ANNUAL REPORTS.

OF THE

HARBOUR COMMISSIONERS

OF MONTREAL

FOR THE YEAR 1892.

Commissioners:

HENRY BULMER, Esq., Chairman.

Hon. EDWARD MURPHY.	HUGH McLENNAN, Esq.
VICTOR HUDON, Esq.	CHARLES H. GOULD, Esq.
J. O. VILLENEUVE, Esq	JAMES McSHANE, Esq., Mayor.
RICHARD WHITE, Esq.	ANDREW ALLAN, Esq.

ALEXANDER ROBERTSON, Secretary.
JOHN KENNEDY, M. Inst., C. E., Chief Engineer.
CAPTAIN THOMAS HOWARD, Harbour Master.
CAPTAIN TOUSSAINT BOURASSA, Deputy Harbour Master.
JOHN FERNS, Wharfinger and Paymaster.

Montreal:
PUBLISHED BY ORDER OF THE HARBOUR COMMISSIONERS OF MONTREAL.
1893.

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1893.

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MEMORANDUM.

While these reports were in press James McShane, Esquire, ex-Mayor, resigned his seat and the new Mayor, Hon. Alphonse Desjardins, was elected as representative of the Montreal City Council on the Commission, which is therefore as follows for 1893:

Commissioners:

HENRY BULMER, Esq., Chairman.

Hon. Edward Murphy.
Victor Hudon, Esq.
J. O. Villeneuve, Esq.
Richard White, Esq.
Hugh McLennan, Esq.
Charles H. Gould, Esq.
Hon. Alphonse Desjardins, Mayor.
Andrew Allan, Esq.

Alexander Robertson, Secretary.
John Kennedy, M. Inst., C. E., Chief Engineer.
Captain Thomas Howard, Harbour Master.
Captain Toussaint Bourassa, Deputy Harbour Master.
John Ferns, Warfinger and Paymaster.

STATEMENT

MADE BY

MR. HENRY BULMER, CHAIRMAN,

HARBOUR COMMISSIONERS OF MONTREAL,

ON THE

Business of the Port for the year 1892, *and other matters connected with the Trust,*

AT THE MONTHLY MEETING OF THE BOARD, HELD ON

14TH MARCH 1893.

Mr. Andrew Allan's term of office as representative of the Shipping Interest expired on the 1st August last and on that day he was re-elected under the new law regarding that Interest and again took the seat on this Board, which he has so long occupied.

The official reports of the heads of the different Departments of the Board for the past year are now in.

A concise summary shows that there was an increase in the ocean tonnage arriving here over that of the previous years.

In 1891, seagoing vessels were 725, with a total tonnage of 938,657 tons. In 1892, there were seagoing vessels 735, with a total tonnage of 1,036,707.

Increase 10 vessels and 98,050 of tonnage.

The increase is altogether in steam vessels, as the number of sailing vessels coming to Montreal steadily decreases. In 1891, there arrived 94 ocean sailing vessels and in 1892 only 77.

The larger size of the new vessels that have been built for this trade will account for the greater increase of tonnage to that of vessels.

The depth of water in the channel was at, or above, the line of 27 feet 6 inches during the whole season of navigation, except for a few days about the end of October, the lowest water being 27 feet 2 inches on the 31st October.

The outward bound vessels were enabled to load to their full draught and pass down safely.

The "Vancouver" loaded down to 26.7 on the 26th July, the "Samartian" to 27.5 (the deepest draft of any vessel that has previously left this port) on the 23rd August, and the "Pomeranian" to 27.2 on the 15th November, when the water was nearly at the lowest, viz 27 feet 9 inches.

There are still further improvements required below Cap a la Roche to enable vessels of deep draft to pass down at all states of the tide. It is understood that the Public Works' Department is steadily working to attain that end, as well as to widen the curves in the upper section of the channel.

With the exception of the stranding of the S. S. "State of Georgia" there was no serious accident to the shipping in the river during the last season. Some minor accidents that did occur were not of a preventable character. Those that were owing to the carelessness of Pilots were dealt with in accordance with the river regulations.

Had the proposed improvements in the lower reaches of the channel been completed, in all probability the very heavy loss on the "State of Georgia" would not have occurred.

The Gas Light Buoys at Ste. Croix and Pointe aux Trembles (en bas), placed by the Department of Marine and Fisheries, have proved a great aid and benefit to the navigation in that part of the river.

The Buoy Service generally was well attended to last season by the contractors under the Marine Department, all reports made by the Pilots of displacements having been promptly attended to.

From the Secretary's Financial Statement it appears that the revenue of the Board from all sources amounts to $291,430 24 and the expenditure, including interest account, apart from capital account, was $231,925.74, leaving a surplus of $59,504.50, which, with the surpluses of previous years, has been expended on capital account.

There is no change in the Bonded indebtedness of the Harbour since the last annual statement, which remains at $2,368,000.

In January 1892 tenders were asked for $344,000 of Bonds authorized by Act 36 Vic., Chap. 61, for the improvement of the Harbour. None of the tenders were satisfactory and financial arrangements were made to carry on the work without disposing of the Bonds on the terms offered.

Since the opening of the present year $33,000 of that issue of four per cent Bonds have been sold at par.

The expenditure on capital has, during the last year, been $274,027.02. Of this $47,228.92 was for work on the new wharves at Hochelaga, $119,693.82 for new plant, and for the guard pier $76,698 10.

There has been no additional wharfage frontage provided during the last year but the filling in of the breast wharf at Hochelaga was brought up to the proper level and made available for use of the constantly increasing trade in that part of the Harbour.

The filling in required to bring up to grade the distance from the present extension of the breast wharf at Hochelaga to the Maisonneuve wharf has been sufficiently filled to enable two railway tracks to be laid down. The Grand Trunk and the Canadian Pacific Railway Companies have both applied to have the Harbour tracks extended to that point, which the Board has authorized to be done.

The railroad track has been laid on the Windmill Point wharf to connect with the Grand Trunk Railway at Point St. Charles and has been leased to that Company during the last season, and has been of great advantage to the general trade.

Last summer the Board authorized the extension of the Windmill Point wharf up to the Montreal Warehousing Company's property, but from various causes not much has so far been done.

The last year has been an exceptionally heavy one as regards expenditure for repairs and the removal of ice stranded last spring on the wharves. The surface of the wharves and roadways has been kept in order as well as the nature of the foundation and material used will admit.

After the fire in the sheds of the Hansa Line, and at the request of the Insurance Companies, regulations affording additional precautions against accidents from fire were made, and the Harbour Master was instructed to see them carried out.

On the occasion of the above fire, and another on board the S. S. "Tiber" in November, the Commissioners' tug "St. Peter" was promptly on hand, and with her powerful appliances did good service.

Early in the year Captain St. Louis, Deputy Harbour Master, died, after a long service in the employment of the Board. Captain Bourrassa was appointed to succeed him.

Through the Council of the Board of Trade a copy of the plan of the new Harbour Works at the Port of Leixoes, in Portugal, was received.

It is valuable as showing the extent of operations required, and the difficulties to be overcome, in providing harbour accommodation elsewhere.

During the summer the Harbour was honoured with the visit of three of Her Majesty's ships of war and two French Frigates, viz: H. M. S. "Pylades," Captain Young; H. M. S. "Magicienne," Captain Pipon; H. M. S. "Tartar," Captain Fleet; the French Frigates being the "Arethuse," Captain Bernier, and the "Hussard," Captain Krantz.

The presence of these vessels was of great interest to the citizens at large, and the officers and men all appeared to have enjoyed the visit to Montreal.

STATEMENT

OF

GENERAL RECEIPTS AND DISBURSEMENTS

OF THE

HARBOUR COMMISSIONERS OF MONTREAL

FOR THE YEAR 1892.

HARBOUR COMMISSIONERS OF MONTREAL,
SECRETARY'S OFFICE,
MONTREAL, 14th March, 1893.

WILLIAM SMITH, Esquire,

Deputy Minister of Marine and Fisheries,
OTTAWA.

SIR,—

I have the honour, by direction of the Harbour Commissioners of Montreal, to forward herewith, for the information of the Honourable the Minister of Marine and Fisheries, Statement of the General Receipts and Disbursements of the Trust. for the year ended 31st December, 1892.

The revenue from wharfage dues and rentals shows an increase of $29,744.85, or more than 11% over that of 1891; of which two-thirds accrued from exports.

The usual reports for the past year, of the Montreal Decayed Pilots' Fund, the Montreal Pilotage District, and

HARBOUR COMMISSIONERS OF MONTREAL.

STATEMENT OF GENERAL RECEIPTS AND DISBURSEMENTS FOR THE YEAR ENDED 31st DECEMBER, 1892.

		REVENUE	CAPITAL.
Balance at 31st December, 1891.			
Deposits in Bank of Montreal and cash on hand	$ 93,304 15		
Amounts due for rental of Wharf Tracks, etc. $4,614 44			
Less Coupons unpaid	642 50		
	3,971 94		
Value of Macadamizing Stone, Coal, Timber, Lumber and Tree-nails in store	5,541 29		
	$102,817 38		
Securities and Deposit in Montreal City and District Savings Bank, held in trust for Montreal Decayed Pilots' Fund.	49,119 20		$ 151,936 58
RECEIPTS.			
From Collector H. M. Customs, Montreal.			
Wharfage Dues on Imports	$ 142,570 12		
" " Exports	113,836 94		
		$ 256,407 06	
From Wharfinger for Local Traffic.			
Wharfage Dues on Goods Inwards	$ 10,515 91		
" " " Outwards	1,882 32		
Commutation of Richelieu and Ontario Navigation Co.'s wharfage dues	10,000 00		
Rentals of Spaces for piling Lumber	2,245 00		
" " " Coal	1,990 80		
" " for Small Offices	1,066 10		
" " for Scales	1,000 00		
" " for piling Firewood	543 50		
" " " Phosphate	81 36		
		$ 29,324 99	
From Canadian Pacific Railway Co, rental of wharf tracks		2,750 50	
" Grand Trunk Railway Co., " " "		1,392 50	
" Department of Railways and Canals, six months' rental of its offices in Harbour Building (*to 1st May* 1892)		625 00	
Marine Department, six months' rental of Steamboat Inspector's Office in Harbour Building (*to 1st May* 1892)		125 00	
" John Lee & Co., rental of part of Harbour Yard during 1892		300 00	
" Canada Sugar Refining Company, wharfage dues on 775 tons sugar landed in excess of quantity on which wharfage was paid at Custom House		193 75	
" Department of Railways and Canals, for use of Pile Driver (*Acct. Harbour Repairs*)		31 82	
" Citizens' Light and Power Company, interest on Electric Light Plant (*Acct. Harbour Interest*)		137 47	
" Manufacturers' Accident Insurance Company, for sick allowance of two men injured (*Acct. Harbour Expenses*)		51 90	
" Civic Police Committee, for taxes on station in Harbour Building (*Acct. Harbour Expenses*)		44 25	
" Allans, Rae & Co. ($7.00), and Carbray, Routh & Co. ($5.00), for binding charts (*Acct. Printing, Stationery, etc*)		12 00	
" Six apprentices, fees for License ($30.00) and two pilots ($4.00) fees for duplicate Branches (*Acct. Pilotage Expenses*)		34 00	
" Department of Railways and Canals, for cost of working No. 2 Dredge in Lake St. Louis, and repairing two dump scows damaged (*Acct. Harbour Dredging*)			1,792 89
" Department of Railways and Canals, for depreciation of Dipper Handle of No. 2 Dredge, broken while working in Lake St. Louis (*Acct. No. 2 Dredge*)			400 00
" Manufacturers' Accident Ins. Co. for sick allowance to R. Sennitt (*Acct. Harbour Dredging*)			57 60
" L. Tourville & Co., for Hemlock Ties sold (*Acct. Guard Pier Division of Harbour Enlargement Works*)			1,200 00
" Citizens' Light & Power Company, on account of purchase of Electric Light Plant			1,313 13
For Account Harbour Dredging, sundry old material sold, and work performed			404 75
" Account Harbour Plant, 4 old Scows, and 1 Coal Barge sold			37 00
" Account Chart Account, from sale of Ship Channel Charts			112 85
From Bank of Montreal, amount of overdraft at 31st December			118,224 66
" Montreal Decayed Pilots' Fund, for two 4 p. c. Montreal Harbour Debentures at par			2,000 00
For Acct. Mont. Decayed Pilots' Fund, 5 p.c. of Pilots' earnings $3,134 08			
" " " interest on investments and on cash in bank	2,626 14		5,760 22
Balance and Receipts on Capital Account			283,239 68
Receipts on Revenue Account			291,430 24
			$ 574,669 92

DISBURSEMENTS.	REVENUE	CAPITAL.
Harbour Revenue, Mrs. John Young, annuity	$ 600 00	
" " refunds of wharfage dues paid twice, overpaid in error, etc	930 92	
Harbour Survey, soundings and sundry surveys	534 35	
Harbour Repairs, maintenance of wharves and roadways (*See contra for credit*)	69,170 94	
Harbour Interest, on debentures and Government Demand Loan	120,925 00	
Harbour Interest, Bank of Montreal, for paying coupons	292 80	
Harbour Interest on overdraft with Bank of Montreal	3,741 23	
Harbour Expenses, taxes, lighting, heating, etc., (*See contra for credit*)	10,679 43	
Harbour Administrative Staff, salaries	11,353 67	
Electric Lighting, Citizens' Light and Power Co., for 1892	4,202 10	
" " " " " for 1891 in part	780 40	
Electric Lighting Plant, Hon. Provincial Treasurer of Quebec, deposit with on account of amount due Curator of Craig & Sons' Estate (*See contra for credit*)		1,043 89
Travelling and incidental expenses	177 55	
Printing, Stationery, etc., advertising, drawing materials, etc., (*See contra for credit*)	2,250 57	
Legal and Notarial Expenses	858 45	
Buoys and Beacons, rent of ground for low beacon at Cap de la Madeleine for 1888 and 1889 @ $4.00 per year and for high beacon at Grondines Point for 1889 @ $5.00	13 00	
Pilotage expenses, salary of Quebec Agent, etc. (*See contra for credit*)	692 89	
Harbour Dredging, cleaning out basins, etc	4,722 44	
" deepening approach to Victoria Pier, and Commissioners' wharf (*See contra for credit*)		3,396 22
Windmill Point Basin, dredging for enlargement of		2,237 09
Harbour Railway, extension of track to Hudon Cotton Factory in 1891		1,026 74
" new track on Windmill Point wharf		8,610 56
Harbour Plant, electric lighting plant for dredges and derricks		4,053 25
" lathe and lathe chuck		428 90
" rails, fastenings, switches, and charges thereon		5,772 81
" tug "Davis" and hull of No. 10 dredge		558 59
" two light locomotives		6,200 00
" 300 dredging boxes, 48 construction cars, and spare parts		12,861 13
" 3 new floats for Clamshells, new Scow ways and new coal barge		3,006 96
" new spoon dredge No. 2 (*See contra for credit*)		36,222 83
" six new Flat Deck Scows of 150 cub. yds. capacity		14,265 38
Three new Floating Derricks, hulls for, and fitting up, etc		20634 58
John McDougall, on account of contract for machinery of 5 derricks		15,000 00
New Pile Driver, machinery, etc		1,126 39
Harbour Enlargement new approach, dredging of		1,477 52
Guard Pier construction, dredging for, depositing in, etc. (*See contra for credit*)		77,898 10
Hochelaga Construction, filling for railway embankment, etc., and macadamizing		47,228 92
Chart Account, printing and binding Ship Channel Charts, (*See contra for credit*)		905 00
Harbour of Montreal, macadamizing Sections 37 to 39		5,325 65
Montreal Decayed Pilots' Fund, pensions to old pilots and widows $4,709 19		
" " " audit of Fund for 1891, postage, etc. 37 32		4,746 51
Disbursements on Capital Account		$ 274,027 02
" Revenue Account		231,925 74
Total Disbursements		$ 505,952 76

Balance at 31st December, 1892.

Deposit in Bank of Montreal at credit of coupon account			$ 220 00
Cash on hand			735 85
Sundry accounts due for rentals, etc.		$ 7,886 69	
Less Coupons outstanding	$837 50		
At credit of cash suspense account	16 07		
Account for refund unpaid	407 17	$1,260 74	$6,625 95
Value of stores on hand			11,006 64
			$18,588 44
Montreal Decayed Pilots' Fund (*held in trust for*).			
Montreal Harbour Debentures	$44,000 00		
City of Montreal Consolidated Fund	5,000 00		
Deposit in Montreal City and District Savings Bank at Interest	1,128 72		50 128 72
{ And $4.19 of cash included in Harbour Commissioners' cash on hand. }			68,717 16
			$ 574,669 92

ALEXANDER ROBERTSON,

Secretary-Treasurer

MONTREAL, 13th March, 1893.

Verified, RIDDELL & COMMON,

Auditors.

MONTREAL, 14th March, 1893.

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the Harbour Master, have already been forwarded you; while that of the Chief Engineer on the Works for the Improvement and Maintenance of the Harbour will be transmitted shortly.

From the Harbour Master's Report it will be seen that there was an increase in the tonnage of Ocean Vessels of 98,050 tons; the total having been over a million tons.

I have the honour to be,

Sir,

Your obedient servant,

ALEXANDER ROBERTSON,

Secretary.

WESTERN CHAMBERS,
22 St. John Street,
MONTREAL, March 14th, 1893.

The Chairman
of the Harbour Cammissioners of Montreal,
MONTREAL.

DEAR SIR,—

We beg to report having completed the audit of your Secretary-Treasurer's books for the year ending 31st December, 1892, and that the Balance Sheet and "Statement of General Receipts and Disbursements" herewith submitted, bearing our certificate, are correctly drawn up therefrom.

Your obedient servants,

RIDDELL & COMMON,

Auditors.

REPORT

OF THE

Pilotage District of Montreal

FOR THE YEAR 1892.

HARBOUR COMMISSIONERS OF MONTREAL,
SECRETARY'S OFFICE,
MONTREAL, 10th January, 1893.

WILLIAM SMITH, Esquire,
Deputy Minister of Marine and Fisheries,
OTTAWA.

SIR,—

I have the honour, by the direction of the Harbour Commissioners of Montreal, as the Pilotage Authority, to transmit, for the information of the Honourable the Minister of Marine and Fisheries, the following report of the Pilotage District of Montreal for the year ended 31st December, 1892.

Pilot Pierre Gagnon, of Three Rivers, on 12th October, resigned and made application to be superannuated, which is now under consideration.

The accompanying statement gives the names, earnings, etc., of all the Pilots for the past season, and shows an increase of about 12½% in earnings as compared with 1891.

The total amount of Pilotage Dues, as therein shown, was received from the following services, namely:

BRITISH.		
Steamships	$58,312 09	
Sailing Vessels	1,773 91	$60,086 00
FOREIGN.		
Steamships	$2,249 05	
Sailing Vessels	566 50	2,815 55
Total		$62,901 55

On 19th July three young men, Nos. 20 21 and 22 on the following list, were, after examination, granted licenses as Apprentice Pilots; while on the 11th October another examination was held at which the last eight on the same list presented themselves and, their certificates having been found to be in conformity with the By-laws, it was ordered that an Apprentice License be given to each of them.

The following list shows the name, age, and residence of each Apprentice Pilot now serving his time under this Authority :—

No.	Name.	Age.	Residence.
1	Nadeau, J. B	34	Lévis.
2	Naud, Aubert	38	Deschambault.
3	Bouillé, Narcisse	32	"
4	Léveillé, Joseph	29	Batiscan.
5	Sauvageau, Josephat	30	Deschambault.
6	Dussault, Napoléon	30	"
7	Perron, Sévère	34	"
8	Arcand, Barthélemi	30	Lachevrotière.
9	Bellisle, Prudent	29	Deschambault.
10	Arcand, George	28	Lachevrotière.
11	Toupin, Constant	26	Three Rivers.
12	Perrault, George	26	Deschambault.
13	Belisle, Arthur	31	"
14	Bélanger, Charles	22	Lotbinière.
15	Pleau, J. E	23	St. Anne de la Pérade.
16	Hamelin, Théodule	18	Grondines.
17	Perrault, Anthyme	24	Deschambault.
18	Raymond, J. N	22	"
19	Bélisle, Cyrille	24	"
20	Veillet, George	21	St. Anne de la Pérade.
21	Perrault, Arthur	22	Deschambault.
22	Naud, Damase	25	"
23	Labranche, Melville	18	Portneuf.
24	Gagnon, Albert	17	Three Rivers.
25	Angers, Alberic	18	St. Anne de la Pérade.
26	Paquin, Azarias.	19	Deschambault.
27	Gignac, Arthur	19	Portneuf.
28	Desjordy, J B	20	Contrecoeur.
29	Belisle, Felix	22	Deschambault.
30	Belanger, Achille	19	Lotbiniere.

