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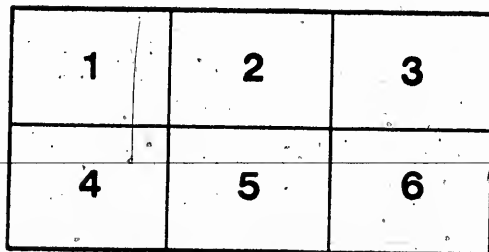
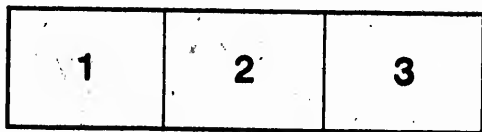
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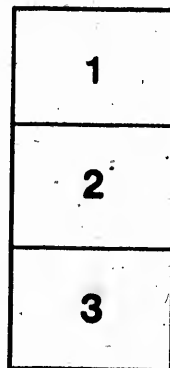
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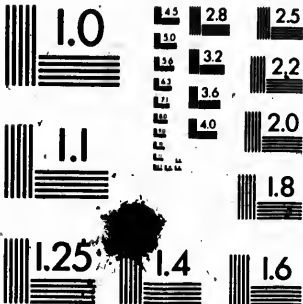
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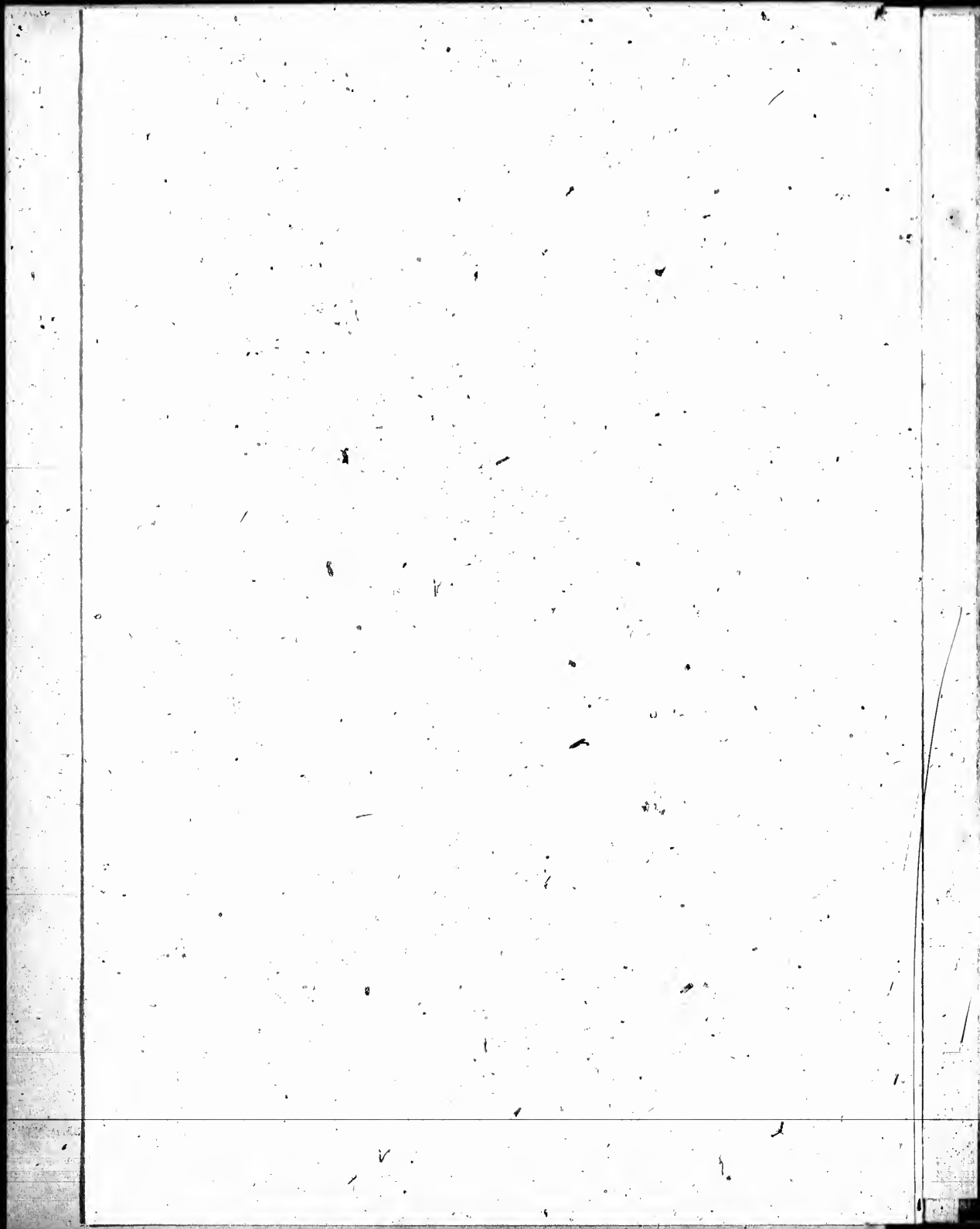
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**NAVIGATION**  
**ON**  
**LAKE ONTARIO**

