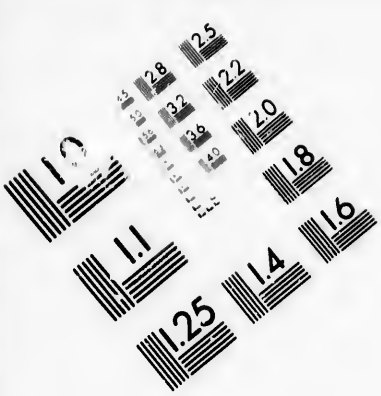



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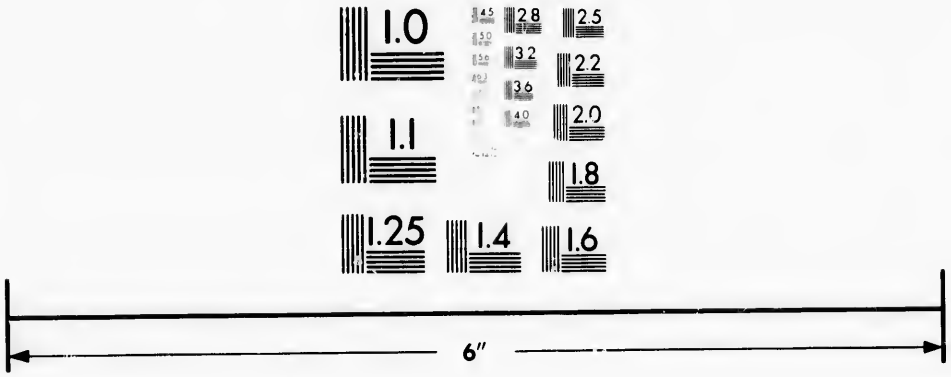



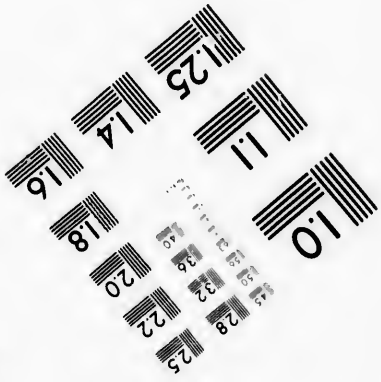


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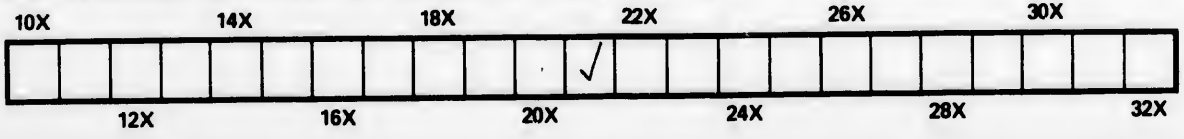

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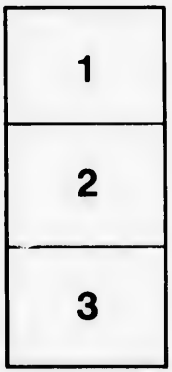


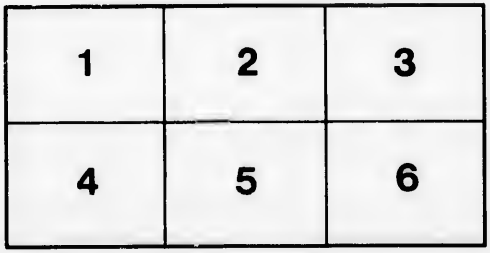


32X

THE

# WATER SUPPLY



# THE HYDRAULIC COMPANY

# QUESTION.



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Montreal:
PRINTED BY JOHN LOVELL, ST. NICHOLAS STREET.
1868.

# THE

# WATER SUPPLY

AND

# THE HYDRAULIC COMPANY

# QUESTION.

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# ANSWER TO ATTACKS.

## THE WATER AND HYDRAULIC COMPANY QUESTION.

The unprovoked, impudent and savage attacks of a certain print, long notorious for its disloyalty and bitter anti-national feeling—its annexation proclivities—anti-confederation prejudices—hostility to the most vital interests of the very people among whom it has grown fat and wanton—and an anxious, but mean devotion to its own presumed pecuniary interests, which it is well-known to prefer to all other things, induces publication of the following papers, merely to shew those who may choose to read them—that,—The Hydraulic Company are no monopolists—and that they ask no privileges or powers not freely and even thankfully conceded to all Railway and other public Companies, at any time required, without which, it would, in fact, be utterly impossible to build any road, canal, bridge, common turn-pike, *or even dam unnavigable waters* for the most necessary and highly useful purposes—things in which the public have a most essential interest and far more advantage, often, than the very men who spend their time and substance in the furthering and doing of such—*too often ill-prized and thankless offices and works.*

But, why should such a circumstance be minded—since, like the class of shameless women he is so very fond of instituting comparisons with, he, in spite of all the commandments in the Decalogue, is always ready to bestow his favors when and where the price is such as to satisfy (no easy matter, truly) his cupidity, for the nonce. But, courtesans and prints, it is well known, are not only equally shameless, but equally notorious for their utter want of principle, disregard of truth, and base love of filthy lucre. The pigments they use and false lights which it is their habit to carry are ever and anon displayed upon occasions expressly for the purpose of leading the unwary into error. Common Christian charity or truth

from such a quarter, none but fools would ever think of expecting. The wanton vilifier brings discredit only on himself. When levelled at men in whose conduct or character neither flaw nor blemish can be found, his malignancy and his strictures are alike impotent to do them harm—more especially when the meanness of his motives and baseness of his acts are, as here unquestionably they are, so very plain and unmistakeable. But—Having done with that,

The objects of the Company, in a very general way, are two-fold, viz:

1st. Supplying this great and growing city permanently with pure and wholesome water in unlimited abundance, and in such a way as henceforth to make impurity or failure next thing to impossible.

2nd. Creating, while doing so, a vast amount of invaluable water-power for general use, in the hope of legitimately stimulating the national industry and largely increasing the national wealth and well-being through the manifold employments certain to result from the due execution of the main design—which, with the general prosperity sure to accompany such a condition of things, could not fail to re-act and operate the most successful check that can be given to the outward emigration of our people so much and justly complained of, while supplying the most powerful incentive and attraction to that inward emigration which is so universally desiderated and desired and greatly improving the navigation of our noble river at a most difficult and dangerous place.

Whether such considerations are deserving of acceptance and favor, or merit only insult and abuse, the public will judge; although it may not be able to do so with a full appreciation of all the beneficial consequences certain to follow in the wake of such an event, until some later stage is reached, when the actual reality will no doubt silence all miserable objectors, and, at same time, impart better light and higher confidence to other incredulous and unbelieving mortals,—if any such there be.

*To the Editor of The Gazette.*

Sir,—For a great and populous city on a mighty stream, with water ever flowing past—enough for all the ordinary uses of a continent and to spare—to be so dreadfully afflicted and endangered, periodically, through an absolute scarcity and dearth of water, is anything but creditable to its inhabitants. But so it is; and the annoyance, distress and danger consequent thereon, is too real, wide-spread and frequent to admit of question or excuse. Reproach, however, is useless. The past is past. With the future alone our business lies. And the question is:—Is this great trouble preventible? In an age so full of engineering wonders, it would be strange if science could not deal successfully with such a case. The remedy may be difficult and costly; but it is not by any means impossible. Indeed, the word *impossible* is an obsolete term in engineering dictionaries, now-a-days. The practicability admitted, then what is the remedy? At one time it may not have been quite so absurd, but it is altogether too late now to think of bringing water from Coteau-du-Lac, or Terrebonne, or any other distant source however elevated. Even if our insular position did not forbid this, the difficulties attending such a course are much too great—the expense altogether too frightful. Neither, surrounded as we are by a great river, is it necessary or advisable to think of looking beyond our own island for supplies. So situate, our efforts must be circumscribed accordingly. Even thus limited, however, our sources happily are ample—our means, if only used aright, adequate enough.

Now, the grand, if not the only causes of all our water difficulties, are threefold; viz: *frazil*—low water—and a variable head; and any plan, it is clear, that does not meet and obviate these, together and permanently, cannot justly be regarded as sufficient in itself or entitled to acceptance; for, any one of the three causes above mentioned unmet, the trouble is sure to continue and recur with each revolving year, and be periodical and enduring as the seasons themselves.

Well, then, the steam engines recommended by Mr. Lesage, being intended as a stand-by merely, to be used only when the water is low and wheel-power deficient, can do but little good. Very expensive in themselves—their utility could scarcely compensate their

cost. Doubtless, as auxiliary to the wheels, they might be of some use occasionally; but, as any remedy for the main trouble, they would be totally worthless, and may therefore be dismissed at once.

And, as to extending or carrying up the supply-canal or Aqueduct in the manner proposed by Mr. Atwater, or Mr. Keefer, although this may, if they are right as to levels, give a somewhat better head, or more water and greater forcing power, nevertheless, the actual head would still vary as before with the state of the river and condition of the weather, while the old difficulty with the *frazil* would remain untouched, and might even be materially increased thereby. The longer and more winding or less straight the supply-canal becomes, the greater, clearly, will be the danger and likelihood of trouble with this *frazil*. Nor, in so very rigorous a climate, can it well be otherwise, in any canal that debouches into an open rapid, where *frazil* forms fast or comes floating and crowding down continually with the current, which is always sure enough to carry it in. The suction being constant, this action goes on unintermittingly, or, at least, is always in danger of doing so with favoring weather, when the *frazil* keeps accumulating till the canal becomes full, the water-course gets choked, and the indraft ceases—all which is only in strict accordance with the painful experience of every mill-owner throughout the country exposed in any way to similar conditions.