The following new By-law, with reference to the licensing of applicants wishing to become Apprentice Pilots, was passed by the Commissioners on 11th October and approved by His Excellency the Governor-General in Council on 24th November :—

" Whereas, in the carrying out of the By-law at present " in force regarding the examination of persons desiring " to be apprenticed as Pilots, it has been found incon-

" venient to require the presence of the Committee of " Pilots, or of a Nautical Assessor, and their presence is " not considered essential :

" Therefore, it is resolved that the following be, and " is hereby, added to the By-laws of the said Harbour " Commissioners already in force.

ARTICLE 134 A.

" Any persons now acting, or who may hereafter act, " as licensed Apprentice Pilots, and who shall have " passed, or may hereafter pass, a satisfactory examination " before the Board of Examiners, may be admitted to be " Branch Pilots in ordinary course, notwithstanding that, " at the time of their examination to be admitted as " Licensed Apprentice Pilots, no Nautical Assessor, nor " Committee of Pilots, were notified to attend at the " Board of Examiners, or did so attend."

While during the season there were a number of minor accidents to vessels in the nature of touchings and groundings by which some delay and expense were caused, only three were of a serious nature. The particulars of these are as follows :—

On 18th August, in Lake St. Peter, about half way between Nos. 2 and 1 Lightships, the S. S. "Trafalgar," while upward bound in charge of Pilot Arthur Briére, suddenly sheered across the channel and collided with the S. S. "Texas," bound down in charge of Pilot Louis Bellisle, the starboard bow of the latter and the starboard quarter of the former receiving some damage.

From the reports of the Pilots, the accident appeared unavoidable and no action was taken by the Commissioners, as no complaint was made on behalf of either vessel.

On 7th September the S. S. "Pomeranian" while proceeding to Quebec in charge of Pilot Pierre Gagnon collided with the S. S. "Sobraon," upward bound in charge of Pilot Gédéon Groleau, just below No. 3 Lightship in Lake St. Peter.

Some damage was done to both vessels, and the Commissioners, after hearing the evidence in the case, adjudged that Pilot Gédéon Groleau had violated article 133 A of the By-laws, which provides that the upcoming vessel must give way to a downward bound one at certain bends, &c., in the channel, and that he be severely reprimanded and suspended until the 31st December, 1892.

On 4th October the S. S. "State of Georgia," while downward bound in charge of Pilot Trefflé Toupin, struck heavily and repeatedly on the north bank and outside of the dredged channel at Cap a la Roche.

As she was making water rapidly she was promptly beached about two miles below, on the south side of the river and clear of the channel.

The Master and Agents of the vessel having complained against the Pilot and asked an investigation, a number of witnesses were heard both for the Plaintiff and Defendant, the latter of whom was represented by Counsel.

After careful deliberation on the evidence adduced the Commissioners gave judgment to the effect that as the grounding and consequent damage were due to the culpable negligence of Pilot Toupin who had not handled the vessel in a skilful, careful and competent manner, he be suspended till 1st May 1893.

In addition, and based on this finding, it was decided that no Pilotage Dues be allowed him for the conducting

of the vessel from Montreal to Quebec, where, after being floated, she safely arrived on 11th October and was docked for repairs.

The Pilot subsequently applied to the Superior Court for a Certiorari, which was granted just before the close of the year, but the judgment itself has not yet been pronounced upon by the Court.

It may be added that this vessel was able to reload and proceed on her voyage about a month after the accident; and that the four steamers mentioned in the two collisions also escaped with comparatively little damage and were able to complete their voyages.

The two new Gas and Bell Buoys, placed by the Marine Department in June last at Point aux Trembles (en bas) and St. Croix, were found of great service by, and gave entire satisfaction to, the Pilots.

The maintenance of the Buoys and Beacons by the Sincennes-McNaughton Line was carried out during the season to the general satisfaction of the Commissioners.

The tariff of pilotage is the same as has been in force since 5th of March, 1877.

The following is an extract from it :—

Quebec to Montreal and Vice Versa.	Upwards.	Downwards.
Pilotage of vessels in tow of steamers, for each foot of draft of water.....	$2 00	$2 00
Pilotage of vessels propelled by steam, for each foot of draft water.....	2 50	2 50
Pilotage of vessels under sail, for each foot of draft of water.....	4 20	2 80
Moving a vessel from one wharf to another in the Harbour of Montreal, or from the Harbour into the Lachine Canal.....	5 00	5 00

The amounts received and expended by the Harbour Commissioners, as Pilotage Authority of the District, apart from their receipts and disbursements in trust for the Montreal Decayed Pilot Fund, of which the Annual Report and Statements are being sent to you, certified by Messrs. Riddell & Common, Chartered Accountants, were as follows:—

RECEIVED.

From six Apprentice Pilots, the fee for their License, ($5.00) each	$30 00
From two Pilots, for duplicates of their Branches which were lost	4 00
Total	$34 00

EXPENDED.

To Messrs. Morton, Phillips & Co., for Stationery, &c	$35 39	
" The Geo. Bishop Printing and Engraving Company for Blank Pilotage Licenses	38 50	
" John Lovell & Son, for Printing	6 00	
" The Gazette Printing Company, for Circulars to Pilots	8 00	
" Charles Garriepy, services as Pilot Agent at Quebec	600 00	
" " allowance for postage	5 00	
		$692 89

The deficiency of $658.89 was made up out of the Harbour Revenues.

I have the honour to be,

Sir,

Your obedient servant,

ALEXANDER ROBERTSON,

Secretary.

STATEMENT *showing the number of Branch Pilots for and above the Harbour of Quebec, on the Active List, on the 31st December, 1892, their Age, Residence, Number of Pilotages, Earnings, and whether employed on Special Service or on Tour-de-Role.*

No.	Names.	Age.	Residence.	Date of Branch.	Remarks.	No. of Trips to Montreal.		No of Trips to intermediate places.		Total No. of Trips.	Earnings to Montreal.	Earnings to intermediate Ports.	Total Earnings.	Employed on Special Service or on Tour-de-Rôle.
						IN.	OUT.	IN.	OUT.					
1	Bouillé, Zépherin...	63	Deschambault	March 1, 1855..	.....	16	15	.....	.....	31	$ 1,706 40	$	$ 1,706 40	Allan Line.
2	Gagnon, Pierre.....	64	Three Rivers.....	November 27, 1866..	Resigned on 12th October, 1892.	11	11	.....	.....	22	1,147 86	.....	1,147 86	Allan Line.
3	Naud, Oné-ime.....	50	Deschambault	March 16, 1870..	.....	14	15	.....	.....	29	1,574 30	.....	1,574 30	Allan Line.
4	Hamelin, J. Octave.	58	Deschambault	March 16, 1870..	.....	16	16	1	1	34	1,181 66	55 32	1,236 98	Intercolonial Coal Co
5	Chandonnet, Jos...	51	St. Henri de Lauzon, Lévis....	August 2, 1870..	Member Pilots' Committee 1892 Re-elected 1893.	14	16	.....	.....	30	1,697 70	.....	1,697 70	Beaver Line.
6	Bouillé, Louis A....	55	Deschambault	September 1, 1870..	.....	11	11	1	.....	23	965 47	35 58	1,001 05	Tour-de-Role.
7	Boudet, P'rudent...	51	Lotbinière	October 10, 1870..	.....	11	13	.....	.....	24	1,333 31	.....	1,333 31	Dominion Line.
8	Bélisle, Elzéar.....	58	Deschambault	October 10, 1870..	.....	14	13	2	.....	29	609 93	40 75	650 68	J. G. Brock.
9	Pleau, Joseph.....	55	St. Anne de la Pérade	October 10, 1870..	.....	10	12	1	3	26	926 93	104 25	1,031 18	Tour-de-Rôle.
10	Brunet, Célestin....	48	278 Dorchester St. St., Montreal.	February 28, 1872..	.....	17	20	.....	.....	37	1,976 87	.....	1,976 87	Donaldson Line.
11	Bélisle, Louis.....	46	Deschambault	February 28, 1872..	Member Pilots' Committee 1892. Re-elected 1893.	13	13	.....	.....	26	1,430 01	.....	1,430 01	Dominion Line.
12	Caien, Damase.....	54	Portneuf.....	October 1, 1872..	.....	11	9	.....	1	21	845 89	30 00	875 89	Tour-de-Rôle.
13	Groleau, Ulric.....	44	Grondines	October 30, 1872..	.....	10	9	2	2	23	871 20	97 64	968 84	Tour-de-Rôle.
14	Frenette, Alfred....	53	Portneuf.....	October 30, 1872..	.....	13	13	.....	.....	26	1,302 29	.....	1,302 29	McLean, Kennedy & Co
15	St. Amant, Alfred..	48	Deschambault	October 30, 1872..	.....	10	10	1	1	22	757 83	50 00	807 83	Tour-de-Rôle.
16	Bélanger, Philippe..	53	Lotbinière	April 8, 1874..	.....	17	17	.....	.....	34	1,269 72	.....	1,269 72	J. & R. McLea.
17	Gagnon, Victor....	56	Champlain	April 9, 1874..	.....	10	13	1	1	25	1,152 03	50 75	1,202 78	Tour de-Role.
18	Perrault, Narcisse..	55	Deschambault	April 10, 1874..	President P. C. 1892; re-elected for 1893.	15	19	1	.....	35	1,770 95	42 52	1,813 47	Donaldson Line.
19	Toupin, Trefflé.....	43	Lake Bouchette, Lake St. John.	September 22, 1874..	Suspended from 11th Oct., until 1st May 1893.	9	16	1	2	28	1,083 78	80 25	1,164 03	Tour de Rôle.
20	Auger, Cléophas....	46	Point Lévis	September 22, 1874..	.....	15	15	.....	.....	30	1,700 59	.....	1,700 59	Beaver Line.
21	Desjordy, François..	50	Lavaltrie	April 8, 1875..	.....	10	7	.....	1	18	716 42	32 62	749 04	Tour-de-Rôle
22	Labranche, Ferdin'd	45	Portneuf	April 8, 1875..	.....	13	13	.....	.....	26	1,407 26	.....	1,407 26	Dominion Line.
23	Perrault, David....	49	Deschambault	April 9, 1875..	Secretary Pilots' Committee 1892, re-elected 1893.	15	16	1	3	35	1,160 59	120 31	1,280 90	Carbray, Routh & Co.
24	Gauthier, Alexis...	44	Deschambault	January 15, 1878..	.....	14	13	.....	.....	27	1,465 99	.....	1,465 99	Allan Line.
25	Bouillé, Louis Z....	42	Deschambault	January 16, 1878..	.....	15	15	.....	.....	30	1,688 94	.....	1,688 94	Allan Line.
26	Toupin, Joseph.....	42	Champlain	November 15, 1878..	.....	20	19	.....	.....	39	1,577 91	.....	1,577 91	Black Diamond line.
27	Gauthier, Laurent..	41	Deschambault	December 10, 1879..	.....	13	13	.....	.....	26	1,416 46	.....	1,416 46	Dominion Line.
28	Arcand, Jean.....	39	Deschambault	December 10, 1879..	Member Pilots' Committee 1892.	11	14	1	3	29	1,156 60	129 72	1,286 32	Tour-de-Rôle.
29	Nault, Delovoie.....	39	Deschambault	December 10, 1979..	.....	22	23	1	.....	46	1,686 77	32 18	1,718 95	Black Diamond line
30	Gauthier, Wilbrod..	39	Deschambault	December 10, 1879..	.....	15	15	.....	.....	30	1,693 38	.....	1,693 38	Allan Line.
31	Mayrand, Louis.....	45	St. Anne de la Pérade	December 9, 1880..	.....	11	10	.....	.....	21	925 73	.....	925 73	Tour-de-Rôle.
32	Dufresne, George...	43	Deschambault	December 10, 1880..	.....	10	8	1	2	21	800 04	74 88	874 92	Tour-de-Rôle.
33	Arcand, Norbert...	39	Champlain	December 10, 1880..	.....	16	16	1	2	35	1,227 65	86 31	1,314 46	Ross & Co., Quebec.
34	Toupin, Ulderic....	37	Champlain	December 11, 1880..	.....	11	7	.....	2	20	723 10	33 19	756 29	Tour-de-Rôle.
35	Bouillé, Tancrède..	38	Deschambault	December 11, 1880..	.....	10	10	.....	.....	20	1,049 96	.....	1,049 96	Hansa Line.
36	Arcand, Nestor.....	36	Deschambault	February 20, 1884..	.....	10	10	2	2	24	915 53	135 50	1,051 03	Tour-de-Rôle.
37	Nault, John.....	35	Deschambault	February 20, 1884..	.....	17	18	.....	.....	35	1,824 32	.....	1,824 32	Thomson & Ross line
38	Dussault, Joseph....	36	Deschambault	February 20, 1884..	.....	18	17	.....	.....	35	1,279 33	.....	1,279 33	J. & R. McLea.
39	Groleau, Gédéon...	40	Grondines	May 20, 1887..	Suspended from 13th Sept. until 31st Dec., 1892.	9	5	2	2	18	553 32	109 38	662 70	Tour-de-Rôle.
40	Bellisle, Néré.....	41	Deschambault	May 20, 1887..	.....	13	11	.....	.....	24	940 71	.....	940 71	Black Diamond line.
41	Perrault, Liboire...	46	Deschambault	April 20, 1888..	.....	10	10	1	3	24	866 15	109 93	976 08	Tour-de-Rôle.
42	Raymond, Wilfrid..	37	Deschambault	April 20, 1888..	.....	16	17	.....	.....	33	1,859 08	.....	1,859 08	Thomson & Ross line
43	Hurteau, Joseph....	31	1598 St. Catherine St., Montreal.	March 20, 1889..	Member Pilots' Committee 1893.	16	18	1	2	37	1,237 75	80 68	1,318 43	F. C. Henshaw.
44	Perrault, Edouard..	42	Deschambault	March 20, 1889..	.....	17	16	1	2	36	1,229 74	68 98	1,298 72	Carbray, Routh & Co
45	Bouillé, Lydoric....	35	Deschambault	March 20, 1889..	.....	10	10	.....	.....	20	1,023 32	.....	1,023 32	Hansa Line.
46	Dussault, Honoré...	39	St. Petronille.....	July 16, 1889..	.....	13	13	.....	.....	26	948 11	.....	948 11	Ross & Co., Quebec.
47	Brière, Arthur.....	35	Portneuf	April 28, 1891..	.....	16	16	1	2	35	1,185 40	80 90	1,266 30	Intercolonial Coal Co
48	Labranche, J. S....	38	Portneuf	" 28, 1891..	.....	10	10	2	2	24	892 07	107 12	999 19	Tour-de-Rôle.
49	Perrault, Alexis....	29	Deschambault	" 28, 1891..	.....	17	14	.....	.....	31	1,180 36	.....	1,180 36	F. C. Henshaw.
50	Dufresne, N.C.....	31	Deschambault	June 23, 1891..	.....	15	15	.....	1	31	1,147 87	27 71	1,175 58	Tour-de-Rôle.
										Total..	$61,084 58	$1,816 97	$62,901 55	

HARBOUR COMMISSIONERS' OFFICE,
MONTREAL, 10th January, 1893.

ALEXANDER ROBERTSON,
Secretary

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REPORT AND STATEMENTS

OF THE

MONTREAL DECAYED PILOT FUND

FOR THE YEAR 1892.

HARBOUR COMMISSIONERS OF MONTREAL,
SECRETARY'S OFFICE,
MONTREAL, 10th January, 1893.

WILLIAM SMITH, Esquire,
Deputy Minister of Marine and Fisheries,
OTTAWA.

SIR:

I have the honour, by direction of the Harbour Commissioners of Montreal, to transmit herewith, for the information of the Honourable the Minister of Marine and Fisheries, the usual statements of (1) Receipts and Disbursements of the Montreal Decayed Pilot Fund for the year ended 31st December, 1892, and (2) Assets belonging to the Fund at 31st December, 1892.

The following is an abstract of the former:

RECEIPTS.

5 p.c. of all Pilotage Dues, collected at Montreal	$3,010 27	
" " " " " Sorel	36 13	
" " " " " Three Rivers	17 59	
" " " " " Batiscan	11 92	
" " " " by the Montreal Pilotage Agent at Quebec, on vessels to and from Batiscan, &c	34 51	
Sundry small amounts of percentages	23 66	
		$3,134 08
Interest on investments and on cash in Bank		2,626 14
		$5,760 22

DISBURSEMENTS.

Pensions to old and infirm pilots and widows of pilots.	$4,709 19	
Messrs. Riddell & Common for audit of fund	25 00	
Postage Stamps and Stationery	10 00	
The Vice Consul for Sweden and Norway, refund of percentage on barque "Bothnia," collected at Batiscan and also at Quebec	2 32	
		$4,746 51
Showing a gain for the year of		$1,013 71

During the year three of the pensioners died, namely: Dame Olivier Raymond, on 19th January; Dame Olivier Abelle, on 25th March; and Dame Zephirin Boudreau, on 31st October; to the legal heirs of whom the full pension for the quarter during which the death occurred was in each case paid, as usual.

There are now on the list, eight old pilots, at $360.00 per annum, and eleven widows, of whom eight receive $149.32, two $128.00, and one $117.32 annually.

An application was received towards the close of the year from Pilot Pierre Gagnon, of Three Rivers, to be superannuated on account of failing health, which will be considered at an early date, Mr. Gagnon having now reached the age of 65.

As at the beginning of the year there was a cash balance of $2,119.20, on which interest at the rate of 3 per cent. per annum is allowed by the Bank, the Harbour Commissioners, on 31st December, decided to invest $2,000.00 in two 4 per cent. Montreal Harbour Bonds, of $1,000.00 each, at par.

The assets of the Fund now amount to more than $50,000.00, of which $49,000.00 is in Montreal Harbour Debentures and City of Montreal Stock, the balance being on deposit.

I have the honour to be, Sir,

Your obedient servant,

ALEXANDER ROBERTSON,

Secretary.

SEE NEXT PAGE FOR TREASURER'S STATEMENT.

Dr. ALEXANDER ROBERTSON, TREASURER, IN ACCOUNT

1892			
Jan.	1.. To balance from December, 1891		$2,119 20
"	4.. To six months' interest due 1st January on the shares of the City of Montreal Consolidated Fund, viz., $5,000, 5 per cent. stock		125 00
"	21.. Harbour of Montreal Coupons, *Due 5th Jan*		
	Series M, Nos.	154-156 = 3 × $32.50 =	$ 97.50
	" N, Nos.	36- 43 = 8 × 65.00 =	520.00
	" P, No.	81 = 1 × 60.00 =	60.00
	" R, Nos.	20 and 102 = 2 × 15.00 =	30.00
	" R, Nos.	117-119 = 3 × 30.00 =	90.00
	" D, Nos.	21 and 45-49 = 6 × 25.00 =	150.00
	" F, Nos.	164-172 = 9 × 20.00 =	180.00
	" G, Nos.	289-290 = 2 × 20.00 =	40.00
			$1,167 50

Forward..... $3,411 70

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WITH THE DECAYED PILOT FUND. Cr.

