



## 36 Victoria. Sessional Papers (No. 29.) A. 1873

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The Batiscan

The Becancour and the St. Anne-en Bas

Soundings at Belleville

Fenelon Falls

Bobcaygean

Scugog River

River Muskoka

Appendices

1. Copy of a Petition signed by Messrs. Gilmour & Co. and 17 others, against the Bill introduced into the House of Commons by R.J. Cartwright, Esq., M.P. for County of Lennox
  2. Copy of 1st Report of Prof. Greene to Mr. Bronson, on subject of Commission
  3. Copy of 2nd Report of Prof. Greene to Mr. Bronson, on subject of Commission
  4. Copy of Affidavit of Hon. W.J. McAlpine
  5. Copy of Report of Hon. W.J. McAlpine
  6. Copy of Affidavit of Thomas McManus
  7. Copy of Affidavit of Jeremiah Finch
  8. Copy of Affidavit of Levi Young
  9. Copy of Affidavit of Henry Swalley
  10. Copy of Affidavit of J. M. Wilson
  11. Copy of Affidavit of John Keenan
  12. Copy of Affidavit of David Underwood
  13. Copy of Affidavit of Joseph Russell
  14. Copy of Letter from Geo. Richards to Mr. Bronson
  15. Copy of Letter from Judge Rosekran to Commissioner of Public Works, Ontario
  16. Copy of Affidavit of D. H. Sullivan
  17. Copy of Affidavit of A. Sherman
  18. Copy of Affidavit of Geo. Satterlee
  19. Copy of Affidavit of Col. J. W. Norgan
  20. Copy of Affidavit of Geo. W. Nelson
  21. Copy of Affidavit of W. Coleman
  22. Copy of Affidavit of Orsond Richard
  23. Copy of Memorandum, from A. J. Russell, Crown Land Department, on the Water Shed, &c. of the River Ottawa.
  24. Communication from General Thom, Bt. Brigadier General, U.S. Artillery, to Hon. H. H. Killaly on subject of Commission
  25. Communication from Hon. M. Muirhead to Hon. H. H. Killaly on subject of Commission
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## RETURN

To an ADDRESS of *The House of Commons*, dated 26th March, 1873; For the Report made by the Commission appointed to inquire into the condition of navigable streams.

By command,

J. C. AIKINS,  
*Secretary of State.*

Department of the Secretary of State,  
OTTAWA, 31st March, 1873.

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OTTAWA, March 31st, 1873.

SIR,—I am directed to transmit the accompanying Copy of Report of the Commission appointed to inquire into the Condition of Navigable Streams, called for by an Address of the House of Commons of the 26th inst., which is returned herewith.

I have the honor to be, Sir,

Your obedient servant,

F. BRAUN,  
*Secretary.*

E. Parent, Esq.,  
Under Secretary of State.

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REPORT OF THE COMMISSIONERS APPOINTED TO ENQUIRE INTO THE  
ALLEGED OBSTRUCTION OF NAVIGABLE STREAMS AND RIVERS  
BY SAW-DUST, &c.

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OTTAWA, February, 1873.

F. BRAUN, Esq.,  
Secretary, Department of Public Works.

SIR,—In laying before the Honorable the Commissioners of Public Works for the Dominion, this our Report upon the results of our examination and enquires into the subject submitted to us, in your letter of the 14th November, 1871, we consider it expedient, in the first place, to quote that letter in full :—

“SIR,—I have the honor to inform you, that by Order in Council, bearing date 6th November inst., with the view of carrying out the recommendation made by the Committee of Parliament on Banking and Commerce, you have been commissioned, conjointly with John Mather, of Chelsea, and R. W. Shephard, of Montreal, Esquires,

“ to enquire into and report on the alleged obstructions of navigable streams and rivers, in the Provinces of Quebec and Ontario, by deals, edgings, saw-dust, and other refuse from sawmills.

“ The Commission will please ascertain in time to allow the Minister of Public Works to have a report laid before Parliament at its next session (11th April, 1872), whether the complaint made of navigable streams and rivers being so obstructed, are well founded; and what means should be adopted to prevent such obstruction in future, keeping in view the legitimate interests of mill owners and manufacturers.

