VOLUMES NOT VALUES:

CANADIAN SAILING SHIPS AND WORLD TRADES

Edited by

DAVID ALEXANDER ROSEMARY OMMER

Maritime History Group

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Proceedings of the
Third Conference of the
Atlantic Canada Shipping Project
April 19 — April 21, 1979

Maritime History Group
Memorial University of Newfoundland
1979

Also available from the Maritime History Group:

Keith Matthews and Gerald Panting (eds.), *Ships and Shipbuilding in the North Atlantic Region: Proceedings of the Conference of the Atlantic Canada Shipping Project, 1977.*

Lewis R. Fischer and Eric W. Sager (eds.), *The Enterprising Canadians: Entrepreneurs and Economic Development in Eastern Canada, 1820-1914. Proceedings of the Second Conference of the Atlantic Canada Shipping Project, 1978.*

Design: Publications Department of the Division of University Relations and Development, Memorial University of Newfoundland

Printing: Printing Services, Memorial University of Newfoundland

ISBN 0-88901-037-4

EDITORS' NOTE

This is the third volume of papers from the annual workshops of the Atlantic Canada Shipping Project. The first dealt with shipbuilding and the composition of merchant fleets in the North Atlantic in the nineteenth century. The second focussed on the Atlantic Provinces of Canada and whether the region's general economic performance and the rise and fall of its shipping industry could be linked to the changing perceptions and capacities of its entrepreneurs. This third volume, which centres on the great nineteenth century bulk trades, once again places Canadian issues within an international context. Capie opens with a wide ranging survey of issues surrounding the growth of world trade and British Empire trade. On a smaller canvas many of the same issues arise in Ommer's study of the trade relations between Jersey and the Gulf of St. Lawrence region. Alexander, Sager and Fischer provide quantitative descriptions of participation by Canadian vessels in the deep sea trades with some preliminary measures of productivity. Greenhill and Matthews examine the trading opportunities for shipowners in South America and the U.S.A., which were of major importance for the Canadian fleet. Fairlie, Craig, Williams and Palmer write on commodities which were major employers of shipping in the century, and the particular problems for shipping which each entailed. From these papers and the discussions surrounding them many themes emerged, although one was dominant — the necessity for the maritime historian to concentrate on the volume of trade rather than its value. It is, of course, this theme which provides the main title for the volume.

Every editor knows there are more contributors to a volume than appear on its title page. We wish to acknowledge the editing assistance of our fellow labourers in the Maritime History Group, Heather Wareham, Janet Bartlett, Roberta Thomas and all the staff. For transforming a frequently difficult typescript into print we are thankful to Mary Langhout, Elaine Pitcher, Beverly Wight and Joe Vaters. The Social Science and Humanities Research Council has provided the support for this project and each of its conferences, and Memorial University of Newfoundland has provided the funds for the publication of proceedings.

David Alexander
Rosemary E. Ommer
St. John's, November 1979

It is absolutely essential that there be no confusion between trade values and volumes. Values are not of the slightest use in establishing trade flows as they affect shipping services...so my text must be, volume not value. Volumes not values, Ladies and Gentlemen, volumes not values. I cannot stress this enough.

Robin Craig
April 21, 1979

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FORREST CAPIE

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BRITAIN AND EMPIRE TRADE IN THE SECOND HALF OF THE NINETEENTH CENTURY

Forrest Capie

> Under the Providence of God, after centuries of laborious cultivation, the sacrifice of much heroic blood and the expenditure of a vast amount of treasure, the British Empire, as it stands, has been got together and the question is 'what is now to be done with it?'[1]

So Joseph Howe expressed a view prevalent in the 1860s. The fact is that what was to be done with it over the next forty years or so was that it was to be greatly extended and developed; and the development that took place depended in good part on the burgeoning world trade of mid and late century, particularly with a few industrial countries. The character of British/Empire trade was to change in the second half of the nineteenth century especially after 1870. Where once there had been slaves, bullion and spices there was now wheat, wool, meat and dairy products.

This paper is very general in its coverage, considering in a broad way how Britain traded with the Empire in the second half of the nineteenth century. There are three parts to the paper. The first describes the course of trade and draws some comparisons between trade with Empire and trade with other markets. Part Two reviews some of the many explanations profferred for the growth of trade, or the changing rate of growth, or the changing direction of trade in the period and makes some suggestions as to which of the explanations is valid for the British/Empire experience of the time and which might be laid aside. Part Three takes up the specific example of New Zealand for this presents an interesting case.[2] New Zealand was heavily dependent on the British market, more so than almost any other territory and yet achieved per capita growth rates equalled by few other countries. This experience can be set against other areas of different nature.

A great hazard to be avoided in a description and analysis of foreign trade is tedium. A recitation of the course of the components of trade (exports, imports, trade balances, etc.) is tiresome to all but the numerically hardened. More than most branches of economic history this is likely to produce what has been called up-and-down writing: such-and-such has increased by x percent while such-and-such has fallen by y percent. The hazard will be avoided as far as possible and minimised where it can be by presenting the essential elements of trade (the magnitudes, the important commodities and so on) in tables and keeping comment comparatively brief.

Since there was a relatively stable pattern of trade between 1820 and the 1860s this paper is biased to the years after 1870. Between that date and 1914 the British Empire more than doubled in size. In area it increased from 4.5 to 11.1 million square miles; and its population almost doubled growing from 202.3 to 372.1 million people. The number of territories that comprised the Empire rose from around forty seven to around seventy three (according to the definition used).[3] *The Times* kept the public informed of this expansion with daily accounts of new territories, and of Mark Twain's comment, "And the meek shall inherit the earth" Lillian Knowles remarked that this "was not regarded as a joke, but as a just appreciation of the situation rather remarkable in a foreigner."[4]

Given the great growth of Empire territory, and the concomitant diminution of foreign land it would be surprising if British trade with the Empire had not grown at a rapid rate and indeed if there had not been some slowing down in 'foreign' trade, for a good part of the world was ceasing to be foreign and becoming Empire. Certainly we should anticipate some shift in the statistics on trade away from foreign and towards Empire, as a simple consequence of the definitional changes. Table 1 presents a starting point for the investigation providing trade figures for Empire and foreign countries in aggregate at the opening and closing dates of this study.[5]

From these figures which give an indication of the changing size of trade values (in current prices) it can be seen that total British imports more than doubled but that those originating in Empire almost trebled. Exports to the Empire had a roughly parallel course, more than trebling in value while exports to foreign countries failed to double. This is shown up in the percentage shares these respective areas occupied in the total; while the Empire grew from almost twenty three percent to almost thirty five percent, foreign countries slipped back by more than twelve percent.

The most important sources of British imports within the Empire in 1870 were, in order of importance: India, Australia, North American colonies, and the West Indies. The three most important sources in 1870 were still the most important by 1914. The West Indies had fallen out of the leading group being replaced by Southern Africa and New Zealand. The three top countries as sources were also the principal destinations for British exports in 1870; and again the West Indies was an important customer. And the five principal destinations for exports in 1914 again included India, Australia and North America and added to these were Southern Africa and New Zealand. The other outstanding feature of these sources and destinations for imports and exports is the extent to which they dominated total Empire trade. For in spite of there being over seventy territories in the Empire in 1914, over thirty of which were acquired in this

TABLE 1

DISTRIBUTION OF BRITISH OVERSEAS TRADE, 1870 AND 1914

	1870		1914	
	£m	%	£m	%
Imports from:				
Foreign	238.4	78.6	508.8	73.0
Empire	64.4	21.4	187.8	27.0
Total	303.2	100.0	696.6	100.0
Exports to:				
Foreign	188.7	77.3	342.3*	65.1
Empire	55.4	22.7	183.9*	34.9
Total	244.1	100.0	526.2*	100.0

*Includes re-exports. Source: British Parliamentary Papers 1872 vol. LXIII, 1916 vol. XXXII

period, these five areas alone took the overwhelming amount of British exports and supplied the great bulk of British imports from Empire sources. For both imports and exports these regions took or supplied around eighty to eighty five percent of the total Empire.

World trade had enjoyed a great boom in the middle of the nineteenth century but after the 1860's the rate of growth slowed. Expressed in current prices and for the years 1883-1913 world trade grew at an average annual rate of 3.4 percent. British exports slowed down considerably from the mid-Victorian boom years (1833-73) when they were running at a rate of 3.3 percent per annum to 1.6 percent per annum for 1873-99. Imports although also increasing less rapidly than in mid century continued at a rate greatly in excess of exports (4.5 percent per annum). In order to bring out the different experience between leading Empire and leading foreign countries Tables 2 and 3 are provided. The point they make very clearly is that these important Empire countries dragged the aggregate Empire figure up and three of Britain's most important foreign trading partners were performing less well than the rest of the foreign sector.

At the beginning of this period the principal commodities entering into the British import list from these important Empire sources were raw cotton, jute and indigo from India, wool from Australia and timber and wheat from North America. The West Indies supplied sugar. In 1914 most of these economies were less dependent on one or two export items and were supplying a greater range of goods though almost all were still foodstuffs. India had lost the indigo market with German synthetic

dyestuffs proving too much competition but with the opening of the Suez Canal in 1869 bulkier cargoes developed especially from India, the greatest beneficiary of the reduced freight rates. By 1913 wheat exports had more than compensated for the loss of indigo, becoming India's third most important export to Britain, next to tea and jute. Raw cotton had slipped to fourth place. Australia too was exporting substantial quantities of wheat. It was her third most important export to Britain, in this case next to wool and meat. Dairy products were also becoming significant for Australia. Wheat was of course Canada's domain by 1914. She exported

TABLE 2

AVERAGES OF EXPORT AND IMPORT VALUES WITH FOREIGN AND EMPIRE COUNTRIES

	1870-73		1893-96		1910-13
	£m	% change	£m	% change	£m
British exports to:					
France	+ 28.5	- 29.1	+ 20.2	+ 49.7	+ 36.8
United States	+ 38.2	- 6.5	+ 35.7	+ 69.8	+ 60.6
Germany	+ 36.6	- 15.3	+ 31.0	+ 87.4	+ 58.1
Total Foreign	+226.4	- 10.7	+202.2	+196.8	+400.1
British imports from:					
France	+ 38.1	+ 21.3	+ 46.2	- 3.7	+ 44.5
United States	+ 59.3	+ 57.8	+ 93.6	+ 38.0	+129.2
Germany	+ 18.5	+ 46.0	+ 27.0	+157.0	+ 69.4
Total Foreign	+265.5	+ 22.1	+324.2	+ 66.1	+538.4
British exports to:					
North America	+ 9.4	- 22.3	+ 7.3	+254.0	+ 25.9
India	+ 20.2	+ 44.1	+ 29.1	+ 99.7	+ 58.1
Australia	+ 11.8	+ 34.8	+ 15.9	+123.3	+ 35.5
New Zealand	+ 2.3	+ 65.2	+ 3.8	+184.2	+ 10.8
Total Empire	+ 61.9	+ 30.9	+ 81.0	+123.5	+181.0
British imports from:					
North America	+ 9.6	+ 45.8	+ 14.0	+ 97.9	+ 27.7
India	+ 29.9	- 11.7	+ 26.4	+ 78.8	+ 47.2
Australia	+ 12.8	+ 78.9	+ 22.9	+ 65.9	+ 38.0
New Zealand	+ 2.6	+215.4	+ 8.2	+142.7	+ 19.9
Total Empire	+ 74.5	+ 25.6	+ 93.6	+ 91.8	+179.5

TABLE 3

AVERAGE PERCENTAGE SHARE OF VARIOUS COUNTRIES IN BRITISH TRADE

	1870-79	1880-89	1890-99	1900-09	1910-14
British Exports to:					
Canada	3.2	3.3	2.6	3.4	4.5
Australia	5.3	7.3	6.2	5.6	6.6
India	8.5	11.0	10.2	10.2	10.9
New Zealand	1.3	1.3	1.4	1.8	2.0
France	10.2	8.7	7.2	6.5	6.7
Germany	12.1	9.9	10.7	10.2	9.7
United States	10.6	12.9	12.5	11.2	11.4
British Imports from:					
Canada	2.9	2.8	3.6	4.4	4.0
Australia	4.3	5.0	5.1	4.5	5.3
India	8.2	8.6	6.5	5.9	6.5
New Zealand	1.0	1.4	1.9	2.4	2.9
France	11.6	10.0	10.9	8.7	6.0
Germany	5.8	6.3	6.2	7.4	9.1
United States	19.8	23.1	23.9	22.4	18.4

three times as much as either India or Australia; this expansion a result of the growing urban population of the United States diminishing the latter's exportable surplus. Canada also exported other important items to Britain such as cheese, timber, wheatmeal and flour and interestingly some manufactures. The West Indies supplied sugar and while the trade continued to grow, like many other trades that grew, it lost its relative importance. Southern Africa and New Zealand became important with the supply of that basic raw material wool and dual product meat.

In the list of exports to these important Empire markets the items that dominated were cotton piece goods, woollen and worsted goods, iron and steel manufactures and machinery. But of considerably greater importance was cotton piece goods to the Indian market. Indeed to emphasize the size of this it is worth noting that cotton goods to India were worth more than the entire Canadian and New Zealand markets put together.

Empire (excluding Britain) exports to foreign countries were generally small. No one market dominated in any country's trade as Britain did. At the beginning of this period the most important item would have been Indian exports of opium to the East. But of course that trade was

destroyed by the end of the period. At that point the most likely place to look for an Empire country trading substantially with a foreign country would have been Canada with the neighbouring United States. Yet in 1913 Canada still exported more to Britain than to the United States. At the end of the nineteenth century the Empire's biggest export to foreign countries was wool, valued at twelve million pounds — Australasian to Europe. Next but some way behind in value came hides and then raw jute. By 1912 the importance of wool exports to Europe had soared, partly a result of direct trade increasing at the expense of the re-exporting business. Raw cotton was the next important item and these two together were worth over sixty two million pounds. However the general pattern for Empire countries was that after sending the bulk of their exports to Britain a large number of countries, frequently Empire countries (Australasia buying tea from India and Ceylon) took small amounts of their exports.

The outline of merchandise trade presented above is comparatively well known and the essence of it is that Britain concentrated her exports in cotton and woollen goods and considerable quantities of these went to India and other Empire countries. Equally Britain's imports from Empire sources were largely food and raw materials and the items of food that dominated by the end of this period were wheat and meat; the raw materials of most importance were raw cotton and wool. But what lay behind the commodity and country pattern of trade? This section considers some of the explanations put forward for the nature of British trade in the late nineteenth century. There is an array of explanations and after briefly describing the spectrum this paper looks at some possibilities for Empire: capital flows, trade and the flag, the role of sentiment, the question of exploitation or enforced dependency.

Explanations of foreign trade come in a variety of forms. There are those where the emphasis for the initiation of trade lie in the 'new' world; those biased towards the old; and those stressing the inter-dependency of regions. In other words some are concerned more with supply factors while some stress demand, and others the relationship between two mutually dependent areas. For example the 'Staple' approach to economic development is a version of the export-led growth model but with special reference to the regions of recent settlement.[6] This approach examines development in a new territory through the exporting of a basic commodity (such as a mineral) to products requiring a greater degree of processing or 'value added' and so, via linkage effects, generating economic growth. In this 'model' the impetus comes from the developing

country — from the supply side as it were. At the other end of the spectrum of explanations is the Marxist/Leninist position: that is that the industrial economy experiencing a declining rate of profit has to search further afield for investment opportunities, for its markets and for cheaper sources of raw materials. The latter explanation can certainly embrace the former though it may be argued that the former came first in specific cases. A version of a combination of the two has recently been provided by Sir Arthur Lewis.[7] Lewis regards France, Germany, Britain and the United States as the 'core' of the world economy and the newly settled and tropical regions as periphery. Industrial output of the core was seventy two percent of world industrial output in 1913 and this combined industrial sector was the engine of growth in the world in the late nineteenth century. The periphery could either respond to the challenge of this growth or fail to respond; growth at the core was not dependent on the periphery's behaviour. Unfortunately as soon as individual countries or commodities are examined the generalizations have to be greatly modified if not entirely laid aside.

Lying somewhat outside this band are other approaches. For example geographers have developed their own explanations of trading patterns. In the nineteenth century the German, von Thünen, propounded his theory of the location of crop production[8] and in recent years this has been refined and applied to the world economy of the nineteenth century. The proposition advanced is that over time communities have gone further afield for their food and raw materials as economic rents rise under the pressure of growing population and urbanization. Table 4 presents some results of a recent example of this exercise. Peet argues that the von Thünen model provides, "the necessary general connecting mechanism between the causal factor of the industrial revolution in Western Europe and the consequential invasion of the great continental interiors by commercial farmers."[9]

Another approach of geographers is to suggest that international trade tends to take place between neighbours rather than with distant cousins.[10] This is not an explanation that need detain us for while it may have some application in the 1960s and 1970s it is immediately palpably unsatisfactory for Britain in the nineteenth century. In fact something close to the opposite holds with the greatest trade taking place with the distant cousins. However these geographical considerations are something of a digression.

Capital exports have been at the centre of many explanations as to the size and direction of trade flows. The role of foreign investment has been seen partly as lubricator of the international economy after 1870 but partly as a direct stimulant to trade. Over this period Britain was at the

TABLE 4

AVERAGE DISTANCES VARIOUS BRITISH IMPORTS TRAVELLED 1830-1913*

	1831-35	1856-60	1871-75	1891-95	1900-13
Fruit & Vegetables	0	324	535	1150	1880
Live Animals	0	630	870	3530	4500
Dairy Produce	262	530	1340	1610	3120
Meat & Tallow	2000	2900	3740	5050	6250
Wheat & Flour	2430	2170	4200	5150	5950
Wool & Hides	2330	8830	10,000	11,010	10,900

*Average distance from London in miles to source of the import. Source: Extracted from J. Richard Peet, "The Spatial Expansion of Commercial Agriculture in the Nineteenth Century: A von Thunen Interpretation" *Economic Geography* Vol. 45, No. 4. 1969.

centre of international trade and the international monetary system, the gold standard. This system was supposedly a smoothly adjusting, self correcting one which held world prices and exchange rates in alignment. However in the modern literature doubts have been shed on contemporaries' simplistic interpretations and capital flows, both long and short, have been given greater credit for its relatively smooth operation. This is the lubricating sense. Those who view short term capital flows as an underlying explanation for trading patterns give the availability of sterling a central place; those who regard long term capital as important give more weight to the view that the lender lends where there is the highest (risk adjusted) rate of return on capital — investment follows the yield rather than the flag. The rate of return is a reflection of the opportunities for exploiting some natural resource(s) of the area.

Britain certainly dominated international lending in this period and the volume of capital flowing abroad was immense.[11] But the exact nature of the relationship between capital flows and trade is not established. Saul stresses that the role of capital should not be exaggerated, but nevertheless gives much emphasis to the role British capital played in the search for primary products and the stimulation of primary production, particularly in the initial stages of a territory's development.[12] At the end of the nineteenth century views were mixed. J.A. Hobson seems to have accepted that a substantial amount of foreign investment went to 'new' territories, but he had also shown that the extension of Empire had meant little increase in trade.[13] What he failed to do was explain why merchandise trade did not flow in the same direction as capital.[14] It may be that Hobson's disparagement of trade (a reaction against contemporaries laying overmuch emphasis on it) accounts for his scant treatment. The fact that no connection was made was taken by some as

implicit acceptance that trade was governed by price above all.

There is no doubt that in many cases the imperial connection brought confidence for investors and some colonial stocks were regarded almost as gilt edged. This of course was not always true but risk was certainly tempered by the relationship.[15] Where this was true Empire clearly had a role to play.

One of the simplest notions concerning British trade in the nineteenth century is that 'trade followed the flag.' In its extreme expression this is suggestive of the view that new territories were taken over in order to secure their trade to the metropolis. This, I suppose, is fundamentally behind most economic explanations of imperial expansion and has been advanced rather strongly in relation to Britain in this period. The British economy having reached maturity, experienced a deceleration in growth after 1870 and, according to one line of argument, the heavily dependent open economy had to seek greater income from the sale of goods to 'protected' markets. Associated with this is the changing commercial ideology abroad. For while Free Trade was preached and in large part accepted in the middle of the century it was increasingly under fire as the century wore on. Much has been made of the point that as Britain found it harder to sell in Europe, she pressed more diligently in the Empire. The Dominions tended to protection too, though at the end of the century they were granting preferential treatment to the mother country. This aspect of the Empire argument should obviously not be pressed too far for tariff barriers were not raised and preference was not granted until late in the period.

