# CITY ENGINEER'S REPORT.

## CITY WORKS DEPARTMENT.

### COMMITTEE ON WORKS, 1905-1906.

R. T. MacIlreith, Mayor, *Chairman.*

Alderman G. A. Taylor, Alderman W. H. Cawsey.

### OFFICERS:

F. W. W. Doane, M. Can. Soc. C. E., *City Engineer.*

H. W. Johnston, *Assistant City Engineer.*

T. W. J. Lynch, *Assistant.*

#### WATER WORKS.

Ewen Morrison ..... *Foreman.*

D. P. O'Neill ..... *Plumbing Inspector.*

John E. Burns ..... *Water and Meter Inspector.*

#### STREETS, SEWERS, &c.

John McDonald ..... *Foreman.*

#### OFFICE.

James J. Hopewell ..... *Clerk of Works.*

Miss Minnie Hunter ..... *Stenographer.*

CITY ENGINEER'S OFFICE, CITY HALL,

HALIFAX, N. S., May 1st, 1906.

*To His Worship the Mayor*:

SIR,—I have the honor to present the report of the Department of City Works for the civic year ending April 30th, 1906, my fifteenth annual report:—

WATER WORKS.

| | |
|---|---|
| Amount of funded debt on Water Account | $1,056,600.00 |
| " transferred from Revenue | 36,000.00 |
| " of debt redeemed by Sinking Fund | 8,000.00 |
| " " " Revenue | 30,000.00 |
| " " " Premiums on Loans | 4,073.33 |
| | $1,134,673.33 |

| | | | |
|---|---|---|---|
| Amt. expended to April 30th, 1905 | $1,125,757.06 | | |
| " May 1st, 1905, to April 30th, 1906 | $18,668.57 | | |
| " Repaid 1905-6 | 2.399.65 | | |
| | | 16,268.92 | |
| | | | 1,142,025.98 |
| Bal. covered by stock on hand | | | $7,352.65 |

Amt. paid into Sinking Fund in excess of debt redeemed $15,125.00

COST OF MAINTENANCE, 1905-1906.

| | |
|---|---|
| Interest | $47,142.00 |
| Sinking Fund | 2,625.00 |
| Maintenance of System | 38,668.71 |
| | $88,435.71 |

The cost of maintenance again shows an increase due to a con-

tinuance of the work of renewal of old worn-out mains. The total increase for such work should be averaged over a period of at least forty years.

There seems to be an impression that we have a surplus water revenue which is unnecessarily large. This belief is caused by the publication of statements showing a large balance on hand. The civic year closes April 30th. Interest is paid half-yearly, so that the collections of four months (less current expenses) will be shewn on hand at the end of April, although practically the whole amount will be paid out at one time at the end of June. The rate is as low now as it can be made without cramping the service. In fact there has been a deficit in two of the last ten years amounting to $11,282.60. The deficit in these years seems to be accounted for principally by the variation in the amount collected annually, the arrears of perhaps three years being apparently collected in one year.

| Year. | Amount Collected. | Amount Expended for Maintenance, including Sinking Fund. | Deficit for Year. | Surplus for Year. |
|---|---|---|---|---|
| 1895-6 | $77,198 79 | $76,066 97 | ..... | $1,131 82 |
| 1896-7 | 68,838 42 | 67,665 52 | ..... | 1,172 90 |
| 1897-8 | 66,097 22 | 69,668 26 | $3,571 04 | ..... |
| 1898-9 | 73,892 90 | 71,941 89 | ..... | 1,951 01 |
| 1899-1900 | 70,634 81 | 69,252 38 | ..... | 1,382 43 |
| 1900-1901 | 80,703 82 | 69,393 16 | ..... | 11,310 66 |
| 1901-1902 | 77,181 50 | 68,207 29 | ..... | 8,974 21 |
| 1902-1903 | 87,502 52 | 70,037 57 | ..... | 17,464 95 |
| 1903-1904 | 78,910 50 | 75,246 11 | ..... | 3 664 39 |
| 1904-1905 | 95,280 28 | 84,597 32 | ..... | 10,682 96 |
| 1905-1906 | 81,725 39 | 89,436 95 | 7,711 56 | ..... |
| | | | $11,282 60 | $57,735 33 |

The foregoing statement, which is compiled from the published accounts of the Clerk of Works, shows that in the last eleven years there has been a total surplus of $46,452.73 — an average of $4,222.98. As the renewal charges during the next few years must be heavy, it is evident that we cannot afford to reduce the rate, nor can we pay the interest and maintenance charges on the cost of improvements in the existing system unless such improvements increase the revenue or the rates are advanced. Even if the above average surplus can be maintained it will not re-lay one mile of pipe while it is quite possible that an average renewal of two miles may be necessary for some years.

## MR. CHIPMAN'S REPORT.

Mr. Willis Chipman, who was employed as Consulting Engineer, was in Halifax from April 26th to May 6th, 1905, and made a preliminary report dated May 11th, 1905, stating that it was considered advisable to delay his report until he had been furnished with complete plans and data respecting the service. He also recommended the immediate installation of the Venturi Meters first asked for by your Engineer in 1899-1900. His report states: "I "made a sufficient inspection of the water works system within the "City to convince me that there is now an enormous waste of water, "and that both the high service and the low service are "unsatisfactory."

It is unnecessary to say that the conditions existing at the date of Mr. Chipman's report have not changed for the better.

The Venturi Meters were received so late in the year that the installation of the large meters was postponed until warmer weather. The 14 inch meter was placed in the high service main in the old road below the hatch box at Chain lake. It was set in a by-pass so that the cleaning of the main would not be obstructed. It has been in service since February 15th, 1906, is provided with register and chart recorder, and shows that the consumption is much larger than had been estimated. Under ordinary conditions the consumption was estimated at about one and three-quarter million gallons a day, and during hot and cold weather at about two million gallons. In February, however the consumption was at times at the rate of two million four hundred thousand gallons a day.

Mr. Chipman also asked for analyses of the water. Prof. E. MacKay's report is appended, together with the last analyses made of these waters.

## NEW WORK.

There were ten petitions for the extension of main distribution pipes presented to the Council and twelve orders passed.

Extensions were made in eleven streets, one of which measuring 500 feet was in the low service district. The remainder, aggregating 4,456 feet, were high service. The total length of mains laid during the year was 6,443 feet, the total now in use being 70 3/5 miles.

One thonsand four hundred and twenty-six feet of six-inch pipe on Gottingen Street was renewed.

Thirteen new main stop valves and five hydrant valves were placed in service. The total number in use is eight hundred and twenty-two.

Four new hydrants were installed, making the total four hundred and twenty-eight. One old hydrant was replaced with an improved City Design Frost Jacket Hydrant with steamer nozzle.

Three thousand nine hundred and eighty three feet of pipe was laid for 112 new services, and 2,295 feet of old service pipe was renewed.

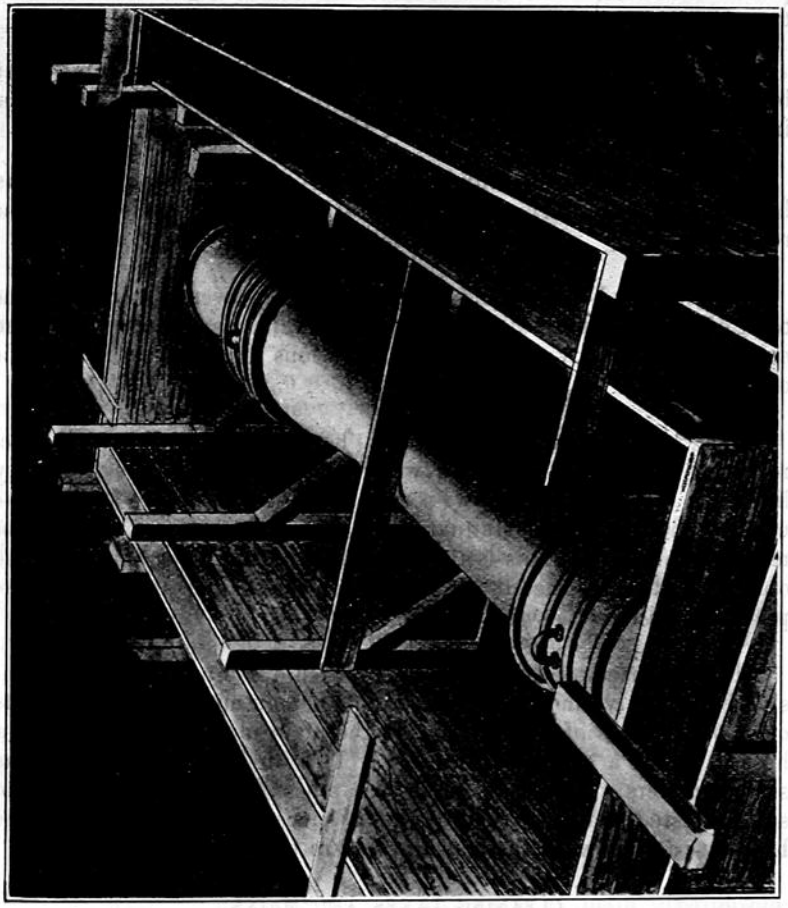
One hundred and twenty-eight new meters were set, making the total 476. The prejudice against meters is disappearing to some extent, as shewn by the written applications for them on file in this office.

The Massachusetts Legislature has recently passed an Act requiring all cities taking their water supply from outside their City limits to meter every new service that is installed, and of the unmetered services on January 1st, 1907, five per cent. must be metered annually. This is the most important endorsement of the opinion that water meters afford the cheapest and best method of preventing all waste yet given.

The meter also places within our reach a comparatively inexpensive but effective method of detecting waste in mains. Two hydrants on opposite sides of a gate valve in the main may be connected by a hose in which a meter is inserted. This in conjunction with the service meters shows leakage in the pipes; or all services on the section tested may be turned off in succession, the meter in the hose by-pass showing the consumption in the remaining ones.

## CLEANING LAKES AND MAINS.

The high service supply main was cleaned on June 12th, and the 15-inch portion of the pipe on September 8th. In consequence of the low water in the lakes neither the 20-inch high service main nor the 24-inch low service mains could be cleaned in the fall.



CLEANING HATCH, HIGH SERVICE MAIN.

The reducer at the junction of the 20-inch and 15-inch pipe had been cracked and the end of the 20-inch pipe damaged during cleaning operations in former years. The old hatch box was too small and the water did not run off readily, and no provision had been made for raising and lowering the scraper. The old joints were bad, and it was difficult to make new ones in the water in such cramped quarters. It was therefore decided to put in a longer reducer, excavate the drain deeper in the rock and construct a longer and wider concrete hatch box with a crane for hoisting and lowering the scrapers. This work was carried out during the dry weather, and is ready for this season's cleaning.

