

ANNUAL REPORTS  
OF THE  
HARBOUR COMMISSIONERS  
OF MONTREAL  
FOR THE YEAR 1885.



Commissioners :

ANDREW ROBERTSON, Esq., CHAIRMAN.  
J. B. ROLLAND, Esq. | HUGH McLENNAN, Esq.  
EDWARD MURPHY, Esq. | CHARLES H. GOULD, Esq.  
HENRY BULMER, Esq. | HONORÉ BEAUGRAND, Esq. (MAYOR)  
VICTOR HUDON, Esq. | ANDREW ALLAN, Esq.  
H. D. WHITNEY, SECRETARY.

Montreal :

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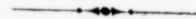
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# STATEMENT

MADE BY

MR. ANDREW ROBERTSON, CHAIRMAN,

OF THE

*Business of the Port for the year 1885, and other matters connected  
with the Trust,*

AT THE PUBLIC MEETING OF THE BOARD, HELD ON 17TH FEBRUARY, 1886.

GENTLEMEN,—

The usual reports of the Chief Engineer and Harbour Master are hereto appended, and contain all the details of their respective departments. In last year's report I stated that we might expect a considerable increase in Tonnage during 1885, in consequence of additional accommodation being asked for by various parties. This prediction has been verified by an increase of Ocean vessels of 34,480 tons, an aggregate of 683,854 being the largest amount in any previous year.

Increased accommodation has again been applied for, and it is expected that a similar result will occur in the year we have now entered.

The tonnage as compared with last year, is as follows :—

	Vessels.	Tonnage.
Ocean Steamships, 1884.....	444	585,397
“ “ 1885.....	441	619,647
	Decrease.... 3	Increase.... 34,250
Ocean Sailing Vessels, 1884.....	182	63,977
“ “ “ 1885.....	188	64,207
	Increase.... 6	Increase.... 230

Total Ocean Vessels, 1884.....	626	649,374
“ “ “ 1885.....	629	683,854
	<u>3</u>	<u>34,480</u>
	Increase....	Increase....
Total Inland Vessels, 1884.....	4,808	726,605
“ “ “ 1885.....	5,003	724,975
	<u>195</u>	<u>1,630</u>
	Increase....	Decrease....
Total Ocean and Inland, 1884.....	5,434	1,375,979
“ “ “ 1885.....	5,632	1,408,829
	<u>198</u>	<u>32,850</u>
	Increase....	Increase....

The income for last year was.....	\$230,633
And for the present year.....	224,396
	<u>\$ 5,839</u>

	1884.	1885.
Dues on Imports.....	\$94,900	\$90,704
“ Exports.....	52,079	53,171
Tonnage Dues.....	46,281	42,253
Local.....	37,373	38,768
	<u>\$230,633</u>	<u>\$224,896</u>

or about two and one-half per cent. less compared with last year.

This can be accounted for by the vessels going into the canal. Now that that they can accommodate sea-going vessels to 18 feet, many go there that would otherwise discharge in the harbour. Thus in 1880 to 1882, not a ton of coal went into the canal, the ocean-going vessels and cargoes caused a loss to the harbour revenues of about \$1,500 a year, whereas in 1883 to 1885 they averaged \$9,000 a year; last year showing nearly \$13,000, of a loss, of which \$7,000 was for coal alone. While this is a loss to the harbour revenues it is a gain to the Port, and the manufacturers reap an advantage by having their coal transferred to them by shorter cartage, as in the canal

it can be taken so much nearer to the factories, than from the harbor.

The usual Annual Inspection of the Lake and River Works, took place on the 22nd July, on the Steamer "Cultivateur;" the Commissioners being accompanied by a number of representative citizens. The Ship Yard and Machine Shop at Sorel were visited, also the Dredges and other plant working in various parts of the river. Everything was found in a satisfactory condition. The party then proceeded to Quebec, and were afforded an opportunity of inspecting the Harbour Improvements there, as well as the Graving Dock, which it seems to me should not be a burden on the City of Quebec but a Dominion Work; being for the benefit of the country at large, as also a benefit to the Shipping Interest who will go where the best facilities are afforded. The Esquimault Graving Dock in British Columbia which I had the pleasure of seeing last year; (in view of the trade outlook it is a pity that it had not been made 100 feet longer)—should also be a Dominion Work; as well as the Canadian Atlantic Ports of Halifax, St. Johns, or St. Andrews, should such become necessary.

The Commissioners from Montreal were most hospitably entertained by the Harbour Commissioners of Quebec at the Island of Orleans, and a pleasant opportunity was thus afforded for an exchange of views.

His Worship Mayor Beaugrand succeeded the Hon. Mr. Beaudry as representative of the City Council on the Board in the beginning of August—the latter's term of office having expired.

No progress has been made in the negotiations with the city authorities regarding the repairs to the Revetment Wall. Considerable portions of the wall are in a more dangerous condition than ever, and if something is not done it may become necessary for the Commissioners

to forbid traffic on portions of the flagstone pavement on top of it, so as to prevent accidents. The city should in this case certainly come to the aid of the harbour, which has done in the past, is doing, and will continue to assist in the growth of the city ; besides, the revetment wall is not necessary for the purposes of the harbour, but is a promenade for the citizens, who reap the benefit, at the expense of the shipping interests.

During the past season there were 46 pilots engaged in piloting sea-going vessels between Montreal and Quebec, and their total earnings were \$39,975,34, a slight decrease as compared with last year. Several of the pilots have earned comparatively small amounts owing to ill health or other causes ; but the majority have done fairly well and it will be noticed that the earnings are more evenly distributed amongst them, showing a more satisfactory division of the work ; seven do not appear to have worked regularly, their earnings amounted to \$2,370 ; leaving \$37,603 for the 39 pilots, whose separate earnings were from \$500 to \$1,500, the average amount being \$964.

It is satisfactory to be able to state that only one accident of at all a serious nature happened to any vessel coming to the port the past season.

On the 26th September, the S.S. "Montreal" while on her way to Quebec, in charge of pilot George Raymond, touched the ground heavily near St. Antoine, starting some of the plates and causing the vessel to leak. An investigation was held, the pilot was considered to have been to blame, and he was suspended from exercising his functions as pilot until the 1st July, 1886.

During the prevalence of the small-pox epidemic, the Commissioners co-operated with the health authorities so far as lay in their power, in enforcing vaccination. All the employees of the Trust were obliged to furnish satisfactory proof that they themselves and their families had



been successfully vaccinated. Circulars strongly setting forth the necessity of vaccination were sent to all the employers of labour in the Harbour; to the pilots, and to the Captains of all sea-going vessels coming to the port, through our agent at Quebec.

#### RAILWAY TRACKS ON THE WHARVES.

Last year I stated that one of the most pressing question which has to be dealt with, is the accomodation which will be required by railways for tracks on the wharves, and, here quote what I then said:

“ There are at present two single tracks on the wharves  
 “ having no connection with each other—one, extending  
 “ over a portion of the Harbour, worked by the Grand  
 “ Trunk Railway, to whom permission to lay down tracks  
 “ was granted by our predecessors in 1871, and the other,  
 “ the property of the Commissioners, running along the  
 “ greater portion of the wharves, and worked by the  
 “ Canadian Pacific Railway.

“ After permission was given the Grand Trunk Railway  
 “ to lay tracks, it was found advisable that all the tracks  
 “ on the wharves should be the property of the Harbour  
 “ Commissioners only, and be open for use by all Rail-  
 “ ways on equal terms, and efforts have for some years  
 “ back and are still being made, in the interests of the  
 “ Harbour, to have these tracks amalgamated, so that  
 “ they may be worked in common. Such an arrangement  
 “ would greatly facilitate the handling of the cars on the  
 “ wharves, as well as increase the capacity of the rails  
 “ now laid.”

I regret to say that no advance has been made in this direction, and in consequence of so much more cargo coming by Railroad, it is of the utmost importance to insure harmony among the Railways and Cartage Companies so as to expedite their business; complaints from

the latter having been frequent during the past season. The Commissioners trust that the Grand Trunk Railway in its own interest as well as that of the other Railways and the Cartage Companies, and for the best interests of the Port, will meet the views of the Commissioners and come to some working arrangements to take effect at the opening of Navigation this year.

During last season the grain dues were reduced, to meet the views of the trade, one half for the season. Whether this reduction had any effect in increasing the quantity of grain coming this way, is a question on which there is considerable difference of opinion, but which I shall leave to those who are more specially interested. I, however, would like to put this matter fairly before you. Let me carry you back to 1880, when our tariff was remodelled. Our revenue for that year was very large, being \$331,294, an increase over the previous year of nearly 23 per cent. In consequence of this marked increase, strong pressure was brought to bear on the Commissioners to reduce the charges, and the tariff was changed, commencing with the season of 1881, in the hope that the trade would increase so as to cover the reductions made. Unfortunately such has not been the case. The following will show what rates per ton was paid for Imports, Exports and Tonnage Dues, assuming only a ton of goods was carried to the ton register :—

	IMPORTS.	EXPORTS.	TONNAGE DUES.
1880.....	17.95 cents.	13.09 cents.	12.20 cents.
1885.....	13.26 "	7.75 "	6.17 "
	<hr/>	<hr/>	<hr/>
Reduction.	4.69 "	5.34 "	6.03 "
	<hr/>	<hr/>	<hr/>

From this you will at once see that while for each registered ton in 1880 the charge was 12.20, the charge in 1885 was only 6.17, or very little more than one half for tonnage dues on shipping.

You will also observe that Imports show the least reduction, and that Exports have a very much larger percentage of reduction—Imports showing 4.69 and Exports 5.34. It must not however be overlooked that Imports have fallen off in consequence of our manufacturers supplying the country with many bulky goods formerly imported, thus decreasing the quantity, so that probably not more than one ton or even that is now imported to the ton register; while for Exports, I have it on good authority, that probably one and three-quarters tons went out last year to the ton register by cargo boats; it may therefore be safely assumed that one and one-half tons were exported per ton register, so that the charge would be about  $5\frac{1}{4}$  cents per ton on the actual exports. My reason for pointing this out is because my attention has been called to the fact that some of the exporters think they are paying higher dues than the importers.

I may also further say that the limit of reduction of harbour charges has been more than reached unless relief is granted by the Government by assuming the channel debt, which I hope they will see their way to do at no distant day, believing as I do, and repeating my previously expressed opinion, that no Railway or Canal, which has been built or subsidized by the Government, has produced or will produce, such an amount of good to the Dominion at large, as the deepening of the channel from Quebec to Montreal, at an infinitesimal cost as compared with the expenditures on Railways and Canals.

In regard to charges of Atlantic Ports vs. Montreal, even before the reductions I have named in 1881, had taken place, my predecessor, Mr. Cramp, stated that, with *exception of towage*, the Port of Montreal would compare favorably with any American port; and Mr. McLennan, one of our confreres, used similar language.

