
incidentals	469.71	
		<u>\$31,437.92</u>

## Pumping Station Expenses.

For salaries, engineer and fireman	\$1,540.00	
fuel	425.55	
oil and packing	47.14	
lubricators	50.00	
repairs	19.00	
gas and telephone	50.55	
insurance	25.00	
		<u>\$2,157.24</u>

**EXTENSIONS AND IMPROVEMENTS.**

Cast-iron main and distribution pipes have been laid and hydrants set during the year, as follows:

*In South State street,*

south from Thompson to Thorndike street, 763 feet 14-inch pipe in place of 10-inch cement-lined pipe discontinued.

*In South street,*

south from Thompson to Thorndike street, 922 feet 12-inch pipe in place of 6-inch cement-lined pipe discontinued.

*In Thorndike street,*

west from South Main to South street, 1,898 feet 10-inch pipe in place of 6-inch cement-lined pipe discontinued, and two hydrants.

*In South Main street,*

south from Freight to Thorndike street, 1,435 feet 10-inch pipe in place of 6-inch cement-lined pipe discontinued.

*In Penacook street,*

east from North State to North Main street, 744 feet 10-inch pipe in place of 6-inch cement-lined pipe discontinued.

*In North Main street,*

north from opposite Mr. Enoch Gerrish's to Penacook street, 397 feet 10-inch pipe in place of 6-inch cement-lined pipe discontinued.

*In South Spring street,*

south from Pleasant street to opposite Mrs. M. E. Mugridge's, 1,247 feet 8-inch pipe in place of 4-inch cement-lined pipe discontinued.

*In Warren street,*

west from Green to North Spring street, 726 feet 8-inch pipe in place of 6-inch cement-lined pipe discontinued, and one hydrant.

- In Thompson street,*  
west from South to South Spring street, 326 feet 8-inch pipe.
- In Thorndike street,*  
west from South to South Spring street, 250 feet 8-inch pipe.
- In Concord street,*  
west from South Main to South street, 1,593 feet 6-inch pipe in place of 4-inch cement-lined pipe discontinued.
- In Monroe street,*  
west from South State to South street, 1,289 feet 6-inch pipe in place of 4-inch cement-lined pipe discontinued.
- In Pleasant street, St. Paul's School,*  
extended west to near New Upper School, 616 feet 6-inch pipe and one hydrant.
- In Ridge road,*  
extended north 488 feet 6-inch pipe.
- In Broadway,*  
south from McKinley street, 390 feet 6-inch pipe.
- In Carter street,*  
east from Bow to Eastman street, 412 feet 6-inch pipe.
- In Thompson street,*  
west from South Main to South State street, 360 feet 6-inch pipe in place of 4-inch cement-lined pipe discontinued.
- In Fayette street,*  
west from South Main to South State street, 272 feet 6-inch pipe in place of 4-inch cement-lined pipe discontinued.
- In Fisher street,*  
west from Engel to Clarke street, 343 feet 6-inch pipe.

*In Forest street,*

east from Ridge road to Ridge road, 93 feet 6-inch pipe.

*In Clarke street,*

north from Fisher street, 77 feet 6-inch pipe and one hydrant.

*In Green street,*

on connection at Warren street, 66 feet 6-inch pipe in place of 4-inch cement-lined pipe discontinued.

*In Hill's avenue,*

east from South Main street, 58 feet 6-inch pipe in place of 4-inch cement-lined pipe discontinued.

*In Chandler street,*

east from South Main street, 46 feet 6-inch pipe.

*On hydrant branches,*

205 feet 6-inch pipe; 175 feet 6-inch and 34 feet 4-inch cement-lined pipe discontinued.

Also 606 feet 1-inch pipe.

There have been set 37 gates; discontinued, 20.

---

**Summary of the Foregoing.**

**NEW PIPES, HYDRANTS AND STOP-GATES.**

<i>Pipes.</i>	<i>Hydrants.</i>	<i>Stop-Gates</i>
1-in., 606 feet.	Thorndike street, 2	6-in., 23
6-in., 6,308 "	Pleasant street, 1	8-in., 4
8-in., 2,549 "	Warren street, 1	10-in., 8
10-in., 4,474 "	Clarke street,	12-in., 1
12-in., 922 "	West Concord, 1	14-in., 1
14-in., 763 "		
<hr/> 15,622 feet.	<hr/> 5	<hr/> 37
equal to 2.95 miles.		

PIPES AND STOP-GATES DISCONTINUED.

<i>Pipes.</i>	<i>Stop-Gates.</i>
1-in., 546 feet.	4-in., 8
4-in., 4,843 "	6-in., 9
6-in., 6,314 "	8-in., 1
10-in., 763 "	10-in., 2
12,466 feet.	20
equal to 2.36 miles.	

Total length of main and distribution pipes now in use, 326,314 feet, equal to 61.80 miles.

Total number of hydrants now in use, 277.

Total number of gates now in use, 800.

SERVICE-PIPES.

There have been laid during the year and connected with the main pipes, 65 service-pipes, consisting of

64 $\frac{3}{4}$ -inch,	1,401 feet.
1 4-inch,	42 "
65	1,443 feet.

There have been discontinued, 12; whole number in use at the present time, 3,331; total length of service-pipes, 78,116 feet, or 14.79 miles. We have placed 207 service-boxes at the curb on old services.

We have set 68 meters during the year; 7 have been removed, making the total number now in use, 1,203.

The following table shows the height of water in Penacook lake on the first day of each month:

January . . . . . 184.80	July . . . . . 184.90
February . . . . . 184.85	August . . . . . 184.90
March . . . . . 185.05	September . . . . . 184.90
April . . . . . 185.00	October . . . . . 185.10
May . . . . . 185.05	November . . . . . 185.15
June . . . . . 184.90	December . . . . . 185.15

The lowest point reached during the year was on September 26, being 184.60; the highest was on December 17, 185.50; mean height, 184.98, which was 1.12 feet higher than the mean height for the year 1901.

The water has been running over the overflow through the entire year, except eight days in February and five days in September.