“ I have the honor to be, Sir,

“ Your obedient servant,

“ F. BRAUN,

“ Secretary.”

“ Honorable H. H. Killaly,  
“ Toronto.”

In reply to this communication “the gentlemen named expressed their willingness to undertake the performance of the duties involved in the Commission; and Mr. Killaly (elected Chairman of it) added, that all possible diligence would be used so that the report should be made *as soon* as practicable, which, however, in a great measure, must unavoidably be governed by the nature of the weather. He also suggested that time might be saved by the Commissioners being furnished with a copy of the complaints given in evidence before the Parliamentary Committee.”

On the 11th January, 1872, the Chairman received the following telegraph from the Department:—

HON. H. KILLALY,

“ Please state whether your Commission has commenced *enquiry*, and, if possible “ When report may be expected.”

F. BRAUN.

The answer to this was that the nature of the matter, and the frozen state of the rivers, had, up to that date, utterly precluded the possibility of our making any examination of them; but that we had been in communication with several parties in Canada and elsewhere, upon the subject, from whom we trusted to receive information of value, and which would facilitate us in the discharge of our duties.

From the importance of the subject and the magnitude of the two great interests (the lumbering and the navigation) specially involved in it, and which seemed to be in some measure antagonistic, we felt fully convinced that mere enquiries on our part could not enable us to make a report that would be entitled to much weight; and that to lay the matter so fully before the Minister, as would enable him to meet the requirements of the Committee of Parliament, a thorough and personal examination of all the important points on the principal rivers was absolutely indispensable, and that such an examination should be attended by a close comparison of the relative heights of the rivers at different times, in reference to extreme low water, as well also by numerous borings, with suitable instruments, by which specimens of the material forming the beds of the rivers, taken from many places and at various depths, could be brought up. It was obvious that such inspections and trials should be made at different stages of the rivers.—First, immediately after high water, upon the “break up,” in order to determine whether, as is alleged by some, all the saw mill refuse, thrown in the preceding summer is annually carried off by the floods or not—a similar examination is equally as essential in summer low water, in order to ascertain the nature and extent of the bars (if any) represented to have been made, to the serious detriment of the navigation. Again, shortly before the setting in of winter, when the mills had ceased to work, it is highly desirable to find where the great mass of waste, discharged into the river during the whole of the preceding summer, had lodged;—this point being fully established, a final examination in the suc-

ceeding spring would settle the question, beyond all doubt, as to whether *obstructions to the navigation are, or are not, created by the throwing of the waste from the saw mills into the river.*

During the portions of the past year whilst the frozen state of the river rendered a practicable inspection of them impossible, we were not remiss in seeking to collect information from several persons in the adjoining States, and the Dominion, whose acquirements and pursuits, we conceived, justly entitled their opinion to careful and unbiassed consideration, in doing this, we have at the same time, spared no pains to satisfy ourselves, by *personal examinations* and close observation of the facts so far as it was possible for us to do in the course of one season.

Our first step, before going upon our inspection, was to send to each member of Parliament of the Provinces of Quebec and Ontario, and also to other parties whom we considered informed or interested in the subject of the enquiry, a copy of the following circular :—

OTTAWA, June 5th, 1872.

To ——— M. P.

"SIR—The undersigned, who have been appointed by the Government, Commissioners to enquire into and report as to the effects produced by the discharge into the navigable streams and rivers of the Provinces of Ontario and Quebec, (*as regards the navigation thereof*) of the waste from saw mills, saw-dust slabs edgings, &c., take the liberty of requesting you will be so good as to suggest to them, through their Chairman, the names and localities of any such rivers and streams in your County, to which you may consider their attention should be directed.

Yours respectfully,

" HAMILTON H. KILLALY, Chairman, Toronto,  
 " R. W. SHEPHERD, " Montreal,  
 " JOHN MATHERS, " Chelsea."