Where are the sailing vessels now, the Towage Ques-

tion, or the Port of Call vessels that, in 1880, were supposed to be essential to the Grain Trade of Montreal? They are numbered with the past, as only one sailing vessel, the "Lodson," 267 tons register, with 14,653 bushels of peas has been cleared from this port to Falmouth for orders during last season, all grain beyond this small shipment being carried by steamers. Sailing vessels that come now chiefly load with lumber and deals. In 1880 the proportions of steam tonnage was 76 per cent., and of sail 24 per cent., while for last year the proportions were steam, 90 $\frac{2}{3}$ , and of sail 9 $\frac{1}{3}$ —showing that steam, so far as the port of Montreal is concerned, is carrying the day, just as railways are superseding canals. I applied the other day to the Secretary of the Board of Trade to see if he could give me the relative quantities of grain carried by railways and Erie Canal in 1885. These have not yet appeared, but he kindly sent me a book showing the tons of goods carried for several years past by Erie Canal and Railways, to New York, every year, from 1880 to 1884, showed an increase by railways: thus, in 1880, canal carried 6,457,656 tons, or 25 per cent., against 19,248,930 tons by railways, or 75 per cent. In 1884, canals carried 5,009,488, or 16 per cent., railways carried 26,432,016, or 84 per cent. These were the New York Central and Erie Railways, and very shortly the Baltimore and Ohio, with their Staten Island accommodation, will no doubt largely increase the tonnage by Rail, as against the Erie Canal.

This shows that communication all the year round by rail is beating water communications when they are only open for a portion of the year, and now that we are one of the summer terminals of two great Railways, we shall no doubt receive by rail a fair proportion of what comes to them for shipment by sea. The past year alone, the largest half of the wheat shipped came by railway to Montreal.

I am informed that on the 8th inst. the first wheat was

put into the new Elevator of the Canadian Pacific Railway, which will, no doubt, be in the future a great advantage not only to this Port but to our city, as the Great North-West becomes more settled and the area of land cultivated with wheat gradually increases.

In a speech made lately in Staten Island, at a dinner given by Mr. Wiman to the President of the Baltimore & Ohio Road, I find the following statement made by several of the speakers, re Canals and Railways :—

“Chancellor Livingstone said, twenty-five years ago, that undoubtedly every plausible argument might be made for the railroads, but the canals were the true means of communication,” and, further on, says :—

“I remember, very well, when our friends upon the North River dreaded the approach of the Hudson River Road. No where in the country was there so noble a series of estates as those that bordered the River ; and Edward Everett, fifty years ago, in Boston, advocating the building of the Western Road to Albany, urged it especially upon this ground ; that the sole transportation from New York was by water ; that for three or four months in the year the water way was closed, and for three months, of course, *Boston* would be *New York*.”

Baltimore is not a competitive port by water with Montreal, but by Rail only. The Mayor of Baltimore, at that banquet, speaking of the Baltimore & Ohio Road, said in his speech, and I commend it to the consideration of our Mayor and the City Council :—

“As a rule, all you gentlemen know, who have had  
 “railroad experience, city and municipal aid to railroad  
 “construction is considered in the light of a gift, and  
 “very few subscriptions are made with any ultimate  
 “object of receiving payment, either in the form of prin-  
 “cipal or interest. In round figures, the stock interests  
 “of the city and State in the Baltimore and Ohio Rail-

" road was represented by stock subscription aggregating  
 " six million and a half of dollars; and for every dollar  
 " thus subscribed and handed over to the Baltimore and  
 " Ohio Railroad, that road has returned six dollars. More-  
 " over, the city and State could to-day dispose of the stock  
 " they are now holding at figures which would not only  
 " repay the principal, but very largely cover the interest,  
 " calculated from the date of the subscription to the pre-  
 " sent time. Of the gross revenue of the city of Balti-  
 " more, each year, \$325,000, or 13 per cent. of its gross  
 " receipts from taxation, come to it from the coffers of the  
 " company which it created. With prompt compliance  
 " with the obligations, with steady and continued pay-  
 " ments of dividend, with steady adherence to original  
 " principles in giving every stockholder an equal advan-  
 " tage, the Baltimore and Ohio Railroad Company has  
 " still remaining a surplus fund of perhaps unparalled  
 " proportions; and this great surplus, now reaching  
 " nearly fifty millions, is largely invested where the city  
 " and State reap the benefit. It is represented by Eleva-  
 " tors, which have given Baltimore its enviable promin-  
 " ence as a grain receiving and distributing point, and in  
 " wharves and docks, which have rendered her harbour  
 " the equal of that of any on the globe."

In referring to the remarks made by the gentlemen  
 whom I have quoted, I may be going beyond the record  
 of the Harbour Trust, but I am so impressed with the  
 future of the rail and water transportation that I have  
 ventured to place them before you. New York has her  
 two great railways and her free canals, yet the latter,  
 when tolls existed, in 1880 only carried 25 per cent.,  
 while the railways carried 75 per cent. In 1884, with no  
 tolls, the canal's proportion is only 16 per cent., and rail-  
 ways 84 per cent., evidently showing that even with free  
 canals, railways are pushing canals aside.

Baltimore has only her Railways to depend on. The distances from Chicago to Baltimore and Montreal are practically the same—like the two sides of a triangle. I am led to wonder how it is that Montreal, during her season of navigation, with her two great Railways, with her shorter sea route, leaving our taxed Canals out of consideration, cannot compete on as favourable terms for through freight as our competing city of Baltimore.

#### MONTREAL HARBOUR.

In the Harbour of Montreal the Victoria Pier has been lengthened about 100 feet on its down stream end, and widened 50 feet, or one-half wider than before. The effect of this is to make the pier of sufficient capacity to allow of berthing two large steamers on each side, and to afford space on the wharf for the erection of goods sheds which could not before be done.

The dredging in the harbour has been mainly directed toward the deepening of the basins and approaches so as to keep pace with the deepening of the ship channel below.

Details of the work done, both in the Channel and Harbour, will be found in the report of Mr. Kennedy, Chief Engineer.

#### SHIP CHANNEL.

The summer's work in the deepening of the Ship Channel to  $27\frac{1}{2}$  feet at low water has been carried on very satisfactorily. A Cap a la Roche and vicinity, where the channel is being cut through rock shoals and the work is the most difficult now on hand, the dredges have done about one-third more than in 1884. In Lake St. Peter, which is the most extensive though not the most formidable section of the work, the dredges have done over 50 per cent. more than in 1884, and the aggregate of all the dredg-

ing done throughout the Ship Channel is also over 50 per cent. greater than in the preceding year.

It was with feelings of the deepest sorrow, that when in Ottawa on 18th February last, I received a telegram stating that my predecessor in the chair, the late Mr. Cramp, had died very suddenly. At the first meeting of the Board thereafter, the following resolution was unanimously adopted :—

*Resolved.*—That the Harbour Commissioners have learnt with extreme regret of the sudden death of Mr. Thomas Cramp, a gentleman who was a member of the Trust for various periods, from 1860 to 1879, during a portion of which time he occupied the position of acting chairman, and in 1878-9 that of chairman.

The Commissioners desire to place on record their high appreciation of the valuable services he rendered to this Trust, and of the willingness he at all times displayed in forwarding the best interests of the Harbour and the Shipping Trade by the St. Lawrence route.

That the secretary be instructed to forward a copy of this resolution to Mrs. Cramp, and at the same time express the deep sympathy of the Commissioners in the great loss she has sustained.

It was further resolved that the Commissioners attend the funeral of the deceased on Saturday, the 21st instant, at 2 P. M.



RECEIPTS AND EXPENDITURE  
OF THE  
HARBOUR COMMISSIONERS OF MONTREAL  
FOR THE YEAR 1885.

HARBOUR COMMISSIONERS OF MONTREAL,  
*Secretary's Office,*  
MONTREAL, February 9th, 1886.

WM. SMITH, ESQ.,  
*Deputy Minister of Marine,*  
OTTAWA.

SIR,

I have the honour, by the direction of the Harbour Commissioners of Montreal, to forward herewith, for the information of the Honourable the Minister of Marine, statements of the receipts and disbursements of the Trust for the year ended 31st December, 1885.

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

FROM COLLECTOR OF CUSTOMS, MONTREAL:

Wharfage on Goods, Inwards.....	\$ 90,703 82
"    "    Outwards.....	53,171 20
Tonnage Dues on Steamships .....	36,725 48
"    "    Sailing Vessels.....	5,528 41
	————— \$186,128 91

Brought forward..... 186,128 91

## LOCAL TRAFFIC.

Wharfage on Goods, Inwards .....	\$ 5,142 07	
"    "    Outwards .....	316 42	
Harbour Dues on Barges .....	8,218 02	
"    "    Steamers .....	2,168 43	
Commutation on " .....	13,313 44	
Received for Cars transferred by Str. South-Eastern.	1,452 00	
"    Lumber piled on Wharves .....	1,820 00	
"    Firewood " .....	365 50	
"    Coal stored on " .....	1,440 00	
"    Phosphates stored on " .....	98 12	
"    Small Offices .....	675 10	
"    Scales .....	800 00	
"    Penalties .....	9 00	
"    Rent of Tracks .....	2,950 00	
		<u>38,768 10</u>

## ORDINARY REVENUE.....

\$224,897 01

## FROM DOMINION GOVERNMENT:

Received on account New Channel Works .....	\$349,504 10	
Harbour Revenue—Rent of Offices .....	\$1,625 00	
"    "    —    "    tracks to C.P.		
Ry., 1884..	2,950 00	
		<u>4,575 00</u>
Real Estate—Third instalment on old building .....	3,600 00	
"    "    —One year's inter't on above.	648 00	
		<u>4,248 00</u>
Harbour Debentures, Series C, sold .....	68,000 00	
"    "    "    D, " .....	95,000 00	
Harbour Interest on Bank Account .....	\$1,441 14	
Accrued Interest on Debentures sold....	7,050 20	
		<u>8,491 34</u>
		529,818 44
Sundry Accounts received for Credit, as under :—		
Harbour Repairs .....	42 50	
"    Dredging .....	2,470 00	
Buoys and Beacons .....	20 00	
Coal Oil, Lighting Wharves .....	7 00	
New Channel Operations .....	3,198 87	
Printing, Advertising and Stationery .....	24 15	
Sundry Plant, sold. &c. ....	3,660 25	
		<u>9,422 77</u>
'TOTAL RECEIPTS.....		<u>\$764,138 22</u>

## The expenditure was as follows :—

Harbour Survey.....		\$ 10 49
Legal and Notarial Expenses.....		1,174 64
Dominion Government Interest Account.....		81,704 10
Harbour Railway.....		86 88
St Lambert's Channel, Government Survey.....		25 10
Latrines.....		31 96
Lighting Wharves, Coal Oil.....	457 27	
“ “ Electric Light.....	2,397 67	
	<hr/>	2,854 94
Mrs. John Young, Annuity.....		600 00
Wharfages Returned.....		2,337 95
Interest on Harbour Debt.....		115,975 00
Harbour Repairs.....		42,200 55
Buoys and Beacons.....		10,356 69
Travelling and Incidental Expenses.....		311 80
Victoria Pier, Construction Account.....		30,876 13
Printing, Advertising and Stationery.....		2,039 92
Harbour Dredging.....		38,588 86
Harbour Expenses and Management.....		26,111 57
New Channel Operations.....		154,195 84
Accounts written off.....		2 00
Harbour Debentures, Series E E, paid.....	4,000 00	
“ “ “ F F, “.....	72,000 00	
	<hr/>	76,000 00
TOTAL EXPENDITURE.....		<hr/> <hr/> \$585,484 42

The ordinary revenue for the year shows a decrease of \$5,668, or, say, 2.45 per cent., as compared with 1884, the decrease in sea-going traffic being \$7,062, while the local traffic has increased \$1,394.