Fieldhouse has remarked that this well known dictum 'trade followed the flag' is too simple.[16] Indeed it is. Yet the idea has been fostered for a long time. As recently as 1959 in the *Cambridge History of the British Empire:* "there was truth in the saying that trade follows the flag...since 1870, British trade fared better in Africa and Asia than in the United States or Germany, or in markets close to those competitors, and fared best in Empire countries."[17] Yet as shown above, and the information could be read from the trade returns of the time, the expansion of Empire over the last quarter of the century brought a disproportionately low increase in British trade with the Empire. Indeed there were those at the time who pointed this out. Courtney in a review of Hobson's *Imperialism: A Study,* used the book as evidence that trade "flows along currents of cheapness rather than in sequence to the flag."[18]

Nevertheless it is interesting to speculate on the impact Empire sentiment may have had on the pattern of trade. When competition from trading rivals intensified some time after 1870 and protective barriers went up, a movement for 'Fair Trade' developed in Britain which in turn

gave birth to the Tariff Reform campaign. Both of these had inextricably bound up in them a desire for Empire trade. For some this was rationalized as a duty to Empire; for others it was simple protection. Chief among the tariff reformers was Joseph Chamberlain who as Secretary to the Colonies for the eight years 1895-1903 turned the energy he had formerly employed in Birmingham to promoting Empire unity. The economic historians Cunningham and Ashley provided academic respectability for the movement in their writings[19] and although the movement may have initially foundered with the electorate certain actions were taken to promote Empire trade. Chamberlain believed the Empire might be self sustaining:

> I will speak of its variety and of the fact that here we have an Empire which with decent organization and consolidation might be absolutely selfsustaining...There is no article of your food, there is no raw material of your trade, there is no necessity of your lives, no luxury of your existence which cannot be produced somewhere or other in the British Empire.[20]

The impetus that Chamberlain gave is of course impossible to quantify but the general feeling that through the Empire lay commercial salvation was quite prevalent. There were the obvious 'natural' advantages of ease of communication in language, though the United States and some others would have been in a similar position. Commercial intelligence was more easily come by, though perhaps not significantly since skillful and diligent consuls in all parts of the world were reporting back to the Board of Trade. There were too, special incentives provided to stimulate Empire trade. For example trading links were strengthened through the imperial conferences and the establishment of imperial trade commissioners; postage rates were cheaper within the Empire; preferences were granted in the matter of loans on the part of Britain, which in turn it was argued facilitated spending on British goods by Empire; income tax concessions were granted on money invested within the Empire; and there was a common approximation of various branches of commercial and industrial law. As the Dominions Commission put it:

> So long as freight rates are cheaper, and means of communication better, between the Mother country and the Dominions overseas, and between the Dominions themselves than between foreign countries and The Dominions, so long will trade naturally follow Imperial Channels.[21]

The simple concept of using Empire as a form of relief from international trading competition is captured in the words of Baden-Powell:

> It has been said that in Africa two thirds of the natives are

> unclothed and one third half clothed and that it is England's mission to clothe the half clothed and half clothe the unclothed. Even a rough statistical estimate of the number of yards of grey shirtings and other mysterious cloths of commerce needed for such a purpose would far and away outrun the capacities of all the mills of Lancashire and India combined. It has also been said that if these many millions or even any large proportion of them could be prevailed upon to wear flannel next the skin Australian squatters no less than Bradford manufacturers would have unprecedented cause for rejoicing.[22]

However in spite of such sentiment and indeed effort in promoting closer ties with Empire, specifically to raise Empire trade, it is doubtful if much was achieved, at any rate before 1914.[23] The minority report of the Royal Commission in the 1880s had expressed the desire for closer Empire trade with the suggestion that Britain might find some relief for trade in the formation of an imperial zollverein.[24] But preference was too low and too late.[25] And in any case as Saul concluded, "The idea of even partial isolation of the Empire into a single economic unit or zollverein was nonsensical."[26]

Trade figures have been used in a variety of forms to suggest a measure of enforced dependency or even exploitation. For example recently Gunder Frank set out to show the extent to which the Third World had been exploited by the industrialized world after 1870.[27] Using merchandise trade alone Frank found that, "Except for the years of worst depression in the metropolis, the latter has had a constant but growing trade deficit and the underdeveloped countries a trade surplus throughout the whole imperialist period of world capitalist development and particularly at the end of the XIXth and the beginning of the XXth centuries."[28] Further, since the underdeveloped had a growing export surplus this enabled them to pay a return on the capital invested in them from the developed countries. But as Pollard has pointed out the study rests on the wholly inadequate proposition that of the current account of the balance of payments, only merchandise trade could be used.[29] In any case the study is full of contradictions and Latham has shown that for India and China, two countries that were prominent in Frank's argument, neither fitted Frank's model.[30] In other words this explanation is not helpful.

In an earlier study along not dissimilar lines, Hirschman made some calculations to show the preference that large trading countries had for trading with small (defined in terms of their trade) or weak countries.[31] Here the concept of exploitation is implicit — the suggestion is that it is easier for a large country to exert monopoly power to force the weak

country to be dependent on it. Hirschman produced an index which measured the extent of that preference. When the index is one hundred the relative distribution of trade as between large and small countries shows no distortion. If the index were less than one hundred the hypothesis is nullified. When the index is over one hundred the hypothesis is supported and the greater it is the greater is the degree of preference of that country for trading with small countries. The index was calculated for major countries for the years 1913 and 1925-38. For 'England' the value for exports is always over one hundred but nevertheless always lower than Germany and invariably lower than Italy. And for imports 'England' is again always over one hundred but again usually lower than Germany, the United States and Italy. Now obviously large trading nations are obliged to trade more with small trading nations so there appears to have been very little marked preference on Britain's part for trading with small or weak countries.

When Hirschman reverses the process and seeks a measure of the concentration upon markets and supply sources of the small or weak countries he uses an index whose range is zero to one hundred. When a country's trade is completely monopolized by another the value is one hundred. Hirschman finds that for countries in the British Empire both import and export indices are high compared with the smaller European or Scandinavian or even South American countries. An index figure of the same kind was calculated for 'England' effectively providing the lower bound of the index, being very low at twenty, and indicating a very wide spread of trade. Typical values for the white Dominions' imports and exports are around fifty. Some are higher. India was lower while that of Nigeria was higher.

Hirschman's general conclusions are that the association between country concentration and commodity concentration is positive and that world trade is built rather in large proportion upon the reliance of the export products of one particular country upon the prosperity and tastes of another individual country: New Zealand butter in England, Phillipine sugar in the U.S.A. and Bulgarian tobacco in Germany. I have suggested that diversification was taking place in the closing years of the nineteenth century.

More recently the problem has been posed explicitly and examined for some years after 1945.[32] Kleiman's study focuses on the trade bias introduced by colonial rule — namely that of bilateralizm. The argument is that colonial countries are said to trade to a greater extent with their metropolitan countries than they would otherwise do. Kleiman demonstrates that this is the case for the years 1960-62 by comparing the share of colonies' trade taken by metropolitan countries. I tested this

hypothesis for the British Empire for 1913. The share of Britain as the metropolitan country in the trade of the Empire is calculated and shown in Table 5. For the hypothesis to hold the commodity trade of Empire territories would be heavily concentrated in Britain. But an examination of the results hardly bears this out. For both of the years 1913 and 1929 New Zealand is the country which exhibits the greatest "dependency" on the British market. New Zealand sent 84% of her exports to Britain in 1913 and while that had fallen to 75% in 1929 it rose again to 84% in 1938. And Australia, Canada and South Africa sent larger shares of their exports to Britain than India, East Africa, British Asia or British South America. When we look at imports which is perhaps more appropriate we do find that West Africa took a larger share of her imports from the U.K. than any other part of the Empire but not much more than New Zealand.

Kleiman's measure of what he called the 'degree of enforced bilateralizm' was what he regarded as the excess of the metropolitan country's trade share over and above that which might be expected in the absence of colonial rule. He used as a control group the metropolitan country's share in the trade of all other "less developed countries." Scarcity of data prevented this test being carried out at this stage.

TABLE 5

METROPOLITAN COUNTRY'S SHARE IN TRADE
BRITAIN AND EMPIRE

	Exports from		Imports into	
	1913	1929	1913	1929
Canada	49.8	25.3	21.3	15.1
Australia	45.4	38.1	52.3	39.7
New Zealand	84.1	75.0	61.1	46.1
Southern Africa	78.8	48.4	56.7	43.9
India	23.4	21.3	65.4	43.8
East Africa	28.7[1]	39.3	28.3	28.5
West Africa	47.4	34.9	69.3	60.1
British Asia	36.7[2]	19.3	22.3	17.0
British South America	27.5	26.8	37.2	30.7

1. Aden missing
2. North Borneo, Brunei, Sarawak missing.

Source: Calculated from *Statistical Abstracts for British Empire*

Now there may have been, indeed there almost certainly was, exploitation of overseas territories by the metropolitan country. But any investi-

gation of this is better carried out at a micro level and conducted along the lines suggested by Drummond. Drummond used the following definition of exploitation: "the existence of markets so arranged that buyers pay more than they would otherwise have paid or where sellers obtain less than they would otherwise have got."[33] And with this definition in view Drummond concludes that there was little if any exploitation in the twentieth century Empire. Besides, the most obvious exploitative device would have been a tariff on Empire foods with the incidence pushed back on the producer; yet to a large extent free entry was preserved for Empire foods in Britain. In summary where exploitation did take place it was hardly significant: "However large the surpluses this extracted. . .it cannot conceivably have been large relative to the inter-war rise in British consumption."[34]

A final comment may be appropriate about one of the more obviously important factors in determining trade — income. From empirical studies of world trade there has emerged a conventional wisdom that trade takes place more between industrialized countries than between industrial and primary producer.[35] Behind this lies the view that income dominates in the explanation. Superficially there is a contradiction in this since for the period here examined foreign trade was not growing as rapidly as that with Empire, and foreign tended to be industrialized Europe and America while Empire was largely primary producing. But as I have shown it was rather trade with the white Dominions that grew, countries that were industrializing and experiencing rapidly rising real incomes. Unfortunately the lack of reliable income data prohibits a thorough test of this for the whole period but for some years at the end of the period, 1904-13, British exports to a range of countries is shown to be highly correlated with the income of these countries. The following correlation coefficients bring out the closeness of the association: France 0.89, United States 0.79, Germany 0.81, Australia 0.98, and New Zealand 0.91.

In summary, simple notions of trade following the flag or moving in easy parallelism with capital are unsatisfactory. Equally, the concept of exploitation or dependency ought to be very carefully specified. For the fact is that in the late nineteenth century British trade with Empire countries was growing but the rapid growth was with those countries which were industrializing, the white Dominions. Price and income are the important variables, stimulated by an easier flow of information and communication.

3

For the first half of the nineteenth century it has been hypothesized that British trading relationships with markets other than northern Europe

and the United States were in some way constrained by the ability of the other markets to obtain sterling by the export of their own products to Britain.[36] Even for the first half of the nineteenth century this explanation has been shown to be limited,[37] and when we move into the second half of the century with the extension of multilateral settlements in the developing international economy the options increase. It is the purpose of this section to consider what happened in the case of New Zealand.

The New Zealand economy grew at a rapid rate in the second half of the nineteenth century and for this period the Staple Approach has a certain attraction, at least as a description of the course of that economy. The pattern of exports from New Zealand was not unlike that of Australia. Soon after settlement was organized around 1850, pastoral farming was established and wool made up over seventy percent of total exports. Gold discoveries of the 1860s brought a second major staple and together these two items accounted for more than ninety percent of total exports. While these two staples facilitated inflows of capital and labour, grain farming was given a fillip and by 1883 gold had declined in importance and grain had become the Colony's second most important export next to wool. A further change in the structure of trade followed when grain lost its relative importance and was replaced by meat. At the beginning of the twentieth century dairy products joined these items. Our interest lies not so much in the linkage effects of these exports which allowed economic development to proceed in the Colony but rather in the trading relationships which permitted a rapid growth of exports. At the same time it is important to note that there were differing degrees of value added in each of the items exported, that the amounts increased over time and possibilities for diversification of markets improved for the exporting economy.

The trading relationship between New Zealand and Britain in the second half of the nineteenth century does appear to fit rather neatly into one side of one of the well known pictures for that period alluded to above: the demand for food and raw materials on the part of the industrial metropolis and the need of the latter to promote a market for its manufactures. New Zealand fitted at least the first part of this picture, hardly providing a market of great significance before the First World War.

It should be remembered that New Zealand was the Colony prepared more or less for this purpose in the schemes of Edward Gibbon Wakefield. Wakefield in the 1830s had attacked the Ricardians for paying too little attention to the role of new markets. He argued that new investment opportunities would reduce the pressure on profits. Transferring labour and capital to sources of food and raw material would allow the British

economy to be supplied more cheaply.[38] Wakefield regarded New Zealand as one such ideal source of produce.

Now it is beyond the scope of this paper to investigate the demand strength and structure in Britain over the latter part of the century but it is clear that there was a steeply rising demand for food which, with British agricultural output relatively static, called for greater supplies from the regions of recent settlement. British population grew from thirty five million in 1880 to forty-five million in 1911. This population enjoyed rising real incomes, most of the gains being made before the close of the century, and rising real incomes were reflected in the changing diet of the populace.[39] Several factors improved New Zealand's relative position as a supplier. For example the United States fell away as a supplier of meat by the turn of the century as its own supplies were consumed domestically. And the element of imperial preference introduced in 1902 when the War Office insisted that only home bred and/or Colonial meat should be supplied to British troops,[40] did nothing to damage her position.

New Zealand has certain natural advantages for pastoral farming. Soil and climate enable it to grow English grass pastures perfect for sheep. The great expansion of the English textile industry in the middle of the century meant importing increasing quantities of wool from the 1840s onwards. The position of the Empire wool producer improved further in the 1860s when there was a shortage of cotton during and after the American Civil War and wool filled part of the gap. The gold discoveries of the 1860s had attracted migrants and the settlement this encouraged stimulated grain farming. Output of grain was such in the 1870s that it became a significant export product. However it was the next item in the sequence of exports that was to play the really significant part in the expansion of exports and is deserving of more detailed examination. The item is meat.

Economic development in New Zealand was substantial in the 1870s, based largely on a public works programme instigated by the dynamic Treasurer Vogel (particularly in the 1870s after a slight lapse of financial confidence in the sixties). Population doubled in the decade of the seventies. Much of the social overhead capital was provided: eleven hundred miles of railway track was laid, four thousand miles of telegraph cable put down and many bridges and roads built. Major ports in the South Island were now linked by rail and short lines linked them with the sheep country.

The position in the 1870s was that the New Zealand farmer was concentrating on wool exports but having to dispose of great numbers of his flock for little or no return. Thus potentially valuable supplies of meat were lost — sheep were sometimes driven over a cliff after shearing, but more usually boiled down for tallow. And this at a time, 1850-80, when for

a number of reasons the British demand was rising and supply was faltering. In a pamphlet published in 1882 Mulhall gave the following average prices for meat in Britain:[41] 6⅝ d. in 1856-60, 7⅛ d. in 1866-70, and 8⅜ d. in 1876-80. Giffen confirmed this trend and reinforced the suggestion that demand was growing rapidly: "The truth is however that meat fifty years ago was not an article of the workman's diet as it has since become."[42]

New Zealand had to await the development of refrigeration before being able to take advantage of possibilities in the British market. Much was achieved with the new technology in the 1870s. In 1878 the first cargo of frozen meat was successfully landed in the United Kingdom from the United States and two years later the first cargo from Australia was landed in satisfactory condition. But it was the consignment of frozen mutton that arrived in London from New Zealand in April 1882 that *The Times* in a leading article chose to call a 'prodigious' fact.

And so it proved. By 1890 despite falling prices in Britain frozen meat from New Zealand was earning over one million pounds a year. Tables 6 and 7 give a picture of New Zealand's total trade together with exports of meat. By this year New Zealand had overtaken Australia in the export of frozen mutton. Quantities exported doubled by 1901 again in a period when prices fell back. Several factors encouraged the producer to continue. The first was that compared with twenty years earlier when boiling down for tallow was the only alternative, exports now represented a major gain. A second factor was that there was a shift taking place from mutton to lamb and lamb prices did not suffer to the same extent as did mutton. And of course this was taking place in a period of falling costs as well as prices. One of the more dramatic falls was that of freight rates and New Zealand being the furthest away benefited most. The index of tramp shipping rates tumbled from 117 in 1873 to fifty six in the mid nineties.[43]

In other words, at the risk of stressing the obvious, we should attend to profitability and not price for some guidance on the level of production. When the *Dunedin* carried the first shipment in 1882 the freight rate was 2¼ d. per pound. In most ships sailing in 1883 the freight rate was 2½ d. per pound and the cost of killing and freezing was estimated 1¼ d. per pound. By the mid 1890s these costs had almost halved falling from 3¾ d. per pound to 2 d. per pound.[44] There may have been some reduction in profitability based on these crude estimates but it is not of the order sometimes implied. Indeed profitability had been given another boost in the 1890s with the development of sheepskins for export.[45] Thus in the normal way of a price taker with little alternative for diversion or stocking, New Zealand maximized output and accepted the prices obtaining in the British market.

TABLE 6

EXPORTS AND IMPORTS OF N.Z.

	Total Exports £m	Total Imports £m	Meat as % of Total Exports
1882	6.858	8.609	0.30
1883	7.096	7.974	1.60
1884	7.091	7.663	4.85
1885	6.820	7.479	5.45
1886	6.672	6.759	6.40
1887	6.866	6.245	6.60
1888	7.767	5.941	8.01
1889	9.342	6.308	8.35
1890	9.812	6.260	11.00
1891	9.566	6.503	12.04
1892	9.535	6.943	10.70
1893	8.985	6.911	12.00
1894	9.231	6.788	12.60
1895	8.550	6.400	14.15
1896	9.321	7.137	13.30
1897	10.017	8.055	14.90
1898	10.518	8.230	15.13
1899	11.938	8.739	16.50
1900	13.246	10.646	14.80
1901	12.881	11.817	16.40
1902	13.645	11.326	17.49
1903	15.010	12.988	19.00
1904	14.748	13.291	17.90
1905	15.656	12.828	16.50
1906	18.095	15.211	15.40
1907	20.069	17.302	15.80
1908	16.317	19.471	18.90
1909	19.662	15.674	17.80
1910	22.180	17.051	16.80
1911	19.028	19.545	17.70
1912	21.511	20.976	17.70
1913	22.810	22.288	18.90
1914	26.253	21.856	21.30

Source: *Statistics of New Zealand,* and *N.Z. Official Yearbook, 1923,* p. 660.

TABLE 7

TOTAL EXPORTS OF ALL MEAT FROM N.Z.

	To All Countries £m	to U.K. £m	% of All Meat to U.K.
1881	22,391	18,862	—
1882	73,736	70,177	95.0
1883	191,100	186,061	97.5
1884	404,305	391,244	97.0
1885	455,270	417,231	92.0
1886	495,258	447,536	90.5
1887	553,804	515,098	93.0
1888	737,688	683,433	93.0
1889	921,813	849,527	92.5
1890	1,243,759	1,165,754	93.5
1891	1,320,981	1,264,335	95.5
1892	1,114,970	1,078,369	96.5
1893	1,138,034	1,117,263	98.0
1894	1,259,219	1,241,177	99.0
1895	1,338,668	1,316,591	98.5
1896	1,333,698	1,302,885	97.5
1897	1,604,461	1,567,053	97.5
1898	1,707,341	1,659,810	97.0
1899	2,073,740	2,013,515	97.0
1900	2,072,466	2,007,565	97.0
1901	2,231,549	2,153,933	96.5
1902	2,724,989	2,471,378	91.0
1903	3,203,324	2,900,278	90.5
1904	2,782,764	2,674,983	96.0
1905	2,722,010	2,651,589	97.5
1906	2,922,356	2,860,893	98.0
1907	3,461,577	3,383,792	97.5
1908	3,219,974	3,145,281	97.5
1909	3,685,614	3,583,211	97.5
1910	3,942,080	3,845,923	97.5
1911	3,578,733	3,486,112	97.5
1912	3,985,608	3,873,139	97.0
1913	4,478,864	4,334,322	97.0
1914	5,891,675	5,680,474	96.5
Total	68,893,819	66,359,094	96.3

Source: *Statistics of New Zealand*

Of course behind or alongside this very important trade, as was hinted at above, lay a great inflow of British capital. Exactly what the role of overseas capital has been in developing such a trade as this is difficult to decide. As mentioned above Saul has given an important role to capital in claiming that British investment stimulated the output of primary production,[46] and further that it was the "key determinant of the nature, extent and timing of developments in Empire trade,"[47] and that it was particularly important at the beginning of a period. Ford too has suggested something similar in his view of a development cycle in investment:

> An upsurge in overseas investment takes place in a favoured area or perhaps on an excessive scale, as enthusiasm waxes amongst promoters and lenders with consequent bunching of projects... Speculative excesses overtake any expansion of output to bring disillusion, crisis and cessation of lending...[48]

After capital projects are completed and profits rise interest in the area revives and so the process may be repeated. Those views may be true in the aggregate or for some particular case but how true are they in the case of New Zealand?

Clearly as Table 8 shows no simple relationship between investment and trade exists in this case. The measure of foreign investment used shows that New Zealand's overseas debt grew from around seven million pounds in 1870 to over thirteen times that amount by 1914. And over the same period New Zealand exports grew from almost five million pounds to just over twenty six in 1914. The level of foreign indebtedness grew rapidly in the first half of the period — a compound rate of 7.7 percent.