1892.			
Feb		By pensions paid to the following for three months ended 31st January :—	
"	1	Widow Olivier Abelle, Montreal	$ 37 33
"	"	" Hubert Lemay, do	37 33
"	"	Old Pilot Augustin Naud, Montreal	90 00
"	2	" J. B. Dorval, Cap de la Madeline	90 00
"	"	" Onesime Naud, Sorel	90 00
"	"	" George Raymond, Deschambault	90 00
"	"	" Cyrille Bellisle, do	90 00
"	"	" Hubert A. Belisle, do	90 00
"	"	Widow Isaie Beaudry, Sorel	37 33
"	"	" Severe Belleisle, Deschambault	37 33
"	"	" Zepherin Boudreau, Three Rivers	37 33
"	"	" Edouard Boudreau, do	37 33
"	"	" David Bouille, Deschambault	29 33
"	"	" Leandre Dessureau, Sorel	37 33
"	"	" Placide Gaillardet, St. Gregoire	37 33
"	"	" Adolphe Lisé, Batiscan	37 33
"	"	" David Mathieu, Grondines	32 00
"	"	" Zepherin Mayrand, Contrecœur	37 33
"	"	" Edouard Naud, Sorel	32 00
"	3	Dame J. R. Poitras, for the heirs of the late Dame Olivier Raymond, who died on the 19th January, the 3 months' pension which would have been due the latter on 1st February. (See Board Minutes of February 2nd, 1892	37 33
"	"	Old Pilot Joseph Leveillé, pension for 3 months to 1st February	90 00
"	10	Old Pilot Athanase Dufresne, pension for 3 months to 1st February	90 00
		Forward	$1223 96

Dr. ALEXANDER ROBERTSON, TREASURER, IN ACCOUNT

1892			
		Forward.....	$3,411 70
April 28	To Francois Desjordy, poundage on pilotage dues of the U. S. Steamer "William Harrison," Quebec to Montreal, 6 ft. draft.....		75
May 31	Trinity dues for May from Collector H. M. Customs, Montreal.....		297 06
June 21	Pilot George Dufresne, poundage on bk. "Progress," from Quebec to Montreal. Draft, 12 feet.....		1 20
" 30	Trinity dues for June from Collector H. M. Customs, Montreal.....		496 89
July 4	Poundage on H. M. S. "Pylades," 17 feet draft, Quebec to Montreal.....		2 12
" 20	Poundage on H. M. S., "Pylades," 16 feet 10 inches draft, Montreal to Quebec.....		2 10
" 30	Six months' interest, due 1st July, on the shares of the City of Montreal Consolidated Fund, viz., $5,000 of 5 per cent. stock.....		125 00
" "	Trinity dues for July from Collector H. M. Customs, Montreal.....		543 27
" "	Harbour of Montreal Coupons, *due 5th July*.....		
	Series M, Nos. 154-156 = 3 × $32.50 =	$ 97.50	
	Series N, Nos. 36- 43 = 8 × 65.00 =	520.00	
	Series P, Nos. 81 = 1 × 60 00 =	60.00	
	Series R, Nos. 20 and 102 = 2 × 15.00 =	30.00	
	Series R, Nos. 117-119 = 3 × 30.00 =	90.00	
	Series D, Nos. 21 and 45-49 = 6 × 25.00 =	150.00	
	Series F, Nos. 164-172 = 9 × 20.00 =	180.00	
	Series G, Nos. 289-290 = 2 × 20.00 =	40.00	
		———	$1,167 50
		Forward.....	$6,047 59

WITH THE DECAYED PILOT FUND.—*Continued.* Cr.

1892		*Forward* . . .	$1,223 96
Mar. 23		Riddle & Common for audit of this Fund for the year ended 31st December, 1891	25 00
		By Pensions paid to the following for three months to 1st May :—	
May 2		Widow Hubert Lemay, Montreal	37 33
" "		Annie McIntosh, 3 months' pension to 1st May, which would have been due her sister, Catherine McIntosh, widow of Olivier Abelle, she having died on 25th March	37 33
" "		Old Pilot Augustin Naud, Montreal	90 00
" 5		" Joseph Levéillé, do	90 00
" 6		Widow Isaie Beaudry, Sorel	37 33
" "	"	Sévere Belleisle, Deschambault	37 33
" "	"	Zepherin Boudreau, Three Rivers	37 33
" "	"	Edouard Boudreau, do	37 33
" "	"	David Bouille, Deschambault	29 33
" "	"	Leandre Dessureau, Sorel	37 33
" "	"	Placide Gaillardet, St. Gregoire	37 33
" "	"	Adolphe Lisé, Batiscan	37 33
" "	"	David Mathieu, Grondines	32 00
" "	"	Zepherin Mayrand, Contrecœur	37 33
" "	"	Edouard Naud, Sorel	32 00
" "		Old Pilot J. B. Dorval, Cap de la Madeline	90 00
" "	"	Onesime Naud, Sorel	90 00
" "	"	George Raymond, Deschambault	90 00
" "	"	Cyrille Bellisle, do	90 00
" "	"	Hubert A. Bellisle, do	90 00
" "	"	Athanase Dufresne, do	90 00
		Forward	$2,435 59

Dr. ALEXANDER ROBERTSON, TREASURER, IN ACCOUNT

1892.			
Aug.		*Forward*.....	$6,047 59
"	31	Trinity dues for August from Collector H. M. Customs, Montreal.....	439 37
Sept.	3	Poundage from Messrs. Carbray, Routh & Co. on French Ship of War "Hussard," 14 feet draft.....	1 75
"	14	Poundage on H.M.S. "Tartar," Pilot Louis A. Bouille, from Quebec to Montreal with 16 feet draft.....	2 00
"	21	Poundage on H.M.S. Magicienne," Pilot Zepherin Bouille, from Quebec, with draft of 19 feet 7 inches, and to Quebec with draft of 19 feet 9 inches.....	4 91
"	30	Trinity Dues for September from Collector H.M. Customs, Montreal.....	453 90
Oct.	26	Poundage on American Yacht "Comanche," Pilot Jos. Pleau, from Montreal to Quebec, draft 10 feet.	1 25
"	26	Poundage on H. M. S. "Tartar," Pilot Louis A. Bouille, Montreal to Quebec, 16 feet draft.....	2 00
"	31	Trinity Dues for October from Collector H. M. Customs, Montreal.....	431 47
		Forward.....	$7,384 24

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WITH THE DECAYED PILOT FUND.—*Continued.* Cr.

1892.			
Aug.		*Forward*.....	$ 2,435 59
		By Pensions paid to the following for three months to 1st August:—	
"	1	Old Pilot Augustin Naud, Montreal.....	90 00
"	"	Widow Hubert Lemay, "	37 33
"	"	Old Pilot Joseph Leveille, "	90 00
"	3	Widow Isaie Beaudry, Sorel.....	37 33
"	"	" Sévère Belleisle, Deschambault.....	37 33
"	"	" Zepherin Boudreau, Three Rivers.....	37 33
"	"	" Edouard Boudreau, do	37 33
"	"	" David Bouille, Deschambault.....	29 33
"	"	" Léandre Dussureau, Sorel.....	37 33
"	"	" Adolphe Lisé, Batiscan.....	37 33
"	"	" David Mathieu, Grondines	32 00
"	"	" Zepherin Mayrand, Contrecœur.....	37 33
"	"	" Edouard Naud, Sorel	32 00
"	"	Old Pilot J. B. Dorval, Cap de la Madeline.....	90 00
"	"	" Ouesime Nault, Sorel.....	90 00
"	"	" George Raymond, Deschambault	90 00
"	"	" Cyrille Bellisle "	90 00
"	"	" Hubert A. Bellisle "	90 00
"	"	" Athanase Dufresne "	90 00
"	4	Widow Placide Gaillardet, St. Gregoire	37 33
		Forward.....	$ 3,584 89

Dr. ALEXANDER ROBERTSON, TREASURER, IN ACCOUNT

1892			
		Forward	$7,384 24
Nov.	17	Pilot N. Comè Dufresne, Poundage on Steamship "Mersario" from Three Rivers to Quebec, with draft 15 feet 6 inches	1 39
"	24	P. B. Vanasse, Esq., Collector H. M. Customs, Three Rivers, poundage collected as per statement....	17 59
"	29	Charles Garriepy, Montreal Pilotage Agent at Quebec, poundage on vessels to and from Batiscan etc., in 1892, as per his statement	34 51
"	30	Trinity dues for November from collector of H. M. Customs, Montreal.....	348 31
Dec.	3	Jos. Mathieu, Esq., collector H. M. Customs, Sorel, poundage collected at Sorel during 1892, as per statement	36 13
"	7	I. Johnston, Pro. Collector H. M. Customs, Batiscan poundage collected at Batiscan during 1892, as per statement	11 92
"	27	Pilot Alfred St. Amant, poundage on U. S. Supply Boat "Columbine" $1.50, on U. S. Yacht "Wadena" $1 25.....	2 75
"	"	Pilot Gedeon Groleau, poundage on U. S. Yacht "Lilac"	1 44
		Forward	$7,838 28

WITH THE DECAYED PILOT FUND.—*Continued.* Cr.

1892			
		Forward.....	$3,584 89
		By Pensions paid to the following for three months to 1st November :—	
Nov.	1	Widow Hubert Lemay, Montreal	37 33
"	"	" David Mathieu, Grondines	32 00
"	2	Old Pilot Augustin Naud, Montreal.....	90 00
"	3	" Joseph Leveille do	90 00
"	4	Widow Isaie Beaudry, Sorel.....	37 33
"	"	" Severe Belleisle, Deschambault.....	37 33
"	"	" Edouard Boudreau, Three Rivers.....	37 33
"	"	" David Bouille, Deschambault.....	29 33
"	"	" Leandre Dessureau, Sorel	37 33
"	"	" Placide Gaillardet, St. Gregoire.....	37 33
"	"	" Adolphe Lisé, Batiscan.....	37 33
"	"	" Zepherin Mayrand, Contrecœur.....	37 33
"	"	" Edouard Naud, Sorel.....	32 00
"	"	Old Pilot Hubert A. Belleisle, Deschambault.....	90 00
"	"	" Cyrille Belleisle, do	90 00
"	"	" Athanase Dufresne, do	90 00
"	"	" George Raymond, do	90 00
"	"	" J. B. Dorval, Cap de la Madeline.....	90 00
"	"	" Onesime Nault, Sorel.....	90 00
"	16	Henry M. Balcer, Three Rivers, Executor, for the Estate of the late Mrs. Zepherin Boudreau, the Pension due her for 3 months to 1st Nov., she having died on the 31st Oct.....	37 33
Dec.	15	D. Connelly, Vice Consul for Sweden and Norway, Refund of Poundage on Barque "Bothnia," collected at Bastican by Pro Collector, and also from the Pilot by Montreal Pilot Agent at Quebec in October, it having thus been paid by the vessel twice—.....	2 32
		Forward.....	$4,736 51

Dr. ALEXANDER ROBERTSON, TREASURER, IN ACCOUNT

1892.		
	Forward.....	$7,838 28
Dec. 31	Interest from Montreal City and District Savings Bank on money at deposit during the year at 3 p.c..	41 14
		$7,879 42

STATEMENT OF THE FUND.

Montreal Harbour Debentures.

Nos.	*Series.*	*Due.*	*Interest.*	
154-156	M	5th Jan. 1894	6½	p.c.= 3 × $1,000.... $ 3,000 00
36- 43	N	5th July 1894	6½	p.c.= 8 × 2,000.... 16,000 00
81	P	5th July 1896	6	p.c.= 1 × 2,000.... 2,000 00
20 and 102	R	5th July 1906	6	p.c.= 2 × 500.... 1,000 00
117-119	R	5th July 1906	6	p.c.= 3 × 1,000.... 3,000 00
21 and 45-49	D	5th July 1915	5	p.c.= 6 × 1,000.... 6,000 00
164-172	F	5th July 1917	4	p.c.= 9 × 1,000.... 9,000 00
289-290	G	5th July 1918	4	p.c.= 2 × 1,000.... 2,000 00
64-65	H	5th July 1921	4	p.c.= 2 × 1,000.... 2,000 00

(Without current Coupon for six months interest, due on 5th January, 1893.)

City of Montreal Consolidated Fund

165	(due 1st July, 1910), interest 5 p.c. 50 × $100	5,000 00
	Cash in Montreal City and District Savings Bank at 3 p.c. interest..... $1,128 72	
	Cash in Harbour Commissioners hands at 31st December, 1892..... 4 19	
		$1,132 91
	Total.....	$50,132 91

Alexander Robertson,
Treasurer,
Montreal, 31st December, 1892.

WITH THE DECAYED PILOT FUND.—*Continued.* Cr.

1892.			
		Forward.....	$4,736 51
Dec. 31	By Postage, etc., on Pensions remitted during 1892.		10 00
" "	By Harbour Commissioners of Montreal for two Montreal Harbour Debentures, Series "H" of $1,000 each, at Par (Ex Coupon due 5th Jan. 1893)		2,000 00
	By Balance to January 1893		1,132 91
			$7,879 42

We hereby certify that we have examined the entries for the year 1892, as recorded on preceding pages, and have found them to agree with vouchers on fyle; also, that debentures and certificates covering the sum of $50,128.72, as called for in statement opposite, have this day been submitted for our inspection.

RIDDELL & COMMON,
Auditors.

MONTREAL, 9th January, 1893.

REPORT

OF THE

HARBOUR MASTER OF THE PORT OF MONTREAL

For the Year 1892.

CAPTAIN THOMAS HOWARD, *Harbour Master.*

HARBOUR COMMISSIONERS OF MONTREAL,
HARBOUR MASTER'S OFFICE,
MONTREAL, January 3rd, 1893.

ALEXANDER ROBERTSON, ESQ.,
Secretary,
Harbour Commissioners of Montreal.

DEAR SIR :—

For the information of the Board of Harbour Commissioners I beg to submit the following as my Annual Report for the year 1892, with comparative statements showing the number, tonnage, classification, nationality, greatest number of vessels in Port at one time, number and tonnage of sea-going vessels consigned to the different agents, with statements showing the number and tonnage of inland vessels and the greatest number in Port at one time during the past ten years.

Seven hundred and thirty-five sea-going vessels arrived in the Harbour during the season, of the aggregate ton-

nage of 1,036,707 tons. Of these vessels 659 were built of iron of an aggregate tonnage of 1,008,178 tons, and 76 of wood of an aggregate tonnage of 28,529 tons, showing an increase in ocean tonnage of 98,050 tons over the previous year. Of inland vessels there arrived in Port 5,200 of an aggregate tonnage of 1,049,600 tons, showing a decrease of 68 vessels, and in tonnage 69,884 tons, and a total of 5,935 vessels of all classes and 2,086,307 tons in tonnage, showing an increase of tonnage of vessels of all classes of 28,166 tons. Some of the principal items of exports and imports during the season were :—

EXPORTS.

Lumber.—There were shipped during the season, of lumber, square and wane timber, 198,622,466 feet board measure. Of this lumber 186,177,640 feet went to the United Kingdom and 12,444,826 feet to South America, showing an increase of 89,986,146 feet over the previous year.

Phosphate.—There were shipped 6,013 tons, showing a decrease of 8,722 tons, as compared with 1891. This decrease is caused by the ruinous competition between Southern and Northern speculators.

Grain.—There were shipped 8,379,562 bushels of wheat; 1,763,854 of corn; 2,255,691 of peas; 5,930,750 of oats; 403,978 of barley; 160,391 of rye; making a grand total of 18,894,226 bushels, and an increase of 4,715,189 bushels over the previous year.

Flour. –There were shipped in bags and barrels, equal to 601,243 barrels, showing a decrease of 121,145 barrels from the previous year.

Cheese.—There were shipped 1,652,628 boxes, showing an increase of 302,635 boxes over the previous year.

Butter.—There were shipped 103,139 packages, showing an increase over the previous year of 21,248 packages.

Apples.—There were shipped 470,480 barrels, showing an increase of 163,545 barrels over the previous year.

Cattle and Sheep.—Cattle shipped 98,755 head, and 15,-932 sheep, showing a decrease of 10,192 head of cattle and a decrease of 16,225 sheep.

Horses.—There were shipped during the season 1,739 horses, which is a large increase on previous years and and is likely to go on increasing.

Imports.

Coal.—We had from Great Britain 18,356 tons, showing a decrease of 357 tons, from the United States 221,863 tons, showing an increase of 37,442 tons, making a total of 240,219 tons; from the Maritime Provinces 549,971 tons, showing an increase of 45,419 tons, and a grand total of 790,190 tons, and an increase over the previous year of 82,504 tons. Of this coal 590,211 tons were discharged in the Harbour and 199,979 tons in the canal.

Cement.—We had 120,358 barrels, showing a decrease of 14,073 barrels from the previous year. The manufacturing of cement in this Province and Ontario accounts for the decrease in imports.

Scrap Iron.—We had discharged in the Harbour 19,812 tons, showing an increase over the previous year of 3,659 tons.

Harbour Improvements.

The wharves and roads were kept in good repair during the season. The filling in and levelling up between Hochelaga and the St. Lawrence Sugar Refinery has been pushed forward so that your Commissioners can extend

their tracks in the early spring for the accommodation of the Grand Trunk and Canadian Pacific Railways, which will be of great advantage to the trade in general.

Yours respectfully,

THOMAS HOWARD,

Harbour Master.

Weather Report.

January.—1st, east wind, temp. 16 above zero, no snow, dark morning; 2nd, east wind, temp. 27 above, rain this morning, rain all day; 3rd, snow this morning and sleighing, temp. 30, east wind, 4th, fine morning, west wind, temp. 17 above; 5th, northwest wind, temp. 5 above; 6th, east wind, temp. 8 above, fine morning; 7th, west wind, 16 above, snow last night, good sleighing; 8th, west wind, temp. 19 above; 9th, fine day, west wind, temp. 19 above; 10th, west wind, temp. 20 above; 11th, east wind, temp. 12 above; 12th, south-west wind, temp, 35, rain; 13th, east wind, temp. 29, sleighing bad, snowing; 14th, snow last night, east wind, temp. 27; 15th, north-west wind, temp. 17 above. 16th, east wind. temp. 5 above, fine and clear; 17th, south-west wind, temp. 19 above; 18th, temp. 25, south-west wind, channel all clear of ice, snowing; 19th, east wind, snow last night, 14 above; 20th, north-west wind, at 8 a.m. 9 below zero, fine clear day; 21st, south-west wind, temp. 10 above, snowing; 22nd, fine morning, south-west wind, temp. 10 above, water over the wharves, four men crossed this morning to the Island; 23rd, temp. 31, east wind, snow storm this morning; 24th, east wind, temp. 5 above, snow storm in the afternoon; 25th, east wind, temp. 10 above, snowing; 26th, west wind, 5 above, water last night 33 feet 6 inches; 27th, west wind, temp. 6 below

zero, fine clear day ; 28th, north-west wind, temp. 22 above, snowing ; 29th, east wind, temp. 27 above, sleighing good ; 30th, east wind, temp. 17 above, no road on ice yet from the city ; 31st, east wind, temp. 18, fine day.

February.—1st, north-west wind, temp. 23 above , 2nd, south-east wind, temp. 23 above, fine day, first road made on ice from Hochelaga to Longueuil this winter ; 3rd, east wind, temp. 23 above, snowing this morning ; 4th, east wind, tem. 23 above ; 5th, west wind, temp. 10 above, fine day ; 6th, north-west wind, temp. 2 above, crossing from St. Lambert's to city ; 7th, east wind, temp. 13 above, 4 p.m. snow storm ; 8th, east wind, temp. 23 above, snow storm ; 9th, south-west wind, temp. 23 above, snow last night ; 10th, west wind, temp. 20 above, fine day ; 11th, temp. 23 above, snowing, east wind ; 12th, snow storm, temp. 17 above, 10 p.m. 4 above ; 13th, east wind, 8 a.m. 4 below zero, snowing ; 14th, east wind, 4 above zero, snow storm ; 15th, fine morning, temp. 17 above, snow storm last night ; 16th, west wind, temp. zero ; 17th, north-west wind, temp. 6 above ; 18th, west wind, temp. zero, fine day ; 19th, south-west wind, temp. 8 above ; 20th, east wind, temp. 27 above, snow last night ; 21st, mild, temp. 33, fine day ; 22nd, east wind, temp. 34 ; 23rd, temp. 34, east wind, fine sunshine ; 24th, east wind, temp. 28, clear morning ; 25th, south-west wind, temp. 30, road to Laprairie bad and closed up ; 26th, north-west wind, temp. 35, bad sleighing ; 27th, north-west wind, temp. at 8 a.m. 5 below zero ; 28th, west wind, temp. zero, fine day ; 29th, east wind, temp. 10 above, water 24 ft. 6, is very low for season.

March.—1st, cold north-east wind, temp. 6 above ; 2nd, east wind, temp. 7 above, clear day ; 3rd, east wind, 9 above, fine weather ; 4th, west wind, temp. 10 above ; 5th, west wind, temp. 15 above ; 6th, north wind, temp.

33 above ; 7th, north-west wind, temp. 35, fine ; 8th, south-west wind, temp. 30 ; 9th, south-east wind, temp. 35 ; 10th, west wind, temp. 40, bad roads ; 11th, west wind, temp. 28, snow storm continued all day and night, most severe of the winter ; 12th, north-west wind, temp. 10 above, good sleighing ; 13th, north-west wind, temp. 5 below zero ; 14th, north-west wind, temp. zero, fine ; 15th, north-west wind, temp. 2 above ; 16th, north-west wind, temp. 3 above ; 17th, west wind, temp. zero ; 18th, east wind, temp. 22 above, snow storm ; 20th, west wind, temp. zero, fine day ; 21st, west wind, temp. 10, fine weather ; 22nd, west wind, temp. 22 above, good sleighing, crossing to Longueuil, no crossing opposite the city ; 23rd, south-west wind, 1 p.m. rain storm, temp. 35, very mild ; 24th, west wind, temp. 30, fine morning ; 25th, north-west wind, temp. 33, sleighing bad ; 26th, north-west wind, temp. 33, fine day ; 27th, temp. 35, west wind ; 28th, north-east wind, temp. 36, fine ; 29th, north-west wind, tem. 32, bad roads ; 30th, east wind, temp. 31, crossing at head of St. Helen's Island from St. Lamberts ; 21st, east wind, temp. 30, fine morning.