Now, if this view be correct, something more comprehensive and reliable is needed than either of the two plans last above referred to can be expected to effect. Even assuming their utility or sufficiency for a time, still, at the present rate of progress of this city, it is certain enough—that, in less than another decade, we should, nevertheless, again be exposed to a repetition of all the dangers and difficulties we are suffering from to day. But—a remedy is what is wanted; and, relieving temporarily only, or merely shifting forward the difficulty, is not a remedy—at least not such an one as can meet the requirements of the case, or calm and satisfy the public mind on so very interesting and grave a subject. Now, to be permanently sufficient or effectual, the means employed must cover the end designed— in short, must fairly meet the whole difficulty by fully obviating the several phenomena before referred to as the grand cause of all this water trouble. But how, it will be asked, is

this to be accomplished ?—Run a dam across that branch of the river which flows betwixt Isle-au-Heron and the Montreal shore—extend the rising-mains from the present wheel-house up to—and, place the lifting wheels at the dam.—That seems the only feasible, if not the only possible way of securing, at all times, a full and permanent supply of water with absolute success. By such means a wide expanse of deep, still, pure water—a sort of minor lake or pond as the supplying source, would be formed—and an unvarying head be secured, over which ice of course would form rapidly as far as the still water extended upwards, where all the *frazil* coming from beyond (none could form in this pond) would, with the current which brings it down, in consequence of the resistance here presented, be deflected and swept off into the rapids and main channel of the river south of Heron Island.

The banks and land on both sides being high, and an off-let already provided by nature, damming here, presents no serious difficulty, and no danger need be apprehended. Beyond, for ever insuring to a great and growing city like Montreal, an unfailing supply of pure and wholesome water, inexhaustible and permanent as the St. Lawrence itself, the plan here suggested would not only materially improve the navigation of our noble river at a most difficult and dangerous place, but likewise create a vast amount of water-power or mechanical force, the various uses and value of which can neither be enumerated nor computed now. Not another city anywhere existing at the present day occupies, or indeed can occupy so very favourable and commanding a position for speedily becoming a great manufacturing and commercial centre; and, if it be not now availed of and turned to valuable account now when so many pre-eminently useful and excellent purposes may thereby be promoted, the whole fault and blame will lie with the citizens of Montreal, and those who have her destinies in charge. Suppose the opportunity lost—How will posterity regard our present want of forethought and inaction, or disregard of duty ? No doubt the cost will be considerable, but then the benefits will also be immense, widespread, enduring. Not a foot of land upon this Island, nor within a wide circumference of it, but would be well worth double, maybe treble its present value within a period of 10 to 15 years provided his great improvement were only once successfully accomplished,

and our external relations brought into due accord with our domestic interests. Only admit its practicability, and the vast and lasting importance of such a project at once becomes too manifest to stand in need of argument.

If anybody still doubts the feasibility of this plan, let the whole matter be referred to competent engineers before anything definite is done. Let *them* examine and report. If they can suggest an easier or better way of dealing with these difficulties, good and well, let it be adopted and carried out. But, in any case, let there be no further postponement or delays. Mr. Keefer and Mr. Legge, in conjunction with, say Mr. Francis, of Lowell, Massachusetts, an Engineer of high repute and large experience in such matters, with a perfect knowledge of the water-works and system in use and operation at Lowell and also at Philadelphia—positions not very dissimilar to our own in not a few respects—would constitute an excellent board. Thus, well-accredited local knowledge and skill conjoined to and co-operating with the most eminent foreign experience and sagacity, would be brought to bear upon the whole subject. And any Board so constituted, I should think, may safely be trusted and left to discover and devise the very best means of meeting and vanquishing this annually recurring, much dreaded, and most distressing water difficulty—relieving at same time the Public mind from all further anxiety, uncertainty, and fears about the future.

The whole expense need not be great, and it could hardly happen but that the information and good advice so obtained would, in any case, be well worth the cost, and nobody would begrudge it.

The course here recommended is solely with the view of preventing mistakes and waste while insuring economy, despatch and success.

Your very obedient servant,

THO. F. MILLER.

Montreal, 2nd March, 1868.

*From the Daily News.*

Mr. Thomas F. Miller publishes a very sensible and well-written letter, in a contemporary journal, on the water supply question. He could not have hit upon a topic more personally interesting to every dweller in this city. The painfully ludicrous scenes daily witnessed of maids rushing frantically after coy water-carriers, and the airs of importance those who own a sled and an old puncheon assume, must tell the stranger that we are suffering a famine from the lack of one of the necessaries of life. Our municipality has spent some $3,000,000 since the days when Mr. Atwater championed the cause of a copious supply of water. Much of the money is buried under ground in the shape of iron tubes; some on the reservoir—some on the aqueduct. It would be a waste of energy to fight over the battle of expenditure, though millions may have been foolishly, or it may have been wisely, disbursed. What we want is a satisfactory result; and, if we have to spend as much more before we can succeed, we must pay without wincing. There is not an insurance agent or a large proprietor of city property who does not shudder when the fire alarm sounds. Entire streets, including the costliest edifices, and stored with valuable goods, may any day be delivered over to the flames if the firemen cannot command a head of water. Mr. Miller points out the facility with which an abundant supply can be secured by throwing a dam from the north shore of the St. Lawrence to Heron Island. His theory is perfectly sound, whether that enterprise be considered as an aid to manufacturing industry or as an agent in securing Montreal an unfailing supply of pure and wholesome water. The objections made in the House of Assembly to the passage of the bill to incorporate the St. Louis Hydraulic Company were, amongst other things, founded on the fact that such a bill would be a virtual transfer of half the St. Lawrence to a private company consisting of five individuals, with a paid-up capital of $5,000, who could make Montreal tributary to them for water. Now that the bill is hung up, we beg to call the attention of our new-made Mayor to its provisions. A practical man of business of his intelligence need hardly be warned against the danger of allowing this city to become subservient to any company. We cannot tolerate a monopoly of water.

*To the Editor of the Daily News.*

SIR,—Being unfortunately a taxpayer residing in the city of Montreal, and heartlessly compelled to pay water-rates before receiving any equivalent, and even when the Superintendent of the Water Works does turn on the water it is in such *thimblefuls* that there is scarcely enough to wash up the dishes and plates after dinner, I feel deeply interested in the management of said works, for I am somewhat of a thinking turn of mind, and cannot be persuaded that it is conducive to health to go unwashed, or that the drains of my house should not, during the winter months, have water passing through them.

These are points on which I think one and all of my fellow-taxpayers are agreed, and for which, as the present supply is totally inadequate, I am glad to see that you, amongst others of the daily journalists, are drawing public attention to the subject, and each, according to the light he possesses, advocating this or that scheme.

The most sensible letter on this subject I have read is that of Mr. Miller, adverted to in the *News* of to-day, and, as far as my judgment goes, I am convinced that the method mentioned in that letter for supplying the city with water will not fail, and that the idea of a water-monopoly being thereby formed (as seems to be your opinion) will not be the case, and that, on mature consideration of the method proposed, you will abandon that view.

*The Gazette* in this morning's issue states emphatically that Mr. Keefer's plan will give over three feet more additional head of water. The inference from this statement is, that as soon as that additional head of water is obtained, property holders may go to rest quietly in the winter nights with full confidence of there being plenty of water to prevent their goods and chattels being destroyed by fire; and, what is equally a cheering thought (for no man with any conscience can lay his head easily on his pillow, even if it be made out of the best eider-down, if the cook is growling for water and the baby squalling for a drink) there will be no lack of *aqua pura* to supply domestic uses, and no one will have his temper ruffled by paying his water rates beforehand. These, indeed, are cheering thoughts, but can they be realized under Mr. Keefer's auspices is the next question? There is an old saying—"a burnt child dreads the fire."

*The Gazette* asks the public whether they can doubt that gentleman's ability to do all he says. As one of the public, I do doubt very gravely whether that gentleman can be relied upon in such matters. If my memory fails me not, the gentleman whom *The Gazette* coolly asks the public to put confidence in, was the very man whose brain conceived, mind matured, and hands executed *the present failure!* which is so apparent that even some of the late City Fathers, now defunct, (peace to their ashes) *could* perceive it; and absolutely made a commencement to enlarge the reservoir, so as to remedy, in their opinion, the oversight of this eminent Engineer. Not only has the plan of supplying the city with water all the year round failed, but the cost of bringing into existence *this failure!* exceeded enormously the estimate of that "eminent" gentleman. *Humanum est errare*, is a saying applicable to all, great and small, rich and poor; but from what I have said I would not wish for one moment to shake the faith of the Editor of *The Gazette* in the "hydraulic capacity" of his friend Mr. Keefer. But I do believe that the people will be fearfully disappointed in the result--were they to depend upon a full supply of water from Mr. Keefer's arrangements—if carried out.

The Editor of *The Gazette* states that Mr. Keefer, from his local knowledge and experience gained during the construction of the present Water Works, is better able to give an authentic opinion on the question than any other man.

I am one who take nothing for proven without my reasons, to a certain extent, can argue it out; and, to form a conclusion I must know the premises on which the subject rests. I admit that Mr. Keefer's plan for supplying the city with water all the year round *has failed*. I know it—I feel it. I mean to say that the lack of water to wash with makes me feel the want of it, and so my reason assents to the scheme of Mr. Keefer as being *a failure*.

I am asked by the Editor of *The Gazette* to admit that the local knowledge and experience gained by Mr. Keefer, *in depriving me of water*, has taught him how to supply me *with* it. Now, this second point I will never admit, for I have no data to go upon. I have never heard it even gently whispered that he has expressed *contrition* for depriving me of water during the winter months, or that he admits his scheme to be a failure. His act of contrition to me I

will waive; but, until he admits his scheme of the present Water Works *a failure*, I will never believe that he can permanently supply the public with water all the year round.

In conclusion, let the public pin its faith to no one man; but let it adopt Mr. Miller's views, and call in the scientific aid of other engineers, with whom I would associate Mr. Walter Shanly. Let them submit their views, plans and estimates to a body of Commissioners, and let *them* have authority to adopt the scheme most suited to the general welfare.

I am, Sir, yours truly,

PUNCHEON,

St. Catherine street,
Montreal, March 4, 1868.

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*To the Editor of the Daily News.*

ST. LOUIS HYDRAULIC COMPANY'S OFFICE,
131 Great St. James Street,
Montreal, March 17th, 1868.

J. W. McGAUVRAN, Esq., Chairman of Water Committee,

SIR,—As Chairman of the Committee into whose hands the Council have demitted the whole question and matter of the Water Supply—we, as representing the parties interested in the project of damming the northern and unnavigable branch of the river at Isle Heron, now beg leave to address you.