To these circulars we received replies from the following gentlemen, viz :—

J. J. Robitaille, Esq., M. P.,	County of Bonaventure.
Charles Clarke,	" " Wellington,
George McManns,	" " Cardwell,
John J. Grange,	" " Lanark,
George Kempt,	" " Victoria, N. B.,
J. C. Wood,	" " Victoria, S. R.,
H. Finlayson,	" " Brant,
S. McCall,	" " South Norfolk,
J. S. Smith,	" " North Middlesex,
Samuel Ault,	" " Stormont,
Thomas Gibson,	" " Huron, N. R.,
Hon. A. McKellar,	" " Bothwell,
William Barber,	" " Halton,
M. P. Ryan,	" " Montreal City,
Thos. Street,	" " Welland,
McKenzie Bowell,	" " Hastings,
Louis Sylvester,	" " Berthier,
R. S. Cartwright,	" " Lennox,
A. Oliver,	" " Oxford.

We commenced our inspections with the River St. Maurice. On our arrival at Three Rivers, we called upon Mr. McDougall, M. P. for the town. He introduced us to Mr. Gerin, M. P., and Mr. Godin, M. P. To all those gentlemen, and to Mr. Symms, Superintendent of the River Works, we are much indebted for the information they afforded us, and also to the Messrs Baptiste, who kindly placed their steamers at our disposal, thereby much facilitating our examination of the River. We were accompanied

on our inspection by Messrs. McDougall, Gerin, Godin, and Symms, and by several of the leading inhabitants of the town. Mr. McDougall informed us that he and his brother are the proprietors of the "Forges," about six miles up from the mouth of the river; that they are deeply interested in the maintenance of the navigation, inasmuch as they carry the greater part of their supplies and iron upon it in batteaux. They have never suffered any inconvenience from the saw dust, slabs, edgings, &c., which are all thrown into the River, at the saw mills of the Messrs. Baptiste, situated at the head of the Grais Rapids, about 9 miles above the "Forges." From the head of the Grais to the Shawenagan Rapids, about 11 miles, the river is unfitted for navigation, by a series of strong currents and rapids. The amount of lumber annually made at this mill is about ten millions of feet; as already stated, all the waste from this mill is thrown into the River. Almost the entire of the slabs and edgings are, in the first instance, caught by the rough rocky bottom of the rapids, which extend some distance down the river, but above the navigable portion of it. They there accumulate, and form "Jams," which, however, never remain for any length of time, being carried away by each succeeding freshet. A portion of the saw dust is deposited upon the shores of the River, all along down to its junction with the St. Lawrence, but none in the channel to the detriment of the navigation. The chief part of it is carried into the St. Lawrence, and no more heard of. The floating slabs and edgings, &c., when freed from the "Jams" in which they had been at first detained, are eagerly collected and carried off for fuel by the poorer people, many of whom we observed so occupied.

The opinion given us by Mr. Symms fully confirmed Mr. McDougall's statements, and were further corroborated by our own soundings and observations. We closely examined several parties, residing in the vicinity,—the uniform answer from each was, that he never had heard of, or known any complaint made of obstructions to the navigation, from saw dust deposits.

We next proceeded to examine that part of the River from the Bridge to the St. Lawrence, a distance of about  $1\frac{1}{2}$  mile, taking the opportunity of inspecting the very extensive and fine new saw mill on the west side of the St. Maurice, the property of the Messrs. Stoddart and Company. The gentlemen we found in charge freely gave us all the information we asked for.

The lumber annually made at this mill is about twenty millions of feet.

The small portion of saw-dust not consumed in the furnace, is all carted to form and level the piling ground. The whole of the slabs, edgings, sidings, battings, &c., is converted into fence pickets, sash and other stuff, and fuel wood: this latter item, alone, contributing to the company from twenty to thirty dollars daily, thus conclusively proving that it is perfectly practicable, economical, and the true interest of the proprietors of all such concerns to utilize every portion of their timber; the people in the vicinity are, at the same time, greatly benefited, by being enabled to procure, for the trifling sum of about fifteen cents, a full cartload of firewood.

At the mouth, or, rather, the mouths, of this river, for by islands near the St. Lawrence it is divided into three branches, (hence the name *Three Rivers*,) there are very extensive shoals, obviously formed of the vast quantity of detritus (chiefly fine sand) brought down annually, and deposited in the eddies, which may be said to extend wholly across the entire river. These eddies are caused by what may be termed the struggle of the waters of the St. Maurice with those of the St. Lawrence, where they meet; the strength, position, and direction of these eddies are very much influenced by the constantly occurring variations in the levels of the waters of both rivers, the periods of which do not coincide. They are also much affected by the high winds which occasionally are felt there in great violence. The inevitable consequence of all this is repeated and sudden changes in the position and character of the bars and channels. A navigable channel, which had been on the west side of the river in one year, for some months, will be found in a short time closed up perfectly, and in its place a bank of sand; a channel in a totally different place being cut at the same time. Such changes, to a greater or less degree, are constantly occurring.

