ANNUAL REPORTS

OF THE

HARBOUR COMMISSIONERS

OF MONTREAL

FOR THE YEAR 1886.

Commissioners:

ANDREW ROBERTSON, Esq., Chairman.

J. B. ROLLAND, Esq.	HUGH McLENNAN, Esq.
EDWARD MURPHY, Esq.	CHARLES H. GOULD, Esq.
HENRY BULMER, Esq.	HONORE BEAUGRAND, Esq., (Mayor)
VICTOR HUDON, Esq.	ANDREW ALLAN, Esq.

H. D. WHITNEY, Secretary.

Montreal:

PUBLISHED BY ORDER OF THE HARBOUR COMMISSIONERS OF MONTREAL.

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STATEMENT

MADE BY

MR. ANDREW ROBERTSON, CHAIRMAN,

HARBOUR COMMISSIONERS, MONTREAL,

ON THE

Business of the Port for the year 1886, *and other matters connected with the Trust,*

AT THE PUBLIC MEETING OF THE BOARD, HELD ON 27TH JANUARY, 1887.

GENTLEMEN,—

When presenting you with the Annual Reports for 1884, I then stated that the prospects were such that we might expect a considerable increase in Ocean Tonnage during the year 1885. That year closed showing an increase of 34,480 tons, or 5.30%.

The totals for 1884 being.....649,374 tons.
" " 1885 " .....683,854 tons.

Last year I again stated that increased accommodation had been applied for and that a similar result might be expected. The increase has been very large, being no less than 125,845 tons in 1886, or 18.40%. This gives an increase in the two years of 160,325 tons, or nearly 25%. Ten years ago, say 1877, the ocean tonnage was 376,859, that of 1886, 809,699, showing an increase of no less than 432,840 tons, or 114.85% in the decade.

A very curious coincidence in the figures this year is, that in the ocean and inland tonnage, the difference is only 119 tons, the inland showing 809,818 against the ocean tonnage of 809,699.

In former years the inland tonnage showed a very great preponderance over ocean. Thus in 1872-4 the

average ocean tonnage was 409,000 tons to 942,000 tons inland, or 130.31% tons in excess of the ocean tonnage. No doubt a considerable portion of this change is caused by the competition of the railways.

The following figures give the comparative details for 1886 and the preceding year.

	Vessels.	Tons.
Ocean Steamships, 1885	441	619,647
" " 1886	532	736,648
Increase	91	Increase 117,001
Ocean Sailing Vessels, 1885	188	64,207
" " " 1886	171	73,059
Decrease	17	Increase 8,844
Total Ocean Vessels, 1885	629	683,854
" " " 1886	703	809,699
Increase	74	Increase 125,845
Total Inland Vessels, 1885	5,003	724,975
" " " 1886	5,521	809,818
Increase	518	Increase 85,843
Total Ocean and Inland, 1885	5,632	1,408,829
" " " 1886	6,224	1,618,517
Increase	592	Increase 209,688

The income for 1885 was $224,897
" " " 1886 " $273,764

Showing an increase of ..... $ 48,897 or 17.80%

Received from the following sources:	1885.	1886.
Dues on Imports	$90,704	$109,189
" Exports	53,171	72,171
" Steam Vessels	36,726	44,376
" Sailing Vessels	5,528	4,625
" Local Traffic	38,768	43,433
	$224,897	$273,794

The imports show an increase of 16.83%, exports 26.29%, steamers of 17.24%, sailing vessels a decrease of 16.03%, local traffic an increase of 10.74%, the total result being an increase of $49,278, averaging 17.80% in revenue, coupled with an increase of tonnage of 125,845 tons of ocean shipping, or 18.40%, and of inland 85,845 tons, or 11.74%, with a total increase of the two of 209,688 tons, or 14.08%. The tonnage dues of 1880 were equal to 12½c. per ton, against 6c. in 1886, or over 50% reduction. The dues on imports were respectively 18c. to 13½c., or 25 % reduction, and on outward cargoes 9c. to 6c., or 33⅓% reduction, this calculation being based on one ton inward cargo to the registered ton, and one and a half outward. I feel sure that you all will be delighted to hear that such satisfactory progress has been made during the past year, and join with me in hoping that there are yet greater things in store for the Harbour of Montreal, of which our citizens are so justly proud.

Extension of the Harbour.

It is only during the past year that such an addition to the tonnage and the revenue of the port has taken place as to warrant the serious consideration of an extension of the Harbour facilities. In this connection, let me first deal with the revenue. In 1880, we had not only the largest tonnage till that time, but the largest revenue that the Harbour has ever attained. In consequence of this great apparent prosperity, such a strong pressure was brought to bear upon the Commissioners for a reduction of the dues that they were reduced on vessels 33⅓ per cent. and on goods about 20 per cent., or an average of about 25 per cent. over all. It was hoped that this reduction would bring increased tonnage as well as increased revenue. Such did not, however, prove to be the case. The tonnage fell from 628,271 tons in 1880 to

531,529 in 1881, and the revenue from $326,424 to $238,140 the following year.

In 1885, the tonnage reached 683,854 *vs.* 628,731 in 1880, while the revenue was only, in 1885, $224,897, against $326,424 in 1880. From 1881 to 1885 the average income was only $238,123, a steadily decreasing revenue from 1882. Caution was required on the part of the Commissioners. It is therefore a source of satisfaction that the tonnage increased last year to 809,699 and the revenue to $273,794, $35,671 over the average of the five previous years.

The reduction from 1881 to 1885 caused a loss to the revenue, as compared with 1880, of about $450,000, which could have been used in providing additional accommodation and improvements which now, with better prospects, will no doubt be required, but which improvements till now, prudence forbade, but, while saying this, the Commissioners have not been standing still. During the last seven years, they have maintained the wharves, paid about $300,000 for deepening the Harbour and $150,000 for additions and construction of new wharves, for which purposes the Commissioners have added to the Harbour debt $200,000. Notwithstanding this expenditure, in July next we will have added very little to our interest account on the Harbour Bonds. The interest payable in 1878 was $111,779, it will be, after 4th July next, $112,675, being only $896 of an increase on the interest in eight years.

Our channel debt, which, in 1878, required only $46,945, last year (1886) required $91,385. It is this which bears us down. Since 1880 we have paid interest on the channel debt, $440,032, and since the commencement of the channel we have paid for interest on this debt the sum of $694,840 to July last, which has been paid out of the Harbour Revenues. This

presses very seriously upon us in the way of Harbour improvements. It is to be hoped that the Government will come to our relief, not as a matter of favour, but of justice,—the channel being, as we think, as much a Dominion work as the railways or canals. We do not get, nor have we asked, from the Government, one cent of assistance for our Harbour, as other places east or west of us have done, and obtained. What we ask is a free channel and every Harbour to assume their own responsibilities; if otherwise, to treat all alike.

As to the extension of the Harbour, you are, of course, aware of the commission given, in 1875, to Messrs. Robert Bruce Bell, C.E., of Glasgow, Major-General Newton, U.S.A., and Sandford Fleming, C.E., C.M.G., for plans for harbour improvements, which were received in 1878, but have remained in abeyance ever since. Any improvements so far made have not in any way interfered with these plans, should they be ultimately adopted; other plans have been proposed; but, in the meantime, pending the report of the Flood Commission, we are at a standstill. What they may recommend it is, of course, impossible to predict; one of the plans proposed has some points that may prove worthy of consideration, viz., the raising of the wharves to the level of the revetment wall. Alderman Laurent, chairman of the Road Committee has also for years past been anxious to extend the street out on the present level of the wharves 100 feet, but to have done so would have curtailed the ground which is far too limited for the present traffic.

Now, let us suppose that the city would come to our help, and from the Canal down to the Quebec Gate Barracks, raise the level, which is at present 38·8 above the lock sill. During the last 35 years, it has only on two occasions risen over the revetment wall as it at present stands in the fall season. In the spring, it has been over

the wall five times in 34 years. Were this done, it would give greater room : it would, first, allow the street to be widened, thus giving more accommodation : it would increase the surface now lost by the ramps : it would be a great saving in cartage : it would give a chance for drainage and permanent paving : it would enable permanent sheds to be built on the wharves : it would give greater space in this congested portion of the Harbour ; the Harbour Railway for goods would be on the street level, and if the railways east and west would join in an elevated road, they could run their trains without interfering with the traffic on the wharves. The steamship companies who are now paying from $1,000 to $7,000 per annum to put down and take up their temporary sheds could well afford to help the scheme should such, after due consideration, be considered desirable. It would also be a saving to the Harbour Trust in many seasons in which they are obliged to move large masses of snow and ice, some years costing several thousand dollars.

Early in the spring the Commissioners again brought before the Government at Ottawa the necessity of completing the survey of the river at various points between Cap la Roche and Quebec, at which obstructions are suspected to exist. It is to be hoped that this will be done during the coming summer, as without it vessels will be unable to take full advantage of the 27½ foot channel, which it is expected will be finished this year, owing to the uncertainty as to the actual depth of water, between the points named. The better lighting of the river, especially in the vicinity of Grondine, has also been brought before the Commissioners. This matter, of course, pertains to the Department of Marine, and their attention has been called to it.

An Act was passed by Parliament, entitled, "The St. Gabriel Levee & Railway Co.," giving power to

certain parties to build a levee or dyke above the Victoria bridge, extending from the river side to a certain point on the canal, the dyke to be, in height, above the highest flood level of the water. This, it was thought, would protect a large portion of the west end of the city. For various reasons the scheme was not carried out, and eventually the Government appointed a Commission of Engineers, consisting of Messrs. Hy. F. Perley, T. C. Keefer, John Kennedy, and P. W. St. George, to enquire into and report on the whole subject of inundations.

The following letter was received from the Department of Public Works, announcing the appointment:—

OTTAWA, June 7th, 1886.

SIR,

I am directed to state for the information of the Harbour Commissioners of Montreal, that, in compliance with the request made, an order-in-Council has been issued, appointing Henry F. Perley, C.E., as representing the Government, Thomas C. Keefer C.E., as representing the Board of Trade and Corn Exchange Association of Montreal, John Kennedy, C.E., as representing the Harbour Commissioners of Montreal, and Percival W. St. George, C.E., as representing the City of Montreal, a commission to enquire into the causes of the floods at Montreal, and to suggest the necessary remedies to prevent their recurrence.

These gentlemen have been notified of their appointment and requested to organise as soon as possible, so that the object for which the Commission has been appointed may be accomplished without delay.

I have the honor to be, Sir,

Your obedient servant,

H. D. WHITNEY, Esq.,
Secretary, Harbour Commissioners.

A. GOBEIL,
Secretary.

These gentlemen have already sent in two reports, which have been published in the newspapers, and copies of which are hereto appended. To carry out the recommendations of the second one, the Commissioners agreed to lend four of their tugs and fit them with the necessary ice-breaking prows. The city authorities also voted a sum of money towards the cost of the experiment. After considerable delay the Government gave their consent, and the work of preparing the tugs was carried on with every possible despatch; before, however, they were ready, cold weather set in and navigation closed, so there was no opportunity to try them.

MONTREAL FLOOD COMMISSION,

MONTREAL, July 31st, 1886.

SIR,

The Commissioners appointed "to enquire into the causes and suggest remedies" for the floods at Montreal, immediately upon their organization last month made arrangements for the land and river surveys, and the investigations necessary in dealing with so great a question, and these are now being actively prosecuted.

The Commissioners, conscious of the great desire on the part of the citizens of Montreal, that every possible effort should be made to prevent the disastrous floods of April last, took immediate steps to deal with the protection of the district south of the Lachine Canal, relative to which a charter was obtained at the last session of Parliament for the construction of a Dyke or Levee. They have prepared and herewith submit a plan showing the position of the site proposed for this dyke, together with an estimate of the probable cost.

The area which would be protected by this dyke, is bounded by the Lachine Canal, the River St. Pierre, the Tail-race of the Montreal Water-Works, and the River St.

Lawrence, from the City Limits as far down as the waste weir at Tate's Dry Dock, and included nearly the whole of the Municipality of St. Gabriel, excepting the Islands in the St. Lawrence.

The area protected within the limits of the City of Montreal is about 360 acres, and in St. Gabriel about 300 acres. The assessed value of this area is nearly five millions of dollars, of which about one million eight hundred thousand dollars is in St. Gabriel.

The route of the dyke is along the present road and top of River bank, from Tate's Dry Dock to a point about 3,000 feet above the Victoria Bridge. Here it turns inland, crossing the City Limits at the rear of the property belonging to the estate Knox, and strikes the Tail-race embankment near Wellington Street,—otherwise known as the Lachine Road,—passing in rear of the farm-house on the property of the Congregational Nuns.

The Tail-race Bank is now raised by the city to the level proposed for the top of this dyke, which is 29 feet above City datum or summer level of Montreal Harbour. The level of the top of dyke would be one foot six inches above highest level of floods of April last, and is nearly the same as the coping of Tate's Dry Dock, as also of the rails of the Grand Trunk Railway where crossed by the dyke.

The connection of the head of the Tail-race with the Lachine Canal bank completes the route of the dyke.

The estimated cost of the dyke and the necessary pumping plant and drainage works required in connection with it, will be about $85,000. The land is valued at about $35,000, making a total of $120,000. The land valued is much more than will be required for the site of the dyke, as it includes the whole of such building lots as are affected by the close proximity of the embankment.

The estimate for the drainage and pumping works also

includes sewers, which, though now only wanted in connection with a dyke, will, ultimately, be of value to the city as sewers.

The estimate, and the right of way provided for, are for a dyke alone, but the culverts are lengthened to admit of widening the dyke for a future roadway.

The final location, breadth, &c., may be modified by arrangements with the proprietors. These are few in number, and the most of them are *quasi* public bodies.

The Commissioners think it probable that it may be decided to construct at once the Levee, on account of its simplicity, certainty of effect, the small amount of inconvenience or damage to be caused by it, and its moderate cost in proportion to the large amount of property it would benefit, as well as because any alternative scheme involves delay and the risk of further possible damage.

The protection of the remainder of the exposed district of the City, north of the Lachine Canal, by raising the river front, is a work of much greater magnitude, involving as it does, almost the entire reconstruction of the revetment wall. In connection with the plans and estimates required to show the cost of this work the Commissioners are now conducting surveys and investigations for the purpose of ascertaining the practicability and probable cost of diminishing the floods, and of reducing them within harmless limits, by means of river works.

We have the honor to be,

Sir,

Your obedient servants,

(Signed,) THOS. C. KEEFER,
" HENRY F. PERLEY,
" JOHN KENNEDY,
" PERCIVAL W. ST. GEORGE,
Commissioners.

ESTIMATED COST OF PROPOSED POINT ST. CHARLES AND ST. GABRIEL DYKE.

Embankment, culverts, fencing, etc., - -	$37,400.00
Pumping and Drainage Works, - - - -	41,600.00
	$79,000.00
Engineering and contingencies. - - -	6,000.00
	$85,000.00
Land Valuation, - - - - - - - - - -	35,000.00
Total, - - -	$120,000.00

MONTREAL FLOOD COMMISSIONERS,

MONTREAL, October 28th, 1886.

SIR,

The Commissioners have had under consideration one of the proposed methods of dealing with floods at Montreal, which has the advantage of being applicable to other points on the river between the Lachine Rapids and Lake St. Peter, namely :—To keep open the channel between Sorel and Three Rivers for a period of time long enough to remove a great portion of the floating ice which is now arrested between Sorel and Montreal. If this can be done, the river, with its dangerous burden of ice, will be kept within its banks, and both shores of the St. Lawrence between Three Rivers and the Lachine rapids relieved of the risk due to inundations caused by ice.

Last winter, the ice did not stop in the channel at any point below Three Rivers, and the presumption is that had the ship channel through Lake St. Peter and the Sorel islands been open, the ice from above would have continued to pass down and out to sea, because the channel of the River St. Lawrence between Sorel and Montreal is not closed in the natural way—by ice of first intent—but this

channel remains open between its bordage ice until after Lake St. Peter and its island channels have been frozen over in the natural way and is only closed as it is filled up with floating ice from above.

It is asserted that the open channel below Three Rivers last winter, which was a severe one, was due to the continuous running of the ferry boats at Quebec and to the efforts made by them to prevent the formation of an ice bridge. It is impossible to say what may take place another winter, but the chances are in favor of an open channel for the future, if the same exertions are made at Quebec. Portions of this reach between Three Rivers and Quebec, as at Cap à la Roche, are generally open, and if the channel below Three Rivers can be kept open only during a portion of the winter, it would effect the object in view—that is, get rid of enough of the arrested ice above Lake St. Peter to prevent the ice floods at Montreal and elsewhere below Lachine.

Ice breaking boats are used in the Delaware and Chesapeake bays to maintain an open channel for navigation to Philadelphia and Baltimore. At the latter place ice prows are applied to ordinary tugs at an expense of about $250 each. For the purpose of an experiment, four of the tugs of the Montreal Harbor Commission could be fitted up as ice breakers for the sum of $1,000. The daily cost of running would be about $30 each, or a total of $120 per day. The duration of the service would depend on the result. They would be kept in commission as long only as they were effective. If they only succeed in keeping an open channel until the descent of the ice from Lake St. Louis is arrested by advancing winter, we believe this alone would prevent a dangerous ice-flood.

The Commissioners are fully impressed with the uncertainty which is inseparable from such an experiment, and it is in the light of an experiment, only, in which they

wish it to be regarded. They have considered the difference in climate between the Chesapeake and the St. Lawrence. They are aware that conditions of weather may occur which (with the appliances available) may render the attempt abortive, but they believe that every day in which the ice from above Sorel can be kept running past Three Rivers will tend to alleviate the risk of ice floods, and if unsuccessful, they have the satisfaction of remembering that the stoppage of the ice carries with it a stoppage of the expenditure also. They are, therefore, of opinion that the experiment is well worth the cost involved, and they are aware that much larger sums have been expended in experiments when the interests at stake were small in comparison with this.