**By HUGH RICHARDSON.**

**YORK,**  
**Printed by J. COLLET.**  
**1875.**

625.8204  
R37

**TO THE LIBERAL PATRONS OF THE  
Steam-Vessel "CANADA."**

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**GENTLEMEN,**

To you I address these few pages from humble abilities, trusting they will be received without reference to their merits, as well meant endeavours to propogate useful information: to stimulate énterprise in the more general employment of the Steam-vessel: and lastly, to lay before my readers the principles upon which I modeled the "CANADA." And whilst proudly flattered by a list of Patrons, wherein the Legislature, the Bench, the Bar, the Learned, and the liberal professions, stand so eminently conspicuous, whilst the whole commerce of Niagara, and the Towns at the Head of the Lake, promote with spirit, the most efficient of all water conveyances, I much lament, that I am not equally supported by the mercantile interest of the Metropolis, although the Town of York, directly, or indirectly, reaps all the benefit of her construction. A friendly and liberal support from that respectable body, would be highly gratifying to me, and, I am sure, profitable to them. I cannot conclude without



To the liberal Patrons of the Steam-Vessel "CANADA."

particularly acknowledging my debt of gratitude to a few, ever to be venerated individuals, who were the first to patronise my endeavours. The warm interest I feel to make some return for such kindness, the eligible route laid down for the "CANADA," amalgamated myself in the prosperity of the Boat; with such a prospect, and such stimulants to personal exertion; let me not fail in means, I cannot fail in success! I have the honor to subscribe myself,

GENTLEMEN,

Your most obedient humble Servant,

HUGH RICHARDSON.

STEAM NAVIGATION  
ON  
*LAKE ONTARIO.*

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**T**HERE are no doubt many persons more able than myself to enlarge upon this subject; but since I have taken an active part in it, I am more immediately anxious to impress upon the minds of my readers, and the public in general, the paramount excellence of the agency of steam for the purpose of navigation. For what can we compare in the annals of nautical improvements to the present, novel and stupendous attainment of having shaken off our dependance on the uncertain wind? How incalculable the advantages of this discovery, of being able to transport the largest ships in a direction never before imagined, against wind, sea, and current! It seems as if God, admitting Man in participation of divine Omnipotence, had given him an element of his own, and said, "Go! take thou this at thy command, with it thou shalt traverse every sea, thou shalt neither wait for winds, nor dread the storm;—thy power shall exceed my power, thy element vanquish my elements, the most intricate channels shalt thou explore unaided by me. The winds shall blow in stormy currents, in the constant trade, in the monsoon period, or the fierce tornado: yet thou, waving thy sceptred trident o'er the main, shall pass unaided, unobstructed!" The mind can scarcely dwell upon the wonders of this invention, without being suffused with the imagery of poetry: without feel-

ing the sublimity of its own composition : without confessing the immortality of that agency, that could create and direct a power, to which the elements themselves give place. The discovery of the Copernican system, the invention of the Press, the application of the Steam-Engine to the purposes of navigation. are epochs engraved upon the tablets of eternity. And when human existence shall be swept from the face of the earth, they will stand recorded to more ethereal powers, as the broad encroachments of us sublunary beings on divine omniscience.