On our inspection of Messrs. Stoddart's mill, complaints were made that they were much troubled by bars formed about their boom, which they attributed to the slabs and saw-dust thrown into the river above, being collected and deposited there. We took particular pains to investigate the matter.

We found that in order to collect and retain their logs, a very long boom had been constructed, extending from their mill to a pier above the bridge, sunk for the purpose. This boom is, on an average, about 150 yards from the bank, and parallel to it, or nearly so. The direction of the boom is maintained by a series of piers sunk at certain distances apart, and rather overlapping each other. They are met by the current somewhat obliquely. We observed down stream of each of those piers, a considerable bank of sand was formed. The space between them and the shore was thereby rendered nearly slack-water, and the current all but stopped by the mass of logs, lying on the bottom of the pond, which is, therefore, rapidly filling up, and must continue to do so. The banks of the river are high and perpendicular, and consist of fine sand. In any, even in very moderate winds, great quantities of this sand are blown into and remain in the dead water within the boom.

On examining the bars very carefully, and in several places, we could detect but a very minute portion of woody matter, and we came to the conclusion that the piers are the chief cause of what the Messrs. Stoddart complain. Some few years ago, a deep channel lay nearly in the line of the boom, where, at present, a saw-log can scarcely float; owing, in our opinion, to the effect of the piers upon the current.

On the island in the east channel, are two fine steam saw-mills, owned by Messrs. Baptiste, at which some ten millions feet of lumber are annually produced.

Before leaving Three Rivers, being not far from the Rivers Batiscan, Bécancour, and St. Anne-en-bas, we thought it desirable to extend our enquiries to them, although not referred to in any one of the answers to our Circular.

#### THE BATISCAN.

Batteaux, capable of carrying from eighty to one hundred cords of firewood, ply in this river as far as St. Geneviève, which is about eleven miles from its mouth.

Mr. Price is the owner of a saw-mill upon this river, situate about five miles higher up it. The produce of this mill is set down at about eight to ten millions of feet, annually. The lumber is carried down from the mill by means of a long shoot or "*dahl*," of three miles in length. It is then loaded at a wharf into barges, and sent off.

This mill is worked by water, and the waste from it is discharged into the river. It is detained at first in the long rapids, but is carried off by the next floods. No complaints are or have been made of any inconvenience or impediment to the navigation.

#### THE BÉCANCOUR AND THE ST. ANNE-EN-BAS.

From the information we received as to these rivers, we did not consider that the object of our Commission required our visiting them; we accordingly proceeded thence to Ottawa, to examine that most important river, whether as regards its magnitude, or the importance of its navigation, which it is contemplated to extend, so as to make it a thorough and uninterrupted water communication, connecting Lakes Huron, Michigan and Superior with the cities of Ottawa, Montreal and Quebec.

There being naturally very conflicting opinions entertained and expressed upon the subject of our enquiry, this seems to us a very fitting place to state the order in which we propose to treat it, so that both sides of the question may be impartially considered.

1st. To give a resumé (see page 6) of the allegations in the petition (see Appendix No. 1) presented to the House of Commons, against the Bill, intituled, "An Act for the better protection of Navigable Rivers and Streams," signed by Messrs. Gilmour & Co., and seventeen others.

2nd. Of the opinions and views expressed in their respective reports and affidavits, laid before us, of all those (many of them gentlemen of high standing) who believe

that no injury accrues, or is likely to accrue, to navigation by the discharge into the rivers of all the saw-dust produced by the mills on the Ottawa and its tributaries (*See Appendix 2 to 23, both inclusive.*)

3rd. Of the opinions and views of parties, of equal authority, with which we have been furnished, who contend that such disposal of saw-dust is prejudicial to navigation (*See Appendix Nos. 24 and 25.*)

4th. To shew how far those conflicting statements and opinions are corroborated, or otherwise by our own trials and observations.