At Chain Lakes and Long Lake all sticks, stumps, overhanging bushes, turf, etc., were grubbed and removed and the shores thoroughly cleaned. At Spruce Hill Lakes similar work was performed. In the upper lake there was a growth of swamp moss and bushes known locally as a floating island. All bushes were removed and hundreds of loads of the mossy accumulation, but this growth rose to the surface after the top was removed, and will be attacked again during the next low water. Similar material was removed from a cove of the lower lake, but the condition of these portions of the lake is not yet satisfactory. The shoal water and mossy or muddy bottom are very undesirable features in a water supply reservoir. The heat of the sun quickly raises the temperature of the water, causing a more favorable condition for the rapid multiplication of various objectionable forms of microscopic organisms which impart a disagreeable taste and odor to the water.

## PRECIPITATION.

The average rainfall in Halifax, as deduced from long-continued observations covering a period of thirty-seven years, is 55.927 inches. The rainfall of 1905 was 47.795 inches—a deficiency of 8.132 inches, or 85% of the mean. The number of days on which precipitation was recorded, 182, was about the average, but the total precipitation for the year was very near the minimum.

In the year 1894 the total precipitation was 45.808 inches, about two inches less than in 1905. A comparison of the two years shows, however, that at the end of November the rainfall of 1905 was slightly less than that of 1894, the difference of two inches being made in December. In fact, the year from November 1st, 1904, to

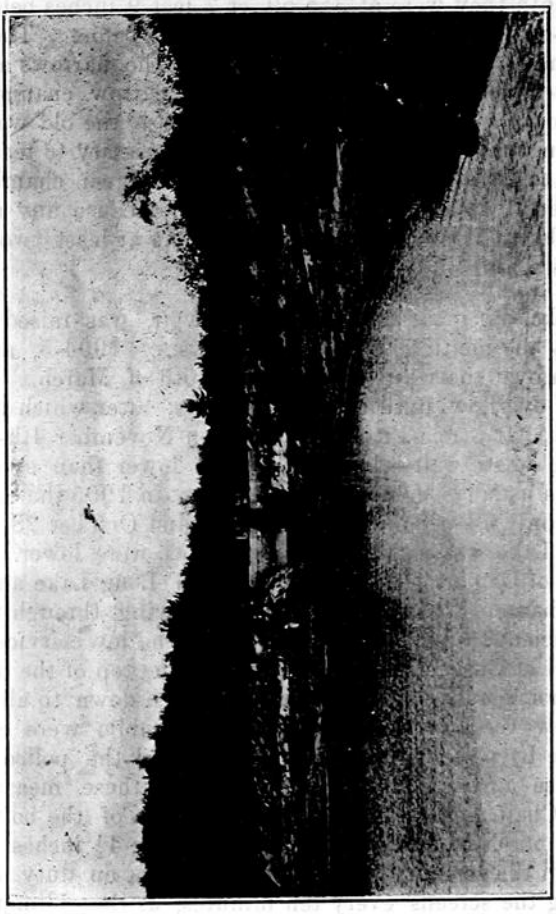
SPRUCE HILL LAKES NARROWS, NOV. 1905.

October 31st, 1905, is the driest on record, the total precipitation being only 41.685 inches.

Spruce Hill Lakes reached their highest level for the year on May 10th, viz., 362.74, which is 7¼ inches below the overflow. On November 16th they were at 355.59, or 7 feet 9 inches below waste weir level—nearly three feet lower than ever before. The cove at the upper end of the upper lake was dry and the narrows a ledge of rocks. A very small stream ran through a narrow channel, across which one could easily leap. At the pipe house the old wall in the settling basin was exposed, and it became necessary to tear down a portion of it to enable the water to flow to the screen chamber. The conditions here, while very unusual, did not cause any alarm or uneasiness, but it is probable that it will take at least two years to fill the lakes again.

Long Lake, our great low service reservoir, was raised to overflow level by the melting of the great snows of 1904-5, and water began to run over the waste weir on the 30th of March. The lake continued to overflow until the 19th of May, after which the water began to fall. It reached its lowest level on November 4th—8 ft. 4¾ in. below the waste weir—1 foot 9¾ inches lower than ever before. The fall rains usually begin in September, but in 1905 the September rainfall was only 74 per cent. of the mean and October 28 per cent. While Long Lake was very low, Chain Lakes were lower. During the last part of October the conduit between Long Lake and Upper Chain Lake had only 14 inches of water flowing through it, which was not sufficient to maintain the supply to the low service district and the level of Chain Lakes fell rapidly. The top of the old stone dam at the north outlet of Long Lake was torn down to allow more water to flow through the conduit. The public were cautioned against waste by notice in the newspapers and the police began a house-to-house inspection. Notwithstanding these measures the level of the Chain Lakes fell until a large area of the bottom was exposed, and on November 3rd there was only 4½ inches of water going through the screens. Two men were kept on duty night and day changing the screens every ten minutes, as the sediment, moss, etc., carried by the water soon clogged the meshes.

During the last days of October the conditions were becoming so serious that it became absolutely necessary to increase the flow of water from Long Lake to Chain Lakes, and it was decided that a



LONG LAKE OUTLET, NOV. 1905.

pump should be installed. Mr. S. M. Brookfield, Manager of the Dry Dock, had the only suitable plant available, and on November 1st he began to set up his 15-inch pump and two boilers. The pump had a capacity of 6,000 gallons a minute, and began to work on the 4th, continuing steadily until the 17th, when the rains relieved the fears for the efficiency of the supply. The pump was removed on the 21st.

All through the dry weather the supply in the high service district was even better than usual. Notwithstanding the loss in pressure in consequence of low water in the lakes of about 3¼ pounds the gauge in the high service district was about seven pounds higher than the usual summer pressure. This most satisfactory condition resulted from the thorough house-to-house police inspection followed where waste was detected by turning it off until the fine was paid and the cause of waste removed, The result demonstrates the correctness of the claim so often made in these reports that the waste is largely avoidable. In the past the Inspector reported the waste, the Engineer had the water turned off, the Mayor had it turned on and the waste continued. Let us hope that observance of the law as practiced during the past year will be continued.

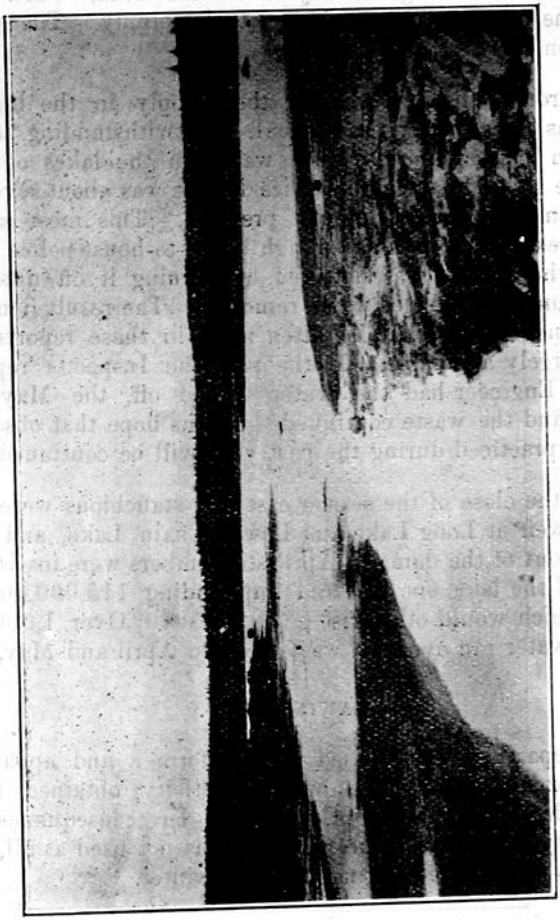
Before the close of the season cast iron stanchions were placed in the waste weir at Long Lake and Lower Chain Lake, and after the frost came out of the dams in April stop timbers were inserted raising the level of the lake one foot and impounding 115,000,000 gallons of water which would otherwise go to the sea. Over 1,000,000,000 gallons of water ran over the waste weir in April and May, 1905.

### THAWING PIPES.

The Department purchased a transformer and apparatus for thawing frozen service pipes with electricity obtained from the Halifax Electric Tramway Company. In consequence of the extraordinary mildness of the winter it was not used at all, but will undoubtedly be required during the next winter.

### EMPLOYEES.

Owing to advancing years and increasing infirmities it became necessary to relieve from further service as turnkeys two old employees—James Romans and Norman McRae. The vacancy was



UPPER CHAIN LAKE LOOKING WEST FROM DAM, NOV., 1905.

filled by the appointment of one man—William H. Daniels,—who is performing the work very satisfactorily. Mr. McLeod, City Blacksmith, having resigned, Seymour Brown was appointed in his place.

SEWERS.

Sewers were constructed in ten streets, authority having been obtained from the Legislature to borrow $150,000 for such work. The average cost per lineal foot is higher than usual as a portion of the relief sewer across the Common is included. Work on this sewer was stopped in December and started again as soon as the weather was favorable in the spring.

The length of sewers constructed under the Act from 1890 to 1905 inclusive is 118,884 feet or 22½ miles.

| | |
|---|---|
| Cost | $547,458 49 |
| Amount assessed on property owners | 233,449 17 |
| Balance paid by City | $314,009 32 |

Eight concrete catchpits were constructed making a total of 769.

Two steam drills were purchased at a cost of $206.48,

At the Poor House the manufacture of kindling wood occupied all the space in the buildings formerly utilized in winter in making concrete sewer blocks. It was therefore determined that the work should be done by the City Works Department at the Bell Road Yard. A building was erected at a cost of $827.62 and the work carried on for about three months with the following result :—

CONCRETE SEWER BLOCKS MADE AT CITY LOT JANUARY 10TH TO APRIL 21ST, 1906.

48″ 1,277 blocks. 36″ 739 blocks—20″ x 30″
287 inverts. 413 sides—14″ x 21″
1111 " 681 " 457 tops—12″ x 18″
1412 sides. 682 tops. 30″ 739 blocks.
4 catchpit covers.
Total number of batches made 1341. No. of cu. ft., 9,621.44.
Each batch averaged 7.17 cu. ft. including facing.

UPPER CHAIN LAKE LOOKING EAST TOWARDS DAM, NOV., 1905.

| | | |
|---|---|---|
| Labor 5050 hours @ 16 to 24c. cost | $ 838 76 | |
| =8 7/10c. per cu. ft. | | 62 6/10c. per batch. |
| Cement 1732 bus. @ 80c. | 1,386 40 | |
| =14 4/10c. per cu. ft | | 1 03 " |
| Sand 2850 bus. @ 6c. | 171 00 | |
| =1 7/10c. per cu. ft. | | 12 7/10 |
| Gravel 2684 bus. @ 6c. | 141 04 | |
| =1 4/10c. per cu. ft. | | 10½ |
| Stone 5,364 bus. @ 7c. | 375 48 | |
| =3 8/10c. per cu. ft. | | 28 |
| Paper. | 26 82 | |
| =28/100c. per cu. ft. | | 02 |
| Soap 255 lbs. @ 7c. | 17 85 | |
| =18/100c per cu. ft. | | 01 3/100 |
| Coal | 48 95 | |
| =½c. per cu. ft. | | 03 6/10 |
| Total cost | $3,006 30 | |

=31¼c. per cu. ft. =$2.24 2/10 per batch. =$8.44 per cu. yard.