Descending from this strain, let us examine the intrinsic value of the Steam-Vessel. True, its prime cost is a little more, and it is navigated at somewhat greater expense than a sailing one of the same size. But look at their comparative susceptibility of profit. Suppose each to receive full freight of either goods or passengers every trip. The one is constantly going, the other waiting or obstructed. The one has the agent within itself, the other dependant on the wind. It is this susceptibility, this power of accomplishing in the Steam-vessel, as in machinery, that is discovered by the intelligent and enterprising, as the jewel of excellence! For, if, according to Adam Smith, all riches are but the signs of accumulated labour, every invention that will increase this aggregate in a given space, is a certain instrument to the accession of wealth. From England's machinery sprang the vast sinews of War, that held the world so long at bay; and England was, as a nation what many individuals are in commerce, enterprising from superior intelligence. And in that she still stands paramount, for at this present moment,

ON LAKE ONTARIO.

As one immense undertaking, she is about to cover every sea with her steam-vessels. Gulfs, straits, sounds, archipelagos, rarely visited, or visited with danger from the intricacy of their navigation, where the wind too often, proved a treacherous mistress, shall now be explored with safety. The steam-ship will be seen threading in among the shoals of the red sea; the Florida-stream will be abandoned by the homeward bound; the passage from the Mediterranean will be certain; the calm latitudes no longer barriers, and Europe may be circumnavigated from St. Petersburg to the sea of Azof, which requires winds from every point of the compass on a mere calculation of time, distance, and fuel. For the purposes of War, (the engine only protected,) the steam-vessel is terrific. As a battery, as a fire ship, as a transport, of ability to render wind vessels nugatory. No fleet of such, could blockade a port, or shut out supplies against the power, and activity of Steam. No fleet of wind Men of War, could contend against a fleet of Steam Men of War, which like fancy Men would have the fight all their own way. I should think it of the highest consideration to the people of Canada, to encourage the building of efficient steam-vessels, for the reason, that, in case of War their value, as transports, will be *touchingly* felt by either contending party. In the present case if I predict that the "CANADA" to run as a Packet betwixt York, Niagara, and the head of the Lake, will be attended with complete success; if I predict an uncommon source of profit to those who have had spirit and enterprise to promote it, I do it upon a survey of the geographical position of these places; I do it upon a glance at the population and wealth of the adjacent coun-

tries; I do it upon a retrospective view of the growth of this colony; I do it finally upon the consequent increase of traffic that naturally flows with facility of intercourse. Added to these, the high and general patronage attending her, and the moral conviction, that I have provided ample means for the desired ends. Having mentioned geographical position, I will digress so far as to instance one of those remarkable sources of ultimate profit inevitably insured by it: I mean the Welland Canal. Here it sets itself down in the centre of Upper Canada, in the centre of an immense tract of country, not exceeded in fertility by any in America, betwixt two large, navigable, and already commercial Lakes; and, at the comparative trifling expense of a few miles cutting, virtually assumes the consequence of a canal of some hundreds, stretching its arms from Prescott to Detroit, and even levying its contributions on the commerce of the shores from the Ocean to Lake Huron. Thus, as ominous to prosperity, let us hail the formation of high roads and navigable canals, those grand arteries of circulation, which with their numerous ramifications, distribute, in the flux and reflux of commercial intercourse, that healthful deposit (accumulated labour) which is wealth to the country, growth to the colony, and vigour to the state. I will now attempt a few practical and theoretical deductions to shew the principles upon which I think all Steam-vessels for the Lake, ought to be built, and upon which principles the "Canada" is modeled.

A Steam-boat intended for a river, ever acting upon a smooth and level plane, is best adapted when superficial, to come in contact as little as possible with the resisting fluid.

A Steam-vessel for the lake having to encounter an unequal surface, a succession of inclined planes, should be, long, narrow, sharp, and deep: must pass through the water, to avoid as much as possible the sinuous path over it. These are the strong distinctions betwixt the River-boat, and lake Steam-vessel. Each will excel in its element. Hence, a Steam-vessel for the lake should have good depth, with sharpness, founded upon the axiom, that as the water is most agitated upon its surface, that which approaches nearest it will be most affected.

A Steam-vessel for the Lake should be narrow.

Wind-vessels require great breadth of beam, to support them under the pressure of their masts when crowded with sail. The same description of vessels, if by any accident dismasted in a seaway, become extremely laboursome, rolling very heavy. And, as a general rule, the better a ship is adapted for carrying much sail, the greater her propensity to roll without them.