After doing this, having already stated the results of our enquiry upon the Bécancour, Batiscan, and St. Anne-en-bas, we shall proceed with a statement of the examinations and observations we have ourselves made upon the condition of the

Shannonville River.  
Napanee            "  
Moirà               "  
Lower Trent       "

Bobcaygean River.  
Fenelon Falls    "  
Scugog            "  
Muskoka           "

Finally, we shall conclude our Report by explaining the means we recommend to be at once adopted by legislative enactments for the protection of the navigable streams and rivers within the Provinces of Ontario and Quebec, as being, in our opinion, the most expedient under all the circumstances, in the interests of these two great sources of Canadian industry:—The lumbering, and the navigation. In November, 1871, a Bill, intituled, "An Act for the better protection of navigable Streams and Rivers," was introduced into the House of Commons by Richard J. Cartwright, Esq., M.P. for the County of \_\_\_\_\_ . After the preamble the following enactments were contained:—

Section 1. That from and after the first day of July, 1872, no owner, tenant, &c., &c., of any saw mill shall throw, or cause to be thrown, or permit to be thrown, any saw-dust, edgings, or rubbish of any description into any navigable stream or river, either above or below the point at which such stream or river ceases to be navigable.

Section 2 declared the penalty for violating the preceeding section, for the first offence, a fine of not less than twenty dollars, and for the second and each subsequent offence, a fine of not less than fifty dollars for each offence, and by this section also was declared the manner in which the fines were to be summarily recovered.

The third Section made it the duty of the several fishery officers to examine and report upon the state of the navigable streams and rivers, and to prosecute all parties contravening the terms of this Act.

By the fourth Section, it was provided, that in cases where it was clearly shewn to the satisfaction of the Minister of Marine and Fisheries, that no injury is accruing, or likely to accrue to the navigation of any stream or river, he might, by proclamation in the official *Gazette*, exempt from the operations of the Act, the whole, or any part, of such stream or river, lying above the point where it ceases to be navigable.

The introduction of this Bill was immediately followed by a strong petition to the House of Commons (see Appendix No. 1), signed by Gilmour & Co., and seventeen others, chiefly connected with the mills upon the Ottawa, and its tributaries. In accordance with the arrangement which we laid down for making our report (as explained on page 6) we now proceed to give a resumé of the allegations in the petition, viz:—

That petitioners represent a very large capital, invested at the Chaudiere and else, where on the Ottawa and its tributaries; employing at least 8,000 men, and 3,000 teams, producing a very large addition to the exports of Canada, amounting to four hundred millions feet of lumber, and four millions of dollars of value annually.

That the proposed legislation, with regard to the navigable streams and rivers, will most injuriously affect those interests, as it is impossible to prevent saw-dust from mills, driven by water, falling into the water, and consequently the enforcement of the Bill would compel them to close their mills, and to remove to other localities where steam power can be used.

That they fully recognize the importance of maintaining the navigation of the Ottawa River, but that they are in a position to prove, as well from the result of actual investigation of the River Ottawa, as from the experience of similar operations, of fifty years past on the Hudson and Penobscot Rivers, that navigation is not injured by the falling into them of *saw-dust*, which is yearly carried off by the spring freshets.

That the petitioners therefore prayed the subject might be fully investigated and opportunity be afforded them to submit scientific and practical evidence, in support of the allegations of the petition.

Upon consideration of the Bill, and the arguments and evidence adduced *pro* and *con*, and opportunity afforded to gentlemen to appear and address the Committee in opposition to it. It was moved by the Hon. M. Cameron, member for the County of Peel, "That the Committee are not in possession of sufficient information to pass the Bill now before the Committee, and that they report to the House, that by commission or otherwise, as the Government may determine, information be obtained on the subject, to be laid before the House at a future period." This motion was carried, and the following report (in substance) was made to the House by the Select Standing Committee on Banking and Commerce, signed, Alex. Morris, Chairman *pro tem* :—

"That the Committee had considered the Bill, the object of which is to put an end to the practice of throwing saw-dust, edgings and other mill rubbish into navigable rivers, tending (as assumed by the Bill) to obstruct the navigation; that upon this point the Committee are entirely without evidence, and as it is a matter of serious importance, they report the Bill back to your honorable House, and beg to recommend this subject to the consideration of the Government, with a view to an enquiry by a commission or otherwise." Signed Alex. Morris, Chairman *pro tem*.