We have replaced nearly two and one half miles of old cement-lined pipe with cast-iron, also increasing the size of the mains. There still remain of the original cement-lined pipe laid in 1872, 12.05 miles, and I would respectfully urge that the work of relaying be continued as fast as the income of the works will allow. There are also in use 3.53 miles laid in 1882, and 9.51 miles laid in 1887, all of cement-lined pipe, but according to the excellent record of the original mains these will be of good service for several years after the older pipes have been replaced.

We have moved the cottage at Penacook lake across the road, and built a new stable according to your directions; the cottage needed considerable repairing inside, which was done, a piazza was added and the buildings are now in good condition. The old barn was moved away and the grounds graded, making that end of the lake much more attractive.

The water in the lake continuing high, we were obliged to cut the brush and trees along the shore up to high water line and shall continue the work this winter. The wood which we cut is used at the pumping station and shop.

I would call your attention to the fact that our pump has now been in use eleven years, and while it has furnished excellent service with very little expense for repairs, it would seem advisable to consider the matter of some auxiliary power, as an accident would at least cause anxiety to the department as it might shut off the entire high service, including St. Paul's School and the fire service in Main street.

I wish to thank your board for many courtesies extended; and I also wish to express here, both for myself and the employees of the department, gratitude to Messrs. Fiske and Hood for kindness during their term of service. During the ten years of Mr.

Fiske's presidency we have always felt free to ask and safe to follow his counsels; particularly have I personally appreciated his wise guidance and staunch support through the varied experiences and difficulties of a water department.

Respectfully submitted,

V. C. HASTINGS,

*Superintendent.*

# REPORT OF THE ENGINEER AT THE PUMPING-STATION.

## PUMPING-STATION, CONCORD WATER-WORKS.

V. C. HASTINGS, *Superintendent*:

SIR,—I would report that the pumping machinery at the pumping-station is in very fair working condition.

The total amount of water pumped is 148,876,167 gallons, a decrease of 494,848 gallons from last year. The coal consumption shows a decrease of 5,832 lbs. from last year.

Following will be found a statement of the coal and supplies used at the pumping-station during the year, with a table showing the work for each month.

### Statement.

98 tons 1,210 lbs. Pocahontas coal.  
 33 tons 1,234 lbs. Cumberland coal.  
 36 cords of wood.  
 55 gallons of oil.  
 27 lbs. of waste.

### ENGINE RECORD.

Date.	Pumping time. <i>h. m.</i>	Gallons water pumped.	Daily average pumped.	Total coal burned.	Daily average coal burned.	*Gallons pumped per pound of coal.
January .....	174:00	14,964,378	482,721	29,815	961	501
February .....	143:00	12,438,558	444,234	24,548	876	506
March .....	139:00	12,104,763	393,056	23,922	771	506
April .....	140:15	11,762,091	392,069	23,069	768	509
May .....	150:30	13,087,536	422,178	25,830	833	506
June .....	157:45	13,341,603	444,720	26,338	877	502
July .....	144:00	12,311,937	397,159	24,370	786	505
August .....	162:30	13,792,185	444,909	27,361	882	504
September .....	145:00	12,296,823	409,894	24,610	820	499
October .....	141:30	12,052,293	388,783	24,100	777	500
November .....	111:30	9,547,692	318,256	19,144	641	496
December .....	137:00	11,176,308	360,526	22,777	734	490
Total .....	1,746:00	148,876,167	407,879	295,884	810	500
Daily average	4:47	407,879	.....	810	.....	.....

\* Amount of coal consumed includes that used for heating the building and banking fires.

The amount of coal consumed per thousand gallons pumped, 1.92 pounds.

HENRY A. ROWELL,  
*Engineer.*

# APPENDIX.

## A

Receipts for Each Year Since the Completion of the  
Works.

For the year ending January 31, 1874	.	.	\$4,431.10
For fifteen months ending April 1, 1875	.	.	17,535.00
For the year ending April 1, 1876	.	.	16,921.24
“ “ “ 1877	.	.	19,001.07
“ “ “ 1878	.	.	20,763.03
“ “ “ 1879	.	.	21,869.86
“ “ “ 1880	.	.	22,451.53
“ “ “ 1881	.	.	26,744.58
For nine months ending December 31, 1881	.	.	25,534.01
For the year ending December 31, 1882	.	.	27,243.06
“ “ “ 1883	.	.	28,255.48
“ “ “ 1884	.	.	28,915.65
“ “ “ 1885	.	.	30,222.54
“ “ “ 1886	.	.	30,862.64
“ “ “ 1887	.	.	34,047.52
“ “ “ 1888	.	.	38,441.32
“ “ “ 1889	.	.	40,237.53
“ “ “ 1890	.	.	42,133.41
“ “ “ 1891	.	.	46,075.16
“ “ “ 1892	.	.	48,351.52
“ “ “ 1893	.	.	52,299.66
“ “ “ 1894	.	.	53,230.10
“ “ “ 1895	.	.	55,343.19
“ “ “ 1896	.	.	56,557.81
“ “ “ 1897	.	.	55,156.42
“ “ “ 1898	.	.	59,147.54
“ “ “ 1899	.	.	53,953.13
“ “ “ 1900	.	.	57,003.71
“ “ “ 1901	.	.	62,253.61
“ “ “ 1902	.	.	63,430.85
Total receipts for 30 years	.	.	<u>\$1,138,413.27</u>

## B

## Mean Height of Water Each Year.

1873 . . .	175.86	1888 . . .	181.96
1874 . . .	179.50	1889 . . .	180.91
1875 . . .	180.00	1890 . . .	181.90
1876 . . .	180.28	1891 . . .	180.00
1877 . . .	176.46	1892 . . .	174.32
1878 . . .	179.50	1893 . . .	173.38
1879 . . .	179.74	1894 . . .	172.81
1880 . . .	175.30	1895 . . .	171.15
1881 . . .	174.70	1896 . . .	178.96
1882 . . .	179.15	1897 . . .	183.33
1883 . . .	176.40	1898 . . .	184.31
1884 . . .	178.18	1899 . . .	183.49
1885 . . .	176.80	1900 . . .	183.09
1886 . . .	178.10	1901 . . .	183.86
1887 . . .	179.04	1902 . . .	184.98