TABLE 8

FOREIGN INVESTMENT AND EXPORTS

	Investment		Exports	
	£m	% per annum	£m	% per annum
Average of				
1870-74	9.18		5.22	
		7.7		2.9
1890-94	40.72		9.32	
		3.3		4.5
1910-14	78.00		22.36	

Source: W. Rosenberg, "Capital Imports and Growth — The Case of New Zealand", *Economic Journal* (March, 1961) pp. 109-110; M.F. Lloyd Prichard, *An Economic History of New Zealand* (1970); New Zealand, *Statistics of New Zealand* (1914); and B. Mitchell and P. Deane, *Abstract of British Historical Statistics*, p. 476.

There was a slowing down in the middle and then a speeding up at the end but the overall rate for the second half of the period was 3.3 percent. Annual exports grew faster in the second half of the period.

Hancock stressed the point that differences would follow depending on total capital inflow, the source and channel of that inflow, the terms on which it is obtained and the sectors in which it is invested.[49] Britain was almost the sole source of New Zealand's overseas debt and we know that the capital was obtained on the best available terms and further that it was directed in the first instance towards building the social overhead capital which was necessary for successful exporting and development.

In order to test the hypothesis that foreign investment in New Zealand was a reflection of profitability which in turn was an indication of actual and possibly potential exporting conditions, some regression equations were run.[50] One possibility for the period is that railway profits are an indicator if not for the aggregate rate of return, at least for the export sector. While New Zealand was small alongside other regions of recent settlement, variations in investment were important and the railway system greatly facilitated the carriage of goods for export; and railways made up a quite significant part of all New Zealand capital formation, averaging around twenty percent each year.[51] In spite of a number of variations of the hypothesis tested no satisfactory results were obtained. New Zealand borrowing showed little correspondence (that is a close direct or lagged relationship) with trade over any of this period. Of course it is still possible to speculate that something of Saul's idea has application. But it is difficult to give precision to the latter.

NOTES

1. Quoted by L.S. Amery, *My Political Life* (London, 1955, Vol. II).

2. S.B. Saul gave particular attention to Canada and India as two obviously important Empire countries in *Studies in British Overseas Trade 1870-1914* (Liverpool, 1960).

3. *British Parliamentary Papers* 1872 LXIII Accounts and Papers 28 No. 1; 1916 LXXII Accounts and Papers No. 3; 1914-16 LXV.

4. L.C.A. Knowles, *Industrial and Commercial Revolutions in Great Britain during the Nineteenth Century* (London, 1926) p. 323.

5. No distortion is introduced by taking these years singly rather than say, five year averages for the beginning and end of the period.

6. The approach originated with H.A. Innis, *The Fur Trade in Canada* (New Haven, 1930).

7. W. Arthur Lewis, *Growth and Fluctuations 1870-1913* (London, 1978).

8. P. Hall, Ed., *Von Thünen's Isolated State* (Oxford, 1966).

9. Extracted from J. Richard Peet, "The Spatial Expansion of Commercial Agriculture in the Nineteenth Century: A Von Thünen Interpretation" *Economic Geography* (Vol. 45, 1969).

10. Hans Rinnemann, "Trade Flows and Geographical Distance, or the Importance of being Neighbours" in H. Bos, Ed., *Towards Balanced International Growth* (North Holland, 1969)

11. The literature is now extensive. A useful selection is provided in A.R. Hall, Ed., *The Export of Capital from Britain 1870-1914* (London, 1968).

12. Saul, *Overseas Trade.*

13. J.A. Hobson, *Imperialism: A Study* (London, 1903).

14. For an analysis of Hobson's changing views see P.J. Cain, "J.A. Hobson, Cobdenism, and the Radical Theory of Economic Imperialism, 1898-1914" *Econ. Hist. Rev.* (Vol. 31, 1978).

15. Luke Trainor, "The British Government and Imperial Economic Unity" *Historical Journal* (Vol. 13, 1970).

16. D.K. Fieldhouse, *Economics and Empire 1830-1914,* (London, 1973).

17. E.A. Benians, "Finance, Trade and Communications 1870-1895", *The Cambridge History of the British Empire* (Cambridge, 1959, Vol. III, Ch. VI) p. 207.

18. Leonard Courtney, "What is the Advantage of Foreign Trade?" *Nineteenth Century* (Vol. 53, 1903) p. 807.

19. W. Bunningham, *The Case Against Free Trade* (London, 1911); W.J. Ashley, *The Tariff Problem* (London, 1903).

20. C.W. Boyd, Ed., *Chamberlain's Speeches* (London, 1914).

21. *British Parliamentary Papers,* Cmd 8462, 1917.

22. Sir George Baden-Powell, "The Development of Tropical Africa", *Proceedings of the Royal Colonial Institute* (Vol. 27, 1895-96) p. 223.

23. Much was desired though, as *The Times* put it: "The British Empire is so large and so completely self-supporting that it could very well afford, for the sake of serious political gain, to surround itself with a moderate fence," 15th Jan. 1891. Something closer to unified trading was approached after the 1932 Ottawa Conference though this was still very far from a Customs Union.

24. *Royal Commission on the Depression of Trade and Industry,* Cmd 4175, 1886.

25. For example S.B. Saul showed that the value of the Canadian tariff preference of 1897 was doubtful, "The Economic Significance of Constructive Imperialism" *Journal of Economic History* (Vol. 17, 1957).

26. Saul, *Overseas Trade,* p. 228.

27. Andre Gunder Frank, "Multilateral Merchandise Trade Imbalances and Uneven Economic Development" *Journal of European Economic History* (Vol. 5, 1976).

28. *Ibid,* p. 407.

29. Sidney Pollard, "Merchandise Trade and Exploitation", *Journal of European Economic History* (Vol. 6, 1977).

30. A.J.H. Latham, "Merchandise Trade Imbalances and Uneven Economic Development in India and China" *Journal of European Economic History* (Vol. 7, 1978).

31. Albert O. Hirschman, *National Power and the Structure of Foreign Trade* (Berkeley, 1945).

32. Ephraim Kleiman, "Trade and the Decline of Colonialism" *Economic Journal* (Vol. 86, 1976).

33. Ian M. Drummond, *Imperial Economic Policy 1917-39* (Toronto, 1974).

34. *Ibid.*, p. 445.

35. A.J. Brown, "The Present Pattern of World Trade" in *Banking and Foreign Trade* (1952).

36. R.C.O. Matthews, *A Study in Trade Cycle History: Economic Fluctuations in Great Britain 1833-1842* (Cambridge, 1954). It is fundamentally this view that has been accepted by D.C.M. Platt in "Further Objections to an 'Imperialism of Free Trade', 1830-60" *Econ. Hist. Rev.* (Vol. 26, 1973).

37. Forrest Capie and K.A. Tucker, "British and New Zealand Trading Relationships, 1841-1852" *Econ. Hist. Rev.* (Vol. 25, 1972).

38. Donald Winch, *Classical Political Economy and Colonies* (Cambridge Mass., 1965) Ch. VI.

39. A.L. Bowley, *The Change in the Distribution of the National Income 1880-1913* (Oxford, 1920) p. 15.

40. J.T. Critchell and J. Raymond, *A History of the Frozen Meat Trade* (London, 1912) p. 318.

41. Quoted by Critchell and Raymond, *op. cit.*, p. 314.

42. R. Giffen, "Progress of the Working Classes in the Last Half Century", *JRSS* (Vol. 46, 1883) p. 603.

43. L. Isserlis, "Tramp Shipping Cargoes and Freights" *JRSS* (Vol. 101, Pt. 1, 1938) p. 122.

44. *New Zealand Official Year Book,* 1894, p. 314.

45. A.H. John, *A Liverpool Merchant House* (London, 1959) p. 74.

46. Saul, *Overseas Trade,* p. 61.

47. *Ibid.*, p. 208.

48. A.G. Ford, "British Investment in Argentina and Long Swings, 1880-1914", *JEH* (Vol. 31, 1971).

49. W.K. Hancock, "Agenda for the Study of British Imperial Economy 1850-1950", *JEH* (Vol. 13, 1953).

50. Forrest Capie and K.A. Tucker, "Foreign Investment in New Zealand 1870-1914", *University of Leeds Discussion Paper No. 15.*

51. J.A. Dowie, "Business Politicians in Action: The New Zealand Railway Boom of the 1870's", *Australian Economic History Review* (Vol. 5, 1965).

2. DISCUSSION FOLLOWING THE PAPER BY CAPIE

ALEXANDER asked whether it was useful to make a distinction between Britain's Empire and non Empire trade.

CAPIE replied that he was interested in exploring the extent to which sentiment provided protection against the rising trade barriers in Europe and the USA in the 1870s and 1880s, and encouraged Britain to concentrate on Empire markets.

ALEXANDER wondered if sentiment, and trade following the flag, could not be more concretely grounded in habits of consumption. In the new countries of British overseas settlement we had a population with well established tastes for British goods which were not produced, or were produced only as poor substitutes elsewhere.

CAPIE did not place much faith in the long term effects of taste: price and quality enter into consumption patterns very quickly.

BUCKNER insisted that Empire was important in terms of the business communities in self governing colonies. It is clear that the Empire does have a meaning in terms of connections, interests and the political decisions that affect trade.

CAPIE agreed this was important. Trade did not follow the flag, but in countries like Canada and New Zealand sentiment was important in stimulating and maintaining commercial connections. But after that, if you have to choose between the Japanese contract for a new bridge and a British one, price is clearly important, even if sentiment does enter into the decision somewhere. It delays the change to clear price advantage.

BUCKNER questioned whether the issue can be settled by simply looking at the trade statistics. Canadian legislation discriminated in favour of Britain and against the USA, and if Canada had not been in the Empire this legislation would not have been passed.

CAPIE thought this could be overemphasized. The clearest example of that kind of legislation was the Canadian preference in the 1890s, and Saul's study came to the conclusion that it was irrelevant, since it is difficult to see on whom the incidence is pushed back.

ALEXANDER shifted the discussion to the question of trade and its connections with underdevelopment. Harold Woodman had recently argued in a stimulating if not entirely convincing paper, that at the beginning of the 19th century India had some advantages relative to the USA in terms of prospects for economic development. These advantages had been crushed by the dead hand of the Indian Civil

Service and other dependency linkages. Was not Capie's evidence that Britain's trade grew fastest with far distant places rather than near partners, some evidence of the distorting effects of the Empire connection? It might have been far healthier for India if, as Myrdal has argued, she had developed her trade with Southeast Asia rather than Western Europe.

CAPIE replied that around 1850 India probably had more trade with Asia than with Britain, although the dominant export was opium, and it was Britain that killed off that trade at the end of the century. But he was surprised that Alexander had chosen India for his example, because India was less compelled to deal with Britain than colonies where it is quite clear that budgets were written in London, and there was some compulsion to trade.

ALEXANDER replied that he was not thinking of compulsion so much as the more subtle consequences of imperialism produced by the presence of expatriate business houses and banks.

CAPIE responded that New Zealand and Australia were far better examples of economies dominated by British branch plants. But no countries grew faster in the late nineteenth century than New Zealand and Australia.

ALEXANDER countered that it was important to distinguish between the new countries of settlement, which were essentially outposts of Britain itself, and the older settled countries of what is now the Third World. He would not press a thesis of exploitation in Canada, Australia and New Zealand, but thought it should not be ignored for countries in Asia, Africa, the West Indies, and possibly South America.

OMMER objected to Capie's survey of the contribution of geographers to trade analysis. The two he had selected from a very wide field were Richard Peet and Hans Rinnemann, both published in 1969, rather than more recent work. She argued that the export base approach had been very fruitful in Gilmour's study of nineteenth century Southern Ontario; that geographers had contributed substantially to studies of migration in the colonial context; that studies were underway on the impact on a developing colony of wholesaling linkages with the mother country; and listed other major advances in analysis offered by the most recent work of geographers.

CAPIE assured Ommer that he did not mean to cast a slur on the discipline. In referring to works published in 1969 he did not realize that geographers rendered themselves redundant so quickly these days.

PALMER emphasized that if one is interested in the shipping industry, then what is important is the volume of the traffic rather than the value

of the trade. Looked at in these terms, Britain's trade with her European neighbours held up very well in the late 19th century, thanks to the huge coal trade.

GREENHILL added that there were other important European bulk trades with Britain, such as the grain trade from the South of Russia, sugar from Central Europe, dairy products from Scandinavia and other products from the Baltic.

CAPIE accepted that volumes were important if you are concerned with shipping. But in terms of trade it is values that are important, and the trade statistics show that Britain's trade with near neighbours declined relative to trade with more distant parts of the world.

PALMER agreed that value was the appropriate way of looking at visible trade, but if you are concerned with total trade, then the invisible component must be considered, and this again brings in the question of volumes, especially for a big shipping country like Britain.

3. THE TRADE AND NAVIGATION OF THE ISLAND

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THE TRADE AND NAVIGATION OF THE ISLAND

Rosemary E. Ommer

> L'industrie d'une nation n'est pas bornée par l'étendue de son territoire, mais bien par celle de ces capitaux.*

Small countries are not usually characterized by great wealth, certainly absolutely and commonly on a per capita basis. This paper will look at one semi-independent island with a small population and a limited resource base, which sustained itself and indeed flourished through the development of an 'invisibles' sector. The Island of Jersey is very small indeed — only forty five square miles in area — and historically its domestic economy has never been involved in the kind of produce (or production) which is likely to generate great wealth. Hence, from a local fishery in conger eels in the 12th century, through a knitting industry which made the Jersey sweater famous, to cider production and a potato and cattle industry designed to feed an expanding London market in the 19th century, Jersey could make no claim to a secure prosperity based on her natural resources.

Jersey's greatest natural 'resource' was her location as the most southerly part of the United Kingdom close to the shores of France. Whether as an entrepôt for French trade with Elizabethan England, as a tourist resort for wealthy Victorian and Edwardian industrialists, or in the present decade as a somewhat ephemeral 'branch office' for multinational finance interests who wish the tax advantage of a Jersey address, it has usually been her location which offered the opportunity for economic advantage through nine hundred years of existence. Indeed, this location and her diminutive proportions have always been Jersey's greatest asset and her greatest problem: location favoured the entrepôt function which was responsible for her early wealth, and the small size of the Island demanded that some solution be found to ward off chronic threats of population pressure and emigration.[1]

The solution to Jersey's economic survival, then, always had to be sought within the context of a restricted land and resource base, and that in turn meant that she always had to look beyond her own shores. In the Middle Ages the solution lay in the export of local fishery produce to the markets of Catholic Europe. By the time of Elizabeth it was based on a continuing mutual distrust between England and France, with Jersey fulfilling an entrepôt function between the two from her position in the buffer zone of the Channel. It became second nature for Jerseymen to operate in the arena of Anglo-French political and economic rivalry, and

to exploit the situation to their own advantage whenever such occasions presented themselves. The position of the Island's merchants as peripheral to larger French and English fisheries in 18th century Newfoundland, was no more than an extension of the home situation of lucrative peripherality to France and England in the markets of Europe, where Jerseymen had grafted their trade onto the margins of their two great neighbours. Their ability to move quickly to take advantage of the fall of New France, by a rapid extension of their Newfoundland operations into the newly vacated Gulf of St. Lawrence, was also characteristic of Jersey strategy: it was another opportunity created by another Anglo-French dispute, and seized avidly by Jerseymen waiting on the sidelines to secure for themselves some economic advantage from their neighbour's latest conflict.

The advantages to Jersey of this cod trade are clear: it was an ideal solution to the deficiency of Jersey in domestic resources and markets. What the cod trade supplied was a resource which existed in abundance in a location which Jersey could attempt to 'own', or at least to control, and which had large and generally reliable markets.

By examining the trading voyages of Jersey in the 1830s and 1840s it has become clear that the cod trade was essentially composed of three foci: ownership, production and marketing. It was not the actual geometry of the shipping patterns which was important (they might be triangular or rectangular or whatever), but rather the function of each landfall. The market was geographically diverse and temporally variable — a range of options flung across the globe. The production centres were more restricted, more specialized and more homogeneous in environment, but still extensive — the Gulf and Newfoundland littoral, which is a geographer's concept of 'region' but with limited integration. The ownership centre in Jersey itself was a single small island and a tightly woven social group with the characteristics of a class and an ethnic group identity. Jersey's trade was triangular — not cartographically but functionally — because of the three foci involved. This was a 'merchant triangle' of information flows, of money circulation, of the spatial movement of goods, services and labour, of power policies and of merchant strategies operating between the three locations.

Nineteenth century staple trades involved the extraction of a staple from an area other than that in which the extracting agency, the 'metropole', resided. When the sale of that staple occurred in a third location, the market, then the trade was a triangular trade because the structure involved three separate locations. If there was more than one market location, then the structure still remained triangular even if the physical pattern did not. The Jersey merchant triangle was a special case of triangular trade in that Jersey merchants did not acquire the staple

simply by purchasing the commodity, but by managing the extraction and production, and then selling the product elsewhere for those things which they needed. Jerseymen were well aware of the problem of "local disadvantages material to a small island of this kind — such as the want of export produce and of manufactures" which forced their dependence on trade. Failure in the staple trade would mean that

> emigration to a great extent must take place and numbers of the inhabitants of this Island will be bereaved to seek in foreign countries those resources and means of subsistence which they can no longer find in their mother country.[2]

Indeed, as late as 1880, the Chamber of Commerce remarked that "apart from our shipping interest and fisheries, we are an agricultural and domestic community", and they emphasized that the fisheries had "ever been a more important factor, the prosperity or failure of which is shared or lamented by the whole trading community".[3]

The nerve centre of the Jersey merchant triangle was, of course, Jersey itself: the organizational and ownership base for the cod trade. Here were written the political petitions which sought to create and maintain a favourable politico-economic framework within which the trade could operate more efficiently.[4] Here also in the early years, was where the supplies for the fishery were assembled; where the goods bought with the produce of the fishery were filtered back into the system as supplies; and where other goods were purchased or manufactured for dispatch to the fishery. Jersey was where the skilled labour was recruited in the form of shore crews, clerks and agents; where the ships' captains and crews were contracted and where the vessels returned at the end of their voyages. This was home, the metropole, master-minding its outpost across the Atlantic. From here was deployed the capital that created the trade, and back here came not only the profits of the trade, but also the payments to almost all production factors, to be spent in the Jersey economy and thus to support its domestic sectors. The production bases of the fishery, the Jersey outposts in the New World, drew little benefit from the business.[5] The likelihood of any great development out of fish as an export staple was not realistically to be expected unless an unusual amount of diversification around the staple base were to occur.

Normally diversification out of fish as an export staple is minimal,[6] at least historically. This is not to say that no benefits could be derived from the Jersey cod fishery, but merely that they were unlikely to occur in the production outports. This is not surprising when it is considered that the cod trade was seen in Jersey as providing an economic base for the Island which it did not possess *in situ*. By 1837 Jerseymen could comment that the codfishery was of prime importance to Jersey, not only because of the

value of the industry *per se* in terms of labour employed, capital invested and the returns on that investment, but also because it was "the root of other indirect industry, and the means of supporting many families".[7] Indeed, it was thought that "without her codfishery, the commerce of Jersey would dwindle away".[8] This, of course, amounts to a claim that Jersey's cod trade was her 'engine for growth', and it is this perspective on the cod trade that the remainder of this paper will examine.

In the early 1600s the population of Jersey consisted of about 25,000 inhabitants. The landed gentry — seigneurs — held about one hundred to one hundred and thirty fiefs, were addressed by the names of these fiefs, and were spoken of as 'noblesse'. Below them in social status were the peasant farmer-proprietors with small estates devoted to the production of meat, dairy produce, vegetables and apples, supplemented by the local fishery. Wheat was the chief crop and surpluses were exported to Normandy. Artisans formed only a very small proportion of the population, and it has been suggested that this lack of an artisan class was inhibiting commercial development.[9]

By 1685 Jersey had begun to supplement her agricultural base with a thriving smuggling 'industry',[10] a local knitting industry and the beginnings of the cod fishery in the New World. By 1731 the importance of the cod trade was recognized, and it was being referred to as the "prime trade" of the Island.[11] In that year, seventeen vessels sailed from Jersey for Newfoundland, and the following year twenty seven were sent. According to Shebbeare, "45 ships were annually employed in the Newfoundland fishery".[12] By 1796, the Jersey Chamber of Commerce was writing to Lord Granville that,

> the cod fishery on the coast of Newfoundland and parts adjacent is the principal trade carried on from this Island, employing in times of peace between 60 and 70 vessels and about 2000 seamen...the British fisheries in the Isle of Newfoundland and parts adjacent...would be more than sufficient to supply the markets of Spain, Portugal and Italy.[13]

In 1805 the merchants protested to the Jersey States (the local parliament) that there was a bill before Parliament in Westminster which they feared would prohibit their importation of salt in vessels under two hundred tons burthen, noting that such a law would "crash the almost only branch of trade which your Memorialists enjoy".[14] The strongest statement was made by Philip DeQuetteville, then President of the Jersey Chamber of Commerce, to the President of the Board of Trade in December 1841:

> The principal commerce of the Island, my Lord, that which employs a great part of its shipping and a great number of its

inhabitants,...are the fisheries at Gaspé, Nova Scotia, Newfoundland and Labrador. There are employed...as seamen, fishermen and landsmen about 4,000 persons. There are in this Island many families engaged in the making of worsted hose and mitts, wearing apparel, boots and shoes for the use of the fisheries. The trade gives employment to about 8,000 tons of shipping, exclusive of those vessels which carry fish to the Brazilian and other markets from this Island. It is therefore with peculiar interest that the Chamber of Commerce regards this branch of commerce and whatever is favourable or injurious to it. That trade destroyed, that source of industry dried up, the commerce of this Island would receive a death-wound, and many a parent who now, by the industry which this trade supplies, maintains his family in decent pride and honest independence, would probably be obliged to seek relief from his parish, which is a degradation and a stain which a Jerseyman can never forget or overcome.[15]

By 1840, the Channel Islands were prosecuting the British North American fisheries on an equal footing with the United Kingdom, and were seeking to extend their commercial interests on a broader front.[16] In 1841, Philip DeQuetteville wrote Lloyds, seeking A-1 classification for Jersey vessels, built, as he pointed out, specifically for merchants on their account, and not on speculation.[17] Such A-1 classification was important, for the Island was becoming increasingly involved in the carrying trade and was therefore dependent on charter voyages and hence on A-1 status if at all possible. DeQuetteville, pointing out that "at the United States our vessels, not of the first letter, can be insured on more favourable terms than A-1 English ships",[18] stressed the increasing reputation of the Jersey fleet in world trading centres.