During the discussion upon the Bill, Mr. Bronson, a proprietor of extensive mills at the Chaudiere appeared before, and addressed the Committee in corroboration of the allegations in the petition, and in opposition to the Bill.

This gentleman had spared no trouble or expense in procuring reports from undoubtedly eminent professional men, in support of the views of the petitioners, and also a large number of affidavits from various parties connected, more or less, with the milling interests, on the Hudson above Troy, and with the navigation of that river, and of the Champlain and Troy Canals.

We follow the arrangement adopted by us (See page 6) in here giving a resumé of the substance of these several reports and affidavits, which are to be found in the Appendix 2 to 23, both inclusive.

In all of them, the most decided opinions and statements, affirmed under oath, will be found, that *saw-dust* is not to be traced in combination with sand in the Bars created from time to time in those rivers and canals, and further, that in no case has the throwing of saw-dust been found to be injurious to the navigation.

The first of the papers in the above list (see Appendix No. 2), is a report, the date not given, made to Mr. Bronson, by Professor Green, treating the subject in a purely Engineering point of view, he puts the questions :—

1st. What are the causes which induce the formation of bars in navigable or other Rivers ?

2nd. What materials usually compose such bars ?

3rd. What are the specific gravities of these materials ?

4th. What velocities of current are necessary to take up and transport these materials to the point of final deposit ? After these, a fifth is indirectly added, What is the specific gravity of pine saw-dust, and the velocity of current necessary to take it up and transport it ?

To these questions, clearly and logically put, Mr Green gives, in their succession, indisputable answers, so far as his theoretic calculations and experiments extend. The entire report, which is very voluminous, exhibits great research, and intimate acquaintance



with the best scientific authorities, both native and foreign, upon the subject on which he writes. This report is concluded thus:—

“ In view of my experimental results, together with the facts observed by the U. S. Engineers upon the Hudson River, and in view of the experience of lumbermen and navigators upon the Hudson and Penobscot Rivers, I have formed the following opinions,” viz. :—

That saturated pine saw-dust will not be permanently deposited in water where the velocity of the current exceeds 0.25 of a foot per second, or one-sixth of a mile per hour.

That water-logged chips may be deposited when the velocity of the current is less than 1.00 feet per second, or two-thirds of a mile per hour.

That saw-dust may accumulate in eddies and in still water, or where the velocity of the current is permanently less than 0.20 to 0.25 of a foot per second.

That bars of *saw-dust* and sand combined will not be formed under any circumstances, for the reason that when the velocity of the current is diminished so as to permit the deposit of sand, it is still more than twice as great as is necessary to hold and transport saturated saw-dust ; and hence,

That saw-dust will not accumulate or be permanently deposited in rivers where sand bars occur, unless their exist expansions of the river below such sand bars, sufficient to make a cross section, more than double that at the side of the bar.

That if in low water saw-dust should accumulate in small quantities, *the accelerated current of the first freshet would take it up and sweep it down stream* ; and finally,

That it is extremely improbable that the minimum freshet velocity in the Ottawa River, ever falls below 0.25 of a foot per second, there is no reason to anticipate the formation of permanent or troublesome bars, or accumulation of saw-dust in that river.

“ This opinion may be modified or strengthened when more definite and precise information shall have been obtained in relation to the magnitude of the Ottawa River, its water shed and other characteristics.

I am, &c.,

D. M. GREENE,

Civil Engineer.

H. F. BRONSON, Esq.,  
Ottawa, Canada.

His reference to the *Penobscot River* is short. “ That sworn statements have been obtained of persons who have been engaged upon, and are acquainted with the Penobscot River, in the State of Maine, which runs through a pine timber region, upon which very extensive lumbering operations have been conducted for many years, and into the waters of which vast quantities of saw-dust and edgings are and have been cast. These statements shew that accumulations of *saw-dust alone* in the channel of that river, have never been known, and that no injury, impediment, or obstruction to its navigation has ever resulted from the casting of saw-dust into it.”