The Commissioners recommend that the Government authorize the expenditure of $5,000 as a special appropriation for this service, and that the Harbour Commissioners of Montreal be requested to grant the use of four of their tugs for the same.

We have the honor to be,

Sir,

Your obedient servants,

(Signed) THOMAS C. KEEFER.
JOHN KENNEDY.
PERCIVAL W. ST. GEORGE.

I have to dissent from the recommendation contained in the last paragraph, as I hold the opinion that the prevention of floods, or bearing the cost of the means to prevent their occurrence or to lessen their severity, does not lie with the Government. The remainder of this letter has my approval.

(Signed) HENRY F. PERLEY.

As a natural result of the extreme high water, various reasons for the same were given; among others that the

depositing of surplus dredgings below Longueuil and elsewhere was a serious obstruction, several complaints having been made by letters in the papers and by a protest from the town of Longueuil. These were referred to our Chief Engineer. The correspondence in this connection is as follows, from which it will be seen that the statements made were incorrect :—

HARBOUR COMNISSIONERS OF MONTREAL,

Chief Engineer's Office,

MONTREAL, May 13th, 1886.

ANDREW ROBERTSON, ESQ.,
Chairman, &c., Harbour Commissioners.

DEAR SIR,

Referring to your note, covering an enclosure regarding the deposit of dredgings below Longueuil, which you send me, I beg to say that if by the statement in the enclosure " ils ont recommencé comme de plus belle à déposer de la terre, etc., en bas de Longueuil " it is meant that the Harbour Commissioners have recommenced depositing dredgings near the Town, as complained of in former years, the statement is certainly in error. We have deposited nothing there this year and had not thought of doing so. We did, however, while getting work commenced for the season, deposit a few scow loads north of the Boucherville Islands, near Longue Pointe, and the deposit was made as heretofore, in a deep hole where it can do no possible harm. In any case the depositing was temporary and ended before the note was received.

It would be out of place here to enter into a discussion of so complicated a question as the causes of the Montreal floods, but I may remark that the belief that the dumping of the dredgings below the city has any evil effect can easily be shown to be a new and popular fancy, resting on no foundation of facts.

In designing and carrying out the River improvements we have certainly a wider range of information than is possessed by others, and events show that in this matter we have made no mistake in using it. It is a fact that the floods of the past decade have not averaged higher, but lower than those of a long time before, and it would not be difficult to show strong reasons for asserting that the behaviour of the river and its ice have been somewhat regulated and the floods rather reduced than otherwise.

The last flood is the only exceptionally high one of our generation, but so far as can be gathered from tradition, even it has been overmatched by floods before the days of either Harbour Commissioners, dredgings or dumpings.

Yours respectfully,

JOHN KENNEDY,
Chief Engineer.

HARBOUR COMMISSIONERS OF MONTREAL,
Chief Engineer's Office,
MONTREAL, May 26th, 1886,

H. D. WHITNEY, ESQ.,
Secretary, &c.,

DEAR SIR,

I beg to acknowledge the receipt of the protest of the Town of Longueuil, dated 15th inst, directed to the Harbour Commissioners and the City of Montreal, and protesting against the deposit of dredgings near the head of the Boucherville Islands, as tending to cause floods, and against the building of the proposed walls or dykes for protecting Montreal from floods, and also making certain demands mentioned therein, which protest is referred to me for remarks.

Without entering into a discussion of the whole question of floods from the rising of the St. Lawrence in the vicinity of Montreal, which I presume is not required of me at present, I can hardly say more than I have already said in recent letters, addressed to the Chairman and to you, on the depositing of dredgings at the places complained of. I am entirely at variance with the views contained in the protest as to the causes of the floods.

I maintain that in the deposit of dredgings, care has been taken that it should be done in such a manner as not to contribute to those causes, and that as a matter of fact it does not. In any case the depositing was discontinued, as the Board is aware, before the date of the protest, and it is not at present proposed to resume it.

As regards the proposed walls and dykes for protecting Montreal, they are not, so far as I am aware, promoted by the Harbour Commissioners, and I have no information regarding them which would enable me to say more than is contained in my report of 5th April, 1886.

Yours respectfully,

JOHN KENNEDY,

Chief Engineer.

Several of the residents of the north side of the river have applied to the Commissioners to put down their surplus dredgings so as to protect their property, but before anything is done a deed is drawn up defining the line between the proprietors and that of the Harbour Commissioners. This will give us ample room for deposits for a long time to come, as well as preparing for future extensions of the harbour eastward.

Railway Tracks on the Wharves.

I regret to say that during the past year no progress has been made in settling this question, although it would greatly facilitate the movement of the traffic if a satisfactory solution could be arrived at. The following correspondence has taken place on the subject :—

Grand Trunk Railway of Canada.

Traffic Manager's Office,

Montreal, April 26th, 1886.

Dear Sir,

Having regard to the approaching opening of Navigation, will you allow me to draw your attention to the inconvenience sustained by this Company in consequence of not having access to the Harbour Commissionners siding in front of Messrs. Allan's sheds. We should like to have permission to place cars on that siding, and you will oblige me by stating if any objections exist to our doing so, and if not, upon what terms the siding can be used.

Yours truly,

L. J. Seargeant,
Traffic Manager.

A. Robertson, Esq.,
Chairman Harbour Commissioners.

Harbour Commissioners of Montreal,

Secretary's Office,

Montreal, April 28th, 1886.

L. J. Seargeant, Esq.,
Traffic Manager, Grand Trunk Railway,
City.

Dear Sir,

Your letter of the 26th inst., has been laid before the Board. After due consideration, I am to say that it is within the knowledge of the General Manager that the

Board of Harbour Commissioners have for a loug time past tried to have the tracks on the wharves amalgamated, and to him they would respectfully refer you for the correspondence on this subject, with the present Board during several years.

For your further information I send you the following extracts from our Minutes, showing the permission granted to the Grand Trunk Railway, what it was in 1871, how it stood in 1872, and to the present time unaltered.

MONTREAL, March 2nd, 1871.

"*Resolved*,—On motion of Mr. Stephen, seconded by Mr. Workman, that the prayer of C. J. Brydges, Esq., on behalf of the Grand Trunk Railway Co., be, and the same is hereby granted, subject, however, to such regulations as may be deemed necessary by the Harbour Commissioners as to running hours, and generally for the safety and convenience of the public. And further, on condition that the plan and mode of laying down the rails, shall be submitted to this Board for approval."

MONTREAL, June 10th, 1872.

A letter was read from Chas. Glackmeyer, Esq., City Clerk, transmitting an extract from the Minutes of the City Council in reference to the laying of railway tracks on the wharves. In reply the following resolution was adopted:—

"*Resolved*,—That the Harbour Commissioners, in allowing the Grand Trunk Railway Co. to place rails on the wharves, did not intend to, nor did they grant that Company any exclusive privilege, and that, if any such statement had been made by the President of that Company, it was unwarranted."

MONTREAL, November 25th, 1872.

The following resolution was unanimously adopted by the Board:—

"*Resolved*—That before any further extension of the rails of the Grand Trunk Railway Co. upon the wharves be allowed, some distinct understanding be arrived at as to the conditions upon which the same shall be permitted, and the entire question of the Grand Trunk occupation and privileges there defined."

The Board therefore regret that they cannot grant your request.

First, Because of the resolution passed by the then Board of the 25th November, 1872, and which the present Board has repeatedly confirmed.

Second, Because they have given the right on certain reasonable monetary conditions, to the Canadian Pacific Railway, to use and to work the tracks laid on the wharves by the Commissioners.

Third, Because that by having two Companies working on each other's lines, there would be greater risk of damages to life and property than there would be if one Company controlled the working of the system.

As to the terms on which the siding can be used, I am to say that the Commissioners after long negotiations got an offer from the Canadian Pacific Railway as per their letter of the 14th July, 1882, copy of which was enclosed in my letter of 3rd August to Mr. Hickson. No reply being made, I was instructed to ask for one and did so under dates of 30th May 1883, May lst, 1884, and Sept. 10th, 1884. On 23rd Sept., 1884, an answer was at last received after over two years delay. In consequence of this long delay in not accepting their offer, the Canadian Pacific Railway have practically withdrawn from it.

If, however, you can now make satisfactory arrangements

with the Canadian Pacific Railway Co. to work the traffic in common on the basis proposed by the Commissioners, they will be only too happy to assist to the fullest extent of their ability, as their only object is, to give every facility to increase and develop the Port of Montreal, whether by rail or by water.

I have the honor to be

Sir,

Your obedient servant,

(Signed) H. D. WHITNEY,

Secretary.

MONTREAL, August 3rd, 1882.

DEAR SIR,

I am directed by the Board to enclose you copy of Mr. Kennedy's report on the value of the Grand Trunk Railway tracks on the harbour property.

In the letter of the 19th of June you name your price for the tracks from the foot of the ramp at McGill street, whereas Mr. Kennedy includes the track on the ramp and the revetment wall on Common street as being within the harbour limits. The length you mention would be only 7,979 feet, while the additional track above referred to will make the total length 9,029 feet.

The Commissioners are prepared to pay the price named by Mr. Kennedy, or if this is not satisfactory to you, they are quite willing to leave it to arbitration.

I am also desired to enclose you copy of a letter from the Canadian Pacific Railway after an interview with them and the South Eastern Railway in reference to the working of the traffic on the wharves, which the Commis-

sioners hope will prove satisfactory to you. Awaiting your reply,

I am, dear Sir,

Your obedient servant,

(Signed,) H. D. WHITNEY,

Secretary.

JOSEPH HICKSON, ESQ., General Manager
Grand Trunk Railway Co.,
Montreal.

CANADIAN PACIFIC RAILWAY COMPANY,

Office of the Secretary,

MONTREAL, July 14th, 1882.

SIR,

Referring to the interview between the Harbour Commissioners and Messrs. McIntyre and Baker, on the 10th inst., in relation to the handling of cars on the tracks situated on the property of the Harbour Commissioners, I am authorised to make the following propositions on behalf of the company :

1st. Should the Harbour Commissioners decide to take the business into their own hands and do the shunting themselves, this company will pay a shunting charge of $1.50 per car per day on all its cars handled by the Harbour Commissioners.

2nd. Should a transfer company be formed for the purpose of doing this work, this company will agree to make the same arrangement with them.

3rd. This company will pay the Harbour Commissioners asked by them $1,000 per mile per annum for the tracks now laid on the Harbour Commissioners property, and do

the shunting of such cars in a satisfactory manner at the following scale of charges:

Under	50	cars	per	day,	$2.00	per car.
50 to	75	"	"	"	$1.50	"
75 to	150	"	"	"	$1.25	"
Over	150	"	"	"	$1.00	"

4th. This company will pay the Grand Trunk Railway the same scale of charges as they are willing to accept themselves, should it be decided to place the shunting on the wharves under the control of the Grand Trunk Railway Company.

Should the work be done by any other than the Harbour Commissioners, a demurrage charge of $2.00 per car per day should be imposed upon all cars remaining on the docks over 24 hours, half of which should go to the Harbour Commissioners and the other half to the company owning the cars so delayed.

Should the Harbour Commissioners so decide to take the matter into their own hands, this company will furnish them with one locomotive at the customary rental.

Yours truly,

(Signed,) C. DRINKWATER,
Secretary.

To the SECRETARY,
Harbour Commissioners, Montreal.

On the 9th June the Hon. Sir Hector Langevin, Minister of Public Works, made a tour of inspection round the Harbour. On the following day he accompanied the Commissioners on their annual inspection of the Lake and River Works. The trip was made in the steamer "Cultivateur," the Hon. Mr. Foster, the President and members of the Quebec Harbour Commissioners, and others, being of the party. Everything was found progressing in a satisfactory manner.

In May last, Mr. J. T. Therien, the Chief Foreman of works in the Harbour, resigned his position owing to failing health. He had been in the service for upwards of 40 years, during which time he had always performed his duties to the entire satisfaction of the Commissioners. Mr. Denis O'Brien, sub-foreman, was promoted to fill the vacancy.

During the month of June the case of Hus vs. the Commissioners, involving the liability of the Commissioners for damages caused by the non-maintenance of a light on the wreck of the S.S. "Ottawa," at Cap la Roche, which has been in litigation for several years, was finally decided in our favor in the Court of Appeals. The Chief Justice stated that he was unable to find any law for holding the Commissioners responsible for the accident; that they were not a private corporation, but a public corporation created to perform certain works under the supervision of the Government, and with authority to place buoys in such places as they might consider necessary.

Permission was given the Canadian Pacific Railway Co. to proceed with the building of their Elevator No. 2 at Section 22, and considerable progress has already been made.

In September the Commissioners were honored by a visit from Admiral Vigne, of the French Navy, who was, with the Consul-General of France, afforded an opportunity of inspecting the Harbour.

On the 23rd of this month, on the invitation of the Quebec Harbour Commissioners, the members of this Board attended the ceremonies in connection with the laying of the last stone of the Graving Dock at Levis. The proceedings were of a most interesting character, and the Commissioners were received with the greatest courtesy and hospitality.

Some fault was found with the Commissioners for giv-

ing the usual notice as to the removal of the buoys, it being contended that the date fixed, the 23rd November, was too early, especially as one trans-atlantic steamship—delayed by accident—would hardly arrive much before that time. While the Commissioners maintained that their action was in the best interests of the navigation, it was agreed to leave the buoys down till the last possible moment. Happily the weather continued mild, and the vessel was enabled to get safely to sea without loss on either side.

The following is a Statement showing the last date of Sailing of the Royal Mail Line, from Montreal, from the year 1856 to 1886:

			Tons.		*Draft of water.*
1856	SS.	Canadian	1045	November 11	12.06
1857	"	Indian	1154	" 10	16.03
1858	"	Do	1154	" 13	16 00
1859	"	North American	1137	" 12	17.00
1860	"	Do	1137	" 20	18.06
1861	"	Nova Scotian	1487	" 20	20.00
1862	"	Bohemian	1487	" 13	16.03
1863	"	Do	1487	" 19	17.06
1864	"	North American	1137	" 15	17.01
1865	"	Peruvian	1899	" 15	17.02
1866	"	Nova Scotian	1487	" 21	19.10
1867	"	Do	1487	" 23	17.00
1868	"	Austrian	1519	" 21	18.10
1869	"	Peruvian	1432	" 20	18.03
1870	"	Moravian	1527	" 22	18.09
1871	"	Scandinavian	1811	" 21	18.00
1872	"	Manitoban	1545	" 22	18.00
1873	"	Corinthian	959	" 19	18.06
1874	"	Do	959	" 17	18.00
1875	"	Sardinian	2577	" 20	18.09
1876	"	Moravian	2013	" 20	18.09
1877	"	Circassian	2355	" 20	19.06
1878	"	Sardinian	2577	" 17	18.09
1879	"	Corinthian	1158	" 21	21.06
1880	"	Peruvian	1854	" 22	22.03
1881	"	Scandinavian	1967	" 19	20.03
1882	"	Peruvian	1845	" 19	22.05
1883	"	Do	1845	" 19	22.00
1884	"	Circassian	2355	" 19	21.08
1885	"	Polynesian	2023	" 19	22.08
1886	"	Parisian	3445	" 16	21.08

I learn from the Chief Engineer's report that the year's work has been on the whole very successful and has done much towards the attainment of the 27½ ft. channel to Montreal.

The quantity dredged is a little over 1½ millions cubic yards (1,532,588 yards) which is a larger quantity than was ever taken out in a single season before. Of this quantity, nearly 10 p. c. (146,517 yards,) is rock and large boulders from the neighbourhood of Cap à la Roche and Pointe-aux-Trembles, and the remaining 90 p. c. is earth from other parts of the river and Lake St. Peter.

In the rock dredging at Cap à la Roche and Cap Charles, which greatly exceeds in cost and difficulty the dredging of Lake St. Peter or any other section of the work, very good progress has been made. At Cap Charles, the rock has been cut through to the required depth, with the exception of about 100 feet in length, and any clearing up which may yet be found in testing when this is finished; the plant engaged in it will be free to assist in the larger piece of rock dredging at Cap à la Roche.

The long channel through Lake St. Peter, in which there are 17 miles of dredging, is about finished.

The new Contrecœur channel, which is next in importance is practically finished, and the Pointe-aux-Trembles channel and the only remaining larger section of the work is about two-thirds completed.

The progress of the work, thus far, verifies former estimates and it is now confidently expected that the 27½ foot channel will be completed during the season of the current year.

In the Montreal Harbour, the dredging has mainly consisted of deepening existing basins, so as to make them equal to the ship channel when the 27½ ft. depth is attained.

Extensive repairs have also been made to the timber

work of the wharves, particularly at Windmill Point, the Island Wharf and Victoria Pier and in the neigbourhood of the Canadian Pacific Railway Company's Elevators. Besides special heavy repairs, the repairing in general has been more freely done than of late and the condition of the wharves as a whole has been much improved.

Full particulars of the deepening of the ship channel and harbour improvements will be found in the report of the Chief Engineer, of the shipping in the Harbour Master's, and the financial accounts in that of the Secretary.

RECEIPTS AND EXPENDITURE

OF THE

HARBOUR COMMISSIONERS OF MONTREAL,

FOR THE YEAR 1886.

HARBOUR COMMISSIONERS OF MONTREAL,

Secretary's Office,

MONTREAL, February 17th, 1887.

WM. SMITH, ESQ.,

Deputy Minister of Marine,

OTTAWA.

SIR,

I have the honor, by direction of the Harbour Commissioners of Montreal, to forward herewith, for the information of the Honorable the Minister of Marine, statement of the receipts and disbursements of the Trust for the year ended 31st December, 1886.