The records of the Custom House in London also give ample evidence of the successful expansion of Jersey into a wider commercial sphere. In 1841, for example, Philip Pellier, a fish merchant, wrote the Customs,

Gentlemen,

As I am on the eve of sending out my new Barque the 'Achilles' of 288 tons (N.M.) to the Cape of Good Hope and the Mauritius — and several parties with myself being desirous of furnishing goods on speculation to those Colonies, among which I would enumerate "Bricks, Coals, Salt, Cordage, Soap, Vinegar, Flour, Biscuit, Iron, Coal Tar, Ironware, Beer, Piece Goods, Mus[1] Instruments, Stationery", *British Produce or Manufacture* — "Wine, Geneva, Deals, Spars, Pitch, Tar, etc" —

Foreign — and a direct intercourse between these places being a new feature in the Trade of this Island, May I request...under what footing such Trade may be carried on....

I am, Gentlemen, etc.
Ph. Pellier, Owner.[19]

By 1845, the Chamber of Commerce noted that "now vessels from the Island frequent all parts of the Globe. You will find them in the South Seas at our Antipodes. They may be seen at New Holland and in the Indian Ocean",[20] and they suggested that St. Helier needed a new dry dock. Shipping entering inwards at Jersey with cargo had risen from 1360 vessels in 1838 to 1585 vessels in 1844, and shipping registered at Jersey had increased from 244 vessels (23,826 tons, old measurement) to 311 vessels (28,078 tons) over the same time period.[21] By 1846 the mail service to the Island was being improved, and by 1851 the Island had acquired its own local Board of Examiners for the Mercantile Marine.[22] In that year there were 372 vessels (33,000 tons) registered at Jersey. The fisheries were also growing, and by 1853 about 100 vessels with a total tonnage of over 10,000 tons, and about 2,000 seamen were directly involved in the trade.[23]

By 1860 Jersey's population had risen from the 25,000 inhabitants of the pre-cod trade days to 60,000 persons which is only 15,000 less than present day figures.[24] In the same year there was 60,000 tons of shipping in the Channel Islands. Indeed, Channel Island shipping between 1831 and 1863 had grown by fifty seven percent,[25] and the Chamber of Commerce was contemplating construction of new harbour facilities — one for sail and one for steam.[26] Clearly, between 1830 and 1860 the economy of Jersey had expanded very rapidly. It was also this same time period that saw the Jersey merchant emporium in the Gulf of St. Lawrence reach its maximum extent and produce its greatest financial rewards. Moreover, the annual rate of increase in the Jersey population during the critical period of 1821-51 was 2.23%, compared to 1.6% for Guernsey, and 0.88% for the Isle of Man, both of which are of comparable size with Jersey. The rate for England and Wales over the same period was 1.28%, and that of Scotland 1.04%, although the considerable regional variations that existed in these latter areas makes direct comparison hazardous.[27] This expansion of the Jersey population did not contain any serious demographic imbalance,[28] and while information on migration is not available, relevant sources such as the Minute Books of the Jersey Chamber of Commerce and the local newspapers for the time, give no indication of either a large influx of immigrants or of emigration. In the case of the latter particularly, this 'negative' information is solidly founded in that the Chamber of Commerce was always especially aware

of the potential threat of emigration from the Island should the economy 'fail', and constantly used this hazard as a weapon with which they assailed Westminster whenever they felt it necessary to win additional or continued support for the cod trade. Jersey, then, was clearly experiencing major population growth without any evidence of it being in any way a distressing increase which might be overburdening the economic resources of the Island.

How much of this general growth of the Island economy can be attributed to the cod fishery, either directly or indirectly? The question will be examined using, as an analytical device, the categories of forward, backward and final demand linkage as developed by Hirschman and used by Watkins in his paper on export base theory.[29]

Forward linkage in the fishery was always very weak, and was effected (as far as the technology of the time permitted) in the British North American fisheries with the dry cure.[30] The cured fish was consumed in the market countries as processed in the New World. No further processing occurred either at market or in Jersey.

The major backward linkage from the fishery was not roads — as would have occurred perhaps in a land focussed staple industry such as timber — but shipbuilding. This is best thought of as the maritime equivalent of roads, being the means by which to cross the sea lanes to market and to collect the staple along the coasts of the production area. This was carried out for some time in the New World as a direct 'spin-off' of the fishery, but by 1850 Charles Robin and Company in Gaspé (C.R.C.) was writing to local lumber merchants in Campbelltown that,

> We beg to state that, having discontinued shipbuilding, we are not in want of juniper or indeed of any other kind of timber.[31]

Indeed, after 1834 the Jersey shipbuilding industry in the New World, including C.R.C.'s ships in Gaspé, was minimal, being about 170 tons only of the shipping registered in Jersey that year, compared to nearly 500 tons built and registered in Jersey. The considerable capital investment in ships built in Jersey was a feature of the middle years of the 19th century, and in 1845 the Chamber of Commerce noted of the growth of Jersey shipbuilding that,

> It may be that the increase hereafter may not be so proportionately great or so rapid as during the past, but with increasing Capital and enterprise we may reasonably believe that an increase of the shipping and commerce of the Island will continue.[32]

As shipbuilding in Jersey increased, the spread effects of the industry were felt in and around St. Helier and St. Helier Bay, in the form of

navigation schools, block makers, anchor smiths, iron founders, coopers, mast and oar makers, sail makers, rope and twine manufacturers and other ancillary services to the industry.[33]

Table 1 shows the figures, taken from the Jersey ship registers, for Jersey built tonnage from 1818 to 1827 — the earliest years of the Jersey shipbuilding industry.[34] The percentage total tonnage owned by cod fish merchants is highest, and indeed dominant until 1823, after which it drops rapidly. Especially if the aberrant year of 1823 is removed, the picture is one of steady decline of cod trade ownership dominance, and a concomitant rise of other owners. The number of ships involved indicates that other owners were investing in a larger number of smaller ships, and indeed locally built ships in these years were either cod trade ships or coasters, almost without exception. Not only was the cod trade important in terms of the early investment into Jersey shipbuilding, it was also vital as the central trade of the Island. The cod trade was extremely important in Jersey trading, in the light of the analysis of ownership patterns: owners in the cod trade commanded more, and heavier, ships than those in any other trade up to 1840, and they were more diversified, attempting to link their various trading networks into one complex structure which ultimately focused on Jersey.

TABLE 1

JERSEY BUILT AND REGISTERED

Year	Total New Ships Built		Total Cod Merchant Ships		
	Tons	Number of Vessels	Tons	Number of Vessels	% Total Tons
1818	121	1	121	1	100.0
1819	265	3	239	2	90.1
1820	266	3	233	1	87.6
1821	348	4	315	2	90.5
1822	254	3	197	1	77.6
1823	202	1	202	1	100.0
1824	574	5	308	3	53.7
1825	1007	14	581	4	57.6
1826	906	10	436	3	48.1
1827	914	6	426	3	46.6

Source: Jersey Ship Registers.

The pattern of Jersey reinvestment of capital accumulated in the cod trade warrants further research than I have been able to carry out — as indeed does the whole question of linkage effects at the metropole from staple trades conducted in the colonies — since detailed investigation would uncover the nature and amount of reinvestment as well as the specific source of the capital. This would help to identify shifts in investment from merchant (staple) sectors to industrial or other sectors of the metropolitan economy, thereby allowing a finer realization of the role of colonial staple trades in the mother country's economy, as well as identifying the innate potential for growth which those staples afforded. It would also, of course, help in the assessment of the loss to the colonies which such a transfer of capital/linkages implies.

In Jersey little industrial development occurred, apparently not so much because of reluctance on the part of investors, but because in terms of size and location, Jersey could neither generate a substantial local market for her manufactures, nor compete with her giant neighbour in either external or internal markets.[35] Her fortune came from the sea and the shipping lanes and her major 'industrial' thrust, such as it was, was the wooden shipbuilding industry.

It has been shown that Jersey's home based shipbuilding industry was in large part a result of investment by cod trade firms, and that shipbuilding in the New World declined as Jersey shipbuilding grew.[36] Table 2 shows this process in more detail, for the years 1834-1839 — the first few years of the period in which Jersey built shipping finally dominated the New World built ships. Not only did Jersey built ships for the cod trade merchants' accounts increase numerically, but the larger average tonnage of these vessels is also evident. A concomitant decline in New World tonnage is also obvious — an indication that cod-trade shipbuilding in the New World was increasingly shrinking to the provision of shallops and non ocean going vessels. This left larger construction to Jersey, although this construction was never substantially concerned, to the extent that most major ports of the period became involved, in vessels over one thousand tons.[37]

In 1838, one of the Robin (cod trade) family registered his first Jersey built vessel, the *Andes,* a 212 ton brig built by Francis Grellier and owned by C.W. Robin, I.H. Gosset and John Jerault. She was destined for the South American trade. This vessel is just one example of how cod trade capital was invested in Jersey shipbuilding, and it also suggests that there existed in Jersey a need by cod trade merchants for vessels over and above those they used in the cod trade, since otherwise it would have been more economical for them to continue to build in the New World. Podger sees a relationship between the cod trade and the growth in Jersey shipbuilding,

TABLE 2

JERSEY AND NEW WORLD CONSTRUCTION

Year	New World Built			Jersey Built		
	Tonnage	Average	No.	Tonnage	Average	No.
1834	436	87.2	5	366	183.0	2
1835	445	148.3	3	259	129.5	2
1836	224	74.7	3	877	125.3	7
1837	384	96.0	4	656	109.3	6
1838	310	51.7	6	617	154.3	4
1839	51	51.0	1	1054	150.6	7

Source: Jersey Ship Registers.

commenting that,

> As the cod-fishing trade expanded so new markets had to be found both for the fish and for the produce usually purchased as a return cargo after the fish had been sold. At the commencement of the 19th century it became apparent that wood could be imported cheaply from the Baltic, and with a world in the process of rapid and continuing expansion more and more ships were needed.[38]

Indeed, histograms of seasonality in Jersey trades[39] indicate a strong growth in Baltic trade with Jersey in the period between 1830 and 1840, and a general 'take off' in Jersey voyaging and shipbuilding dates from this period. This take off was not confined to the cod trade, or even dominated by it; it was rather a picture of general growth in the carrying trades into which the cod trade merchants had diversified.[40] It could even be argued that it was in the nature of the cod trade to create an entry into the carrying trades, by virtue of the trading structure involved in marketing and supplying for the staple trade, as Podger suggests. This is reflected in the manner of cod trade diversification, which was usually by market region and/or in product lines — that is, as a result of deciding what could be purchased in exchange for cod, or to supply the cod trade settlements using the cash acquired in the sale of the staple.

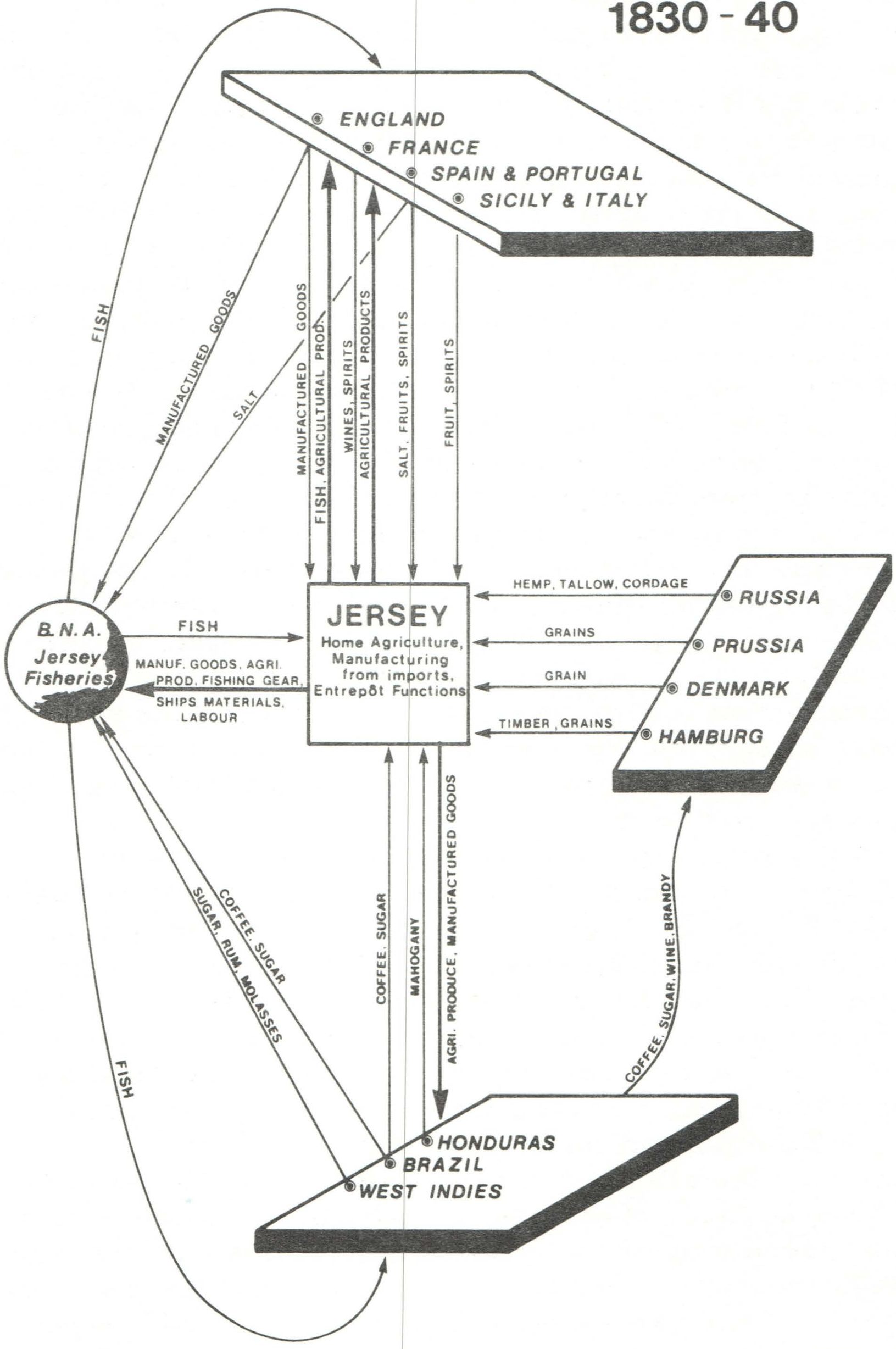
The commodities sought in the trades into which cod firms diversified in the early years are instructive in this respect: Lisbon salt, figs and wine for local Jersey consumption, Rio coffee and sugar, Sicilian wine. Given the nature of inputs into the cod trade, the markets in which the fish was sold, and the freight strategies employed by Jersey ships at market,[41] such

commodity sales indicate an integrated cod trade system of salt as input, fish as output, and figs/wine (Mediterranean), coffee/sugar (Caribbean and Brazil), timber (Honduras/Baltic) as exchange goods.[42] The pattern was, of course, increasingly more complicated than this simple triangle of flows. Figure I shows the commodity flow pattern for Jersey as indicated in the newspapers and almanacs for 1830-40. Absolute amounts are not available, but the pattern of flows is clear. To two of the three groups of countries involved the fisheries sent their produce direct, where it was exchanged for other goods required either in Jersey or in her export markets, or in the fisheries. Fish was sent direct to Honduras, Brazil and the West Indies, and to England, France, Spain, Portugal, Sicily and Italy. From the first three, which were in the New World, the fisheries received coffee, rum, sugar and molasses.[43] From the others, Jersey received a wide range of goods including manufactured goods: iron, copper, cloth, etc., from Britain, and wines, fruits, and salt from the Mediterranean including France. In Brazil fish was exchanged either for notes of credit against future purchases made by Jersey, or for coffee, sugar, wine and brandy sent directly from Brazil to the third group of countries, as well as the coffee and sugar which was sent to Jersey. From this third group, in exchange for those goods which had been purchased in exchange for fish, came the inputs into the shipbuilding industry: timber, hemp, tallow, cordage, linen. "Ships were built here", says Podger, "of the finest wood available, and rigged with the best Russian hemp...."[44] From this group also came wheat, barley, and 'grain' for the use of the fisheries, for the Island, and as fodder for Jersey cattle. Exports of Jersey produce *per se* were relatively small: apples, cider, cows, heifers, potatoes, stone, cotton stockings, some flour.[45]

Jersey's major exports were re-exports, purchased with the produce of the fisheries and often further processed in Jersey before sale as inputs into the fishery. Such goods might be bought directly with fish, or indirectly with such articles as coffee, which had in turn been previously purchased with fish. Hence, the Gaspé exports to Honduras, for example, translated into the mahogany imports from there to Jersey.[46] Jersey's exports, then, were primarily the produce of the fisheries, or some commodity derived ultimately from a country which imported from the fisheries. This commodity flow pattern explains the voyage patterns, and affirms what the sales of cod fish firms such as DeQuetteville, Nicolle, C.R.C. and LeVisconte[47] suggest: namely, that the produce of the fisheries was the foundation of Jersey's commercial wealth. Given the relative insignificance of her home produce, she could not have created an Atlantic, and still expanding, entrepôt trade by 1840 based on cider, apples, cows and potatoes. Indeed, the immense growth in Jersey coasting

Figure 1

JERSEY COMMODITY FLOWS 1830 - 40



trade between 1830 and 1840 is an important indicator of Jersey domestic development in that decade. It is evidence of capital accumulation at the local level, of the growth of local linkages in domestic business, and of spread effects reaching down to the local Jersey level from the increasing prosperity that the cod and related carrying trade had brought to the Island. Proudfoot, for example, in his study of Jersey, maps the rapid growth of local enterprise in St. Helier by mid century, and the almanacs of the 1830s onwards list increasing domestic expansion of small businesses and services year by year.

In effect there appeared to be in Jersey the kind of transportation development (albeit a sea based, and therefore vessel focused, maritime development) and final demand generation that was absent in the New World Jersey fishing colonies — even in Gaspé, where there was the greatest likelihood of such development. It was the produce of her distant fisheries which gave Jersey that market commodity, and in sufficient quantities, which she herself lacked. She could then use this product as a marketable good with which to operate an entrepôt trade, and to supply inputs into her nascent shipbuilding industry.