The above includes cleaning moulds, moving and storing blocks and every expense incident to the cost of manufacture except the cost of water used.

The invert of the Common relief sewer was constructed with moulded blocks, the arch with concrete in place on collapsible templates.

## HOUSE-DRAINS AND PLUMBING.

Two hundred and one permits were issued for laying, cleaning or repairing drains.

From time to time accidents happen in consequence of the carelessness of men who do the work of drain-laying. Usually the immediate cause is inefficient lighting. There is also a good deal of complaint respecting the condition of the trenches after completion. In regard to the latter the remedy is available as every property owner taking out a permit is obliged to make a cash deposit with the City Treasurer. Any work necessary to restore the street to its former condition shonld be done without delay by the street official who is detailed for that duty.

Drain-laying work, however will not be satisfactory either to the public or the City Officials until it is performed by the employees of the City or by licensed drain-layers. If drain-layers were obliged to obtain a license and give a bond for the satisfactory performance of their work the Inspecting Officials would soon have

a great deal less trouble and the work would not occupy so much of their time.

The Plumbing Inspector reports approval of 415 applications for permission to do plumbing work—an increase of 135 over last year. Four hundred and twenty-two certificates of completion were issued an increase of 153. He made during the year 1174 plumbings Inspections.

The Board of Plumbing Examiners held four meetings, and one journeymen received a certificate.

### INTERNAL HEALTH.

One new two-horse sprinkler was constructed in the shops and three old carts were fitted with new Studebaker sprinklers replacing the home-made pattern.

Four carts were operated by contract—one by A. J. Nicholson at $3,50, two by Nolen Bros., at $3.50, and one by Heber Hartlen, at $3.70.

During the dryest part of the season and while the lakes were so low an arrangement was made with G. S. Campbell & Co., to pump salt water into the street sprinkling carts. The "A. C. Whitney" was used for this service.

Four large sleighs for removal of snow and one large plow were constructed in the shops.

The street cleaning squad in the business portion of the City were supplied with white uniforms. All material removed in cleaning streets is now disposed of solely in City work. It was formerly the custom that every person who applied to the Mayor or Aldermen could get the City teams to haul to their premises all the material they saw fit to ask for at the expense of the general taxpayer while City work suffered. Hundreds and thousands of loads absolutely necessary for various City works were thus diverted and as many dollars of the citizens' money wrongfully taken, for every load of such material delivered is worth a dollar. The work that it will do cannot be performed in any other way for less. We need this material every year at the Public Gardens; at the Cemetery, for filling up depressions on City property, covering over objectional

materials deposited at the dumps, fiilling new and many old streets to sub-grade, re-filling where sods are cut for City work, grading around City buildings including schools and many other works which it will take years to overtake. Quinpool Road grading is not yet completed principally on account of the scarcity of material for filling. Although demands for the street sweepings continued to reach this office, and at times with the strong backing of a member of the council, it is pleasing to be able to report that under the present City Government the giving sway of City property of value has ceased. It was a pernicious custom that died hard, but let us hope that it will never be resurrected again.

At the last meeting of the 1904-5 Council the minimum rate of laborers' wages was raised. There are few who will not admit that the rate was too low. It would be well in future, however, to make such changes only when considering the estimates, which is the custom with salaries. The Internal Health appropriation voted in December was not available until May, and the increase in wages reduced the quantity of work that could be done with the money. The necessary consequence was the cessation of street cleaning work early in the fall when the money was exhausted. Many bitter complaints were made while the dirt lay and blew about, but your officials were powerless and had to take their punishment.

The assessment for this work will be increased this year by $3,000.00 to cover the difference in wages, so that the same quantity of work may be done as in former years. Street and other appropriations must be increased or less work done.

STREETS.

The widening of Agricola Street on the east side between Cunard and West Streets was taken up early in the season, but expropriation proceedings and awards were not completed until November and all buildings were not removed until this spring. The old cellars are being filled in and no permanent work will be attempted until the material has subsided.

The widening of Cunard and Jacob Streets was again before the Council, but nothing definite was decided.

Mr. L. A. Graves purchased the machine shop of W. W. Howell

on the east side of Water Street, at the foot of Salter Street, and proposed to alter it to suit his business. The City offered him $1,000.00 to remove that portion of the building projecting beyond the line of the street, and Mr. Graves accepted the offer.

A small lot on the west side of Henry Street was purchased from the Bliss estate for $80.00 for the purpose of opening a street between Henry and Vernon Streets to permit the construction of a sewer to drain Vernon Street.

A proposal to open more streets leading to the Arm was before the Council on September 7th and December 8th, 1905 with full reports, but the consideration of this matter was deferred.

Granville Street from George Street to Water Street was paved with 2 inch Bitulithic, a four-inch concrete base being substituted for the rubble base on which the contractors have been laying this pavement elsewhere. The granite gutters have been laid by the City on broken stone. The Tramway Company paved their track allowance with Bitulithic, laying granite setts on each side of the outer rails and between their tracks. The area of Bitulithic laid outside of the track allowance is 1686.65 square yards, track allowance (including setts) 1183.50 square yards. Petitions have been sent in for the paving of several of the principal streets and an appropriation of $50,000 has been obtained to pay the City's share of the cost of work in 1906.

Street and sidewalk improvements in the western cities were thoroughly inspected by the Mayor and Engineer in July 1905, and a careful study of results obtained elsewhere convinced the Works Department that there could be no economy in continuing the laying of tar concrete sidewalks and cobble gutters. It was determined that more permanent work should be constructed and if necessary the extent curtailed.

The cobble gutter question has been thoroughly thrashed out in former reports. The conviction that tar concrete or so-called asphalt sidewalks are an expensive luxury has been growing rapidly. Two Thousand Dollars in repairs in one year is a much larger drain than our meagre street appropria ion can stand.

The experience of other cities and the authorities consulted all

go to show that there are inherent defects in the various coal tar preparations which make them short lived and unsatisfactory pavements. The tar concrete pavement differs from the standard asphalt pavement in two important particulars, first the substance is a product of the distillation of gas-tar instead of being a natural asphalt or bitumen, and second the base is of broken stone or pebbles partly cemented with tar instead of being a rigid mass of concrete masonry.

One defect in coal tar preparations consists in the fact that if the tar is boiled to expel the volatile parts it becomes brittle and soon crumbles after being laid as a pavement and exposed to the wear of ordinary traffic, while if it is not boiled it becomes too soft in hot weather and soon wears away.

Coal tar is very brittle at the freezing point and softens at 115 degrees Fahr., whereas true bitumen (commonly known as asphalt) is tough at 20 degrees and is not supposed to soften at 170 degrees Fahr. Coal tar pitch is the residue obtained by distilling coal tar. This material is sometimes used instead of bitumen for mixing, but is brittle, softens more under heat, is easily crushed and altogether inferior.

When the tar concrete is placed upon the street and subjected to atmospheric influences a slow and gradual oxidation takes place by which the tar losses its cementing qualities and becomes inert. The particles of sand then lose their cohesion and the pavement rapidly disintegrates.

A five-feet cement concrete walk with concrete curb and gutter and sodded parking was laid on the north side of Spring Garden Road from Park Street 500 feet west. The width of this sidewalk provoked a great deal of criticism as it is the first narrow walk laid. In other cities hundreds of miles of such walks have been laid on suburban streets and are still being laid. Property owners and the general public accept them without adverse criticism and many walks are laid only four feet wide. This much is certain that if a five feet sidewalk is sufficient in suburban streets your engineer would not be justified in throwing away money by laying a wider walk, and the money saved by adopting the narrower walk will permit the extension of the work much farther. The appropriation required for 500 feet of walk six feet wide will lay 600 feet, five feet wide.

At the recent session of the Legislature authority was obtained to borrow $150,000 to pay the City's half of the cost of laying permanent sidewalks, and the work will be commenced as soon as the season opens.

The Intercolonial Railway laid a second track on Water Street from the North Street yard near the Bridge to the Deep Water Terminus yard.

On the recommendation of the Mayor, the Council decided not to grant permission to any corporation to make excavations in the streets on a large scale between July 1st and October 1st.

The difficulty in working out a satisfactory solution of the grade problem in the paving of Granville Street emphasizes the necessity of establishing some system of fixing official grades. There are few streets, whether improved or unimproved, on which it is not possible to make some radical changes in grade to the benefit of the adjacent property and the general appearance of the street. There should be a thorough study and revision of the grades, and the curb and tree lines and the grades should be determined and made a matter of record.

The law prohibits the acceptance of new streets until they are graded, and it is desirable that the City should be able to do this work at the expense of the property owners on receipt of a petition from two-thirds of the owners. The houses erected on these unimproved and ungraded streets are at all kinds of grades. On Agricola Street in Merkelfield the houses on the east side are many feet lower than those on the west side, and the Engineer who undertakes the grading of a street under such conditions will need the prayers of the community, for he will get no mercy from those directly interested.

Robie Street from Cunard Street to South Street and Morris Street from Robie Street to Park Street should be boulevarded. If properly designed and carried out it would be the most beautiful street in the City. There are a number of gores that could be treated so that the general appearance of the streets would be very much improved. A few of the most important are—the intersection of Inglis Street and Tower Road, Young Street and Gottingen Street, St. Andrew's Cross, Summer Street and Bell Road.

STREET RAILWAY.

Double track was constructed on Lockman Street between North Street and the bridge, on Spring Garden Road between Tower Road and Robie Street and between Queen Street and Park Street, on Agricola Street between Charles Street and West Street, on Cambbell Road between Young Street and Hanover Street.

PUBLIC BATHS.

The Beach Bath was opened July 1st and closed September 24th.

The number of bathers:

| | |
|---|---|
| Males | 4599 |
| Females | 1124 |
| Total | 5723 |

The expenditure was $677.72. Receipts, $283.00.

The Floating Bath was opened July 1st and closed Sept. 2nd.

The attendance was:

| | |
|---|---|
| Males | 2445 |
| Females | 386 |
| Total | 2831 |

Expenditure, $334.73, Receipts, $16.15.

BUILDINGS.

380 permits were issued, 112 being for new buildings and 268 for repairs, alterations, renewals, additions, &c.

Violations of the law were reported to His Honor the Recorder as follows:—

| Date of report. | Owner. | Location. | Violation. |
|---|---|---|---|
| 1905. | | | |
| June 28. | Wm. R. King.... | W. side Hollis St. (in lane.) | Erecting wooden building. |
| June 28. | Peter Allen..... | W. side Maitland Street. | Encroachment 2 ft. |
| July 10. | Geo E. Francklyn. | W. side Water St | Renewing wooden building. |
| July 28. | Wm. R. King..... | W. side Hollis St | Moving 3rd class building. |
| Sept. 28. | E. M. Boutilier.... | E. side Water St. | Wooden building within 57 feet of Water Street. |
| Oct. 13. / Dec. 30. | Jas. Watson..... | 81 Upper Water Street. | Renewing wooden building. |
| Dec. 10. | Jos Spencer. ..... | 50 Argyle Street. | Wooden structure. |

In each case no permit had been issued. On an order of the Court Mr. King's building was destroyed. Mr. Allen applied for and obtained a lease of his encroachment.