This may, on the whole, be considered satisfactory, in view of the dues on grain being reduced by one-half (viz.,  $3\frac{3}{4}$  per cent. per ton) for the whole season,—and further, that, owing to the improvements in the Lachine Canal, a large number of vessels resort there to load and discharge, thus depriving the Commissioners of a considerable revenue, which for the year amounted to over \$13,000.

The reports of the several departments have been forwarded you, viz.: the Chief Engineer's on the Harbour

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

The Harbour Master's Report shows an increase in the number of sea-going vessels of 3, and in tonnage of 34,480 tons.

As regards the inland traffic, the vessels have increased by 198, but the tonnage has fallen off 1,630 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.

It is satisfactory to be able to state that the work has been carried on with good results within the period above mentioned.

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 1885.

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

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HARBOUR COMMISSIONERS OF MONTREAL,  
*Chief Engineer's Office,*  
MONTREAL, 15th February, 1886.

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, 1885 :—

The principal works of the year are: Dredging the basins in Sections 5 to 10, 12 to 14, and 20 to 21; deepening the Ship Channel through the Harbour and enlarging the Victoria Pier.

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

*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 plant was also employed for some weeks in the fall, and cleared away many of the boulders from the lower part of the basin. Quantity dredged, 28,856 cubic yards; boulders raised by stone-lifter, 169 cubic yards; expenditure, \$13,290.

*Section 11 (near the entrance to Lachine Canal).*—A few boulders and a small piece of shoal were cleared away; expenditure, \$510.

*Sections 12 to 14.*—In the basin occupied by the Allan Line, several small detached shallow places have been deepened to  $27\frac{1}{2}$  feet at low water, and a few boulders have also been taken out by a stone-lifter. Quantity dredged, 21,330 cubic yards; boulders lifted, 20 cubic yards; expenditure, \$10,130

*Section 18 (Market Basin).*—Some deepening was done in the upper side of the basin; quantity dredged, 742 cubic yards; expenditure, \$197.

*Sections 20 and 21 (Military Basin and Victoria Pier).*—The basin was deepened at several places on the north-east side and at the entrance. Quantity dredged, 8,089 cubic yards; costing \$2,169. The down-stream portion of the Victoria Pier, or that parallel to the main shore, was formerly 103 feet wide by 700 feet long on the inner side and 608 feet on the outer side. It has proved too short to berth two large steamers on each side, and also too narrow to afford convenient room for sheds and handling of cargo, and it was therefore determined by the Board that it should

be enlarged. The work was carried out last summer and the pier was lengthened by the addition of cribwork similar to that in other parts, and was widened by pilework placed on the side next the basin, making the down-stream portion of the pier as thus enlarged 689 feet long on the outer and 847 feet on the inner side, by 151 feet in width. Expenditure to end of 1885, \$28,558. Extensive repairs (described below under the head of "Harbour Repairs,") were also made to the pier.

*Sections 41 to 44 (Hochelaga).*—The greater part of the hard material dredged out of other parts of the Harbour has, as in former years, been deposited alongshore 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, 20,564 cubic yards; deposited from scows by hand, 810 yards; total, 21,374 yards.

In Sections 41 and 42 some channels were dredged through the shoal places in order to allow access for the scows carrying the dredgings. Quantity dredged, 3,994 cubic yards—costing \$657.

*Ship Channel through the Harbour opposite Sections 12 to 24.*—The deepening of shoal places to 27½ feet at low water has been continued by some of the dredges belonging to the Harbour Dredging Fleet and by a stone-lifter of the Ship Channel Fleet. Quantity dredged, 32,703 cubic yards; boulders lifted by stone-lifter, 212 cubic yards; costing in all \$15,518.

#### HARBOUR REPAIRS.

It will be remembered that the breaking up of the ice in the Harbour in spring was accompanied by "shoves" of unusual magnitude, and also by the rising of the river

to more than ordinary height,—one of the effects of which was to leave a quantity of ice lodged on the wharves vastly greater than is known to have ever been left before. It may be said broadly that the whole surface of all the wharves and roadways in the Harbour, except those on Section 20 and those from 25 to 32, were completely covered with masses of ice from 3 feet to 40 feet in height. On the 4th of May, which was as soon as the lowering of the river permitted, a force of 400 to 500 men and 100 horses with carts and scrapers were set to work to clear the wharves of ice, and by the 26th of May all was either removed or had melted away.

Rough measurements showed that the total quantity of ice left lodged on the wharves was about 292,000 tons or 368,000 cubic yards, and of this there were 135,000 tons or 170,000 cubic yards removed artificially at a cost of about \$8,400 or very nearly 5 cents per yard.

Appended to page 29 is a detailed table of the approximate quantity of ice left on the wharves by the flood, and of that artificially removed.

The greatest height to which the water of the river rose, at the foot of the Lachine Canal, was 40 feet 8 inches over the lower lock sill. The highest of former years since 1852 was 41 feet 7 inches in 1861, 40 feet 9 inches in 1865, and 40 feet 5 inches in 1869.

On the clearing away of the water and ice the wharves were found to have suffered damage in several places, partly from the direct action of ice, but chiefly from scouring out the foundation of the cribwork, caused, doubtless, from the choking up of the river by ice in certain parts and more violent currents in the remaining channels. The wharves which suffered noteworthy damage from scouring are Sections 9 and 10. Windmill Point, and the upper and lower ends of Victoria Pier, Section 20. Those damaged by ice are at various places



from Sections 23 to 25 inclusive and Sections 33 to 36 inclusive.

The roadways of the wharves were damaged by scour, chiefly in the neighbourhood of Victoria Pier, but not greatly more than in other years.

*Section 20, Victoria Pier.*—The outside corner of the pier, at the lower end, was so much displaced and damaged by being undermined during the winter that it was necessary to rebuild it. One crib of 115 feet in length was therefore dredged out and replaced by a new one founded at 28 feet depth at low water, and the whole made good. Cost of cribwork, \$1,748; dredging, crib-filling and back-filling, \$2,181; total, \$3,929.

Repairs of lesser extent were also made to other wharves damaged by the ice and winter scour, costing in all \$1,543.

*Roadways.*—The roadways, as above mentioned, were considerably damaged by the winter scour of the river, and on the cessation of the flood they were repaired with macadamizing stone. The total quantity of macadam used in this and ordinary repairs for the summer was 1,029 toises.

The other Harbour repairs for the year have been light, and have mainly consisted of ordinary maintenance and repairs of the wharves and roadways.

The total expenditure under the head of "Harbour Repairs" has amounted to \$42,158, and 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

## HARBOUR DREDGING.

The Harbour Dredging Fleet has been of the same strength as in 1884, viz. : Four spoon (or dipper) dredges, two derricks, three screw tugs, with scows and a floating shop as detailed in the annexed table. Besides being engaged in work belonging strictly to the Harbour, the Harbour dredges have spent a considerable portion of their time in deepening that part of the Ship Channel which runs through the Harbour. One of the stone-lifters belonging to the Ship Channel Fleet was in turn borrowed to assist in clearing the boulders from the Windmill Point Basin.

The dredges, tugs and derricks were as usual wintered in the Richelieu River at the Harbour Commissioners' shipyard, Sorel, and the necessary repairs were made at the Commissioners' works. A few of the dredges' scows were also wintered and repaired at Sorel, but the greater part, 14 in all, were wintered in Vinet's Channel, Boucherville Islands.

All the vessels at Sorel were safely wintered : those at Boucherville, however, though placed where they have been safely wintered for many years past, unfortunately sustained very serious damages. The ice, in the extraordinary shoves of last spring, broke into the channel where the scows lay, stove in the sides of some, tore the decks off others, piled some of them on top of each other, and then carried most of them down the river, till they were rescued adrift or left stranded at different places as far down as Pointe du Lac.

(A list of the repairs made to the hulls and machinery of the different vessels given in the manuscript report is here omitted.)

## COST AND QUANTITY OF WORK.

The Harbour dredging fleet left winter quarters at Sorel on May 6th, which was as early as the clearing away of the ice from the St. Lawrence allowed, and arrived at Montreal on the 7th. The dredges were, however, prevented from commencing work for several days after, for lack of the scows damaged in the ice shove at Boucherville. The scows were repaired at Sorel as quickly as possible and No. 6 dredge was enabled to begin work on May 13th, No. 5 on 15th and No. 4 on 18th, and No. 7, the last, followed on June 1st. All worked until December 4th when Nos. 4, 5 and 6 were stopped by the severe frost and were sent to Sorel for the winter.

No. 7 dredge, the tug *Delisle* and two scows were chartered to the Grand Trunk Railway and sent to Belœil on Nov. 26th, where they worked till December 21st, and were laid up for the winter there. No. 4 dredge and clamshell derrick No. 2 worked 17 days in June, under charter, at the new basins in the Lachine Canal.

No. 7 dredge, while lying off the Island wharf, Sec. 15, in August was run into by the barque "*Idun*" and had her crane and other forward parts rather seriously damaged, causing a delay of four days. The same dredge while lying in the basin opposite Sec. 13 at night in November was run into by a barge and was so careened over that before she could be righted she filled and sank. She sustained no serious damage and was lifted by the other dredges and set to work after a delay of seven days.

With these exceptions the Harbour dredging plant was employed throughout the summer, either on the Harbour work proper or in the Ship Channel through the Harbour. The number of days during which the spoon dredges were on duty, including all except Sundays and the charter time of Nos. 4 and 7, from commencing in spring to

leaving off in the fall, was 156 days for No. 4; 175 days for No. 5; 177 days for No. 6, and 153 days for No. 7; making an aggregate of 661 days without deductions for stoppages. From this may fairly be deducted the 11 days lost by No. 7 in consequence of being run into by other vessels, and therefore not due to any failure of the dredge itself. There will then remain 650 days in which the dredges were on duty. The nominal working time is 10 hours per day which gives a total of 6,500 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 5,192 hours or an average of 79.90 per cent of the gross time of service.

The total outlay for working the fleet, consisting of four spoon dredges, two unloading derricks, three tugs and the scows was \$43,442, 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 year's work compares favorably with that of other years, but the cost of the dredging per yard is high. This latter arises from the dredging having been almost entirely in small shoals of rock and very hard ground in deep water.

The following are the comparative costs and quantities of dredging for 1885 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 $\frac{50}{100}$	
1877...	173,449	45,103	26	
1878...	211,731	48,748	23	
1879...	189,609	41,006	21 $\frac{63}{100}$	
1880...	186,430	46,914	25 $\frac{16}{100}$	
1881...	170,764	54,128	31 $\frac{69}{100}$	
1882.	187,339	53,598	28 $\frac{60}{100}$	Spoon Dredges and Stonelifters.
	9,429	13,254	\$1.40 $\frac{60}{100}$	Elevator Dredges.
	196,768	66,852	33 $\frac{26}{100}$	Average.
1883.	35,142	16,998	48 $\frac{37}{100}$	Spoon Dredges and Stone-lifters.
	6,795	17,539	\$2.58 $\frac{10}{100}$	Elevator Dredges—lifting rock and boulders and clearing up.
	41,937	34,537	82 $\frac{35}{100}$	Average.
1884...	125,648	49,468	39 $\frac{37}{100}$	Spoon Dredges and Stone-lifters.
1885...	69,494	28,563	41 $\frac{10}{100}$	" " "

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 cleaning up loose boulders and rock. Material, chiefly shale, hard pan and gravel, dredged with spoon dredges ; and boulders grappled with stone-lifting barges. Depth of water at time of dredging 25 to 30 feet. Quantity 29,025 cubic yards measured loose on scow, costing 45<sup>8</sup>/<sub>10</sub> cents per cubic yard.