With the machinery of her entrepôt trade in position, her expanding fleet could then take her into the carrying trade, and into the wealthy commerce of the British Empire. The carrying trade, of course, burgeoned along with the expanding shipping fleet,[48] and Jersey vessels became the sailing ship equivalent of the modern tramp steamer, venturing into the world shipping lanes in search of freights. Crew Lists for Jersey vessels give numerous examples of this: vessels sailing from St. Helier for London, Wales, Rosario and Singapore,[49] or from London for Montevideo, the Pacific and beyond.[50] Nor were the cod trade vessels always excluded, for examples can be found like the *Canada* (J.P. Carrel, master) of 156 tons, which in 1880 sailed to LaPoile, Newfoundland, and thence into the cross trades of the North and South Atlantic "to and fro as freights may offer" for two years, her crew under the control of DeGruchy, Renouf, Clement et Cie., or their agents in Newfoundland.[51] Jersey ships sought freights of wheat and timber in Dantzig; sugar, rum and timber in Demerara; they sailed to Alexandria, Constantinople, Odessa, Melbourne and the China Seas in search of freights; and they carried coal, fish, wine, bricks, cordage and countless other articles of trade from Jersey and Britain during this heyday of the British Empire.[52] Commercial capital flourished, and large stores were established, many being names long associated with the cod trade: DeGruchy and LeGallais for example, who after 1835 are found in the Jersey ship registers as building and owning vessels.[53]

The cod fisheries, moreover, provided Jersey with a major market for home produce as well as such foreign produce as was needed. More

importantly, they provided her with a stimulus in the form of a major demand for home manufactures. Jersey could by law export to Britain only her produce *and* manufactures, that is, produce of the Island manufactured in the Island. However, to the fisheries Jersey could export the produce *or* manufactures of the Island, regardless of where the raw materials were acquired. The distinction was important,

> for, while we cannot, in the former case (i.e. exports to England) manufacture a commodity from foreign articles for a free importation into England, we can in the latter (i.e. exports to the fisheries), which enables us to support our establishments with more facility, by supplying them with flour and biscuit made here from foreign wheat and with other articles, at a cheaper rate than we otherwise could: but it must also be mentioned, that all articles for the use of the fisheries can be imported there duty free.[54]

Table 3 shows the amount of this export to the fisheries in 1833, 1834 and 1835, along with some estimated values of these exports. Even potatoes, the 'prime crop' of Gaspé, were imported from Jersey where potatoes were a major local agricultural product. All other commodities, except salt, had been processed to a degree in Jersey before export, and even the flour barrels were made in Jersey, as were the tubs required for the packing of codfish for the Brazil market.[55] Clothing was usually a finished good, rather than material for home production in Gaspé:

> The preparation...of the wearing apparel, gives employment to several persons, and to many during the winter evenings, in addition to their usual daily occupations. Most of these goods are sold to the fishermen resident at British North America, and go toward paying their wages, or the price of the fish which they catch.[56]

Consequently, either directly or indirectly, the cod fisheries created the demand for ships and for goods (both producer and consumer) that in turn created the expansion of Jersey mercantile interests out of the 'simple' cod trade triangle into an extended overseas pattern of commerce and trade. Jerseymen were therefore justified in remarking that,

> our fisheries are not only beneficial from the capital and industry which they directly employ, but they are the means of increasing and supporting other valuable branches of our commerce and industry.[57]

Figure 2 shows the linkages of shipbuilding and its ancillary trades in conjunction with the local industries that arose out of the processing of

TABLE 3

JERSEY EXPORTS TO THE FISHERIES: 1830s.

Year	Potatoes	Flour	Biscuit	Pork	British Salt	Foreign Salt	Bricks	Cider
1833	732 tons	196 tons	257 tons	760 barr.	447 tons	420 tons	70,900 tales	6762 galls.
1834	586 tons	178 tons	273 tons	928 barr.	1318 tons	288 tons	21,500 tales	2155 galls.
1835	325 tons	312 tons	237 tons	—	395 tons	722 tons	39,450 tales	8400 galls.

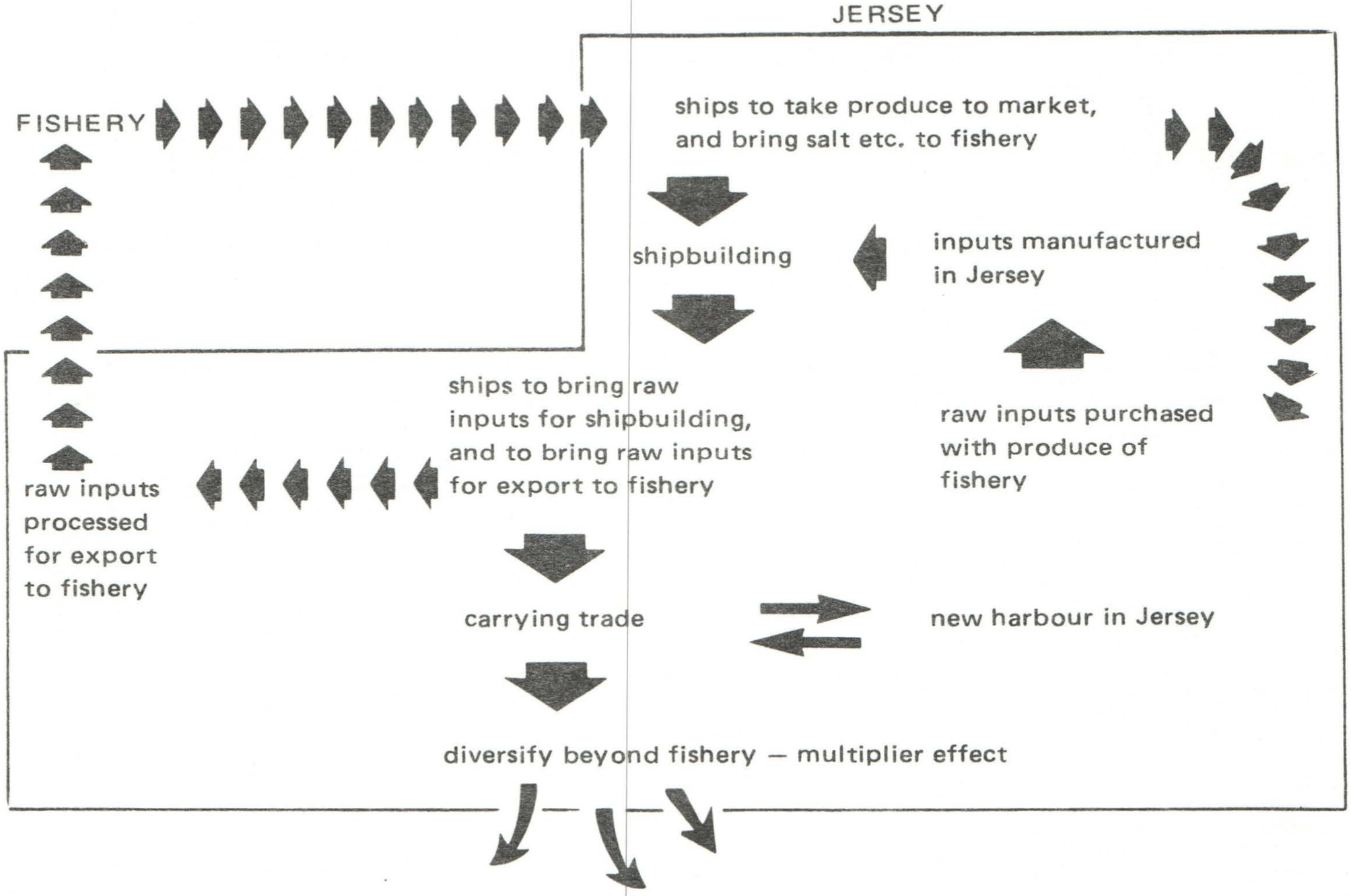
Year	Sail Cloth	Ready Made Sails	Cottons (Shirts etc.)	Cloth	Woollen Clothing	Linen Clothing	Worsted Clothing	Boots	Shoes
1833	7531 yards	4493 yards	19,653 yards	341 articles	2978 articles	3864 articles	2337 articles	1013 pair	12,271 pair
1834	7829 yards	4913 yards	17,026 yards	53 articles	2866 articles	3743 articles	2005 articles	871 pair	11,309 pair
1835	8963 yards	6552 yards	16,589 yards	97 articles	2662 articles	2384 articles	1629 articles	705 pair	10,598 pair

EXPORT (1835)	APPROX. VALUE (£ Sterling)
Potatoes	490
Flour	3000
Biscuit	2000
Cider	80
Boots	630
Shoes	2120

Source: *Guernsey and Jersey Magazine, op. cit.* p. 310.

Figure 2

IMPACT OF BACKWARD LINKAGE OUT OF FISHERY - JERSEY, 1830 - 1860



inputs into the New World production area.

It has been shown elsewhere[58] that no final demand structures in Gaspé resulted from the cod fishery so long as the firms there maintained the truck system and an import/export monopoly. Instead, savings generated in the business were either re-invested in the staple production unit, or else they accrued to Jersey as wages, conspicuous consumption or capital accumulation. In 1837, it was noted that,

> most of the men who go over from Jersey in the beginning of the year, to be employed either as landsmen or fishermen...return home at the latter end of the year...While they are absent, their wives and families are not idle...they knit lamb-skin stockings, mittens and jackets for them, a great portion of which these fishermen sell previously to their return home, at a profit.[59]

Thus, the need for basic clothing in the New World also produced a *cottage* industry response in Jersey, the profits from which returned home to Jersey with the fishermen, and which was over and above their wages. Crew Lists for Jersey often show the wages of seamen being paid on return to the home port, thereby enhancing final demand structures at home rather than at the fishery — a not surprising situation when it is considered that many of these fishermen were seeking supplementary income for a wife and family in Jersey.

Conspicuous consumption, in classic fashion, took the form of such things as the large "cod houses" of Jersey — the Island equivalent of the West Country mansion.[60] While not built in the 'grand manner' of their Dorset counterparts,[61] the Jersey cod house was a spacious building, often a farm, equipped with coach house, orangerie, and functional farm buildings. "Petit Menage", the home of Raulin Robin, was a moderate sized farm, valued in 1886 at about £10,120 including contents. Insurance on it in 1868 had amounted to £3000, and had included the house and adjoining offices, the household goods, books, clothes, etc., outhouses, coach house, farm buildings (potato and cattle stores mostly), and cottages occupied by labourers "in service of the assured".[62] But the Robin family were not given to ostentation, nor in general were Jerseymen as a race. Perhaps the best assessment that can be made when considering conspicuous consumption in Jersey was that the Jerseyman was more enamoured of capital accumulation than of extravagant display.

Capital accumulation in Jersey out of the cod trade was not inconsiderable, as the earlier review of the Jersey economy suggests. One estimate of the value of the trade to Jersey in the 1830s amounted to at least £100,000 per annum, and the value of cod imported into Jersey alone in 1837 was over £40,000.[63] The personal capital assets of Raulin Robin at the time of his bankruptcy in 1886 amounted to £41,960. With personal

debts removed, his estate was valued at £31,233, prior to bankruptcy proceedings, and including £27,925 which he had advanced to Philip Robin and Company (the family firm) and Charles Robin and Company (the major company).[64] In 1833, McConnell had remarked of the Gaspé business that "The Messrs. Robin have deservedly acquired family fortunes in this district" and of P. and F. Janvrin he observed that "The extent of their business and amounts of capital are unlimited."[65] Certainly the merchants' capital flowed from the periphery to the core, as metropolis/hinterland theorists suggest, but in Jersey the capital was often reinvested, and sometimes to a considerable degree if Raulin Robin's advances to C.R.C. and P.R.C. of £27,925 (that is, 89.4% of his estate in 1886) is typical of investment patterns among Jersey merchants of the time.

Along with increased capital accumulation, and the consequent investment in industry and commerce, came the creation of finance capital in Jersey. The firm of Janvrin, Durell et Cie, for example, was behind the Commercial Bank, which grew directly out of the cod trade. In 1816, the firm of P. and F. Janvrin began selling off its sailing vessels and stores, and in 1817 it was listed in the Almanachs of Jersey under "Banquiers de la Ville".[66] In 1841, Frederick Janvrin sold the Gaspé establishments — houses, stores, wharves, cookrooms, etc., at Grand Grève, Gaspé Basin, Malbaie, Cap Rosier and Griffon's Cove — in one lot, with inventories and debts.[67] They were sold, of course, in Jersey, and with the sale the Janvrins completed their move from merchant to finance capital. Their bank later became Robin Frères. Other banks resulted from similar shifts: the Old Bank (Hugh Godfray and Sons), the Mercantile Union Bank (Nicolle, De Ste Croix, Bertram and Co.) and the Jersey Joint Stock Bank (Mathews, DeCarteret and Co.).

In summary, when recalling the trading geometries of Jersey, and the non-expansion of the Gaspé economy, the growth of the Jersey economy demonstrates the purpose of colonial states and metropolitan monopoly structures. Put bluntly, from Jersey's perspective, the value of the New World fisheries was to develop industry and wealth in Jersey. That is, limiting activity in the colonies, while advantageous to the Jersey economy, was a cod trade merchant's strategy for protecting his supply function at Gaspé and maintaining the profitability of his firm. It was not done from any altruistic or patriotic desire to expand the Jersey economy.

It now becomes possible to identify the dual effects of the cod trade on Jersey and its fishing colonies. The weakness of forward linkages can be clearly attributed to the staple itself, since they appear neither in the New World, nor in Jersey, nor in the markets for the staple. The backward linkage effects, however, are a different matter. Transportation

development in the form of "no roads" can be attributed to the nature of the staple; but the maritime equivalent in the form of building ships to sail the sea lanes should have been located in the colonies — and indeed for a period of time in the early years of the nineteenth century it was. The backward linkages out of shipbuilding should likewise have accrued to the colonies, at least to the extent that the industry serviced the cod trade. But only the cutting of timber has been identified as occurring in the area, since blacksmiths, carpenters, etc., were transported from Jersey, as was much of the physical equipment that was input into the industry — sails, anchors, etc. Even other local shipbuilders, at least in Gaspé, who were contracted to the Jersey firms were supplied from Jersey, and thus no real backward linkages were developed through their enterprise.[68] The extent of the increasing loss to the colonies, while not yet quantifiable, can be estimated from the extent of the ancillary trades in Jersey, always mindful that a parallel development of the carrying trade cannot be assumed, and thus a shipbuilding 'boom' of the kind experienced in Jersey cannot be claimed. Thus harbour improvements in Jersey, which were at least in part a result of the growth of shipbuilding, were mostly due to the expanded carrying trade which, while a natural outgrowth of the cod trade, was undoubtedly enhanced by metropolitan diversification potential.

Final demand linkages should also have accrued to the colonies — those arising from the production of producer and consumer goods for fishermen on the coasts. Some estimate of the cash value of these goods can be gleaned from the estimated values given earlier for the exports to Gaspé from Jersey, the manufacture of which enabled the metropolitan industry to flourish accordingly. It must be noted, however, that as the century progressed there was an increase in the importation to the Jersey fisheries of British manufactured goods sent through Liverpool. Neither the colonies nor Jersey were to benefit from any linkage effects derived through the manufacture of these English goods. Otherwise, final demand structures, capital accumulation and investment were all confined to Jersey.

What happened, then, was that the 'trade and navigation of the Island' which the Jersey Chamber of Commerce fought so determinedly to protect and promote, could not have been achieved on the basis of local production. The far flung world trade linkages seen in firms such as Nicolle or DeGruchy, Clement, Renouf, were inherent in the cod trade. Home and local linkages, however, were not necessarily inherent in it, and in fact the cod trade could be argued to militate against any domestic production in the colonies and any substantial industrial investment in Jersey. It may be that the explanation of Jersey's lack of movement towards an industrial revolution may have been partly a result of the flourishing

trade economy that developed around the cod trade. Such a contradiction could be thought of as characteristic of the Jersey combination of cod and carrying trades: the effective *ocean* harvest and *ocean* transport, with its related shipbuilding and carrying trades implied a minimal interest in *land* harvest, *land* development and hinterland penetration, in either the New World or Jersey. Perhaps we have to wonder about the existence of a similar contradiction in the case of the Atlantic Provinces of Canada at the end of the nineteenth century. More generally, it may be that in the situation of small states like Jersey the only path to development must be one which relies on exogenous resources and a skillful manipulation of an economy based on 'invisibles' created around such a resource. In Jersey's case this has led to a twentieth century move into a lucrative finance 'industry' based, in parasitical fashion, on other countries' wealth and transnational locational decision making. In the process, as classical export-base theory would predict, the old exogenous staple base has become unnecessary — and indeed it was destroyed.

NOTES

* *The Guernsey and Jersey Magazine* (Vol. 5, 1837) p. 306.

1. The threat of emigration is an ongoing theme of writers in and on Jersey from about 1700. Even today, the Jersey States sets a ceiling on the population of the Island of 80,000 persons. It monitors immigration into Jersey accordingly.

2. Letter of Francis Giffard, President of the Jersey Chamber of Commerce, to the Lieutenant Governor of Jersey, and containing a Petition from the Chamber to be presented to H.R.H. the Prince Regent in Council. Chamber of Commerce Minute Books, 23 March, 1816. (Hereafter cited as the "Minute Books"). The originals are in the Chamber of Commerce, St. Helier, Jersey.

3. "Minute Books", Annual General Meeting of 1880.

4. See R.E. Ommer, "A Peculiar and Immediate Dependency of the Crown" (Paper presented to the Atlantic 18th Century Studies Conference, Halifax, Nova Scotia, April 1979). See also R.E. Ommer, "From Outpost to Outport: the Jersey Merchant Triangle in the 19th Century" (Unpublished Ph.D. dissertation, McGill University, 1979).

5. See Ommer, "From Outpost to Outport", especially Ch. 6.

6. *loc. cit.* See also James M. Gilmour, *Spatial Evolution of Manufacturing in Southern Ontario, 1851-91* (Toronto, 1972) Ch. 2.

7. *The Guernsey and Jersey Magazine* (Vol. 5, 1837) p. 306.

8. *loc. cit.*

9. L.J. Proudfoot, "The Historical Geography of Jersey" (Unpublished B.A. dissertation, The Queen's University, Belfast, 1972). For a comprehensive history of Jersey, see G.R. Balleine, *The History of the Island of Jersey* (London, 1950) and pp. 130-160. For land tenure in medieval times, and a detailed discussion of the complexities of the Jersey feudal situation, see G.F.B. DeGruchy, *Medieval Land Tenures in Jersey* (Jersey, 1957).

10. Balleine, *History*, pp. 236-37.

11. *Guernsey and Jersey Magazine, op. cit.*, p. 308.

12. *loc. cit.*

13. "Minute Books", January, 1796.

14. *Ibid.*, 20 April, 1805.

15. *Ibid.*, Philip DeQuetteville to the President of the Board of Trade, December, 1841.

16. *Ibid.*, Petition to the Board of Trade, 1839.

17. *Ibid.*, 18 January, 1841.

18. *loc. cit.*

19. Jersey Letters Inwards, Custom House, London. Letter from Philip Pellier, Jersey, to the Principal Officers, H.M. Customs, 2 July, 1841, p. 156.

20. "Minute Books", 1 July, 1845, Book V, p. 14.

21. *loc. cit.*

22. *Ibid.*, April, 1851.

23. *Ibid.*, Representation to the Earl of Clarendon, Principal Secretary of State for Foreign Affairs, 14 April, 1843, p. 110.

24. *Ibid.*, Letter to the Postmaster General, 12 June, 1860, pp. 161-63.

25. Ommer, "From Outpost to Outport", p. 234.

26. "Minute Books", Letter to Lister, 1860, p. 183. See R.E. Ommer, "Nouvelles de Mer: the Rise of Jersey Shipping, 1830-1840" Lewis Fischer and Eric Sager, Eds., *The Enterprising Canadians* (St. John's, Maritime History Group, Memorial University, 1979) pp. 149-82 for the trades involved.

27. The rate of increase is dramatic, but even less reliable given the immense discrepancy in the population sizes involved. The figures are: England and Wales 49.4%, Scotland 38.1%, Guernsey 61%, Isle of Man 30%, and Jersey 100%.

28. The absolute increase in the male population between 1821 and 1851 was 23,304 persons; in the female population it was 15,253 persons.

29. A.O. Hirschman, *The Strategy of Economic Development* (New Haven, Connecticut, 1958) pp. 98-119. M. Watkins, "A Staple Theory of Economic Growth", *Canadian Journal of Economics and Political Science*, (Vol. 29, 1963) pp. 141-58. R.E. Baldwin, "Patterns of Development in Newly-Settled Regions", *Manchester School of Economic and Social Studies* (Vol. 24, 1956) pp. 161-79.

30. See, in particular, R.E. Caves and R.H. Holton, *The Canadian Economy: Prospect and Retrospect* (Cambridge, Mass., 1961) for an application of linkages in the fishery. The changeover from the 'green' fishery in the Gulf of St. Lawrence to the 'dry' cure is an example of forward linkage, in that processing was taken a stage further locally and thereby increased the value of the export staple.

31. C.R.C. (Paspébiac) to James MacMillan, Campbelltown, 11 February, 1850. C.R.C. Letterbooks, Public Archives of Nova Scotia.

32. "Minute Books", 1 July, 1845. See also *The Guernsey and Jersey Magazine, op. cit.*, p. 370; Jersey Ship's Registers, 1834; and Ommer, "Nouvelles de Mer", pp. 173-75.

33. Ommer, "Nouvelles de Mer", p. 176.

34. *Ibid.*, p. 173.

35. Interviews, November to December, 1976 and October to November, 1977, with Mr. Philip DeVeulle, Jurat Henry Perrée, Mr. Nicholas Robin, Mr. Guy Janvrin Robin, conducted in Jersey. I am greatly indebted to these persons for their assistance and cooperation.

36. Ommer, "Nouvelles de Mer", pp. 173-75.

37. See, for example, A. Podger, "Shipbuilding in Jersey", *Annual Bulletin of the Société Jersiaise* (1975) pp. 229-35.

38. *Ibid.*, p. 234.

39. Ommer, "Nouvelles de Mer", p. 154.

40. *Ibid.*, pp. 166-67.

41. Ommer, "From Outpost to Outport", Ch. 4.

42. See advertisements by firms in the Jersey newspaper *Chronique de Jersey, passim.* These trading patterns had a distinct seasonality and complementarity. See Ommer, "Nouvelles de Mer", pp. 166-7.