Whether regarded as a means, and perhaps the only unquestionable means of obviating all past difficulties, and quickly, reliably, and permanently supplying this rapidly growing city with pure and wholesome water in unlimited abundance; or, of creating a vast amount of water-power, the varied uses and value of which can neither be imagined nor measured now—in both of which respects the essential interests and destiny of this great and populous city are most vitally concerned—not a more necessary, nor a more important project, at least in our opinion, can agitate or occupy the public mind. Indeed, rightly considered in all its beneficial consequences, we can conceive of nothing at all comparable with it in

respect of the universal comfort and security it would afford, or the immediate great utility and permanent advantages thereby secured, not only in a local but a national point of view—all which sequences are much too obvious to stand in need of argument.

Now, as with objects so valuable and a project of such magnitude and concernment before us—things so important in themselves and full of consequences so beneficial—it would certainly be quite a pity if any misapprehensions existed as to the motives and purposes of those on either side, and where especially, as here we think, the legitimate objects of both may very well be made to harmonize into some general plan, and a great economy and public good result therefrom, it is extremely desirable, in any case, that a clear idea and distinct appreciation of the views and purposes of each should be obtained at the first, and a good understanding preserved throughout. The full benefit of this will be more clearly seen as the works go on. Exclusive private benefit being—whatever may be said about it—no part of our design, we cannot see why a perfect accordancy of action may not exist, with benefit to all interests and all concerned.

Animated by these and similar considerations, and believing that the grand object of your Committee may, in some one way or another, most quickly, economically, safely, and best be accomplished in and through the successful execution of our main design, and cannot so satisfactorily be done in any other way, we invite co-operation, and respectfully beg leave to suggest that you will have the goodness to bring about an early interview betwixt them and those we represent for consultation on the subject, and to see whether our respective views may not be brought into a full accord, and one general purpose eliminated, plan designed, and line of operations agreed on, whereby the public weal and interests may, first of all, be provided for and secured, and all the other separate and, if you will, subsidiary, but still vastly important objects, be at same time facilitated, not only without any disadvantage upon either hand, but with far more economy, expedition, certainty and satisfaction in fact, than otherwise could be the case. We believe they could with signal advantage to all concerned, and that belief is our chief reason for addressing you on this occasion.

Strongly impressed with these considerations, the gravity of the

whole position and responsibility of the occasion—whatever may be thought of the views we here have indicated, or the suggestion we submit—we do hope it will be received and regarded in the same frank and well-intentioned spirit in which it is offered and recommended.

And we remain,

Your very obedient servants,

(Signed,) R. JAMES REEKIE,
DUNCAN McDONALD,
JAMES HODGES,
p. p. THO. F. MILLER,
A. B. FOSTER,
JAMES K. SPRINGLE.

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*From Daily News.*

In another column will be found a most important letter from Messrs. Reekie, McDonald, Miller, and some others, to the Chairman of the Water Committee. The suggestion of an interview of the kind and for the purposes stated is eminently judicious, and augurs well, *at least*, for something effectual being speedily done in the way of preventing a repetition of past difficulties; and securing, for the future, a most bountiful and unfailing supply of that first and highest necessity of life and being—pure and wholesome water. Satisfied that good may come of it, we hope that the Committee will at once accede to so well-timed a suggestion. If they do not, they will certainly fail in their duty to the citizens, whom, in this matter, they must be held to represent. It seems probable that through concert and co-operation with the Hydraulic Company, the grand object of the Committee may be accomplished most effectually, and an immense saving gained for the city without prejudice or disadvantage to the main design of the Company—than which nothing can be more laudable in itself, or more promotive of the essential and permanent interests of the citizens. The high character of the gentlemen concerned is a good guarantee that the confidence of the public will not be misplaced — that, with them, personal objects are merely secondary—and that, whatever they undertake will be performed, not only with promptitude and fidelity, but, in a

way certain to be not less creditable to the community than to themselves. It is a great work truly; but they are willing; and, we believe, can readily command any amount of means that may be necessary—millions if required—and they are much too experienced and prudent men ever to think of risking their reputation and fortunes where any doubt can possibly exist about the value, advantages, or ultimate success of this, or indeed any other undertaking they designed to embark in, or resolved to carry through.

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*To the Editor of the Daily News.*

Sir,—I have seen a good deal lately in the newspapers about Mr. Miller's plan for remedying the defects of our water system. To every Montrealer this ought to be an interesting subject. Exaggerate as one may, he can hardly over-state the importance of the matter. I am persuaded that Mr. Miller's plan, upon the whole, is comprehensive and complete.

A good many worthy people think with me that it would be a most capital thing for Montreal if this plan could be fully carried out. But we have our doubts about the matter, and those I wish to state, in the hope that you, Sir, or some other person, will have the goodness to enlighten us on the subject. We are anxious to acquire a thorough understanding of the bearings of so very important a design, well knowing that—if practicable in itself, and nowise dangerous in its consequences—what a benefit and a blessing it would be to ourselves (we who are obliged to work for our daily bread, I mean) and our posterity to the latest generations.

Indeed, it is a grand idea, the full consequences of which, upon the future destiny of our city and its inhabitants, rightly considered, it seems to me impossible to over-estimate.

But, since I must not be taking up your time and space about what must be evident enough to everybody,—The main thing is—the doubts and fears alluded to above. And they are:

1st. Would it be safe? Would not this damming, as in another rather curious case occurred to some extent, cause such an overflow as to deluge the surrounding country and drown and destroy us all?

2nd. Supposing no such overflow could occur, would there not, nevertheless, be a *back-flow* from below, sufficient to seriously diminish if not endanger the vast water-power or mechanical force itself, which Mr. Miller evidently contemplates as part and consequence of his main design for supplying our city for ever with an abundance of pure and wholesome water?

If not, clearly then there is neither any limit to the uses of such a power, nor would it be an easy matter to compute its value.

Except through reason of the doubts and fears above expressed, and entertained, I believe, by not a few, I do not see that any actual uncertainty as to the entire sufficiency and value of such a work should exist, or how any honest objection can be taken to the carrying out of Mr. Miller's scheme.

The flooding and the back-flow seem to me to be the only points on which more light is needed. All the other schemes have *a something* wanting; while this alone, within itself, appears to be complete—that is—assuming the doubts before stated to be satisfactorily resolvable.

Your obedient servant,

MONTREAL.

Montreal, March 19, 1868.

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*To the Editor of the Daily News.—(Not before published.)*

ANSWER TO DOUBTS AND FEARS OF "MONTREAL."

MONTREAL, 21st March, 1868.

SIR,—The object of the present communication is, if possible, to resolve the doubts and fears of your correspondent *Montreal* as to the consequences of the Dam proposed to be constructed at Isle-aux-Heron for the purpose of securing to this city a most plentiful supply of pure and wholesome water. Considering the numerous extremely valuable purposes that may at same time be subserved thereby,—it cannot be said that the object in question is not one of the very highest and most enduring concernment to our fair and favoured city.

The little paragraph in your leader column of yesterday was, I

presume, intended to draw forth an answer from some body, at least, that is my interpretation of it. Diffident by nature, I cannot well help doubting my own competency for the self-imposed and rather serious task of attempting to satisfy *Montreal*. Still, although I may not succeed in pleasing either you or your readers; and am quite sure I never shall be able to satisfy myself, or, worst of all, the proprietors of property in that locality, on such a subject,—I shall try.

Indeed, from what I hear and am bound to believe, the parties last alluded to are trying to frighten the public entirely out of its wits through the industrious circulation of unfounded reports and the most absurd statements as to the tremendous consequences and awful destruction of life and property that must follow the construction of a dam in the locality mentioned for any purpose whatever. But it is all affectation—their fears, if they have any, being purely imaginary; or, rather, only assumed for the purpose of creating a public outcry and alarm; and then adroitly turning that to their own account in the way of claiming enormous compensation, not for any injury done themselves, but an actual benefit to their property, as a consequence of the dam in question—if it is ever built. Now, the idea of asking damages for a good done one in despite of himself is quite *original* and a novelty. And the further idea of a little knot of people setting up themselves and their own little interests in opposition to, and trying by all means in their power, no matter how questionable, either to defeat a great and necessary work designed solely for public uses and the public good; or, if unsuccessful in that, unpatriotically trying to enrich themselves at the public expense through the most unconscionable claims for far-fetched and fancied rights and fancy damages, is very preposterous and absurd to say the least of it. And, will it not be altogether too bad—if man's rapacity, like his inhumanity, shall here again be allowed to make work scarce and the "countless thousands mourn?" But,—It cannot be allowed.

Now, the doubts and fears of *Montreal* and the parties he refers to, evidently enough, owe their origin to the influence of some such-like exaggerations. Indeed, there is no other way of accounting for them in the case of so very acute a man as *Montreal* appears to be. It must have been under the influence of such statements

that he sat down to peruse the document which, he says, he studied so attentively. Biassed in no small measure he must have been in some way, otherwise he hardly could have failed to find, in that same document, a pretty satisfactory answer to, at all events, the first and gravest fear and doubt that perplexes him, viz.:

1st. The flooding and destruction which floods usually occasion. At least, it so appears to me, and nothing more, I think, is necessary than to ask him to renew acquaintance with the particular passage of that able document which follows:—

"The banks and land on both sides being high, and an off-let already provided by nature, damming here presents no serious difficulty, and no danger need be apprehended."

Now, that is the whole case, briefly, clearly, and, as I think, quite conclusively—for, if the facts be as stated here (and I am assured by thoroughly competent parties, who have carefully examined the position, that they are)—the sequence is inevitable, and nothing more need now be said. Indeed, if any man wants more to satisfy him on this head, clearly, he can only find it for himself through a personal examination of the whole position.