The receipts from all sources were as follows, viz :—

FROM COLLECTOR OF CUSTOMS, MONTREAL :		
Wharfage on Goods, Inwards	$113,984 95	
" " Outwards	72,170 78	
Tonnage Dues on Sailing Vessels	4,625 85	
" " Steamers	44,376 03	
		$235,157 61

Brought forward		$235,157 61
LOCAL TRAFFIC.		
Wharfage on Goods, Inwards	$ 7,178 26	
" " Outwards	695 34	
Harbour Dues on Barges	9,733 85	
" " Steamers	2,198 37	
Commutation on "	13,640 50	
Transfer of cars by Str. "South Eastern	1,124 50	
Revenue from Lumber piled	2,200 00	
" Coal "	1,363 00	
" Small offices	760 00	
" Scales	800 00	
" Firewood piled	565 75	
" Phosphate "	158 32	
" Penalties	65 00	
Rent of Wharf for Tracks	2,950 00	
		43,432 89
ORDINARY REVENUE		$278,590 50
FROM DOMINION GOVERNMENT:—		
Received on account New Channel Works		191,000 00
Real Estate—Fourth instalment on old building.	$3,600 00	
" " —One year's interest on above	432 00	
		4,032 00
Harbour Debentures, Series D, sold	5,000 00	
" " " E, "	100,000 00	
		105,000 00
Premiums on above Debentures	8,567 50	
Accrued interest on "	1,491 38	
		10,058 88
Interest on Bank account		1,745 63
Rent of offices in Building		1,250 00
Henry Dobell & Co., for storage		20 00
Sundry Accounts received for Credit, as under :—		
Harbour Dredging		9,034 44
New Channel Operations		323 02
Harbour Repairs		15 00
Buoys and Beacons, allowance for 1884, 1885		14,000 00
TOTAL RECEIPTS		$615,069 47

The expenditure was as follows :—

Construction Account, Windmill point Wharf....	$13,101 46	
" " Victoria Pier.....	488 72	
		$13,590 18
Dominion Government Interest.....		91,384 75
Harbour Railway.....		105 68
Lighting Wharves, Electric Light.....	3,034 46	
" " Coal Oil.....	497 58	
		3,532 04
Travelling and Incidental Expenses.....		169 90
Printing, Advertising and Stationery.....		1,633 56
Harbour Dredging.....		37,817 52
Harbour Expense and Management.....		27,843 94
New Channel Operations.....		170,268 11
Harbour Repairs.....		60,101 46
Paid for paving.....		4,636 31
Buoys and Beacons.....		7,624 59
McKenna and Bastien, on account of Stone.....		700 00
Paid Debentures, Series Z.....	50,000 00	
" " " H.....	43,000 00	
		93,000 00
Legal and Notarial Expenses.....		927 52
Mrs. John Young, Annuity.....		600 00
Refund and rebate of Wharfages.....		4,915 73
Interest on Harbour Debt.....		118,477 62
TOTAL EXPENDITURE		$637,328 91

In comparison with last year, the ordinary revenue shows an increase of $53,693.49, or about 19½%. This is especially gratifying when it is borne in mine that large numbers of sea-going vessels now load and discharge in the deep-water basins of the Lachine Canal, causing a loss of revenue to the Harbour of about $13,000 00 for the year alone, and then, considerable traffic is diverted to Sorel, Three Rivers and other places on the river, where, by the assistance of the Government, wharf accommodation has been afforded.

The following departmental reports have already been forwarded you, viz : the Chief Engineer's on the Harbour

Works ; the Harbour Master's, with comparative statement of the Trade of the Port ; the Superintendent of Pilots, having reference to the service of Buoys and Beacons in the River, and the Report on matters relating to the Pilotage District under the jurisdiction of the Commissioners.

From the Harbour Master's Report, it will be seen that there has been a large increase in the business of the Harbour for the last year, the increase in Sea-going Traffic, being 74 vessels and 125,845 tons, and the Inland, 518 vessels and 85,843 tons, the total tonnage was 1,619,517 tons.

The usual report on the deepening of the Ship Channel between Montreal and Quebec to 27½ feet, at low water, for the last fiscal year, has been furnished the Department of Public Works.

Should nothing unforeseen happen, it is expected that before the close of the season of Navigation of 1887, the Channel will be completed to the required depth.

I have the honour to be,

Sir,

Your obedient servant,

H. D. WHITNEY,

Secretary.

REPORT

OF THE

HARBOUR MASTER OF THE PORT OF MONTREAL

FOR THE YEAR 1886.

CAPTAIN THOMAS HOWARD, *Harbour Master.*

HARBOUR COMMISSIONERS OF MONTREAL,
HARBOUR MASTER'S OFFICE,
MONTREAL, January 5th, 1887.

H. D. WHITNEY, ESQ.,
Secretary,
Harbour Commissioners of Montreal.

SIR,—

I beg to submit the following as my Annual Report for the year 1886, for the information of the Board of Harbour Commissioners, with comparative statements showing the number, tonnage, classification, nationality, greatest number of vessels in port at one time, number and tonnage of sea-going vessels, consigned to the different agents, with statements showing the number and tonnage of inland vessels, and the greatest number in port at one time during the past ten (10) years.

Seven hundred and three (703) sea-going vessels arrived in port during the past season, of the aggregate tonnage of 809,699 tons, showing an increase of seventy-four (74) vessels, and 125,845 tons in tonnage, as compared with the year 1885. Of these vessels, 532 were built of iron, of an aggregate tonnage of 738,166 tons, and 171 built of wood, of an aggregate tonnage of 71,533 tons. Of inland vessels, there arrived in port 5,521, of an aggregate tonnage of 809,819 tons, showing an increase of inland vessels, of 518, and in tonnage, of 74,834 tons, and a total of 6,224 vessels of all classes, and 1,617,518 tons in tonnage. shipped to all places.

Lumber.—There were shipped during the season to the United Kingdom, 97,804,336 feet ; to South America, 29,088,204 feet ; total shipments, 126,892,540 ; showing an increase of 37,225,133 feet, over the previous year,

The Coal Trade —During the season, we had from Great Britain, 30,611 tons, showing a decrease of 17,422 tons, and 1175 tons of coke, showing an increase of 29 tons, and from the United States, 222,438 tons, showing an increase of 8,797 tons, and 857 tons of coke, showing an increase of 653 tons, making a total of 255,081 tons. We had from the Maritime Provinces, 312,801 tons, making an increase of 95,391 tons, over the previous year.

The shipment of phosphate during the season, shows a decrease ; the following are the figures for the past six seasons : in 1880, 7,500 tons were shipped ; in 1881, 10,307 tons ; in 1882, 15,556 tons ; in 1883, 17,160 tons ; in 1884, 20,461 tons ; in 1885, 24,290 tons ; and in 1886, 19,030 tons, and 2,078 bags.

The grain trade during the season, shows a great increase. There were shipped from this port, 5,964,238 bushels of wheat, 3,966,707 of corn, 2,256,719 of peas, 1,945,125 of oats, 3,303 of barley, and 19,226 of rye, making

a grand total of 14,145,318 bushels. I am credibly informed that we are more than likely to have a great increase next season on these figures.

The cattle trade is becoming of great importance, so much so, that several steamers plying to this port are specially fitted up for that purpose. There were shipped in 1884, 57,789 head of cattle, 61,053 sheep; 1885, 63,655 cattle, 40,054 sheep, and 1886, 65,824 cattle and 96,648 sheep.

This important branch of business is likely to increase every year.

Wharf Accommodation.—When the Board of Harbour Commissioners consider the great increase in tonnage, quantity of grain, cattle, lumber, and products of all description that are shipped from this port, I trust they will see the great necessity of building more wharf accommodation, as it is much needed to meet the demands of the trade.

Through the kindness of Andrew Allan, Esq., I am enabled to annex a statement of the first arrival from sea in Quebec, commencing May 13th, 1772 to April 20th, 1851. Also giving first arrivals of steamboats in Quebec since the first steam communication between Quebec and Montreal, which will be found very interesting. Also a statement of the first arrivals from sea in this port, commencing April 30th, 1840, to 30th April, 1886, which I take from the records in my office.

JANUARY 1st.—Very mild, temperature 37°; sleighing bad; river opposite the city open; 3rd, rain in the afternoon, temperature 38°; 4th, rain all morning; sleighing all gone, cabs on wheels; 5th, rain and thick weather, temp. 40°; 6th, fine and cold, temp. 20 above zero; west wind; 7th, 3 above; 8th, 15 below zero; 9th, temp. 5 above, great snow storm, drifting all day: 10th, blowing a gale; temp. 10° below, water rising fast; 11th, 9 a.m., temp. 10 below; 12th, temp. 19 below, at 8 a.m.; 13th,

temp. 2 below, fine and clear, crossing on foot at Longueuil; 14th, making road from St. Lamberts to city, sleighing good; 16th, roads all made across the ice; 17th, temp. 32 above; 18th, cold, temp. 1 below; 19th east wind, snowing, 3 above; 23rd, cold, west wind, blowing a gale, temp. zero; 24th, 12 below; 25th, north-east wind, 12 below at 8 a.m.; 26th, much milder, temp. 25 above, snowing last night; 28th, snowing in the morning, temp. 20 above zero; 31st, temp. 26 above zero. The month throughout was very changeable.

FEBRUARY 1st.—Fine morning, west wind; temperature 6 above zero; 2nd, 2 below; 3rd, 5 below; 4th, 15 below; 5th, 21 below, west wind: 6th, 10 below; 7th, fine and mild, 26 above zero; 12th, 35 above: 13th, rain, temp. 35 above; 14th, temp. 40, rain and snow, very mild; 15th, much colder, temp. 15 above; 19th, 25 above, west wind; 21st, cold morning, zero; 22nd, 5 below; 23rd much milder; 24th, cold, temp. 5 below, east wind; 25th, south wind, temp. 22 above; 26th, 20 above; 27th, great change, cold, 10 below zero, blowing a gale, most severe morning of the winter; 28th, 10 below, good sleighing throughout the month.

MARCH 1st.—Cold morning, temperature 12 below, blowing a gale; railroads east and west all blocked; 3rd, 10 above, south wind; 4th, 20 above; 5th, 28 above; 6th, 30 above; 8th, 10 above; 10th, fine and cold, 10 above; 12th, very mild, south-west wind, 35 above; 13th, much colder, 15 above, snow last night; 15th, temp. 30 above; 16th, snowing, mild east wind; 17th, very mild, temp. 32 above; 21st, snow-storm all day, temperature 34; 25th, fine morning, temp. 30; 26th, delightful day, temperature 40 above; 31st, very mild, rain all morning, temp. 44, south wind.

APRIL 1st. fine and mild, temperature 48, south wind: 3rd, fine and cold, temperature 28 above; 6th, snow storm all night, 28 above; 7th, east wind, temperature 29, storm

last night very severe. Telegraph communication very much interrupted. 8th, good sleighing, temperature 28; 9th, temperature 44; 13th, dark morning, rain, temperature 45, north-east wind; 15th, cold, foggy morning, east wind, temperature 40, 3 p.m., ice shoving; 16th. temperature 35; 9,30 a.m., great ice shove, water came on to Common Street; 17th, at 1.30 p,m., water four feet on Common Street, in front of office, all lower parts of city and Griffintown flooded; 19th, fine and warm, temperature 70; 20th, water falling fast, river clear: 21st. temperature 65, water gone down, all streets clear; 23rd, blowing fresh, temperature 70, water going down fast; 24th, east wind, temperature 42. Navigation open. Steamer "Laprairie," first arrival, Schooner "Eugenie," first sailing vessel; 27th, east wind, temperature 60; sheds going up on the wharfs; 28th, steamer "Quebec" arrived from Quebec this morning, first trip from there; 30th, SS. "Dominion" arrived this afternoon, first arrival from sea.

MAY 1st—Line clear, morning temperature 60; 3rd, temperature 53: Str. "Filgate" came to Harbour down Lachine Rapids. Lachine Canal opened this morning for traffic; 4th, temperature 60, rain all night; 7th, east wind; temperature 53; 9th, fine day, temperature 60, west wind; 14th, delightful morning, temp. 60; south wind; 15th, south-west wind, rain last night; 18th, temperature 60, fine day; 20th, temperature 65; 22nd, temperature 70; 24th, fine morning, temperature, 55; 25th, cold with rain, temperature 49; 26th, rain all night, temperature 50; 27th, temperature 60; 30th, fine day, temperature 60; 31st, fine and clear, temperature 64, north-east wind.

June 1st. Fine weather, tempt. 70; 3rd., rain all last night, tempt. 65; 7th., fine morning. west wind, tempt. 70; 10th., dark morning, east wind, tempt. 60, fine afternoon; 13th., dark and gloomy day, south wind, tempt. 68; 14th., rain this morning, tempt. 65; 15th., dark morning, south

wind, tempt. 59; 16th., fine morning, tempt. 70; 18th., tempt. 60; 20th. delighful day tempt. 70; 25th. tempt. 68; 27th., fine morning tempt. 70; 30th., fine clear tempt. 70, north wind, the month throughout was fine.

July 1st. Fine weather, tempt. 70, west wind; 4th., fine morning tempt. 85; 7th., tempt., 83; 11th., cold tempt, 62; 15th. rain all night, east wind tempt. 68; 16th., rain all night and this morning tempt. 68, at 4 p. m. great rain storm; 17th., fine morning west wind tempt. 75; 22nd.. tempt. 60, north west wind; 27th., rain all last night tempt. 70, at 4 p. m. rain storm; 29th., west wind tempt. 70; 30th., fine morning tempt. 75, west wind; 31st., north wind tempt. 70, the month throughout was cool, the highest tempt. being 85, only for one day.

August. 1st. West wind, fine day tempt. 80; 3rd., cold north wind, tempt. 60; 5th fine morning, rain last night tempt. 70; 8th, fine day, tempt. 80; 10th, tempt. at 2 p. m. 85; 11th., west wind, 2 p. m. tempt. 84; 13th., fine morning, tempt. 75, west wind, 9 p. m. great rain storm; 15th., tempt. 65; 17th., great rain storm last night tempt. 65, north east wind; 19th., tempt. 65; 20th., tempt. 70; 24th., rain last night, tempt. 68; 25th, cold east wind, tempt. 60; 28th., west wind, tempt. 80; 30th., rain storm, east wind, tempt. 80; 31st., fine morning, rain all last night, tempt. 70, north west wind, the month throughout was cold for the season, with an unusual quantity of rain.

September 1st. Cold north wind, tempt. 60; 2nd, north west wind, tempt. 60, frost reported in western Canada; 4th. tempt. 73; 9th., cold east wind, with rain, tempt. 63; 12th., cold day, tempt. 60, rain all day; 13th., cold morning, tempt. 60; 17th., fine morning, tempt. 75, rain last night; 19th., cold rain all day; 20th., cold, tempt. 54; 21st., tempt. 50; 28th., rain all last night, fine morning. tempt. 59; 30th., tempt. 60, fine morning west wind. The month was cold and much rain.

October 1st. North west wind, tempt. 55 ; 2nd, cold north wind, tempt. 40, at 8 a. m. ; 3rd., tempt. 50 ; 7th., east wind, tempt. 50, thick fog ; 12th., east wind, tempt. 60, rain in the afternoon ; 13th., tempt. 55, north east wind ; 14th., rain storm at 7 a. m., 9 a. m. fine south wind, tempt. 60 ; 15th., blowing a gale all night, tempt. 58 ; 16th., cold morning, tempt. 40 ; 17th., nasty day, with showers ; 18th., fine morning, tempt. 44 ; 22nd., fine morning, tempt. 50 ; 26th., tempt., 45, east wind ; 29th., dark morning, tempt. 44 ; 31st., fine day, tempt. 50.

November 1st. Delightful morning, west wind, tempt. 50 ; 4th., rain last night, fine morning, tempt. 51 ; 5th., tempt. 45, west wind, 6th., snowing, tempt. 40 ; 7th., snow storm all day ; 8th., tempt. 28, west wind ; 9th., tempt. 45, south wind ; 10th., tempt. 39, rain ; 12th., tempt. 32 ; 13th., snow storm, tempt. 30, blowing a gale ; 15th., tempt. 35, west wind ; 18th., bad day, rain and snow, tempt. 32 ; 23nd, rain this morning, tempt. 34 ; 25th., s.s. Grassbrooke left port this morning, last ship for sea, tempt. 35 ; 26th., snowing all night ; 27th., tempt. 25, snowing, west wind ; 29th., mild tempt. 34 ; 30th., tempt. 18, north-east wind.

December 1st. Snow last night, sleighing good, tempt. 22 ; 3rd., clear and cold tempt. 7 above zero ; 4th., 3 above ; 5th., 5 above ; 6th., ice making fast, tempt. 7 below zero ; 7th., 5 below, Lake St. Louis and Lake St. Francis frozen over, crossing from Isle Perrault to Beauharnois on foot, being the earliest date to cross ever known ; 8th., 15 above ; 9th. delightful day, we had an unusual cold snap ; 11th., mild tempt 34 ; 12th., tempt. 30 above ; 13th., unpleasant weather, rain and snow, tempt. 32 ; 14th., fine morning tempt. 24, above ; 15th., snow last night, tempt. 20 above ; 16th., 2 below zero, north west wind ; 17th., 13 above ; 18th., water just over the wharves, tempt. 20 above ; 19th., tempt. 20 above, snow last night ; 20th., fine morning, south wind, tempt. 24 above, water rising ; 23rd.

tempt., 25 above, west wind, sleighing good ; 24th., tempt, 32 above, south-west wind, very disagreeable weather, rain storm all afternoon and night ; 25th., Christmas day. fine and cold, tempt. 5 below ; 27th., snowing, tempt. 24 above ; 28th tempt. 13 above, west wind ; 29th., 6 below zero, west wind ; 30th., very cold morning, tempt at 7 a.m. 20 below zero, ice opposite city stationary ; 31st., east wind, tempt. 6 below, road making to St. Lamberts and Longueuil, 2 p.m., snow storm, continued all night, trains all detained. Height of water on sill of lock No. 1, at noon on the 28th, was 33 feet 3½ inches, this was the highest, on 31st, 32 feet 10 inches, and continued to fall.

Yours respectfully,

THOMAS HOWARD,
Harbour Master.

PORT OF MONTREAL.