D.  
FIRE-HYDRANTS.

STREETS.	LOCATIONS.	Number.	Total.
North Main.	Southwest corner North Main and Penacook.....	1	
"	East side North Main, near J. B. Walker's.....	1	
"	Junction North Main and Fiske.....	1	
"	East side North Main, near Larkin's store.....	1	
"	Northwest corner North Main and Franklin.....	1	
"	East side North Main, opposite Pearl.....	1	
"	Northwest corner North Main and Washington.....	1	
"	West side No. Main, opposite Historical Society rooms.....	1	
"	East side North Main, opposite Chapel.....	1	
"	Northwest corner North Main and Court.....	1	
"	Northwest corner North Main and Pitman.....	1	
"	Northwest corner North Main and Montgomery.....	1	
"	East side North Main, opposite Montgomery.....	1	
"	Northwest corner North Main and Centre.....	1	
"	Southeast corner North Main and Bridge.....	1	
"	Southwest corner North Main and Park.....	1	
"	East side North Main, opposite Park.....	1	
"	Northwest corner North Main and Capitol.....	1	
"	Northwest corner North Main and School.....	1	
"	West side North Main, at Centennial Block.....	1	
"	East side North Main, opposite Centennial Block.....	1	
"	East side North Main, in rear Eagle Hotel.....	1	
"	East side North Main, in rear Woodward Block.....	1	
"	Northwest corner North Main and Warren.....	1	
"	West side North Main, at Central Block.....	1	
"	Northeast corner North Main and Depot.....	1	
South Main.	Northwest corner North Main and Pleasant.....	1	27
"	Southeast corner South Main and Pleasant.....	1	
"	Northeast corner South Main and Fayette.....	1	
"	East side South Main, opposite Fayette.....	1	
"	East side South Main, opposite Thompson.....	1	
"	Southeast corner South Main and Chandler.....	1	
"	Northwest corner So. Main and Wentworth's avenue.....	1	
"	Northwest corner South Main and Thorndike.....	1	
"	East side South Main, opposite St. John's Church.....	1	
"	Northwest corner South Main and Perley.....	1	
"	West side South Main, near Abbot-Downing Co.'s.....	1	
"	East side South Main, opposite Abbot-Downing Co.'s.....	1	
"	Northwest corner South Main and West.....	1	
"	East side South Main, near West.....	1	
"	West side South Main, opposite Gas.....	1	
"	West side South Main, opposite Holt Bros. Mfg Co.....	1	
"	Southwest corner South Main and South State.....	1	
"	Northwest corner South Main and Pillsbury.....	1	
"	East side South Main, opposite Pillsbury.....	1	
"	West side South Main, at J. H. Lamprey's.....	1	
"	West side South Main, at W. J. Sawyer's.....	1	
Water.	West side Water, near Capt. James Thompson's.....	1	20
Hall.	West side Hall, below Rolfe and Rumford Asylum.....	1	1
"	East side Hall, opposite W. H. Page's.....	1	2
Hammond.	North side Hammond, near Bridge.....	1	1
Fiske.	West side Fiske, near North State.....	1	1
Summer.	Northeast corner Summer and Pitman.....	1	1
North State.	East side North State, near cemetery gate.....	1	1
"	Northeast corner North State and Foster.....	1	
"	West side North State, at water-works storehouse.....	1	
"	Southwest corner North State and Penacook.....	1	
"	Northwest corner North State and Walker.....	1	
"	Northwest corner North State and Church.....	1	
"	Northwest corner North State and Tremont.....	1	
"	Northeast corner North State and Washington.....	1	
"	West side North State, opposite Court.....	1	
"	Northwest corner North State and Maple.....	1	

FIRE-HYDRANTS.— *Continued.*

STREETS.	LOCATIONS.	Number.	Total.
North State.	Northeast corner North State and Centre .....	1	
"	East side North State, opposite government building.	1	
"	Southwest corner North State and School .....	1	
"	Northwest corner North State and Warren .....	1	
"	Northwest corner North State and Pleasant .....	1	15
South State.	East side South State, opposite Wall .....	1	
"	Northwest corner South State and Thompson .....	1	
"	Southwest corner South State and Monroe .....	1	
"	East side South State, opposite Laurel .....	1	
"	Southeast corner South State and Downing .....	1	
"	Northeast corner South State and West .....	1	
"	Junction of South State and South Main .....	1	7
Mills.	Southeast corner Mills and Downing .....	1	
"	West side Mills, near Levi Call's .....	1	2
Dakin.	West side Dakin, near C. E. Harriman's .....	1	1
Dunklee.	Northwest corner Dunklee and Pillsbury .....	1	1
Broadway.	Northwest corner Broadway and Allison .....	1	
"	West side Broadway, near precinct line .....	1	2
Green.	Northwest corner Green and Prince .....	1	
"	East side Green, opposite Prince .....	1	
"	Northwest corner Green and Warren .....	1	3
South.	West side South, opposite Wall .....	1	
"	Northwest corner South and Thompson .....	1	
"	West side South, opposite Monroe .....	1	
"	West side south, opposite Laurel .....	1	
"	West side South, opposite Downing .....	1	
"	West side South, opposite Allison .....	1	
"	West side South, near Abbott farm .....	1	
"	West side South, opposite Smith farm .....	1	
"	Northwest corner South and Rockingham .....	1	9
Bradley.	Southwest corner Bradley and Penacook .....	1	
"	West side Bradley, opposite Walker .....	1	
"	East side Bradley, opposite Highland .....	1	3
Union.	Northwest corner Union and Maple .....	1	1
Lyndon.	Southwest corner Lyndon and Tremont .....	1	1
North Spring.	Southwest corner North Spring and Centre .....	1	1
South Spring.	Southwest corner South Spring and Oak .....	1	
"	West side South Spring, opposite Concord .....	1	
"	West side So. Spring, opp. Perley proposed extension.	1	3
Rumford.	West side Rumford, opposite Perkins .....	1	
"	Northwest corner Rumford and Beacon .....	1	
"	Northeast corner Rumford and Franklin .....	1	
"	Northeast corner Rumford and Abbott .....	1	
"	Northeast corner Rumford and Cambridge .....	1	
"	Northeast corner Rumford and School .....	1	6
Tahanto.	Northwest corner Tahanto and School .....	1	1
Pine.	Southwest corner Pine and Centre .....	1	1
High.	Northwest corner High and Auburn .....	1	
"	East side High, opposite Forest .....	1	
"	Southwest corner High and Franklin .....	1	3
Giles.	Southeast corner Giles and School .....	1	
"	Northeast corner Giles and Warren .....	1	2
Princeton.	Southwest corner Princeton and Clinton .....	1	1
Fruit.	East side Fruit, opposite Wm. W. Critchett's .....	1	
"	Northwest corner Fruit and Woodman .....	1	2
Minot.	West side Minot, near Odd Fellows' Home .....	1	1
Penacook.	South side Penacook, east of P. B. Co.'s bark house .....	1	
"	South side Penacook, near P. B. Co.'s .....	1	
"	South side Penacook, near P. B. Co.'s office .....	1	
"	Southeast corner Penacook and North Main .....	1	
"	Southwest corner Penacook and Rumford .....	1	
"	Southeast corner Penacook and Columbus avenue .....	1	6
Highland.	Northeast corner Highland and Rumford .....	1	1
Church.	North side Church, opposite Lyndon .....	1	
"	Northeast corner Church and Rumford .....	1	2