The existing regulations should be amended so that shacks or buildings of objectionable design or construction could not be erected among buildings of a better class. When streets are laid out in residential districts a building line should be established so that no builder may be able to spoil the appearance of a whole row by planting his house exactly on the street line while his neighbors have improved their property by cultivating a plot of green between the house and the sidewalk.

It is time also that some steps were taken to improve the design of the cheaper class of dwellings. The almost universal "dry goods box" gives a most uninviting appearance to streets which under better treatment might be made attractive. Nor is it absolutely necessary that such treatment should add materially to the cost.

Many builders who cannot afford to employ an architect make a rough plan themselves of the only kind of house with which they are familiar, get a permit and build, and the "dry goods box" is the result. There seems to be no good reason why the City should not help such property owners to build from a better design. Each of the architects might be invited to submit a design with details and specification for an ordinary dwelling of the cheaper class with a

certificate of cost. Special attention should be given to appearance consistent with economical construction. The Council could accept one, two, three or all designs, paying such remuneration or prize as they consider equitable. The building regulations should then be amended so that property owners who cannot afford to employ an architect would be required to build according to one of the standard designs; the City supplying the plans and specification and the City Carpenter, who acts as Assistant Building Inspector, supervising the work. Such a system would effect a great improvement in the appearance of the City in the years to come, especially in the suburbs.

CABLE CONDUITS.

The statements appended show the underground work performed during the year.

CITY PROPERTY.

The contract for the construction of a new fire station on the corner of Bedford Row and Prince Street was awarded to E. Maxwell for $17,764.00. The building was to be of brick with concrete trimmings according to the design of R. A. Johnson, Architect. The work is nearing completion.

At a meeting on April 5th, 1906, the Council decided to take over the old Clock Tower on the Citadel and maintain the clock and building in future. The Militia Council agreed to pay the City $500.00, which they estimated would be sufficient to place the building in good repair externally, including painting.

Michael Carney, Esq., offered to lease to the City a lot on the north side of the Esplanade for an amouut equivalent to the taxes and interest on the cost. His offer was accepted.

The retaining wall at the City Hall end of the Grand Parade has been bulging out for some time, and that portion of it between Barrington St. and the entrance steps was taken down. The ground was excavated to the level of the sidewalk for the construction of an underground stable 53 feet x 34 feet. The north wall and the eastern half of the south wall were constructed of concrete, the west wall and remainder of the south wall of stone. The roof was re-inforced concrete on steel I beams, water-proofed, covered with soil and sodded. The concrete in south wall is designed to form the

north wall of a public comfort station in the future. Both stable and comfort station will be heated from the City Hall. Frost stopped the work when the roof was finished, and it will be completed this year.

EXPENDITURE.

The report of the Clerk of Works shows the totals:—

| | |
|---|---|
| Water Maintenance | $ 89,436 95 |
| Water Construction | 18,668 57 |
| Sewer Construction | 57,116 39 |
| Sewer Maintenance | 1,541 83 |
| Streets | 29,664 11 |
| Internal Health | 14,001 14 |
| Street Lighting | 19,948 98 |
| Teams and Stables | 5,947 44 |
| City Property | 2,083 80 |
| Agricola Street Widening | 25,147 65 |
| Bedford Row Engine House | 15,563 35 |
| Fire Insurance | 1,075 25 |
| Fuel | 1,123 26 |
| Lighting City Hall | 749 30 |
| Baths | 976 45 |
| Telephones | 249 40 |
| City Plan | 500 00 |
| Citaldel Improvement | 57 32 |
| Parade Improvement | 2,812 05 |
| | $286,663 24 |
| Total Labor Pay Roll | $106,183 12 |
| Increase in expenditure above last year | $103,195 49 |

OFFICE.

Survey work for the City Plan was continued, and it is confidently expected that this part of the work will be completed in 1906. A Buff & Buff transit was purchased at a cost of $205.85.

The demands upon the staff are steadily increasing, and for some years we have not been able to do the work that should be done. Realizing the hopelessness of our struggle, the Works Committee

employed Mr. T. W. J. Lynch, with whose assistance we have been able to avoid falling farther behind.

The pleasant relations existing during the year between the Works Committee and the staff will be remembered gratefully, and their kind expressions of appreciation, advice, consideration and support in connection with the operations of the year have helped to lighten heavy official burdens.

The reports of Formen and Inspectors, statements of expenditure, etc., are appended.

Respectfully submitted,

F. W. W. DOANE,

*City Engineer.*

## REPORT FOREMAN WATER DEPARTMENT.

CITY HALL, April 30th, 1906.

F. W. W. DOANE, ESQ.,

*City Engineer:*

SIR,—The following is the Annual Report of Stock belonging to the Water Department, length of main and service pipes laid, length of pipes re-cleaned, and location of houses supplied with water during 1905.

Respectfully submitted.

E. MORRISON,

*Foreman Water Department.*

# New Mains.

| Street. In | From | To | High or Low Service. | Cast Iron Main Pipe. 3 inch Pipe—feet. | 6 inch Pipe—feet. | Joints. | Hyd'nts. Number of Valves. | Length of Pipe—feet. | Size of Pipe—inches | Number. | Number of Valves. | Percentage of Rock. | Cost per foot in Cents. Pipes and Specials. | Valves and Hydrants. | Labor and Cartage. | Lead, Gasket, &c. | Dynamite and Fuse. | Incidentals. | Total. | Total Cost. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bower Road | Francklyn | 500 feet eastwardly. | L | .... | 500 | T. & B. | 1 | 11 | 6 | 1 | 1 | 20 | 61.6 | 20.9 | 70.5 | 1.6 | 0.5 | .. | 155 1 | $ 792 81 |
| City Prison | Gottingen | Prison Yard | H | .... | 259 | " | 1 | .. | .. | .. | .. | 100 | 60.9 | 8.3 | 258.3 | 0.9 | 4.5 | .. | 332.9 | 865 02 |
| Creighton | North end of pipe | Northwardly | H | .. | 225 | " | .. | .. | .. | .. | .. | 100 | 60.0 | .. | 140.7 | .... | 8.4 | .. | 209.1 | 470 40 |
| Fern Lane | May | " | H | 122 | .... | " | 1 | .. | .. | .. | .. | 80 | 38.6 | 9.8 | 138.9 | 2.8 | 6.8 | .. | 196.9 | 240 35 |
| Gottingen | Duffus | Rockhead | H | .... | 1833 | " | 3 | 20 | 6 | 1 | 1 | 100 | 61.6 | 7.9 | 161.6 | 0.7 | 18.5 | .. | 250.6 | 4643 18 |
| Harvard | Yale | Yukon | H | .... | 339 | " | 1 | .. | .. | .. | .. | 100 | 61 3 | 5.9 | 194.7 | 0.3 | 14.2 | .. | 276.4 | 936 95 |
| Harvard | Duncan | Northwardly | H | .... | 216 | " | 1 | .. | .. | .. | .. | .... | 60.0 | 9.2 | 36.8 | 0 8 | 1.0 | .. | 107.9 | 234 18 |
| Maynard | North | " | H | ... | 111 | " | .. | .. | .. | .. | .. | 100 | 60.0 | .... | 204.4 | 1.1 | 15.5 | .. | 281.0 | 311 94 |
| North | Windsor | Eastwardly | H | .... | 135 | " | 1 | .. | .. | .. | .. | 100 | 67.1 | 14.8 | 245.1 | 3.7 | 17.2 | .. | 346 9 | 467 33 |
| Oakland | End of pipe | Southwardly | H | .... | 90 | " | .. | .. | .. | .. | .. | 100 | 60.0 | .... | 193.8 | 1.0 | 15.9 | .. | 270.7 | 243 63 |
| Pepperell | " | Westwardly | H | .... | 45 | " | .. | .. | .. | .. | .. | 100 | 60.0 | ..... | 177.7 | .... | 15.7 | .. | 253.4 | 114 00 |
| Pepperell | Preston | Eastwardly | H | .... | 245 | " | 1 | .. | .. | .. | .. | .... | 64.2 | 8 2 | 44.3 | 1 2 | ..... | .. | 117.9 | 288 85 |
| Windsor | Young | Northwardly | H | .... | 162 | " | 1 | .. | .. | .. | .. | .... | 60.0 | 12.4 | 53.0 | 1.0 | ..... | .. | 126.4 | 204 81 |
| Yukon | Harvard | Eastwardly | H | .... | 674 | " | 1 | 30 | 6 | 2 | 2 | 100 | 61.3 | 27.4 | 120.7 | 0.8 | 8.0 | .. | 218.1 | 1535 89 |
| **OLD MAINS REPLACED WITH NEW MAINS.** | | | | | | | | | | | | | | | | | | | | |
| Gottingen | Cogswell | Cunard | L | .... | 1426 | T. & B. | 3 | .. | .. | .. | .. | 10 | 62.6 | 4.2 | 100.8 | 0.4 | 2.8 | .. | 170.8 | 2648 21 |

Old pipe was 6 inch.

## Total Length in Feet of Cash Iron Water Mains in the Water Supply System.

| | Size of Pipe in Inches. | | | | | | | | | | | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 27 | 24 | 20 | 15 | 12 | 9 | 8 | 6 | 4 | 3 | Less than 3 inch. | |
| Length December 31st, 1904..... | 14560 | 20524 | 6712 | 44236 | 37201 | 43127 | 415 | 136296 | 33272 | 30653 | 898 | 367894 |
| Laid during 1905 ..... | .... | ..... | ..... | ... | .... | .... | ..... | 4895 | ..... | 122 | ..... | 5017 |
| Length December 31st, 1905. ..... | 14560 | 20524 | 6712 | 44236 | 37201 | 43127 | 415 | 141191 | 33272 | 30775 | 898 | 372911 |

Equal to 70 $\frac{33}{52}\frac{11}{80}$ miles.

N. B.—45 feet of 20 inch pipe in waste way Chain Lakes, and pipes from main to hydrant (except wharves) laid previous to 1897 not included in above summary.