2nd. The back-flow and its consequences. Now, we do not yet know that the water actually will back up below or against the dam at all. Not only will this for a time be uncertain, considering the altered condition of the position; but, it is still more uncertain how often, or to what extent it may, *i. e.* upon the supposition that it will. Nevertheless, it must be admitted that it sometimes may, for, it is true, that, through the obstruction occasioned by the stationary and stagnated ice or choked passage-ways below Longueuil, a variable rise and back-flow of some sort usually (not always) does occur, fall and spring (for most part and from natural causes higher, but always of shorter duration in the spring) which may occasionally find its level only at the dam in question; and may, also, when it does so, somewhat reduce the head and power there; but it cannot, even in the very worst of seasons do so, it is believed, to any very serious extent. The difference of level is too considerable for that. Besides, wherever, as here, there is an ever-plentiful supply to draw from, and the centre-discharge or Vandewater form of wheel is used, protected or enclosed as it always is, it can run in back-water,—just about as well as not. The only difference is one of velocity or degree

in a slightly diminished speed, owing to a somewhat less free or rapid discharge, in consequence of the presence of back-water—a fact of no great importance where, as mentioned before, the supply is good—and less, of course, where, as here, it is at all times superabundant. The days of the clumsy, old, obsolete and primitive breast-and-bucket wheel, once and long in vogue, are past. It is almost entirely superseded now by the newer and better forms in daily use and requisition; and, until we return to old and obsolete ways again, which no man in his senses would ever think of doing, any ordinary and merely momentary back-flow at such seasons (allowing it to happen) could never, it is clear enough, present any serious hindrance to the practical application or working and uses of the power derived from such a dam at any period of the year. Plainly enough, therefore, all such exaggerated statements and reports are only intended to forward and serve a purely selfish and unworthy purpose.

Now—The explanation here offered is about all that needs, or, at least, can yet be done in the way of satisfying *Montreal*. It is to be hoped it may have the effect of silencing his fears and removing the doubts which he tells us disturb him in common with so many others. It may be so: but all such fears are groundless; and, if we have failed to convince him of their groundlessness, the fault is not in the subject but the author. It is well-known that there are people who, with a preconceived notion in their head, or a supposed pecuniary interest in their eye, it is quite impossible to reason with. *Montreal* may not be one of this class. Nevertheless, the class is very numerous. If such people can hardly be brought to believe in the evidence of their own senses, as often happens, how can they be expected to put any trust in other men, or have any faith in any thing?

Another matter, in this connection, appears deserving of some notice. It is not, properly speaking, an objection to the proposed plan of the Dam &c., but only a sort of reason against any such change; and, in point of wisdom, not one whit better than that which the stupid tradesman displays when, clinging affectionately to old instruments and old ways, he sulkily refuses to adopt a new machine or tool, with which much more, and better, and cheaper work can be done—merely because the change would entail a little outlay;

although it could be shewn that the new and better article was a real economy, and that its first cost would be even less than the mere putting and keeping of the ill-contrived, old and insufficient one into some passably decent sort of repair, for just another, and, perhaps, a very short season longer. If that is not what is called being "penny wise and pound foolish,"—the meaning of the proverb is unintelligible to me. Now, the objection referred to is this:—

If the dam-plan proposed be adopted, our present costly water works will be rendered useless—in fact, a dead loss. But this is a grand mistake, for, the only portion of the present works that could be dispensed with, is the aqueduct or supply-canal and Wheel-House. But these would not by any means be useless. On the contrary, if affected at all, and benefited as they easily could be by the Hydraulic Company's operations, and converted, in the shape of power, to manufacturing purposes, they would still continue to be as useful and valuable as ever—even more so, may be:—For instance, only *one* large cotton mill, with its attendant print mill, Machine Shops, Stores, &c., &c., (the aqueduct would admit of many mills upon it) employing thousands of hands (not an unusual thing) would actually, in mere money value, be worth far more to the city every year than the whole cost of carrying up the rising-mains to the proposed dam, where the water now running past to waste continually before our very eyes, could be made to do the work of lifting itself up to any height desired—the top of the mountain, if it were thought useful—without ever a fear of any future trouble with frazil, low water, muddy water, or any of the other causes which heretofore have fairly baffled the genius of Mr. Lesage—compelled a whole garrison to be turned out to the rescue—and decent citizens to pay beseeching court, on more than one or two occasions, to lubberly and foul-mouthed water-men with their rickety carts and dirty, greazy puncheons; and, after all, not get as much as one "little drop" to wet one's whistle with.

Now, the drift of this last objection is merely to oblige a two-mile extension upwards of the present canal or aqueduct, that is—of making sure that all the old difficulties will remain to afflict us in a far more aggravated form when the city and its population will only be larger, (the sickly, silly efforts of some would-be wise persons may check but cannot prevent its growth) and their re-

quirements greater, and the distress and danger more widely and severely felt—of course. For, if Mr. Keefer's plan be carried out, we shall certainly be in danger of being without water altogether for a goodly portion of every winter—because, if, in extending the present canal, you follow the *sinuosities* of the bank, as proposed by Mr. Keefer, raise its head, and deepen its bed, and widen its mouth, and make it dip into the river in a slowly running current, the more extended area and greater influence of suction in such a position, will inevitably draw in, vortex-like, a much larger proportional quantity of frazil than could possibly be the case in a stronger rapid where the influence of the in-draft is much less felt, and the velocity of the stream hurries and sweeps the larger portion of it past. Besides, at every bend or turn in the more extended and crooked canal, the direction of the current within it of necessity changes from side to side—eddies forming after every one of them and operating as traps to attract and to retain frazil. And thus the free passage of the water would be impeded, and a great loss of head and speed would follow, while the very unevenness and projecting sides of such a canal would form such a barrier to the progress of the frazil that it would always be in imminent danger of becoming useless just at the very moment when its use was *wanted most of all.* Not only so, but the danger would be permanent—for a cold spell, any time of any winter, might make it cease to furnish any water at all to your thirsty, water-starved and water-craving citizens.

When that happens, you may as well try and draw the water through a bank of puddle-clay as through a heavy body of this frazil. A gorge of no great thickness (it could not help growing thicker every instant) would do the business handsomely, without even considering this further fact, viz :—that from the point where the first obstruction did take place up to the very mouth of the canal would soon become one solid mass of fix'd frazil. What then,—Blasting frazil even with glycerine being well known to be impossible, there would be nothing for it, at last, but pick and shovel. But who so cruel as to permit men, even if for large pay willing, with the thermometer ranging from 20 to 30 degrees below zero, to go working up to their middle in the icy-slush in a vain hope and attempt to clear it out—even with crow bar, pick and shovel.

Only two short years ago when the garrison went out to try, and hundreds of citizens also went to witness them, the attempt was given up because of its utter impracticability, and furrowing the surface was finally had recourse to with little better effect—when, a change set in, and the sun and weather, out of pity for a public in sore perplexity and distress, providentially came to our relief. Had not the change come when it did, there is no saying what might have happened then, or what may happen even yet, unless the only safe and certain way is now taken to obviate a renewal of such difficulties.

Moreover, at a late and an unusually full meeting of the City Council, Mr. Rodden stated that—In anticipation of a petition presented by the agents and managers of Insurance Companies, calling attention to the dangers that threatened us all and demanding the immediate adoption of some adequate remedy for this water difficulty, he had obtained from the superintendent of the works, Mr. Lesage, certain reliable information and sketches, of which—sketch No. 2—showed :

" What might occur at the same time and place should the aqueduct be extended until it would be filled from a higher level on the banks of the river with a water area of about 270 feet, say five times what sketch No. 1 gives, supposing the ice would only be four feet thick (*five and a half feet was the actual thickness at the moment!*) ; this area, and the probable increase of power obtained by increased head, would, no doubt, admit of a full supply being put upon the city during the winter month Now mark—" The requirements of the city are 2,500,000 gallons daily. The consumption increases at the rate of about 500,000 gallons per annum. *By the time the extension would be completed, the consumption of water in the city would reach the full measure of the winter supply that could be obtained from the proposed extension to a higher level* without increasing the size of the present aqueduct, which supply would be about 7,000,000 gallons daily. Therefore, it is to be considered what further pumping water-power can be obtained to keep pace *with the annually increasing demand for water*." Now, although it might be plainer, could anything be more suggestive as to the utter futility of the proposed extension in any shape, seeing we are so distinctly told by its very promoters, that " BY THE TIME THE EXTENSION WOULD BE COMPLETED, THE CON

SUMPTION WOULD REACH THE FULL MEASURE OF THE WINTER SUPPLY FROM SUCH EXTENSION." A very good reason, certainly, for the following sound conclusion: "THEREFORE, IT IS TO BE CONSIDERED WHAT FURRHER PUMPING WATER-POWER COULD BE OBTAINED TO KEEP PACE WITH THE ANNUALLY INCREASING DEMAND FOR WATER." Undoubtedly—*that is the question*, according to this good authority—but how, pray, is it to be answered, seeing that—if Mr. Keefer's plan of elongating the aqueduct is adopted, it is certain, if Mr. Lesage and Mr. Rodden are to be regarded as authorities, (and they ought to know something worth knowing about it surely by this time) that—after all the expenditure proposed to be made, has been made, and the work is completed, we shall be no better off than now, and will, even afterwards, be exposed to all the difficulties and dangers we are suffering from to-day. And,—be it remembered—Mr. Lesage and Mr. Rodden's sketch (No. 2) assumes the full head observable at the entrance of the canal, without any allowance whatever for diminution or loss, *in transitu*, whereas, if the canal be extended, and Mr. Keefer's singularly strange and devious plan be followed, a great decrease of head and body will certainly be found to arise—that at the upper and that at the lower end (nay, even at the junction of the proposed extension to the present aqueduct, or vertex of the sharp angle there formed) being very different things, since, at every bend or curve (and these would be numerous, and the more angular the worse, of course) of the elongation, a serious loss of head and speed or force would certainly take place, while, at the same time and in the same way, the danger of the water-way getting completely choked by frazil catching at these protuberating bends or curves and lodging in the accompanying eddies, would be vastly increased,—all which is only in strict conformity with scientific principles, or Smeaton, Faraday, Tyndall, Fairbairn, Sir William Armstrong, and other equally eminent men, not a few, are all wrong together, and entirely unworthy of the respect and admiration in which they have heretofore been held. You cannot pass, indeed you cannot force an equal quantity of water through a crooked or uneven and a straight tube of the same dimensions—not even through the identical tube if its interior be not perfectly smooth—much less if it be crooked or irregular, and have protuberating and withdrawing sides. In such a case, the measured loss from resis-

tance or friction, is such as no one not well up (as our neighbours would term it) in hydraulics, would be apt to believe, and the same principles, in a somewhat different form, of course, are equally applicable to open canals or aqueducts. In fact, with this proposed extension of the canal, a greater likelihood than ever of being without water altogether some winters would exist, while the danger of being so every winter would be seriously increased—a prospect far more calculated to cause than to calm apprehension and alarm in the public mind.