*Section 11.*—Cutting down some small points and taking up loose stones and boulders ; lime stone rock, hard pan and boulders ; 25 to 30 feet of water ; 400 cubic yards, costing \$1.24 per 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 ; 21,350 c. yds. costing 47<sup>1</sup>/<sub>2</sub> cents per cubic yard. A stone lifter also worked one day raising loose boulders.

*Section 18.*—Deepening on upper side of basin ; sand ; 25 to 30 feet depth ; 742 cubic yards ; costing 26<sup>8</sup>/<sub>10</sub> per yard.

*Sections 20 and 21.*—Military Basin. Dredging several detached shoals ; sand and stones ; 25 to 30 feet depth ; 8,089 cub. yds., costing 26<sup>8</sup>/<sub>10</sub> cents per yard.

*Victoria Pier.*—Dredging out a damaged crib of the wharf and preparing site for new one ; 15 to 28 feet depth ; sand stones and timber work ; 5,884 cubic yards, costing 27<sup>3</sup>/<sub>4</sub> cents per yard.

*Sections 41 and 42 (Hochelaga).*—Dredging small channel for scows ; 4 to 10 feet depth ; sand and stones ; 3,994 cubic yards, costing 16<sup>1</sup>/<sub>2</sub> cents per cubic yard.

Yours respectfully,

JOHN KENNEDY,

*Chief Engineer.*

## ICE ON WHARVES.

TABLE showing the approximate thickness and quantity of ice left on the wharves in Montreal Harbour, in the first week of May, 1885, on the subsidence of the spring floods; also the approximate quantity of ice removed from the wharves by the Harbour Commissioners:—

Section No.	Greatest thickness stranded. Ft.	Average thickness stranded. Ft.	Tons (2,000 lbs.) stranded.	Tons (2,000 lbs.) removed.	Kind of ice.	
6	12 to 14	7	10,706	1,606	} Chiefly block ice.	
7	12 " 14	7	10,706	1,606		
8	12 " 14	7	10,706	1,606		
9	12 " 14	7	2,294	.....		
10	12 " 14	7	2,294	.....		
12	10 " 12	4 to 5	6,118	6,118	} The ice toward the revetment wall was chiefly in blocks, and that near edge of wharves was chiefly anchor ice.	
13	10 " 12	4 " 5	14,706	7,353		
14	10 " 12	4 " 5	11,173	7,749		
15	10 " 12	4 " 5	3,088	1,544	} Chiefly anchor ice, with coating of block ice on top.	
16	.....	6	17,647	8,823		
17	40	10	24,088	18,066	} Block ice near revetment wall, and chiefly anchor ice on piers.	
18	.....	2	5,070	791		
19	.....	12	11,295	1,967	} From section 20 downward the ice was chiefly in blocks.	
20	.....	3	221	.....		
21	.....	4	7,588	7,588		
22	.....	4	8,565	8,565		
23	.....	5	18,235	13,676		
24	.....	1	8,074	2,153		
32	.....	3	882	.....		
33	.....	3	441	.....		
34	.....	10	15,294	4,588		} Chiefly block ice, but with masses of anchor ice intermixed.
35	.....	10	19,882	4,588		
36	.....	10	22,941	4,588		
37	.....	10	37,647	25,098		
38	.....	10	19,706	5,912		
39	.....	5	3,162	949		
Totals.....			292,529	134,934		

NOTE.—34 cubic feet of ice allowed to a ton. In cubic yards the quantities are:—Total stranded, 368,580 cubic yards; removed, 170,000 cub. yards.

HARBOUR DREDGING—ABSTRACT OF WORK DONE BY EACH DREDGE FOR THE HARBOUR OF MONTREAL IN 1885.

VESSELS.	Time of Service.	PLACES AT WHICH DREDGES WORKED.	QUANTITIES DREDGED, CUBIC YARDS.			CHARACTER OF SOIL.
			Spoon Dredges.	Stone Lifters.	Totals. <i>Cubic Yds.</i>	
Dredge No. 4.....	55½ 7 5 24½ 10	Sections 5 to 10, Windmill Point..... " 11, Entrance to Canal..... " 12 to 14, Allan's Basin..... " 20, Victoria Pier..... " 41 to 44 Hochelaga.....	6,750 394 641 5,884 3,994		17,663	Black rock, hard pan gravel, and stones. Black rock, hard pan and stones. Sewage. Foundations for cribs-sand and stones. Sand, gravel and stones.
Do. No. 5.....	23 22 3 33	" 5 to 10, Windmill Point..... " 12 to 14, Allan's Basin..... " 18, Market Basin..... " 20 and 21, Military Basin.....	3,420 2,396 742 8,089		14,647	Black rock and boulders. Black rock, hard pan, quick sand and stones. Sand. Rock, sand and stones.
Do. No. 6.....	80 97	" 5 to 10, Windmill Point..... " 12 to 14, Allan's Basin.....	12,239 14,029		26,268	Rock. Hard pan, sand and stones.
Do. No. 7.....	40 30	" 5 to 10, Windmill Point..... " 12 to 14 Allan's Basin.....	6,457 4,284		10,721	Hard pan, sand and boulders. Hard pan, sand and sewage.
Stone-Lifter, No. 1.....	29 6 1	" 5 to 10, Windmill Point..... " 11, Entrance to Canal..... " 12 to 14 Allan's Basin.....		169 16 20	205	Boulders. "
Totals.....	466		69,289	205	69,494	

The Dredging done in the Ship Channel through the Harbour of Montreal is not included in the above table.  
Dredge No. 4 worked on charter, 17 days in Lachine Canal.



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 1885.

PLACES WHERE DREDGES WORKED.	VESSEL.	DAYS.	TOTAL DAYS.	QUANTITIES DREDGED.			CHARACTER OF SOIL.
				Spoon Dredges.	Stone Lifters.	Totals. Cubic yds.	
Sections 5 to 10, Windmill Point.....	Dredge No. 4.	55½	.....	6,750	.....	.....	Black rock, shale rock, hard pan, gravel, sand and boulders.
	" " No. 5.	23	.....	3,420	.....	.....	
	" " No. 6.	80	.....	12,220	.....	.....	
	" " No. 7.	40	198½	6,457	.....	28,856	
" 11, Entrance to Canal.....	S. Lifter No. 1.	29	29	.....	169	169	Boulders.
	Dredge No. 4.	7	7	384	.....	384	Black rock, hard pan and stones.
" 12 to 14, Allan's Basin.....	S. Lifter No. 1.	6	6	.....	16	16	Boulders.
	Dredge No. 4.	5	.....	641	.....	.....	Black rock, hard pan, gravel, sand and boulders.
	" " No. 5.	22	.....	2,396	.....	.....	
	" " No. 6.	07	.....	14,029	.....	.....	
" " No. 7.	30	154	4,264	.....	21,330		
" 18 Market Basin.....	S. Lifter No. 1.	1	1	.....	20	20	Boulders.
	Dredge No. 5.	3	3	742	.....	742	Sand.
" 20 and 21, Victoria Pier.....	Dredge No. 4.	24½	.....	5,834	.....	.....	Digging foundations for cribs. Rock, sand and stones.
	" " No. 5.	33	57½	8,089	.....	13,973	
" 41 to 44, Hochelaga.....	Dredge No. 4.	10	10	3,994	.....	3,994	Stones, sand and gravel.
Totals.....			466	69,280	205	69,491	

HARBOUR COMMISSIONERS' DREDGING PLANT EMPLOYED IN THE HARBOUR OF MONTREAL, 1884.

DESCRIPTION OF VESSEL	HULL.			ENGINES.				Capacity of Bucket.	Depth to which Dredge can work.	REMARKS.	
	Length over all.	Breadth of Beam.	Depth of Hold.	When Built.	Kind of Engine.	No. of Cylinders.	Diameter of Cylinders.				Length of Stroke.
<b>DREDGES.</b>											
Crane Spoon Dredge, No. 4	77.3	27.0	6.6	1872	Horizontal, non-condensing.	1	14	16	60	32	Wooden Hull. Altered in 1882. Altered in 1881. Wooden Hull.
Beam " " No. 5	77.6	27.0	6.6	1873							
" " " No. 6	77.0	27.0	7.6	1874							
Crane " " No. 7	77.3	27.0	7.0	1874							
<b>DERRICKS.</b>											
Clam Shell Derrick, No. 1	56.8	23.9	5.9	1872	Horizontal, non-condensing.	1	8	12	75	Used as pile-driver. Wooden hull.	
" " " No. 3	61.9	24.0	5.9	1875		1	10	12	75		
<b>TUG BOATS.</b>											
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	29	22	93		
" St. Paul	65.6	15.0	8.0	1875		1	16	18	100		
<b>BARGE.</b>											
Staghound, floating shop.	103.4	21.5	7.6	1869						Wooden hull.	
<b>SCOWS.</b>											
4 Dumping Scows	80.0	16.0	7.6							All wood.	
2 Flat Scows	75.0	20.0	5.9	1876						" "	
6 " " various sizes and ages.	75.0	20.0	6.0	1878						" "	

REPORT  
OF THE  
HARBOUR MASTER OF THE PORT OF MONTREAL.  
FOR THE YEAR 1885.

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CAPTAIN THOMAS HOWARD, *Harbour Master.*

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HARBOUR COMMISSIONERS OF MONTREAL,  
HARBOUR MASTER'S OFFICE,  
MONTREAL, January 6th, 1886.

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

SIR,—

For the information of the Board of Harbour Commissioners, I beg to submit the following as my Annual Report, for the year 1885, with comparative statements, showing the number, tonnage, classification, nationality, greatest number of vessels in port at one time, and 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.

Six hundred and twenty-nine (629) sea-going vessels arrived in port during the past season, of the aggregate tonnage of 683,854 tons, showing an increase of (3) three vessels and 34,480 tons in tonnage, as compared with the year 1884. Of these vessels, 459 were built of iron, of an aggregate tonnage of 609,191 tons. and 170 built of wood, of an aggregate tonnage of 74,663 tons. Of inland vessels there arrived in port 5,003, of an aggregate tonnage of 724,975 tons, and a total of 5,632 vessels of all classes, and 1,408,829 tons in tonnage. Of inland vessels there is an increase of 195 vessels, and in tonnage a decrease of 1,130 tons.

There were 26,465,543 feet of lumber shipped for South America during the season, showing an increase of 2,079,270 feet over the previous year. This lumber was carried in 47 vessels, being the same number as the previous year, but of a much larger class.

The South American trade increases yearly, which shows the advantage of shipping from this port over any other on the River St. Lawrence.

There were shipped during the season to the United Kingdom by steamers, 84,282,275 feet of lumber, and by sailing vessels 5,385,132 feet, making a grand total 89,667,407 feet shipped from this port during the season of 1885, showing an increase of 37,080,202 feet over the previous year.

*The Coal Trade.*—During the season, we had from Great Britain 48,022 tons, showing a decrease of 4,320 tons, and 1,146 tons of coke, and from the United States, 213,641 tons, showing a decrease of 9,058 tons, and 184 tons of coke, making a total of 262,993 tons. We had 215,600 tons from the Maritime Provinces, showing a decrease of 1,810 tons, making a total from all sources of 478,593 tons, and a decrease for the year of 14,642 tons.