## Pipe Cleaning by Mechanical Scrapers.

| Date. | Location. | Diameter in inches. | Length cleaned in feet. | Cost. | Remarks. |
|---|---|---|---|---|---|
| 1905. | | | | | |
| June 12th. | High Service Main ... ..... | 20 | 6712 | $23 73 | Re-cleaned. |
| " | " " ..... | 15 | 29628 | | |
| Sept. 8th. | " " ..... | 15 | 29628 | 14 59 | " |

## New Service Pipes.

| ½ Inch. Feet. | ¾ Inch. Feet. | 1 Inch. Feet. | 1½ Inch. Feet. | 2 Inch. Feet. | Total length. Feet. |
|---|---|---|---|---|---|
| 3593 | 314 | 51 | ..... | 25 | 3983 |

## House Services Renewed.

| ½ Inch. Feet. | 1½ Inch. Feet. | Total length. Feet. |
|---|---|---|
| 2278 | 17 | 2295 |

## New Hydrants.

| Street. | Location. | Kind. | Service. | Size of Pipe in Inches. | Length of Pipe in Feet. | No. of Nozzles. | Distance Valve from Hydrant. |
|---|---|---|---|---|---|---|---|
| | | | | | | | FT. IN. |
| Yukon | Harvard | City | H. | 6 | 15 | 3 | 8 |
| " | Near E. end | " | " | 6 | 15 | 3 | 8 |
| Bower Road | E. of Francklyn | " | L. | 6 | 11 | 3 | 7 2 |
| Gottingen | Opp. Rockhead Gate | " | H. | 6 | 20 | 3 | 14 11 |

## Old Hydrants Replaced with Frost Jacket Hydrants.

| Street. | Location. | Kind. | Service. | Size of Pipe in Inches. | Length of Pipe in Feet. | No. of Nozzles. | Distance Valve from Hydrant. |
|---|---|---|---|---|---|---|---|
| | | | | | | | FT. IN. |
| Duke | Granville | City | L. | 6 | .... | 3 | 4. 0 |

## Summary of Hydrants.

| | | | |
|---|---|---|---|
| No. of Hydrants on | Streets December 31st, 1904 | | 371 |
| " | " | Wharves " " | 20 |
| " | " | Military and Naval property Dec. 31st, 1904 | 20 |
| " | " | Private property " " | 13 |
| " | " | in use December 31st, 1904 | 424 |
| " | " | set on streets in 1905 | 4 |
| " | " | in use December 31st, 1905 | 428 |

## New Valves on Mains.

| STREET. | LOCATION. | Size. | Service. |
|---|---|---|---|
| | | Inch. | |
| Bower Road .. | E. side Francklyn, to wire fence, N. side, 24′ 6″, W. side Francklyn cor. stone wall 57′ 6″ | 6 | Low. |
| City Prison ... | W. side Gottingen 32′ 10″, N. side N. pillar, of big gate 45′ 11″ | 6 | High. |
| Fern Lane .... | N. side May, N. E cor. 20′ 6″ | 3 | " |
| Gottingen .... | S. side Brunswick Lane, S. E. cor. 17′ 0″ S. of S line Brunswick Lane 6′ 6″ | 6 | Low. |
| " .... | N side Duffus, N. E cor. 21′ 5″, N of cor. 3′ | 6 | High. |
| " ... | Opposite Rockhead gate, to N. side S. pillar of gate 36′ 9″, N. pillar 41′ 6″ | 6 | " |
| " .... | North of Rockhead gate, W. line of street 35′ 6″, N. side N. pillar of gate 59′ 2″ | 6 | " |
| Harvard ..... | N. side Yale, N. E. cor. 28′ 2″ | 6 | " |
| " .... | N. side Duncan, N. E. cor. 28′ 6″ | 6 | " |
| North ..... | E. side Windsor, N. E. cor. 21′ 3″ | 6 | " |
| Pepperell ..... | E side Preston, S. E. cor. 32′ 6″ | 6 | " |
| Windsor ..... | N. side Young, N. E. cor. 23′ 0″ | 6 | " |
| Yukon..... | E. side Harvard, N. E. cor. 26′ 6″ | 6 | " |

## Hydrant Valves.

| STREET. | LOCATION. | Size. | Service. |
|---|---|---|---|
| | | Inch. | |
| Bower Road . | 480 feet E. of Francklyn, 7′ 2″ from hydrant | 6 | Low. |
| Gottingen..... | Opposite Rockhead gate, 14′ 11″ from hydrant..... | 6 | High. |
| Yukon ..... | Harvard, 3′ 8″ from hydrant | 6 | " |
| " ..... | Near E. end, 3′ 8″ | 6 | " |
| Duke ..... | Granville, 4′ 0″ | 6 | Low. |

## Old Valves replaced on Mains.

| STREET. | LOCATION. | Size. | Service. |
|---|---|---|---|
| | | Inch. | |
| Gottingen..... | N. side Cogswell, N. E. cor. 21′ 0″ | 6 | Low. |
| " .... | S. side Cornwallis, S. E cor. 18′ 0″, S. of cor. 4′ 0″. | 6 | " |

## Total Number of Valves.

| | 27" | 24" | 20" | 15" | 12" | 9" | 6" | 4" | 3" | 1½" | 1¼" | 1" | ¾" | Hydrant Valves 6" | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| In use December 31st, 1904.. | 1 | 8 | 2 | 29 | 55 | 66 | 331 | 106 | 108 | 1 | 9 | 2 | 11 | 75 | 804 |
| Set during 1905 ..... | .. | .. | .. | .. | .. | .. | 12 | .... | 1 | .. | .. | .. | .. | 5 | .. .. |
| Total December 31st, 1905... | 1 | 8 | 2 | 29 | 55 | 66 | 343 | 106 | 109 | 1 | 9 | 2 | 11 | 80 | 822 |

N. B.—All valves open by turning to the right except two on the 24 inch mains at their junction below Chain Lake gate houses.

## Pipe Stock on Hand December 31st, 1905.

| No. of Pipes. | Diameter in inches. | Weight of one in lbs. | Total weight in lbs. | Value per lb. in cents. | Total Value. | Remarks. |
|---|---|---|---|---|---|---|
| 3 | 27 | 2870 | 8610 | 1¾ | 150 67 | Class A, T. & B. 12 ft. |
| 3 | 27 | 3206 | 9618 | 1¾ | 168 10 | Class B, T. & B. 12 ft. |
| 1 | 27 | 3653 | 3653 | 1¾ | 64 10 | Class C, T. & B. 12 ft. |
| 6 | 24 | 2360 | 15150 | 1¾ | 202 13 | |
| 4 | 20 | 1263 | 5052 | 2¼ | 113 67 | |
| 9 | 15 | 1200 | 10800 | 2¼ | 243 00 | |
| 12 | 12 | 680 | 8160 | 2¼ | 184 20 | |
| 13 | 10 | 550 | 7150 | 2¼ | 160 87 | |
| 95 | 9 | 500 | 47500 | 2¼ | 1068 75 | |
| 37 | 8 | 386 | 14282 | 2¼ | 321 34 | |
| 302 | 6 | 380 | 114760 | 2¼ | 2584 60 | |
| 324 | 6 | 280 | 90720 | 2¼ | 2041 20 | |
| 17 | 5 | 222 | 3774 | 2¼ | 84 91 | |
| 32 | 4 | 204 | 6528 | 2¼ | 146 88 | |
| 1104 | 4 | 160 | 66240 | 2¼ | 1490 40 | |
| 68 | 3 | 130 | 8840 | 2¼ | 178 01 | |
| 58 | ..... | 26 | 1508 | 2¼ | 33 93 | Stand pipes. |
| 5 | ..... | 12 | 60 | 2¼ | 1 35 | Plates. |
| 137 | ..... | 6 | 822 | 2¼ | 18 49 | Caps. |
| 95 | ..... | 2 | 190 | 2¼ | 4 27 | Thimbles for service pipes. |
| 92 | ..... | 18 | 1656 | 2¼ | 37 28 | Sleeves for service pipes. |
| 164 | . ... | 4 | 656 | 2¼ | 14 76 | Square caps for service pipes. |
| 20 | ..... | 7 | 140 | ..... | 3 15 | Square caps for main stop cocks. |
| 2601 | | | 425869 | | $9306 04 | |

## Pipe—Specials.

| No. of pieces. | Diameter in inches. | Description. | Weight of one in lbs. | Total weight in lbs. | Value per lb. in cents. | Total value. |
|---|---|---|---|---|---|---|
| 12 | 27 | Thimbles | | | | |
| 2 | 27 | Bell Mouth | 831 | 1662 | 2¼ | $ 37 39 |
| 13 | 27 | Bevel Collars | 795 | 10335 | 3 | 310 05 |
| 1 | 27 | Plain Special 2 ft. long, Class A | 404 | 404 | 1⅞ | 7 07 |
| 1 | 27 | " 2 " B | 460 | 460 | " | 8 05 |
| 1 | 27 | " 3 " B | 700 | 700 | " | 12 25 |
| 1 | 27 | " 4 " B | 920 | 920 | " | 16 10 |
| 1 | 27 | " 5 " B | 1248 | 1248 | " | 21 84 |
| 2 | 27 | " 5 " B | 1144 | 2288 | " | 40 04 |
| 1 | 27 | " 3 " C | 820 | 820 | " | 14 35 |
| 1 | 27 | " 3 " C | 930 | 930 | " | 16 27 |
| 1 | 27 | " 4 " C | 1068 | 1068 | " | 18 69 |
| 1 | 27 | " 5 " C | 1332 | 1332 | " | 23 31 |
| 1 | 24 | Bevel Collar | 688 | 688 | 3 | 20 64 |
| 12 | 24 | Thimbles | 396 | 4752 | 2¼ | 106 92 |
| 1 | 24 | Cap | 290 | 290 | " | 6 52 |
| 6 | 24 | Split Thimbles | 620 | 3720 | 2½ | 93 00 |
| 1 | 24 | Y branch 24" x 24" | 2372 | 2372 | 2¼ | 53 37 |
| 4 | 20 | Thimbles | 230 | 920 | " | 20 70 |
| 1 | 20 | Split Thimbles | 453 | 453 | 2½ | 11 32 |
| 3 | 15 | 4-way branches | 896 | 2688 | 2¼ | 60 48 |
| 3 | 15 | 4-way branches 15" x 6" | 660 | 1980 | " | 44 55 |
| 1 | 15 | 3-way branch | 812 | 812 | " | 18 27 |
| 2 | 15 | Y's | 1112 | 2224 | " | 50 04 |
| 4 | 15 | Thimbles | 234 | 936 | " | 21 06 |
| 1 | 15 | 3-way branch 15" x 12" x 6" | 580 | 580 | 2½ | 13 30 |
| 1 | 15 | Reducing to 6" | 400 | 400 | 2¼ | 9 00 |
| 5 | 15 | Sadles 15" x 6" | | | | |
| 9 | 15 | Split Thimbles | 260 | 2340 | 2½ | 58 50 |
| 1 | 12 | 4-way branch | 615 | 615 | 2¼ | 13 84 |
| 3 | 12 | " 12" x 9" | 500 | 1500 | " | 33 75 |
| 4 | 12 | " 12" x 6" | 475 | 1900 | " | 42 77 |
| 2 | 12 | 3-way branch 12" x 12" | 524 | 1048 | " | 23 58 |
| 3 | 12 | " 12" x 9" | 494 | 1482 | " | 33 34 |
| 1 | 12 | " 12" x 6" | 469 | 469 | " | 10 55 |
| 2 | 12 | Reducing to 9" | 240 | 480 | " | 11 00 |
| 8 | 12 | " 6" | 200 | 1600 | " | 36 00 |
| 2 | 12 | " 6" with faucets | 200 | 400 | " | 9 00 |
| 21 | 12 | Thimbles | 160 | 3360 | " | 75 60 |
| 5 | 12 | Caps | 45 | 225 | " | 5 06 |