Statement showing the Nationality and Tonnage of Sea-going Vessels that arrived in Port during the Season of 1886, *that were navigated by* 20,715 *Seamen.*

Nationality.	Number of Vessels.	Tonnage.
British	651	764,971
Norwegian	29	25,027
German.....	10	13,022
Prussian..	2	2,296
Swedish.....	3	1,270
Spanish.	1	1,426
French	2	990
Italian	1	406
American	4	291
Total.....	703	809,699

PORT OF MONTREAL.

Comparative Statement, showing the dates of the Opening and Closing of Navigation, first arrival from Sea, and the last Departure for Sea, the past ten years.

Years.	Opening of Navigation.	Closing of Navigation.	First Arrival from Sea.	Last Departure for Sea.
1877.....	April 17.	Jan. 2, '78.	April 29.	Nov. 24.
1878.....	March 30	Dec. 23.	" 20.	" 24.
1879.....	April 24.	" 19.	May 1.	" 24.
1880.....	" 17.	" 3.	" 2.	" 22.
1881.....	" 21.	Jan. 2, '82.	April 29.	" 23.
1882.....	" 11.	Dec. 9	May 6.	" 21.
1883.....	" 27.	" 16.	" 5.	" 20.
1884.....	" 22.	" 18.	" 2.	" 20.
1885.....	May 5.	" 7.	" 8.	" 20.
1886.....	April 24.	Dec. 4.	April 30.	" 25.

PORT OF MONTREAL.

Comparative Statement showing the Number and Tonnage of Inland Vessels that arrived in Port the past ten years, with the greatest number in Port at one time.

Years.	Number of Vessels.	Tonnage.	Greatest Number in Port At one time.
1877.....	6,333	847,978	258.....Oct. 3.
1878.....	5,502	764,243	261..... " 15.
1879.....	5,698	817,243	227.....Nov. 6
1880.....	6,489	1,044,380	253.....July 7.
1881.....	6,030	949,380	191.....Nov. 4.
1882.....	5,947	848,780	190.....Sept. 29.
1883.....	5,477	764,721	174..... " 5.
1884.....	4,808	726,015	161.....July 9.
1885.....	5,003	724,975	142.....Oct 1.
1886.....	5,521	809,819	178.....Aug. 25.

PORT OF MONTREAL.

COMPARATIVE STATEMENT, *showing the Number, Tonnage, and Classification of Sea-going Vessels that arrived in Port from the Maritime Provinces the Past Ten Years.*

YEARS.	Steamships.	Tonnage	Ships.	Tonnage.	Barques.	Tonnage.	Brigs.	Tonnage.	Brigantines.	Tonnage.	Schooners.	Tonnage.	Total No. of Vessels.	Total Tonnage.
1877.....	72	39,277	5	4,306	25	13,566	3	758	18	2,744	37	3,924	160	64,575
1878.....	42	21,812	2	1,132	32	15,749	3	954	21	4,196	65	6,683	165	50,526
1879.....	62	40,686	2	1,733	59	32,271	1	457	16	3,660	80	8,573	220	88,380
1880.....	88	62,688	3	2,492	59	36,294	1	413	17	5,001	68	6,562	236	113,450
1881.....	104	80,040	1	734	44	10,666	2	553	13	2,502	48	4,883	212	99,378
1882.....	168	136,036	....	.....	25	15,574	....	.....	13	2,364	54	5,993	260	159,967
1883.....	191	164,982	....	.....	11	8,066	1	307	6	1,015	54	5,620	263	179,990
1884.....	161	124,377	....	.....	8	5,031	....	.....	1	456	40	3,825	210	133,689
1885.....	142	117,436	....	.....	18	11,997	....	.....	10	2,307	47	4,814	217	136,554
1886.....	175	150,784	...	.....	4	2,535	3	794	2	466	41	2,902	225	157,481

PORT OF MONTREAL.

PORT OF MONTREAL.

COMPARATIVE STATEMENTS, *showing the Number, Tonnage and Classification of Sea-going Vessels that arrived in Port the past ten years, with the dates of the greatest number in Port at one time, each year.*

Years.	Steamships.	Tonnage.	Ships.	Tonnage.	Barques.	Tonnage.	Brigs.	Tonnage.	Brigantines.	Tonnage.	Schooners.	Tonnage.	Tot'l number of vessels.	Tot'l number of tonnage.	Greatest Number in Port at one time.
1877..	247	261,764	41	41,904	108	56,909	10	2,560	25	4,987	78	,735	513	376,859	59....Oct. 19
1878..	207	269,878	44	47,577	113	58,711	9	2,610	34	6,537	109	11,953	516	397,266	45....June 3
1879..	289	378,353	33	38,412	121	65,223	5	1,404	37	8,560	127	15,017	612	506,969	49....Aug. 13
1880..	354	475,741	42	50,141	143	76,816	11	3,252	41	9,715	119	12,606	710	628,271	67.... " 4
1881..	321	446,457	5	4,640	104	60,617	9	2,377	30	6,152	100	11,686	569	531,929	59.... " 18
1882..	379	475,679	4	4,330	93	51,195	10	2,702	37	7,182	125	13,604	648	554,692	53.... " 21
1883..	464	605,805	3	3,356	70	38,547	7	2,417	15	3,012	101	11,126	660	664,263	38....June 27
1884..	444	585,397	2	2,218	83	49,048	3	1,036	13	2,996	81	8,679	626	649,374	44....Aug. 13
1885..	441	619,647	2	2,792	76	45,560	1	338	23	6,141	86	9,376	629	683,854	43....July 15
1886..	532	736,648	11	13,475	68	47,233	10	3,061	7	1,850	75	7,432	703	809,699	44....Aug. 18

PORT OF MONTREAL.

Number and Tonnage of Sea-going Vessels consigned to the following Merchants, 1886:—

No.	Name of Firm.	Steam.	Tonnage.	Sail.	Tonnage.	Total. No.	Total Tonnage.
1.	H. & A. Allan	75	171,729	.....	.....	75	171,729
2.	D. Torrance	48	107,343	.....	.....	48	107,343
3.	R. Reford	58	91,873	.....	.....	58	91,873
4.	Canada Shipping Co.	26	57,764	.....	.....	26	57,764
5.	J. G. Sidey	37	44,736	.....	.....	37	44,736
6.	Kingman Brown	41	32,519	4	3,030	45	35,549
7.	Charles McLean	24	32,597	1	392	25	32,989
8.	Carbray Routh	25	26,023	5	4,037	30	30,060
9.	Intercolonial Coal Co.	26	25,800	.....	.....	26	25,800
10.	Henry Dobell	31	22,994	1	1,242	32	24,236
11.	Munderloh & Co.	15	20,151	4	1,864	19	22,015
12.	Anderson McKenzie	2	2,792	23	18,107	25	20,899
13.	H. Dobell (Canal)	23	15,457	1	1,242	24	16,699
14.	David Shaw	16	9,335	9	5,514	25	14,849
15.	Kingman Brown (canal)	18	13,964	.....	.....	18	13,964
16.	J. & R. McLea	14	12,972	1	43	15	13,015
17.	F. W. Henshaw	10	9,840	.....	.....	10	9,840
18.	Carbray Routh (canal)	7	7,480	3	2,003	10	9,483
19.	A. McKenzie, (canal)	1	897	12	7,769	13	8,666
20.	Burstall & Co., (canal)	3	2,903	7	3,060	10	5,963
21.	Charles McLean do	6	5,432	1	392	7	5,824
22.	Burstall, (from sea)	3	2,903	4	2,851	7	5,754
23.	Bryant & Co	4	5,572	.....	.....	4	5,572
24.	J. G. Sidey (canal)	5	4,773	1	341	6	5,114
25.	C. A. Boucher	.....	.....	32	4,430	32	4,430
	Eighteen others	14	8,799	62	16,734	76	25,533
		532	736,648	171	73,051	703	809,699

PORT OF MONTREAL.

First arrivals from sea, the following years.

YEARS.	VESSEL'S NAME.	DATES.	CAPTAIN'S NAME.	WHERE FROM
1840....	Ship Great Britain....	Apr. 30....	J. Swinburn.....	London.
1841....	" Great Britain....	May 5....	J. Swinburn.....	London.
1842....	" Caledonia	" 9....	B. Allan.....	Greenoch.
1843....	" Great Britain....	" 7....	J. Swinburn.....	London.
1844....	" Great Britain....	" 5....	J. Swinburn.....	London.
1845....	" Great Britain....	" 4....	J. Swinburn.....	London.
1846....	" Albion	Apr. 27....	B. Allan.....	Glasgow.
1847....	" St. Andrews	May 11....	J. Locby.....	London.
1848....	" Albion	" 3....	J. McArthur.....	Glasgow.
1949....	" Albion	" 4....	J. McArthur.....	Glasgow.
1850....	" Great Britain....	Apr. 28....	M. B. Wade.....	London.
1851....	" Toronto	" 28....	W. Ballantine.....	Liverpool.
1852....	" City Manchester.	May 2....	H. Flinn.....	Liverpool.
1853....	" Shandon.....	Apr. 28....	N. Craig.....	Glasgow.
1854....	" America.....	May 20....	W. Guttnie.....	Liverpool.
1855....	" Ottawa	" 9....	N. Wylie.....	Glasgow.
1856....	" Qu'n of the Lake.	Apr. 30....	L. Patshing.....	Liverpool.
1857....	" Montreal	May 1....	J. Banlay.....	Liverpool.
1858....	" Toronto	Apr. 30....	R. Brown	Liverpool.
1859....	S.S. United Kingdom.	May 3....	W. Meikleraid....	Glasgow.
1860....	" United Kingdom.	Apr. 30....	W. Meikleraid....	Glasgow.
1861....	" Jena	" 27....	G. Langlands.....	Liverpool.
1862....	Ship Shandon	" 28....	R. D. Munroe.....	Glasgow.
1863....	" City of Quebec..	May 6....	W. Dalrymple....	London.
1864....	" Ardinillan	Apr. 28....	J. Fullerton.....	Glasgow.
1865....	S.S. Peruvian	May 3....	Wm. Ballantine...	Liverpool.
1866....	Ship Gleniffer	" 1....	Wm. Hamilton ...	Glasgow.
1867....	S.S. Moravian..	" 4....	Ths. Aiton.....	Liverpool.
1868....	" Hibernian	" 4....	Wm. Smith	Liverpool.
1869....	" Nestorian.....	Apr. 30....	A. D. Aird	Liverpool.
1870....	Ship Abeona	" 22....	Wm. Hamilton ...	Glasgow.
1871....	" Lake Superior ..	" 22....	A. Ritchie.....	Liverpool.
1872....	S.S. Scandinavian ...	May 5....	W. Ballantine	Liverpool.
1873....	" Prussian	" 4....	J. Dutton.....	Liverpool.
1874....	" Quebec	" 11....	N. L. Bennett.....	Liverpool.
1875....	" Prussian	" 9....	J. Ritchie.....	Liverpool.
1876....	" Polynesian	" 8....	R. Brown.....	Liverpool.
1877....	Ship Lake Erie	Apr. 29....	D. Lemont.	Glasgow.
1878....	S.S. Venezia	" 20....	J. McMaster.....	Coro Bay.
1878....	" Circassian	May 1....	J. Wylie.....	Liverpool.
1880....	" Prussian	" 2....	J. Ritchie.....	Glasgow.
1881....	" Buenos Ayres...	Apr. 29....	N. McLean.....	Glasgow.
1882 ...	" Manitoban	May 6....	G. Scott	Liverpool.
1883....	" Lake Champlain.	" 5....	S. A. Jackson.....	Liverpool.
1884....	" Lake Champlain.	" 2....	O. Tramner	Liverpool.
1885....	" Brooklyn	" 8....	G. S. Dale.....	Liverpool.
1886....	" Dominion	Apr. 30....	J. Wall.....	Bristol.

PORT OF QUEBEC.

STATEMENT *showing the dates of the first arrivals from Sea, in the Port of Quebec, commencing May 13th, 1772, to April 20th, 1851. From 1773 to 1795, it will be seen there are some years left out.*

DATES.	YEARS.	NAME OF VESSELS.	CAPTAIN.	WHERE FROM.
May 13..	1772..	Brigt Canadian	Abbott ...	London.
" 20..	1773..	Ship Canadian	Abbott	London.
" 5..	1777..	Fr t. Sh. Gen. Con'y	.....	Newfoundland.
" 20..	1778..	Snow Jason.....	Sloper	7 weeks from Cadiz.
" 7..	1781..	Harriet.....	Bacon.....	London.
" 14..	1786..	Ship Integrity.....	.....	From the Downs.
" 11..	1787..	H. M. S. Shistle....	Coffin	11 days from Halifax.
" 14..	1789...	Ship Achilles.....	Pile.....	From Liverpool.
June 2..	1795..	Brig Caroline.....	Jenkins ...	17 days from Trinity Bay.
May 20..	1796..	Brig Jessies.....	Paterson ..	3rd April from Greenoch.
" 15..	1797..	Sch. Susan Craigie..	McIntyre .	56 days from Domingo.
" 11..	1798..	Sch. Swift.....	Bobson....	2nd March from Jamaica.
" 8..	1799..	Brig Nymth.....	Pryse	4th March from St. Vincent.
" 17..	1800..	Ketch Firm.....	Vertramel.	19 days from Halifax.
Apr. 25..	1801..	Ship Nancy	Bain	27th March from Liverpool.
May 12..	1802..	Brig Mary.....	Sactus	11th March from Newcastle.
" 4..	1803..	Brig Antelope.....	Boucher ..	49 days from Jamaica.
Apr. 25.	1804..	Ship Jane.....	Perkins	16th March from Liverpool.
May 5.	1805..	Ship Quebec.....	Bailey	19th March from London.
" 9..	1806..	Brig Caledonia.....	Wilson ...	26 days rom Ayr.
Apr. 28..	1807..	Brig Henrietta.....	Losh.....	22 days from Liverpool.
" 19..	1808..	Brig Triton	Wright....	Hull.
May 4..	1809..	Ship Ocean.....	Tracey ...	52 days from Portsmouth.
" 3..	1810..	Ship Prospect.....	Ware.....	33 days from Newcastle.
Apr. 26..	1811..	Ship Hero.....	Stephenson	30 days from London.
May 2..	1812..	Ship Christopher...	Coward ...	38 days from London.
" 5..	1813..	H. M. S. Woolwich.	.....	5 weeks from Portsmouth.
" 8..	1814..	Sch. Priam.....	Pye	27th April from Halifax.
" 10..	1815	Ship Hope.....	Bonner ...	45 days from Alient.
" 12..	1816..	Ship Glory.....	Shand.....	42 days from Liverpool.
" 13..	1817..	Ship Fame.....	Mimet	25th March from Hull.
" 7.	1818..	Brig Patriot.....	Anderson .	32 days from Aberdeen.
" 1..	1819	Brig Patriot.....	Anderson .	25 days from Aberdeen.
" 9..	1820..	Brig Roy. Charlotte.	Hobson ...	50 days from Alicent.
" 8.	1821..	Brig Southampton..	White.....	30 days from Grenada.
Apr. 27 .	1822..	Brig Mary.....	Murphy...	20th March from St. Vincent.
May 9..	1823..	Brig Hugh.....	Greig	27th March from Belfast.
" 1..	1824..	Barque Europe.....	Willis.....	25th March from London.

PORT OF QUEBEC.—*Continued.*

Dates.	Years.	Name of Vessels.	Captain.	Where from.
Apr. 24..	1825..	Ship Perseverance..	Egg	29th March from Plymouth.
" 25.	1826..	Ship Walrus.....	Wright ...	18th March from London.
" 30.	1827..	Ship Quebec Packet.	Anderson..	2nd April from Aberdeen.
May 8..	1828..	Ship Gaspé.....	Boungman	4th April from Gibraltar.
" 2..	1829..	Brig Ann Eliza Jane	Reid.....	23rd March from Bristol.
Apr. 26..	1830..	Ship Unicorn.....	Troup	31st March from Liverpool.
" 16..	1831..	Brig Neuvesis.....	Roallins ..	24th March from Poole.
May 4..	1832..	Ship Canada.....	Allan.....	2nd April from Greenoch.
" 10..	1833..	Ship Favourite.....	Allan.....	27 days from Greenoch.
" 6..	1834..	Bark Ottawa.....	Douglas ..	31st March from London.
" 2..	1835..	Brig Wm. Ash.....	Randall...	20th March from Bordeaux.
" 11..	1836..	Ship Canada.....	Allan.....	2nd April from Greenoch.
Apr. 29..	1837..	Bark Great Britain.	Swinburn .	London.
May 3..	1838..	Bark Pocies.....	Arnold ...	27th March from Poole.
" 8..	1839..	Ship Rainbow.....	Arnold ...	31st March from Poole.
Apr. 25..	1840..	Ship Vere.....	Webb	25 days from Poole.
" 29..	1841..	Ship Vere.....	Mills	2nd April from Poole.
May 2..	1842..	Bark Kingston.....	Robson....	50 days from Gibraltar.
Apr. 18..	1843..	Bark Great Britain.	Swinburn..	London.
May 3..	1844..	Bark Great Britain.	Swinburn .	19th March from London.
" 1..	1845..	Bark Great Britain.	Swinburn..	13th March from London.
Apr. 24..	1846..	Ship Albion.....	Allan.....	28th March from Glasgow.
May 8..	1847..	Ship St. Andrew...	Locby.....	Glasgow.
" 1..	1848..	Ship Caledonia	Gr'enhouse	27th March from Greenoch.
Apr. 28..	1849..	Ship Albion.....	McArthur .	20th March from Glasgow.
" 28 .	1850..	Ship Montreal.....	McMaster .	19th March from Liverpool.
" 20..	1851..	Ship Toronto.....	Ballantrie .	17th March from Liverpool.