The shipment of phosphate from this port continues to

increase, as shown by the following figures : 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, and in 1885, 24,299 tons, showing an increase of 3,838 tons for the past season.

The Canadian Pacific Railway Company's Elevator, with a capacity of about half a million of bushels, will be completed by the opening of navigation. It will be of great advantage to our port as a receiving store house for the grain from the Great North-west, from there to be discharged into the ships in our harbour.

The extension and widening of Victoria Pier, which was completed this fall, affording accommodation for four of the largest class of sea-going vessels, was much needed.

*The Wharves.*—I would recommend that, when practicable, the wharves should be permanently planked, for the discharging and receiving of cargoes from ships. It would much facilitate loading and unloading. Merchandise of all classes could be handled without damage, and at much less cost, as it is at present. I am credibly informed, that in the spring and fall, ship agents have had, on several occasions, to pay heavy damages to merchants. The first cost may seem large, but I am confident, in the long run, it would be much cheaper, and would tend to increase the popularity of our harbour, with ship agents and merchants in general.

JANUARY 1st—The year came in mild, temperature 45 at 10 A. M., north-west wind ; in the afternoon much colder, temperature 29, open water opposite the city, crossing at Longueuil on foot, sleighing bad ; 2nd, much colder, temperature 5 above zero ; on the 3rd, 2 above zero, ice taken opposite the city ; 4th, much milder, temperature 25 above zero, no snow yet ; 5th, water rising ; 6th, mild east wind, rain, temperature, 52 ; 7th, west wind, temperature 34 ; 8th, fine morning, temperature 32, snow

last night, but not enough to make sleighing ; 11th, snow and rain ; 12th, very mild, temperature 44, rain all morning, snow all gone ; 15th, snowing, temperature 16 above ; 17th, great snow-storm, blowing a gale ; 21st, 17 above zero ; 22nd, cold day, 21 below zero ; 23rd, zero ; 27th, 15 below zero ; 28th, blowing a gale, temperature 15 below zero ; 29th, delightful day, temperature 8 above ; 31st, fine, temperature 10 above zero. The month throughout was very changeable, having gone as high as 52 above zero, and as low as 21 below zero.

FEBRUARY, 1st, snow-storm all day, 5 above zero ; 3rd, very cold, 20 below zero ; 5th, 12 above zero ; 7th, 10 below zero ; 9th, 12 above zero ; 10th, snow and rain all last night, temperature 30 above zero ; 11th, cold, temperature zero ; 14th, 10 below zero, clear weather ; 17th, great snow-storm, all roads blocked, west wind ; 21st, fine and cold, temperature 20 above zero ; sleighing good ; 26th, temperature 8 above zero ; 28th, much milder ; 25 above zero, west wind.

MARCH 1st, mild, snow and rain, temperature 35 ; 4th, snowing, east wind, temperature, 15 above zero ; 7th, cold morning, east wind, temperature 5 above zero ; 9th, very cold, temperature zero ; 11th, 10 below zero ; 14th, snow last night, temperature zero ; 15th, snow-storm all day, with high westerly wind ; 19th, very cold, temperature 14 below zero ; 20th, blowing a gale, snow-storm, temperature 22 above zero ; 26th, fine and mild, south-west wind, temperature 24 above zero ; 28th, delightful day, temperature 38 above zero ; 30th, fine, cold morning, east wind, temperature 10 above zero ; 31st, mild, temperature 38, west wind.

APRIL 1st, 8 a.m., snowing ; 9 a.m., fine sunshine, west wind, temperature 40 ; 2nd, much colder, temperature 25 above, in the afternoon, snow storm, which continued all night ; 3rd, snow storm still continued, this was the most

severe snow storm of the winter; 4th, blowing a gale, temperature 28; 5th, rain, snow and wind; 6th, temperature 40, roads in a dreadful condition; 7th, south wind, temperature 44; 11th, fine morning, temperature 32, south wind; 13th, temperature 35, fine day, first appearance of vehicles on wheels; 22nd, temperature 48, north wind, the ice opposite the city moved at 1 p.m.; Richelieu River clear last night at 11 p.m.; 24th, ice shoved this morning, water up to the street; 25th, much colder, temperature 45, Point St. Charles all flooded; 26th, snow storm all the afternoon; 28th, temperature 42, north-east wind, ice shoved last night, channel clear, the water was at highest 40 feet 8 inches; 29th, water falling slowly; 30th, temperature 48, no change in ice.

MAY 1st, fine, clear day, temperature 42, north wind; 4th, temperature 50, river clear of ice, great quantity remained on the wharves, water fell to level of wharves; 5th, the steamers "Laprairie" and "Boucherville" arrived in port at 2 p.m., from Boucherville, where they had wintered, being the first arrivals in port; 6th, a number of steamers arrived from Sorel; steamer "Quebec" left for Quebec; 8th, temperature 49, SS. "Brooklyn" arrived at 8 a.m., first arrival from sea, and SS. "Concordia" at 9 a.m.; 20th, fine but cold, temperature 57; 24th, temperature 75; 27th, temperature 65, ice nearly all clear off the wharves; 31st, rain all day.

JUNE 1st, west wind, temperature 65; 5th, rain all day, east wind, temperature 55; 8th, cold, wet morning, temperature 55; 9th, frost last night; 12th, fine and warm, temperature 65; 16th, temperature 70 to 84 in the afternoon; 21st, south wind and rain, 3 p.m. heavy squalls, temperature 75; 28th, 10 a.m. fine, 3 p.m. great rain storm, continued all night; 30th, cold north-east wind, temperature 55.

JULY 1st, disagreeable weather, temperature 60; 4th,

temperature 70; 5th, temperature 80; 12th, fine day, temperature 75; 17th, at 3 p.m. temperature 85½; 18th, great change, temperature 60; 22nd, Harbour Commissioners left at 7 a.m. on their annual trip to inspect the channel; 24th, Commissioners arrived home at 10 a.m.; 25th, temperature 84; 29th, temperature 75; 31st, temperature 75.

AUGUST 1st, cool morning, with north-east wind, temperature 67; 4th, rain all last night, temperature 70; 6th, temperature 50, at 6 A. M.; 12th, temperature 70; 18th, south wind, rain during the night; 23rd, temperature 70; 27th, cold north wind, temperature 50; 31st, dark day, temperature 60.

SEPTEMBER 1st, dark cold day; 2nd, temperature 62; 7th, temperature 65; 9th, blowing a gale, north-east wind, with rain; 14th, rain all last night, temperature 70; 20th, delightful day, temperature 60; 23rd, cold wet day, temperature 44; 25th, cold frosty morning; 27th, temperature in the afternoon, 80; 29th, thick fog, east wind; 30th, fine day, temperature 75.

OCTOBER 1st, fine day, east wind, temperature 65; 4th, rain all day; 5th, clearing up, temperature 50; 8th, frost last night, temperature at noon 44; 19th, dark cold morning, temperature 52; 21st, rain all last night, and raining all day, one of the heaviest rain falls we have had for many years; 22nd, fine and clear, temperature 55; 27th, dark day, raining, temperature 47; 29th, east wind and rain; 30th, first snow-storm of the season, blowing a gale, temperature 33; 31st, cold frosty morning, temperature 30.

NOVEMBER 1st, fine and mild; 2nd, temperature 37, snow and rain; 5th, misty morning, east wind; 8th, rain all day and night; 15th, cold wet wind, temperature 32; 19th, rain all night, snowing this morning, temperature 32; 25th, snowing, temperature 33; 26th, snowing all



day ; 29th, snowing all night ; 30th, dark morning, temperature 30.

DECEMBER, 1st, fine morning, east wind, temperature 30 ; 2nd, thick fog ; 5th, snow-storm, temperature 24 ; 7th, blowing a gale, temperature zero ; 9th, cold rain, and frost, temperature 27 above zero ; 14th, temperature 32, rain last night ; 17th, 4 above zero ; 20th, blowing a gale ; 21st, good sleighing ; 25th, Christmas Day, fine and cold ; 26th, water over the wharves ; 30th, mild, temperature 30 ; 31st, temperature 32, west wind, rain in the afternoon, river full of ice, to the head of St. Mary's current, opposite the city, open water, about one foot of water over the wharves, dark, unpleasant day, sleighing bad.

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 1885, that were navigated by 18,344 Seamen.*

Nationality.	Number of Vessels.	Tonnage.
British .....	598	664,034
Norwegian .....	19	10,943
German .....	5	4,871
American .....	4	2,360
Swedish .....	1	468
Austrian .....	2	1,178
Total .....	629	683,854

## 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.
1876.....	April 27.	Dec. 10.	May 8.	Nov. 23.
1877.....	" 17.	Jan. 2, '78.	April 29.	" 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.

## 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.
1876.....	6,083	786,083	262..... Nov. 9.
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.

## 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.
1876.....	87	47,199	1	739	30	15,451	4	993	25	4,220	67	7,322	214	75,924
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

## 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.	Total number of vessels.	Total number of tonnage.	Greatest Number in Port at one time.
1876 .	240	262,829	40	37,303	146	66,002	18	4,700	35	5,848	123	14,498	602	391,180	61.....July 24
1877..	247	261,764	41	41,904	108	56,909	10	2,560	25	4,987	78	8,735	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	4,339	93	51,195	10	2,702	37	7,182	125	13,604	648	554,692	53..... " 21
1883..	464	605,805	3	3,556	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	682,854	43.....July 15

## PORT OF MONTREAL.

*Number and Tonnage of Sea-going Vessels consigned to the following Merchants, 1885 :—*

No.	NAME OF FIRM.	STEAM.	TONNAGE.	SAIL.	TONNAGE.	TOTAL No.	TOTAL TONNAGE.
1.	H. & A. Allan.....	77	175,353	.....	.....	77	175,353
2.	D. Torrence & Co.....	48	98,546	.....	.....	48	98,546
3.	R. Reford & Co.....	57	83,518	2	790	59	84,308
4.	Canada Shipping Co.....	27	58,010	.....	.....	27	58,010
5.	J. G. Sidey.....	44	42,852	.....	.....	44	42,852
6.	Henry Dobell & Co.....	43	34,732	.....	.....	43	34,732
7.	Kingman Brown.....	30	24,507	3	1,729	33	26,236
8.	H. Dobell (from Canal)..	32	24,557	.....	.....	32	24,557
9.	Anderson McKenzie....	2	2,242	28	18,978	30	21,220
10.	Charles McLean.....	12	16,586	7	2,636	19	19,222
11.	Carbray Routh.....	13	13,965	6	3,569	19	17,534
12.	David Shaw.....	17	10,552	3	2,934	20	13,486
13.	F. W. Henshaw.....	9	7,837	1	619	10	8,456
14.	A. McKenzie, from canal	1	954	13	7,456	14	8,410
15.	Kingman Brown do	8	6,303	.....	.....	8	6,303
16.	C. A. Boucher.....	.....	.....	55	6,164	55	6,164
17.	Bryant & Co.....	3	4,859	.....	.....	3	4,859
18.	Intercolonial Coal Co...	5	4,554	.....	.....	5	4,554
19.	Munderloh & Co.....	4	4,169	.....	.....	4	4,169
20.	Wulf & Co.....	.....	.....	9	3,806	9	3,806
21.	Wm. Muir & Son.....	4	3,580	.....	.....	4	3,580
22.	John Hope & Co.....	1	970	1	1,498	2	2,468
23.	Wulf & Co., from canal.	.....	.....	6	2,277	6	2,277
24.	J. & R. McLea.....	3	669	3	1,349	6	2,018
25.	Stewart Munn.....	1	322	11	1,410	12	1,732
	Ten others.....	.....	.....	40	8,992	40	8,992
		441	619,647	188	64,207	629	683,854

REPORT  
OF THE  
SUPERINTENDENT OF PILOTS.