April—1st, east wind, temp. 47, fine clear day, street cars running on Notre Dame street ; 2nd, west wind, temp. 43, fine day ; 3rd, west wind, temp. 50 ; 4th, east wind, temp. 40, fine day ; 5th, east wind, temp. 38, quantity of ice came down last night, water 36 feet ; 6th, west wind, temp. 59, no change in the appearance of the ice ; 7th, west wind, temp. 40, ice and water same as yesterday ; 8th, east wind, no change in ice, water same as yesterday ; 9th, east wind, dark day, temp. 44 ; 10th. east wind, temp. 30, no change ; 11th, west wind, temp. 28 ; 12th, channel clear, west wind ; 13th, fine day, west wind, steamer Hochelaga arrived from winter quarters, first arrival ; 14th, north-east wind, temp. 40 ; 15th, fine,

west wind, temp. 42 ; 16th, dark morning, west wind, temp. 43 ; 17th, west wind, temp. 43, fine ; 18th, east wind, temp. 44 ; 19th, temp. 47, west wind ; 20th, west wind, temp. 55, ice still jammed at Cap Rouge ; 21st, east wind, temp. 50, ice gone at Cap Rouge, river open between Montreal and Quebec ; 22nd, south-west wind, temp. 55, rain last night ; 22rd, west wind, temp. 45, rain last night, S.S. Fremona arrived 11 a.m. from sea ; 24th, west wind, blowing hard, temp. 25 ; 25th, west wind, temp. 30, fine and clear ; 26th, temp. 40, north-west wind, fine day ; 27th, fine morning, east wind ; 28th, west wind, temp. 50, rain last night ; 29th, west wind, temp. 50, fine morning ; 30th, north-west wind, temp. 44.

May.—1st, cold morning, temp. 40, Lachine Canal opened for navigation ; 2nd, north-west wind, temp. 45 ; 3rd, east wind, temp. 45 ; 4th, west wind, great change, temp. 70, steamer Filgate first boat down the rapids ; 5th, north-west wind, temp. 45 ; 6th, east wind, temp. 40, fine. sheds of the Hamburg American Packet Company burnt on Island wharf ; 7th, cold, east wind, temp. 40 ; 8th, west wind, temp. 60 ; 9th, east wind, temp. 45, fine day ; 10th, east wind, temp. 45, sunshine ; 11th, east wind, temp. 45 at 9 a.m., rain ; 12th, east wind, temp. 45, rain last night ; 13th, north wind, temp. 50, fine day ; 14th, south-west wind, temp. 65 ; 15th, temp. 50, south-west wind ; 16th, rain last night, temp. 55, south-west wind ; 17th, west wind, temp. 60, fine clear day ; 18th, east wind, temp. 65, fine weather ; 19th, west wind, temp. 65 ; 20th, west wind, temp. 55 ; 21st, south-east wind, temp. 50 ; 22 temp. 47, east wind ; 23rd, temp. 44, east wind ; 24th, north-west wind, temp. 50, clear day ; 25th, west wind, temp. 58, fine morning ; 26th, west wind, temp. 65, fine day ; 27th, north-west wind, rain all night, temp. 57 ; 28th, north.west wind, temp. 55, fine clear day ; 29th,

west wind, temp. 65, rain ; 30th, west wind, temp. 70 ; 31st, south-west wind, tem. 67, fog this morning, at 10 p.m. temp. 76.

June.—1st, south-west wind, temp. at 7 a.m. 75, at 3 p.m. temp. 88 ; 2nd, west wind, temp. 76, at 1 p.m. rain storm ; 3rd, temp. at 7 a.m. 60, great change ; 4th, fine day, west wind ; 5th, temp. 65, west wind ; 6th, north-west wind, temp. 70 ; 7th, east wind, temp, 60, fine day ; 8th, south-west wind, temp. 65 ; 9th, rain all last night, north-west wind, temp. 65 ; 10th, east wind, temp. 60, fine day ; 11th, west wind, temp. 65 ; 12th, west wind, temp. 80 ; 13th, south-west wind, temp. 75, at 2 p m. temp. 85 ; 14th, west wind, temp. at 7 a.m. 77, at noon 85, rain storm ; 15th, temp. at 7 a.m. 64, west wind ; 16th, west wind, temp. 60, at 4 p.m. thunder and rain ; 17th, east wind, rain this morning, temp. 60 ; 18th, north-west wind, temp. 65 ; 19th, rain all last night and to-day, temp. 65 ; 20th, rain continues, east wind, 2 p.m. clearing up ; 21st, west wind, temp. 70, fine morning ; 22nd, temp. 7 a.m. 70 west wind ; 23rd, east wind, temp. 75 ; 24th, temp. 70, south-east wind, 9 p.m. thunder storm ; 25th, north-west wind, 9 a.m. great rain storm, temp. 70 ; 26th, west wind, temp. 70, noon rain storm, 5 p.m. rainstorm ; 27th, south wind, temp. 70 rain ; 28th, temp. 70, west wind ; 29th, west wind, temp. 70, clear day ; 30th, south-west wind, rain this morning.

July.—1st, west wind, temp. 65 ; 2nd, temp. 7 a.m. 65, west wind ; 3rd, rain all forenoon, temp. 60, H.M.S. Pylades arrived at 6 p.m., berthed at Long wharf ; 4th, temp. 57, west wind, fine day ; 5th, north-east wind, temp. 60, fine day ; 6th, south-west wind, temp. 65 ; 7th, south-west wind, temp. 70 ; 8th, temp. 70, west wind ; 9th, dark morning, rain, temp. 65, west wind ; 10th, west wind, temp. 75 ; 11th, south-west wind, temp. 74 ; 12th,

temp. 80, south wind ; 13th, west wind, temp. 7 a.m, 77 ; 14th, east wind, temp. 75 ; 15th, west wind, temp. 80 ; 16th, rain last night, temp 62, west wind ; 17th, temp. 65, west wind, fine day ; 18th, west wind, temp. 65 ; 19th, temp. 70, west wind ; 20th, west wind, temp. 72 ; 21st, temp. 60, west wind ; 22nd, west wind, temp. 70, 9 a.m. rain and thunderstorm ; 23rd, west wind, temp. 80 ; 24th, temp. 80 at 11 a.m., 10 p.m. 82 ; 25th, temp. 78 10 p.m., rain, west wind ; 26th, temp. 76 at 7 a.m., at 1 p.m. 86 ; 27th, north-west wind, temp. 77 ; 28th, east wind, temp. 75, 10 p.m. 84 ; 29th, west wind, temp. 7 a.m. 75, 11 a.m. temp. 67 ; 31st, temp. 75, south wind.

August.—1st, south-west wind, temp. 70 ; 2nd, temp. 70, south-east wind ; 3rd, west wind, temp. 70 ; 4th, temp. 74 west wind ; 5th, north-east wind, temp. 70, fine day ; 6th, temp. 70, rain this morning ; 7th, west wind, temp. 85 ; 8th, temp. 84, west wind ; 9th, temp. 90, west wind ; 10th, east wind, temp. 70, rain ; 11th, temp. 70, rain, north-east wind ; 12th, north-east wind, temp. 65, rain ; 13th, temp. 65 rain, north-east wind ; 14th, temp. 67, east wind ; 15th, temp. 70, east wind, fine day ; 16th, temp. 75, east wind ; 17th, west wind, temp. 75, fine weather ; 18th, west wind, temp. 75 ; 19th, south-east wind, temp. 70 ; 20th, temp. 70, east wind ; 21st, west wind; temp. 70 ; 22nd, north-east wind, temp. 65 ; 23rd, temp. 63, east wind ; 24th, temp. 65, south-west wind ; 25th, south-west wind, temp. 65, rain this morning, at 5 p.m. French warships "Arethuse" and "Hussard" arrived in a great rain storm, berthed at Victoria pier ; 26th, south-east wind, temp. 65 ; 27th, cold east wind, temp. 60 ; 28th, temp. 70, south-east wind ; 29th, temp. 63, north wind ; 30th, west wind, temp. 65, fine weather ; 31st, rain, west wind, temp. 68.

September.—1st, fine but cold, temp. 60 ; 2nd, north-west wind, frost last night ; 3rd, north-west wind, temp. 55 ; 4th, west wind, temp. 70, fine weather ; 5th, south-west wind, temp. 70 ; 6th, west wind, temp. 65, rain this morning ; 7th, west wind, temp. 55 ; 8th, west wind, temp. 55, H.M.S. "Magicienne" arrived at 9 a.m., berthed at Victoria pier ; 9th, west wind, temp. 36 ; 10th, north-west wind, temp. 55 ; 11th, south-east wind, temp. 65 ; 12th, south-west wind, temp. 65 ; 13th, temp. 68, south-west wind ; 14th, rain last night and this morning, south-west wind, temp. 70, H.M.S. " Tartar" arrived at 10 a.m. and berthed at Victoria pier ; 15th, west wind, temp. 65, blowing hard ; 16th. west wind, H.M.S. " Magicienne" left port at 8 a.m. ; 17th, temp. 66, west wind ; 18th, rain storm, temp. 60, west wind ; 19th, east wind, temp. 60 ; 20th, north-east wind, temp. 55, frost last night ; 21st, south-west wind, temp. 55 ; 22nd, temp. 60, south-west wind ; 23rd, rain last night, temp. 65, west wind ; 24th, temp. 68, south-west wind, fine day ; 25th, east wind, temp. 75 ; 26th, rain storm last night, temp. 65, west wind ; 27th, north-west wind, temp. 54, blowing hard, H.M.S. " Tartar " left at 10 a.m. ; 28th. temp. 55, north-west wind ; 29th, temp. 56, north-west wind ; 30th, temp. 56, north-west wind, clear weather.

October.—1st, temp. 57, north-west wind ; 2nd, south wind, temp. 55 ; 3rd, temp. 52, south-west wind ; 4th, rain last night, temp. 55 ; 5th, north-west wind, temp. 50 ; 6th, temp. 45 ; north-west wind ; 7th, north-west wind, temp. 55 ; 8th, east wind, temp. 54 ; 9th, west wind, temp. 60 ; 10th, north-west wind, temp. 50 ; 11th, north-west wind, temp. 55, rain ; 12th, north-east wind, temp. 42, frost last night ; 13th, north west wind, temp. 45, frost last night ; 14th, west wind, temp. 60, fine

morning ; 15th, north-west wind, temp. 60 ; 16th, west wind, temp. 55 ; 17th, temp. 50, north wind ; 18th, south-east wind, temp. 50 ; 19th, north-west wind, temp. 50, rain ; 20th, temp. 50, north-west wind ; 21st, temp. 45, north-west wind ; 22nd, temp. 40, west wind ; 23rd, temp. 45, west wind ; 24th, temp. 45, north-west wind ; 25th, temp. 46, north-west wind ; 26th, south-west wind, temp. 55 ; 27th, temp; 45, west wind ; 28th, temp. 45, north-west wind ; 29th, temp. 50, south-west wind ; 30th, temp. 50, north-west wind ; 31st, north-west wind, temp. 45.

November.—1st, north-east wind, temp. 38 ; 2nd, south-east wind, temp. 34, snow storm last night and this morning ; 3rd, east wind, temp. 34 ; 4th, west wind, temp. 40, fine day ; 5th, snow storm last night, temp. 30, north wind ; 6th, west wind, temp. 35 ; 7th, west wind, temp. 38 ; 8th, temp. 44, west wind ; 9th, north-west wind, temp. 35 ; 10th, temp. 30, east wind, snowstorm ; 11th, frost last night, temp. 25, north wind, fine clear morning ; 12th, south-west wind, temp. 35, snowstorm, S.S. Parisian detained ; 13th, south-west wind, temp. 30 ; 14th, temp. 42, south-west wind ; 15th, temp. 44, south-west wind ; 16th, north-east wind, temp. 45 ; 17th, north-west wind, temp. 47 ; 18th, south wind, temp. 50 ; 19th, south-west wind, temp. 45 ; 20th, south-west wind, temp. 45 ; 21st, north-west wind, temp. 30 ; 22nd, north-west wind, temp. 30 ; 23rd, north-west wind, temp. 21 ; 24th, west wind, temp. 25, buoys and beacons removed to-day by order of Harbour Commissioners ; 25th, north wind, temp. 30 ; 26th, north-west wind, temp. 30 ; 27th, west wind, temp. 30, S.S. " Thames" left port this morning for St. Johns, Nfld., being the last sea-going vessel of the season ; 28th, south-east wind, temp. 32, dark day ; 29th, east wind, temp. 25 ; 30th, east wind, temp. 30, dark weather.

December.—1st, west wind, temp. 30, fine morning; 2nd, west wind, temp. 37, fine weather; 3rd, west wind, temp. 25, dark morning; 4th, temp. 28, north-west wind; 5th, north-west wind, temp. 25, fine day; 6th, north-west wind, temp. 22, no snow; 7th, west wind, temp. 30, no ice on river yet, fine morning; 8th, south-west wind, temp. 35, rain this morning; 9th, north-west wind, temp. 37, fine day; 10th, north-west wind, temp. 38, dark day; 11th, temp. 30, fine weather, west wind; 12th, west wind, temp. 30, snowing; 13th, temp. 30, west wind, fine weather; 14th, east wind, temp. 30, snowstorm this morning; 15th, rain this morning, temp. 35, west wind; 16th, north-west wind, temp. 35; 17th, west wind, temp. 22, fine weather; 18th, west wind, temp. 15 above; 19th, snow this morning, temp. 25, east wind; 20th, north-west wind, temp. at 8 a.m. 8 above; 21st, west wind, temp. 20 above, fine weather; 22nd, north-west wind, temp. 1 above zero; 23rd, north-west wind, temp. at 8 a.m. 5 below zero, navigation closed, steamers Longueuil and Hochelaga left this morning for winter quarters; 24th, north-west wind, temp. 5 below, clear weather; 25th, north-west wind, temp. at 8 a.m. 5 below zero; 26th, north-west wind, temp. at 8 a.m. 15 below zero, coldest yet, water level with docks, river full of ice, water 28 feet 4 inches; 27th, north-west wind, temp. 8 a.m. 8 below zero, ice looks to be stationary opposite the city; 28th, north-west wind, temp. at 8 a.m. 6 above, clear morning, no change in the appearance of the river; 29th, north-west wind, 8 a.m. temp. 9 above, fine clear weather; 30th, temp. 10 above, sleighing bad, water in harbour 33 feet, north-west wind; 31st, north-west wind, temp. 15 above, crossing on ice to-day with loaded sleighs from Longueuil to Hochelaga. This is a month earlier than last

winter, when first crossing was on 2nd February, water to-day, 32 feet 5 inches and falling, 10 p.m. temp. 22, fine weather.

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 1892, *that were navigated by* 23,018 *Seamen.*

Nationality.	Number of Vessels.	Tonnage.
British	673	970,623
American	6	1,105
German.....	20	35,225
Norwegian	30	21,785
Dutch	2	22,241
French	3	4,645
Italian	1	1,083
Total.....	735	1,036,707

THOMAS HOWARD,
Harbour Master.

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.
1883.....	5,477	764,721	174.....Sept. 5.
1884.....	4,808	726,015	161.....July 9.
1885.....	5,003	724,975	142.....Oct. 1.
1886.....	5,521	809,819	178.....Aug. 25.
1887.....	5,367	791,452	189.....May 31.
1888.....	5,500	863,014	163.....Aug. 14.
1889.....	5,847	1,069,709	187.....Aug 15.
1890.....	5,162	966,959	167.....Oct. 20.
1891.....	5,268	1,119,484	151.....Sept. 7.
1892.....	5,200	1,049,600	159.....Aug. 6.

THOMAS HOWARD,
Harbour Master.

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.
1883.....	April 27.	Dec. 16.	May 5.	Nov. 20.
1884.....	" 22.	" 18.	" 2.	" 20.
1885.....	May 5.	" 7.	" 8.	" 20.
1886.....	April 24.	" 4.	April 30.	" 25.
1887.....	May 1.	" 23.	May 3.	" 28.
1888.....	April 29.	" 14.	" 4.	" 22.
1889.....	" 14	" 29.	April 27.	" 23.
1890.....	" 14.	" 3.	" 30.	" 24.
1891.....	" 17.	" 17.	" 27.	" 21.
1892.....	" 13.	" 23.	" 23.	" 27.

THOMAS HOWARD,
Harbour Master.

PORT OF MONTREAL.

COMPARATIVE STATEMENT, *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.*

YEARS.	Steamships.	Tonnage	Ships.	Tonnage.	Barques.	Tonnage.	Brigs.	Tonnage.	Brigantines.	Tonnage.	Schooners.	Tonnage.	Total No. of Vessels.	Total Tonnage.	Number in Port.
1883..	464	605,805	3	3,356	70	38,547	7	2,417	15	3,012	101	11,126	660	664,263	38 June 27
1884..	444	585,397	2	2,218	83	49,047	3	1,036	13	2,996	81	8,679	626	649,374	44 Aug 13
1885..	441	619,647	2	2,792	76	45,560	1	338	23	6,141	86	9,376	629	683,854	43 July 15
1886..	532	736,648	11	13,475	68	47,233	10	3,061	7	1,850	75	7,432	703	809,699	44 Aug 18
1887..	600	807,491	7	8 648	68	43,275	2	1,118	7	2,031	82	8,194	767	807,773	37 July 21
1888..	532	742,276	7	9,634	32	20,208			10	2,631	74	7,714	655	782,473	36 June 27
1889..	522	763,783	8	11,923	49	33,982	4	1,239	11	2,356	101	9,882	695	823,165	39 Aug 14
1890..	624	889,189	9	13,127	33	19,442	2	590	8	1,323	70	6,671	746	930,332	37 Sep 3
1891..	631	903,043	11	16,113	15	11,054	1	149	9	2,127	58	6,171	725	938,657	46 Aug 19
1892..	658	1,004,396	8	11,705	21	15,405	1	149	4	809	43	4,243	735	1,036,707	39 July 12

THOMAS HOWARD, *Harbour Master.*

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.

THOMAS HOWARD, *Harbour Master.*

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.
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	133,554
1886.....	175	150,784	....	.....	4	2,535	3	794	2	466	41	2,902	225	157,481
1887.....	224	194,028	2	2,389	11	8,676	1	313	2	342	36	3,139	276	208,882
1888.....	213	195,598	1	1,199	4	3,079	....	.....	3	701	35	3,375	256	203,952
1889.....	184	174,076	....	.....	1	998	....	.....	3	441	52	4,668	240	179,183
1890.....	252	235,722	....	.....			....	.....	1	170	42	3,714	295	329,606
1891.....	272	261,702	....	.....	2	1,462	....	.....	2	520	29	3,067	305	266,751
1892.....	289	275,040	....	.....	3	2,215	1	149	2	340	36	2,214	331	280,958

PORT OF MONTREAL.

Number and Tonnage of Sea-going Vessels that were consigned to the following merchants during the season of 1892:

No.	Name of Firms.	Steam.	Tonnage.	Sail.	Tonnage.	Total Vessels.	Total Tonnage.
1	H. A. Allan	84	203,953	.....	....	84	203,953
2	R. Reford & Co	79	140,560	.....	....	79	140,560
3	D. Torrance & Co	52	119,307	.....	....	52	119,307
4	McLean, Kennedy & Co	38	63.814	11	6,689	49	70,503
5	H. E. Murray	30	70,398	.....	....	30	70,398
6	Harling, Ronald & Co	30	51,809	5	6,514	35	58,323
7	Kingman, Brown & Co	54	52,106	2	2,374	56	54,480
8	Munderloh & Co	27	46,474	1	1.453	28	47,927
9	Carbray, Routh & Co	45	47,488	.....	....	45	47 488
10	Hy. Dobell & Co	47	39,988	1	547	48	40,535
11	F. C. Henshaw	31	35.792	3	969	34	36,761
12	J. & R. McLea	36	34,940	.....	....	36	34,940
13	Intercolonial Coal Co	32	33,256	.....	....	32	33,256
14	J. G. Sidey	18	25,779	2	2,908	20	28,687
15	David Shaw	7	11,761	.....	....	7	11.761
16	G. G. Brock	27	7,384	13	1,096	40	8,480
17	Masters	11	6,176	9	2,262	20	8,438
18	Anderson McKenzie	2	2,214	5	4,881	7	7,095
19	Imperial Government	3	6,140	.....	....	3	6,140
20	Three others	5	5,057	25	2,618	30	7,675
	Total	658	1,004,396	77	32,311	735	1,036,707

THOMAS HOWARD, *Harbour Master.*

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THOMAS HOWARD, *Harbour Master.*

REPORT

ON THE

WORKS FOR THE IMPROVEMENT AND MAINTENANCE

ON THE

HARBOUR OF MONTREAL

FOR THE YEAR 1892.