43. Ommer, "From Outpost to Outport", Ch. 4.

44. Podger, "Shipbuilding", p. 234.

45. *Jersey Almanachs, passim; Chronique de Jersey,* "Nouvelles de Mer" and "Mouvements de Port", *passim.*

46. Pers. Comm., Mr. John Norman, President of J. Norman Ltd., St. Helier, Jersey, 4 November, 1977.

47. See advertisements in the *Chronique de Jersey,* 1830-1840, and footnote 40, above.

48. "Nouvelles de Mer" of the *Chronique de Jersey* for 1840, 1850 and 1860. Also the Crew Lists of Jersey vessels, Archives of the Maritime History Group, Memorial University of Newfoundland. (Hereafter cited as the M.H.G. Archives).

49. Crew Lists, the *Hasty,* official number 21153, October 1864, M.H.G. Archives.

50. Crew Lists, the *William,* official number 11372, November 1872, M.H.G. Archives.

51. Crew Lists, Jersey vessels, M.H.G. Archives.

52. See Jersey ships and cargoes, *Chronique de Jersey,* 1830-1870; *Clyde Bills of Entry and Lading, passim.* (1840s onwards), the Glasgow Room, the Mitchell Library, Glasgow, Scotland, on microfilm; *Mitchell's Maritime Register* (London, 1860-70).

53. Jersey Crew Lists, M.H.G. Archives.

54. *The Guernsey and Jersey Magazine, op. cit.,* p. 310.

55. *loc. cit.* Also pers. comm. Mr. John Norman, 4 November, 1977.

56. *Ibid.,* pp. 310-11.

57. *Ibid.,* p. 313.

58. Ommer, "From Outpost to Outport", Ch. 6.

59. *The Guernsey and Jersey Magazine, op. cit.,* p. 309.

60. Joan Stevens, *Old Jersey Houses* (St. Helier, 1965).

61. D. Beamish, D. Hillier, J. and H.F.V. Johnstone, *Mansions and Merchants of Poole and Dorset* (Poole, 1976) Vol. 1.

62. Documents in the possession of Mr. Guy Janvrin Robin, "Petit Menage", Jersey. Hereafter cited as the "Petit Menage Documents". These include a box of Raulin Robin's documents dating to the period of the 1886 bank crash. I am indebted to Mr. Guy Janvrin Robin for permission to examine these family papers.

63. *The Guernsey and Jersey Magazine, op. cit.*, p. 312.

64. Petit Menage documents. See also Ommer, "From Outpost to Outport", Ch. 3, estate of John Fiott, for capital accumulation in the fishery.

65. Report of J.D. McConnell to F.W. Baddely, quoted in the *Quebec Mercury* (18 November 1833).

66. Margaret Syvret, "Valpy dit Janvrin" (Unpublished manuscript to be lodged in the Société Jersiaise upon completion). I am indebted to Miss Syvret for giving me a copy of the unfinished work.

67. Advertisement of sale — document in the Société Jersiaise, St. Helier.

68. Perrée Papers. A collection of letters and a ship account book of the brigantine *Chance*. I am indebted to Jurat Henry Perrée for permission to examine these. They are now lodged in the Société Jersiaise, St. Helier.

4. DISCUSSION FOLLOWING THE PAPER BY OMMER

RUFF expressed surprise that shipbuilding was done in Jersey itself when there was so much construction capacity and materials available in Atlantic Canada.

OMMER replied that one had to think of Jersey as primarily based on a codfishing industry. Had Jersey been primarily concerned with a timber and a shipbuilding industry, then it might well have built in North America and engaged in the standard transfer trade across the Atlantic. But even in the transfer trade ships were brought across, dismantled and rebuilt. This happened in Jersey as well. She suspected that shipbuilding in Jersey became economic when the Island got involved in the carrying trade. As long as the shipbuilding industry was servicing the fishing industry, and only the fishing industry, then the economics demanded that construction remain in the New World. But when the carrying trade began in Jersey and when cheap supplies of timber from the Baltic became available, then the economics of the situation meant that in fact the people who were demanding the ships were no longer resident in North America. Hence Jersey shipbuilding takes off with the codtrade and is sustained after 1840 with the development of other trades.

WILLIAMS inquired whether it was not also connected with the reductions in the timber duties in 1842.

OMMER agreed, but noted that the growth of Jersey shipbuilding began before that.

BUCKNER was intrigued by the fact that the backward linkages out of the codfish industry were concentrated in Jersey. He noted that Acheson has established for the New Brunswick shipbuilding industry that anchors, sails and other hardware were all imported from Britain, and wondered why pressures were not built up to have the linkages re-located to the Maritimes?

OMMER observed that in Gaspé the Jerseymen maintained control up to 1850 by operating the truck system. There was no cash flow into Gaspé, and hence they had a totally controllable fishing population. Moreover, the Quebec government at that time was singularly uninterested in the fishery. When you have a totally non cash economy and an unsympathetic, unresponsive government, as happened in Gaspé, you are going to have an import-export monopoly. This breaks down very rapidly after 1850, and from there on the picture is one of decline for Jersey.

CRAIG was not entirely convinced that the rise of Jersey shipping had much to do with the rise of the fisheries. He believed there was a pre-existing industry in Jersey, and the Channel Islands generally, and that in the seventeenth century and especially the eighteenth, they owned a lot of shipping that acted as common carriers in the way characteristic of tramp steamers in the nineteenth century. He wondered whether Jersey's interest in such things as smuggling and privateering, which is well documented for the eighteenth century, did not in fact generate a great deal of capital and expertise, and that in fact Jerseymen were sailing around the world in very substantial numbers before the development of the codfisheries. The cod trade was a new outlet for them, rather than being the first impetus towards economic development.

OMMER did not dispute that there were other and earlier sources of growth, but insisted that the codtrade was the prime impetus. The problem with smuggling and privateering was that they were insecure; and with trades like sugar and tobacco they were dependent upon external ownership. Certainly if you look at the composition of the Jersey Chamber of Commerce in 1768 you see firms involved in an amalgam of smuggling, privateering, the Caribbean and the codtrades. It is almost impossible to pull apart the codtrade firms from the Caribbean firms because of the pattern of linked interests. But the key point is that shipbuilding, as opposed to shipowning in Jersey, does not occur until about 1814, and does not occur seriously until about 1834. Privateering and smuggling were major initial sources of capital, but the codtrade was the prime industry which generated employment for a rapidly growing population, and which provided linkages that for the first time allowed Jersey to manufacture at home and re-export.

ALEXANDER commented that he found the Jersey experience fascinating for two reasons. The first was that it showed a very small country, without natural resources and a large domestic market in which to build a finished goods industry, nonetheless accumulating wealth and a comfortable standard of living for a growing population on the basis of an export service industry. He wondered if in development economics far too much attention is given to commodity production and not enough to import substitution and exports of services. Secondly, what is very clear from the development of Jersey is that it meant underdevelopment for the Gulf, not because the terms of trade were manipulated, or because factors of production were paid less than their marginal products, but because industry linkages were monopolized by the "metropolitan" country.

OMMER stressed that the key was the truck system. With the Reciprocity Treaty of 1854 New England traders came into the Gulf trading for cash. Cash entered the economy for the first time, and the merchants were in trouble. The important thing about truck is not that it may be used to exploit labour, but that it was used to control a common property resource. The migratory ship fishery of the eighteenth century was undermined by the growth of a resident population. To maintain control of the resource what the merchant had to do was to move himself one step further back in the access process and say, "alright you are obviously going to catch the fish, but you need nets, you need gear, you need food, you need clothing and all the other necessities of life. I will provide you with those. I will give them to you and you will give me the fish." In other words, the supply function of the merchants was indirectly an attempt to protect his access to the resource, and the truck system is more properly understood in terms of access to a resource rather than in the classic sense of exploitation.

BATTICK asked about population growth and emigration from Jersey, and whether all the skills necessary for shipbuilding and other backward linkage activities existed in the Jersey population, or whether skilled craftsmen had to be imported?

OMMER replied that good demographic data does not yet exist for Jersey. Emigration seems to have been limited to women, in and around the 1850s, going to the South of England and London as servants. The men were employed either in small farm activities, the shipbuilding industry, or as crew. With respect to the latter, the codfishery ships are always dominated by Jerseymen, whereas the carrying trade employs an international crew. There is very little evidence of skilled craftsmen having been brought in.

CAPIE questioned the portrayal of the Jersey economy as being 'parasitic' and 'imperialist'.

OMMER thought it was a fair portrait, in that Jersey developed its small industries and its financial institutions on the basis of an overseas resource. The Jersey codfish firms took three different directions. One firm, for example, went into the central brokerage business in London. Another got out of the codfishery in 1850 and turned itself into a bank. The third major group of firms, of which C.R.C. was the major one, remained with the fishery as the prime focus. I think indeed you can say that this kind of small economy must be parasitic, for it can only generate its linkages so far.

FAIRLIE asked why the development of Guernsey was different from Jersey, and wondered if it was because of geographic differences.

OMMER replied that geographically the islands are very similar. Guernsey tried to get into the codfishery but failed. She was uncertain

exactly why this was so, but thought it might be nothing more than the fact that Jersey had the better businessmen. That was what Charles Robin thought himself.

ALEXANDER asked if Jersey's success could be in any way related to its population stock and its cultural and educational characteristics?

OMMER said that little is known about relative educational levels, but that Jersey managed to generate an artisan class more quickly than Guernsey after the influx of Huguenots. In addition, Jersey was extremely precocious in developing the Chamber of Commerce which effectively challenged the power of the landed gentry and the stranglehold of the old seigneurial system.

GREENHILL inquired whether there was any national income data for Jersey which would allow for a more precise estimate of the contribution of the fishing industry? He also wanted to know whether there was any evidence of capital accumulated by Jerseymen being invested in the mainland U.K. economy.?

OMMER regretted that there was no national income estimate, and this was something that badly needed doing. There was capital export into London in terms of brokerage firms and banks. But the firms which remained in the codfishery tended to plow their profits back into the fishing industry, or into shipbuilding and to some degree diversification into other trades. In general, she thought that capital accumulation from codfish firms accrued to Jersey, whereas firms that diversified tended more to capital export. It is also interesting that the principals in codfishery firms did not much go in for conspicuous consumption like their counterparts in the West Country of England. You don't find enormous mansions in Jersey; you find something they call 'codhouses', and they are really quite modest.

PALMER asked if she could return to the question of entrepreneurship, and whether there was something special about Jerseymen?

OMMER thought there was. Jerseymen have always lived at the interface of two giants, France and England. This has given them a capacity to manipulate, and to develop entrepreneurial characteristics and skills which are still there today, as can be seen in the way Jersey manipulates wealthy Englishmen who move to Jersey.

BUCKNER noted that so much had been said about the uniqueness of Jersey, in terms of its constitution, people, and geography, that he had begun to wonder if this was a unique case from which no generalizations could be drawn.

OMMER did not want to carry the argument that far: it is uniqueness at the margin which is important. In terms of the way in which a merchant fishery operated, Jersey was not unique at all; it was using the old

techniques with slight adjustments of strategy. They moved away from fishing and into the supply function of the merchant firm in the same way as the merchant firms did in Newfoundland.

5. OUTPUT AND PRODUCTIVITY IN THE YARMOUTH OCEAN FLEET, 1863-1901

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OUTPUT AND PRODUCTIVITY IN THE YARMOUTH OCEAN FLEET, 1863-1901

David Alexander

In the second half of the nineteenth century the Atlantic Provinces of Canada had a small, prosperous economy which was export based, internationally competitive and efficient. It was characteristic of new overseas countries to establish their export economies on the shipment of foodstuffs and raw materials to Northwestern Europe. The Atlantic Provinces did that, but their location athwart the major shipping lanes of the Northwest Atlantic also offered an opportunity to develop an export service sector in shipping. The town of Yarmouth while scarcely more than 5,000 people, emerged as one of the region's major ocean ports of registry. The objectives of this paper are to describe the patterns and trends in the ocean trades between 1863-1901 and to give preliminary estimates of the rate of growth of output and capital productivity.[1]

In 1863 the Yarmouth registry had ninety seven ocean going barques and ships totalling 56,000 gross tons. At the port's height of development as a shipping centre in 1879 the fleet had expanded to 170 vessels and 163,000 tons. The average ocean vessel had risen in size over the period from 570 to 960 tons. The expansion through this period was not a steady progression, for new tonnage brought into the fleet was declining from 1863 to 1869. New investment accelerated again from that year to an historic peak in 1874, and then sank to another trough in 1877. The next year saw the last major burst of investment and these additions to the fleet brought the tonnage on registry to its apex in 1879. By the next year the port's ocean shipping was in sharp and steady decline, falling to ninety two vessels and 103,000 tons by 1889. The rate of decline was less steep than the rise because owners, while holding back on new investments, did not rush to dispose of assets. Moreover the average vessel size continued to climb from 960 tons in 1879 to 1,135 tons in 1888. And while the trend in new investments was a declining one, there were minor peaks when new tonnage was added to the fleet, such as the 10,000 tons in 1881 and 8,000 tons in 1884. Still the shapes of the distributions are distinct: new investment peaked in 1874 and tonnage on registry in 1879. The collapse in new investment and fleet size in the 1880s and 1890s was at some seventy percent of the growth rate in the 1860s and 1870s.[2]

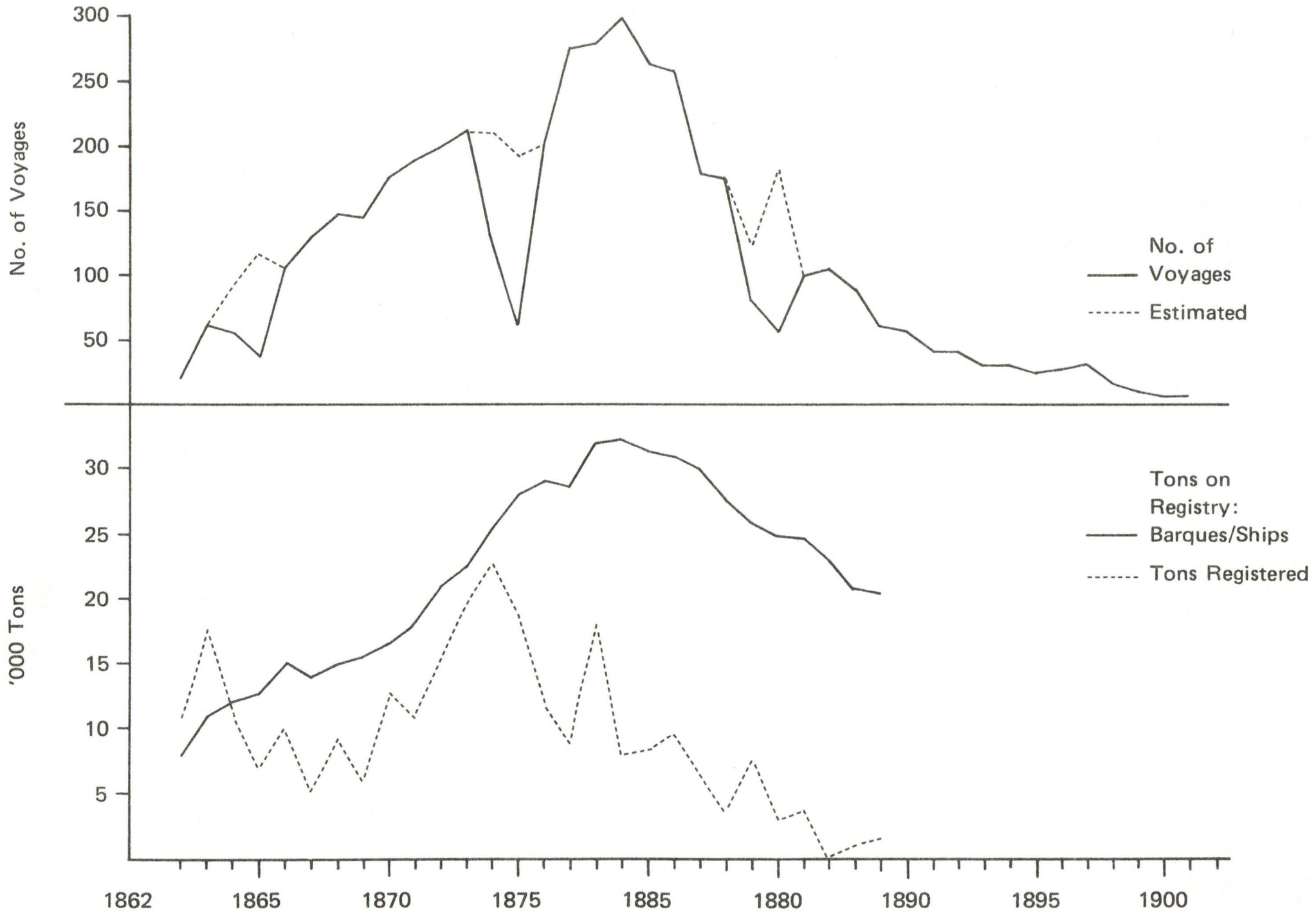
From 1854 to 1889 the port registered 408 vessels of 250 tons or more. Voyage records for 386 of these vessels,[3] or ninety percent, have been preserved. For vessels registered from 1860, over ninety six percent

left voyage records, and for those registered after 1865 the representation is complete. Without a very elaborate analysis it is more difficult to assess how faithfully the surviving records correspond to the histories of the individual vessels. It is estimated at a later point that some 470 voyages were 'lost' to the file through the retention in the United Kingdom of mid decade samples of the Crew Lists and Agreements. For the eighty nine vessels registered before 1863 the file must be incomplete since the holdings of Crew Lists only begin in that year. These represent the known gaps. The coding process indicated that for many vessels (except for the known gaps) the voyage records seemed to be all but complete ranging from the first voyage out of Yarmouth to the last when the ship sank or was sold. Over the period 1863-1901 we know that the average vessel made slightly over two voyages a year and had an average registry life of ten years. If that average vessel was never tied up for repairs or lack of cargo it could undertake some twenty voyages over its lifetime, and hence the entire fleet registered from 1860 some 7,700 voyages. Since some 4,172 voyage records have survived, the file cannot contain less than 55% of the port's voyage history. Moreover the average vessel on file left record of 12.3 voyages. Adjusting for the number of voyage records believed to be lost through the mid decade sample, this would rise to 13.7 voyages per vessel, and in aggregate some sixty percent of the maximum number of voyages possible for the fleet. Since ships were tied up for lack of freight or for repair and for sale, our sample of voyages undertaken by the fleet must be larger and is likely to be over seventy percent. If this is true then there is no reason to hesitate before generalizing about the Yarmouth industry from the data which has been collected.

Since the sample is apparently a very large fraction of the voyage population, the shape of the voyage curve is very similar to that of tonnage on registry. Ignoring for the moment the deep troughs, the voyage curve generally parallels the new investment curve to 1874 after which it lags behind investment by one or two years. The trough years 1864-65, 1874-75 and 1884-85 are completely artificial, resulting from the mid decade samples retained in the United Kingdom. These gaps are unfortunate for we shall never know as precisely for these years as we do for others, the level and geographic distribution of shipping activity. It is possible to make a crude estimate, however, which should predict the direction of change if not the actual level. The downswing in 1874 for example, includes voyages begun in the last months of the year and completed in 1875, and thus 'lost' to the sample by their retention in the United Kingdom. Similarly the small number of voyage records for 1875 mainly represent voyages begun late in 1875 and completed in 1876 and thus saved in the archive. The median voyage length was 120 days and this

FIGURE 1

YARMOUTH VESSELS AND VOYAGES



would imply that the bulk of voyages beginning in September through December would result in missing records. On average thirty five percent of voyages began in those months. By the same reasoning the 1875 sample could represent the thirty five percent of voyages begun in the last quarter of 1875, leaving sixty five percent of the year's voyages as missing records. To estimate the actual level of voyages in those years Table 1 inflates the recorded number of voyages by the appropriate proportion. These estimates correlate in a reasonable way (in terms of the direction of change) with both the curve of tonnage on registry and with new investment. The adjustments also coincide with swings in the United Kingdom trade cycle, which were bound to have a strong impact on both

TABLE 1

ADJUSTED VOYAGE STARTS FOR MID DECADE YEARS

YEAR	RECORDED	ESTIMATED
1864	58	90
1865	40	115
1874	136	210
1875	68	195
1884	81	125
1885	63	180

Source: Agreements on Account of Crew for Yarmouth registered vessels (Maritime History Group Archive, Memorial University of Newfoundland). Unless otherwise indicated tables in this paper are constructed from this source.

world and Canadian shipping activity. In Britain 1862 was a trough year and 1865 a peak; there was another trough in 1869 and a peak in 1874; and the next cycle had a peak in 1883 and a trough in 1886.[5] Our estimated voyage years swing in direction in ways which are compatible, and therefore in all subsequent calculations these estimates are used in place of the recorded data.