FIRE-HYDRANTS. — *Continued.*

STREETS.	LOCATIONS.	Number.	Total.
Franklin.	North west corner Franklin and Jackson .....	1	
"	South west corner Franklin and Rumford .....	1	
"	South side Franklin, opposite W. J. Ahern's .....	1	
"	Northeast corner Franklin and Auburn .....	1	4
Beacon.	North west corner Beacon and Jackson .....	1	1
Blanchard.	North west corner Blanchard and Essex .....	1	1
Ferry.	North side Ferry, east of C. & M. railroad .....	1	1
Washington.	South west corner Washington and Union .....	1	
"	North west corner Washington and Rumford .....	1	
"	North side Washington, opposite Perry avenue .....	1	3
Valley.	North side Valley, opposite Forest .....	1	1
Auburn.	North west corner Auburn and Forest .....	1	1
Centre.	Northeast corner Centre and North State .....	1	
"	South west corner Centre and Green .....	1	
"	North west corner Centre and Union .....	1	
"	North west corner Centre and North Spring .....	1	
"	North west corner Centre and Rumford .....	1	
"	South side Centre, opposite Essex .....	1	
"	South west corner Centre and Summit avenue .....	1	
"	Northeast corner Centre and Ridge road .....	1	8
Bridge.	South side Bridge, near easterly barn .....	1	1
Capitol.	Northeast corner Capitol and North State .....	1	1
School.	North west corner School and Green .....	1	
"	North west corner School and North Spring .....	1	
"	North west corner School and Merrimack .....	1	
"	North side School, near city storehouse .....	1	
"	North side School, opposite E. B. Woodworth's .....	1	5
Durgin.	East side Durgin, opposite Toof's Laundry .....	1	1
Depot.	North west corner Depot and Railroad square .....	1	
"	South side Depot, at end of train-shed .....	1	2
Warren.	Southeast corner Warren and Fremont .....	1	
"	North west corner Warren and North Spring .....	1	
"	North west corner Warren and Rumford .....	1	
"	South west corner Warren and Merrimack .....	1	
"	North west corner Warren and Tahanto .....	1	
"	Northeast corner Warren and Liberty .....	1	
"	Junction of Warren and Pleasant, near Fruit .....	1	7
Pleasant.	North west corner Pleasant and Railroad square .....	1	
"	Southeast corner Pleasant and South .....	1	
"	Northeast corner Pleasant and Fremont .....	1	
"	South west corner Pleasant and Spring .....	1	
"	South side Pleasant, opposite Rumford .....	1	
"	South side Pleasant, opposite Merrimack .....	1	
"	South side Pleasant, opposite Pine .....	1	
"	South side Pleasant, opposite Liberty .....	1	
"	North side Pleasant, opposite Mrs. Aiken's .....	1	
"	South side Pleasant, near Mrs. Eddy's .....	1	
"	North side Pleasant, near Mrs. Lane's .....	1	
"	North side Pleasant, near J. McC. Hammond's .....	1	
"	North side Pleasant, opposite Fiske road .....	1	
"	South west corner Pleasant and School avenue .....	1	
"	North side Pleasant, opposite Infirmary .....	1	
"	South side Pleasant, near gasometer .....	1	
"	South side Pleasant, near new upper School .....	1	17
Mill road.	East side Mill road, near Laboratory .....	1	
S. P. School.	North side Mill road, at Orphans' Home .....	1	2
Old Hopkin- ton road.	Junction Old and New Hopkinton roads .....	1	1
Marshall.	North side Marshall, opposite Fuller .....	1	1
Freight.	North side Freight, at southwest corner passenger station .....	1	1
Hill's avenue.	Northeast corner Hill's avenue and South Main .....	1	
"	South west corner Hill's avenue and Railroad square .....	1	2
Fayette.	North west corner Fayette and Elm .....	1	1