## PIPE SPECIALS.—*(Continued.)*

| No. of pieces. | Diameter in inches. | DESCRIPTION. | Weight of one in lbs. | Total weight in lbs. | Value per lb. in cents. | Total Value. |
|---|---|---|---|---|---|---|
| 2 | 12 | Saddle 12″ x 4″ | 90 | 180 | 2¼ | $ 4 05 |
| 13 | 12 | Split Thimbles | 222 | 2886 | 2½ | 67 93 |
| 2 | 9 | 6-way branches 9″ x 9″ x 9″ x 3″ | 450 | 900 | 2¼ | 20 25 |
| 6 | 9 | 3-way branches 9″ x 9″ | 355 | 2130 | " | 47 92 |
| 10 | 9 | " 9″ x 6″ | 335 | 3350 | " | 75 37 |
| 7 | 9 | Reducing 9″ to 6″ | 157 | 1099 | " | 24 73 |
| 3 | 9 | Offsets | 156 | 468 | " | 10 93 |
| 20 | 9 | Thimbles | 112 | 2240 | " | 50 40 |
| 1 | 9 | Saddle 9″ x 4″ | 45 | 45 | " | 1 01 |
| 20 | 9 | Split Thimbles | 139 | 2780 | 2½ | 69 50 |
| 7 | 9 | Caps | 34 | 238 | 2¼ | 5 35 |
| 4 | 6 | 6″ x 6″ 3-way branches | 209 | 836 | " | 18 81 |
| 9 | 6 | 6″ x 4″ " | 200 | 2200 | " | 49 50 |
| 6 | 6 | 6″ x 3″ " | 131 | 786 | " | 17 68 |
| 13 | 6 | Reducing to 4″ | 114 | 1482 | " | 33 34 |
| 6 | 6 | " 3″ | 105 | 630 | " | 14 17 |
| 11 | 6 | Thimbles | 75 | 825 | " | 18 56 |
| 7 | 6 | Offsets | 140 | 1120 | " | 25 20 |
| 4 | 6 | Y branches | 209 | 836 | " | 18 87 |
| 21 | 6 | Split Thimbles | 92 | 1930 | 2½ | 48 25 |
| 3 | 6 | Caps | 19 | 57 | 2¼ | 1 28 |
| 3 | 6 | Bends | 140 | 420 | " | 9 90 |
| 22 | 4 | 4-way branches | 123 | 2706 | " | 60 88 |
| 10 | 4 | 3-way branches | 114 | 1140 | " | 25 65 |
| 6 | 4 | Y branches | 96 | 576 | " | 12 96 |
| 1 | 4 | Reducing to 3″ | 84 | 84 | " | 1 05 |
| 3 | 4 | Offsets | 66 | 198 | " | 4 45 |
| 27 | 4 | Thimbles | 29 | 783 | " | 17 64 |
| 8 | 4 | Bends | 88 | 704 | " | 15 76 |
| 16 | 4 | Split Thimbles | 64 | 1024 | 2½ | 25 50 |
| 6 | 3 | 4-way branches | 90 | 540 | 2¼ | 12 15 |
| 4 | 3 | 3-way branches | 60 | 240 | " | 5 40 |
| 1 | 3 | 3 x 2-way branches | 50 | 50 | " | 62 |
| 30 | 3 | Thimbles | 29 | 870 | " | 19 57 |
| 16 | 3 | Split Thimbles | 48 | 768 | 2½ | 19 20 |
| 6 | 2 | 4-way branches | 30 | 180 | 2¼ | 4 05 |
| 2 | 2 | Y branches | 23 | 46 | " | 1 04 |
| 5 | .... | Fire hydrants | ..... | ..... | ..... | 332 50 |
| 5 | .... | Casting for fire hydrants | 418 | 2090 | 3 | 62 70 |
| 9 | .... | Bases for hydrants | 140 | 1260 | 3 | 37 80 |

## Pipe Specials.—*(Continued).*

| No. of Pieces. | Diameter in inches. | Description. | Weight of one in lbs. | Total weight in lbs. | Value per lb. in cents. | Total value. |
|---|---|---|---|---|---|---|
| 8 | .... | Jackets for fire hydrants | 340 | 2720 | 3 | $ 81 60 |
| 11 | .... | Extensions for fire hydrants | 124 | 1364 | " | 40 92 |
| 12 | .... | Cast iron caps for hydrants | 5 | 60 | " | 1 80 |
| 6 | .... | Cast iron caps for suction | 9 | ..... | ..... | 1 62 |
| 6 | .... | Fire hydrants without jackets tar manhole | ..... | ..... | ..... | 300 00 |
| 1 | .... | Base for fire plug, plug 6" x 3" | 150 | 150 | 3 | 4 50 |
| .. | .... | Brass castings all sorts | ..... | 30 | 35 | 10 50 |
| .. | .... | Tin tubing | ..... | 160 | 33 | 52 80 |
| .. | .... | Refined iron | ..... | 1600 | 1½ | 24 00 |
| 3 | .... | Cast iron boxes for meters | 260 | 780 | 2¼ | 23 55 |
| 15 | .... | " " | 199 | 2985 | " | 67 16 |
| 81 | | | | 13399 | | $1040 95 |

## Joint Staves.

| For 6 inch pipe. | For 9 inch pipe. | For 12 inch pipe. | For 15 inch pipe. | For 20 inch pipe. | For 24 inch pipe. | Key Wedges. | Cost of each. | Total cost. |
|---|---|---|---|---|---|---|---|---|
| 3400 | 2700 | 1500 | 800 | 690 | 5500 | ..... | $0 1¼ | $171 25 |
| ..... | ..... | ..... | ..... | ..... | ..... | 3500 | 0 0¼ | 8 75 |

## Valves.

| No. of Pieces. | Diameter in inches. | Description. | Weight of one in lbs. | Total weight in lbs. | Value of each. | Total value. |
|---|---|---|---|---|---|---|
| 1 | 12 | Regulating Valve | | | | $206 66 |
| 1 | 6 | " " | | | | 103 33 |
| 3 | 12 | Stop Valves | | | $40 00 | 120 00 |
| 9 | 9 | " " | | | 25 77 | 231 93 |
| 26 | 6 | " " | | | 17 49 | 454 74 |
| 30 | 4 | " " | | | 15 00 | 450 00 |
| 4 | 3 | " " | | | 12 00 | 48 00 |
| 10 | 1 | Service Stopcocks | | | 2 50 | 25 00 |
| 3 | | " " | | | 2 00 | 6 00 |
| 38 | | " " | | | 1 60 | 60 80 |
| 6 | | " " Curb | | | 1 60 | 9 60 |
| 4 | 15 | Gun Metal Spindles | 28 | 112 | 60 | 67 12 |
| 3 | 9 | " " | 14 | 56 | 60 | 33 60 |
| 5 | 6 | " " | 9 | 45 | 60 | 27 00 |
| 7 | 4 | " " | 6 | 42 | 60 | 25 20 |
| 12 | 3 | " " | 5 | 60 | 60 | 36 00 |
| | | | | | | $1894 98 |

## Meters in Stock.

| Number. | Size in inches. | Description. | Value of each. | Total Value. |
|---|---|---|---|---|
| 7 | 6 | Siemen's Meters | $143 42 | $1003 94 |
| 9 | 4 | " " | 86 75 | 780 75 |
| 12 | 3 | " " | 65 67 | 788 04 |
| 1 | ¾ | " " | 15 50 | 15 50 |
| 20 | 2 | Tridant " | 62 60 | 1252 00 |
| 10 | 1½ | " " | 37 60 | 376 00 |
| 17 | 1 | " " | 21 00 | 357 00 |
| 11 | ¾ | " " | 17 60 | 193 60 |
| 40 | ⅝ | " " | 11 97 | 471 60 |
| 2 | ¾ | Crown " | 49 25 | 98 50 |
| 1 | ½ | Hersey " | 21 05 | 21 05 |
| 1 | ½ | Disc " | 12 34 | 12 34 |
| 1 | ½ | Nash | 14 49 | 14 49 |
| 1 | ½ | Niagaro-Buffalo Meters | 13 19 | 13 19 |
| 2 | ⅝ | Frost | 31 42 | 62 84 |
| 1 | ½ | Keystone | 12 00 | 12 00 |
| | | | | $4472 84 |

## Miscellaneous.

| Number. | Description. | Value of each. | Total Value. |
|---|---|---|---|
| 1 | Pipe tapping machine | ..... | $127 60 |
| 1 | 5 H. P. steam engine and pump | ..... | 625 00 |
| 1 | 4 H. P. gas engine | ..... | 475 50 |
| 3 | Derrick winches | $ 7 00 | 21 00 |
| 2 | Hand winches | 8 00 | 16 00 |
| 2 | Platform scales | 25 00 | 50 00 |
| ..... | Tape packing for meters | ..... | 60 00 |
| 1 | Tapping and boring machine | ..... | 80 00 |
| 3 | Lathes | ..... | 200 00 |
| 5 | Pressure gauges | 10 00 | 50 00 |
| ..... | Blacksmiths tools | ..... | 150 00 |
| | | | $1855 10 |

## Recapitulation.

| Description. | No. of Pieces. | No. of Pounds. | Value. |
|---|---|---|---|
| Pipes | 2601 | 425869 | $9306 04 |
| Specials | 561 | 110047 | 3297 78 |
| Joint Staves | 14500 | | 180 00 |
| Valves | | | 1894 98 |
| Meters | | | 4472 84 |
| Miscellaneous | | | 1855 10 |
| | | | $21006 74 |

## Rented Domestic Hydrants.

| Street. | Location. |
|---|---|
| Cedar | N. E. corner Louisburg & Cedar Streets. |
| Wellington | S. W. corner Lundy's Lane. |
| Duncan | N. side. |
| Duncan | N. E. corner Harvard Street. |
| Preston | S. W. corner Jubilee Road. |
| Tower Road | At Fay's Lane. |
| Duffus | Corner Gottingen Street. |
| Oak | S. E. corner Beech Street. |
| Sullivan | Opposite May's Brewery. |
| Atlantic | Corner Brussel Street. |
| Mott | Corner Seldon Street. |

## Free Pumps Maintained by City.

| No. | Location. |
|---|---|
| 1 | Leahyville. |
| 1 | Lady Hammond Road. |
| 1 | Kempt Road. |
| 1 | Duffus Street. |
| 1 | Africville. |
| 1 | North Kline Street. |
| 1 | Campbell Road. |
| 1 | West Harvey for Haley. |
| 1 | Quinn Street. |

## Hydraulic Hoists in Operation.

| Name. | Business. | Size of Service. | How Rated |
|---|---|---|---|
| Dominion Government | Post Office | 3 inch | Meter. |
| Dominion Government | Appraisers' Office | 3 " | " |
| G. M. Smith | Dry Goods | 4 " | " |
| Wm. Stairs, Son & Morrow | Hardware | 4 " | " |
| Dillon Bros | Groceries | 3 " | " |