STATEMENT *showing the first arrivals of Steamboats in Quebec, since the first Steam Communication between Quebec and Montreal.*

YEARS.	DATE.	NAME OF STEAMBOAT.
1812....	Nov. 22.....	Steamboat Swiftsure.
1813....	May 2.....	" Swiftsure.
1814....	" 5.....	" Swiftsure.
1815....	Apr. 27.....	" Swiftsure.
1816....	May 1.....	" Malsham.
1817....	" 7.....	" Malsham.
1818....	Apr. 27.....	" Malsham.
1819....	May 2.....	" Telegraph.
1820....	Apr. 24.....	" Lady Sherbrooke.
1821....	May 3.....	" Quebec, Telegraph, and Swiftsure.
1822....	Apr. 29.....	" Lady Sherbrooke, Cae of Commerce, and Lang n.
1823....	" 27.....	" Quebec.
1824....	" 21.....	" Swiftsure.
1825....	" 17.....	" Laprairie and Swiftsure.
1826....	" 22.....	" Laprairie.
1827....	" 16.....	" Waterloo.
1828....	" 12.....	" Chambly.
1829....	" 20.....	" Lady of the Lake.
1830....	" 17.....	" Lady of the Lake.
1831....	" 21.....	" Lady of the Lake.
1832....	" 29.....	" St. Lawrence.
1833....	" 18.....	" St. Lawrance.
1834....	" 17.....	" St. Lawrence, from Sorel only.
1834....	" 18.....	" Lady of the Lake, from Montreal.
1835....	May 4.....	" Canada.
1836....	" 11.....	" Canada.
1837....	" 1.....	" British America.
1838....	Apr. 28.....	" St. George.
1839....	" 21.....	" British America.
1840....	" 19.....	" Lady Colborne.
1841....	May 1.....	" Queen.
1842....	Apr. 21.....	" Lady Colborne.
1843....	May 5.....	" Canada.
1844....	Apr. 23.....	" Alliance.
1845....	" 25.....	" Lord Sydenham
1846....	" 17.....	" Queen.
1847....	May 8.....	" Queen.
1848....	Apr. 6.....	" Montreal, from Montreal.
1849....	" 25.....	" Cataraqui and Ontario, from Kingston and Montreal.
1850....	" 25.....	" Montreal, from Quebec.
1851....	" 22.....	" Montreal, from Montreal.

REPORT

OF THE

SUPERINTENDENT OF PILOTS.

JOSEPH LEVEILLÉ, *Superintendent of Pilots.*

HARBOUR COMMISSIONERS OF MONTREAL,
Superintendent of Pilots' Office,
MONTREAL, December 31st, 1886.

H. D. WHITNEY, ESQ.,
Secretary, &c.,
Harbour Commissioners of Montreal.

SIR.

For the information of the Harbour Commissioners, I beg to submit this, my Annual Report, of the work done during the past season of navigation, in the maintenance of the buoys in this pilotage jurisdiction, whereof I have charge in my position as Superintendent of Pilots.

The season of navigation opened this year on the 26th April, the day that I commenced placing the buoys, and closed on the 27th November last.

Between these two dates, I made seven trips, nearly one per month, of which the two first were for the purpose of placing the buoys and putting them in order; the last, to take them up and put them in safety for the winter. All the other trips were made to repair damages, to replace buoys which had become displaced, and, in a word, to cause the buoys to be clearly visible, in order to render as easy as possible the passage of vessels in the Channel between Quebec and Montreal.

I have used at different times for these different works, three tugs of the Harbour Commissioners, namely, the "John Pratt," "St. James" and "Glacial," whichever one

of the three could easiest be placed at my disposal, without interfering with the other works.

I would have wished to have had a tug oftener, in order to avoid the numerous complaints of the Pilots about the delay in the care of the buoys, caused by the difficulty of having a boat at my service, delays which exposed them (the Pilots) to the danger of stranding their vessels.

I have been assisted in this work, as in the previous year, by Mr. Scott, one of the Assistant Engineers, who has saved me more numerous trips. He aided me particularly in this last one, by taking up the buoys below Sorel himself.

Two other tugs have been employed this year to place the buoys in the spring, and to raise them in the fall, which is of the greatest utility. Without this it would be likely in the spring that vessels would arrive, before the placing of the buoys, and in the fall we would be liable to lose many of them, by sudden cold weather coming on before they could be lifted. Mr. Scott is charged with placing and taking up those below Sorel, leaving to me those above. The service is in this manner performed very rapidly.

There are, this year, the same number of buoys as last year, but 16 wooden buoys have been replaced by 16 cylindrical iron ones of great size.

During the summer, two iron buoys which had been lost, were found. There remain in the ship yard about 150 new buoys, besides those taken up, which is amply sufficient for the service for year.

I have the honor to be,

Sir,

Your humble servant,

JOSEPH LEVEILLÉ,

Superintendent of Pilots.

Table showing the total number of buoys, as well as those taken up and left down, together with the number of beacons :—

Place.	Buoys.					Beacons.
	Left.		Raised.			
	Iron.	Wood.	Iron	Wood.	Barrels.	
Pt. aux-Trembles (en bas)..	1	.....	.....	.....	.....	.....
Ste. Croix, Pointe Platon, Portneuf	1	2	.....	.....	.....	.....
Grondines and the Point.....	.....	.....	.....	.....	.....	4
Bature Cadieux.....	.....	1	.....	.....	.....	.....
Cap Charles and Laroche.....	2	.....	5	15	.....	.....
Cap Levrard and Champlain.	.....	.....	2	.....	.....	2
Becancour Traverse and Cap de la Madeleine	1	.....	.....	13	.....	2
Poulier Laforce, bature au fer.	.....	2	.....	.....	.....	.....
Lake St. Peter. Nicolet Traverse.....	1	.....	1	3	.....	2
Lake St. Peter. Light ship No. 3 to No. 2	.....	9	3	37	4	.....
Lake St. Peter. " 2 " 1	.....	7	.....	.....	.....	.....
Harbour of Montreal.....	.....	.....	.....	5	.....	.....
Hochelaga to Ile Bouchard...	.....	7	.....	26	.....	.....
Isle Deslauriers.....	.....	.....	.....	.....	.....	2
Contrecœur Traverse, and Contrecœur	2	1	5	14	.....	.....
Contrecœur Channel	.....	5	5	28	.....	4
Total.....	8	34	21	141	4	16

REPORT

OF THE

PILOTAGE DISTRICT OF MONTREAL

FOR THE YEAR 1886.

HARBOUR COMMISSIONERS OF MONTREAL,

Secretary's Office,

MONTREAL, February 12th, 1887.

WM. SMITH, ESQ.,

Deputy Minister of Marine,

OTTAWA.

SIR,

I have the honor to submit herewith, for the information of the Honorable the Minister of Marine, the Annual Report of the Pilotage District of Montreal, for the year ended 31st December, 1886.

There was no increase in the number of apprentice Pilots during the year.

Pilot Louis N. Bouillé, aged 59, died on April 13th.

Pilots J. B. Dorval, and Adolphe Lisè, were superannuated, owing to infirmity caused by ill death.

The following is a list giving the name and age of each Pilot, acting in this District, under the authority of this Trust, with the earnings of each for the season of 1886 :—

No.	Name.	Age.	Earnings.	Remarks.
1	Léville, Joseph	69	.....	Supt. of Pilots.
2	Bouillé, Zepherin	58	$1,208.00	
3	Bélisle, Cyrille	59	520.19	
4	Lisé, Adolphe	57	173.50	Sp. to 15 Dec '86.
5	Raymond, George	57	392.91	" 1st July '86.
6	Naud, Augustin	60	748.58	
7	Bélisle, Hubert A	56	607.16	
8	Dufresne, Athanase	53	1,338.07	
9	Gagnon, Pierre	59	1,134.82	
10	Bélisle, George	47	590.29	
11	Naud, Onésime	46	1,404.64	
12	Hamelin, J. Octave	53	1,836.45	
13	Chandonnet, Jos	46	1,475.57	
14	Bouillè, Louis A	47	1,264.74	
15	Boudet, Prudent	45	1,837.26	
16	Bélisle, Elzéar	52	601.61	
17	Pleau, Joseph	49	648.49	
18	Brunet, Célestin	44	1,732.60	
19	Bélisle, Louis	41	1,069.66	
20	Caien, Dumas	46	319.32	Ill hea'h p.of.sea
21	Groleau, Ulric	39	1,077.80	
22	Frenette, Alfred	47	1,180.83	
23	St. Armand, Alfred	43	493.62	
24	Bélanger, Phillipe	48	1,154.73	
25	Gagnon, Victor	48	831.49	
26	Perrault, Narcisse	49	1,464.87	
27	Toupin, Treflé	39	801.61	
28	Auger, Cléophas	40	1,470.20	
29	Desjordy, François	42	394.23	
30	LaBranche, Ferdinand	41	1,898.09	
31	Perrault, David	45	900.51	
32	Gauthier, Alexis	40	1,258.73	
33	Bouillé, Louis Z	38	1,326.11	
34	Toupin, Joseph	37	1,467.80	
35	Gauthier, Laurent	37	1,685.24	
36	Arcand, Jean	34	652.38	
37	Nault, Delovoie	35	1,530.99	
38	Gauthier, Wilbrod	35	1,385.70	
39	Mayrand, Louis	39	575.13	
40	Dufresne, George	38	626.61	
41	Arcand, Norbert	34	1,078.34	
42	Toupin, Uldoric	32	926.12	
43	Bouillé, Tancrede	33	1,089.18	
44	Arcand, Nestor	31	508.08	
45	Nault, John	30	809.35	
46	Dussault, Joseph	31	757.36	
	Total		$46,299.68	

The foregoing amount was received from the following services, viz:—

BRITISH:		
Steamers	$37,667.15	
Sailing Vessels	4,458.70	
		$42,125.85
FOREIGN:		
Steamers	$3,193.27	
Sailing Vessels	980.56	
		$4,173.83
Total		$46,299.68

The following list shows the name and age of each apprentice Pilot serving his time under the authorities of this trust:—

No.	NAME.	AGE.	RESIDENCE.
1	Alphonse Cossette	38	Champlain.
2	Gédéon Groleau	34	Grondine.
3	Néré Belisle	34	Deschambault.
4	Hubert Perrault	37	Montreal.
5	Audilon Portelance	33	Grondine.
6	Leboire Perrault	37	Deschambault.
7	Joseph Hurteau	26	Contrecœur.
8	Wilfred Raymond	32	Deschambault.
9	Adolphe Richard	38	Contrecœur.
10	Joseph Langlois	31	Pointe-aux-Trembles (en bas)
11	Edouard Perrault	36	Deschambault.
12	Lydoric Bouillé	29	do
13	Elié Bouillé	27	do
14	N. Edson Angers	36	do
15	Honore Dusseau	33	do
16	Narcise Paquet	32	do
17	Jean Baptiste Nadeau	28	Levis.
18	Arthur Brière	29	Portneuf.
19	Aubert Naud	32	Deschambault.
20	J. Sifroy Labranche	30	Portneuf.
21	Alexis Perrault	24	Deschambault.

During the season of 1886, the only casualty to a vessel, of at all a serious character, was that of the SS. "Newcastle City." This steamship, on the 12th July, when in charge of Pilot Adolphe Lisé, while coming into the Harbour, grounded on the shoal opposite Sec. 28-29. It was necessary to discharge a considerable portion of her cargo before she floated, and the vessel was somewhat

damaged. An enquiry was held, and the Pilot was found to be at fault, and he was suspended from exercising his functions as Pilot until the close of the season of Navigation.

Complaint was made against Pilot Jean Arcand for causing the grounding of the Barque "Yuba" on the 11th November, near Longue Pointe, while on her way to Quebec, the said vessel being in low of the Steamer "Anglesea." An enquiry was asked for, and the Commissioners were called together to hear the case.

Owing to the fact that the vessel had to proceed to sea, no witnesses on the part of the complainants were available, so the case was adjourned pending the return of the vessel.

The following is the Tariff of Pilotage now in force in the Pilotage District of Montreal, viz :—

QUEBEC TO MONTREAL & VICE VERSA.	DOWNWARDS.	UPWARDS.
Pilotage of Vessels in tow of Steamers, for each foot of draft of water.....	$2.00	$2.00
Pilotage of Vessels propelled by Steam, for each foot of draft of water.....	2.50	2.50
Pilotage of Vessels under Sail, for each foot of draft of water.....	4.20	2.80
Moving a Vessel from one wharf to another in the Harbour of Montreal, or from foot of Current of St. Mary into the Harbour.	5.00	5.00

The amount received by the Harbour Commissioners as the Pilotage authorities of the District, was as follows :—

For poundage, 5 per cent. on the earnings of Pilots.....	$2.310.46
" Sundry poundage from Three Rivers 1885-6.....	131..83
" Sundry poundage.....	3.72
Interest on investments.....	2,177.27
	$4,623.28
The disbursements for Pensions to old and infirm Pilots and widows of Pilots, were.....	$2,645.00

I have the honour to be, Sir,

Your obedient servant,

H. D. WHITNEY, *Secretary.*

REPORT

ON THE

WORKS FOR THE IMPROVEMENT AND MAINTENANCE

OF THE

HARBOUR OF MONTREAL,

FOR THE YEAR 1886.

JOHN KENNEDY, M. Inst., C. E., *Chief Engineer.*

HARBOUR COMMISSIONERS OF MONTREAL,
Chief Engineers' Office,
MONTREAL, 25th Januuary, 1887.

H. D. WHITNEY, ESQ.,
Secretary,
Harbour Commissioners of Montreal.

DEAR SIR,

I beg to submit, for the information of the Board of Harbour Commissioners, the following report upon the works in the Harbour of Montreal, for the year ended 31st December, 1886 :—

The principal works of the year are : Dredging the basins in Sections 5 to 10, 12 to 14, 15 and 16 ; deepening the Ship Channel through the Harbour ; rebuilding and widening part of the wharf in Sections 9 and 10 ; and raising and repairing parts of the wharves of Sections 15, 18, 20, 23, 24 and 25.

The following are the chief details of the work done :—

New Works.

Sections 5 *to* 10 (*Windmill Point Basin*).—The enlarging and deepening of the basin has been continued with such plant as could be spared from the dredging in other parts of the Harbour. A stone-lifter from the Ship Channel was employed for some time in the fall in clearing away boulders and rock loosened by the dredges.

Quantity dredged 21,904 cubic yards, boulders removed by stone-lifter, 140 yards, expenditure, $9,351.

Sections 12 *to* 14.—Several small shoals and ridges left from former dredging were deepened to 27½ feet at low water.

Quantity dredged, 7,301 cubic yards, costing $5,449.

Section 15 (*King's Basin*).—Some parts of the basin were deepened to 27½ feet.

Quantity dredged 7,616 cubic yards, costing $2,526.

Section 16.—Some parts near the front of the wharf and several small detached shoals were deepened to 27½ feet. Quantity dredged 12,825 cubic yards, costing $3,898.

Section 18 (*Market Basin*).—A days dredging done in cleaning out some shoal places. Quantity dredged, 135 cubic yards, costing $72.

Sections 20 *and* 21 (*Military Basin*).—Several places in the basin, principally near the main shore wharf were deepened. Quantity dredged, 4,634 cubic yards, costing $2,129.

Sections 41 *to* 45 *and below* (*Hochelaga*).—The greater part of the hard material dredged out of other parts of the Harbour has, as in former years, been deposited along shore in such positions as to form part of the back-filling for future extension of the wharves below the Hudon Cotton Mill.

Quantity deposited by Clamshell Derricks, 23,625 cubic yards.

Ship Channel through the Harbour.—At different times during the summer, parts of the main channel through the Harbour—chiefly opposite Victoria Pier—have been deepened by Harbour dredges.

Quantity dredged, 5,580 cubic yards, costing $4,402.

Electric Lighting.—In the early part of the summer, a water power lighting station was built, by the Dominion Government Department of Railways and Canals, at the large waste weir (Hydraulic Lot No. 20, Lachine Canal,) and in accordance with a previous understanding with Government, the Harbour Commissioners electric light dynamo was transferred to it on its completion in August.

In order to connect with this, and also to light Windmill Point, wires and lamps were placed along the wharves from the station to the foot of the Canal, and the wires carried thence under the Canal by cables and joined to the former circuit, thus making the electric lighting of the Harbour extend from Section 5 to Section 23.

The lighting capacity of the present dynamo is nearly reached, but there is ample water power provided to allow of the addition of other dynamos, sufficient to light the whole Harbour.

Section 20 (*Paving*).—The stone paving on Victoria Pier was extended by laying an experimental piece with granite blocks on Portland cement concrete foundation, and bedded and joined with Portland cement mortar, instead of with sand, as usual.

This method of laying was adopted with a view to resisting the scouring and grinding of the water and ice over the Pier in winter, which ordinary paving cannot successfully do.

Quantity laid, 1,047 square yards, costing $4,481, or $4.66 per yard.

Harbour Repairs.

The breaking up of the ice in spring, it will be remembered, was accompanied by an unprecedented rise in the River, and this caused the lodgement of a considerable quantity of ice on the wharves, especially from Section 21 (opposite the Canadian Pacific Railway station) downward. It was necessary that a considerable part should be removed by hand, in order to make room for freight sheds and for berthing vessels, and an expenditure of about $2,033 was incurred in doing so.

After the subsidence of the ordinary high water in May, it was found that several wharves had suffered damage from scouring out of the foundations of the crib work, during winter, and required that heavy repairs be made. In a number of other places, the tops of the wharves, especially the older ones, were more or less damaged in the planking and upper timber work.

Besides the repairs to damaged wharves, some heavy renewals to old and decayed timber work have been this year necessary. Generally speaking, repairs to timber work have been made more freely than of late, and the wharves, as a whole, have been brought into better condition than for some years past.

These unusual works together with the ordinary repairs, have swelled the years' expenditure for repairs and maintenance to $ which compares as follows with that of previous years :—

1875	$16,449
1876	35,711
1877	26,077
1878	18,974
1879	18,819
1880	17,330
1881	16,159
1882	27,962
1883	35,768
1884	44,869
1885	42,158
1886	.....