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

HARBOUR COMMISSIONERS OF MONTREAL,
Chief Engineer's Office,
MONTREAL, March 13th, 1893.

ALEXANDER ROBERTSON, 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, 1892 :—

NEW WORKS.

Sections 4 *and* 6 (*Windmill Point Basin*).—Some enlargement of the upper end of the basin was done by dredging at a cost of $4,796.69; $2,152.75 of which is chargeable to the basin and the remainder to places where the dredgings were sent. A small quantity of embanking was done in Section 4 with dredgings brought from Sections 22 and 23. Portion of cost chargeable to Section 4, $100.67.

Sections 42 *to* 46 (*Hochelaga*).—About one-third of the Commissioners' ground in rear of the lower end of the wharf in Section 42, which had previously been left low and unimproved, was last fall filled up to proper wharf level and macadamized back to the boundary line. An embankment 25 feet wide on top and 1,750 feet in length was made from the end of the finished wharf in Section 42 to the new pier in Section 46 for the purpose of extending the Commissioners' railway tracks down to the pier. Total expenditure for filling at both places and for macadamizing $39,662.

A considerable part of the shoal places in front of Sections 42 and 43 was dredged out to 27½ feet at low water. Cost $2,565, exclusive of unloading by derricks.

The basin on the lower side of the new pier, Section 46, was dredged out to an average of 30 feet deep at low water, and was enlarged sufficiently to afford easy access and a turning space for vessels. Cost $5,243, exclusive of unloading by derricks.

The dredgings, both from this basin and opposite Sections 42 and 43, were used for making up the wharf and railway bank, as above described.

Sections 37 *to* 39.—A part of the wharves which was formerly used for lumber shipments was regraded and macadamized to fit it for general purposes. Cost $5,177.

HARBOUR ENLARGEMENT AND FLOOD PROTECTION WORKS

The work of constructing the guard pier was resumed on the opening of navigation and continued until the close. A trestle wharf of 40 feet in width by 260 feet in length was built at the upper end of navigable low water to serve as a landing and transhipping place for the material to be used in making the portion of the pier between that and the Victoria Bridge, 5,600 feet in length.

From the wharf upward, toward the bridge, a part of the pier itself was built, having a length of 400 feet with a breadth of 140 feet at low water line, and a height of six feet above low water level. Commencing at a distance of 180 feet below the trestle wharf and extending 700 feet downward or nearly to the intended lower end of the pier, another portion was built. Most of this lower portion is submerged in deep water, but parts of it project above low water level to a height of 20 feet.

These embankments, or portions of the pier, are made wholly of dredgings of the following kinds and quantities.

From the Island Shoal, between the guard pier and the ship channel, silt, mostly very tough, with gravel and boulders of all sizes up to immoveable masses; 242,636 cubic yards;

From Windmill Point Basin, Sections 6 to 8, shale rock, 12,740 cubic yards;

From the shoal immediately below the Victoria Pier and the Basin, Sections 20 to 23, sand, gravel and boulders, 7,875 cubic yards;

From Allans' Basin, Sections 13 and 14, sand and stones, 250 cubic yards;

From Dominion Line Berths, Sections 16 and 17, sand, 1,200 cubic yards;

From a Government elevator dredge working in the Ship Channel at Hochelaga, sand, gravel and stones, 3,740 cubic yards, amounting in all to 268,441 cubic yards, scow measurement.

It was intended, as is well known, that vastly more should have been done last summer than has been accomplished in the construction of the Guard Pier. The failure, as is also known, is because of the non-completion of a pair of new land derricks and the inefficiency of

three new floating derricks which were being built under contract and should have been furnished to the commissioners last spring.

These derricks were to have transferred the dredged stuff from scows to cars and from the latter to its place in the embankment. For lack of them the dredgings could only be unloaded by the old derricks, by dumping scows and by hand, and so slowly that it was possible to work only some of the dredges and for only part of their time. The work accomplished, therefore, not only fell far short of what was intended, but its cost was greatly increased because of the disadvantages under which it was carried on.

Expenditure in 1892 $76,698.10, in 1891 $11,777.60. Total on Guard Pier Construction to date $88,475.70.

Harbour Repairs.

Upon the clearing away of the ice in spring it was found that a piece of the crib-work wharf at the Beaver Line Berths, Section 20, had been undermined and forced out of position. No damage of importance was done elsewhere.

The total cost of maintenance and repairs for the year was $72,175, which compares with the cost of previous years as follows:—

1875	$16,499
1876	35,711
1877	26,077
1878	18,974
1879	18,819
1880	17,330
1881	16,159
1882	27,962
1883	35,768
1884	44,869
1885	42,158
1886	64,989

1887	64,984
1888	49,520
1889	51,892
1890	56,380
1891	49,109
1892	72,175

The following are the principal items of repairs in 1892:—

Section 6 (*Windmill Point*).—The raceway culvert under the wharf at Peck, Benny & Company's Mills had the top raised in October and connected with a new portion built by that Firm on their own property.

Sections 13 *and* 14 (*Allan Line Berths*).—Some repairs were made to the woodwork of the wharf; new coping was put on and the back filling made up to proper height in November and December.

Section 15.—Light repairs were made to the outer end of the Island Wharf.

Section 17.—The top planking was repaired in several places.

Sections 19 *and* 20.—Guard timbers were put along the edge of the inshore wharf and returned a short distance round the pier wharf to prevent the brick carts from being backed over.

Section 20.—Part of the cribwork wharf beginning at 357 feet from the corner of the pier and extending downward a distance of 190 feet was found, on the clearing away of the ice in spring, to be settled down and thrown forward, and from having become undermined by the winter scour. The damaged cribs were forthwith removed by dredging and new ones substituted and the back filling made good.

At each end of the part which failed the cribwork was examined by a diver and was found to be more or less

undermined by scouring. All such parts were strengthened by piling driven close or open as the case required. Extent of space piled 570 linear feet.

Total cost of repairs, including cost of dredging old cribwork and part cost of material used for refilling cribwork $12,007.

On the outer side of the Victoria Pier a part of the cribwork which was sunken and out of repair had the top rebuilt and raised to proper level.

On the inner side of the Pier the old cribwork has, in the past two or three years, been sinking and carrying down with it the timber and top planking at the back of the Pile Wharf. After the vessels left in the fall the top was stripped and raised and repaired throughout a distance of 290 lineal feet.

Sections 26, 27 *and* 28.—The cribwork of the wharf, from the small basin to the lower end of Section 28, had become much decayed above low water line and also damaged by the grinding of the ice in successive years. The faulty portions throughout, about 1,250 feet in length, and mostly down to near low water line, were taken out and replaced with new timber work and top and face planking. Cost $4,835.

Sections 36 *to* 40.—The top of the wharf was furnished with new top sleepers, planking and coping, and with nine new countersunk iron mooring posts. Cost $4,068.

Roadways.—Macadamizing Stone to the extent of 474 toises has been used in the maintenance of the wharves, distributed as follows :—

Section.	No. of Toises.	Section.	No. of Toises.
7	35	20	18
9	16	21	23
10	16	22	43
11	33	23	50
14	14	29	29
15	30	30	20
16	33	31	30
17	24	32	15
18	15	34	30

Nearly all the paved footpath crossings in the Harbour were more or less repaired or relaid in May and June.

The quantity of ice left upon the wharves, in spring, was less than usual from the Canadian Pacific Elevators (Section 22) upward. Below the Elevators the quantity was decidedly larger than the average. Expenditure in clearing the ice off the wharves $7,639.

Harbour Dredging Plant.

The Harbour Dredging Plant in use in 1892 was composed of five dipper, or spoon dredges, six floating derricks, four tugs, one coal barge, twenty flat deck scows, 4 dumping, or hopper scows, and a floating shop, as detailed in the appended table. One of the tugs and the four dumping scows were borrowed from the Ship Channel Dredging Fleet.

A floating derrick and two scows with twelve boxes for dredgings to each, were borrowed from the Department of Railways and Canals in the early part of the season and worked 54 days on the Guard Pier work.

Dredges Nos. 1, 4 and 7, Derricks Nos. 1, 2 and 3, the Tugs "St. Peter and St. Louis" and some scows were wintered in 1891-92 in the Lachine Canal about half way between the St. Gabriel Locks and the Wellington Bridge. The floating shop and some scows were wintered

on the south side of the Island above the St. Gabriel Locks, Dredge No. 6 was hauled out and wintered on the upper end of the same Island, for rebuilding, and the steam launch "City of Stratford" was hauled out and wintered alongside the dredge.

The remaining scows and the coal barge "Nish" were wintered in the basins between the St. Gabriel Locks and Wellington Bridge

All repairs were made by the Commissioners' own men, with exception of some heavy machine work which was done in neighboring shops.

Dredge No. 6 was entirely rebuilt in the sides and ends and with much stronger timbering and planking than before. The forward spud slides and connecting framing were renewed The after spud which was formerly of elm of 16" x 18" was replaced by one of Douglas fir 21" square during the rebuilding, and the two forward ones, which were formerly of elm built up to 24" x 26" were during summer replaced, also by solid Douglas fir of 24" x 30". During winter the machinery was overhauled generally. Cost of rebuilding and general overhaul $4,205.

No. 1 Dredge had the fastenings of the hog frames changed and new timbers put in for carrying the sheaves of the swinging ropes.

All the fleet had such other light repairs to hulls and machinery as were required.

A large Dipper Dredge, No. 2, practically a duplicate of of No. 1, was built by Messrs. Carrier, Lainé & Company, of Levis, Que., under contract, during the winter, and was handed over ready for work in Montreal on May 24th last. Cost complete, including spuds, wire ropes and equipment $35,822.83.

The hulls of the three floating derricks were built during winter by the Harbour Engineer's Department, on the Island above St. Gabriel Locks, for the reception of the machinery furnished under contract by Mr. John McDougall.

Cost of hulls, including alterations during summer, caused by alterations in the machinery ; $6,878.19 each.

A pair of land derricks upon one frame was built wholly by Mr. John McDougall, also on the Island, under contract.

Six flat deck scows 85 feet x 25 feet x 6 feet 9 in. over all and of 150 cubic yards capacity were built by the Harbour Engineer's Department during winter, upon the south bank of the Canal, between St. Gabriel Locks and Brewster's Bridge. Cost $2,377.56 each.

A small tug, the M. P. Davis, of 10″ x 12″ cylinder, was purchased from the Dominion Government in the early part of the summer. Cost $450.00.

The hull of the Government Elevator Dredge No. 10 was purchased and converted into a coal barge for serving the Harbour Dredging Fleet.

The hull of the old coal barge, which was formerly the hull of the Chain Tug A. G. Nish, was condemned and sold and subsequently broken up. Four old flat deck scows were also sold and broken up.

All the vessels of the dredging fleet, with exception of the new derricks and the new No. 2 dredge were brought out into the Harbour on the 2nd May when released by the opening of the Lachine Canal.

The new Dredge No. 2 arrived from Levis on May 15th.

The new Derrick No. 4 was brought into the Harbour on June 10th ; No. 5 followed on the 16th, and No. 6 on the 5th July, and finally the Land Derricks were floated out to the Guard Pier on a scow on the 8th July.

The first of the new Floating Derricks, No. 4, was got ready for work, and commenced, on August 5th; No. 5 started on the 17th and No. 6 on the 30th.

The new Land Derricks were sufficiently advanced to have the engines moved by steam about 27th September, but other essential parts were not completed by the close of navigation and the derricks were therefore never used.

Dredge No. 7 commenced work on May 6th, No. 4 on the 9th, No. 1 on the 12th, No. 6 on the 24th and the new No. 2 on June 1st.

All worked till November 22nd when No. 1 was stopped to prepare for going into winter quarters. Nos. 4 and 6 were stopped on the 23rd and Nos. 2 and 7 on the 24th.

The Harbour Commissioners' vessels were sent to winter in the Lachine Canal and the Government Tug was returned to Sorel.

The Harbour Dredges, Floating Derricks, the tugs St. Peter and St. Louis and scows were laid up in the Lachine Canal between Montmorency and St. Etienne Streets.

The coal barge and all the remaining scows, except two, were laid up in the canal basins opposite.

The tug M. P. Davis and launch City of Stratford were laid up in Cantin's dry dock.

The Land Derricks, which are still in the Contractor's hands, were floated on two scows loaned to him and were laid up at the Island above St. Gabriel Locks.

The number of days during which the dredges were on duty, reckoning every day except Sundays, from commencing in spring to leaving off in fall was, for No. 1, 167 days and 98¾ nights; for No. 2, 105 days of Harbour work, and 47 days loaned to the Department of

Railways and Canals; for No. 4, 171 days and 1¾ nights; for No. 6, 158 days; and for No. 7, 171 days. No. 1 Dredge worked night and day from 29th June to 22nd October, and No. 2 was loaned to Government for work in Lake St. Louis from 19th July to 10th September.

Derrick No. 1 worked night and day from 29th June to 22nd October; No. 2 from 23rd June to 22nd October; No. 3 from 29th June to 22nd October and the new No. 4 from 19th September to 22nd October.

The new Floating Derricks had many breaks and mishaps in working, and with the exception of about eleven weeks fairly steady work by No. 4, they rendered but little useful service.

The tugs were worked night and day so far as necessary for serving the dredges and derricks.

The nominal working time of the dredges was partly 10 hours and partly 11 hours when working by day only, and 11 hours each shift when working night and day. This gives a total of 8,958 hours nominal service, but the actual dredging time, after deducting that lost for repairs, changing position, detentions by derricks detentions by vessels, and all other causes, was reduced to 6,685 hours, or an average of 74.64 per cent of the gross time of service.

The total outlay for working the whole fleet in Harbour Work, that is apart from the expenses of No. 2 Dredge when loaned to Government, was $92,595.53, and this, as usual, represents the entire cost of working the plant and machinery, repairs, outfit, fuel, wages, salaries, insurance, management charges and all other outlays except interest on capital and depreciation of plant.

It also includes the cost of the rebuilding of No. 6 Dredge.

The following are the comparative costs and quantities of dredging for 1892, and for previous years:—

Years	Cubic Yards Dredged.	Total Cost.	Cost per Cubic Yard, Cents.	Remarks.
1875...	151,719	$68,979	45	
1876...	156,082	55,462	35 50/100	
1877...	173,499	45,103	26	
1878...	211,731	48,748	23	
1879...	189,609	41,006	21 63/100	
1880...	186,430	46,914	25 16/100	
1881...	170,764	54,128	31 69/100	
1882	187,339	53,598	28 60/100	Spoon Dredges and Stone-lifters.
	9,429	13,254	$1.40 60/100	Elevator Dredges.
	196,768	66,852	33 96/100	Totals and average.
1883	36,358	17,956	49 38/100	Spoon Dredges and Stone-lifters.
	6,990	19,385	$2.77 30/100	Elevator Dredges—lifting rock and boulders and clearing up.
	43,348	37,341	86 14/100	Totals and average.
1884...	125,648	49,468	39 37/100	Spoon Dredges and Stone-lifters.
1885...	68,494	28,563	41 1/100	" " "
1886...	57,728	25,772	44	" " "
1887...	36,993	23,259	62	" " "
1888	73,150	36,690	50 16/100	" " "
	2,077	1,333	64 18/100	Elevator Dredges.
	75,227	38,023	50 54/100	Totals and average.
1889	205,283	54,574	26 58/100	Spoon Dredges and Stone-lifter.
	9,420	2,996	31 80/100	Elevator Dredge.
	214,703	57,570	26 81/100	Totals and average.
1890...	186,670	53,674	28 60/100	Spoon Dredges and Stone-lifter.
1891	259,267	49,571	19 12/100	Spoon Dredges.
	43,290	14,232	32 87/100	Elevator Dredge.
	302,557	63,803	21 8/100	Totals and average.
1892...	361,947	93,595	25 58/100	Spoon Dredges.

The cost and character of the dredging done in the different parts of the Harbour last year and the comparative cost of dredging by different dredges are as follows. All the quantities are scow measurements and the cost includes tug and scow service.

Sections 4 *to* 8 (*Windmill Point Basin*).—An effort was made to increase the breadth of the upper end of the basin to 150 feet with the new No. 2 Dredge, but it was found that the *banc rouge* or trap portions, of which there are several, were undredgeable, mainly because the steel teeth of the buckets could not be made to stand.

Some cleaning of the rock bottom of sections 6 to 8 was done by No. 6 Dredge and a considerable quantity of shale rock was dredged up by Nos. 2 and 6 in Section 4. The greater part of the dredged rock was sent to the Guard Pier and the remainder was used in banking about the slip in Section 4 for hauling out scows and other craft for repairs.

Total quantity dredged throughout the basin 13,175 cubic yards ; average cost 39⅓ cents per cubic yard. Of this, 9,575 yards were deposited from dump scows and the remaining 3,600 yards were unloaded by derricks at an additional cost of 8⅔ cents per yard.

Sections 13 *and* 14 (*Allan Line Berths*).—Some cleaning of very small scattered spots was done. Depth of water about 29 feet. Much detention by vessels ; quantity 250 cubic yards ; cost 98 cents per yard. Of this 100 yards were deposited from dump scows and the remaining 150 yards were unloaded by derricks at an additional cost of 8⅔ cents per yard.

Sections 16 *and* 17 (*Dominion Line Berths*).—Several places which had become shallow from accumulation of rubbish and silt were cleaned out to 27½ feet at low water. Quantity 1,200 cubic yards ; cost 37¾ cents per

yard. Of this 750 yards were deposited from dump scows and the remaining 450 yards were unloaded by derricks at an additional cost of $8\frac{2}{3}$ cents per yard.

Sections 20 to 22 (Military Basin).—The damaged cribwork mentioned under the head of Harbour repairs was torn out by a dredge, and the foundations and necessary space behind were cleaned out to receive the new cribwork. Depth of dredging 28 to 32 feet; quantity 7,875 cubic yards; material, cribwork, stones and sand; cost 22 cents per cubic yard; all of this was dumped direct from bucket of dredge into deep water alongside. A small quantity of material for filling the new crib was brought from dredges working at the Island Shoal.

Several places alongside the wharf in Sections 20 to 22, which had become shallow, were cleaned out at different times. Depth about 29 feet; material mud and rubbish; quantity 2,325 cubic yards; cost 45 cents per yard. Of this 375 yards were deposited from dump scows and the remaining 1,950 yards were unloaded by derricks at an additional cost of $8\frac{2}{3}$ cents per yard.

Sections 22 and 23.—In the approach from the Ship Channel to Victoria Pier several shallow places were deepened to 30 feet. Material; sand, gravel and stones; current very strong, much detention by vessels. Quantity 7,650 cubic yards; cost $21\frac{1}{3}$ cents per yard; all of which was unloaded by derricks at an additional cost of $8\frac{2}{3}$ cents per yard.

Sections 42 and 43 (Hochelaga).—Parts of the shoals between the wharf and the Ship Channel were dredged down to 30 feet at low water; material hard silt with some boulders; quantity 19,875 cubic yards; cost $12\frac{9}{10}$ cents per yard. All of this was unloaded by derricks at an additional cost of $8\frac{2}{3}$ cents per yard.

Section 46 (Maisonneuve).—The basin on the downstream side of the new Pier was enlarged and some

shallow parts cleared out. Depth of dredging 30 to 32 feet; material varying from soft sand to tough silt; quantity 56,199 cubic yards; cost $9\frac{1}{3}$ cents per yard. All of this was unloaded at an additional cost of $8\frac{2}{3}$ cents per yard.

Harbour Enlargement.—Dredging on the Island Shoal in different places, chiefly alongside the site of the Pier, at the lower end of the shoal and in a new channel from the Guard Pier to opposite Section 12. Depths from 14 to 32 feet. Material chiefly tough silt, with boulders of all sizes; quantity 253,398 cubic yards; average cost $18\frac{83}{100}$ cents per yard. Of this 32,925 yards were deposited from dump scows and the remaining 220,473 yards were unloaded by derricks at an additional cost of $8\frac{2}{3}$ cents per yard.

The cost prices of dredging at the separate places above given have been made out in the way followed for years past, that is, all the expenses of every kind which are chargeable to the year's working of all the dredges of one general type are summed up and divided by the aggregate number of days service.

The result is therefore the all round average cost of working one dredge and all that belongs to it for one day of the year in question and from this the cost per yard is computed.

In the year just past all the dredges were of the dipper (or spoon) type and they have therefore been grouped together as usual. By this system any unusual expenditures for repairs or mishaps in the individual items of plant are spread over the whole and an average cost of working is obtained which is very useful in comparing the cost of dredging in different localities and kinds of material. Besides this, however, it is important in view of the large quantity of dredging to be done that a comparison

of the performances of different sizes of dredges of the same type should be made, and the working of all together in the same class of material on the Guard Pier gives good data for doing so.