## Motors.

| Name. | Business. | Size of Service. | How Rated |
|---|---|---|---|
| Brunswick St. Church (Methodist) | Organ | 2 inch | Indicator. |

## Drinking Fountains.

| No. | Location. |
|---|---|
| 1 | Market Square. |
| 1 | St. Paul's Street, near Barrington Street. |
| 1 | Park Street, opposite Cogswell Street. |
| 2 | Public Gardens. |

## Ornamental Fountains.

| | |
|---|---|
| 3 | Public Gardens. |
| 1 | Grand Parade. |

## Service Pipes Laid.

| Number. | Name of Owner or Agent. | Location of Premises. | No. of Stopcock. | Size of Pipe. | Purpose for which water is used. |
|---|---|---|---|---|---|
| 1 | Frank Ward | N. side Macara St. | 6940 | ¾ | Dwelling. |
| 2 | Vincent Pettipas | E. side Plover St. | 6941 | " | " |
| 3 | Jas. E Gould | W. side Robie | 6942 | " | " |
| 4 | Samuel Stead | S. side Quinpool Rd | 6943 | " | " |
| 5 | G. R. Marshall | S. side Black St | 6944 | " | " |
| 6 | J. W. Hershman | E. side Kempt Rd. | 6945 | " | " |
| 7 | A. O. Blakely | N. side Compton Av. | 6946 | " | " |
| 8 | B Archibald | N. side Coburg Rd. | 6947 | " | " |
| 9 | John Vincent | S. side Willow St. | 6948 | " | " |
| 10 | Geo. T. Allan | S. side Duncan St. | 6949 | " | " |
| 11 | ———Cook | E. side Henry St. | 6950 | " | " |
| 12 | J. Egan | W. side Walnut St. | 6951 | " | " |
| 13 | W. W. Howell | W. side Upper Water St. | 6952 | " | Machine Shop. |
| 14 | D. Stewart | W. side Pleasant Av. | 6953 | " | Boiler House. |
| 15 | M. Maltus | W. side Hunter St. | 6954 | " | Dwelling. |
| 16 | Ambrose Vail | E. side Windsor St. | 6955 | " | " |
| 17 | Carrie Hutt | N. side Quinpool Rd. | 6956 | " | " |
| 18 | Baptist Church | S. side Quinpool Rd. | 6957 | " | Church. |
| 19 | Geo. G. Vass | S. side Yukon St. | 6958 | " | Dwelling. |
| 20 | Joseph Eastwood | S. side Yukon St. | 6959 | " | " |
| 21 | Donald Keith | W. side Granville St. | 6960 | ¾ | Store. |
| 22 | J. W. Carmichael | S. side Yukon St. | 6961 | ¾ | Dwelling. |
| 23 | Geo. Drysdale | S. side Yukon St. | 6962 | " | " |
| 24 | E. Radford | S. side Yukon St | 6963 | " | " |
| 25 | R. Walker | S. side Yukon St. | 6964 | " | " |
| 26 | N. Menchions | N. side Yukon St | 6965 | " | " |
| 27 | Geo. Barter | N. side Yukon St. | 6966 | " | " |
| 28 | S. J. Hatcher | N. side Yukon St | 6967 | " | " |
| 29 | John Clements | N. side Yukon St. | 6968 | " | " |
| 30 | Henry Parsons | N. side Yukon St. | 6969 | " | " |
| 31 | W. A. Phillips | N. side Yukon St | 6970 | " | " |
| 32 | A. Bourke | N. side Yukon St. | 6971 | " | " |
| 33 | Jemima Phillips | E. side Harvard St | 6972 | " | " |
| 34 | E. T. Becknell | S. side Yukon St. | 6973 | " | " |
| 35 | Geo. E. Rennerd | W. side Harvard St. | 6974 | " | " |
| 36 | Thomas Robinson | S. side Yukon St. | 6975 | " | " |
| 37 | Thomas Robinson | S. side Yukon St. | 6976 | " | " |
| 38 | Geo. T. Whitford | W. side Harvard St | 6977 | " | " |
| 39 | W. B. A. Ritchie | N. side Bower Road. | 6978 | " | " |
| 40 | John Brown | E. side Needham | 6979 | " | " |
| 41 | Henry Roper | W. side S. Bland St | 6980 | " | " |
| 42 | Edna M. Creighton | W. side Robie St. | 6981 | " | " |
| 43 | Henry Roper | W. side Plover St. | 6982 | " | " |
| 44 | Henry Roper | W. side Plover St. | 6983 | " | " |

## SERVICE PIPES LAID.—*(Continued.)*

| Number. | Name of Owner or Agent. | Location of Premises. | No of Stopcock. | Size of Pipe. | Purpose for which water is used. |
|---|---|---|---|---|---|
| 45 | Henry Roper | W. side Plover St | 6984 | ¾ | Dwelling. |
| 46 | C. E Dow | N. side Willow St | 6985 | " | " |
| 47 | F. T. Crook | N. side Allen St | 6986 | " | " |
| 48 | S. W. Dixon | E. side Agricola St | 6987 | " | Shop & Dwelling. |
| 49 | H. H. Wallace | E. side Lucknow St. | 6988 | " | Dwelling. |
| 50 | H. S. Freeman | W. side Windsor St | 6989 | ¾ | " |
| 51 | W. T. Harris & Son | E. side Agricola St | 6990 | ¾ | " |
| 52 | Walter Lownds | N. side Coburg Road | 6991 | ¾ | " |
| 53 | Graham Creighton | E. side Oakland St | 6992 | " | " |
| 54 | Albro Languil | E. side Plover St | 6993 | " | " |
| 55 | ——Smeardon | W. side Windsor St. | 6994 | " | " |
| 56 | ——McPhee | E. side Maynard St. | 6995 | " | " |
| 57 | W. R. Silver | W. side Gottengen St | 6996 | " | Stables |
| 58 | Eliza Curren | E. side Edward St. | 6997 | " | Dwelling. |
| 59 | H. D Holloway | E. side Robie St | 6998 | " | " |
| 60 | O. E. Smith | N. side Morris St | 6999 | " | " |
| 61 | Thos. Nichol | N. side Shirley St | 7000 | " | " |
| 62 | J. C. Lithgow | E. side Creighton St | 7001 | | Stable. |
| 63 | Geo. L Ryan | W. side Campbell Rd | 7002 | " | Dwelling. |
| 64 | H. French | E. side North George St. | 7003 | " | " |
| 65 | J. P. Fairbanks | W. side L. Water St | 7004 | 1 | Hotel. |
| 66 | John McInnis & Son | S. side Morris St | 7005 | ¾ | Dwelling & Stable. |
| 67 | Frank Selig | S side Willow St | 7006 | ¾ | Dwelling |
| 68 | Thomas Nichol | S. side Shirley St | 7007 | " | " |
| 69 | J. W. Grant | N. side Shirley St. | 7008 | " | " |
| 70 | Alfred Cox | S. side Pepperell St | 7009 | " | " |
| 71 | J A. Martin | S. side Pepperell St | 7010 | " | " |
| 72 | Kennedy & Phalen | S. side Pepperell St | 7011 | " | Bakery. |
| 73 | A. G. Jones | S. side Wharf | .... | 2½ | Stores. |
| 74 | S J. Harivel | N. side North St | 7012 | ¾ | Shop & Dwelling. |
| 75 | Alfred Whitman | W. side Harvard St | 7013 | " | Dwelling. |
| 76 | W. Jollimore | N. side North St | 7014 | " | " |
| 77 | John Duff | S. side West St | 7015 | " | " |
| 78 | O. E. Smith | N. side Morris St | 7016 | " | " |
| 79 | O. E. Smith | N. side Morris St | 7017 | " | " |
| 80 | D. A. Johnston | N. side Macara St | 7018 | " | " |
| 81 | W. A Cragg | N. side Lawrence St | 7019 | " | " |
| 82 | W. H Wood | S. side West Young St. | 7020 | " | " |
| 83 | John R Fillis | W. side Preston St | 7021 | " | " |
| 84 | Catherine Bates | W. side Edward St | 7022 | " | " |
| 85 | J. A. Artz | N. side North St | 7023 | " | " |
| 86 | H. A Matheson | E side Agricola | 7024 | " | " |
| 87 | Wm. Brodie, | W. side Union St | 7025 | " | " |
| 88 | Isaac Hutchings | E. side Agricola St | 7026 | " | " |
| 89 | Thomas Keith | W side Carleton St | 7027 | " | " |
| 90 | Robt. Clancey | E. side Louisburg St | 7028 | " | " |

## SERVICE PIPES LAID.—*(Continued.)*

| Number. | Name of Owner or Agent. | Location of Premises. | No. of Stopcock. | Size of Pipe. | Purpose for which water is used. |
|---|---|---|---|---|---|
| 91 | Eli Evans | W. side Fern Lane | 7029 | ¾ | Dwelling. |
| 92 | Eli Evans | W. side Fern Lane | 7030 | " | " |
| 93 | Isaac Hutchings | W. side Kempt Rd | 7031 | " | " |
| 94 | C. E. Graham | W. side Creighton St | 7032 | " | " |
| 95 | Mrs. W. Jollimore | W. side Creighton St | 7033 | " | " |
| 96 | John Glacey | E. side Creighton St | 7034 | 1 | Stable. |
| 97 | Waren Gray | N side Willow St | 7035 | ¾ | Dwelling. |
| 98 | Annie B. Sheehy | S. side Pepperell St | 7036 | " | " |
| 99 | Robert Love | N. side Welsford St | 7037 | " | " |
| 100 | J. A. Gray | S. side Williams St | 7038 | " | " |
| 101 | M. LeMarchant | E. side Lemarchant St. | 7039 | " | " |
| 102 | Mrs. R. Smith | W. side Wellington St. | 7040 | " | " |
| 103 | Harriet Shaddock | W. side Wellington St. | 7041 | " | " |
| 104 | C. Yeadon | N. side Yukon St | 7042 | " | " |
| 105 | Mrs. A. H. Mosher | W. side Albert St. | 7043 | " | " |
| 106 | J. H. Kelly | W. side Plover St | 7044 | " | " |
| 107 | S. Cunard & Co | E. side L. Water St | 7045 | " | " |
| 108 | A. Gregoire | E. side Brunswick St | 7046 | " | " |
| 109 | E. M. Boutilier | E. side L. Water St | 7047 | 2 | Stores. |
| 110 | T. J. Barron | E. side Windsor St | 7048 | ¾ | Shop & Dwelling. |
| 111 | J. F. Meehan | N. side Woodill St | 7049 | ¾ | Dwelling. |
| 112 | John Naylor | N. side Salter St | 7050 | " | " |