This adjusted voyage distribution presents a positively skewed distribution rising from sixty three voyages in 1863 to a peak of 295 in 1879, for an average annual rate of growth of 8.1%. In this powerful and generally stable upward sweep minor troughs appear in 1866 and 1869. A more prolonged pause and slump stretched over 1874-76 prior to the

final upward sweep. On the downward slide voyage starts decline at 13.9% per annum to only fifty seven voyages in 1890, with the only notable interruption being the estimated peak in 1865. Disintegration proved to be swifter and more relentless than development. In the period of expansion with voyage starts rising at 8.1% and tonnage on registry at 7.1%, Yarmouth's owners seem to have sensitively adjusted supply in a rising market. In the decade of decline fleet depletion was at a rate of only -4.9% compared with the decline in voyage starts of -13.9%, which implies some severe problems in capital utilization.[6] But before that conclusion can be made it is necessary to develop the basis for a more sensitive index of output and fleet productivity.

How was Yarmouth's fleet employed? We can begin with a static analysis which covers the entire period 1862-1901. Over this forty years there were 4,340 voyages and passages outward bound from a total of 159 world ports. The United Kingdom and Europe accounted for eighty percent of the clearances and sixty seven of ports cleared. In fact voyage starts were even more European centred than this figure indicates. The bulk of Canadian voyage starts are accounted for by new vessels outward bound from their port of build for either Saint John or a USA port for passage to UK/Europe, where new articles would be taken out. By this measure then, the centre of the fleet's operations was on the other side of the Atlantic from its base of ownership and management.

Voyage destinations were sometimes not stated, but when they were, often in a very general and permissive way. Still in eighty five percent of

TABLE 2

REGIONAL ORIGINS OF VOYAGES, 1862-1901

REGION	PORTS CLEARED	No. CLEARANCES	% PORTS	% CLEARANCES
TOTAL		4,340	100	100
UNITED KINGDOM	73	2,400	46	55
EUROPE	33	1,086	21	25
USA	22	551	14	13
CANADA	30	294	19	7
OTHER	1	1		
MISSING DATA		8		

TABLE 3

DECLARED DESTINATIONS, 1863-1901

	No Ports	No Destin.	% Ports	% Destin.
Total Voyages		4,340		100
USA	55	1,961	22	45
Canada	34	685	14	16
UK	49	327	20	8
South America	17	302	7	7
Europe	38	175	16	4
West Indies	26	151	11	3
Africa	7	43	3	1
Asia	11	35	5	1
India	4	13	2	—
Australia	3	5	1	—
Total Declared	244	3,697		85
Missing Data		643		

the cases, a specific port or port for orders was declared. Since an overwhelming share of voyages were outward bound from UK/Europe, an overseas destination was the norm, for Yarmouth's fleet rarely participated in the British home trades. The exceptions were when a vessel was bound from a European or UK port to load at another UK port for overseas, Cardiff being a prime example. The concentration of destinations on North America, nonetheless, remains overwhelming, accounting for sixty one percent of the cases, close to half bound for the USA. The Americas and West Indies account for seventy one percent of destinations. If overseas destinations alone are counted, then eighty two percent were North American bound, and ninety seven percent for the Americas and West Indies. In other words, Yarmouth's vessels were mainly employed in the North and South Atlantic trades.

Simple observation of regional starts and declared destinations, however, can be misleading as an index of participation in world trades. For example, one trading pattern in the 1880s was for a vessel to clear UK/Europe for Quebec/Montreal/Saint John, clear the Canadian port for South America/East Coast, and on the return, touch Barbados/St. Thomas for orders to the US Gulf and terminate in UK/Europe. Simple observation of clearances and destinations would obviously lead to understatement of the South American and US trades in cases of this kind. The problem can be corrected by counting all port of call entrances during

the voyage and the terminal entrance. Clearances from the starting port should not be included in the count because to do so would involve double counting. This is because where the last voyage terminated, must be the starting port for the succeeding voyage. Moreover a vessel terminates at a port for a commercial reason — it has cargo for the port, or expects to acquire one if in ballast — whereas it may start a voyage in ballast at a port such as Liverpool, in order to proceed to another such as Cardiff, for loading. Calculating on the basis of entrances, therefore, the UK and USA each accounted for almost a third of the entrances, Europe for half that level and Canada for eleven percent. That is, UK/Europe accounted for forty six percent of entrances, USA/Canada for forty one percent, West Indies/South America for ten percent and the rest of the world for only three percent. A huge eighty seven percent of the fleet's employment was provided by Western Europe and North America, with the remainder of the world providing only thirteen percent of the traffic.

Within these broad regional divisions, which ports offered the bulk of the entries? There were fifty one ports in the world in which at least twenty five entrances were recorded over the period — on average at least one entrance for every year and a half — and these accounted for over eighty percent of all entrances. Three ports stand out, accounting for a fifth of all entrances — Liverpool, New York and Philadelphia. A second tier of ports, with entrance rates of about half that of the leading three ports, included Cardiff, London, Baltimore, Antwerp, Havre — and the only Canadian port — Quebec City.[7] Another Canadian port, Saint John, led the third tier of ports with around a quarter of entries at the leading ports. The group also included Dublin and the New England port of Boston. Together, these leading fourteen ports (twenty seven percent of the leading fifty one ports) accounted for fifty five percent of the entrances. Thereafter the distribution of entrances is more continuous and no tier groupings appear. In the leading three tiers then, there were six US ports, four UK and two each for Europe and Canada, and none from the rest of the world. The only non-North Atlantic ports which were of any major importance were Rio, Buenos Aires and Montevideo, with Callao and Valparaiso at the bottom of the list of leading ports.

In the period of expansion to 1879 world entrances grew at 8.1% per annum, which is the same as the growth rate for voyage starts. In the decline to 1890, however, voyage starts fell by -13.9% per annum compared with -10.4% for world entrances. The difference indicates a movement into longer voyages touching more regions of the world per voyage. Table 6 provides estimates of the growth rates for entrances into various world regions. These rates are then weighted by the region's annual share of the world traffic to yield a regionally weighted growth

rate. From this it is possible to estimate the region's contribution to the net growth of world entrances. Some of the equations provide a poor fit, but despite the resulting error there is no reason to question the broad implications.

In the expansion years it was only the North Atlantic regions which made positive contributions to world entrances. The growth of entrances into Europe and the USA was extremely high at about three times the rate of growth into the United Kingdom. The Canadian growth rate was relatively modest, and since it accounted for only ten percent of entrances, the Canadian trade provided less than two percent of the contribution to net world growth. The United States and Britain each provided about a third of entrances, and this meant that with a very high growth rate the USA alone provided fifty one percent of net world growth. Although Europe supplied only seventeen percent of entrances, its equally high growth rate meant a contribution of twenty eight percent to net world growth compared with only nineteen percent for the UK. West Indies traffic was declining very sharply, but since the Islands and the rest of the world had only a ten percent share of world entrances they did not provide a significant drag on world growth.

In the contraction decade it was the North Atlantic regions which accounted for the negative growth while there was expansion of traffic

TABLE 4

PORTS OF CALL AND TERMINAL ENTRANCES, 1863-1901

	No.	%
Total	10,944	100
UK	3,378	31
USA	3,317	30
Europe	1,642	15
Canada	1,166	11
South America	662	6
West Indies	438	4
Asia	141	1
Africa	40	—
India	34	—
Australia	28	—
	10,846	99
Missing Data	98	

TABLE 5

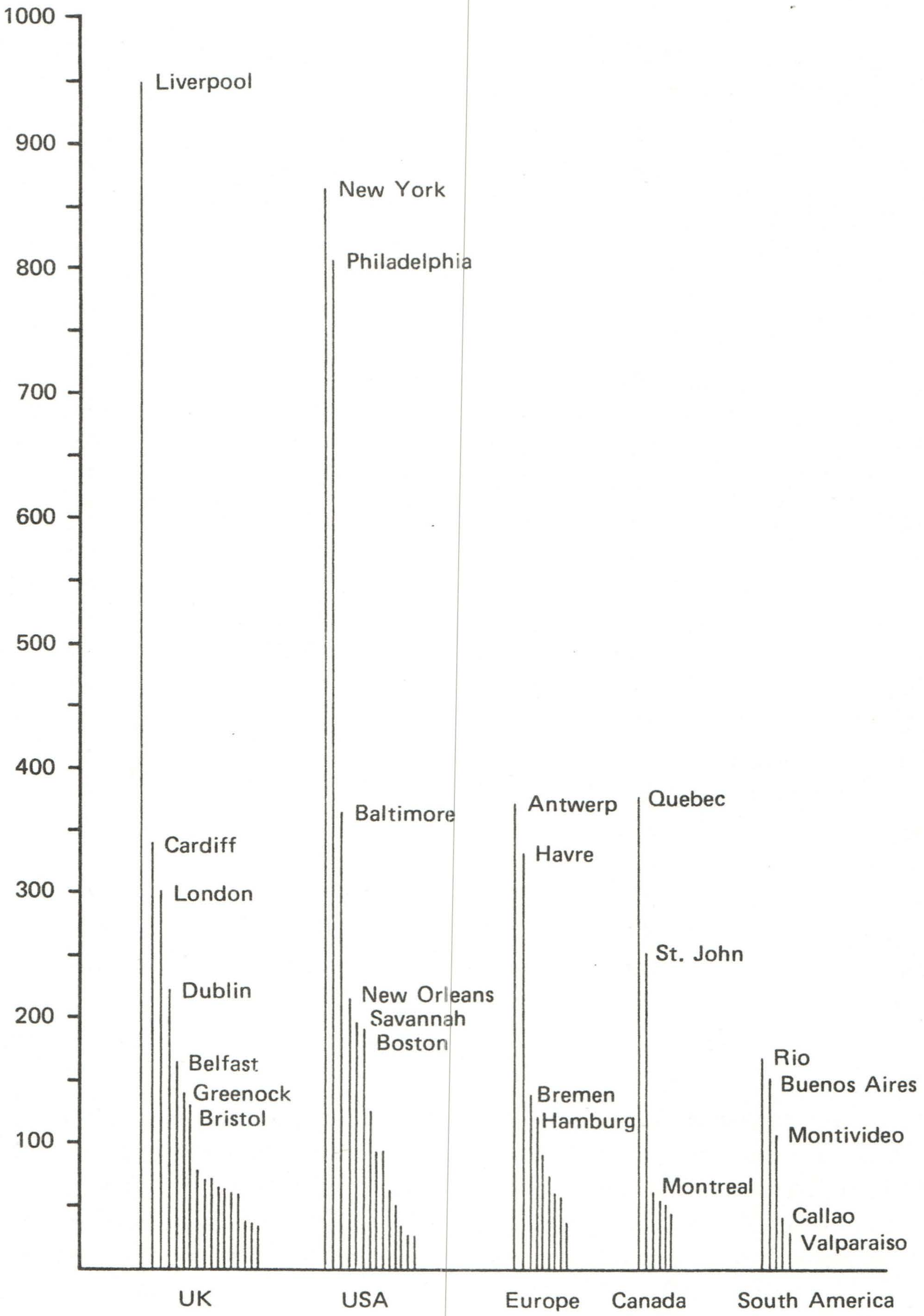
MAJOR PORT ENTRANCES, 1863-1901

PORT	RANK	NO.	PORT	RANK	NO.
World		10,944			
Liverpool	1	948	Dunkirk	27	86
New York	2	863	Newport (Mon.)	28	78
Philadelphia	3	807	Newcastle/Shields	29	73
Quebec	4	376	Glasgow	30	72
Antwerp	5	371	Queenstown	31	70
Baltimore	6	364	Cork	32	65
Cardiff	7	339	Mobile	33	62
Havre	8	329	Ardrossan	34	61
London	9	300	Montreal	35	61
Saint John	10	249	Londonderry	36	60
Dublin	11	219	Amsterdam	37	60
New Orleans	12	216	Bordeaux	38	58
Savannah	13	195	Miramichi	39	56
Boston	14	191	Galveston	40	51
Rio	15	166	Sydney/N. Sydney	41	50
Belfast	16	163	Yarmouth (N.S.)	42	45
Buenos Aires	17	147	Callao	43	41
Greenock	18	137	Hull	44	38
Bremen/B'haven/Brake	19	136	Rouen	45	38
Bristol	20	133	Waterford	46	36
Charleston	21	125	Limerick	47	34
Hamburg	22	124	Portland	48	32
Montevideo	23	105	Providence	49	27
Norfolk (Va.)	24	95	Valparaiso	50	27
Pensacola	25	94	San Francisco	51	25
Rotterdam	26	91			
			Total		8,965

into all other regions. Once again it was Europe and the USA which supplied the highest negative rates, although the negative growth in both the UK and Canada was higher than their positive contributions in the earlier decades. Expansion into South America and the Other World (basically Asia) was very strong in the 1880s, and in particular South American expansion offered a significant brake on net world decline. For both periods, however, the patterns of growth suggest that expansion and contraction was fuelled by US trade to Europe, and secondarily to the UK.

FIGURE 2

PORT ENTRANCES 1862-1901



There can be little doubt that the investment trends at Yarmouth were dominated by the pivotal role of the US bulk trades and UK/Europe demand for American food and raw materials. This interpretation is

TABLE 6

REGIONAL ENTRANCES, 1863-1890

REGION	EQUATION	CORR. COEF.	% GROWTH RATE	% WEIGHTED GROWTH	% CONTRIBUTION (+)	% CONTRIBUTION (—)
			1863-1879			
World	LnY=5.82 + 0.078t	+0.90	+8.1	+8.1		
Canada	3.49 + 0.014t	+0.15	+1.4	+0.16	1.8	
USA	4.54 + 0.145t	+0.90	+15.6	+4.59	50.8	
UK	4.76 + 0.048t	+0.82	+4.9	+1.73	19.2	
Europe	3.83 + 0.159t	+0.83	+17.2	+2.55	28.2	
West Indies	2.61 - 0.097t	-0.40	-10.2	-0.49		52.6
South America	2.14 - 0.037t	-0.20	-3.8	-0.11		11.8
Other World	0.83 - 0.014t	-0.10	-1.4	-0.13		14.0
Error				-0.20		21.5
			1879-1890			
World	LnY=5.74 - 0.099t	-0.88	-10.4	-10.40		
Canada	3.52 - 0.045t	-0.48	-4.6	-0.55		4.3
USA	4.44 - 0.176t	-0.91	-19.2	-5.91		46.1
UK	4.53 - 0.103t	-0.95	-10.8	-3.33		26.0
Europe	3.73 - 0.178t	-0.93	-19.5	-3.02		23.6
West Indies	1.33 + 0.107t	+0.53	+11.3	+0.24	6.4	
South America	2.51 + 0.251t	+0.88	+28.5	+2.02	54.1	
Other World	1.74 + 0.192t	+0.81	+21.2	+0.81	21.8	
Error				+0.66	17.7	

strengthened by Table 7, which provides a matrix of correlation coeffecients of annual first differences in entries for each region against all others and against world entries.[9] Up to 1879 all regions were positively correlated with annual changes in world entries, although it was weak for the US and Other World and very weak for Canada and South America. No region was strongly correlated with changes in world entries, which suggests there was a quite dense market for vessel employment offering shipowners opportunities to move vessels among

regional trades in response to varying market opportunities. It is striking that Canadian entries are strongly associated only with the UK, that US entries move with Europe and that both of those move against entries into the UK. That is, when activity was high in the US trades it was traffic to Europe that generated the boom, and when the US market was relatively depressed vessels were moved into the UK-Canada trade and to a lesser extent the UK-West Indian and UK-South American routes.

In the 1880s this pattern obviously weakens. Canadian entries were still only strongly associated with the UK although not to the level of the 1860s and 1870s. But movements into the UK, Europe and USA were now positively correlated, which probably indicates that the possibilities for vessel employment shifts were now much weaker. This view is strengthened by the fact that movements in all regions in the 1880s (apart from the West Indies) were much more strongly correlated with changes in world entries. Yarmouth's shipowners in other words, were now supplying a secondary market with their increasingly obsolescent vessels. Employment was increasingly determined by the general level of buoyancy in the North Atlantic economy and a willingness to move out

TABLE 7

ANNUAL ENTRIES CORRELATION OF FIRST DIFFERENCES

	CANADA	USA	UK	EUROPE	W.IND.	S.AMER.	OTHER	WORLD
				1863-1879				
Canada		-0.78	+0.83	-0.63	-0.27	-0.40	-0.51	+0.20
USA	-0.78		-0.48	+0.81	+0.34	+0.28	+0.50	+0.34
UK	+0.83	-0.48		-0.24	+0.24	+0.19	-0.22	+0.53
Europe	-0.63	+0.81	-0.24		+0.26	+0.32	+0.47	+0.45
West Indies	-0.27	+0.34	+0.24	+0.26		+0.46	+0.53	+0.49
S. America	-0.40	+0.28	+0.19	+0.32	+0.46		+0.36	+0.15
Other World	-0.51	+0.50	-0.22	+0.47	+0.53	+0.36		+0.31
				1879-1890				
Canada		+0.08	+0.46	+0.38	+0.03	+0.17	-0.10	+0.37
USA	+0.08		+0.70	+0.77	+0.09	+0.76	+0.43	+0.94
UK	+0.46	+0.70		+0.48	-0.10	+0.60	0.0	+0.80
Europe	+0.38	+0.77	+0.48		+0.30	+0.58	+0.37	+0.84
West Indies	+0.03	+0.09	-0.10	+0.30		+0.40	+0.17	+0.12
S. America	+0.17	+0.76	+0.60	+0.58	+0.40		+0.48	+0.80
Other World	-0.10	+0.43	0.0	+0.37	+0.17	+0.48		+0.42

into the South American and Asian trades. Multiple regression and partial correlation coefficients are required to determine the relative importance of each region in determining fluctuations in world entries, but there can be no doubt that jointly the UK, Europe and USA offered the core of the system.

In both periods of contraction and expansion the trends in regional entries did not apply uniformly to the major ports within the region. Table 8 gives a breakdown of growth rates in major UK ports.[10] While London was the second most important British port for Yarmouth vessels up to 1879 it nonetheless experienced a declining trend of entries. Entries into Newport, Cardiff, Greenock and Glasgow were also declining at substantial rates, while Bristol's growth was only half the regional rate. It was Liverpool, Dublin and Belfast which were the large dynamic ports collectively accounting for sixty one percent of net regional growth. Liverpool with its huge size and high growth rate of 8.3% per annum alone provided thirty four percent of net regional growth, compared with 18% for Dublin its nearest rival. In the 1880s the only expansion was provided by South Wales, for entries into London, Bristol, Belfast and Dublin were all declining faster than regional entries. The pace of decline at Liverpool was also substantial and accounted for thirty percent of the decline in regional entries. While the Mersey and the two big Irish ports had contributed sixty one percent of growth in net regional entries up to 1879 in contraction they supplied forty eight percent of the decline. The only major port which now provided growth opportunities was Cardiff with its steam coal.

The British economy was large and dense while the American was growing huge and geographically diverse. It makes sense therefore, to observe US entries in terms of the major East Coast regions — for that was the only coast which mattered for Yarmouth's shipowners. In the expansion period US entries were rising by an enormous 15.2% per annum. The New England region shared in this expansion until 1872 with a growth rate of 21% per annum.[11] But in 1873 entries into the region dropped by fifty percent and virtually disappeared for the remainder of the decade. Since New England contributed only six percent of US entries the large negative growth rate of 16.2% only moderately depressed the growth of net US entries. The US Gulf by contrast, provided the most rapid rate of expansion at 25.2% per annum. There were no entries into the Gulf until the end of the Civil War, and a significant number did not emerge before 1872. The New England decline was therefore matched by expansion in the Gulf and the Southern Atlantic ports. Entries into the Southern Atlantic also waited upon the cessation of war and did not become significant until 1872. Expansion there peaked in 1878, and

TABLE 8

UNITED KINGDOM ENTRANCES, 1863-1890

REGION	EQUATION	CORR. COEF.	% GROWTH RATE	% WEIGHTED GROWTH	% CONTRIBUTION (+)	% CONTRIBUTION (-)
		1863-1879				
United Kingdom	LnY=4.76 + 0.048t	+0.82	+4.9	+4.9		
London	2.47 - 0.013t	-0.16	-1.3	-0.1		4.0
Bristol	1.58 + 0.027t	+0.22	+2.7	+0.1	1.4	
Newport	1.17 - 0.128t	-0.69	-13.7	-0.6		24.0
Cardiff	1.84 - 0.068t	-0.53	-7.0	-0.5		20.0
Liverpool	3.48 + 0.080t	+0.73	+8.3	+2.5	33.8	
Belfast	1.63 + 0.113t	+0.60	+11.9	+0.7	9.5	
Dublin	1.94 + 0.156t	+0.78	+16.9	+1.3	17.6	
Greenock	1.61 - 0.113t	-0.64	-11.9	-0.7		28.0
Glasgow	1.07 - 0.111t	-0.59	-11.7	-0.6		24.0
Residual				+2.8	37.8	
		1879-1890				
United Kingdom	LnY=4.53 - 0.103t	-0.95	-10.8	-10.8		
London	1.80 - 0.170t	-0.72	-18.5	-1.6		12.7
Bristol	1.28 - 0.114t	-0.64	-12.1	-0.5		4.0
Newport	0.21 + 0.059t	+0.53	+6.1	0.0	0.0	
Cardiff	2.12 + 0.132t	+0.81	+14.1	+1.8	100.0	
Liverpool	3.53 - 0.093t	-0.74	-9.7	-3.7		29.4
Belfast	1.22 - 0.217t	-0.86	-24.2	-1.1		8.7
Dublin	1.10 - 0.259t	-0.87	-29.6	-1.3		10.3
Greenock	0.69 - 0.022t	-0.14	-2.2	-0.1		0.8
Glasgow	0.25 - 0.076t	-0.61	- 7.9	-0.1		0.8
Residual				-4.2		33.3

while the growth rate was substantially less than in the Gulf the fact that the volume of entries was close to double meant that the Southern Atlantic provided thirteen percent of net US growth compared with ten percent for the Gulf. For Yarmouth's shipowners, however, it was the Mid-Atlantic ports which were the heartland of the industry. The region accounted for two thirds of all entries and provided seventy one percent of net US growth. Given the volume of traffic and its high growth rate it is safe to say that without the US Mid-Atlantic region there would not have been a

significant shipping industry at Yarmouth.