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JOSEPH LEVEILLÉ, *Superintendent of Pilots.*

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HARBOUR COMMISSIONERS OF MONTREAL,  
*Superintendent of Pilots' Office,*

MONTREAL, December 31st, 1885.

H. D. WHITNEY, Esq.,  
*Secretary, &c.,*

*Harbour Commissioners of Montreal.*

SIR,

I have the honor to submit for the information of the Commissioners, in my capacity as Superintendent of Pilots, the report of the work that has been necessary in the maintenance of the buoys and beacons between Quebec and Montreal.

This service was commenced this year on the 4th of May, with the tug "St. James," which was employed in this first trip for seventeen days, which were occupied in putting down all the buoys, both wood and iron, in their respective places.

I found in this trip nearly all the buoys that were left in place for the winter, with the exception of two iron ones. One of these was subsequently found at Gentilly, and placed in position on the 15th of May, the other, with some wooden buoys, were carried away with the ice and lost.



After this first trip, I made several others at different times, to replace buoys out of position, and make such repairs as was rendered necessary by vessels striking them, which often happen.

This year I have been aided in the service by Mr. W. L. Scott, one of the Assistant Engineers, who has been nearly always aboard of the tug St. James, which has been employed almost continually either for the buoys or for other works when I was not using it myself.

The last trip of the season for putting the buoys in winter quarters, was finished the 29th of last November.

During the course of the year the Grondine beacons, and several others, have been repaired.

Before closing, I beg to say that this year the number of iron buoys has been increased, as you will see in the annexed table; of these there are sixteen (16) old ones, and fifteen (15) new ones made this last summer. These last buoys have been made very much larger than the others, and weigh about two tons with their weights. Buoys of this size increase the work so that to put them in winter quarters it was necessary to employ two tugs with their scows; it will be necessary to again employ two tugs to place them next spring. If we do otherwise, vessels will arrive before the channel is properly buoyed.

The number of buoys which have been taken up, with those which are in the yard, make a total of three hundred (300) which is more than sufficient for the service next year.

I have the honor to be,

Sir,

Your humble servant,

JOSEPH LEVEILLÉ,

*Superintendent of Pilots.*

Table of the number and the place of the buoys and beacons left and those taken up at close of season 1885 :—

PLACE.	BUOYS.					BEACONS.
	Left.		Taken up.			
	Iron.	Wood.	Iron.	Wood.	Barrels.	
Pt. aux-Trembles ( en bas ) and St. Croix.....	.....	.....	2	.....	.....	.....
From Cap La Roche to Lake St. Peter. ....	.....	.....	11	74	.....	13
Becancour.....	1	.....	.....	.....	.....	.....
Lake St. Peter.....	4	20	.....	.....	.....	.....
Harbour of Montreal.....	.....	.....	.....	6	.....	.....
Hochelaga to Ile Bouchard...	.....	.....	6	25	.....	.....
Longue Pointe to Isle Des- lauriers. ....	.....	.....	.....	.....	.....	6
Lavaltrie Traverse, Iles Peate.	3	.....	.....	11	.....	.....
Contrecoeur to Sorel.....	.....	.....	3	27	4	6
Total.....	8	20	22	143	4	25

REPORT  
OF THE  
PILOTAGE DISTRICT OF MONTREAL  
FOR THE YEAR 1885.

HARBOUR COMMISSIONERS OF MONTREAL,  
*Secretary's Office,*  
MONTREAL, January 15th, 1886.

WM. SMITH, ESQ.,  
*Deputy Minister of Marine,*  
OTTAWA.

SIR,

I have the honour 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, 1885.

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

There were no deaths among the Pilots on the active list, but two superannuated Pilots died during the year, viz. :—

Joseph Barnabé dit Lafrenière, who died on the 26th January, 1885, aged 72 years, and Placide Gaillardet, on 26th May, 1885, aged 69 years.

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 1885 :—

No.	NAME.	AGE.	EARNINGS.	REMARKS.
1	Léville, Joseph.....	68	.....	Supt. of Pilots.
2	Bouillé, Zepherin.....	57	\$1,372.30	
3	Bélisle, Cyrille.....	58	1,009.77	
4	Lisé, Adolphe.....	56	569.40	
5	Raymond, George.....	56	898.94	
6	Naud, Augustin.....	59	1,260.39	
7	Bélisle, Hubert A.....	55	350.73	
8	Dufresne, Athanase.....	52	1,062.79	
9	Dorval, J. B.....	54	236.50	
10	Bouillé, Louis N.....	59	1,000.00	Pilot Str. Montreal
11	Gagnon, Pierre.....	58	1,079.21	
12	Bélisle, George.....	46	559.78	
13	Naud, Onésime.....	45	1,415.73	
14	Hamelin, J. Octave.....	52	1,435.38	
15	Chandonnet, Jos.....	45	1,555.17	
16	Bouillé, Louis A.....	46	1,164.95	
17	Boudet, Prudent.....	44	1,228.72	
18	Bélisle, Elzéar.....	51	601.30	
19	Pleau, Joseph.....	48	689.92	
20	Brunet, Célestin.....	43	1,386.40	
21	Bélisle, Louis.....	40	472.30	
22	Caien, Dumas.....	45	192.91	
23	Groleau, Ulric.....	38	896.18	
24	Frenette, Alfred.....	46	846.55	
25	St. Armand, Alfred.....	42	623.49	
26	Bélanger, Phillipe.....	47	1,244.55	
27	Gagnon, Victor.....	47	399.41	
28	Perrault, Narcisse.....	48	1,498.14	
29	Toupin, Treflé.....	38	421.03	
30	Auger, Cléophas.....	39	1,489.58	
31	Desjordy, François.....	41	388.32	
32	LaBranche, Ferdinand.....	40	1,308.91	
33	Perrault, David.....	44	408.47	
34	Gauthier, Alexis.....	39	1,055.06	
35	Bouillé, Louis Z.....	37	1,209.89	
36	Toupin, Joseph.....	36	807.90	
37	Gauthier, Laurent.....	36	1,239.16	
38	Arcand, Jean.....	33	573.35	
39	Nault, Delovoie.....	34	1,022.93	
40	Gauthier, Wilbrod.....	34	1,249.54	
41	Mayrand, Louis.....	38	381.91	
42	Dufresne, George.....	37	442.33	
43	Arcand, Norbert.....	33	858.37	
44	Toupin, Uldoric.....	31	609.08	
45	Bouillé, Tancrede.....	32	648.75	
46	Arcand, Nestor.....	30	623.99	
47	Naud, John.....	29	570.21	
48	Dussault, Joseph.....	30	614.66	
	Total.....		\$40,974.35	

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

## BRITISH :

Steamers.....	\$36,207.09
Sailing Vessels.....	2,833.65
	\$39,040.74

## FOREIGN :

Steamers.....	\$ 754.13
Sailing Vessels.....	1,179.48
	\$1,933.61
Total.....	\$40,974.35

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.....	37	Champlain,
2	Gédéon Groleau.....	33	Grondine.
3	Néré Belisle.....	33	Deschambault.
4	Hubert Perrault.....	36	Montreal.
5	Audilon Portelance....	32	Grondine.
6	Leboire Perrault.....	36	Deschambault.
7	Joseph Hurteau.....	25	Contrecoeur.
8	Wilfred Raymond.....	31	Deschambault.
9	Adolphe Richard.....	37	Contrecoeur.
10	Joseph Langlois.....	30	Pointe-aux-Trembles (en bas)
11	Edouard Perrault.....	35	Deschambault.
12	Lydoric Bouillé.....	28	do
13	Elié Bouillé.....	26	do
14	N. Edson Angers.....	35	do
15	Honore Dusseau.....	32	do
16	Narcise Paquet.....	31	do
17	Jean Baptiste Nadeau..	27	Levis.
18	Arthur Brière.....	28	Portneuf.
19	Aubert Naud.....	31	Deschambault.
20	J. Sifroy Labranche....	29	Portneuf.
21	Alexis Perrault.....	23	Deschambault.

The only accident to vessels during the past season, which necessitated the holding of an investigation, was that of the Steamship "Montreal," which steamer, on the 26th September, while on her way to Quebec, in charge of Pilot George Raymond, while in the vicinity of St.

Antoine, grounded so heavily as to cause her to leak; and on her arrival at Quebec, it was found by the divers that she was somewhat damaged. After temporary repairs she proceeded on her voyage to Liverpool, which port she reached in safety. An investigation being asked for, was held; from the evidence submitted, it appeared that the Pilot was out of the channel, and it was ordered that he be suspended from exercising his functions as Pilot until June 30th, 1886.

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 draught of water,.....	\$2.00	\$2.00
Pilotage of Vessels propelled by Steam, for each foot of draught of water.....	2.50	2.50
Pilotage of Vessels under Sail, for each foot of draught 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.....	\$2,049.54
“ Sundry poundage from Three Rivers for 1884 and 1885....	44.13
“ Sundry poundage.....	1.16
Interest on investments.....	2,211.69
	<hr/>
	\$4,306.52

The disbursements for Pensions to old and infirm Pilots and widows of Pilots, were.....	\$2,542.00
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I have the honour to be,

Sir,

Your obedient servant,

H. D. WHITNEY,

*Secretary.*

REPORT  
UPON THE  
DEEPENING OF THE SHIP CHANNEL  
BETWEEN  
MONTREAL AND QUEBEC,  
FOR THE YEAR 1885.

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

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HARBOUR COMMISSIONERS OF MONTREAL,  
*Chief Engineer's Office.*

MONTREAL, February 17th, 1886.

H. D. WHITNEY, Esq.,

*Secretary,*

*Harbour Commissioners of Montreal.*

SIR,

I beg to submit, for the information of the Harbour Commissioners, the following report upon the work accomplished during the year 1885 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  $27\frac{1}{2}$  feet at low water, with a minimum breadth of 300 feet, in accordance with the provisions of Act 46 Vic., cap. 36. The  $2\frac{1}{2}$  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 following are the chief details of the work done during the past year:—

*Cap Charles.*—Work was commenced with one dredge at the lower end of the shoal on September 5th, and was continued upwards till November 7th, when the dredge was moved elsewhere and operations were stopped for the season. During the month's work 600 feet in length of the north half of the Channel was deepened to give 25½ feet at low water. This, with the 1,400 feet done in 1884, leaves only about 180 feet yet to be cut through to make the whole north half 26 feet 3 inches deep.

The dredging at the lower margin of the shoal was boulders and shale rock, but after fairly entering the cut it was shale rock *in situ*, similar to that found in previous dredging. Quantity dredged this year, 20,400 cubic yards, scow measurement, chiefly shale rock, costing \$6,571 or 32.2 cents per cubic yard.