FIRE-HYDRANTS.— *Continued.*

STREETS.	LOCATIONS.	Number.	Total.
Thompson.	North side Thompson, opposite Jefferson.....	1	1
Chandler.	South side Chandler, opposite Railroad.....	1	1
Concord.	South side Concord, opposite Jefferson.....	1	1
Thorndike.	Northeast corner Thorndike and Grove.....	1	1
"	North side Thorndike, opposite Pierce.....	1	1
"	Northwest corner Thorndike and South Spring.....	1	3
Laurel.	Northeast corner Laurel and Pierce.....	1	1
Perley.	Northwest corner Perley and Grove.....	1	1
"	South side Perley, near old brook.....	1	2
West.	North side West, near Badger.....	1	1
"	North side West, opposite Dakin.....	1	1
"	North side West, at intersection Broadway.....	1	3
Clinton.	North side Clinton, at Concord State Fair Grounds.....	1	1
"	North side Clinton, near Snell's.....	1	1
"	Northeast corner Clinton and Fruit.....	1	1
"	North side Clinton, opposite Avon.....	1	4
Avon.	Northwest corner Avon and South.....	1	1
Harrison.	Northwest corner Harrison and Morton.....	1	1
Allison.	Northwest corner Allison and Mills.....	1	1
Rockingham.	Northeast corner Rockingham and Broadway.....	1	1
Prospect.	Northwest corner Prospect and Granite avenue.....	1	1
Curtice ave.	North side Curtice avenue, near John C. Kenney's.....	1	1
North State.	East side North State, near W. H. Perry's.....	1	1
West Concord road.	West side North State, near Calvary cemetery.....	1	1
"	East side North State, near A. L. Colburn's.....	1	1
"	West side North State, at south line of prison wall.....	1	1
"	West side North State, at north line of prison wall.....	1	1
"	East side North State, near Asa L. Gay's.....	1	1
"	West side North State, near Victor Mfg. Company.....	1	1
"	East side North State, near C. H. Farnum's.....	1	1
"	East side North State, near M. H. Farnum's.....	1	1
"	East side North State, near stone cut.....	1	1
"	West side North State, opposite S. Abbott's.....	1	11
WEST CONCORD.			
North State.	East side North State, near old city farm.....	1	1
"	East side North State, near engine house.....	1	1
"	East side North State, opposite D. Holden's.....	1	1
"	West side North State, near north mill.....	1	1
"	East side North State, opposite George W. Brown's.....	1	1
"	East side North State, near Mr. Harrington's.....	1	1
"	East side North State, opposite A. Hollis's.....	1	1
"	East side North State, near Sewall's Falls road.....	1	8
Electric.	Northeast corner of Electric and North State.....	1	1
"	North side Electric, near power station.....	1	2
Clarke.	Northeast corner Clarke and Fisher.....	1	1
Lake.	East side Lake, near S. W. Kellom's.....	1	1
"	East side Lake, near Mrs. G. E. Holden's.....	1	2
Knight.	South side Knight, opposite railroad station.....	1	1
Hutchins.	North side Hutchins, near B. T. Putney's.....	1	1
"	North side Hutchins, near C. & C. railroad.....	1	2
Penac'k road.	West side Penacook road, near Warner road.....	1	1
PENACOOK.			
Main.	West side Main, near Mr. Carrier's.....	1	1
"	West side Main, at Woodlawn cemetery.....	1	1
"	West side Main, opposite Stark.....	1	1
"	West side Main, near Mr. Prescott's.....	1	1
"	Southwest corner Main and Union.....	1	1
"	Washington square, opposite Washington.....	1	1

FIRE-HYDRANTS.— *Concluded.*

STREETS.	LOCATIONS.	Number.	Total.
Main.	Northwest corner Main and Charles .....	1	
"	North side Main, opposite East Canal.....	1	
"	North side Main, near iron bridge.....	1	9
West Main.	West side West Main, opposite cemetery .....	1	1
High.	East side High, opposite Summit.....	1	
"	Northwest corner High and Maple.....	1	
"	Northwest corner High and Spring.....	1	3
Washington.	Southeast corner Washington and Union.....	1	
"	South side Washington, opposite John Whitaker's.....	1	
"	South side Washington, opposite Charles.....	1	
"	South side Washington, near Contoocook bridge.....	1	4
Charles.	Southwest corner Charles and Warren.....	1	
"	North side Charles, near George W. Corey's.....	1	2
West Canal.	Southeast corner West Canal and Warren.....	1	1
East Canal.	North side East Canal, near Contoocook Mfg. Co.....	1	
"	North side East Canal, near Crescent.....	1	2
Crescent.	North side Crescent, east of Canal.....	1	1
Merrimack.	South side Merrimack, opposite Merrimack avenue.....	1	
"	North side Merrimack, opposite D. W. Fox's.....	1	
"	North side Merrimack, opposite Cross.....	1	
"	South side Merrimack, opposite Rolfe's shop.....	1	
"	North side Merrimack, near road to Island.....	1	
"	Northwest corner Merrimack and Penacook.....	1	6
Summer.	North side Summer, opposite High.....	1	
"	Northeast corner Summer and Centre.....	1	2
Spring.	Northeast corner Spring and Church.....	1	1
Centre.	Northwest corner Centre and Spring.....	1	1
Cross.	Southwest corner Cross and Summer.....	1	1
Rolfe.	North side Rolfe, near James Corbett's.....	1	
"	Northwest corner Rolfe and Penacook.....	1	2
Penacook.	West side Penacook, opposite A. W. Rolfe's.....	1	1
	Whole number public hydrants.....		277
	PRIVATE HYDRANTS.		
	Boston & Maine Railroad, upper yard.....	6	
	Boston & Maine Railroad, new shops.....	14	
	New state prison.....	3	
	Abbot-Downing Company's yard.....	6	
	Page Belting Company's yard.....	5	
	W. P. Ford & Co.'s yard.....	1	
	N. H. State Hospital yard.....	1	
	Concord Gas Light Company's yard.....	1	
	St. Paul's School.....	1	
	Water-works pumping station grounds.....	1	39
	Whole number private hydrants.....		39

# CITY ENGINEER.

---

## REPORT OF CITY ENGINEER.

---

OFFICE OF THE CITY ENGINEER,

CONCORD, N. H., December 31, 1902.

*To the City Council :*

In accordance with the ordinance creating this department its tenth annual report is herewith submitted for your consideration, together with a statement of the monies expended on sewer construction and maintenance.

The work of this department has been carried on with the usual force, and to their cheerful attention to the duties assigned them is due, in a large measure, whatever of success has attended our efforts.

We are not unmindful of the co-operation of the mayor and the city council together with the heads of the different departments, with whom our relations have been most pleasant, and to whom our thanks are due.

All services required by the city departments have been rendered as promptly as possible with the small force employed.

A map of the city has been prepared for publication by the city history commission, which map is principally made from actual surveys, but some portions of it had to be filled in from data secured from other sources, but we believe the information from outside sources is as reliable as can be obtained until such time as the general survey of the city can be completed. Such time as was available was spent on extending the general survey in the outlying sections of the town.

There has been added to the equipment of this department one eighteen-inch wye level, which by practicing the strictest economy was purchased from funds of the annual appropriation.

The employees of this department during the past season were : Frank W. Brown, who resigned in April ; Horace P. Edgett, who succeeded Mr. Brown and remained until October first, as assistant engineers, and Harry C. Hill, transitman ; Edward J. Murphy, Carl D. Kennedy, and George H. Barber, rodmen.