Now, as to the cost of this proposed extension or elongation of the present aqueduct—Mr. Atwater says $50,000 per mile will do it,—and Mr. Keefer, *for economy's sake!* wants to make it on the very brink of the river-bank, and throw over the excavated stuff as a protection against a surging, wearing, wasting, uncontrollable current. But what good reason is there to presume that Mr. Keefer and Mr. Atwater are any more correct now in estimating the cost of the proposed extension, than they formerly were in estimating the cost of our present defective water-works. The original estimate, as I am informed, and I believe correctly, of the present water works, was only a paltry $150,000, but the actual cost, nevertheless, exceeded the estimate fully *twenty-fold* (it was over $3,000,000,) and that, too, without including the indispensible caudal appendage of a *tail*-race which afterwards cost the respectable sum of $———, —I know not what.

But it is useless to be arguing about such things. Whoever cannot see the object of them without any further argumentation, can neither be enlightened nor convinced by any reasoning the case as yet admits of. I only hope—if the Corporation determine to carry out their alleged purpose and carry up the canal according to Mr. Keefer's plan—that Mr. Atwater will have the contract at $50.000 per mile—but I would advise them to be careful and see that good security is given for the due fulfilment of the work, before it is begun. If Mr. Keefer thinks HE can carry up the aqueduct two miles further in the way he proposes along a great surging rapid, without any better protection than what he evidently intends, *He* also, should be employed to do it—provided he gives similar good security that it will not only not fail, but stand firm and sure, and give satisfaction for at least one full year after com-

pletion. It is almost incredible that any Engineer of standing would venture on such an undertaking without a proper and continuous line of good crib-work to protect it. If he does, he is sure enough sooner or later to see his folly and find out his mistake. But, will it not be too late then to mend the matter

The constant wash of a great rapid, the ceaseless grinding of descending blocks of ice, heavy frosts, heavy thaws and great freshets, without any respect at all for Mr. Keefer, or Mr. Keefer's handiwork, would likely soon make an end of it. And, suppose he did, or attempted rather, what he offers to do—How far would $50,000 per mile go in the way of paying for even *the first quarter mile of such a work*, which, when finished, as we have shewn, would, after all, be good for very little; and, most likely, when the time of trial comes, as it is sure enough to do, would be found altogether wanting and only leave us worse than ever. What would any one think of the Tailor ordered to make for a fast-growing youth and who made the suit, both, too scrimp and tight—insomuch that he dared not venture to stoop with them when on?—That he was either a fool or a knave, or, at all events, a stupid—to be sure. Does any one fail to see the application of such a question to the projected elongation or enlargement of our present Aqueduct? Indeed, the whole thing is a huge mistake. And, all the fine promises made are evidently without any proper forethought or reflection:—some say merely with the view of getting the work begun, well knowing that, if only once begun, all is safe—the Corporation for its own credit and character with the public being obliged to carry it through whether good for anything or no, and reckless in such a case, of course, as to what the ultimate cost might be. Is it not high time for a good look-out to be posted and on duty? The safety of the whole—ship, crew and passengers—is dependent upon this. Of course, the expense has all to come out of our already well-taxed citizens' pockets, and we all know how easy and pleasant a thing being *liberal* is when it happens to be at other people's expense—and, more especially, when being liberal is highly profitable to one's self.

So much, then, for Mr. Keefer's plan for the extension of our aqueduct and improvement! of our water works—the eminently wise men who, for reasons of their own, are labouring with might and main to force the Council to adopt it—and the generous!

proprietors, who, with the instinctive craving of a pack of famishing wolves scenting some chance prey, would neither give up a solitary inch of ground, even for the public good, without their pound of flesh, nor yield one iota of *their purely fictitious and pretended rights* without a thousand-fold their value when estimated as real ones, by way of compensation for—not an injury, but a positive benefit done them in despite of themselves, while malevolently abusing and threatening every body into the bargain, and bawling out through their hireling's throat and with all their hireling's might for Hercules to come and save them from the horrid fangs of that hydra-headed monster, the St. Louis Hydraulic Company.

Now, has Mr. Keefer—the geniuses who have been combatingthese water difficulties for many years past—or any other body—I wonder, ever once thought how easy a thing it would be for this well-abused Hydraulic Company to do all, nay, far more than all that Mr. Keefer and others promise, without any of the very serious drawbacks inseparable from their plans, and not only without any (worse than useless) extension of the present aqueduct, or disturbing anything whatever, but in a way that would most certainly be far simpler, quicker, infinitely safer, better and cheaper than they, or any of them all, can possibly pretend to. But—so it is; and the fact is demonstrable and may so easily be understood from what has already been said that any further argument seems quite unnecessary.

To revert for a moment to Mr. Rodden's statement in the Council on the occasion above referred to, viz.—By the time the extension contemplated by Mr. Keefer is completed our water consumption will be 7,000,000 gallons daily.

Now, in a city that has trebled its population within a period of twenty years (the last past 20); and where there is every reason to believe, unless one sadly mistakes the signs of the times and the spirit of our people, it will go on continuing to do so in a still higher ratio of increase even for the next twenty years to come, and thence-forward indefinitely, it is surely a matter of the very gravest, and as I look at it, most solemn importance for the public to consider NOW what the state of matters will be THEN—aye, even before half that same score of years comes round.

Well, as the matter has to be considered *now* even with reference to the present.—Why not, while we may, look just a very little

a-head and make some provision for the future. Why—like big, hulking school-boys—go paltering, and trifling, and dallying with so very serious a business? Why not take the benefit of the right sort of knowledge and talent which is at our command, if we go about the getting of it in a right and proper sort of way? Why go secretly scheming, and misleading, and straining to cast the mantle of a high and spotless reputation over a something, which, if it were not indefensible, would not require concealment? Even now the 20 years above alluded to is running on. Again,—according to a calculation I have made, and it is much within the mark, I find that in only

5 years hence our daily consumption of water will be 10 Million gals.
10 " ..... .....15 do
20 " ..... .....20 do

Now, looking at and considering these indubitable facts,—Is not this grave question one which demands to be taken up *openly and at once*, and fairly and fully considered, not merely with reference to the present hour or year, or the next 10 or 20 years, but (say) fifty or 100 years or more. If our city dignitaries would only take this reasonable view of the position and adopt the proper means, their Reservoirs might be always full of pure water, instead of the pea-soup we may be hourly looking for and forced to use and drink, unfortunately, for the next two or three weeks to come from down-right necessity, but without any necessity whatever, if the plain and proper means were only used to obviate our annual festival of that sort of beverages; and the present high and oppressive water-rate at same time reduced full one half or more and the works made to yield an immensely larger revenue than they do at present.

Strange—how very palpable a thing should be lost sight of, and so easy, sure and comfortable a way and means of deriving an increased revenue, while actually reducing, or in a manner removing, a very high and galling rate, often without its due equivalent, should be neglected. But, clearly, this is not the place or time for entering upon such a subject.

Another object and sequence of the very highest importance I have studiously so far kept out of view. It especially concerns the general Government, and every city, town and village in the Pro-

vince of Ontario; viz.—the interior commerce and navigation of the country and their accommodation and improvement. I feel as if I would rather like to say something on the subject: but, unwilling to trespass further on the patience of friends, I abstain, while—to those who desire to learn more of the St. Louis Hydraulic Coy's views and purposes, I would say—Try, if you can, and get a sight of the splendid plans got up by our own—shall I say it—"heaven born" Engineer Mr. Charles Legge. (No one, I hope, will for a moment think that the term is irrelevant, or meant irreverently.)

To return to our first view and to finish then:—Only one way of dealing successfully with all the difficulties of our position is open to us, viz:—damming the river at Isle-au-Heron, carrying up the rising mains to, and placing the lifting-wheels beside the Dam, in the way first proposed by Mr. Miller; and it is the surest, quickest, safest, best and cheapest way of remedying all the annoyances, difficulty and dangers we now are, and always must be subject to, unless this is done—and done, too, as it may, and ought to be.

Finally—Whatever may be done—a fair, dispassionate and full consideration of the matter in hand in all its manifold bearings and aspects, past as well as future, induces a firm belief that we are now arrived at one of those grand climacterics in a people's history, where the roads diverge, and it is just as we turn here—to this hand or to that—whether we move forward or no in a right or a wrong direction. God grant that we may have the sense to choose the right course, and His blessing be on those who lead the way.

Your very obedient servant,

VANDEWATER.

## TO HIS EXCELLENCY THE RIGHT HON. CHARLES STANLEY, VISCOUNT MONCK, &c., &c., GOVERNOR GENERAL OF THE DOMINION OF CANADA.

*The Petition of the undersigned Citizens of Montreal.*

RESPECTFULLY SHEWETH;

THAT during the late Session of the Legislature of the Province of Quebec a certain Act or Bill for Incorporation, of which due notice was given, was presented by certain of your Petitioners and such others as may hereafter be associated with them therein, asking the necessary powers and authority for damming the unnavigable branch of the river St. Lawrence betwixt Isle-au-Heron in the Lachine Rapids and the Montreal shore, and acquiring by arbitration or otherwise all Lands, rights and privileges necessary to the successful accomplishment of such a design—which Bill, although opposed, was duly passed, but afterwards reserved for your Excellency's sanction.

That the object thus sought being of the very greatest public necessity, utility and importance: viz.—obviating the grievous difficulties and exposure heretofore experienced thereanent, and permanently securing for the city of Montreal an unfailing supply of pure and wholesome water—and at same time creating an immense amount of invaluable water-power for general use and furtherance of the national industry and advantage, while incidentally but most materially improving the navigation of the River at a most difficult and dangerous place; besides supplying, through the manifold employments certain to result from the execution of the main design, the most effectual check that can be given to the outward emigration of the people so much and justly complained of, and at sametime presenting a most powerful incentive and attraction to that inward emigration which is so much desired, your Petitioners are naturally anxious to obtain your Excellency's sanction to the measure here referred to, in order to be able fully to avail of the brief season within which alone such a work can properly be undertaken to advantage, or begun and carried through to completion with any very certain hope of success.