Professor Green's second report, (see Appendix No. 3,) also made to Mr Bronson, is dated *10th March, 1871*. He states in the commencement of it, “ that since his arrival in Ottawa, he had been put in possession of such information, in regard to the magnitude, character and habits of the Ottawa River, as would enable him to form a more definite and decided opinion as to the possible effect upon navigation, which may be produced by casting the saw-dust into the river at this point.”

That the information furnished him by A. J. Russell, Esq., of the Crown Lands Department, shewed, that the extent of territory drained by the Ottawa and its tributaries, above the City of Ottawa, is 43,000 square miles ;—that between the City of Ottawa and Grenville, is 19,000 square miles ;—and that 4,000 square miles are drained below Grenville ;—the extent of territory drained by the Ottawa, and its tributaries above the City of Ottawa, is 43,000 square miles ; above Grenville, 62,000 square miles ; above Montreal, 66,000 square miles.

Nearly the whole of this second report is taken up with calculations of the velocity the water at various points, between the City of Ottawa and the foot of the Lake of the Two Mountains, and they are principally based by Mr. Greene upon the breadth of the river and lakes, and the soundings *shewn upon the maps* respectively prepared under the direction of Mr. Shanly, and of Mr. T. C. Clarke, civil engineers, to accompany their reports upon the proposed improvements of the navigation of the Ottawa.

In concluding this, his second report, Mr. Greene says, "samples of material, six in number, taken from the shoal places in the Ottawa, between the City of Ottawa and Grenville, have been *shewn me*. These materials are wholly composed of *pure clean sand*, of different degrees of fineness, not the *slightest indication* of the presence of saw-dust can be detected in any of the samples, even when examined under a glass."

"As the result of this further investigation, together with the examination which I have made of the materials taken (shown to him) from the shoals on the Ottawa River, the opinions which I have expressed in my former communication, are not only confirmed, but are very materially strengthened, and I now feel no hesitation in expressing the opinion:—

"That saw-dust obstructions have not thus far been formed in the *channel* of the Ottawa River, and

"That there is no reason to apprehend the formation of such obstructions in the future."

Having in the above closed our resumé of the opinions of Professor Greene; as stated in his two reports, (see Appendix 2 and 3,) we proceed to give a similar one of the opinions of Mr. McAlpine, as shewn in an affidavit (see Appendix No. 4) made by him, before E. M. Wood, Esq., a Commissioner of the Circuit Court of the commonwealth of Massachusetts, dated Feb. 16, 1871.

In this affidavit Mr. McAlpine deposes that he has had charge of the enlargement of the Glen's Falls Feeder, and the reconstruction of its locks, and also of the Champlain Canal, and (during his term of office) of the removal of the Castleton bar, in the Hudson River, about six miles below Albany.

That he has had to pass over the Champlain Canal and the feeder frequently during the time the workmen were removing the deposits from the bottom of these canals, the character of which deposits he has accurately noticed.

That he has never seen or heard of any accumulation of saw-dust in any part of the *channels* of these canals, or of any obstruction from such to the navigation of the Hudson River above Glen's Falls, nor below Fort Edward (the river between these two places being an almost continuous rapid.)

That during the removal of the Castleton Bar, he frequently examined the material excavated, and never observed any deposits of saw-dust, but has seen sunken logs and decayed wood.

That the sand used for the masonry of sundry public works, was, by his directions, taken from the Hudson River bars, in consequence of its entire purity and freedom from woody matter:

That he has also had occasion to examine the deposits made upon many other rivers of the United States, where large lumbering operations were carried on, as on the Delaware, Susquehanna, and some in the Western States.

That he has never seen or heard of any obstructions to navigation, caused by the deposition of saw-dust.

That from the inferior weight of long water-saturated saw-dust, to that of even the finest sand, the former will always be moved forward by a current which just begins to deposit the latter, and hence, that the two would rarely be deposited in the same place.

That saw-dust will never be deposited where there is a current of more than one-fifth of a mile an hour, and only where there is almost no current, as in eddies, &c., and even if it should occur in any navigable channel, it would of itself form almost no obstruction.