Mr. N. W. V. Matheson was employed the latter part of December and is still with us.

The expenses of this department the past season were as follows :

Paid engineer and assistants . . . . .	\$2,428.65
for supplies and level . . . . .	265.95
repairs . . . . .	23.50
livery, car fares, express, and postage . . . . .	234.60
fuel . . . . .	50.00
	<hr/>
Total . . . . .	\$3,002.70
Appropriation . . . . .	3,000.00
	<hr/>
Overdrawn . . . . .	\$2.70

## SEWERS.

The sewers in the St. Paul's School sewerage precinct have been completed and in operation for some months. The small sizes of pipe used in this precinct caused some unfavorable comments to be made by the taxpayers in it, as they had supposed that the "combined" system was to be installed instead of the "separate" system, but no complaints as to lack of adequate service have been received by this department since their completion. Three flush tanks are connected with this system and are in operation. Their water supply is taken from the city mains, and the precinct pays a special rate for water used in them.

The sewers in this precinct were built under contract with Charles L. Fellows & Co., the contract price for same being \$5,700 ; extra work amounting to the sum of \$5 was allowed

and paid in addition to the contract price. No charge was made, to this precinct, for inspection during the season of 1902, as one of the assistants from the engineering department attended to this duty.

In the city precinct minor repairs have been made, the spring and fall flushings have been thoroughly done, and some small new laterals laid, as shown on the following pages of this report.

One common cause of trouble with small laterals has been the stoppage of them by sticks placed in the catch-basins by children; these sticks would remain in the catch-basins until showers or rain-storms floated them into the street sewer, where, if they were not too long to turn in the main pipe they would float away and no damage would be done; but if too long to turn in the street pipe they would lodge partially in the main and the balance of their length in the basin connection, and would then catch any floating substances. This would continue until some party complained of flooded basements or poor service, and upon investigation we would find the difficulty at the catch-basin connection.

The remedy for this trouble would lie in the use of some catch-basin trap which would not admit sticks long enough to do damage. Such traps are on the market.

Nothing has been done in the East Concord precinct either in the line of repairs or extensions.

In the West Concord precinct there has been built an extension of the North State street sewer in the Sewall's Falls road; also a twenty-inch outlet sewer from a point near the old kit factory property to the Merrimack river, which outlet combines the three old outlets at this point that emptied into Rattlesnake brook and at times caused complaints from people in their vicinity. This sewer should remove all cause for future complaints and leave the brook in a much better sanitary condition in times of drouth.

The twenty-inch outlet was built under contract with Mr. John Walker, of Newmarket, N. H. The contract price amounted to \$3,034. No extra work was allowed. The inspection on this work was furnished by the engineering department.

A statement of the expenditures in this precinct will be found in this report.

## PENACOOK PRECINCT.

No extensions have been made in this precinct during the past season.

The sewers have been flushed and some repairs made.

A statement of the amounts expended will be found on the following pages of this report.

The cost of sewers constructed the past season has been somewhat in excess of the usual price, caused chiefly by the scarcity of labor, together with the general increase in price of materials used. We have never found it so difficult to procure labor since our connection with this department as it was during the season of 1902. The demand for labor of all classes was in excess of the local supply, and at times we were seriously handicapped. All things considered, the cost of the work will compare favorably with that in other cities.

There should be a general revision of our entire sewer system in the city precinct in the near future, as we have some portions of it that are not properly proportioned to drain the areas that have been added to the districts which they were originally designed to accommodate.

I would suggest that some definite steps be taken towards adopting a general plan for our sewers, to be followed in future changes or extensions, and that the services of some competent consulting engineer be secured to co-operate with your engineer in making a thorough study of the situation and preparing some definite plan for your consideration.

This is a matter where we should obtain the best advice to be had and adopt the most feasible methods of construction.

Some of our districts can now be provided with sewers that will be adequate for any future growth, as they have reached the limit for area that can be drained, if the old districts are maintained with their present outlets. Still, it may seem best upon a thorough study of the whole question, to arrange the main outlets in a different manner and combine more districts, or possibly divide into smaller sections some of the areas draining through one outlet.

It is not the idea of your engineer to at once expend large sums of money upon the work of reconstructing the entire system, but rather to have some complete and definite plan at hand for any and all future extensions or changes.

Your serious consideration of this question is of importance to the city's sanitary condition.

As clerk of the committee on sewers and drains, I have collected and deposited with the city treasurer, for which I hold his receipts, the sum of \$51, for rent of pumps and hoister and the sale of old materials.

#### STREETS.

##### NEW.

Maitland, from South Main westerly, 223.25 feet.

Beacon, from Charles westerly, 113.56 feet.

Humphrey, easterly from Broadway to Dunklee.

##### NEW LAYING OUT OF OLD.

Rumford, from Church to North State.

Penacook, from North State to North Main.

##### LINES CHANGED.

Stone, at easterly end.

Lake, at southerly end.

Hopkinton road, from Fiske road westerly, 919.70 feet.

##### LAI D OUT CONDITIONALLY.

Running easterly from South Main, on land of Whittredge estate.

##### DISCONTINUED.

Langdon.

##### GRADES ESTABLISHED.

Westerly sidewalk, Broadway, from Stone street to Rockingham street.

Westerly sidewalk, North Main street, from northerly line of land of W. P. Fiske to his southerly line.

Easterly sidewalk, Pine street, from Frank Battles' northerly line, southerly 111 feet.

Westerly sidewalk, Broadway, from Carter street to Stone street.

Westerly sidewalk, Broadway, from West street to Allison street.

Westerly sidewalk, Dunklee street, from Allison street to Pillsbury street.

Westerly sidewalk, Dunklee street, from Allison street to Humphrey street.

Southerly sidewalk, Monroe street, opposite the Rumford school lot.

Northerly sidewalk, Thorndike street, opposite the Rumford school lot.

Northerly sidewalk, Perley street, easterly from South State street, 141.30 feet.

Southerly sidewalk, Penacook street, from North State street to North Main street.

Proposed grade for street on Whittredge property.

#### COST OF SEWER WORK, 1902.

##### WOODMAN STREET, FROM WEST END SEWER TO FRUIT STREET.

428 feet of 8-inch pipe.