A Steam-vessel not required to carry sail, and having no sails fit to keep her side down, should be narrow and sharp, as well as deep, founded upon the following theory of rolling.

Rolling, is nothing more than the tendency of a vessel to preserve herself perpendicular to the plane of the water, and of course perpendicular to the inclination of every wave. And that a rolling ship is not one inclined to oscillate or sally in the water, may be inferred from the well known fact to seamen, that the broad flat bottomed ves-

sel, which rolls heavy in a beam sea, can with difficulty be made to sally in smooth water. That the narrow, deep, and sharp one, that is easily careened or sallied in smooth water, rolls less and easier in a sea than the broad one. The principles upon which they act, I conceive to be this. Both vessels perform the same operation in a given space, that is betwixt two waves. The narrow and sharp one from her facility of careening, is longer in recovering herself, more languid in her motion, and thus she never catches the full declivity of the wave, which has somewhat subsided, before she is prepared to fall over. Not so with the broad and flat vessel. From every elevation she quickly declines, and falling down broadside plunges gunwale in, and by her strong tendency to preserve her perpendicular, is as suddenly recalled, to repeat the same operation on the other side. Thus the broad vessel by its quick motion, catches the wave in its greatest elevation; whilst the narrow and sharp one, moving slower loses much of it. (For be it understood that the waves are merely a rising and falling of water, with very little transition, except where they meet the ground, they then form what is called broken water and roll over.) An approach to the action of each particular vessel, may be exemplified in the following way. Take a long and flattish piece of wood something like a stave, throw it into the agitated water; you will observe how rapidly it follows the motion of the water in all its inclination, plunging alternately each side, in this is the rolling vessel! Take the same piece of wood, load one edge of it so as just to make it swim with the other edge up; throw it again into the same agitated water: you will see it oscillate:

with an easy pendulous motion, never dipping its topsides. This is the easy vessel! These are the extremes; and as we approach, or recede from either of the models we increase or decrease the tendency to what is called laboursome rolling. It must be obvious that a ship rolls upon her keel as the axis of her motion, and not upon an imaginary line running fore and aft in the deck: for as well might we suppose the sun to revolve round the earth in its apparent diurnal motion, as that the keel and dead wood of a vessel should be carried through the water with immense effort, to produce an effect, which is done without any effort at all by the boat or ship, mechanically following the inclination of the wave in its natural tendency to preserve its perpendicular. And yet, it is upon this latter supposition alone that bilge keels can be put upon a boat to prevent rolling. And I contend, that as breadth, and (what is called in sea terms) stiffness, constitutes the heavy rolling ship, by sinking the flat bottomed vessel in the water, we but increase the evil by augmenting her stability, and depriving her of all inclination to careen or sally, which I look upon as the very antidote that a sharp and tender vessel applies to the motion of the sea to diminish its effect. I have been thus prolix on the subject as rolling is the great evil of steam-vessels, and, therefore, I think it constitutes a part of the science in building Steam-boats, to counteract as much as possible this disagreeable propensity.

Length is another requisite for an easy sea-boat.

This property cannot be so extended in the sailing-vessel as in the Steam boat, because the



former is required to tack and wear in moderate circles; but the latter not having occasion to work or beat to windward, may profit of this qualification to a considerable degree. The theory of a long vessel being easiest in a sea is this. The larger the ship, the less affected by the motion of the water. A boat is tossed about where a ship is not moved: and the small ship is affected by a sea that the majestic line of battle ship scarcely notices. The Columbus, and Baron Renfrew built in Quebec, were the vessels entitled to in theory, and have had in practice the least motion of any ships that ever crossed the Atlantic. And why? Because they were the largest! Suppose for instance, a ship could be constructed so vast, that the most tremendous sea of the Ocean, compared with her size, would only be as the rippling of a River to a Frigate: would not such a vessel circumnavigate the globe unconscious of the agitation of the waters in their greatest fury? Thence it follows that size to a certain extent, is a requisite for a steam-packet on the lake, conducting by her easier motion, to the more effectual stroke of the paddle, the less friction of the engine, the more efficient progress of the Boat, and (though finally of prime consideration) the greater comfort of the passengers. Below a certain size, I am certain Steam vessels on the lake cannot be, to be profitable, the numerous failures they must make, their incessant liability to damage, would more than counteract any advantage on the score of economy. And my opinion is, that a small sailing vessel is far safer than a small Steam-boat in a sea.