May it therefore please your Excellency to take this matter into your early and serious consideration and sanction said Act; or do further and otherwise in the premises as to your Excellency may seem expedient, just and meet.

And your Petitioners, as in duty bound, will ever pray.

Montreal 17th March, 1868.

# APPENDIX I.

*Brief* MEMORANDUM with reference to improvements contemplated at the Lachine Rapids by the St. Louis Hydraulic Company, to accompany preliminary plan of the work.

The plan referred to shews a solid dam or embankment extending from the north shore to Isle Heron, near its foot, raising the water flowing down the north channel, to a height of about twenty feet, at this point. The dam will be constructed of crib work filled with stones, and the whole covered up with a solid earth embankment, raised to a height of about twelve feet above the surface of the water on its upper side forming a water tight structure. The width of the embankment on top will be about one hundred and fifty feet, when completed, giving space for a roadway of one hundred feet, and leaving the balance of fifty feet, for rail tracks. In the first instance, it will possess about one half this total width, and be widened as circumstances may require.

The correct position or location of the dam will be decided after a more minute survey of the bed of the river has been made and may possibly be placed at a point farther up the stream, but, even if so, the same general arrangement of races, lots, &c. &c., as shewn on the plan will obtain.

On the dry rocky bed of the river below the dam, two tiers of hydraulic lots, will be laid off each possessing a depth of three hundred feet, by a width or frontage on the dam of one hundred feet, for each separate lot, reserving spaces of thirty feet between each for flumes and tail races, also serving for roads of access and to give light to the factories placed thereon. On the main land, a large head race possessing an ultimate width of five hundred feet, will be carried around the end of the dam, provided with suitable head gates for regulating the flow of the water, and from thence be continued down the river, at a distance of about 1200 feet from its margin. It is not contemplated to excavate this head race or canal, to the full width of five hundred feet at the present time, but where the nature or level of the ground requires embankments, they will be placed in the correct positions for the full

width, and the balance of the excavation be accomplished when the canal is extended in length, and additional water power required. The material excavated from the canal will be deposited in the main dam for widening and rising the same. The depth of water will be fifteen feet—increased, by deepening, to twenty feet or more, when required, either for navigation purposes, or for additional water supply.

It is suggested that the general government, in place of enlarging and deepening the present Lachine Canal, might devote the money which would be required to accomplish that work, to the assistance of the Company and enable it to carry the canal at once through to the Lachine Canal Basin No. 2, near Wellington Bridge. This canal, where passing through excavation, to have a present width on bottom, of say 100 feet, but where embankments occur, to possess the full width of 500 feet. If this were done, a guard Lock could be placed where shown on the plan, and a lift lock located further down the canal at a point most advantageous for the levels. This lift lock would drop the vessel down to a reach on the same level with Basin No. 2 Lachine Canal. Through this new canal, if of sufficient depth, ocean vessels, as well as river craft, could reach the Company's works at the Rapids, and the latter proceed from thence up the river to Lachine. The fine expanse of still water above the dam will furnish harbourage for a vast fleet, during the season of navigation, while in winter, vessels requiring repairs, would find it a good location for having them done.

The construction of the dam will have the effect of throwing a large volume of water into the south or navigable channel thus increasing its depth. It will also "pack" the water for some distance up the river, and diminish the current between the new Basin and Lachine. The passage of steam vessels up the river will be facilitated—while all vessels descending from above will take this route, leaving the present Lachine Canal, for the "upward bound traffic," in schooners and barges.

Between this main head-race or canal and the river, a space is reserved for a large number of Hydraulic lots for mills, factories, &c., &c., all with suitable head and tail races, roads of access, &c., but only to be completed as required—a space of 150 feet is reserved

between the factories and the canal, giving a road 100 feet in width, and the balance of 50 feet for lines of railway connecting with the Grand Trunk Railway at Point St. Charles.

The large lot at the north end of the dam is reserved for a wheel-house for the Montreal Water Works. It is proposed that the city should acquire this lot, and erect a suitable building capable of extension when required, with rising mains from the new wheel-house, underneath the canal, to the nearest point of their aqueduct, thence following it on their own property to the present wheel-house, and uniting with the existing rising mains to the reservoir ;—The St. Louis Hydraulic Company renting to the city the necessary quantity of water for driving their wheels. The water to be pumped up into the city, can be brought to the new wheel-house, by suitable pipes, from the nearest point in the aqueduct, which will ensure its purity as at present ; in addition to this a connection between the pump pits and the water in the large basin above the dam, can also be provided in case of accident or short supply in winter, from the aqueduct. The power for driving the wheels, to be held by the city under a perpetual lease, at such annual rental as may be mutually agreed on, or a stipulated amount of power may be purchased, or otherwise secured by taking stock in the enterprise.

The manner in which it is proposed to develop the power on the island may be seen by reference to the plan.

The natural channel which divides the island into two unequal parts, is to be deepened and widened for a main tail race. The water passing from the mills and factories located on the smaller island will pass into this main tail race, and from thence into the river at the lower end of the island.

On the larger or south section of the island, a main head race will be carried from the upper end, where it may possess a width of 300 feet, gradually narrowing to 100 feet at the lower end ; at right angles with this main head-race will be minor head and tail-races, arranged at suitable intervals with intervening lots for the erection of factories and mills ; about one-half of the water used will pass into the main tail-race, and the balance directly into the river. All the hydraulic lots on the island will have access by streets from 60 to 100 feet in width, and will generally average 300 feet in depth by 100 feet frontage each.

The main head-race will commence at the upper end, and be gradually extended downwards, as occasion may require—a portion of the excavation will be placed in an embankment to unite the several small islands at the upper end, and thus increase the head of water to the entire system of mills and factories. A fine basin of still water having a length of 5000 feet, by an average width of 2500 feet will be formed, and serve as a "mill pond" for supplying water to the mills.

This smooth sheet of water will freeze over in the early part of the winter season, and prevent floating ice and *frazil* reaching the different head-races and flumes. The greater portion of this moving matter in descending the river, will be drawn by the swift current at the head of the island into the south channel.

The plan submitted, shows the arrangement when the work is completed. The section proposed to be carried out in the first instance is the Dam, with such portions of the main and minor head and tail races, on the main land, as will yield sufficient earth excavation to form the embankment around and above the crib-work of the Dam. The hydraulic lots contiguous to the races, so constructed, may then be disposed of, and additional ones brought into the market from year to year in accordance with the demand—by simply extending the races.

C. LEGGE,
Civil Engineer.

Montreal, 14th October, 1867.

# APPENDIX II.

## ADDENDUM.

In answer to the questions contained in Mr. Page's letter of 23rd October, with reference to additional information respecting the levels of water, land, &c., the following addenda are made to the previous memorandum on the subject of the contemplated hydraulic improvements at the Lachine Rapids.

On referring to the plan, a line of soundings is shown a short distance above the dam, where the river possesses a width of about 2750 feet; the average of these soundings will give seven feet, or a sectional area of water way. of 19,250 square feet, and are reduced to a level of 17 feet on the mitre cill of Lock No. 1, Lachine Canal.

Section No. 1 on line AB, shows the contour of the river bottom, and the adjacent lands on either side of the channel.

Section No. 2 on line CD, along the centre of Isle Heron, shows a fall in the river, between these two points, of eighteen feet, in a total distance of about 6000 feet. The fall between the upper end of this section and the point in the river where the cross section was taken is about 13 feet.

The level of the river bank on the main land where the cross section was taken, is nearly 25½ feet above the present water, and if the surface at this section is raised to the level of the water at the upper end of Section No. 2, the roadway along the bank will still possess a height above the new level of at least twelve feet, a margin amply sufficient to prevent any overflow above the dam, during high water in the river at any season of the year.

During a portion of last winter, a natural dam of ice was actually formed across the lower end of this channel, and raised the water above it to about the level which will be attained when the permanent dam is constructed. No damage was sustained by the farmers in the neighbourhood.

The writer has examined the banks of the river between the site of the proposed dam and Lachine and finds them amply high; also the banks on the opposite side of the river.

That the erection of this dam will be followed by the packing

back of the water to the lake above, was referred to in the first instance, and the probable raising of the lake level, with its tributary streams also. The precise amount of this "pack," cannot be determined definitely at present, except with great trouble and expense, it will therefore be necessary before the work is commenced, to establish numerous bench marks along the margin of the river and lake, to define the original level of the water, and to serve as means of determining with exactness the amount of the pack at those points and consequent damage to land, if any is sustained on low levels, or otherwise.

It is scarcely necessary to observe that an increased height to the level of Lake St. Louis (a shallow sheet of water), together with the increased draft of water down the river and rapids, consequent on the erection of the dam, will be of great benefit to the navigation during the season of low water.

It is thought the foregoing information, together with the Sections and soundings shewn on the plan, will cover the ground required in Mr. Page's letter.

CHARLES LEGGE,
Civil Engineer.

Montreal, November 4th, 1867.

*To the Editor of the Daily News.*

MONTREAL, 25th March, 1868.

SIR,—I am happy to find that the St. Louis Hydraulic Company's charter is attracting public attention. Montreal is deeply interested in this matter, and the citizens should at once petition for the Royal assent to the bill. Why the most important measure passed by the Quebec Legislature should have been reserved, is mysterious.

Was it because the dam proposed by this company would have made one of the most dangerous rapids on the St. Lawrence a safe and navigable channel at all seasons, from the quantity of water which would have been thrown into it, or was it because their works would in a few years have doubled the population of Montreal, and increased the value of property on the island far beyond the expectation of the most sanguine? Or it may have been from a desire to prevent the thousands of people who leave Lower Canada every fall from finding that employment at home which they are compelled to seek during the winter months in the United States. It must have been from some such reasons, for no good one could be assigned.

We have, unfortunately, in Lower Canada many people who know nothing, see nothing, and cannot be made to comprehend anything; who have acquired a little property, but have not the intelligence to encourage any enterprise that would improve it, and who are always ready to oppose any undertaking from which their neighbors might derive any benefit, although they might be losers from such opposition. It is to this class that the backward condition of Lower Canada may be traced.

However annoying such a state of things may have been, they were endurable with no taxation, and the large amount of Imperial money which annually flowed into the country for the payment of troops, &c.; but times are about to change, and we shall soon be thrown upon our own resources. Then we shall soon discover the value of such works as those of the Hydraulic Company, and the fact that they would be cheap to Montreal at any price.