*Pouillier Rayer.*—Work was carried on from May 13th to November 7th with one dredge and a stone-lifter, assisted part of the time by an additional dredge. One thousand feet in length of the half breadth of the Channel, and 2,150 feet of the south half, were dredged to 26 feet depth at low water. On the south side, 2,600 feet were cleared of large surface boulders by the stone-lifter. The dredging is of the most difficult character, and consists of very tough, hard pan clay, with imbedded boulders of all sizes. The heaviest work of cutting through the shoal is now nearly finished, but there yet remains some lighter dredging at the margins, and also considerable areas, both at the margins and at various points towards Cap Charles, from which the boulders must be cleared off in order to finish the Channel through from Cap Charles to Cap à la Roche.

Quantity dredged this year, 44,055 cubic yards hard



pan, clay and stones, costing \$25,017 or 56.8 cents per yard; boulders raised by stone-lifter, 3,568 cubic yards, costing \$3,699 or \$1.04 per yard.

*Cap à la Roche.*—Dredging was carried on from May 13th to November 7th, and during this time 3,000 feet in length of the south half-breadth of the Channel was dredged to give 24½ feet depth at low water, leaving about 520 feet to be yet cut through to carry that depth through the south half. The dredging was all in shale rock *in situ*, of about the same hardness as that met in the work of previous years.

Quantity dredged, 117,930 cubic yards; boulders lifted, 130 cubic yards; costing in all \$30,436 or 25.8 cents per yard.

*Cap Levraut.*—A distance of 4,600 feet, or about seven-eighths of a mile, on the line of the Grondine beacons, has been dredged where necessary to give a width of 300 feet and a depth of 27½ feet at low water. A distance of 850 feet on the line of the Batiscan lights has been dredged to half the width and also to 27½ feet depth. Considerable areas on both lines have also been cleared of boulders by the stone-lifters.

Quantity dredged, 43,275 cubic yards, tough clay and stones; boulders lifted, 229 cubic yards; costing in all \$10,729 or 24⅔ cents per yard.

*Lake St. Peter.*—Dredging was commenced May 23rd and carried on till September 26th, two dredges being employed the greater part of the time. Dredging was started 4,000 feet below the White Buoy, and carried up to within 2,000 feet of No. 2 Lightship. Detached pieces, in all 1,600 feet in length, were also dredged at greater distances below the White Buoy, the whole summer's dredging making a length of 26,400 feet, or five miles of

channel deepened to  $27\frac{1}{2}$  feet. The breadth below the White Buoy is 300 feet, in the bend at the Buoy it is 400 feet and above that it is 325 feet. At the close of the season's work, the deepening of the whole lake from 25 feet to  $27\frac{1}{2}$  feet was about half finished.

Quantity dredged this year, 773,580 cubic yards; costing \$26,700 or  $3\frac{1}{2}$  cents per cubic yard.

*Contreccœur Channel.*—On November 10th two dredges were set to work near the lower cut below Ile St. Ours, and together they dredged a length of 2,100 feet, one stopping on November 27th and the other on December 5th. The dredging was through shoals of irregular width and depth, but the cuttings were all taken out to  $27\frac{1}{2}$  feet at low water.

Quantity dredged, 21,990 cubic yards stiff clay, sand and stones; costing \$4,266 or  $19\frac{1}{10}$  cents per yard.

In the main part of the Channel, work was commenced June 19th and carried on till November 27th, when 11,700 feet, or  $2\frac{1}{4}$  miles in length, partly of half and partly of full breadth, had been deepened to  $27\frac{1}{2}$  feet.

Quantity dredged, 175,560 cubic yards of stiff clay; costing \$18,792 or 10·7 cents per cubic yard.

*Pointe Marie (or Three Buoys).*—Work was commenced on October 27th and carried on to November 30th. A distance of 1,900 feet, which includes the bulk of the dredging at this locality, was deepened to  $27\frac{1}{2}$  feet.

Quantity dredged, 28,320 cubic yards hard clay and stones; costing \$3,343 or 11·8 cents per yard.

*Pouillier Varennes.*—A commencement was made at the lower end of the shoal just at the close of the season. Quantity dredged, 3,300 cubic yards hard clay and stones; costing \$461 or 14 cents per yard.

*Pointe aux Trembles (en haut).*—Work was commenced on October 9th and carried on with one to three dredges till December 5th, the close of the season, the depth made being  $27\frac{1}{2}$  feet at low water.

Quantity dredged, 133,800 cubic yards stiff clay and stones, costing \$9,453 or 7 cents per yard; also 6,000 cubic yards limestone rock, boulders and clay, costing \$2,652 or  $44\frac{1}{2}$  cents per cubic yard.

*Montreal Harbour.*—Work was done at different times throughout the summer in deepening the main Ship Channel through the Harbour up to the entrance of the Lachine Canal, and to  $27\frac{1}{2}$  feet in depth.

Quantity dredged, 32,703 cubic yards hard pan, gravel and boulders; lifted by stone lifters, 212 cubic yards large boulders, or 32,915 cubic yards in all, costing \$15,518 or  $47\frac{3}{4}$  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 in 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 \$142,455, and for the Montreal Harbour fleet employed in the Ship Channel \$15,182, or in all \$157,637. The quantities dredged are: 1,256,583 cubic yards of earth and 148,469 cubic yards of rocks and large boulders, making an aggregate of 1,405,052 cubic yards. Compared with previous years since the commencement of dredging

for the 25-foot channel, the cost and quantity of work done is as follows:—

YEARS.	QUANTITY DREDGED. CUBIC YARDS.	TOTAL COST.	AVERAGE COST PER CUBIC YARD.	NUMBER OF DREDGES EMPLOYED.
1875.....	820,773	\$134,744	16 $\frac{4}{10}$ Cents.	7 to 8 Elevators.....
1876.....	922,808	130,744	14 $\frac{10}{100}$ "	8 ".....
1877.....	1,262,308	137,830	10 $\frac{8}{10}$ "	7 to 8 ".....
1878.....	966,973	\$124,891	12 $\frac{9}{100}$ "	} 8 Elevators.....
	117,663	24,125	20 $\frac{6}{100}$ "	
	1,084,636	\$149,016	13 $\frac{8}{100}$ "	Totals and Average..
1879.....	813,391	\$135,519	16 $\frac{66}{100}$ "	} 8 Elevators.....
	29,819	7,835	26 $\frac{26}{100}$ "	
	843,210	\$143,354	17 "	Totals and Average..
1880.....	1,171,757	\$136,537	11 $\frac{65}{100}$ "	} 8 Elevators.....
	47,474	10,500	22 $\frac{11}{100}$ "	
	1,219,231	\$147,037	12 $\frac{5}{100}$ "	Totals and Average..
1881.....	1,375,251	\$149,141	10 $\frac{84}{100}$ "	} 8 Elevators.....
	78,537	18,160	23 $\frac{12}{100}$ "	
	1,453,788	\$167,301	11 $\frac{43}{100}$ "	Totals and Average..
1882.....	824,932	\$151,223	18 $\frac{36}{100}$ "	} 7 Elevators.....
	74,303	20,981	28 $\frac{33}{100}$ "	
	899,235	\$172,204	19 $\frac{15}{100}$ "	Totals and Average..
1883.....	360,716	\$120,273	33 $\frac{34}{100}$ "	} 6 Elevators.....
	138,115	40,184	29 $\frac{10}{100}$ "	
	498,831	\$160,457	32 $\frac{17}{100}$ "	Totals and Average..
1884.....	816,392	\$122,163	14 $\frac{96}{100}$ "	} 6 Elevators.....
	22,197	11,244	50 $\frac{88}{100}$ "	
	838,589	\$133,407	15 $\frac{21}{100}$ "	Totals and Average..
1885.....	1,372,349	142,455	10 $\frac{38}{100}$ "	} 7 Elevators.....
	32,703	15,182	46 $\frac{42}{100}$ "	
	1,405,052	157,637	11 $\frac{22}{100}$ "	Totals and average..

The measurement of the quantity dredged is by tally of the scows, which, when filled level, hold 80 and 150 cubic yards, for the ordinary and large sizes respectively, but they are reckoned at 60 and 120 cubic yards each 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 " " clay, &c., Nos. 9 and 12.  
 One Elevator Dredge, " small " " " No. 3.  
 Three Spoon Dredges, during part of the summer.  
 Seven to nine Screw Tugs.  
 Two Stone-lifting Barges, Nos. 1 and 2.  
 Five Barges, as coal-tenders and smiths' shop.  
 Fifteen Hopper-bottom Scows.  
 Four Flat-deck Scows.

On the 8th of May, which was as soon as the clearing away of the ice permitted, the first dredge left Sorel and was set to work on Lake St. Peter. On the 11th, a dredge and a stone-lifter left for Cap à la Roche ; on the 12th two more dredges were sent to Cap à la Roche, and they were followed by a stone-lifter on the 18th. On the 23rd a second dredge, which had been detained for special repairs, was sent to Lake St. Peter, and finally No. 3 dredge, which can only work after the high water of spring has receded, was sent out to the Contrecœur channel on June 19th. All worked in the Ship Channel until November 24th, when one dredge was sent to Sorel to be laid up for the winter, another was sent in on the 25th, and a stone-lifter followed on December 2nd. The rest of the fleet worked till the 4th, when a heavy snow storm came on and all were stopped and sent in.

The number of days during which the dredges were on duty, reckoning all except Sundays, from the date of leaving winter quarters to that of returning, was from 137 to 181, and the aggregate for the seven dredges

during the season was 1190 days, or an average of 170 days each. The time of the stone-lifters on duty was 177 days for the one which worked during the day only, and 279 days for the other, counting a night and 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 8,886 hours, or an average of 7.47 hours per day for the whole season.

The dredges and tugs were laid up during the winter of 1884-5 at the Harbour Commissioners' shipyard, Sorel, and the alterations and necessary repairs were, as usual, done at the Harbour Commissioners' works.

The barges, scows and other vessels without machinery were chiefly wintered in the Richelieu River about a mile above the Commissioners' shipyard.

Two accidents to the plant worthy of note occurred during the season.

On July 30th one of the 150-yard hopper scows employed on Lake St. Peter, while loaded, took in water and sunk. It was raised by the two stone-lifters without serious damage.

On the evening of October 30th the tug St. John took fire while in motion near Pointe aux Trembles, en haut, and, in spite of the efforts of the crew, was burned to the water's edge. The hull was a total loss; the boiler is considerably damaged, but the engine is not seriously injured. The fire broke out at the forward end of the boiler, under the pilot house. Cause unknown.

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[A list of the repairs made to the hulls and machinery of the different vessels given in the manustript report is here omitted.]

## BUOYS AND BEACONS.

The buoying of the Ship Channel has been much improved, during the past summer, by placing large iron buoys at a number of important points not so distinguished before, and also by an increase in the number of ordinary wooden spar-buoys, and improvements in the positions of others. All the more important short bends and isolated points and shoals are now marked by one large iron buoy to each, and the longer curves are marked by one at each end. With such marks, these points are easily sighted and distinguished by the pilots from those marked out by common spar-buoys.

To provide the additional large buoys required for this purpose, fifteen new ones were made at the Commissioners' works last summer. These, with the number on hand before, make a total of thirty-four large iron (or steel) buoys, regularly placed and in use in the Channel. Five others are kept as spares to replace any lost or damaged.