I will now say a word regarding the form of vessels' bottoms. In our first ignorance, and I be-

lieve in our present ignorance of the resistance of nonelastic fluids, we have been, and we still are obliged to nature for assistance, who ever, and undeviatingly adapts her means best to her ends. We see the fish with facility make its way through the liquid element: and knowing none better, and no form so good for this purpose, we wisely imitate it, as much as is consistent with the requisites of buoyancy, and those of carrying weight and sail as in a ship. We make the head acute, the shoulders full, and thence tapering away finely to the tail or rudder, we give to the water the full tide of power to act upon that instrument of steering. For buoyancy we look to the water fowl. Here we have the full round bow, the round flat bottom, where this requisite is most wanting as in the floating light-vessel, here is our model, we would plan her upon the duck principle at both ends.

I will conclude with a short essay on the model, which I conceive the best adapted for a steam-packet on the Lake; and more particularly for crossing it, the sea being generally from the East, or west. When I first undertook to get one up for this service, I naturally looked round me, not for theoretical works that I might not understand, but for practical results upon which to found my theory. And when I called a meeting of the stockholders, I read a short dissertation (of which this is a part) on the form of a steam-vessel that I conceived the most effective for Lake service as a packet, at the same time remarking, that I was not prepared to say whether my conceptions put in execution, would warrant the expense. Since when, the stock which I contributed myself, the

liberality and liberal sentiments of the principal stockholders, and the casualty of having to provide more room for a 45 Horse power engine without retrograding from the principles laid down, enabled me to approach so near to what I conceived to be best adapted, that I had nothing more to desire. She is now in that state of forwardness, that I have the satisfaction of saying Mr. Joseph Dennis, the builder, has fully entered into my views, and a finer model there is not on the lake, for the purpose intended! nor one more capacious for her tonnage. I am desirous gentlemen should examine her whilst on the stocks, the only opportunity they may ever have of seeing the essential part of her form.

Upon the aforesaid principles, and with the following model in view I gave her dimensions. A Steam-vessel for sea or lake service, is a sea row boat to all intents and purposes; her paddles being oars applying their strength in the most effective way, that is, at right angles with the Boat, and could we bring the buckets to act all times vertically, we should attain, I think, the summit of perfection.— Smuggling and privateering have produced both the fastest sailing, and the fastest rowing vessels on sea yet constructed. Amongst the latter I sought my model, convinced that in all sea service what answers upon a small scale will do infinitely better upon a large; upon the principle before mentioned, that the larger the vessel the less affected by the motion of the sea. I state for the satisfaction of those gentlemen who are acquainted with it, the Deal boat or gig. This boat is extremely long, narrow and sharp, about half its breadth in depth, sharp in the Bow, little rake in the stern,

round in her midship floors or dead wat, like the belly of a fish, and then runs away a great length with the utmost fineness to her rudder. When light or empty, from the delicacy of her build, she is a mere feather in the water. But with five men in her, a few Gin-kegs, or a few stones, these fellows will go off to a ship in the Downs, row against a head sea or even cross the channel in almost any weather. Necessity, in their perilous business, had so ransacked invention, for the very finest model, and time has so perfected it, that I think nothing can go beyond it. She is so exquisite in her form for elegance, as to remind you of what the Italian grey hound is as a dog. Great length is necessary to produce this fineness, an absolute requisite for fast rowing. I will just instance as the swiftest river boat yet constructed, the London wherry. Diametrically opposed to the other, she is so delicately superficial as scarcely to touch the water, yet at each end sharp as a needle, lightness, buoyancy, elegance itself! In her element, perfection! At sea, useless! Finally I have not gone to extremes in the "Canada" and planned her exactly upon the model laid down; but it has been my leading mark, and that the stockholders may not think I have taken the liberty to innovate much upon the general construction of Steam-boats on the lake, I will say, that her proportions for length and breadth are exactly the same as those of the Frontenac, but with greater proportionate depth and sharper. And when we consider the Frontenac built for burthen, admeasuring 700 Tons, has been propelled only by a 50 Horse power engine, we must admit that her form is equal or superior to any on the lake yet. For had she been broader, shorter,