The following are the chief repairs made during the year :—

Sections 9 *and* 10 (*Windmill Point*).—A length of 400 feet of the cribwork in Sections 9 and 10, was found to have been so much undermined by scour and damaged by ice during the winter that it was necessary that it should be rebuilt. In order to obtain greater breadth of wharf opposite the Canal embankment, it was also determined to take advantage of the rebuilding to place the new cribwork in a straight line from the corner at the junction of Sections 10 and 11 to the outer corner of the offset in Section 9, thus abolishing the offset and gaining an average of 30 feet in breadth opposite the Canal bank.

The work was undertaken early in the summer and 400 lineal feet in length of the new crib-work were finished and the filling made by the close of navigation. Cost, including dredging, $16,398.

As this work is as much an enlargemement as a repair to the wharfage, its cost may fairly be divided between capital and maintenance expenditure. The cost on each account will therefore be $8,199.

In connection with this renewal, about 200 feet of the wharf from the first offset upward had the timber and planking renewed on top and raised to standard level.

Section 11.—The timber work of the wharf between the new and old Lachine Canal entrances has been renewed and replanked on top. Cost $249.

Section 12.—The small basin at the head of the Section, enclosed between the Canal and the main shore, has had new face planks, and general repairs. Cost $209.

Section 15.—The inshore wharf at King's Basin was replanked on top. Cost $288.

The lower outerside of the Island Wharf, which had become undermined and sunk, was repaired and built up to proper level. Cost $1,289.

Section 18.—The top of the pier used for the St. Helen's Island Ferry, which has always been rather insecure, was, last winter, much damaged by ice. Early in the summer, the whole of the timber work from near the water lines up, was rebuilt and replanked and the central part of the pier macadamized. Cost $2,987.

The wharf at the inshore end of the Basin was also much decayed, and it was rebuilt from near water line and raised to the standard level. Cost $1,986.

Section 20.—The greater part of the crib-work of the upstream face and projecting upper end of the wharf was more or less undermined, and allowed to sink, during the past two winters, all such parts were repaired and built up to proper level last summer. Cost $2,131.

The crib-work, renewed at the lower end of the pier in 1885, was last summer planked on the face. Cost $170.

Sections 23, 24 *and* 25.—A length of 1,330 feet of the wharf, in which the timber work had become much decayed and sunken, has been rebuilt from near the water line and raised to standard level. A good part of the necessary back-filling has also been done. Cost $7,502.

Section 37.—The timber work on the River side of the Old Hochelaga ramp, which was much decayed, was entirely renewed and the roadway made good. Cost $3,707.

In the summer of 1882, the side next the street was renewed and the whole timber work is now in good condition.

Section 40.—The wharf at the Hudon Cotton Mill, which was considerably damaged on top by the ice, has been repaired. Sockets for additional mooring posts have been put down in anticipation of the use of the wharf, in the coming spring, for the Longueuil Ferry. Cost $1,147.

Roadways.—The roadways of the wharves and ramps have been maintained with macadamizing stone, as usual, 397 toises of stone being distributed.

On asking tenders for the years' supply of stone, it will be remembered that the prices asked were all unusually high, and it was, therefore, determined to reject all the tenders, and to quarry, haul and break the stone with the Commissioners' own men. This was accordingly done and resulted in considerable saving.

Railway Tracks.—The only change worthy of note is the taking up of the tracks laid down for the Montreal Steam Crane Company, on Sections 7 and 8, Windmill Point, and Sections 36 and 37, Hochelaga.

Harbour Dredges and Dredging.

The Harbour Dredging Fleet has been of the same strength as in 1885, viz.;—four spoon (or dipper) dredges, two derricks, two screw tugs, with scows and a floating shop as detailed in the appended table. The time of the fleet has, however, not been wholly occupied on work belonging to the Harbour, but a considerable part of it has been spent in assisting the Ship Channel fleet and under charter on other works as hereafter detailed.

The dredges, tugs and derricks, with exception of dredge No. 7, were, as usual wintered in the Richelieu River, at the Harbour Commissioners ship yard, Sorel, and the necessary repairs were made at the Commissioners' works. Number 7 dredge and two screws, which were under charter to the Grand Trunk Railway, were wintered at Belœil. All the other scows were wintered in the Richelieu, at or near Sorel.

The ice left the St. Lawrence rather earlier than the average time and allowed of sending the first dredge from Belœil to Montreal on April 27th. The others followed from Sorel soon after, and all were at work by May 3rd.

On the 27th and 28th May, two of the dredges and a tug were sent to the Ship Channel work at Port St. Francis, the other two and a tug remaining in Montreal.

On the 18th June, one of those which had been sent to the Ship Channel was withdrawn, and sent to dredge the foundations for the new Lachine Bridge, under charter to the Canadian Pacific Railway, and on 17th July the other was also withdrawn under a similar charter. Both worked at the Bridge until August 26th, when one was returned to the Ship Channel and the other, No. 5, was by accident sunk in the River a short distance below the Bridge site. The dredge sent to the Ship Channel worked at Bécancour till November 15th, when the weather becoming cold and stormy, she was brought up to Montreal and with the other two, finished the working season in the Harbour work. All were taken to winter quarters at Sorel on 27th November.

Besides the charters mentioned, the dredge which wintered at Belœil, worked at the bridge there a few days before the opening of navigation, for the Grand Trunk Railway, and another dredge worked three days in the Lachine Canal, for Government.

The Canadian Pacific Railway Company made an unsuccessful attempt to raise the dredge sunk at Lachine, after which she was abandoned and her value paid to the Harbour Commissioners.

The number of days during which the spoon dredges were on duty on the Commissioners' works, either in the Harbour or Ship Channel, and including all except Sundays and charter time, from commencing in spring to leaving off in fall, was 178 days for No. 4; 64 days for No. 5; 123 days for No. 6, and 180 days for No. 7, making an aggregate of 545 days for the season. The nominal working time is 10 hours per day, which gives a total of 5,450 hours service, but the actual dredging time, after deducting that lost for repairs, changing position, detention by vessels, short days in autumn and all other causes, is reduced to 4,346 hours, or an average of 79.75 per cent of the gross time of service.

The total outlay for working the fleet, consisting of four spoon dredges, two unloading derricks, two tugs and the scows, not including charter time, was $39,338, and this, as usual, represents the entire cost of working the plant, machinery, repairs, outfit, fuel, wages, salaries, insurance, and all other outlays, except interest on capital and depreciation of plant. The total expenditure for the years work compares favorably with that of former years, but the cost of the dredging per yard is higher. This high cost arises from the dredging having been almost entirely in small shoals of rock and very hard ground, in deep water.

List of repairs to Harbour Dredging Fleet, during 1886.

Spoon Dredge No. 4.—Wintered on stocks. New timbers and planking aft; new breasting check; two new timber heads; new covering board; hull caulked.

One new box for stern spud shaft; two new sheaves for swinging crane; one new counterbalance wheel and sheave for friction belt; one new crane drum; one new wheel and pinion for same; one new sprocket and pinion on crane; the crane mast fitted anew; one new large bracket for head of crane; one new hoisting drum and clutch; new spur wheel on hoisting drum shaft and new pinion on crank shaft of engine; two new drums for spud chains; eight new sheave wheels; two new snatch pulleys; new sheave pin at front of crane; four new hinges on bucket; bucket teeth dressed; new cover for steam pump.

Spoon Dredge No. 5.—Wintered on stocks; new ribbons aft; new slides for after spud; part new deck aft; two new sets of anchor (spud) blocks; engine frame repaired; deck overhauled, and hull and deck caulked; docked at Montreal in June for caulking and light repairs to hull below water line.

Two new drums for spud chains ; two new wheels and pinions ; two new brackets and eight sheaves for one inch chain ; three sheaves on crane for one and a quarter inch chain ; three steel pins for same ; new sheave for hoisting chain ; new friction and set of ratchets on hoisting drum ; new collar for shifting dogs on drum ; new side ratchet faced and bored for hoisting gear ; bed plate of swinging table fitted anew, and bolted on with large bolts and swivel stays ; new pinion for shaft of swinging engine, two new pinions for intermediate shaft of same ; new driving pinion on crank shaft of main engine.

Spoon Dredge No. 6.—Light repairs ; deck and hull caulked ; two new sets of anchor blocks ; docked at Montreal in September for repairs to Hull. One oak bucket hundle made and fitted in during summer.

Two new sheaves for hoisting chain ; one steel pin for same repaired ; two new sheaves for swinging boom ; friction bolts renewed ; new nuts on adjusting serews of backing drum ; new ends on valve spindle of swinging engine ; pistons of main engine and pumps fitted ; new steam chest cover and new studs in steam chest ; joint on steam chest faced with brass ; new brass on guides and new end on valve spindle of main engine ; guides lined up ; new pins in cross head ; new brasses in connecting rod.

Spoon Dredge No. 7.—Light repairs, deck and hull caulked.

Derrick No. 2.—Wintered on stocks, sides of hull all renewed ; boiler and engine frame lifted and new deck placed ; new covering board ; overhauled and caulked all over ; docked at Montreal in June for caulking and light repairs to hull.

Main hoisting drum bored and new bushes put in ; shaft turned to suit bushes ; new driving wheel for hoisting drum ; two new swinging sheaves ; new steel crank

shaft for engine; new crank discs; new crank pins; new brasses and connecting rods; new hoisting pinion on engine shaft; piston fitted; value seats scraped and dressed; new back head sheet in boiler; furnace patched; forty-nine tubes taken out and replaced; twenty-five new stay bolts.

Derrick No. 3.—New mast; new bracing for frame; swinging table repaired; light repairs to deck; hull and deck caulked.

Two new steel pins for hoisting sheaves; new hoisting sheave; new plate for nigger head; new regulating value; new valve in pony pump; piston fitted; new studs in steam chest.

Tug St. Peter.—Wintered on stocks; light repairs and caulking; hauled out in summer to have new propeller put on; hull caulked and iron sheeting removed; docked at Montreal in July, August and November for repairs to propeller; hauled out at Sorel in autumn and ice prow fitted on; again launched.

New bolts in stern bearing; new bolts in thrust; new steel main valve spindle; piston faced and fitted; new phosphor bronze boxes in connecting rod; links dressed and fitted; engine pump repaired; copper pipes repaired; new spindle in blow off value; boiler thoroughly repaired, including two new flue sheets; new tube sheet; three main flues renewed, outside of furnace patched, eighty three tubes taken out and replaced, one hundred and twenty-five new stay bolts put in.

Tug St. Louis.—Wintered on stocks; two strakes of planking renewed; new rail, stanchions, covering board, guard, bulwarks and deck; new knees on timber heads; tie bolts through hull; hull and deck over hauled and caulked.

New phosphor bronze stern bearing and new bolts; twelve feet of main shafting renewed; boiler thoroughly

repaired ; new spouting in furnace ; two new flue sheets ; new tube sheet ; three new flues ; new smoke box ; furnace shell patched ; seventy-three tubes taken out ; three hundred new stay bolts put in.

Floating Shop.—House repaired and painted ; deck repaired ; hull and deck caulked ; docked at Montreal in June for caulking and light repairs to hull.

Dumping Scows.—One scow wintered on stocks, received heavy repairs, new sides and ends, overhauled, caulked and specially fitted up for harbour dredging. Two scows hauled out in summer received light repairs to bottom planking and caulked.

Miscellaneous.—Five side spuds and four stern spuds for dredges made ; one spud for derrick made ; four spoon buckets rebuilt ; one water block made ; one small jolly boat rebuilt : one skiff built, eighteen pairs boat oars made.

The following are the comparative costs and quantities of dredging for 1886 and for previous years :—

Years.	Cubic Yards Dredged.	Total Cost.	Cost per Cubic Yard, Cents.	Remarks.
1875...	151,719	$68,979	45	
1876...	156,082	55,462	35 50/100	
1877...	173,449	45,103	26	
1878...	211,731	48,748	23	
1879...	189,609	41,006	21 63/100	
1880...	186,430	46,914	25 16/100	
1881...	170,764	54,128	31 69/100	
1882.	187,339	53,598	28 60/100	Spoon Dredges and Stonelifters.
	9,429	13,254	$1.40 60/100	Elevator Dredges.
	196,768	66,852	33 96/100	Average.
1883.	36,358	17,956	49 38/100	Spoon Dredges and Stone-lifters.
	6,990	19,385	$2.77 30/100	Elevator Dredges—lifting rock and boulders and clearing up.
	43,348	37,341	86 14/100	Average.
1884...	125,648	49,468	39 37/100	Spoon Dredges and Stone-lifters.
1885...	69,494	28,563	41 10/100	" " "
1886...	57,728	25,772	44	" " "

The following are the cost and character of the dredging done in the different parts of the Harbour during the year :

Sections 5 *to* 10 (*Windmill Point Basin*).—Enlarging and deepening the Basin and clearing up loose boulders and rock. Material, chiefly shale, hard pan and gravel, dredged with spoon dredges ; boulders grappled with stone lifting barge. Depth of water at time of dredging 25 to 32 feet. Quantity 22,044 cubic yards measured loose on scow, costing 42$\frac{4}{10}$ cents per yard.

Clearing out old crib-work and making foundation for new, including time of dredge assisting in handling cribs, 3,173 cubic yards, costing 73$\frac{93}{100}$ cents per cubic yard.

Sections 12 *to* 14.—Dredging off tops of shoals and of ridges alongside wharves, hard pan, gravel and boulders ; 26 to 30 feet depth ; much interruption from vessels ; 7,301 cubic yards, costing 74$\frac{2}{3}$ cents per cubic yard.

Section 15 (*Kings Basin*).—Deepening in different places, quicksand, sand and stones ; 25 to 30 feet depth ; 7,616 cubic yards, costing 33$\frac{17}{100}$ cents per yard.

Section 16.—Deepening at different detached places, chiefly near wharf ; tough silt ; 26 to 30 feet depth ; 12,825 cubic yards, costing 30$\frac{4}{10}$ cents per yard.

Section 18.—Removing small obstructions ; chiefly limestone shale ; 135 cubic yards, costing 53$\frac{1}{2}$ cents per yard.

Sections 20 *and* 21 (*Military Basin*).—Dredging off various detached shoals ; sand, hard pan and stones ; frequent interruption by vessels ; 25 to 30 feet depth ; 4,634 cubic yards, costing 45$\frac{25}{100}$ cents per cubic yard.

Yours respectfully,

JOHN KENNEDY,
Chief Engineer.

HARBOUR DREDGING—ABSTRACT OF WORK DONE BY EACH DREDGE FOR THE HARBOUR OF MONTREAL IN 1886.

VESSELS.	PLACES AT WHICH DREDGES WORKED.	Time of Service.	QUANTITIES DREDGED, CUBIC YARDS.			CHARACTER OF SOIL.
		Days.	Spoon Dredges.	Stone Lifters.	Totals. *Cubic Yds.*	
Dredge No. 4	Sections 5 to 10, Windmill Point	6¼	11,430			Shale rock.
	" 9, Digging Crib	21	2,160			Hard pan and stones
	" 12 to 14, Allan's Basin	11	1,125			Hard pan and stones.
	" 15, King's Basin	25	5,186			Quicksand.
	" 20 and 21, Military Basin	21½	4,050			Coarse sand.
					23,951	
Do. No. 5	" 5 to 10, Windmill Point	12	1,710			Shale rock.
	" 18, Market Basin	1	135			Black rock.
	" 20, Military Basin	2	292			Sand.
					2,137	
Do. No. 6	" 5 to 10, Windmill Point	24	3,240			Shale rock.
	" 12 to 14, Allan's Basin	11	1,260			Hard pan, sand and boulders.
					4,500	
Do. No. 7	" 5 to 10, Windmill Point	24½	5,524			Hard pan and gravel.
	" 9 to 10, Cribwork	11½	1,013			Hard pan and stones.
	" 12 to 14 Allan's Basin	53½	4,916			Hard pan, boulders and sand.
	" 15, King's Basin	10	2,430			Sand and stones.
	" 16, Dominion Basin	54	12,825			Sand,
	" 20, Military Basin	6	292			Hard pan, stones and sand.
					27,000	
Stone-Lifter, No. 1	" 5 to 10, Windmill Point	30		140		Boulders.
					140	
Totals		382	57,588	140	57,728	

Dredge No. 4 worked on charter, 2½ days in Lachine Canal.
" 5 " " 37 " at Lachine Bridge.
" 6 " " 58 4-10 days at Lachine Bridge.
" 7 " " 7½ days at Belœil Bridge.
The Dredging done in the Ship Channel by Harbour Dredges is not included in the above table.

HARBOUR DREDGING—*Statement Showing the number of days worked by each Dredge, and the quantity dredged*

The Dredging done in the Ship Channel by Harbour Dredges is not included in the above table.

HARBOUR DREDGING—*Statement Showing the number of days worked by each Dredge, and the quantity dredged at each place for the Harbour of Montreal in* 1886.

PLACES WHERE DREDGES WORKED.	VESSEL.	Time of Service DAYS.	TOTAL DAYS.	QUANTITIES DREDGED. Spoon Dredges.	Stone Lifters.	Totals. Cubic yds	CHARACTER OF SOIL.
Sections 5 to 10, Windmill Point	Dredge No. 4.	64		11,430			Shale rock.
	" No. 5.	12		1,710			"
	" No. 6.	24		3,240			"
	" No. 7.	24½		5,524			Hard pan and gravel.
	S. Lifter No. 1.	30			140		Boulders.
			154½			22,044	
" 9 and 10, Crib-rock	Dredge No. 4.	21		2,160			Hard pan and stones.
	" No. 7.	11½		1,013			"
			32½			3,173	
" 12 to 14, Allan's Basin	Dredge No. 4.	11		1,125			Hard pan, sand and stones.
	" No. 6.	11		1,260			"
	" No. 7.	53½		4,916			"
			75½			7,301	
" 15, King's Basin	Dredge No. 4.	25		5,186			Quicksand.
	" No. 7.	10		2,430			Sand and stones.
			25			7,616	
" 16, Dominion Berth	Dredge No. 7.	54		12,825			Sand.
			54			12,825	
" 18, Market Basin	Dredge No. 5.	1		135			Black rock.
			1			135	
" 20 and 21, Military Basin	Dredge No. 4.	21½		4,050			Coarse sand.
	" No. 5.	2		292			Sand.
	" No. 6.	6		292			Hard pan, sand and stones.
			29½			4,634	
Totals			382	57,588	140	57,728	

HARBOUR COMMISSIONERS' DREDGING PLANT EMPLOYED IN THE HARBOUR OF MONTREAL IN 1886.