# Total Precipitation for the Year 1905.

| 1905. | City of Halifax. | | | | Chain Lakes. | | | | Spruce Hill Lake. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Snow. | Melted Snow. | Rain. | Total. | Snow. | Melted Snow. | Rain. | Total. | Snow. | Melted Snow. | Rain. | Total. |
| January | 38.4 | 3.84 | 4.450 | 8.290 | 48.75 | 5.76 | 3.19 | 8.95 | 51. | 5.85 | 3.89 | 9.74 |
| February | 37.4 | 3.74 | 1.586 | 5.326 | 36.75 | 4.68 | 1.73 | 6.41 | 44.75 | 6.71 | 1.62 | 8.33 |
| March | 11.6 | 1.16 | 1.644 | 2.804 | 12 75 | 1.51 | 1.14 | 2.65 | 12.50 | 1.64 | 1.36 | 3.00 |
| April | .2 | .02 | 1.240 | 1.260 | .25 | .03 | 1.20 | 1.23 | .25 | .04 | 1.48 | 1.52 |
| May | ..... | ..... | 3.217 | 3.217 | ..... | ..... | 3.01 | 3.01 | ..... | ..... | 4.52 | 4.52 |
| June | ..... | ..... | 4.970 | 4.970 | ..... | ..... | 5.60 | 5.60 | ..... | ..... | 5.27 | 5.27 |
| July | ..... | ..... | 1.927 | 1.927 | ..... | ..... | 2.19 | 2.19 | ..... | ..... | 3.17 | 3.17 |
| August | ..... | ..... | 2.733 | 2.733 | ..... | ..... | 2.84 | 2.84 | ..... | ..... | 3.80 | 3.80 |
| September | ..... | ..... | 2.753 | 2.753 | ..... | ..... | 2.99 | 2.99 | ..... | ..... | 3.51 | 3.51 |
| October | ..... | ..... | 1.539 | 1.539 | ..... | ..... | 1.91 | 1.91 | ..... | ..... | 1.78 | 1.78 |
| November | 1.8 | .18 | 6.168 | 6.348 | 3.00 | .50 | 5.79 | 6.29 | 3.25 | .45 | 6.72 | 7.17 |
| December | 1.5 | .15 | 6.478 | 6.628 | 6.75 | .71 | 6.03 | 6.74 | 7.50 | 1.11 | 6.30 | 7.41 |
| Totals | 90 9 | 8.99 | 38.805 | 47.795 | 108.25 | 13 19 | 37.62 | 50.81 | 119.25 | 15.80 | 43.42 | 59.22 |

All amounts in inches. Returns for the City of Halifax compiled from records of Dominion Government Meteorological Agent.

Rain fell on 124 days ; snow fell on 39 days ; snow and rain fell on 19 days. Total precipitation, 182 days.

# Detailed Precipitation for the Year 1905.

CITY OF HALIFAX.

| Day. | January. | | February. | | March. | | April. | | May. | | June. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Duration. | Inches. | Duration. | Inches. | Duration. | Inches. | Duration. | Inches. | Duration. | Inches. | Duration. | Inches. |
| 1 | 1.0 | .050 | ..... | ..... | 6.2 | .470 | ..... | ..... | 3.3 | .298 | .... | ..... |
| 2 | 3.0 | .020 | ..... | ..... | ..... | ..... | 1.3 | T. | 1.0 | .154 | 6.0 | .925 |
| 3 | 9.0 | .334 | 1.0 | .010 | ..... | ..... | 6.0 | .020 | 2.7 | .082 | 1.0 | .054 |
| 4 | 13.5 | 2.128 | ..... | ..... | .3 | T. | ..... | ..... | 11.6 | .704 | .... | ..... |
| 5 | .3 | T. | ..... | ..... | .5 | T. | 2.0 | .027 | .... | ..... | .... | ..... |
| 6 | ..... | ..... | 3.0 | .030 | 11.0 | .240 | 19.5 | .258 | 1.0 | .020 | 8.0 | 1.681 |
| 7 | 1.8 | .184 | 8.2 | .390 | ..... | ..... | 9.0 | .136 | 10.0 | .332 | .... | ..... |
| 8 | 5.0 | .592 | 2.5 | .040 | 15.5 | .634 | ..... | ..... | .... | ..... | 6.8 | .328 |
| 9 | .1 | T. | .... | ..... | 4.7 | .300 | ..... | ..... | 4.6 | .467 | .... | ..... |
| 10 | 4.3 | .325 | 6.0 | .220 | 12.8 | .402 | 3.0 | .034 | 2.5 | .058 | 1.0 | .038 |
| 11 | ..... | ..... | .8 | .020 | ..... | ..... | 2.5 | .032 | .... | ..... | .... | ..... |
| 12 | 10.5 | .880 | ..... | ..... | .... | ..... | 6.0 | .128 | .... | ..... | .8 | .032 |
| 13 | 3.0 | .190 | 10.0 | .958 | .... | ..... | ..... | ..... | .... | ..... | 15.2 | .452 |
| 14 | ..... | ..... | 1.0 | .048 | ... | ..... | 1.0 | .062 | .4 | T. | .... | T. |
| 15 | ..... | .... | 1.0 | .020 | ..... | ..... | ..... | ..... | .3 | T. | .... | ..... |
| 16 | ..... | ..... | 17.7 | 1.870 | ..... | ..... | ..... | ..... | .4 | T. | .... | T. |
| 17 | 2.0 | .060 | 1.8 | .020 | ..... | ..... | ..... | T. | 7.0 | .082 | .5 | .010 |
| 18 | ..... | ..... | 2.5 | .090 | ..... | ..... | ..... | .... | 9.3 | .270 | 10.5 | .696 |
| 19 | 2.2 | .067 | ..... | ..... | 2.0 | .080 | ..... | .... | .... | ..... | .... | ..... |
| 20 | ..... | ..... | 1.8 | .040 | 2.5 | .030 | ..... | .... | 4.0 | .090 | .... | ..... |
| 21 | ..... | ..... | 1.8 | .110 | ..... | ..... | 2.9 | .056 | .5 | T. | 3.7 | .054 |
| 22 | .50 | T. | ..... | ..... | ..... | ..... | 5.3 | .253 | .... | ..... | 7.5 | .048 |
| 23 | 6.8 | .820 | 7.5 | .440 | ..... | ..... | .5 | T. | .... | ..... | 5.5 | .010 |
| 24 | .... | .... | 10.0 | .140 | .... | ..... | ..... | ..... | .... | ..... | .... | ..... |
| 25 | 5.0 | .420 | 13.0 | .270 | ..... | ..... | .5 | .010 | .... | ..... | 2.0 | .010 |
| 26 | 18.0 | 1.180 | .... | ..... | 2.0 | .120 | ..... | .... | .... | ..... | 8.5 | .268 |
| 27 | 3.5 | .140 | 5.5 | .580 | 2.5 | .090 | .... | ..... | 2.2 | 036 | 12.0 | .270 |
| 28 | 1.8 | .020 | 1.6 | .030 | 10.3 | .426 | ..... | ..... | 3.6 | .392 | 7.8 | .082 |
| 29 | 5.0 | .100 | ..... | ..... | .5 | .012 | 9.5 | .144 | .5 | .010 | 1.0 | .012 |
| 30 | .... | ..... | ..... | ..... | ..... | ..... | 4.8 | .100 | 4.5 | .222 | .... | ..... |
| 31 | 18.0 | .780 | ..... | ..... | ..... | ..... | ..... | ..... | .... | ..... | .... | ..... |
| Total. | | 8.290 | | 5.226 | | 2 804 | | 1.260 | | 3.217 | | 4.970 |

Total for year 47.795 inches.

## DETAILED PRECIPITATION FOR THE YEAR 1905—(*Continued*).

CITY OF HALIFAX.

| Day. | July. | | August. | | September. | | October. | | November. | | December. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Duration. | Inches. | Duration. | Inches. | Duration | Inches. | Duration. | Inches. | Duration. | Inches. | Duration. | Inches. |
| 1 | ..... | ..... | 2.8 | .028 | ..... | ..... | ..... | ..... | 7.0 | .460 | ..... | ..... |
| 2 | ..... | ..... | 13.5 | .315 | ..... | ..... | ..... | ..... | 1.5 | .185 | ..... | .328 |
| 3 | 13.8 | .436 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1.086 |
| 4 | .5 | .011 | ..... | ..... | 12.6 | 1.116 | ..... | ..... | 2.5 | .048 | ..... | T. |
| 5 | ..... | ..... | ..... | ..... | 6.0 | .558 | ..... | ..... | 4.5 | .608 | ..... | ..... |
| 6 | ..... | T. | 4.5 | .372 | 4.7 | .134 | .3 | T. | ..... | ..... | ..... | ..... |
| 7 | ..... | ..... | 2.5 | .986 | 5.3 | .182 | ..... | ..... | 8.2 | .732 | ..... | T. |
| 8 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | .5 | T. | ..... | ..... |
| 9 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1.4 | .098 | ..... | 2.380 |
| 10 | ..... | ..... | 1.5 | .061 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | .034 |
| 11 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 12 | ..... | ..... | .8 | .028 | ..... | ..... | ..... | ..... | .3 | T. | ..... | .396 |
| 13 | .5 | T. | .7 | .020 | 4.5 | .228 | 3.1 | .188 | ..... | ..... | ..... | .010 |
| 14 | ..... | ..... | ..... | ..... | 2.0 | .126 | ..... | ..... | 2.0 | .040 | ..... | ..... |
| 15 | 2.5 | .160 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 16 | ..... | ..... | 13.8 | .426 | 2·0 | .035 | ..... | ..... | 6.5 | .172 | ..... | ..... |
| 17 | 4.8 | .088 | ..... | ..... | ..... | ..... | ..... | ..... | 19.3 | 1.803 | ..... | ..... |
| 18 | 3.2 | .052 | ..... | ..... | 5.2 | .072 | ..... | ..... | ..... | ..... | ..... | .428 |
| 19 | ..... | ..... | ..... | ..... | 2.0 | .028 | 8.6 | .184 | ..... | ..... | ..... | ..... |
| 20 | ..... | ..... | 7.3 | .165 | 11.5 | .236 | 13.0 | .728 | ..... | ..... | ..... | ..... |
| 21 | ..... | ..... | ..... | ..... | 1.0 | .038 | 2.8 | .071 | ..... | ..... | ..... | .100 |
| 22 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | .822 |
| 23 | ..... | ..... | 1.0 | .312 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | .046 |
| 24 | .1 | T. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | .108 |
| 25 | .2 | T. | ..... | ..... | .2 | T. | 4.0 | .368 | 6.8 | .010 | ..... | ..... |
| 26 | ..... | ..... | ..... | ..... | .1 | T. | ..... | ..... | ..... | ..... | ..... | ..... |
| 27 | .5 | .034 | ..... | ..... | ..... | ..... | ..... | ..... | 3.5 | .112 | ..... | ..... |
| 28 | .1 | T. | .3 | T. | ..... | ..... | ..... | ..... | 1.5 | .020 | ..... | T. |
| 29 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 17.0 | 1.488 | ..... | .392 |
| 30 | ..... | ..... | .3 | .020 | ..... | ..... | ..... | ..... | 5.5 | .572 | ..... | .498 |
| 31 | 13.5 | 1.146 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | T. |
| Total. | | 1.927 | | 2.733 | | 2.753 | | 1.539 | | 6.348 | | 6.628 |