The five dredges which worked on the Guard Pier last year, though all of the dipper type, differ considerably as to size and construction.

Of these No. 7 is an old style crane dredge with a single 14″ x 16″ engine, No. 6 was originally the same, but was a few years ago made into an Osgood Boom Dredge with independent swinging engines; No. 4 was at first the same as No. 7 also, but was recently made into a boom dredge so proportioned as to have more digging power in deep water than has No. 6. No. 2 is a large new boom dredge with two main engines of 16″ x 18″ cylinders and independent swinging and backing engines giving over twice the power and speed of action possessed by the small boom dredges; No. 1 is substantially the same as No. 2 but is a year older.

An analysis of the work done by each dredge and its cost shows the results in the table given below. The quantities are in each case by scow measurement, the material is from the Island Shoal and is almost all of very hard tough silt with stones of all sizes from gravel up to immoveable masses of rock.

The cost in each case includes everything connected with the dredge except rebuilding and special work not fairly chargeable to the year. It also includes the proper proportion of the cost of maintaining and working the tugs and scows and of general management, but it does not include the expense of rehandling the material by derricks or otherwise.

Items.	Spoon Dredges Nos. 1 and 2 each.	Spoon Dredges Nos 4 and 6 each.	Spoon Dredge No. 7.
Average per day	660 cub. yds.	335 cub. yds.	241 cub. yds.
Cost per cubic yard	11.266 cts.	20.488 cts.	24.258 cts.
Difference per yard over Nos. 1 and 2	.....	9¼ "	13 "

It will be seen from the above table that the large boom dredges work twice as fast as the smaller ones and at 9¼ cents, or 45 per cent less cost per yard, and that the crane dredge is for this kind of work out of comparison altogether.

There are some 3,000,000 cubic yards of dredging, scow measurement, yet to be done in the Harbour Enlargement Work, and about 800 000 yards of this would, under present conditions, be the share of the smaller boom dredges. If they be disposed of, as hitherto advised, or even laid aside, and another large dredge be purchased to do their work the saving at 9¼ cents per yard would pay for the new dredge and give over $40,000 cash surplus.

In the comparison it should also be taken into account that owing to the inefficiency of the rehandling plant the dredges were much delayed from not being properly served with scows, and that somehow the two large dredges were made to suffer over four times their legitimate share of this delay.

Had they been fairly served, and had they also been provided with the larger buckets which they are capable of carrying, the cost of dredging by these two large

dredges would certainly have fallen below half the cost of that done by the two best of the smaller ones.

Appended are tables giving further particulars as to the dredging plant and the work done.

Yours respectfully,

JOHN KENNEDY,

Chief Engineer.

HARBOUR COMMISSIONERS' DREDGING PLANT EMPLOYED IN THE HARBOUR OF MONTREAL IN 1892.

DESCRIPTION OF	HULL.	ENGINES.	REMARKS

HARBOUR COMMISSIONERS' DREDGING PLANT EMPLOYED IN THE HARBOUR OF MONTREAL IN 1892.

DESCRIPTION OF VESSEL	HULL. Length	Breadth	Depth	When Built.	ENGINES. Kind of Engine.	No. of Cylinders.	Diameter of Cylinders.	Length of Stroke.	Pressure of Steam.	Capacity of Bucket.	Depth to which Dredge can work.	REMARKS.
	Ft. In. over all.	Ft. in. Beam.	Ft. in. over all				Inches.	Inches.				
Dredges.												
Boom Spoon Dredge, No. 1	90.0	36.0	9.6	1890-1	Horizontal, non-condensing.	2	16	18	125	115	40	All wooden hulls.
" " " No. 2	90.0	36 0	10.3	1892		2	16	18	110	115	40	
" " " No. 4	77.3	27.0	6.6	1872		1	14	16	90	70	33	Reb'lt & Alt '90
Crane " No. 6	77 0	27.0	7.6	1874		1	14	16	80	70	35	" " '92
" " No. 7	77.3	27.0	7.0	1874		1	14	16	90	40	32	Rebuilt in '89
Derricks.												
Clam Shell Derrick, No. 1	56.8	23.9	5.9	....	Horizontal, non-condensing.	1	8	12	90	....	..	
" " " No. 2	57.0	23.6	5.9	1872		2	7	12	90	....	..	
" " " No. 3	61.9	24.0	5.9	1875		1	10	12	90	....	....	
" " " No 4	75 0	26.10	7.6	1892		2	12	14	120	....	....	
" " " No. 5	75.0	26 10	7 6	1892		2	12	14	120	....	....	
" " " No. 6	75.0	26 10	7.6	1892		2	12	14	120	....	....	
Tug Boats.												
Tug St. Louis.....	67.0	15.0	8.7	1875	Vertical, non-condensing.	1	16	20	85	....	....	Rebuilt in 1891.
" St. Peter.....	71.6	16.6	8.6	1875		1	29	22	95	....	....	" "
" M. P. Davis.....	40 5	10.7	5.3	1879		1	10	12	95	....	....	
Barges.												
Floating shop (Elevt'r No. 3)	135.0	29.0	10.0	.....	.....	.....	.....	.....	.....	....	....	
Coal Barge (Elevt'r No. 10)	135.0	29.0	10.0	1874	.....	.....	.....	.....	.....	....	..	
Scows.					Capacity, Cubic Yards.							
1 Sounding Scow No. 2	70.6	18.0	5 0	.....	45	.....	.....	.....	.....	....	....	
1 Flat deck Scow No. 6	70.5	18.0	5 0	1873	45	.....	.....	.....	.....	....	....	All wood.
1 " " No 11	70.0	18.3	5.1	1874	45	.....	.....	.....	.....	....	....	
1 " " No. 14	69.5	18.4	5 0	1875	45	.....	.....	.....	.....	....	....	
1 " " No. 15	70.4	18.2	5.0	1875	45	.....	.....	.....	.....	....	....	
1 " " No. 16	70.4	18.3	5.6	1875	45	.....	.....	.....	.....	....	....	
1 " " No. 17	75 0	20.2	6 0	1875	67½	.....	.....	.....	.....	....	....	
1 " " No. 18	75.4	20.4	6.3	1876	67½	.....	.....	.....	.....	....	....	Rebuilt in 1891.
1 " " No. 19	75.6	20 3	6.5	1878	67½	.....	.....	.....	.....	....	....	" 1891.
1 " " No. 20	75.6	20.3	6.3	1878	67½	.....	.....	.....	.....	....	....	" 1892.
2 " " Nos. 21 & 22	85 0	25.0	7.5	1891	150	.....	.....	.....	.....	....	....	" 1892.
2 " " Nos. 23 & 24	85.0	25.0	6 9	1891	150	.....	.....	.....	.....	....	..	
6 " " Nos. 25 to 30	85 0	25.0	6.9	1892	150	.....	.....	.....	.....	....	..	

In addition to the above there were borrowed from the Government one tug boat and four large dumping scows for use in 1892, and from the Department of Railways and Canals one floating derrickand two scows for part of the season.

HARBOUR DREDGING—*Abstract of work done by each Dredge for the Harbour of Montreal in* 1892.

VESSELS.	PLACES AT WHICH DREDGING WAS DONE.	Time of Service.		Quantities Dredged.		CHARACTER OF SOIL.
		Days.	Total	Cubic Yards.	Totals.	
Spoon Dredge No. 1	Approach to Victoria Pier, Sec. 42 & 23	21½		7,650		Gravel, sand and stones.
	Maisonneuve, Sect. 46	69½		55,199		Tough silt, sand and boulders.
	Hochelaga, Sections 42 & 43	34		19,875		Hard silt and stones.
	Island Shoal, (Guard Pier)	140¾		87,856		Tough silt and boulders.
			265½		171,580	
Spoon Dredge No. 2	Windmill Point, Section 4	45		11,535		Shale Rock.
	Military Basin, Section 20	23		7,875		Tearing up cribwork.
	Island Shoal, (Guard Pier)	37		29,490		Tough silt and boulders.
			105		48,810	
Spoon Dredge No. 4	Dominion Line Berths, Sec. 16 & 17	6		1,200		Mud and sand.
	Military Basin, Sec. 20 to 23	14		2,325		Mud and rubbish.
	Island Shoal, (Guard Pier)	152¾		52,200		Tough silt and boulders.
			172¾		55,725	
Spoon Dredge No. 6	Windmill Point, Sec. 6 to 8	23¾		1,640		Shale Rock.
	Allans' Basin, Sec. 13 & 14	3¼		250		Sand and stones.
	Island Shoal (Guard Pier)	131		42,805		Tough silt and boulders.
			158		44,695	
Spoon Dredge No 7	Island Shoal (Guard Pier)	171		41,137		Tough silt and boulders.
			171		41,137	
	Total Dredging in Harbour		872½		361,947	
Spoon Dredge No. 2	Lachine (For Dept. Railways & Canals.	47		7,575		Shale Rock.
Spoon Dredge No 7	Longueuil (Owner of sunken Barge)	2½		300		Wreckage timber.
	Total at expense of parties concerned		49½		7,875	

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* 1892.

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* 1892.

PLACES WHERE DREDGES WORKED.	VESSELS.	Time of Service.		QUANTITIES DREDGED.		REMARKS.
		Days.	Total.	Cubic Yards.	Total.	
Section 4 to 8, Windmill Point	Dredge No. 2	45		11,535		Shale Rock.
	" No. 6	23¾		1,640		
			68¾		13,175	
" 13 & 14, Allans' Basin	Dredge No. 6	3½		250		Sand and stones.
			3½		250	
" 16 & 17, Dominion Line Berths	Dredge No. 4	6		1,200		Mud and sand.
			6		1,200	
" 22 & 23, Opp. to Victoria Pier	Dredge No. 1	21½		7,750		Gravel, sand and stones.
			21½		7,650	
" 20 to 23, Military Basin	Dredge No. 2	23		7,875		Tearing up old cribwork.
	" No. 4	1		2,325		Mud and rubbish.
			37		10,200	
" 42 & 43, Hochelaga	Dredge No. 1	34		19,875		Hard silt and stones.
			34		19,875	
" 46, Maisonneuve	Dredge No. 1	69½		56,199		Tough silt and stones.
			69½		56,199	
Island Shoal (Guard Pier)	Dredge No. 1	140½		87,856		Tough silt and boulders.
	" No. 2	37		29,400		
	" No. 4	152¾		52,200		
	" No. 6	131		42,805		
	" No. 7	171		41,137		
			632½		253,398	
	Totals		872½		361,947	

REPORT OF THE EXPERTS.

MESSRS. JAMES HOWDEN, M.E., HERBERT WALLIS, M. INST., C.E., AND WALTER H. LAURIE, M. CAN. SOC. C. E.

MONTREAL, February 3rd, 1893.

THE HARBOUR COMMISSIONERS OF MONTREAL.

GENTLEMEN,

In conformity with the resolution of your Board, dated October 18th, 1892, appointing experts to report "as to "the practicability of the construction of the Guard Pier, "as described in the Joint Engineers' Report of 23rd June, "1891, with the plant which has been provided for the "work, and as to whether the changes recommended by "the Chief Engineer are advisable and likely to attain "the object aimed at, at the cost mentioned, or whether "some preferable method of working could be adopted "to ensure the Guard Pier being completed at an early date, "with the probable cost of any changes recommended," we beg to make the following statement:

We have carefully perused the various letters and reports submitted for our information, and in particular those of your Chief Engineer especially referred to by the Harbour Improvement Committee, under date of October 18th 1892, and which are summarized as under:—

June 23rd, 1891.—On the plant necessary for the Harbour Improvement Plan.

October 10th, 1892.—On the deficiencies of the five new derricks.

October 11th, 1892.—Reasons for delay in the execution of the work.

October 15th, 1892.—Method of remedying the defects in the derricks, and cost of same.

Owing to the lateness of the season, at the time of receiving our instructions, we were unable to see as much of the working of the floating derricks as was desirable, and as the double land derrick was unfinished at the close of the season of navigation, we have had no opportunity or forming an opinion, after seeing it at work, as to its capacity or capability.

We have, however, examined the plant in detail, and in so far as the derricks are concerned have had before us working drawings which have furnished dimensions which it might otherwise have been difficult to obtain.

We have also taken such evidence as to facts as has seemed to us desirable.

We notice that the "Plan of Progress" outlined in your Chief Engineer's Report of April 28th, 1891, and to which he refers in his letter of June 23rd of the same year, calls for the completion of the Guard Pier within the three seasons of navigation during the years 1891, 1892 and 1893, "subject to such modifications as the trade of the Port or other considerations may hereafter demand."

We assume from the report of the Harbour Improvement Committee, which recommends the completion of the Guard Pier "at an early date," that in so far as the time of completion is concerned, it has not been thought proper to modify the plan, and this assumption would seem to be justified by the report of your Chief Engineer of June 23rd, 1891, which sets forth the means to be adopted for overtaking the delay which, at that date, had occurred.

Since that time, from causes into which we have not enquired, further delays have resulted, and being satisfied

of your desire the overtake the "Plan of Progress" to the extent that it is possible as far as it relates to the Guard Pier we beg now to point out:—

(1) The additions that are, in our judgment, desirable to supplement the present plant;

(2) The changes that are necessary in the plant in view of those additions, and

(3) The additional outlay at which the whole can be accomplished.

The plan of operation adopted by your Chief Engineer involves the constant employment of two floating derricks for transfer as between the dredges and the landing pier. A double land derrick for selecting and depositing the material so transferred. A railway with the necessary sidings and rolling stock to be used for the conveyance of the loaded and empty boxes to and from the double land derrick, and a sufficient number of dredges to keep the whole in proper balance.

The plan we have decided to recommend does not differ materially from this, apart from the fact that the working plant is substantially doubled in number and capacity.

In order to successfully operate the additional derricks without the aid of a dredged or excavated waterway in the rock bottom of the river, or of a raised trestlework on one or both sides of the line of the Guard Pier, either of which plans we do not recommend on the ground of expense, we have thought it better to use the present double land derrick in advance as a roadmaker and follow up with two single derricks which it is intended should raise the pier to the required height, the double derrick making a return trip on the top to complete the slopes and finish the whole.

The general arrangement, which will be readily understood by a reference to the two plans appended to our report, may be described as follows:

The landing wharf, as originally designed, should be increased in width to about 40 feet at the lower and 140 feet at the upper end. Two of the three existing floating derricks will be regularly employed in discharging loaded and embarking empty boxes upon and from the construction cars at the lower end of the landing, while two stationary single 10 ton land derricks, with 70 feet radius of booms, placed on the wharf in suitable positions in regard to the switches and sidings in connection with which they are intended to work, will perform similiar functions.

These four machines will supply, indiscriminately according to requirement, the four booms of the travelling, or depositing derricks, viz, the double, or road making machine working in the centre, and two 10 ton single derricks following in the same tracks.

The depositing derricks will draw their supply from and deliver their empty boxes upon the cars standing on the three feet gauge main line and sidings provided for the purpose and laid on both sides of the pier upon the embankment raised sufficiently above the average level of the water in the month of May.

At this level the embankment will run out near the Victoria Bridge.

The distance apart of the single and double derricks should be regulated by the length of siding required to manipulate the supply trains to the best advantage.

Under this arrangement the travel of the booms need not exceed 170 degrees nor the radius 50 and 70 feet in the case of the single and double derricks respectively.

In regard to the quantity of earth work required and the capacity of this plant for dealing with it we find:—

The total cubic contents of the pier "in situ," measured from the plans submitted to us, are equal to 980,000 yards.

Of this quantity some 162,000, according to cross sections submitted of work already completed, are in place in navigable water at the lower end; there remains therefore 818,000 yards finished measurement, of which 544,000 yards will be in water generally not navigable to dredging plant, later than the end of May.

The quantity of material, by scow measurement, required to complete the pier, measured "in situ," must of necessity be a matter of estimate.

The cross sections of the work already accomplished show a ratio of nearly 2 to 1.

Owing to a larger proportion of the shore end section being above water level, and as the use of boxes becomes more general in its construction, it is not likely that this ratio will obtain throughout its whole length, but if we assume a ratio of $1\frac{3}{4}$ to 1 as applicable to future work to cover all losses, including the additional material required for the supply tracks, it would seem that according to scow measurement the upper part of the pier requires 952,000, and the lower, or downstream end 479,000 yards.

Assuming that it is possible to commence work early in May for a season of say 150 days of 20 hours each and to handle 72 cubic yards per derrick per hour, it would appear that 864,000 yards, by scow measurement, may be deposited within the limits of the shore end and thus this end, as far as the filling is concerned, should approach completion at the close of the season of the current year.

To supply the material it will be apparent that a dredging capacity of 5,760 yards per day for the upper end is necessary, to which the present plant is not equal.

We do not estimate for the purchase of additional dredges believing that they can be hired to any reasonable extent by the month, or for the season, at prices which it would be profitable to take advantage of and in this way the balance as between the capacity of the dredges and derricks would be easily maintained.

If, however, it is found that the work on the shore end should progress more rapidly than herein suggested, the plant, as it becomes available, could be used for assisting at the lower, or downstream end of the pier, which might be proceeded with concurrently to the extent that is possible with the spare plant at disposal.

We think it possible that under such an arrangement the Guard Pier should be completed during the season of 1894.

In regard to the plant already available for the work, we have carefully considered your Chief Engineer's letter of October 15th last, which points out the defects in the derricks and his method of overcoming them.

With his suggestions we may say we are generally in accord. We recognize, however, that the change of system, demanded by an extended plan of operation, required to expedite the completion of the pier renders unnecessary some details of construction which, while being difficult to adapt, were, under the original conditions essential to success.

We refer chiefly to the swing of the booms which need not now travel through an arc exceeding 180 degrees, and the changes which we suggest under these circums-

tances will, we think, be found to materially improve the working of the machines as well as to add to their stability and durability.

With this end in view, therefore, we propose to deal specifically as far as may be, without the aid of detailed working drawings, with this part of our report under various heads, as follows :—

Floating Derricks.

In order to distribute the working load more equally throughout the hull, and to provide generally for greater strength and stiffness, we prefer that the anchors be moved forward 8 or 10 feet and with them the base of the "A" frame, for the diagonals forming which, we advise the substitution of oak for the pine timber of which they are now composed. The present single pine backstay should be duplicated, and the two made fast at the stern on as broad a base as practicable. "A" frames & Backstays

The junction of the backstays and diagonals should be effected by a pivot casting, somewhat cruciform in section, (and not unlike those used in similar positions on dredges), arranged to receive the timbers at the required angles.

This casting should be surmounted by a pivot or cored pin of not less than nine inches outside diameter, provision being also made upon it, in the form of hubs and projections, for tension bolts anchored intermediately on each diagonal, and for two wire guy ropes of $1\frac{5}{8}$ inches diameter which should extend to and be made fast upon the hull at the quarters.

The base castings, or connections between the anchor slides and diagonals, should take in about 16 inches of the forward slides, and about three square feet more surface on the diagonals, to allow of a total bolting capacity on each diagonal of not less than 16 square

inches, besides being provided with asufficient base flange for bolting to the deck, and for tension rods anchored intermediately in the diagonals, as arranged for the pivot casting.

Turn-tables & Swinging Engines

The turntable should be entirely new, the centre, or pivot being not less than 24 inches diameter and the whole deeply ribbed and strengthened to resist the twisting strains to which it is subjected by the side rods of the boom.

The gear of the swinging engines should be altered in ratio, to permit of from 40 to 50 per cent more swinging power.

The guiding sheaves for the turntable chains should be increased in diameter, and the upper pair so inclined to the angle of lead as to dispense with two sheaves ; the bases of all the sheave castings should be greatly enlarged, and the deck stiffened to afford them substantial anchorage.

Anchor and Capstan Shafts gearing and frictions

The counter shafts now interposed between the intermediate and anchor line shafts, have the effect of multiplying the power of the engines to an extent which has at various times been destructive of the gearing and line shafting. We advise that these counter shafts be removed, and that the connection as between the two shafts be made direct, and in the ratio of the present bevel gearing, the capstan gearing being rearranged to retain the present speed of capstans. We advise also that the drum shafts be increased in diameter.

The friction clamps for forward anchors should be enlarged in surface by about 50 per cent, and the additional gripping power obtained by doubling the number of eccentrics to be worked simultaneously with the aid of spur gear and pinion. The holding power of all the anchors should be supplemented by the application of

band frictions to the drums, the anchors being provided with raising and lowering ropes of 1 inch diameter arranged over sheaves at the top and near the bottom to give double purchase.

The system adopted on Nos. 1 and 2 dredges, modified to suit the circumstances, as explained by your Chief Engineer, will meet the requirements.

In view of the proposed decrease in section of the anchor ropes, the present guiding sheaves may be utilized, but the brackets in which they run should be materially enlarged in base and rigidly braced in the line of strains.