with less depth, yet of the same tonnage, she would have moved like a Hay-stack. The dimensions of the "Canada" are 112 feet extreme length 20 feet beam, and 10 feet depth of hold, measuring about 209 Tons, with a 45 Horse power engine. I think experience will bear me out in my opinion, that smaller she could not be with profit or advantage. For once launched into the Lake, she ought to be able to go to any part of it. Casualties might occur to alter her route. For instance War. In which case being capable of acting as a transport, she no doubt would find profitable employment. On the lake that vessel which is best adapted for general purposes, can go any where, will be alike serviceable in peace or War, is likely to be the most valuable. Such, I trust, will be the "Canada." I am sorry the Merchants of York, whence such things should originate, assist so little in promoting what the scientific, and intelligent world have pronounced of immeasurable advantage, and in character with machinery. It can hardly be possible that their enterprise should be exhausted under the trifling effort they have made; and I trust they will shew by their patronage of the "Canada," that they are as persevering, as intelligent, as enterprising as their neighbours. I risk nothing in asserting, *that there is no such thing as an efficient and unprofitable steam-boat on the lake.* I risk nothing in asserting, *that the inhabitants of Upper Canada will not build Steam boats fast enough to make them unprofitable.* And I hold it certain as the phases of the Moon, that were there 7 efficient Steam-vessels, to start one every day in the week from Prescott, taking the round of the lake, that in 12 months, each would find as much employment as any one now.

The Frontenac, the first Steam-vessel, did not make much return whilst running to the Stockholders, but that she is not to them ultimately profitable, they have themselves to blame. She was built at a time when materials were very high, and certainly too large. But she ought still to have been running on their account, and now she is paying handsomely. With their engine the most valuable, and unperishable part of their stock worth now £2500, with her materials, and a sum less than £4000, they might have built a new Frontenac of 400 tons the most perfect, the most serviceable, and most profitable Boat on the Lake, and which in 7 or 8 years would have redeemed principal and interest with a handsome profit on all their stock. I cannot conceive what occasion there can ever be to sell a steam-vessel wholesale, (except to advantage.) The stock being transferable, let every one dispose of his share as he pleases. And when the vessel comes to be worn out, the most valuable part of the stock remains, the Machinery, Anchors and Cables. The fairest way then, I conceive, would be for the Committee to give notice that it was necessary to refit, to build a new boat for the Engine, and that it would require £2000 more stock to be raised; at the same time having engine and materials appraised by an engineer or competent person, and his valuation to stand as original stock proportioned out to each shareholder. The new stock might be taken up by any one, in reduced shares, the original owners of course having the preference. If the stock had been profitable, they no doubt would take the whole among them. And any individual could dispose of his own shares if he pleased, even at auction. Such, I trust, will be the fate of the "Cana"

da." The majority of the stockholders are too respectable and too intelligent to allow of dissension to injure the stock. As a last remark, a Steam-packet should have a decent forecabin for the comfort of such travellers, who from necessity or economy would prefer it. Upon the plan of only one cabin for gentry, reminds me of the streets of Paris, which are all carriage ways, without foot-path for the pedestrian, as if every one should ride in a carriage. To conclude, I pray the gentlemen and liberal stockholders, will truly appreciate the trouble and perseverance it has cost me for twelve months to encompass my object, and that the same spirit which induced them to patronise the endeavour, will still animate them to forward the result.

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FINIS.

SWANS,		SWANS,	
		Continued 123	
The Hon. William D. Powell	8	John Crooks	1
" William Campbell	4	John Trenchill	1
" John H. Duys	10	John Breakenridge	1
" James Baby	2	Richard FitzGerald	1
" George Crookshank	2	Joseph Willson	1
" Joseph Wells	2	Jacob Thorpe	1
" William Allen	4	Joseph Webster	1
" William Claus	2	Peter Desjarlines	1
" Thomas Clark	1	Manuel Overfield	1
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John M'Dougall, Esq.	1	Andrew Kerby,	1
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" John Murchison	2	Joseph Adamsen	1
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Edward Leslie	1	John Brant,	2
James Cryslar	1	Wm. J. Kerr,	2
John Ross	2	James Davis,	1
Thomas M'Cormick	2	William Chisholm,	2
John Muirhead	1	John Barnhart	1
Daniel M'Dougall	1	Abrm. Cook,	1
R. M. Loog	1	John Harris, Esq.	1
Jared Stocking	1		
John Claus	1		

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