Is an enterprise of this value, from which the most stupid must

see that we would derive advantages which could not be computed, to be defeated by the croaking of a few farmers on the Lower Lachine Road, whose fortunes would be made by giving the Hydraulic Company all the land required for the works gratis.

ARGUS.

not be computed,
on the Lower La-
ng the Hydraulic
s.

ARGUS.

## COMPARATIVE REMARKS.

The following Statistics of the Manufactures of Lowell, Mass., for the year 1867, compiled from authentic sources, and published annually (No. 31) will serve to show the result obtained from the employment of 10,000 horses Power of Water, assisted by an auxiliary force of 4,425 horses of Power Steam.—Now, if such results are obtainable t Lowell, from the above figures, what might not be xpected here from the employment of the enor- ous force of 4,500,000 horses power of water!! hich the St. Louis Hydraulic Company can nish for the general public use and good. ain, if 14,425 horses combined power of force ployed at Lowell, produces annually, as it is said do, $30,000,000 worth, what might not the ,000 horses power created by the Hydraulic pany's dam be made to produce annually if brought into use, and actually used?

hat business!!—Who will undertake the lation?

*.—The amount of information shown here so clearly and , with summary of the whole, is very striking, and all so in, that—"he who runs may read."*

### MERRIMACK MANUFACTURING CO.

J. C. PALFREY, Ag't. HENRY BURROWS, Sup't Print W'ks.

Incorporated 1822. Commenced operations 1823.

| | |
|---|---|
| Capital Stock, | $2,500,000 |
| Number of Mills, | 5 and Print Works |
| Spindles, | 100,000 |
| Looms, | 2,500 |
| Females employed, | 1,600 |
| Males employed, | 650 |
| Yards made per week, | 450,000 |
| Pounds Cotton consumed per week, | 80,000 |
| Yards Dyed and Printed per week, | 450,000 |
| Kind of Goods made, | Prints, No. 30 to 37 |
| Tons Anthracite Coal per annum, | 12,000 |
| Bushels Charcoal per annum, | 6,000 |
| Cords Wood per annum, | 700 |
| Gallons Oil per annum, | 7,500 |
| Pounds Starch per annum, | 225,000 |
| Barrels Flour per annum, | 1,100 |
| Water Wheels, | 6 Turbines, 5 ft., 4 do 8 ft. 6 in. diameter |
| Steam power | 22 engines, 2,010 horse power |

In addition to the above, 1,900,000 pounds Madder, 50,000 do Copperas, 170,000 do Alum, 160,000 do Sumac, and 40,000 do Soap are annually consumed.

### HAMILTON MANUFACTURING CO.

O. H. MOULTON, Ag't. WM. HARLEY, Sup't Print W'ks.

Incorporated 1825. Commenced operations 1825

| | |
|---|---|
| Capital Stock, | $1,200,000 |
| Number of Mills, | 5 and Print Works |
| Spindles, | 51,268 |
| Looms, | 1,348 |
| Females employed, | 850 |
| Males employed, | 425 |
| Yards made per week, | 235,000 |
| Pounds Cotton consumed per week, | 50,000 |
| Clean Wool consumed per week, | 10,000 |
| Yards Dyed and Printed, | 120,000 Printed, 6,000 Dyed |
| Kind of Goods made, | Delaines, Flannels Prints, Ticks, Stripes, Drills, Worsted Yarns, Sheetings and Shirtings, 10 to 53. |
| Tons Anthracite Coal per annum, | 3,800 |
| Bushels Charcoal per annum, | 500 |
| Cords Wood per annum, | 100 |
| Gallons Oil per annum, | 6,500 |
| Pounds Starch per annum, | 120,000 |
| Barrels Flour per annum, | 175 |
| Dye Stuffs, amount per annum, | $185,000 |
| Water Wheels, | 9 Turbines |
| Steam power, | 2 engines, 375 horse power |

### APPLETON COMPA

J. H. SAWYER, Agent.

Incorporated 1828. Commenc

| | |
|---|---|
| Capital Stock, | |
| Number of Mills, | |
| Spindles, | |
| Looms, | |
| Females employed, | |
| Males employed, | |
| Yards made per week, | |
| Pounds Cotton consumed per week, | |
| Kind of Goods made, | Sheetings, Drillings a 14 and 34. |
| Tons Anthracite Coal per annum, | |
| Bushels Charcoal per annum, | |
| Gallons Oil per annum, | |
| Pounds Starch per annum, | |
| Water Wheels, | |

### LOWELL MANUFACTURING

SAMUEL FAY, Agent.

Incorporated 1828. Commenc

| | |
|---|---|
| Capital Stock | |
| Number of Mills, | 1 Spinning, 1 Carpe |
| Spindles, | 12,500 worsted and |
| Looms, | 258 Power Carpet, 124 Cott |
| Females employed | |
| Males employed, | |
| Yards made per week, | 35,000 yards Carpets 4,500 Stuff Goods. |
| Pounds Cotton consumed per week, | |
| Pounds Clean Wool consumed per week, | |
| Kind of Goods made, | Carpets, Sheeting |
| Tons Anthracite Coal per annum, | |
| Bushels Charcoal per annum, | |
| Cords Wood per annum, | |
| Gallons Oil per annum, | Red, 24,000; S 1,200. |
| Dye Stuff per annum to the amount of | |
| Water Wheels, | 3 Turbines, 7 feet 4 do 8 feet 4 inches diameter. |
| Steam power, | 2 engine |

## PPLETON COMPANY.

J. H. Sawyer, Agent.

828. Commenced operations 1828.

| | |
|---|---|
| | $600,008 |
| lls, | 3 |
| | 20,608 |
| | 695 |
| yed, | 400 |
| d, | 120 |
| r week, | 130,000 |
| consumed per week, | 50,000 |
| made, | Sheetings, Drillings and Shirtings, Nos. |
| | 600 |
| te Coal per annum, | 500 |
| oal per annum, | 2,000 |
| r annum, | 75,000 |
| per annum, | 5 Turbines |

## L MANUFACTURING COMPANY.

Samuel Fay, Agent.

1828. Commenced operations 1828

| | |
|---|---|
| | $2,000,000 |
| lls, | 1 Spinning, 1 Carpet, 1 Fine Worsted |
| | 12,500 worsted and Wool, 2,816 Cotton |
| | 258 Power Carpet, 124 Cotton, 50 Stuff Goods |
| yed, | 1000 |
| d, | 450 |
| r week, | 35,000 yards Carpets, 13,000 Sheetings, |
| ff Goods. | |
| consumed per week, | 4000 |
| Wool consumed per week, | 63,000 |
| s made, | Carpets, Sheetings and Stuff Goods |
| ite Coal per annum, | 3,500 |
| oal per annum, | 2,000 |
| er annum, | 70 |
| r, unnum, | Red, 24,000; Sperm, 6,000; Olive |
| annum to the amount of | $100,000 |
| | 3 Turbines, 7 feet 4 inches diameter: |
| | 4 inches diameter. |
| | 2 engines, 600 horse pow |

## MIDDLESEX COMPANY.

O. H. Perry, Agent.

Incorporated 1830. Commenced operations 1830.

| | |
|---|---|
| Capital Stock | $750,000 |
| Number of Mills, | 4 and Dychouses |
| Spindles, | 16,400 |
| Looms, | 250 Broadcloth, 50 Narrow |
| Females employed | 320 |
| Males employed, | 452 |
| Yards, made per week, | 13,000 6-4, 2,000 3-4, 2,500 Sq. Shawls |
| Pounds Wool consumed per week, | 25,000 |
| Kind of Goods made, | Broadcloth, Doeskins, Cassimere and Shawls. |
| Tons Anthracite Coal, | 1,500 |
| Bushels Charcoal per annum, | 500 |
| Cords Wood per annum, | 175 |
| Gallons Oil per annum, | Spindle 1,123, Sperm, 553, Red 16,000, Lard 5,500. |
| Water-wheels, | 1 Warren Turbine, 5 Breast, 12 & 17 ft. |
| Steam Power, | 1 engine, 80 horse power |
| 1,000,000 Teasles; 1,300,000 lbs. Fine Wool; 18,000 lbs. Glue; $50,000 worth Dye Stuffs. | |

## SUFFOLK MANUFACTURING COMPANY.

John Wright, Agent.

Incorporated 1830. Commenced operations 1832.

| | |
|---|---|
| Capital Stock, | $600,000 |
| Number of Mills, | 2 |
| Spindles, | 21,532 |
| Looms, | 819 |
| Females employed | 625 |
| Males employed, | 275 |
| Yards made per week, | 125,000 |
| Pounds Cotton consumed per week, | 30,000 |
| Kind of Goods made | Jeans, Cotton Flannels, Denims, Sheetings, Shirtings, 14 to 24. |
| Tons Anthracite Coal per annum | 1,200 |
| Bushels Charcoal per annum, | 1,000 |
| Cords Wood per annum, | 20 |
| Gallons Oil per annum, | 2,000 Sperm |
| Pounds Stach per annum, | 50,000 |
| Water Wheels, | 4 Turbines, 8 feet 4 inches diameter |
| Steam Power, | 1 engine, 400 horse power |

## TREMONT MILLS.

Chas. F. Battles, Agent.

Incorporated 1830. Commenced operations 1832.

| | |
|---|---|
| Capital Stock | $600,000 |
| Number of Mills | 2 |
| Number of Spindles | 20,960 |
| Number of Looms | 764 |
| Females employed | 500 |
| Males employed | 120 |
| Yards made per week | 125,000 |
| Pounds Cotton consumed per week | 41,000 |
| Kind of Goods made | Drillings, Sheetings and Shirtings |
| Tons Anthracite Coal, per annum, | 800 |
| Bushels Charcoal, per annum, | 400 |
| Gallons Oil per annum, | 3,000 |
| Pounds Starch per annum | 45,000 |
| Water-wheels, | 4 Turbines, 8 ft. 4 in., 1, 7 ft. 6 in. diam. |

## LAWRENCE MANUFACTURING CO.

Wm. F. Salmon, Agent.