Main hoisting and dumping gear

We see no objection to the use of steam pistons upon the main dumping and hoisting frictions which undoubtedly give good results, but we think the expense hardly necessary, inasmuch as we propose direct rod connections between the friction screws and operating levers, in which case the loss of power consequent on the friction of intermediary guiding sheaves, as well as the want of prompt action due to the stretch of long wire ropes will be avoided.

We think, however, that the stud columns supporting the friction screw yokes not being in the direct line of strain should be increased in section and more rigidly braced, and that the collars opposed to the end thrust of the drum shafts be more securely fastened to prevent slipping.

Operating Levers

With this end in view the operating levers should be so placed as to be within easy reach of the work, and we suggest, as convenient for the operator, a position between the mast and the engines, as near to the latter as will suffice to ensure reasonable supervision within the limit of the boom swing.

We do not undervalue your Chief Engineer's suggestion to place operator on the upper deck, which is undoubtedly a better post of observation, but in our opinion too far removed from the control of the machinery.

Throttle Valves

The main engine throttle valves act too suddenly, and should be replaced by balanced valves of the type in use on the new dredges which are reported to give entire satisfaction.

Boom Guys

The two main guys to the outer end of the boom should be of wire rope not less than 1½ inches diameter.

Hatches

It is advisable to widen and lengthen the Hatches to afford better access to the machinery below deck.

Double Land Derrick.

Framing

We think the main frames and supports insufficiently secured to successfully resist the working strains to which the machine will be subjected.

The structure should consist of breast bracing as at present (but of oak instead of pine) of the present cross back stays, and of two additional back braces, one from each pivot to the rear of the platform, forming as broad a base as practicable.

Each pair of breast timbers should be stepped into a heavy casting presenting a base surface of not less than 20 square feet to the platform of the machine, through which (and through a washer plate on the lower side of not less than ¾ inch in thickness) it should be secured by holding down bolts of say 15 inches in sectional area. Each base casting should have a central rib extending upwards between the breast timbers, provided with two flanges to afford necessary bolting surface on the two inner sides and on the required angles of each member (with corresponding washer plates on opposite sides) and friction bolts of about 20 inches of sectional area for each member.

The base casting should also have a flange for bolting to the pivot base of the turntable.

The upper junction of the frame should be effected somewhat after the proposition for the floating derricks by castings provided with pockets to receive the back stays and arranged to take the upper, outer, and after sides of the cross brace and outer diagonals, the inner diagonals being connected by $\frac{5}{8}$ inch boiler plates, recessed into and riveted to the castings and extending down the after sides a sufficient distance to allow of a bolting capacity of 20 inches sectional area, of an area of plate at its junction with the casting 12 square inches.

The sectional area of bolts for the connection as between the cross brace and each outer diagonal should be 10 square inches for the former and 20 inches for the latter.

Each casting should be surmounted by a 9 inch pivot as suggested for the floating derricks, arranged to receive at its base two $1\frac{5}{8}$ inch wire rope guys made fast at the back end of the platform.

Both the base and pivot castings should be provided with lugs for tension bolts on the cross brace and outer diagonals which should be anchored intermediately to the timbers or through to the lugs at the opposite ends.

The sectional area of tension rods for the cross brace should be 6 and for the outer diagonals 12 square inches respectively.

These should be arranged as in the case of the floating derricks, and the same readjustment ofgearing followed.

Turn-tables & swinging engines

The guiding sheave bases should similarly be enlarged to receive sheaves of increased diameter and to provide for better bolting, and should be removed to a position nearer the engines to improve the angle of chain lead.

Travelling gear

As at present arranged the travelling gear is too light for the service to which it may be subjected.

Main hoisting and dumping gear and operating levers.

We recommend that the power now actuating the centre trucks only be applied also to the inside axles of the forward trucks through half shrouded gearing in all cases of increased strength and preferably of steel.

These should be substantially the same as in the case of the floating derricks.

Throttle Valves

The remarks under this head for the floating derricks are also applicable in this case.

Gauge of tracks

With the object of reducing the cost of track laying, we think it will be found advantageous to make the gauge conform to that of standard single derricks, say 11 feet at about 29 feet centres, thus rendering unnecessary special tracks for the additional machines which follow the double derrick in the construction of the pier.

Jack Plank

A fifty or sixty feet jack plank 18" x 20" should be provided below the breast frame, and the forward truck should be set back sufficiently to clear it.

Boom Guys

The two tops guys should be of not less than 1½ inches diameter wire rope from pivot to point as for the floating derricks.

Vertical axis of Booms

To facilitate the swinging of the booms we advise that the vertical axis be inclined from the perpendicular at the pivots four inches forward and six inches outward.

Dumping Boxes and Chains.

We estimate that 350 additional boxes will be necessary and recommend that they be constructed entirely of elm, or other suitable hard wood, and that each be provided as at present with its own dumping chains.

The straps should be of ⅜ inch iron and the corner plates made wider to allow for more bolts. The eye bolts should also be heavier and their connection with the bottom should be made with washers on both sides bolted together.

The cross ties which are now cut through to allow the dumping chains to work clear, might be made deeper and recessed.

The hoisting chain hooks should be made heavier, to allow of a greater margin of safety in view of the accidental strains caused by the chains fouling, &c.

Dredges and Scows.

We think that four additional flat deck scows are required, which will bring up the number available to eighteen, sufficient to serve six dredges, and these should suffice to deal with the work at the upstream end of the pier.

In view of the difficulty which would arise in hiring scows of this pattern we have included the extra four as new plant to be purchased.

If the work on the downstream end should proceed concurrently to the extent the spare plant will admit of, it is likely that a seventh dredge will be wanted, but as the derricks in this case could work with clamshells, scows of the ordinary contractors' type could be hired.

We estimate the cost of the proposed additional plant to be as follows :

4 Standard ten ton derricks.....	$23,200 00
350 Dumping boxes and chains.....	12,000 00
4 Large flat deck scows.....	10,000 00
50 Construction cars with chilled wheels	5,000 00
Total.....	$50,200 00

The probable cost of altering the existing floating and land derricks will be :—

3 Floating derricks	$6,750 00
1 Double land derrick	2,750 00
Total	$9,500 00

In concluding this report we desire to acknowledge the courtesy of the Chairman, Mr. Bulmer, and also to thank Mr. Kennedy, your Chief Engineer, who has given us the benefit of his valuable experience and who has spared no effort to furnish us with any information we have required.

We have the honor to be,
Gentlemen,
Your obedient servants,

JAMES HOWDEN, M.E.,
HERBERT WALLIS,
M. Inst., C. E.
WALTER H. LAURIE,
Mem. Can. Soc. C. E.

REPORT

ON

PLANT REQUIRED

FOR THE

NEW HARBOUR ENLARGEMENT WORKS.

HARBOUR COMMISSIONERS OF MONTREAL,
Chief Engineer's Office,
MONTREAL, June 23rd, 1891.

ALEXANDER ROBERTSON, ESQ.,
Secretary, &c.

DEAR SIR,—

I am instructed by the Board to report "as to what plant will be required for this year's work on the new Harbour Improvement Plan."

It is explained to me by the Chairman that by this it is really intended that the report should include all the main items of plant required for the new work.

I have very carefully considered this important question, both in the light of my own experience and in that of such other works as I have knowledge of, and especially in that obtained from examining extensive works at Boston and Chicago.

As regards the Guard Pier, which is in many respects the most difficult part of the work, I would in view of the lateness of the season, recommend a change in the suggested plan of progress of April last, to the extent of beginning work this year at the lower instead of the upper end. This would be done by depositing in deep

water at the downstream end as much of the foundation filling from dumping scows as can be done without serious risk of its being scoured away by the winter's currents. Just how much can be prudently done in this way will depend upon the exact character of the material to be met with in dredging, but it may for the present be taken roughly at 50,000 cubic yards.

For this purpose no additional plant will be necessary beyond some hopper scows, which can, no doubt, be borrowed from the Government Ship Channel Works.

For the remaining and more important parts of the Guard Pier, that is the part which is mainly above water and situated in water so shallow as not to be accessible to tugs and scows, I propose that the stuff be dredged and put in boxes placed on scows; these to be towed to the highest point accessible at low water; the loaded boxes to be there transferred by steam derricks to small car trucks at the level of the top of the Pier; the boxes and cars to be then run forward to the dumping place on the Pier where the boxes are to be dumped by land derricks. The boxes to be afterwards taken back to the dredges and refilled as before.

The method thus sketched out is designed not only with a view to as rapid progress as possible and with the least plant, but in order to fulfil the essential requirements of being able to select the most suitable material for each part of the Pier and place it where needed, and especially that the stoney and gravelly stuff may be selected and placed in the outer side of the Pier, at the proper slope and without hand labour.

To carry out this and other parts of the Harbour Improvement works the new plant required, and its estimated cost will be as follows :—

Two Large Dipper Dredges	$ 70,000
Three Floating Derricks	24,500
One Double Land Derrick	10,000
Six Flat Scows (in addition to the two recently ordered)	15,000
Three Dumping Scows	10,500
Boxes for Dredgings, Car Trucks, and light Locomotives	19,000
Two Tug Boats, compound engines	24,000
One Floating Pile Driver	2,500
Steam Launch, Electric Light Plant, and Sundries	4,500
Total	$ 180,000

This Plant by working night and day during the busiest years will allow of the plan of progress being overtaken and carried out, notwithstanding the delay which has already occurred. It also leaves the older dredging plant nearly altogether free for ordinary works of maintenance and for any smaller new works apart from the general plan, which may be ordered from time to time.

Yours respectfully,

JOHN KENNEDY,

Chief Engineer.

As regards the change of the plan of progress and mode of working I concur.

Yours truly,

PERCIVAL W. ST. GEORGE,

City Surveyor.

25th June, 1891.

REPORT

ON DELAY

IN COMPLETION OF THE NEW DERRICKS.

HARBOUR COMMISSIONERS OF MONTREAL,
Chief Engineer's Office,
MONTREAL, 15th July, 1892.

ALEXANDER ROBERTSON, ESQ.,
Secretary, &c.

Dear Sir,—

I am required by the Harbour Improvement Committee to report upon causes for the delay in the completion of the new Derricks and their present position, and I now beg to do so.

The first of the three Floating Derricks, No. 4, was handed over to the Harbour Commissioners on June 10th, and was supposed to be practically ready to receive the spuds (which are supplied by the Commissioners) and to go to work.

The spuds were put in as quickly as practicable and the machinery was partially tried under steam. It was then found that the friction clutches for lifting the spuds would not work and that the friction grips for holding the spuds fast were insufficient in holding power.

The clutches were altered by the Contractor and were in a few days made to work properly. But as soon as the strain of actual lifting of the spuds was thus thrown upon the bevel gearing which drives the lifting drums, the gearing broke. This was renewed by the Contractor and again it broke, and breaking and renewing was repeated some three or four times. The driving gear of one of the capstans gave way also.

I was not on board when any of the breakages occurred, but an examination of the broken wheels indicated that they had given way from having been forced out of gear or from otherwise acting wrongly and not from mere weakness.

Sometimes the collars which should hold the shafts in place allowed them to move endwise and thus throw the wheels out of proper gear. At other times the wooden framing which supports the shaft shook considerably, but whether this was a cause or a consequence of the bad working of the gearing is not clear.

This woodwork was prepared by the Commissioners' men, as is required by the specification, and was done according to directions of the Contractor's foreman, in charge of the fitting up of the machinery on board.

The Contractor's foreman millwright especially in charge of the fitting up of the shafting and gearing for the Contractor when the woodwork for supporting it was put in all the three Derricks, recently left, or was taken away from the work, and Mr. Alex Jeffrey, the well-known millwright, was put in charge instead. Mr. Jeffrey, on looking over the shafting a week ago, with Mr. Dyer, the Contractor's Manager, and myself, decided that the woodwork supports, in No. 4 Derrick especially, were not stiff enough in the parts subjected to the heaviest strains and must be renewed.

The Commissioners' woodwork, if allowed to remain after being objected to on behalf of the Contractor would certainly be taken as the cause of further breaks in his machinery, and, moreover, anything in reason which was required to assist him in getting the derricks to work quickly could not be withheld. As many of the Commissioners' men as there was room for were accordingly put to work at once under Mr. Jeffrey, who is in charge for the Contractor, to make such change as he might find neces-

sary on closer examination. This resulted in the changing of nearly all the wooden framing which supports the spud gear shafting. The change is now very nearly completed and the shafting in part replaced.

The friction clamps for gripping and holding the spuds fast were as already said found to be insufficient in power, and to overcome this quickly and temporarily some of the Commissioners' spare chain has been lent the Contractor to use as holding down chains, similar to those on Dredge No. 4.

The main machinery of the Derrick cannot be used, nor even tried in any practical way till the spud gear is got into working order, but so far it has given every indication of being able to work well.

The other two Floating Derricks, No. 5 and No. 6, have been tried only enough to find that they give evidence of having the same faults as No. 4, and that to use them before these faults are remedied will certainly break the gearing in the same way.

The land derrick was floated out to the Guard Pier, in an unfinished state, on 8th instant. The main framing is all built up and the machinery is being fitted up by the Contractor at good rate, but when it will be ready for use, or even for trial. I cannot venture to say after all the disappointments which have taken place with the floating derricks.

As to the causes of delay, or in other words why the Floating Derricks are already three months, and the Land Derricks over two months, behind time in being got to work, I am really unable to say, except to state the very obvious fact that in the first place they were not built fast enough, and second that those which have been started have had the mishaps above described.

It has been more than hinted, and in such a way that I cannot help noticing in this connection, that I am largely to blame for the delay by having made changes from the specifications and have introduced unworkable novelties, especially in the placing of the working levers and the mode of connecting them with the machinery, and that in any case I am in some way responsible for delays from failures of parts because the specification requires that "before construction is commenced detail plans are to be submitted for approval."

I beg to say that I decline to accept any such blame or responsibility.

I have made no changes from the specifications except in widening, or rather in allowing the Contractor to widen the gauge of the track for the land derricks and place the booms somewhat wider apart so as to give more stability to the frame and room for the machinery. The placing of the working levers upon the turntable is simply the fulfilling of a clause of the specification requiring that they shall be "placed in such position that the runner may have full view of his work," and after discussing several ways the Contractor chose this way of fulfilling it.

The manner of connecting the levers with the machinery by wire rope is not a novelty but is one in common use in many kinds of machinery, and is as close a copy as possible of the same thing in successful use on No. 1 Dredge.

As to the general control of the designs and details given by the specification, it will be remembered that the specification as I wrote and signed it required that the work be done to the satisfaction of the Chief Engineer.

This was altered by the Harbour Improvement Committee and made to read "to the satisfaction of the Harbour Commissioners" and the alteration relieves me of responsibility.

Yours respectfully,

JOHN KENNEDY,

Chief Engineer.

REPORT ON CHANGES NECESSARY IN THE NEW DERRICKS.

HARBOUR COMMISSIONERS OF MONTREAL.
Chief Engineer's Office,
MONTREAL, 15th October, 1892.

ALEXANDER ROBERTSON, ESQ.,
Secretary, &c.

DEAR SIR,—

As required by the Harbour Improvement Committee I beg to describe the changes which are, in my opinion, necessary to remedy the defects in the new Floating and Land Derricks which were described in my report of 10th inst., and to give an estimate of the cost thereof as definitely as can be done in the short time allowed me.

FLOATING DERRICKS.

The gearing and line shafting of the spud lifting apparatus as at present arranged is much too weak either to transmit the power of the engines or to work the spuds. The drum frictions are insufficient in driving power and the wire ropes foul badly.

Of several ways in w hich these defects can be remedied I would recommend the following :—The spur wheel gearing to be taken out and the line shafts connected directly to the extensions of the intermediate shafts of the engine frame by means of the present bevel gearing.

The spud ropes, drums and frictions to be changed and made substantially the same as Dredges 1 and 2, but

of smaller size, the ropes being reduced to 1″ diameter, the barrels to about two feet diameter, and other parts in proportion.

The friction clamps for holding the spuds at any desired place will need to be replaced by some new and much more powerful device. Time has not permitted of designing such a device and I have therefore taken the value of the auxiliary holding down chains which are in temporary use as roughly equivalent to something better to be substituted.

It is so difficult to make the frictions of the main hoisting and dumping drums hold that it requires two men to work them continuously. They should have a small steam cylinder to work the screw of each in order to give certainty of driving power and ease of control.

The turntables of the booms are so much too weak that it will be necessary to replace them with new ones, preferably cast in one piece, and with strong arms to resist the upward strains which come from the side rods of the booms.

The gearing of the swinging engines should be altered in ratio, so as to give forty or fifty per cent. increase of swinging power. The base, or frame casting, which carries the sheaves of the swinging chains on deck, is so small and of such shape that it cannot now be bolted down firmly. For the increased strains it should have the base enlarged with boiler plate and more bolts added, or better still, it should be made anew with only two sheaves and larger base

The levers of the operating gear, which control the movements of the machinery should be moved to the starboard side of the turntable so that the engineer may have clear view of the work; iron rods and levers should be substituted for wire rope where practicable, for transmitting motion, and the ropes which remain should

be made stronger and more direct. The main engine throttle valve should be changed to a balanced valve with ample travel, or otherwise altered so as to work with ease and control the engines with precision.

In recommending that the working levers should be placed in better position, but still kept at the foot of the boom, I am not forgetting that the chairman maintains that they should be placed inside the housing near the machinery. I hold, however, that it is essential to the proper working of the derrick, especially when handling boxes, that the engineer should be in full view of his work, and this he cannot be if placed inside the house. The movements of the far heavier booms and backing chains on the large new dredges are very successfully controlled from platforms which move with the booms and the easier movements of the derricks can be as successfully managed.

The present defects in the operating gear of the derricks are defects of detail and not of system.

The gearing which drives the capstans should be altered in ratio so as to lighten the strain of the line shafts and compensate for the proposed reduction in speed.

The main guys to the outer end of the boom should be increased to $1\frac{3}{4}$" diameter, instead of $1\frac{3}{8}$" as at present.

Land Derricks.

So far as I am able to judge of the land derricks in their present unfinished state, I am of opinion that the turntables (which are of the same pattern as those of the floating derricks) will prove to be too weak; the fastenings of the timber framings which supports the upper pivots of the booms are quite insufficient and the apparatus for travelling the derricks on their track will be insufficient in strength and sometimes in adhesion.

The turntables should, I think, be replaced by stronger ones, as proposed for the floating dericks.

The fastenings of the framing for the upper pivots should be greatly strengthened both at the top and bottom by boiler plates, castings and bolts. (The precise way in which this should be done cannot be fully explained without drawings.)

There should be at least two more pairs of truck wheels connected with the engine, (preferably a pair at each corner at the boom pivot) for travelling the Derricks on the track, and the gearing for drawing all the wheels should be either changed to steel or be made much stronger in iron than it now is.

The cost of the proposed alterations I estimate at about $1,800 for each of the three floating derricks, and about $700 for each of the two land derricks.

Yours respectfully,

JOHN KENNEDY,

Chief Engineer.

REPORT

OF

JOHN KENNEDY, M.INST.C.E., CHIEF ENGINEER

HARBOUR COMMISSIONERS OF MONTREAL,

UPON THE

REPORT OF THE EXPERTS.

HARBOUR COMMISSIONERS OF MONTREAL,
Chief Engineer's Office,
MONTREAL, February 21st, 1893.

ALEXANDER ROBERTSON, ESQ.,
Secretary, etc.,

DEAR SIR,—

I am in receipt of your letters of the 6th and 17th instant; the first remitting to me the report of the experts upon the guard pier work and plant, for my report thereon after consultation with Mr. Howden, one of the experts; and the second stating, as I understand it, that as there is uncertainty as to Mr. Howden's being able to act, I am required to take the experts' report into consideration and state what the plant needs to fit it for the approaching summer's work.

I further understand from conversation upon the matter, that there is now neither likelihood of Mr. Howden acting, nor of any other engineer being called in for consultation.

Upon this understanding I proceed to report, for although I would be much pleased to consult and report jointly with any engineer of repute, I would hardly care to put myself in the position of making a second report to have that again called in question and submitted to the judgment of experts.

The report of the experts is, as it states, based upon the conception that it was desired by the Harbour Commissioners to hurry the construction of the guard pier forward at such rate as to overtake the plan of progress, and for this purpose it proposes the doubling of the working plant and the adaptation of that on hand to working under the changed conditions.

I am informed, however, that the Commissioners are against incurring so great cost. I fully agree with this and am of opinion that it will not only be much more economical, but much safer in the execution of the work to proceed at the rate and in the manner originally intended. It, therefore, remains for me to merely point out again what is needed to make the plant as originally designed in order to carry out the purposes first in view.