Paid for labor . . . . .	\$377.73
pipe . . . . .	83.53
brick . . . . .	8.00
cement . . . . .	12.95
castings . . . . .	18.42
trucking . . . . .	4.75
hardware . . . . .	1.00
oil . . . . .	1.65
sand . . . . .	1.10
tools . . . . .	35.24
	<hr/>
	\$544.37

Average cost per foot, \$1.27+.

Materials excavated, sand, gravel, boulders and clay.

## WHITE STREET, SOUTHERLY FROM BEACON STREET.

357 feet of 8-inch Akron pipe.

Paid for labor . . . . .	\$238.98
pipe . . . . .	68.30
brick . . . . .	8.00
cement . . . . .	3.75
trucking . . . . .	6.00
oil . . . . .	1.65
tools . . . . .	22.62
	<hr/>
	\$349.30

Average cost per foot, \$0.97+.

Materials excavated, sand.

## CENTRE STREET, EASTERLY FROM GILES STREET.

236 feet of 8-inch Akron pipe.

Paid for labor . . . . .	\$145.90
pipe . . . . .	44.06
castings . . . . .	9.60
trucking . . . . .	1.50
oil . . . . .	.55
tools . . . . .	13.96
	<hr/>
	\$215.57

Average cost per foot, \$0.91+.

Material excavated, hard-pan.

## STONE STREET, EXTENSION OF SEWER WESTERLY.

240 feet of 10-inch Akron pipe.

Paid for labor . . . . .	\$49.27
pipe . . . . .	77.66
trucking . . . . .	4.00
oil . . . . .	.55
tools . . . . .	9.14
	<hr/>
	\$140.62

Average cost per foot, \$0.58+.

Material excavated, sand.

## CITY ENGINEER.

341

## REPAIRS.

Prince street . . . . .	\$4.50
School street . . . . .	9.72
Tremont street . . . . .	14.17
Bowery avenue . . . . .	3.05
South Main street . . . . .	21.15
Rumford street . . . . .	60.23
Brook sewer outlet . . . . .	469.46
South State street . . . . .	2.50
Wall street . . . . .	13.81
Waverly street . . . . .	8.31
	<hr/>
	\$606.90
Expense of spring and fall flushings . . . . .	\$311.04
Paid for flushing hose . . . . .	325.00
Painting hoister house . . . . .	3.67
New work . . . . .	1,249.86
	<hr/>
Total expenditure, city precinct . . . . .	\$2,496.47

## SEWERS BUILT, 1902.

8-inch pipe . . . . .	1,021 feet.
10-inch pipe . . . . .	240 "
	<hr/>
Total . . . . .	1,261 feet.

## SEWERS BUILT IN CITY PRECINCT TO DECEMBER 31, 1902.

8-inch pipe . . . . .	24,566 feet.
10-inch " . . . . .	47,412 "
12-inch " . . . . .	38,559 "
15-inch " . . . . .	11,040 "
18-inch " . . . . .	6,204 "

20-inch pipe . . . . .	4,549 feet.
24-inch " . . . . .	1,930 "
30-inch " . . . . .	969 "
Brick, 12-inch x 14-inch . . . . .	2,758 "
16-inch x 24-inch . . . . .	1,848 "
14-inch x 22-inch . . . . .	350 "
20-inch x 32-inch . . . . .	2,527 "
24-inch x 36-inch . . . . .	17,937 "
28-inch x 48-inch . . . . .	883 "
24-inch circular . . . . .	1,515.5 "
30-inch " . . . . .	402 "
38-inch " . . . . .	4,080 "
24-inch cast-iron pipe . . . . .	1,576 "
30-inch " " . . . . .	1,054.5 "
	<hr/>
	170,160 feet.

Total miles in city precinct to date, 32.2272.

#### WEST CONCORD PRECINCT.

The amounts expended in this precinct during the past season were as follows :

#### SEWALL'S FALLS ROAD.

92 feet of 8-inch Akron pipe.

Paid for labor . . . . .	\$16.89
pipe . . . . .	18.69
cement . . . . .	1.25
trucking . . . . .	4.00
castings . . . . .	.50
	<hr/>
	\$41.33

Average cost per foot, \$0.44+.

Material excavated, sand.

## ENGEL STREET OUTLET.

50 feet of 10-inch pipe.

Paid for labor . . . . .	\$42.50
pipe . . . . .	9.44
brick . . . . .	9.00
cement . . . . .	1.25
castings . . . . .	9.20
trucking . . . . .	5.75
	<hr/>
	\$77.14

Average cost per foot, \$1.54+.

Material excavated, gravel.

## TWENTY-INCH OUTLET.

1,403 feet of 20-inch Akron pipe.

Paid contractor . . . . .	\$3,034.00
land damage . . . . .	100.00
for rubbling at river end of pipe . . . . .	3.00
	<hr/>
	\$3,137.00

## REPAIRS.

Abbottville . . . . .	\$5.25
View street . . . . .	5.25
	<hr/>
	\$10.50
Flushing, spring and fall . . . . .	\$28.12
Repairs . . . . .	\$10.50
New work . . . . .	118.47
Flushing . . . . .	28.12
Twenty-inch outlet . . . . .	3,137.00
Clarke street, 1901 bill . . . . .	6.50
	<hr/>
Total expenditure . . . . .	\$3,300.59

## ST. PAUL'S SCHOOL SEWERAGE PRECINCT.

Paid C. L. Fellows & Co., under contract . . . . .	\$1,140.50
labor connecting flush-tanks . . . . .	12.42
A. S. Trask for pipe . . . . .	.90
land damage . . . . .	150.00
	<hr/>
Total amount expended, 1902 . . . . .	\$1,303.82
Received from sale of bonds . . . . .	\$6,015.00
Expended, 1901 . . . . .	4,825.22
	<hr/>
Unexpended balance, January 1, 1902 . . . . .	\$1,189.78
Expended, 1902 . . . . .	\$1,303.82
Unexpended balance . . . . .	1,189.78
	<hr/>
Overdrawn . . . . .	\$114.04

## PENACOOK PRECINCT.

Amount expended for repairs and maintenance . . . . .	\$237.32
Paid 1901 bills . . . . .	70.23
	<hr/>
Total expenditure . . . . .	\$307.55
Balance January 1, 1902 . . . . .	\$2.26
Appropriated for repairs, 1902 . . . . .	350.00
	<hr/>
	\$352.26
Expended . . . . .	307.55
	<hr/>
Balance, December 31, 1902 . . . . .	\$44.71

Respectfully submitted,

W. B. HOWE,  
*City Engineer.*

## REPORT OF BOARD OF EXAMINERS OF PLUMBERS.

*To the City Council:*

The third annual report of the board of examiners of plumbers, for the year 1902, is herewith submitted.