The new buoys are cylinder-shaped,  $10\frac{1}{2}$  feet long by 4 feet diameter, and show five feet high, or 20 square feet visible surface above water. The shells are of soft, tough steel; weight of buoy and ballast complete, 4,100 lbs.; cost, \$200 each; anchor and ordinary chain, \$50.

Much uncertainty has been felt of late by pilots as to the safe space available at Batiscan for swinging and anchoring vessels drawing the full depth of water in the deepened Ship Channel. To set this at rest, the locality was carefully surveyed and tested for boulders, and an anchorage ground higher up than the old one was defined and buoyed out in August last.

Vessels which come to load with lumber off the mouth of the Batiscan River have been of late in the habit of discharging ballast in places injurious to navigation, and to prevent this a suitable ballast ground was defined by buoys, and public notice was given in August last.

During the past summer the Ship Channel buoys have been in part placed and kept in position from marks and soundings in the ordinary way by the Superintendent of Pilots, but the more important ones have been set and kept corrected, from sextant and other instrumental observations, by the Assistant Engineer in charge of the Ship Channel surveys.

The continued deepening of the Channel has of course much increased the length of that which is purely artificial, or which is narrowed in as deeper natural water is selected. This in turn has required additional and more careful buoying, so that the work of maintaining the buoys is yearly becoming a more arduous and expensive matter. The following are the numbers of buoys now in use, extending throughout the river from Montreal to Pointe aux Trembles, en bas:—

Large iron (or steel) buoys.....	34
Wooden spar buoys .....	165
Total.....	<u>199</u>

Yours respectfully,

JOHN KENNEDY,  
*Chief Engineer.*



**DREDGING PLANT employed in Deepening the SHIP CHANNEL between MONTREAL and QUEBEC in 1885.**

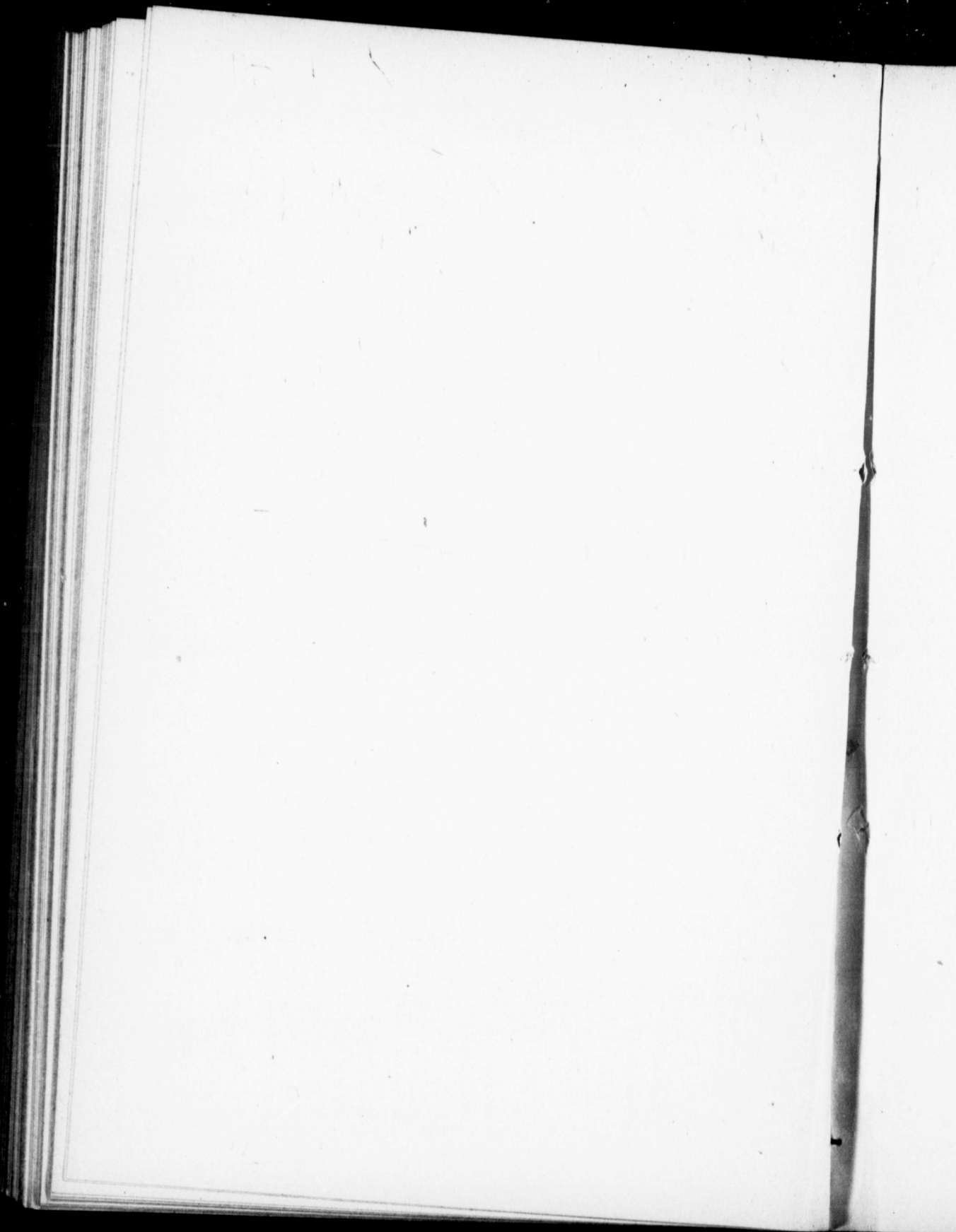
DESCRIPTION OF VESSEL.	HULLS.			When built.	Tonnage Register.	Kind of Engine.	ENGINES.				Depth to which dredge can work.	REMARKS.
	Length over all.	Breadth of Beam.	Depth of Hold.				No. of Cylinders.	Diam. of Cylind.	Length of Stroke.	Pres'tre of Steam.		
<b>DREDGES.</b>												
Elevat'r Dredge No. 3.	135 0	29 0	10 0	1874		Two coupled vertical direct acting condensing engines to each dredge.	2	16	48	25	4	Feet.
" " " No. 8.	135 0	29 0	10 0	1874			2	20	32	70	16	Wooden hull, reb. '89.
" " " No. 9.	135 0	29 0	10 0	1874			2	20	32	70	16	Wooden hull.
" " " No. 10.	135 0	29 0	10 0	1874			2	20	32	70	16	" "
" " " No. 11.	135 0	29 0	10 0	1874			2	20	32	70	16	" "
" " " No. 12.	135 0	29 0	10 0	1874			2	20	32	70	16	" "
" " " No. 13.	135 0	29 0	10 0	1874			2	20	32	70	16	" "
<b>TUG BOATS.</b>												
Minnie F. Parsons.	76 0	15 0	6 6	1864	22 42		1	18 1/2	20	80		Wooden hull.
Delisle.	62 5	14 9	7 3	1863	17 07		1	18	20	90		" "
John Pratt.	96 0	19 2	7 8	1874	21 41	Vertical	2	14	16	77		" "
C. J. Brydges.	62 2	16 0	8 0	1874	21 29	Non-condensing.	1	20	22	85		" "
St. Francis.	80 0	17 0	7 9	1875	37 93		1	20	22	85		" "
St. John.	80 0	17 0	7 9	1875	37 93		1	20	22	80		Burned in 1885.
St. James.	76 0	17 0	8 2	1875	54 57	Vertical condensing.	1	21	20	85		Wooden hull.
<b>BARGES.</b>												
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	23 1	7 1	1870	176 00							" "
Alfred Demers.	105 0	22 5	7 6	1878	131 00							" "
A. G. Nish (fast gshop)	100 8	25 6	6 4	1873								" "
Stone lifter No. 1.	75 0	22 0	6 0	1858		Steam Winches.						" "
" " " No. 2.	75 0	24 0	9 9	1878								" "
<b>SCOWS.</b>												
7 Hopper bottomed.	80 0	16 0	6 9	1874	Scow No. 33 to 44	Capacity of Scow, Cubic yards.						4 Hoppers.
2 " " "	54 6	18 0	7 0	1875	47 and 48	80						2 " "
2 " " "	30 0	19 9	7 3	1876	49 " 50	89						2 " "
2 " " "	89 0	18 0	7 9	1879	51 " 52	140						2 " "
2 Flat scows.	89 0	18 0	7 9	1880	53 " 54	150						All wood.
					10 to 17							" "

NOTE.—Three 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 1885.

VESSEL.	Places at which Dredging was done.	Time of Service		QUANTITIES DREDGED.			Totals.	CHARACTER OF SOIL.
		Days.	Spoon Dredges	Elevators and Stone Lifts.		Cubic Yards.		
				Earth.	Rock.			
Spoon Dredge No. 4.....	{ Ship Channel in Montreal } { Harbour .....	54	7,447					Hard pan, gravel and stones. Black rock, hard pan, sand and stones. Hard pan and boulders.
" " No. 5.....		94	13,005					
" " No. 7.....		83	12,251					
Elevator Dredge No. 3 .....	Contrecoeur .....	137		124,110		32,703		Clay and boulders.
" " No. 8 .....	Pouillier Rayer .....	65		16,530		124,110		Hard clay and stones.
" " " .....	Cap Levraut .....	97		43,275				Hard clay stones and boulders.
" " " .....	Pointe aux Trembles .....	23		12,660				Stiff clay and stones.
" " No. 9 .....	Lake St. Peter .....	109		433,560		72,465		Clay.
" " " .....	Pointe aux Trembles .....	59		121,140				Clay and boulders.
" " No. 10 .....	Pouillier Rayer .....	152		27,525		554,700		Clay and stones.
" " " .....	Cap à la Roche .....	3						Shale rock.
" " " .....	Contrecoeur (St. Ours) .....	14		6,405				Clay.
" " No. 11 .....	Cap Charles .....	57						Shale rock, sand and stones.
" " " .....	Cap à la Roche .....	98						Shale rock.
" " " .....	Contrecoeur (St. Ours) .....	23		15,555		34,275		Sand, clay and stones.
" " No. 12 .....	Lake St. Peter .....	122		340,020				Clay.
" " " .....	Contrecoeur, main Channel .....	25		51,450				Hard clay and stones.
" " " .....	Pointe Marie .....	20		28,320				" "
" " " .....	Pouillier Varennes .....	4		3,300		87,380		" "
" " No. 13 .....	Cap à la Roche .....	156						Shale rock.
" " " .....	Pointe aux Trembles .....	23						Shale rock and boulders.
Stone-lifter No. 1 .....	Cap à la Roche .....	96						Boulders.
" " " .....	Cap Levraut .....	42						Lifting scow.
" " " .....	Lake St. Peter .....	3						Boulders.
" " No. 2 .....	Pouillier Rayer .....	253						Lifting scow.
" " " .....	Lake St. Peter .....	3						Boulders.
" " " .....	Ship Channel in Mont. Harb. .....	23						Boulders.
Totals .....		1,841	32,703	1,223,880	148,459	1,405,652		





## 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. Apples, Flour, Meal, Potatoes 9 " " Fish, Meats, Pitch, Tar. . . . 7 " "		Horses . . . . . 2 to 1 Ton. Neat Cattle. . . . . 3 " " Sheep. . . . . 15 " " Swine . . . . . 10 " "
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*Certified,*

H. D. WHITNEY,

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

*Secretary.*

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.