As regards the new derricks the main defects and their suggested remedies are set forth in my reports of October 10th and 15th last, but the following additional points may here be noted, for it will be remembered that those reports were written at short notice and professed to deal with only the main defects of the contractor's work.

In the floating derricks the rims of the proposed new turn-tables should be stiffened by rollers on deck, or in some equivalent way.

The new pivot castings on the head of the "A" frames should have the upper four bolts increased to two inches diameter, and connected with two of these, there should be a pair of bolts secured to the back leg a little distance below the connection with the other casting.

The feet of the "A" frames should be well fitted to the castings which hold them, where not already done, and the castings should be bolted to both the "A" frame and spud guides by larger bolts having good washers. The "A" frame should also be anchored down to the side of

the hull and spud guide by tie bolts and suitable castings, or wrought iron plates, of liberal strength, at each leg. The rings which encircle the pivots should be made so that the tension of the boom stays may be centred at not more than three inches above the necks.

The splices of the back legs should be strengthened by plates bolted on each side, similar to those on top and bottom, but longer. The fastenings of the lower ends of the back legs with the spud guides should be strengthened by angle plates and bolts.

The operator should be at such height as to command a view of the tops of the dredging boxes on the scows and cars, and for this reason his cabin and levers should be placed over the forward end of the deck house.

The cross bar to which the standing part of the hoisting rope is attached at the upper end of each boom should be increased in size or changed in shape so as to carry the weight safely.

The shafts of the spud lifting drums should be increased in size where subject to the transverse pull of the wire ropes.

The land derricks are still unfinished, and they, therefore, cannot be fully dealt with. The following points may, however, be noted in addition to those mentioned in former reports:

The fastenings of the lower ends of the back braces should be much strengthened. The rims of the proposed new turn-tables should be stiffened as described for the floating derricks.

The swinging engines should be increased in effective strength as for the floating derricks. The sheaves for the swinging chains should be of larger size, and their bases should also be larger and more securely fastened down.

It will be remembered that in a report upon the working plant, dated 23rd June, 1891, in which Mr. St. George concurred on behalf of the city, the providing of two large dipper dredges was recommended, and also that in reports of my own I advised the disposing of one or more of the small old dredges as being unsuitable for the depth and character of the dredging now in hand.

This advice was acted upon only to the extent of procuring one large dredge, and instead of disposing of any of the old dredges one of them was rebuilt for continued use.

The accounts of last year's work, just made up, show that the large dredges worked over twice as fast at the guard pier as the small ones did, and at about 9½ cents less cost per cubic yard, and that the saving for the quantity of dredging yet to be done in carrying out the harbour enlargement plan would buy the large dredge still needed, and leave $40,000 surplus.

I, therefore, now repeat the advice that the other large dredge be built as quickly as possible, and that one or two of the smaller dredges be disposed of afterwards.

It was also recommended that two tug boats be procured. This was carried out to the extent of purchasing one small old tug and the borrowing of a good powerful one from the Dominion Government. So long as the loan of the latter can be continued the dredges can be served fairly well, but it is rumored that it cannot be had for the coming summer, and should this be true it will be necessary that another be procured.

It was further advised that three new dumping scows be provided. This was met by also borrowing some old ones from Government, but they were in such poor condition and so unsuited to the work that they caused much

loss of time to the dredges and involved great cost in keeping them afloat.

I beg, therefore, to repeat the advice regarding dumping scows, but with the modification that owing to altered conditions only two be now built, and that two flat deck scows be built, instead of the third dumper.

I need hardly point out to the Board that as over four months have been spent in procuring and considering the report of the experts it is of the utmost importance that some comprehensive course as to the future be at once decided upon in order that the plant may be made ready for the summer's work.

Yours respectfully,

JOHN KENNEDY,
Chief Engineer.

Extract from the Minutes of a Meeting of the Harbour Commissioners of Montreal, held on 28th February, 1893.

A report was read from the Harbour Improvement Committee to the effect that they had met to receive Mr. Kennedy's report on the changes required in the plant, which, after reading and consideration, it had been decided to lay, along with the experts' report, before the Board.

Mr. Kennedy's report having been read, it was, after consideration, resolved:

That the Board, being satisfied with the general tenor of Mr. Kennedy's report, accept the same and remit it to the Harbour Improvement Committee for their action, giving the Committee meantime authority to deal with

the details of changes and the report of the experts thereon, and with the matter of the contract of Mr. John McDougall.

Mr. Villeneuve dissented therefrom.

Certified ALEXANDER ROBERTSON,
Secretary.

SPECIFICATION OF CHANGES REQUISITE IN THE NEW DERRICKS.

HARBOUR COMMISSIONERS OF MONTREAL,
Chief Engineer's Office,
MONTREAL, March 1st, 1893.

ALEXANDER ROBERTSON, ESQ.
Secretary, &c.

DEAR SIR,—

As desired by the Harbour Improvement Committee, I make the following concise specification of the changes which I deem requisite for remedying the defects of the contractor's work in the new floating and land derricks, and to which I understood to be agreed to by the Committee after the explanations given at the meeting to-day

FLOATING DERRICKS.

Spud Lifting Gear.—The spur wheel gearing to be taken out and the line shafts connected directly to the extensions of the intermediate shafts of the engine by means of the present bevel gearing.

The spud ropes drums and frictions to be changed and made substantially the same as those of Dredges 1 and 2, but of smaller size, the ropes being reduced to 1′ diameter, the barrels to be about two feet diameter, and other parts in proportion.

The shafts of the spud drums should be increased to about 5 inches diam. where subject to the transverse pull of the wire ropes.

Spud Holding Appliances.—The friction clamps to be replaced by others of sufficient holding power, or if this be not done the whole three spuds to be fitted with holding down chains over the tops, as at present on the forward spuds, with the addition of stout sheaves in the heads of the spuds so that the chains may work easily.

Friction of Main Drums.—Means should be provided for preventing oil from the shafts reaching the frictions.

Turn-tables.—The turn-tables of the booms to be replaced by others of much greater strength, preferably cast in one piece, and the pivot castings on which they revolve to be either made stronger or the turn-tables to be steadied at the outer rims by rollers placed on deck.

Swinging Gear.—The gearing of the swinging engines should be altered in ratio so as to give forty or fifty per cent increase of swinging power. The sheaves of the swinging chains on deck should be larger in diameter and should be placed in a new and stronger base, in such way that only two sheaves at each place will be requisite.

"*A*" *Frames and Back Stays.*—The pivot castings on the head of the "A" frames should have the upper four bolts increased to 2 inches diameter, and connected with two of these there should be a pair of bolts 2 inches diameter with swelled ends secured to the back leg a little distance below the connection with the other casting. The feet of the "A" frames should be well fitted to the castings which hold them, where not already done, and the castings shouldbe bolted to both the "A" frame and spud guides by larger bolts having good large washers.

The "A" frame should also be anchored down to the side of the hull and spud guide by tie bolts and suitable

castings, or wrought iron plates, of liberal strength at each leg.

The rings which encircle the pivots should be made so that the tension ot the boom stays may be centered at not more than three inches above the necks.

The splices of the back legs should be strengthened by plates bolted on each side, similar to those on top and bottom, but longer. The fastenings of the lower ends of the back legs with the spud guides should be strengthened by angle plates and bolts.

Operating Levers, Valves, &c.—The levers should be placed in a cabin over the forward end of the deck house and connected with the several things to be worked by means of stiff rods.

The main engine throttle valves should be balanced with bevelled openings so as to give steam gradually.

Capstans.—The bevel gearing between the upright and line shafts should be altered in ratio so as to lighten the strain on the line shafts and compensate for the alteration in their speed.

Booms and Boom Guys.—The main guys to the outer ends of the booms should be increased to $1\frac{3}{4}$ diameter.

The cross bar to which the standing part of the hoisting rope is attached at the upper end of each boom should be increased in size or changed in shape so as to carry the weight safely.

Land Derricks.

The land derricks, being still unfinished and untried, cannot be fully judged of, but the following points are obviously defective and should be remedied as described.

Turntables.—The turntables and their pivot castings should be replaced by stronger ones as described for the floating derricks.

Swinging Gear.—The swinging engines should be increased in effective strength as for the floating derricks. The sheaves for the swinging chains should be of larger size and their bases should also be larger and be more securely fastened down.

Main bracing and pivots for supporting outer ends of booms—The castings which carry the pivots and connect the heads of the brace timbers should be of greatly increased strength and have boiler plate extensions according to drawings to be submitted.

The lower ends of the bracing timbers should have strong tie bolts to take the tensile strains, reaching from large washers at the under side of the horizontal timbers to suitable castings bolted to the sides of the braces. The braces should also have suitable castings bolted to their sides and to the horizontal timbers for taking the thrusting strains.

The lower ends of the diagonal back stays, or legs, should have greatly increased fastenings to take both tensile and thrusting strains.

Travelling Gear.—There should be a pair of truck wheels at each corner of the main platform framing, or at least a pair under each corner of the boom pivots, connected with the engine for travelling the derricks on their tracks, in addition to those already connected, and the spur gears for driving all the truck wheels should be made of steel, or be made of greatly increased strength if of iron.

Booms and Boom Guys.—The guys for supporting the outer ends of the booms should be increased to $1\frac{3}{4}$ ins. diam.

The cross bars at the outer ends of the booms for

carrying the standing parts of the hoisting ropes should be made of sufficient strength.

Yours respectfully,

JOHN KENNEDY,

Chief Engineer.

Extract from the Minutes of a Meeting of the Harbour Commissioners of Montreal, held on the 7th March, 1893.

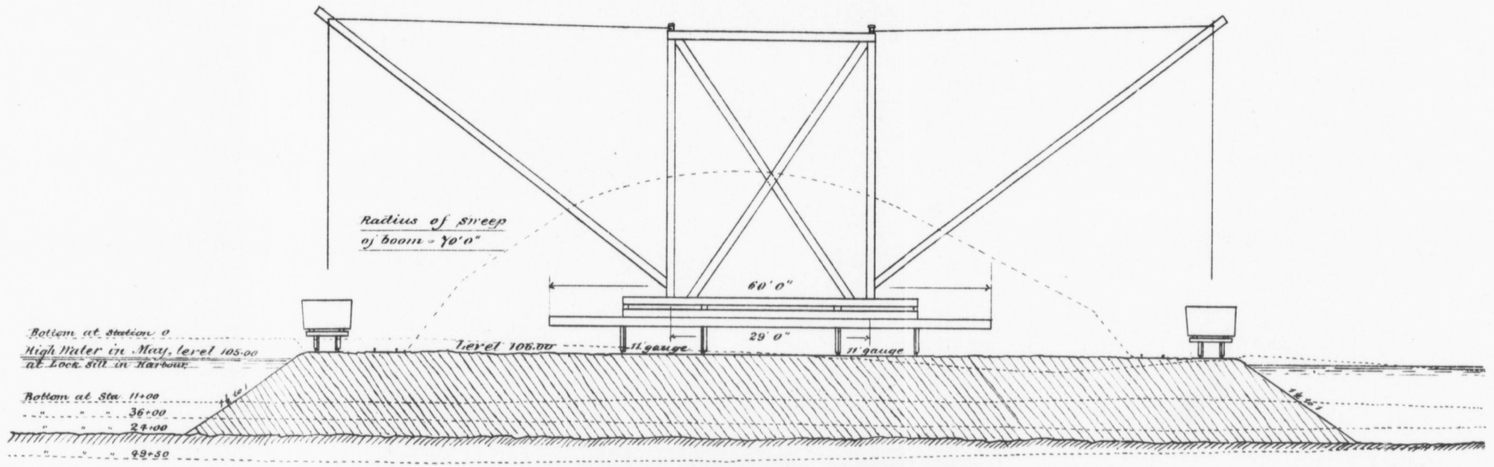
A Report was read from the Harbour Improvement Committee stating that, after careful consideration of the Experts and Mr. Kennedy's Reports a specification had been drawn up by the latter which embodied the required changes in the five derricks and that Mr. McDougall had made a proposition to complete them in accordance with said specification at the earliest date possible, in view of which the Committee recommended that the Coutractor's order should be accepted.

Mr. McDougall's letter having been read, it was, after consideration, resolved that the Report be received and adopted.

Certified,

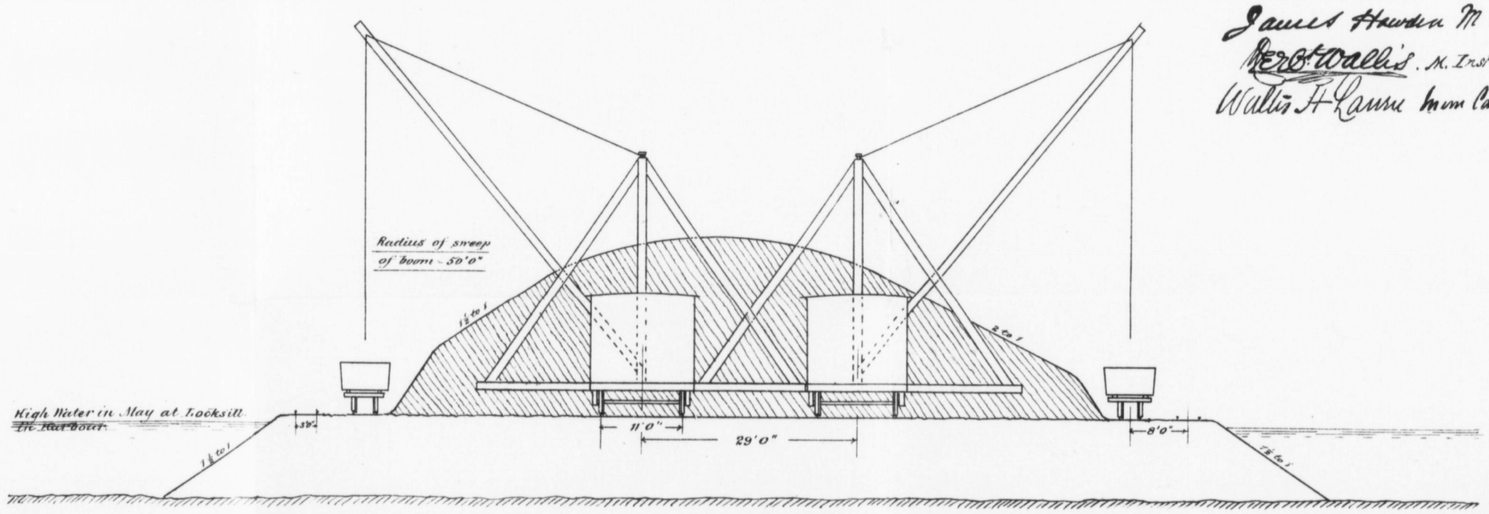
ALEXANDER ROBERTSON,

Secretary.



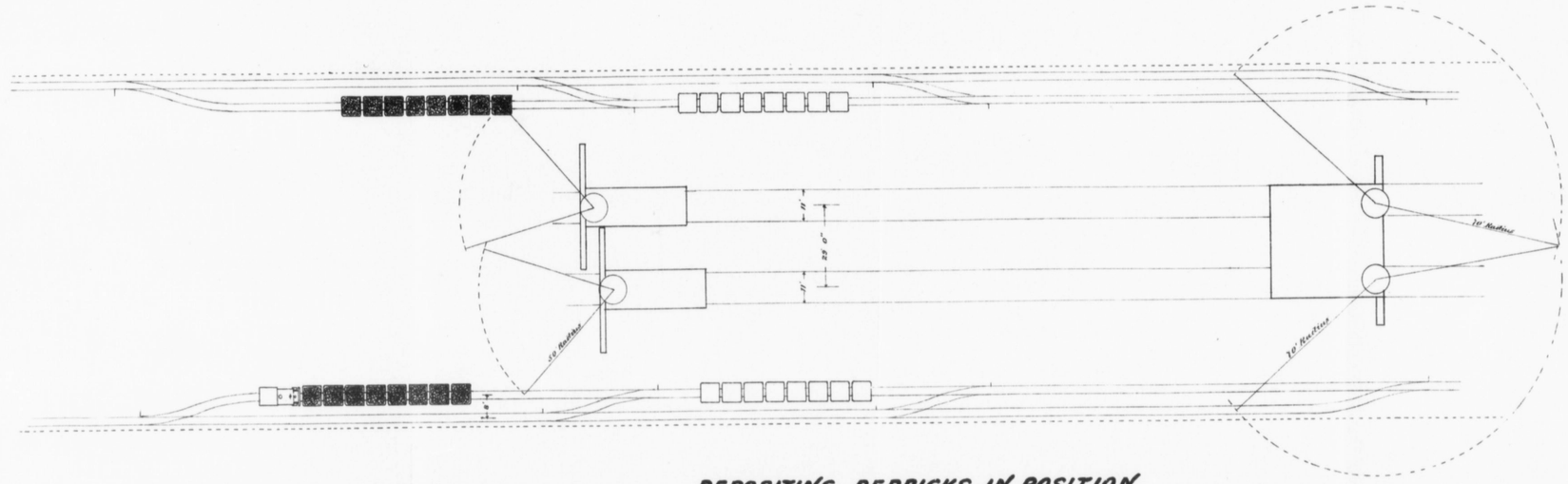
ROAD MAKING DERRICK

James Howden M E
Herbt Wallis. M. Inst. C.E.
Wallis A Lawe Mem Can Soc C.E.



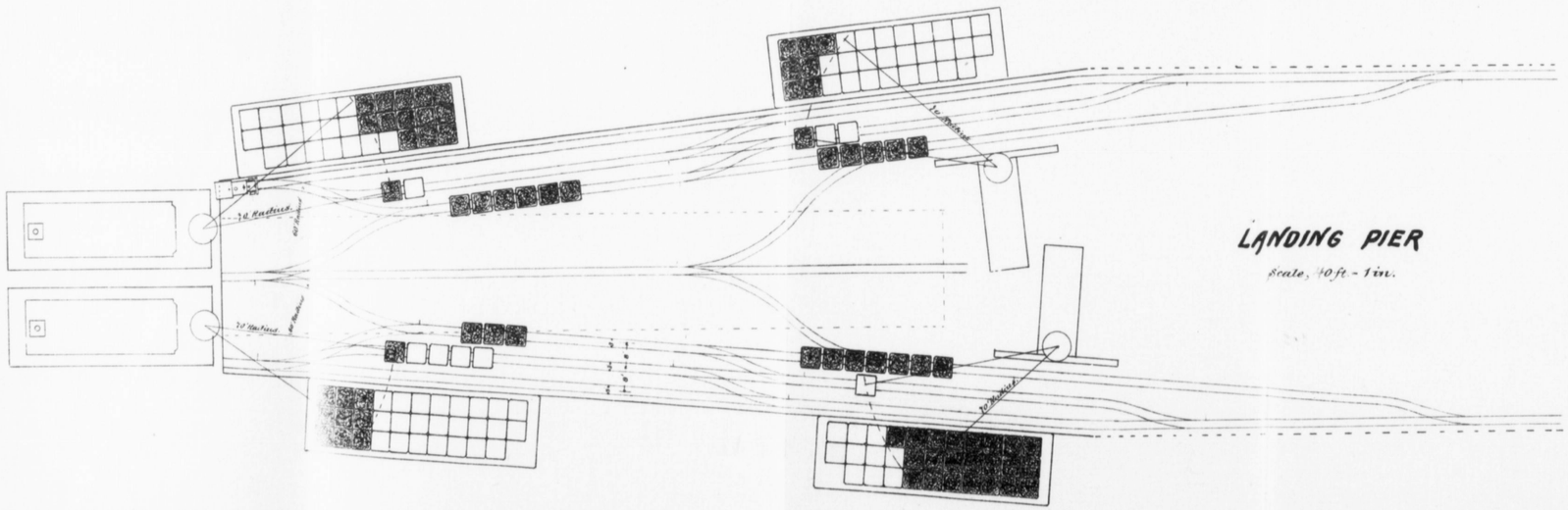
FOLLOWING DERRICKS

Montreal 3rd Feb. 1893.



DEPOSITING DERRICKS IN POSITION

Scale, 40 ft. - 1 in.



LANDING PIER

Scale, 40 ft. - 1 in.

Montreal, 3rd Feb. 1893.

James Hawkes. M. E.
Geo. Wallis M. Inst. C.E.
Walter H. Lennie Assoc. M. Can. Soc. C.E.

TARIFF.

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

Under and by virtue of the Acts, 40 Vic., Cap. 53, 42 Vic., Cap. 28, and 51 Vic., Cap. 5.

ON AND AFTER THE TWENTY-THIRD DAY OF MAY, 1888.

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

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

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

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

J. O. COTÉ, *Clerk, Privy Council.*

Certified,

ALEXANDER ROBERTSON,
Secretary.

HARBOUR COMMISSIONERS' OFFICE,
MONTREAL, 23rd May, 1888.