The organization of the board remains the same as in 1901.

During the past year the board has held nineteen meetings, twelve regular and seven special.

We have examined during the year seven candidates for journeymen's licenses, all of whom have successfully passed and received their licenses.

The total receipts for the year, for fees and renewal of licenses and certificates, were \$25.00. The cost of materials for examination was \$10.64.

Your examiners would renew their previous recommendations and respectfully suggest that some suitable provision be made in the new city building for the practical work of this board; the city engineer's office is not the proper place for such work and has not the proper fittings, it also interferes with the work of that department.

The following is a list of all the registered plumbers, given in the order in which they appear on the register:

MASTER PLUMBERS.

W. Arthur Bean, certificate renewed.		
Seth R. Hood,	“	“
Willis H. Robbins,	“	“
William A. Lee,	“	“
Benjamin H. Orr,	“	“
Richard J. Lee,	“	“
George A. Harwood,	“	“
Michael J. Lee,	“	“
Albert S. Trask,	“	“
Edward H. Randall,	“	“
Frederick Booth,	“	“
G. Arthur Nichols, license renewed.		
Charles W. Bateman,	“	“



BOARD OF EXAMINERS OF PLUMBERS. 347

NUMBER OF CERTIFICATES RENEWED.

Master plumbers, . . . . .	11
Employing plumbers . . . . .	4
Journeyman plumbers . . . . .	11

making a total of forty-three names on the register, holding licenses or certificates issued during the year.

Respectfully submitted,

TIMOTHY KENNA,  
RUSSELL WILKINS,  
W. B. HOWE,

*Board of Examiners of Plumbers.*

# SANITARY DEPARTMENT.

## REPORT OF THE BOARD OF HEALTH.

*To His Honor the Mayor and City Council:*

So far as any serious epidemics or other unusual occurrences are concerned, the past year has been a rather uneventful one for the board of health. The following report comprises the general work of the board for the year ending December 31, 1902, together with a report of the work done under the department of milk inspection.

The membership of the board and its organization have remained the same as in 1901. Mr. Palmer, as sanitary officer, has rendered the same efficient service as in the past, and the board wishes to express its appreciation of his zeal and energy.

The general health of the city for the past year, as measured by the numerical standard of the death-rate, was not quite so satisfactory as in 1901, the total deaths in 1902 being 381, or 13.63 per thousand population, as against 352, or 13.11 per thousand in 1901. The number of deaths from the different diseases, the number in each of the different wards, etc., will be found in the detailed report of the sanitary officer.

The plumbing law has now been in force long enough so that its good results are becoming apparent, and the general character of the work done in this city will compare favorably with that of any city of similar size. Plans and complete records of all work done are kept on file in the office of this board. Undoubtedly the plumbing ordinance has contributed very materially to the sanitary welfare of the city.

## CONTAGIOUS DISEASES.

Since sanitary measures have a most decided effect in diminishing this class of diseases, their presence or absence is a good criterion of the general healthfulness of the city; in fact a better one than the general death-rate, which simply gives us the number of cases of sickness which ended fatally, but no idea of the duration thereof or of the number of persons temporarily incapacitated. During the past year Concord has been especially fortunate in this respect, there being but twenty-nine cases of diphtheria, two of which were fatal; six cases of scarlet fever, twenty-seven of measles, and two of smallpox, none of which were fatal.

Of the two cases of smallpox the first was discovered May 21 in the office of a local physician to whom the patient had applied for treatment. A consultation was held, and it was decided to remove the patient at once to the isolation hospital on the Plains. The boarding-house where the man had resided since his arrival from Boston, about ten days previous, was immediately fumigated and his roommate vaccinated and kept under observation until he made his escape to Providence, R. I., where he developed a mild case of varioloid, his vaccination having modified the disease. No further cases resulted from these, and the patient on the Plains finally made a good recovery and was discharged at the end of seven weeks.

The other case of smallpox was that of a child at Penacook, discovered the last day of the year and immediately removed to the isolation hospital in Boscawen. This was done as Boscawen already had several patients in their hospital and could take care of one more at much less expense than that for which we could open our hospital.

We can only attribute our freedom from this disease to the fact that as a rule our citizens either from choice or because of the requirements of their employers are well protected by vaccination. This work, taken up last year for the first time in a systematic manner among our school children has been continued in the same way this year under the supervision of

the health officer. It is but courtesy to mention here that this work has been greatly facilitated, and much assistance rendered to the board, by the hearty co-operation of the truant officer, Mr. Johnson.

#### TYPHOID FEVER.

Subject to limitations and sources of error the presence of typhoid fever may be taken as an index to the purity of a city's water and milk supply. During the past year there have been twenty-three cases of this disease reported, three of which resulted fatally. Thirteen of these cases occurred in September; eight were in ward 7, and four were in ward 4. On investigation in the families where these cases occurred, no apparent source of contamination could be found, either with the milk or the water supply, but this does not necessarily mean that there was no such source. The board recognizes that typhoid is a preventable disease and one that usually carries off people in the prime of life when they are of most value to the community, and is doing and will continue to do all that is possible to limit its spread.

#### BARBER SHOPS.

There is little doubt in the minds of those who have given much thought to the matter that barber shops furnish a fruitful source of infection. The barber practically never sterilizes his instruments, or when he does it is in such an incomplete manner as to be of little practical value, and only serves to give a false sense of security. The common use of the towel, the magnesia block and the astringent pencil should be stopped, as well as several other such practices. It is time that some attention should be given to these things and that they should be reached through proper legislation licensing each shop and providing some form of inspection.

#### INSPECTION OF MILK.

Inspection of milk in dairies for the year 1902 has been conducted as regularly and as thoroughly as the limited appropriation set aside for that purpose would permit. Two