DESCRIPTION OF VESSEL.	HULL.				ENGINES.					Capacity of Bucket.	Depth to which Dredge can work.	REMARKS.
	Length over all.	Breath of Beam.	Depth of Hold.	When Built.	Kind of Engine.	No. of Cylinders.	Diameter of Cylinders.	Length of Stroke.	Pressure of Steam.			
DREDGES.	Ft. In.	Ft. in.	Ft. in.				Inches.	Inches.	Lbs.	C. ft.	Feet.	
Crane Spoon Dredge, No. 4	77.3	27.0	6.6	1872	Horizontal, non-condensing.	1	14	16	60	40	32	Wooden Hull.
Boom " " No. 5	77.6	27.0	6.6	1873		1	14	16	90	40	35	Altered in 1882.
" " " No. 6	77.0	27.0	7.6	1874		1	14	16	90	40	35	Altered in 1881.
Crane " " No. 7	77.3	27.0	7.0	1874		1	14	16	60	70	32	Wooden Hull.
DERRICKS.												
Clam Shell Derrick, No. 1	56.8	23.9	5.9	.....	Horizontal, non-condensing.	1	8	12	75	.....	.....	Used as pile-driver.
" " " No. 2	57.0	23.6	5.9	1872		2	7	12	75	.....	.....	Wooden hull.
" " " No. 3	61.9	24.0	5.9	1875		1	10	12	75	.....	.....	" "
TUG BOATS.												
Tug St. Louis.....	67.0	15.0	8.7	1875	Vertical, non-condensing.	1	16	20	90	.....	.....	Wooden hull.
" St. Peter.....	71.6	16.6	8.6	1875		1	20	22	93	.....	.....	" "
BARGE.												
Staghound, (floating shop)..	103.4	21.5	7.6	1869	.....	.....	.....	.....	.....	.....	.....	Wooden hull.
SCOWS.												
4 Dumping Scows.....	80.0	16.0	7.6	.....	.....	.....	.....	.....	.....	.....	.....	
2 Flat Scows.....	75.0	20.0	5.9	1876	.....	.....	.....	.....	.....	.....	.....	All wood.
2 " "	75.0	20.0	6.0	1878	.....	.....	.....	.....	.....	.....	.....	" "
6 " " various sizes and ages..	... .	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	" "
					.....	.....	.....	.....	.....	.....	.....	" "

REPORT

UPON THE

DEEPENING OF THE SHIP CHANNEL

BETWEEN

MONTREAL AND QUEBEC,

FOR THE YEAR 1886.

JOHN KENNEDY, M. INST., C.E., *Chief Engineer.*

HARBOUR COMMISSIONERS OF MONTREAL,
Chief Engineer's Office,
MONTREAL, January 25th, 1887.

H. D. WHITNEY, ESQ.,
Secretary,
Harbour Commissioners of Montreal.

DEAR SIR,

I beg to submit, for the information of the Harbour Commissioners, the following report upon the work accomplished during the year 1886, in deepening the Ship Channel between Montreal and Quebec.

The work in hand is, in general terms, the deepening of the Channel from its present depth of 25 feet (except at Cap à la Roche), to a depth of 27½ feet at low water, with a minimum breadth of 300 feet, in accordance with the provisions of the Act 46 Vict., cap. 36. The 2½ feet increase in depth is, as a rule, being taken out by the dredges at a single cut over the whole breadth of the Channel.

The year's work has been, on the whole, very successful and has done much toward the attainment of the 27½ feet Channel to Montreal.

The quantity dredged is a little over 1½ million of cubic yards (1.523,588 yards), which is a larger quantity than ever taken out in a single season before. Of this quantity, nearly ten per cent (146,517 yards) is rock and large boulders from the neighbourhoods of Cap Charles and Pointe-aux-Trembles, and the remaining ninety per cent is earth from other parts of the River and from Lake St. Peter. In the rock dredging at Cap à la Roche and Cap Charles, which really exceeds in cost and in difficulty the dredging of Lake St. Peter or any other section of the work, very good progress has been made. At Cap Charles the rock has been cut through to the required depth, with exception of about one hundred feet in length, and any cleaning up which may yet be found in testing. When this is finished, the dredge will be free to assist in the larger piece of rock dredging at Cap à la Roche.

The long channel through Lake St. Peter, in which there are eighteen miles of dredging, is nearly three-fourths finished.

The new Contrecœur Channel, which is next in importance, is practically finished, and the Pointe-aux-Trembles Channel, the only remaining large section of work, is about two-thirds completed.

The following are the chief details of the work done during the year.

Cap Charles.—Dredging was commenced early in May, and carried on with one dredge, until the middle of November. During the latter part of the season the dredge was worked night and day. A stone-lifter was also employed a considerable part of the season raising large boulders.

The work accomplished consists in first finishing the cut through the north half breadth of the channel, a distance of about 260 feet by 150 feet breadth, and then cutting through the north half, a distance of 1,630 feet, leaving only about 100 feet yet to be done. The depth in the new cuts is 26 feet, 3 ins. at low water.

All the dredging is shale rock, *in situ*, except at the ends of the cuts or margins of the shoal, where it is of loose shale and boulders. The progress, considering the nature of the materials, has been very good and the cost of removal is certainly very low.

Quantity dredged this year, 66,765 cubic yards, scow measurement costing $22,404 or 33½ cents per yard. Boulders lifted by stone-lifters 3,823 cubic yards, costing $2,481, or 65 cents per yard.

Pouillier Rayer.—Dredging was resumed on May 6th, and carried on till November 17th. A stone-lifter was also employed most of the season, working day and night at raising boulders too large for the dredge.

The dredging, as in former years, has been of very difficult character, consisting of exceedingly tough clay in which are imbedded boulders of all sizes.

The work, too, has largely consisted in running over large areas and cutting off the tops and sides of small shoals which are very little above the required depth. While the area cleared of obstructions has thus been considerable, the quantity of material lifted is small and the cost per cubic yard is therefore high.

Quantity dredged, 18,015 cubic yards, costing $19,796, or $1.10 per cubic yard. Boulders raised by stone-lifter 2,182 cubic yards, costing $1,577, or 72¼ cents per yard.

Cap à la Roche.—A dredge was got to work on the 27th April, and continued till the 17th November. Occasional assistance was also rendered by stone-lifters.

The work done consists in deepening about 1,100 feet in length of the North half breadth of the channel to 26½ feet depth, and about 550 feet of the South half to 25 feet, 3 inches deep at low water.

The material met with is much the same as in former years, that is, shale rock *in situ*, and very gratifying progress has been made in dredging through it.

Quantity dredged this year, 69,435 cubic yards shale rock, scow measurement, costing $20,526, or 29½ cents. per cubic yard.

Cap Levrant and Vicinity.—A dredge and a stone-lifter were employed from early in May till near the end of September. About a mile in length of the channel, in detached pieces, has been deepened to 27½ feet at low water.

Quantity raised by dredge and lifted by stone-lifter, 70,535 cubic yards stiff clay and boulders, costing $15,947, or 2.2$\frac{6}{10}$ cents. per cubic yard.

Pointe Citrouille.—A bar of 2,200 feet in width, which extends across the ship channel, was cut through to 27½ feet depth, in July and August.

Quantity dredged 23,861 cubic yards, clay, sand and stones, costing $4.647, or 19$\frac{48}{100}$ cents. per yard.

Champlain.—A commencement was made in the dredging to be done near the village, but the material proving too hard for the dredge, work was postponed until a stronger dredge can be spared from elsewhere.

Quantity dredged, 720 cubic yards, sand, clay and boulders.

Becancour.—One of the spoon-dredges from the Montreal Harbour was employed to cut away the small detached shoal at the Bend opposite the Iron Buoy. The soil is compact clay and sand with imbedded boulders, and has proved to be rather difficult to dredge. Much interruption is also experienced from storms and from passing ships.

Quantity raised 10,746 cubic yards, costing $4,980, or 46⅔ cents. per yard.

Port St. Francis.—Two of the spoon-dredges from the Montreal Harbour were employed during the early part of the summer in dredging through Pouillier Laforce, on the north side of the Channel.

Quantity dredged 16,155 cubic yards, clay and boulders, costing $4,908, or 30⅜ cents. per yard.

A cut of 300 feet in width was run through the iron shoal, and some small detached shoals were also cleared away by an elevator dredge and a stone-lifter. A considerable area of ground was gone over, but the cutting was mostly very shallow, and mainly consisted of hard pan and boulders.

Quantity dredged, 4236 yards, costing $2,775, or 65½ cents. per yard.

Lake St. Peter.—In the Nicolet Traverse, a length of 3,500 feet, or two-thirds of a mile, has been finished, leaving only about 950 feet yet to be dredged. The section of channel from the lower end of the bend at No. 2 Lightship to the lower end of that at No. 1 Lightship, and also part of the Traverse above No. 1, a distance of 4½ miles in all, have been dredged.

Of the 18 miles entire length of dredging in Lake St. Peter, 12¾ miles had been finished up to the end of the past summer, thus leaving 5¼ miles yet to be done.

Of the dredging done in 1886, that in the Nicolet Traverse was stiff clay, with some boulders; above No. 2 Lightship it was soft clay, with a little overlying sand in the neighbourhood of No. 1 Lightship. The greater part of the past year's work has been done by No. 9 Dredge, with large buckets specially fitted for Lake St. Peter work, and the cost has been so low as to be almost without precedent.

Quantity dredged, 886,710 yards, costing $25,723, or $2\frac{9}{10}$ cents. per yard.

Stone Island and Ile de Grace.—A distance of 7,100 feet, or $1\frac{1}{3}$ miles, has been dredged to $27\frac{1}{2}$ feet depth.

Quantity dredged, 98,190 cubic yards, sand and clay, with some boulders, costing $7,942, or $8\frac{1}{10}$ cents. per yard.

Contrecœur Channel.—Work was carried with one dredge, from early in June to the close of navigation, and by two others, for about a week just before the close. A large part of the work was the cutting down of the tops and sides of isolated shoals at and below Isle St. Ours, and the remainder in finishing the dredging of the Bell-mouth, just above the island.

From the lower end of Isle St. Ours upward to the Contrecœur Traverse, the dredging is now practically finished, while below the Island, only about 4000 feet in length yet remains to be done.

Quantity dredged last summer 108.375 cubic yards, stiff clay, with some boulders and gravel, costing $19,678, or $18\frac{16}{100}$ cents per cubic yard.

Varennes.—On the setting in of stormy weather in the fall, the large No. 9 dredge was moved from Lake St. Peter, and finished the season in working between Cap St. Michel and Isle St. Thérèse. About 2,700 feet, or half a mile of the channel was finished. Quantity dredged, 92,310 cubic yards, clay with some stones, costing $4,479, or $5\frac{39}{100}$ cents yer yard.

Pointe-aux-Trembles (en haut).—A small piece of rock-dredging below the village, was finished late in the fall, by one of the rock-working dredges, from Cap à la Roche, and about 1,300 feet, or a quarter of a mile, of earth-dredging was done a short distance above the village, and also late in the fall.

Quantity of limestone, shale and clay dredged, 3,465 cubic yards, costing $1,422 dollars, or 41 cents per cubic yard. Quantity dredged, stiff clay, with some boulders, 42,555 cubic yards, costing $4,267, or 10 cents per yard.

Montreal.—At different times during the summer, parts of the main channel through Montreal Harbour, chiefly opposite Victoria Pier, have been deepened by the Harbour Dredges. The dredging has been chiefly loose stones and boulders, some of a large size, and in swift currents.

Quantity dredged 5,580 cubic yards, costing $4,042, or 72 $\frac{4}{10}$ cents per yard.

Tabular abstracts of the quantities dredged at the foregoing places, and by the different dredges, together with other information as to the works, will be found on the annexed tables.

Dredging Plant and Working Expenses,

The year's outlay, including all repairs, outfit, fuel, wages, salaries, insurance and every expense except interest and depreciation of plant, for the Ship Channel Fleet proper, was $154,640, and for the Montreal Harbour Fleet employed in the Ship Channel, $13,930, or in all $168,570. The quantities dredged are 1,377,071 cubic yards of earth, and 146,517 cubic yards of rocks and large boulders, making an aggregate of 1,523,588 cubic yards. Compared with previous years since the commencement of dredging for the 25-feet channel, the cost and quantities of work done is as follows :—

Years.	Cubic Yards Dredged.	Total Cost.	Cost per Cubic Yard.	Number of Vessels Employed.
1875.....	820,773	$134,744	$16\frac{4}{10}$ Cents.	7 to 8 Elevat'r Dredges
1876.....	922,808	130,744	$14\frac{1}{10}$ "	8 " "
1877.....	1,262,308	137,830	$10\frac{8}{10}$ "	7 to 8 " "
1878.....	966,973	$124,891	$12\frac{9}{10}$ "	8 Elevat'r Dredges
	117,663	24,125	$20\frac{5}{10}$ "	1 to 3 Spoon "
	1,084,636	$149,016	$13\frac{8}{10}$ "	Totals and Average..
1879.....	813,391	$135,519	$16\frac{66}{100}$ "	8 Elevat'r Dredges
	29,819	7,835	$26\frac{26}{100}$ "	2 to 5 Spoon "
	843,210	$143,354	17 "	Totals and Average..
1880.....	1,171,757	$136,537	$11\frac{65}{100}$ "	8 Elevat'r Dredges
	47,474	10,500	$22\frac{11}{100}$ "	2 to 4 Spoon "
	1,219,231	$147,037	$12\frac{5}{100}$ "	Totals and Average..
1881.....	1,375,251	$149,141	$10\frac{84}{100}$ "	8 Elevat'r Dredges
	78,537	18,160	$23\frac{12}{100}$ "	1 to 4 Spoon "
	1,453,788	$167,301	$11\frac{43}{100}$ "	Totals and Average..
1882.....	824,932	$151,223	$18\frac{36}{100}$ "	7 Elevat'r Dredges
	74,303	20,981	$28\frac{23}{100}$ "	2 to 4 Spoon "
	899,235	$172,204	$19\frac{15}{100}$ "	Totals and Average..
1883.....	360,344	$121,325	$33\frac{66}{100}$ "	6 Elevat'r Dredges
	137,047	40,690	$29\frac{10}{100}$ "	2 to 5 Spoon "
	497,391	$162,015	$32\frac{17}{100}$ "	Totals and Average..
1884.....	816,392	$122,163	$14\frac{96}{100}$ "	6 Elevat'r Dredges
	22,197	11,244	$50\frac{66}{100}$ "	2 Spoon "
	838,589	$133,407	$15\frac{91}{100}$ "	Totals and Average..
1885.....	1,372,349	142,455	$10\frac{38}{100}$ "	7 Elevat'r Dredges
	32,703	15,182	$46\frac{42}{100}$ "	1 to 3 Spoon "
	1,405,052	157,637	$11\frac{22}{100}$ "	Totals and average...
1886.....	1,491,177	154,640	$10\frac{37}{100}$ "	7 Elevat'r Dredges
	32,411	13,930	$42\frac{98}{100}$ "	1 to 4 Spoon "
	1,523,588	168,570	$11\frac{6}{100}$ "	Totals and avérage..

The measurement of quantity dredged is by tally of the scows, which, when filled level, hold 80 and 150 cubic yards, but they are reckoned at 60 and 120 cubic yards each respectively, to allow for imperfect filling.

The working plant employed consisted of the following vessels:—

Two Elevator Dredges, with cast-steel buckets, for rock, Nos. 11 and 13.
One Elevator Dredge, " large-built " " " No. 8.
One " " " small-built " " " No. 10.
Two Elevator Dredges, " large-built " " clay, &c., Nos. 9 & 12.
One Elevator Dredge, " small-built " " " " No. 3.
Four Spoon Dredges, during part of the summer.
Eight to nine Screw Tugs.
Two Stone-lifting Barges, Nos. 1 and 2.
Five Barges, as coal-tenders and smiths' shops.
Sixteen Hopper-bottomed Scows.
Four Flat-deck Scows.

The ice left the St. Lawrence last spring somewhat earlier than the average date, and allowed of sending out a stone-lifter to Poullier Rayer on April 26th. The first dredge left on 27th, for Lake St. Peter, and on 28th this was followed by two dredges and a stone-lifter for different places. Others were sent out from May 3rd to 7th, and finally, No. 3, which can only work after the spring freshets are past, was sent to the Contrecour Channel on June 3rd. All worked till November 17th, when No. 2 stone-lifter was stopped for the season, on account of all the other working plant having been then moved from the vicinity of Pouillier Rayer, where she was engaged.

On November 22nd, the old No. 3 Dredge was stopped, and on Saturday, 27th, the remainder of the dredging fleet was stopped and sent to winter quarters at Sorel.

The number of days during which the elevator dredges were on duty, reckoning every day except Sundays from

the date of leaving winter quarters to that of returning, was from 148 to 184, for the dredges which worked in the day time only. No. 11, a rock working dredge, which worked night and day for a short time in the fall, made 198 days, counting a night and a day as two days. The aggregate for the seven dredges during the season, were 1255 days, or an average of 179⅜ days each. The time of the stone-lifters on duty was 183 days for the one which worked during the day only, and 307 days for the other, counting a night and a day as two days.

The nominal working time during the long days of summer is 12 hours per day, but the actual dredging time is reduced by short days in autumn, early stoppages on Saturdays, time lost in storms, changing positions, accidents, repairs and delays of all kinds, so that the time during which the dredges were actually dredging, was 9,291 hours, or an average of 7.40 hours per day for the whole season.