Incorporated 1831. Commenced operations 1833.

| | |
|---|---|
| Capital Stock, | $1,500,000 |
| Number of Mills, | 5 and Dyehouses |
| Spindles | 60,432 |
| Looms, | 1,564 |
| Knitting Machines, | 163 |
| Females employed, | 1,350 |
| Males employed, | 350 |
| Yards made per week | 300,000 Cotton Cloth, 6,000 doz. Hosiery |
| Pounds Cotton consumed per week | 110,000 |
| Pounds Wool consumed per week | 2,000 |
| Kinds of Goods made, | Shirting, Sheeting, Printing Cloth, Cotton and Merino Hosiery. |
| Tons Anthracite Coal per annum, | 2,000 |
| Bushels Charcoal per annum, | 1,500 |
| Cords Wood per annum, | 60 |
| Gallons Oil per annum, | 7,000 |
| Pounds Starch per annum | 160,000 |
| Water-wheels, | 6 Turbines, 9 ft., 6 Breast 17 ft. |

## BOOTT COTTON MILLS.

WM. A. BURKE, Agent.

Incorporated 1835. Commenced operations 1836

| | |
|---|---|
| Capital Stock, | $1,200,000 |
| Number of Mills, | 5 |
| Spindles, | 73,792 |
| Looms, | 1,878 |
| Females employed, | 1,020 |
| Males, | 290, including mule tenders |
| Yards made per week, | 350,000 |
| Pounds Cotton consumed per week, | 100,000 |
| Kind of Goods made | Drillings, No. 14; Sheetings, Shirtings, Printing Cloth—30 to 40. |
| Tons Anthracite Coal per annum, | 1,500 |
| Bushels Charcoal per annum, | 800 |
| Cords Wood per annum, | 50 |
| Gallons Oil per annum, | 8,000 |
| Pounds Starch per annum, | 190,000 |
| Water Wheels, | 6 Turbines, 7 feet 8 inches, and 2 centre vent, improved by Mr. Francis, 9 feet 4 inches diameter; 1 Warren Turbine. |
| Steam power, | 1 Engine, 20 horse power |

## MASSACHUSETTS COTTON MILLS.

FRANK F. BATTLES, Agent.

Incorporared 1839. Commenced operations 1840.

| | |
|---|---|
| Capital Stock | $1,800,000 |
| Number of Mills, | 6 |
| Spindles, | 67,872 |
| Looms, | 1,869 |
| Females employed, | 1,300 |
| Males employed, | 400 |
| Yards made per week, | 540,000 |
| Pounds of Cotton consumed per week, | 180,000 |
| Kind of Goods made | Sheetings, Shirtings, Drillings—12 to 22 |
| Tons Anthracite Coal per annum, | 1,300 |
| Bushels Charcoal per annum, | 800 |
| Cords Wood per annum, | 100 |
| Gallons Oil per annum, | 6,500 |
| Pounds Starch per annum | 220,000 |
| Barrels Flour per annum, | 40 |
| Water Wheels—diam., | 6 Breast, 17 ft.; 3 Turbines, 10 ft.; 2 do., 9 ft.; 1 do., 7 ft.; 2 do., 5 ft. 9 inches. |
| Steam power, | 1 Engine, 200 horse power |

The statistics of the Prescott Cotton Mills, (ERASTUS BOYDEN, Sup't.), are included in those of the Massachusetts, both forming one company.

## LOWELL BLEACHERY.

F. P. APPLETON, Agent.

Incorporated 1832. Commenced operations 1832

| | |
|---|---|
| Capital Stock, | $300,000 |
| Number of Mills, | 4 and Dyeworks |
| Females employed, | 40 |
| Males employed, | 360 |
| Yards Dyed per annum, | 15,000,000 |
| Pounds Bleached per annum, | 8,000,000 |
| Tons Anthracite Coal per annum, | 6,000 |
| Cords Wood per annum, | 200 |
| Gallons Oil per annum, | 2,000 |
| Pounds Starch per annum, | 1,600,000 |
| Barrels Flour per annum, | 100 |
| Water Wheels, | 1 Warren Turbine |
| Steam power, | 2 Engines, 740 horse power |

## LOWELL MACHINE SHOP.

ANDREW MOODY, Agent.

Incorporated 1845. Commenced operations 1845

| | |
|---|---|
| Capital Stock, | $600,000 |
| Number of Mills, | 4 Shops, Smithy and Foundry |
| Males employed, | 600 |
| Tons Wrought Iron consumed per annum, | 300 |
| Tons Cast Iron consumed per annum, | 2,500 |
| Tons Steel consumed per annum, | 3,000 |
| Pounds Brass Composition per annum, | 20,000 |
| Feet of Lumber per annum, | 250,000 |
| Kind of Goods made | Cotton Machinery, Paper Machinery, Locomotives, Machinists' Tools, and Mill Work. |
| Tons Anthracite Coal per annum, | 2,000 |
| Tons Smith's Coal per annum, | 350 |
| Bushels Charcoal per annum, | 6,000 |
| Cords Wood per annum, | 300 |
| Gallons Oil per annum, | 3,500 |
| Water Wheels, | 2 Turbines, 6 ft. 10 in. diam.; 1 Breast, 13 ft. diam. by 13 ft. long. |

Machinery complete for a mill of 6,000 spindles can be furnished in three months.

## SUMMARY.

| | |
|---|---|
| Capital Stock, | $13,650,000 |
| Number of Mills, | 48 and other buildings |
| Spindles, | 448,180 |
| Looms, | 12,169 |
| Females employed, | 9,005 |
| Males employed, | 4,492 |
| Yards made per week, | 2,268,000 cotton; 19,500 woollen; 35,000 carpets; 2,500 shawls; 6,000 doz. hosiery. |
| Pounds Cotton consumed per week, | 645,000 |
| Pounds clean Wool consumed per week, | 98,000 |
| Yards Dyed and Printed per annum, | 44,952,000 |
| Tons Anthracite Coal per annum, | 36,200 |
| Bushels Charcoal per annum, | 20,000 |
| Cords Wood per annum, | 1,775 |
| Gallons Oil per annum, | 113,376 |
| Pounds Starch per annum, | 2,085,000 |
| Barrels Flour per annum, | 1,415 |
| Steam power, | 32 engines—4,425 horse power |

## GENERAL STATISTICS.

| | |
|---|---|
| Wages of females clear of board, per week, | $3.60 to $3.75 |
| Wages of males clear of board, per day, | $1.20 to $2.00 |
| Medium produce of a loom, No. 14 yarn, yards per day, | 45 |
| Medium produce of a loom, No. 30 yarn, yards per day, | 30 |
| Average per spindle, yards per day, | 1 |

**The Proprietors of the Locks and Canals on Merrimack River,** (James B. Francis, Agent,) incorporated in 1792, are the owners and managers of the water power. They have leased to the manufacturing companies water power amounting in the aggregate to about 10,000 horse power. The stock in this company is owned by the manufacturing companies in the same proportions in which they hold the water power.

**A Hospital** is sustained by the several manufacturing corporations, for the comfort and convenience of the sick in their employ. Expenses per week—males, $5; females, $4.

**Population of Lowell.** May, 1865—31,001; polls, 7,754; voters, 5,150. January, 1866—Males, 15,582; females, 21,294; total, 36,876; polls, 8,791; voters, 5,556.

Number of Churches, 22; School Houses, 45; Schools, 57; scholars, 7,000; dwelling houses, 5,324; families, 6,400. Expenditures, in 1866, for school purposes, $106,552.92, which includes the alteration of the High School building, at an expense of $28,309.98.

## Banks of Lowell.

| | |
|---|---|
| OLD LOWELL NATIONAL, Edw'd Tuck, Pres. | $200,000 |
| RAILROAD NATIONAL, S. W. Stickney, Pres. | 800,000 |
| APPLETON NATIONAL, John A. Knowles, Pres. | 300,000 |
| PRESCOTT NATIONAL, C. B. Coburn, Pres. | 300,000 |
| WAMESIT NATIONAL, Chas. Whitney, Pres. | 200,000 |
| MERCHANTS' NATIONAL, Hocum Hosford, Pres. | 300,000 |
| FIRST NATIONAL, A. P. Bonney, Pres. | 250,000 |
| Aggregate Capital, | $2,350,000 |

☞Four Savings Banks, as follows:—Lowell Institution for Savings, City Institution for Savings, Lowell Fire Cent Savings, and Mechanics' Savings Bank. They have and aggregate deposit of about $4,000,000.

## VARIOUS ENTERPRISES.

*Prominent in the industrial branches of Lowell are the following individuals and firms:*

CHASE MILLS, (A. H. Chase, Proprietor). Completed in the fall of 1865; burnt January 17th, 1866, and rebuilt in spring and summer of same year. Contains 4,020 spindles, 71 looms and 10 sets of cards. Employ 123 females and 94 males. Manufacture 350,000 yds. of fancy cassimeres and consume 450,000 lbs. of wool per annum.

THE AMERICAN BOLT COMPANY, manufacture railroad, bridge, and other bolts, nuts, screws and washers, employing 100 men and using 800 to 1000 tons of iron annually.

THE BELVIDERE WOOLLEN MANUFACTURING CO. Capital, $200,000. Charles Stott, Agent.

LOWELL GAS LIGHT COMPANY. Capital, $200,000 O. E. Cushing, Agent.

LOWELL HORSE RAILROAD COMPANY. Capital, $100,000. John A. Goodwin, Treasurer.

CHARLES A. STOTT, Flannel Manufacturer.

FAULKNER & SON, Flannel Mills.

JOHN HOLT & CO., Printed Flannels.

LIVINGSTON & CARTER, Flannel Manufacturers.

RICHARD KITSON, Machinery and Card Clothing.

J. C. AYER & CO., Patent Medicines.

C. P. TALBOT & CO., Chemicals and Dyes.

SAMUEL CONVERS, Carriage Manufacturer.

UNITED STATES BUNTING MANUFACTURING CO. D. W. C. Farrington, Agent.

LOWELL FELTING MILLS. M. A. Johnson, Agent.

PAPER AND BATTING MILLS of C. B. Richmond and George Ripley & Co.

FINE PLATED WIRE GOODS. Woods, Sherwood & Co.

SPOOL AND BOBBIN SHOPS of E. F. Watson and Parker & Cheney.

HOWE & GOODHUE, Card Clothing Manufacturers.