In addition to the regular ship channel fleet, two to four of the spoon dredges of the Montreal Harbour fleet were also employed a considerable portion of the summer.

No accident worthy of note occurred to the plant during the season.

The dredges and tugs, with the exception of the Tug "Delisle," were laid up during the winter of 1885-6 in the Richelieu River, at the Harbour Commissioners' shipyard, Sorel, and the barges, scows, and other vessels without machinery were wintered about a mile above in the same river. The Tug "Delisle," which was chartered with spoon Dredge No. 7, to the Grand Trunk Railway Company, was wintered at Belœil. The repairs were, as usual, done at the Harbour Commissioners' works.

Appended is a list of the principal repairs and alterations made during the year.

Buoys and Beacons.

The buoys and beacons of the ship channel have been maintained in the usual manner, and details of the service will be found in the report of the Superintendent of of Pilots.

Yours respectfully,

JOHN KENNEDY,

Chief Engineer.

DREDGING PLANT *employed in Deepening the* SHIP CHANNEL *between* MONTREAL *and* QUEBEC *in* 1886.

DESCRIPTION OF VESSEL.	HULLS. Length over all.	Breadth of Beam.	Depth of Hold.	When built.	Tonnage Register.	ENGINES. Kind of Engine.	No. of Cylinders.	Diam. of Cylind.	Length of Stroke.	Pres're of Steam.	Capacity of bucket.	Depth to w'h dredge can work.	REMARKS.
DREDGES.	ft. in.	ft. in.	ft. in					inches.	inches	Lbs.	C. ft.	Feet.	Wooden hull, reb. '69.
Elevat'r Dredge No. 3.	135 0	29 0	10 0	.....	.....	Two coupled vertical direct acting condensing engines to each dredge.	2	16	48	25	4	35	
" " No. 8.	135 0	29 0	10 0	1874	.....		2	20	32	70	16	37	Wooden hull.
" " No. 9.	135 0	29 0	10 0	1874	.....		2	20	32	70	28	37	" "
" " No. 10.	135 0	29 0	10 0	1874	.....		2	20	32	70	4	35	" "
" " No. 11.	135 0	29 0	10 0	1874	.....		2	20	32	80	6½	38	" "
" " No. 12.	135 0	29 0	10 0	1874	.....		2	20	32	70	16	38	" "
" " No. 13.	135 0	29 0	10 0	1874	.....		2	20	32	80	6½	38	" "
TUG BOATS.													
Minnie F. Parsons	76 0	15 0	6 6	1864	22.42	Vertical Non-condensing.	1	18½	20	80	....	.....	Wooden hull.
Delisle	62 5	14 9	7 5	1869	17.07		1	18	20	90	....	.....	" "
John Pratt	96 0	19 2	7 3	1874	21.41		2	14	16	77	....	.....	" "
C. J Brydges	62 2	16 0	8 0	1874	21.29		1	20	22	85	....	.....	" "
St. Francis	80 0	17 0	7 9	1875	37.93		1	20	22	85	.	.....	" "
St. James	76 0	17 0	8 2	1875	54.57	Vertical condensing.	1	21	20	85	....	.....	" "
St. Paul	60 6	15 0	8 0	1875	27.00	Vert. non-condens'g.	1	16	18	100	....	.....	" "
Glacial	.....	.....	.....	.....	.....	" "	.....	.....	.....	.....	....	.....	Chartered for summer's works.
BARGES.													
Caroline	103 8	22 6	3 3	1864	132.95	.....	.....	.....	.....	.....	....	.....	Wooden hull.
Dreadnaught	104 2	21 5	7 4	1869	136.42	.....	.....	.....	.....	.....	....	.....	" "
Waverly	100 0	20 11	7 1	1870	176.00	.....	.....	....	.....	.....	....	.....	" "
Alfred Demers	105 0	22 5	7 6	1878	131.00	.....	.....	.....	.....	.....	....	.....	" "
A. G. Nish, (float'g shop)	100 8	25 6	6 4	1873	.....	.....	.....	.....	.....	.....	....	.....	" "
Stone lifter No. 1	65 0	22 0	6 0	1858	.....	Steam Winches.	.....	.....	.....	.....	....	.....	" "
" " No. 2	75 0	24 0	9 9	1878	.....	" "	.....	.....	.....	.....	....	.....	" "
SCOWS.					Scow No.	Capacity of Scow, Cubic yards.							
7 Hopper bottomed	80 0	16 0	6 9	1874	33 to 44	80	.....	.....	.....	.....	....	.....	4 Hoppers.
2 " "	54 6	18 0	7 0	1875	47 and 48	.....	.....	.....	.....	.....	....	.....	2 "
2 " "	50 0	19 9	7 3	1876	49 " 50	89	.....	.....	.....	.....	....	.....	2 "
2 " "	89 0	18 0	7 9	1879	51 " 52	140	.....	.....	.....	.....	....	.....	3 " All wood.
2 " "	89 0	18 0	7 9	1880	53 " 54	150	.....	.....	.....	.....	....	.....	3 "
2 " "	84 0	20 0	8 0	1886	55	150	.....	.....	.....	.....	....	.....	3 "
4 Flat scows	.....	.....	.....	.....	10 to 17	.....	.....	.....	.....	.....	....	.....	3

NOTE.—Four Spoon Dredges belonging to the Montreal Harbour Fleet were, in addition to the above, temporarily employed upon the Ship Channel.

ABSTRACT OF WORK *done by each* DREDGE *in Deepening the* SHIP CHANNEL *between* MONTREAL *and* QUEBEC *in* 1886.

VESSEL.	Places at which Dredging was done.	Time of Service	QUANTITIES DREDGED. Elevators and Steam Scows.	Totals.	CHARACTER OF SOIL.
Elevator Dredge No. 3	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
" " No. 8	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
" " No. 9	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
" " No. 10	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
" " No. 11	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
" " No. 12	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
" " No. 13	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
Minnie F. Parsons	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
Delisle	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
John Pratt	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
C. J Brydges	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
St. Francis	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
St. James	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
St. Paul	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
Glacial	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
Caroline	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
Dreadnaught	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
Waverly	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
Alfred Demers	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
A. G. Nish, (float'g shop)	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
Stone lifter No. 1	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
" " No. 2	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
7 Hopper bottomed scows	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
2 " " "	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
2 " " "	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
2 " " "	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
2 " " "	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
2 " " "	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.
4 Flat scows	Lake St. Peter	1886	1,000,000	1,000,000	Soft mud.

Note.—Four Spoon Dredges belonging to the

Abstract of Work *done by each* Dredge *in Deepening the* Ship Channel *between* Montreal *and* Quebec *in* 1886.

VESSEL.	Places at which Dredging was done.	Time of Service	QUANTITIES DREDGED.			Totals.	CHARACTER OF SOIL.
			Spoon Dredges	Elevators and Stone Lift's.			
		Days.		Earth.	Rock.	Cubic Yards.	
Dredge No. 3	Contrecœur	148		102,510			Clay and stones.
" No. 8	Cap Levrant	121		69,735		102,510	Hard pan, clay and stones.
" "	Port St. Francis Iron shoal	23		4,200			Hard pan and stones.
" "	Pointe aux Trembles	36		42,555			Hard clay and stones.
" No. 9	Lake St. Peter	143		737,640		116,490	Sand and clay.
" "	Varennes	42		92,310			Clay and stones.
" No. 10	Pouillier Rayer	167		18,015		829,950	Hard pan, clay and stones.
" "	Ile St. Ours	9		2,970			Clay.
" No. 11	Cap Charles	189			66,765	20,985	Shale rock.
" "	Ile St. Ours	9		2,895			Sand, clay and gravel.
" No. 12	Pointe Citrouille	39		23,850		69,660	Sand, clay and stones.
" "	Champlain	4		720			" " "
" "	Lake St. Peter	74		149,070			Chiefly soft clay.
" "	Stone Island and Ile de Grace	55		87,000			Sand and clay, with some boulders.
		12		11,190			" " "
" No. 13	Cap à la Roche	172				271,830	
" "	Pointe aux Trembles	12			69,420		Shale.
Stone-lifter No. 1	Pouillier Rayer	4			3,465		Shale and some clay.
" " "	Cap à la Roche	11½				72,885	
" " "	Cap Levrant	13½			66		Boulders.
" " "	Pointe Citrouille	2			15		"
	Port St. Francis, Iron shoal	4			800		"
					11		"
" No. 2	Cap Charles	190			36		"
" "	Pouillier Rayer	117				928	
					3,823		"
Spoon Dredge No. 4	Ship Channel in Mont. Harb.	35½	3,960		2,116		"
" No. 5	Port St. Francis, Force sh'l.	49	10,868			5,939	Hard pan, sand and stones.
" No. 6	Becancour	69	10,676				Clay and boulders.
" "	Port St. Francis, Force sh'l.	19	5,287				Tough clay, sand and boulders.
" No. 7	Ship Channel in Mont. Harb.	20½	1,620				Clay and boulders.
							Hard pan, sand and stones.
Totals		1,908	32,411	1,344,660	146,517	32,411	
						1,523,588	

STATEMENT *showing the number of days worked and the quantity* DREDGED *at each place in deepening the* SHIP CHANNEL *between* MONTREAL *and* QUEBEC *in* 1886.

PLACES WHERE DREDGES WORKED.	VESSEL.	Time of Service Days.	Total Days.	QUANTITIES DREDGED.			Totals.	CHARACTER OF SOIL.
				Spoon Dredges.	Elevators, Etc.			
					Earth.	Rock.	Cubic Yards.	
Cap Charles	Dredge No. 11	189				66,765		Shale rock.
	Stone-lifter No. 2	190	379			3,823	70,588	Boulders.
Pouillier Rayer	Dredge No. 10	167			18,015			Hard pan and clay.
	Stone-lifter No. 2	117				2,116		
	" 1	4	288			66	20,197	Boulders.
Cap à la Roche	Dredge No. 13	172				69,420		Shale rock.
	Stone-lifter No. 1	11½	183½			15	69,435	Boulders.
Cap Levrant	Dredge No. 8	121			69,735			Hard pan, clay and stones.
	Stone-lifter No. 1	131⅔	252⅔			800	70,535	Boulders.
Pointe Citrouille	Dredge No. 12	39			23,850			Sand, clay and stones.
	Stone-lifter No. 1	2	41			11	23,861	Boulders.
Champlain	Dredge No. 12	4	4		720		720	Sand, clay and stones.
Becancour	" 6	69	69	10,676			10,676	Tough clay, sand and boulders.
Port St. Francis, Iron sh'l.	" 8	23			4,200			Hard pan and stones.
	Stone-lifter No. 1	4	27			36	4,236	Boulders.
Port St. Francis, Force sh'l.	Dredge No. 5	49		10,868				Clay and boulders.
	" 6	19	68	5,287			16,155	
Lake St. Peter	" 9	143			737,640			Chiefly soft clay.
	" 12	74	217		149,070		886,710	
Stone Island and Ile de Grace	" 12	55			87,000			Sand and clay, with some bould's.
	" 12	12	67		11,190		98,190	
Contrecœur, Main Channel	" 3	148			102,510			Clay and stones.
Contrecœur, Isle St. Ours	" 10	9			2,970			
do do	" 11	9	166		2,895		108,375	Sand, clay and gravel.
Varennes	" 9	42	42		92,310		92,310	Clay and stones
Pointe aux Trembles	" 8	36			42,555			Hard clay and stones.
	" 13	12	48			3,465	46,020	Shale rock and some clay.
Ship Channel in Montreal Harbour	" 4	35½		3,960				
	" 7	20½	56	1,620			5,580	Hard pan, sand and stones.
Totals			1,908	32,411	1,344,660	146,517	1,523,588	

Mr. Kennedy has drawn up the following interesting table, showing highest water in the Montreal Harbour, from 1852 till 1887, taken from Lachine canal gaugings on the lower sill of lock No. 1, Lachine canal :—

Winter of.	Fall.		Spring.	
	Date.	Height of water.	Date.	Height of water.
		ft. in.		ft. in.
1852-53.....	Jan. —.....	35 3	Apr. —.....	32. 2
1853-54.....	Jan. —.....	37. 9	Apr. —.....	32. 0
1854-55.....	Jan. —.....	31. 9	Apr. —.....	34. 6
1855-56. ...	Jan. —.....	*39. 6	Apr. —.....	36. 9
1856-57.....	Dec. 27.....	34.10	Apr. 15.....	32. 6
1857-58.....	Jan. 17.....	38. 3	Apr. 4.....	36. 6
1858-59.....	Jan. 1.....	36. 5	Mar. 29.....	36. 5
1859-60.....	Dec. 27.....	35.11	Mar. 11.....	29. 6
1860-61.....	Jan. 7.....	36. 4	Apr. 15.....	*41. 7
1861-62.....	Jan. 10.....	36. 6	Apr. 19.....	35. 5
1862-63.....	Jan. 23.....	33. 2	Apr. 21.....	36 9
1863-64.....	Jan. 3.....	37. 6	Apr. 6.....	32. 6
1864-65.....	Jan. 15.....	36.10	Apr. 3.....	*40. 9
1865-66.....	Jan. 4.....	32. 5	Apr. 16.....	33. 2
1866-67.....	Jan. 9.....	37. 8	Apr. 16.....	33. 0
1867-68.....	Dec. 17.....	32. 9	Apr. 5.....	32.10
1868-69.....	Dec. 29.....	31.10	Apr. 22.....	*40. 5
1869-70.....	Jan. 11.....	36. 6	Apr. 9.....	36.10
1870-71.....	Jan. 14.....	34. 9	Apr. 2.....	32. 0
1871-72.....	Dec. 18.....	31. 5	Apr. 24.....	30. 6
1872-73.....	Jan. 6.....	27. 5	Apr. 17.....	38. 6
1873-74.....	Jan. 2.....	34. 8	Apr 21	31. 9
1874-75.....	Jan. 5.....	30. 0	Apr. 27.....	30. 9
1875-76.....	Jan. 15.....	32.10	Apr. 24.....	34. 2
1876-77.....	Dec. 20.....	34.11	Apr. 13.....	31. 4
1877-78.....	Jan. 29.....	34. 3	Mar. 19.....	29. 8
1878-79.....	Jan. 31	33. 4	Apr. 19.....	34. 3
1879-80.....	Jan. 2.....	32. 4	Apr. 7.....	33. 7
1880-81.....	Dec. 29.....	31. 5	Apr. 13.....	30. 2
1881-82	Jan. 27.....	33.10	Mar. 31.....	31. 3
1882-83.....	Dec. 23.....	30. 2	Apr. 20.....	32.10
1883-84.....	Jan. 3.....	38. 4½	Apr. 16.....	37. 5
1884-85.....	Jan. 7.....	35. 3	Apr. 27.....	*40. 8
1885-86.....	Jan. 11.....	*40. 2	Apr. 13.....	*44. 4
1886-87.....	Dec. 29.....	33.11	.....	.....

The level of the revetement wall on Commissioners street is 38 feet 8 inches. The times in which the water rose above this are, therefore, the winter floods of 1855-6 and 1885-6, and in the spring floods of 1861, 1865, 1869, 1885 and 1886 ; the highest recorded flood being that of 1886.

TARIFF.

Rates & Dues to be levied in the Harbour of Montreal,

Under and by virtue of the Acts, 40 Vic., Cap. 53, and 42 Vic., Cap. 28.

ON AND AFTER THE FIRST DAY OF APRIL, 1881.

Tonnage Dues

To be levied on all Vessels in the Harbour.

On Steamboats, for each day of twenty-four hours, or part of a day, they remain in the Harbour, reckoned from the hour of their arrival to that of their departure... 1c. per Ton Register.
On all other vessels, per day, as aforesaid..... ½c. " " "

Wharfage Dues

To be levied on all Merchandise, Animals and Things whatsoever Landed or shipped in the Harbour.

25c. per Ton—All Goods, Wares and Merchandise not elsewhere specified.
20c. " " —Hay, Straw, Pig and Scrap Iron, Pot and Pearl Ashes.
15c. " " —Apples, Crates and their contents, Flour and Meals, Fish, Meats, Pitch, Potatoes, Tar, Horses, Neat Cattle, Sheep, Swine.
10c. " " —Ballast, Clay, Fire-Bricks, Gypsum, Lime, Marble, Phosphates, Sand, Salt.
7½c. " " —Coal and Coke, Grain and Seeds of all kinds.
Special.....Bricks, 10c. per 1,000; Cordwood, 5c. per cord; Lumber, 10c. per 1,000 feet, board measure.
Free.....Bullion, Specie.

On all Goods, Wares and Merchandise whatsoever, the quantity of which by weight, measurement or other mode of estimate provided for in the Tariff, cannot be conveniently ascertained, it shall be lawful for the Harbour Commissioners to levy a rate of ¼ of 1 per cent. on the value thereof.

Each entry shall pay not less than 5 cents.

All property landed on the wharves for re-shipment, shall only pay one wharfage.

The Ton mentioned in the Tariff of Wharfage dues shall be 2,000 lbs. weight, or 40 cubic feet measurement, according to the Bill of Lading.

STANDARD FOR ESTIMATING WEIGHTS.

Ashes, Pot or Pearl.....	3 brls.	to 1 Ton.	Horses	2	to 1 Ton.
Apples, Flour, Meal, Potatoes	9 "	"	Neat Cattle.....	3	" "
Fish, Meats, Pitch, Tar....	7 "	"	Sheep.....	15	" "
			Swine	10	" "

Certified,

H. D. WHITNEY,
Secretary.

HARBOUR COMMISSIONERS OFFICE,
MONTREAL, 26th March, 1881.

PRIVY COUNCIL OFFICE,
OTTAWA, 1st April, 1881.

I hereby certify that the foregoing Tariff has been approved by His Excellency the Governor-General in Council on this 1st day of April, 1881.

J. O. COTÉ, *Clerk, Privy Council.*