In the 1880s only New England provided a positive contribution to net US growth. This rising trend of entries emerged in the second half of the 1880s, but since the region's entries had fallen to only three percent of the US total the weighted contribution was insignificant. Entries into the Gulf held up better than for the US as a whole but the trend was still strongly negative. Entries into the Southern Atlantic region declined at a huge 25% per annum, but since in this decade entries into the region accounted for only four percent of US entries compared with twenty percent for the Gulf, its contribution to decline was only half as important. As the Mid-Atlantic region had been the engine of growth so the disappearance of opportunities in that region was the hammer of extinction. Relatively the region was more important in the 1880s than it had been in the sixteen years of expansion, but with trading opportunities declining at the rate of 23% per annum, it supplied eighty four percent of

TABLE 9

USA REGIONAL ENTRANCES, 1863-1890*

REGION	EQUATION	CORR. COEF.	% GROWTH RATE	% WEIGHTED GROWTH	% CONTRIBUTION (+)	% CONTRIBUTION (-)
		1863-1879				
USA	LnY=4.54 + 0.154t	+0.90	+15.6	+15.6		
New England	1.79 - 0.150t	-0.57	-16.2	-1.0		100.0
Mid-Atlantic	4.13 - 0.164t	+0.86	+17.8	+11.8	71.1	
Southern Atlantic	2.44 + 0.162t	+0.68	+17.5	+2.2	13.2	
US Gulf	1.87 + 0.225t	+0.84	+25.2	+1.7	10.2	
Residual				+0.9	5.4	
		1879-1890				
USA	LnY=4.44 - 0.176t	-0.91	-19.2	-19.2		
New England	0.99 + 0.115t	+0.48	+12.2	+0.4	100.0	
Mid-Atlantic	4.09 - 0.209t	-0.93	-23.2	-16.4		83.7
Southern Atlantic	1.18 - 0.225t	-0.79	-25.2	-1.0		5.1
US Gulf	2.85 - 0.091t	-0.52	-9.5	-1.9		9.7
Residual				-0.3		1.5

*New England includes Portland, Boston and Providence; Mid-Atlantic includes New York, Philadelphia, Baltimore and Norfolk; Southern Atlantic includes Charleston, Savannah and Darien; and US Gulf includes Pensacola, Mobile, New Orleans and Galveston.

TABLE 10

USA PORT ENTRANCES, 1863-1890

REGION	EQUATION	CORR. COEF.	% GROWTH RATE	% WEIGHTED GROWTH	% CONTRIBUTION (+)	% CONTRIBUTION (-)
		1863-1879				
USA	LnY=4.54 + 0.145t	+0.90	+15.6	+15.6		
Boston	1.63 - 0.147t	-0.58	-15.8	-2.0		100.0
New York	3.34 + 0.100t	+0.70	+10.5	+3.5	19.9	
Philadelphia	2.97 + 0.207t	+0.91	+23.0	+5.2	29.5	
Baltimore	2.16 + 0.205t	+0.79	+22.8	+2.5	14.2	
Charleston	1.47 + 0.125t	+0.53	+13.3	+0.8	4.5	
Savannah	1.96 + 0.134t	+0.66	+14.3	+1.2	6.8	
Pensacola	0.48 + 0.047t	+0.41	+4.8	+0.0	0.0	
Mobile	0.41 + 0.077t	+0.61	+8.0	+0.1	0.6	
New Orleans	1.42 + 0.192t	+0.82	+21.2	+1.0	5.7	
Galveston	0.79 + 0.116t	+0.66	+12.3	+0.2	1.1	
Residual				+3.1	17.6	
		1879-1880				
USA	LnY=4.44 - 0.176t	-0.91	-19.2	-19.2		
Boston	0.76 + 0.083t	+0.43	+8.7	+0.4	66.7	
New York	3.25 - 0.137t	-0.87	-14.7	-4.6		23.2
Philadelphia	3.12 - 0.215t	-0.90	-24.0	-6.4		32.3
Baltimore	1.47 - 0.323t	-0.83	-38.1	-2.8		14.1
Charleston	0.43 - 0.098t	-0.58	-10.3	-0.2		1.0
Savannah	0.80 - 0.162t	-0.70	-17.6	-0.4		2.0
Pensacola	1.20 - 0.039t	-0.14	-4.0	-0.2		1.0
Mobile	1.08 + 0.041t	+0.21	+4.2	+0.2	33.3	
New Orleans	2.04 - 0.157t	-0.56	-17.0	-1.9		9.6
Galveston	0.24 - 0.043t	-0.39	-4.3	0.0		0.0
Residual				-3.3		16.7

net decline in US entries.

These regional trends were generated by a handful of great US ports. During expansion the growth of entries was highest at Philadelphia, Baltimore and New Orleans, all of which recorded a rate of growth over 20% per annum. All other ports including New York expanded less rapidly than the US region itself. But New York was huge and together with Philadelphia accounted for fifty five percent or more of the entries in

TABLE 11

CANADIAN ENTRANCES, 1863-1890

REGION	EQUATION	CORR. COEF.	% GROWTH RATE	% WEIGHTED GROWTH	% CONTRIBUTION (+)	% CONTRIBUTION (-)
		1863-1879				
Canada	LnY=3.49 + 0.014t	+0.15	+1.4	+1.4		
Saint John	2.29 + 0.092t	+0.77	+9.6	+3.6	100	
Quebec*	2.19 - 0.050t	-0.26	-5.1	-1.7		77
Montreal	0.63 - 0.043t	-0.28	-4.4	-0.3		14
Residual				-0.2		9
		1879-1890				
Canada	LnY=3.52 - 0.045t	-0.48	-4.6	-4.6		
Saint John	2.79 - 0.062t	-0.69	-6.4	-3.2		60
Quebec*	2.52 - 0.058t	-0.40	-5.9	-2.1		40
Montreal	0.62 + 0.073t	+0.35	+7.5	+0.6	86	
Residual				+0.1	14	

*Quebec in 1880 rather than 1879

both the periods of expansion and contraction. While Boston recorded negative growth up to 1879 there had been a boom of activity at the port between 1869-72. Baltimore emerged in importance from 1869 and grew particularly rapidly between 1876-81. Norfolk enjoyed a brief flurry of activity between 1879-82, and in the Southern Atlantic region entries were rising rapidly at Charleston from 1870-76 and Savannah from 1870-75. In the Gulf the big expansion at New Orleans stretched from 1877-82 or even 1886. Thus ignoring New York and Philadelphia the focus of activity appears to have passed down the coast from Baltimore and into the Gulf in the early to mid 1880s. In a shrinking industry entries into the Gulf ports of Pensacola, Mobile, New Orleans, and Galveston held up into the 1890s relatively better than other US ports. But over the entire period from 1863-1901, New York and Philadelphia, and for a short time Baltimore, were the heart of Yarmouth's presence in the American trades. Many other ports were entered and some with considerable frequency, but they shrink into insignificance when compared with the great Mid-Atlantic ports.

The only overseas ports outside the United States which offered any continuing importance were in Canada and South America. For both

TABLE 12

EUROPEAN ENTRANCES

REGION	EQUATION	CORR. COEF.	% GROWTH RATE	% WEIGHTED GROWTH	% CONTRIBUTION (+)	% CONTRIBUTION (-)
		1863-1879				
Europe	LnY=3.83 + 0.159t	+0.83	+17.2	+17.2		
Hamburg	1.31 + 0.102t	+0.54	+10.7	+0.8	4.7	
Bremen*	1.59 + 0.152t	+0.74	+16.4	+1.8	10.5	
Rotterdam	1.29 + 0.111t	+0.65	+11.7	+0.8	4.7	
Amsterdam	0.82 + 0.075t	+0.42	+7.8	+0.3	1.7	
Antwerp	2.40 + 0.146t	+0.72	+15.7	+3.9	22.7	
Havre	2.17 + 0.178t	+0.83	+19.5	+4.3	25.0	
Dunkirk	0.65 + 0.089t	+0.53	+9.3	+0.4	2.3	
Bordeaux	0.49 + 0.043t	+0.38	+4.4	+0.2	1.2	
Residual				+4.7	27.2	
		1879-1890				
Europe	LnY=3.73 - 0.178t	-0.93	-19.5	-19.5		
Hamburg	0.97 - 0.226t	-0.92	-25.4	-1.5		7.7
Bremen*	0.70 - 0.144t	-0.84	-15.5	-0.5		2.6
Rotterdam	0.59 - 0.100t	-0.63	-10.5	-0.4		2.1
Amsterdam	0.46 - 0.133t	-0.82	-14.2	-0.3		1.5
Antwerp	1.90 - 0.288t	-0.92	-33.3	-6.7		34.3
Havre	2.24 - 0.141t	-0.71	-15.1	-3.7		19.0
Dunkirk	1.45 - 0.076t	-0.53	-7.9	-0.9		4.6
Bordeaux	0.92 - 0.146t	-0.81	-15.7	-1.0		5.1
Residual				-4.5		23.1

*Includes Bremerhaven and Brake

regions the regression equations often provide a poor fit to the data, reflecting the erratic changes in entries into the region and perhaps thereby indicating that these regions were 'residual' markets — markets which were tapped only when the dominant UK/Europe-USA trades were in a slump or in decline.

The regional growth rate for Canada up to 1879 was very low because entries into Quebec were falling at 5.1% per annum. Quebec and Saint John were the only significant ports for Yarmouth ships, accounting for seventy percent of regional entrances up to 1879 and ninety percent

thereafter. Saint John alone provided all the net regional growth in the first period with an expansion rate of 9.6%, which was just above the world rate of 8.1%. This growth dated from the 1860s and continued into the early 1880s. To some extent it was artificial. When a new vessel was launched at Yarmouth or when it went back to sea after a re-fit, the first voyage inevitably meant a call at nearby Saint John. Since the large surge in new Yarmouth tonnage coincided with expansion of entries into Saint John some of this growth was 'non-competitive'. New vessels launched over the period grew at 3.4% per annum, which implies that at a maximum, 'competitive' entries at Saint John were growing at 6.2% or below the world growth rate. If this was true then the growth of competitive regional entries into Canada would be virtually zero. Entries into Quebec were highly erratic. They were relatively stable in the 1860s and early 1870s but after that they swung from high to very low. The entry rate into Montreal improved in the 1880s when a trade was developed with East Coast South America, but its share of entries was too small to affect the overall regional decline. In general the Canadian region offered a small and rather thin market for the fleet, and unlike South America it was not sufficiently distant from America and UK/Europe to offer a haven in the 1880s against the competition of steam.

In the South American region entries were relatively few in number before 1879 and characterized by highly erratic annual patterns. Traffic was fairly brisk from the mid 1860s to 1871 after which it disappeared for the remainder of the decade. Only six ports saw any significant volume of Yarmouth shipping — Montevideo, Rio, Buenos Aires, Valparaiso, Callao and to a lesser extent Iquique. Until the 1880s Montevideo and Buenos Aires led the region with some fifty entries each, mainly concentrated in the years before 1873. Entries into Callao outstripped Rio by twenty nine entries to twenty one, for traffic at Rio dried up after 1873, while it was brisk at Callao between 1874-78. In the 1880s the Chilean entries switched from Callao to Valparaiso but most of the growth was concentrated on the East Coast. In this decade there was a build up of entries at all three East Coast ports starting from the early to mid 1880s and extending into the 1890s. Rio led with one hundred and forty two entrances compared with eighty two for Buenos Aires and fifty one for Montevideo. But the movement into East Coast South America was obviously nothing more than a short term response to contracting opportunities in the major North Atlantic trades.

The UK was where a large fraction of voyages began and the USA by far the most common destination; but in the 1870s Europe emerged as a major terminal for North Atlantic voyages. In 1869 there were only fifty one entries into the European region. They climbed steadily to 118 in 1878 and hovered around that level until 1881. After that there was a

rapid plunge to only fourteen entries in 1890. While vessels ranged from St. Petersburg to Istanbul only eight ports, seven of them in Northwestern Europe, accounted for eighty four percent of entries before 1879 and seventy seven from then to 1890. Slightly less than half of all European regional entries were vessels bound for the two Channel ports of Antwerp and Havre.

With the exception of Bordeaux and to a lesser extent Amsterdam and Dunkirk, entries into all the major European ports expanded at very high rates before 1879. The most rapid build up was at Havre, Antwerp and Bremen, although the German port never achieved the sustained volume of entries of the other two, which together accounted for almost fifty percent of the European growth. When the decline set in the contraction at Antwerp was an enormous 33% per annum — twice that at Havre — and it accounted for a third of the decline in European entries. Whereas there had been forty seven entries into Antwerp in 1881 it sank to only three entries five years later and fluctuated around that level until the last vessel entered in 1893. The retreat from Havre was much more gradual and even in 1886 the port recorded fourteen entries. While there were still trading opportunities for sailing vessels in Europe's smaller ports and more backward regions, Yarmouth's owners had never developed them in the years of expansion and hence in the 1880s had no safe havens into which to retreat. The last entries into a major European port were at Amsterdam and Bordeaux in 1896.

By identifying the regions where Yarmouth vessels were active and isolating the major ports, it is possible to show that the town's industry was very narrowly based. Table 13 indicates that some seventy percent of world growth in entries up to 1879 was attributable to only seven ports in the USA, UK and Europe. Philadelphia was substantially the most important of the seven for it alone provided eighteen percent of the growth. The three US Mid-Atlantic ports — Philadelphia, New York and Baltimore — supplied thirty eight percent of the world growth. The contribution of Liverpool and Dublin combined only equalled that of Philadelphia alone. But the ports which beckoned with traffic in the 1860s and 1870s delivered a proportionately savage rejection in the 1880s. Nine ports — this time including London and New Orleans — accounted for seventy six percent of the world contraction. Philadelphia led the contraction as it had the expansion and half of the world decline was concentrated there and at New York, Liverpool and Antwerp. The obsolescence of the wooden sailing ship in the North Atlantic trades had long been predicted and no doubt Yarmouth owners anticipated its coming, but the sudden and unrelenting rejection when it came must have been a shock.

In the three decades after the Second World War developed countries became accustomed to very high rates of growth in national output and especially in the output of new industries. While the economic growth which swept through Western Europe and some of the overseas territories of settlement in the nineteenth century was historically unprecedented, by recent standards the rate of expansion was relatively modest. For example the volume of Gross National Product in the highly industrialized

TABLE 13

PORT CONTRIBUTIONS TO WORLD GROWTH, 1863-1890

PORT	% REGIONAL WEIGHTED GROWTH	% WORLD WEIGHTED GROWTH	% CONTRIBUTION
	1863-1879		
World		+8.4	100
Philadelphia	+5.2	+1.5	18
New York	+3.5	+1.0	12
Liverpool	+2.5	+0.9	11
Baltimore	+2.5	+0.7	8
Havre	+4.3	+0.6	7
Antwerp	+3.9	+0.6	7
Dublin	+1.3	+0.5	6
Residual		+2.6	31
	1879-1890		
World		-10.4	100
Philadelphia	-6.4	-1.8	17
New York	-4.6	-1.3	13
Liverpool	-3.7	-1.1	11
Antwerp	-6.7	-1.0	10
Baltimore	-2.8	-0.8	8
Havre	-3.7	-0.5	5
New Orleans	-1.9	-0.5	5
London	-1.6	-0.5	5
Dublin	-1.3	-0.4	4
Residual		-2.5	24

countries of Western Europe grew at only 2.0% per annum between 1860-80.[12] In Canada GNP expanded somewhat faster at 2.8%, while between 1851-70 real Gross Value of Production in manufacturing expanded at 3.6% and at 4.5% between 1870-90.[13] By these standards was the volume of output expanding unusually rapidly in the Yarmouth shipping industry before 1879 and was it contracting extraordinarily quickly thereafter? At present it is possible to construct only a preliminary index of gross output in the industry, but this should at least provide an ordinal estimate of relative performance.

If every regional entrance observed involved a fully laden ship discharging and loading, then the annual rate of growth of gross output in the fleet would approximate the relationship;

$$(1)\ \overline{GO} = \overline{EN} + \overline{SV}$$

where $\overline{GO}$ is the rate of growth of Gross Output; $\overline{EN}$ is the rate of growth of world entries; and $\overline{SV}$ is the rate of growth of average vessel size. That is $\overline{EN}$ measures the number of vessels operating in any year and the number of port entries they are able to make as a function of available freights, sailing and turnaround times, repair time lost and so on. $\overline{SV}$ measures the expansion (or contraction) of the cargo capacity involved in these entries over time. As indicated in Table 14 this approach to gross output yields a rate of expansion of 12.3% per annum between 1863-79 and -8.5% between 1879-90. By extension this implies average productivity per vessel as estimated by the relationship,

$$(1.1)\ \overline{GOV} = \overline{EN} + \overline{SV} - \overline{FL}$$

where $\overline{GOV}$ is gross output per vessel, and $\overline{FL}$ is the rate of growth of the number of vessels in the fleet. This indicates a very rapid productivity growth of 8.9% up to 1879 with a declining rate at -1.1% in the 1880s.

Gross output and productivity rates at the levels indicated for the 1860s and 1870s would not be unusual in a new industry or with a new technology, but are obviously high for a fleet with a traditional technology. One of the limitations of the estimate is the assumption that each entry involved a vessel laden with cargo. It is reasonable to assume that with few exceptions vessels entering UK/Europe from overseas were laden. It is also likely that the vast bulk of outward bound sailings to regions other than North America were with cargo. But it can also be assumed that an increasing number of sailings from UK/Europe to North America were in ballast, as the iron hulled and steam powered vessels encroached on the North Atlantic trades. Only a very careful analysis will provide firm data on the pace of this development. For the purpose of this preliminary estimate of output a conservative assumption is made that some seventy five percent of North American entries in 1863 were with

cargo falling at a constant rate to ten percent by 1890. Under this assumption the estimate of gross output is provided by the relationship,

$$(2)\ \overline{GO} = \overline{REV} + \overline{SV}$$

where $\overline{REV}$ is the estimate of 'revenue entries'. Such revenue entries would then decline from ninety two percent of world entries in 1863 to seventy five percent in 1890. The proportional decline is not steeper because in the 1880s there was a shift of voyages out of the North Atlantic into South America, Africa and the Far East. Recalculating gross output on this basis yields a rate of growth of 9.4% for 1863-79 and -6.9% for 1879-90, which is still very substantial in both periods. The most interesting consequence of the adjustment is reflected in the average productivity calculation. It remains a very high 6.0% in 1863-79 but rather than being negative in the 1880s it estimates a small gain in gross output per vessel of 0.5%. That is, by ruthless trimming of capacity at the port, owners were able to keep the remaining vessels in useful, and presumably profitable employment.

The obvious objection to any such conclusion is that these measures of output and productivity are purely physical estimates. This objection can be met partly by adjusting for trends in average freight rates. What must be developed is a comprehensive index of freight rates applicable to Canadian vessels, but for the present purpose the Isserlis index of tramp shipping freights from 1869 is employed. The assumption is that whatever the level of freight rates for the Yarmouth fleet, they probably moved in the same direction as this general index. Hence the new relationship is expressed by,

$$(3)\ \overline{GO} = \overline{REV} + \overline{SV} + \overline{FR}$$

where $\overline{FR}$ is the rate of growth in freight rates. This new estimate yields an output growth rate of +5.5% over 1869-79 and -9.2% for the 1880s. Adjusting for changes in fleet size gross output per vessel is then estimated at +2.2% in the 1870s and -1.8% in the 1880s.

If this last estimate is close to the actual output growth rate of the industry and the average vessel, then how does it compare with alternative investment opportunities in the Canadian economy? Firestone has calculated that current dollar GNP grew at 2.4% in the 1870s and 3.3% in the 1880s, and gross output in manufacturing establishments at 2.9% in the 1870s.[14] By our estimate then, gross output in the Yarmouth shipping industry was expanding almost twice as fast as the manufacturing sector. Manufacturing gross output per establishment was growing at 1.4%, or at only two thirds of our estimate of gross output per vessel in the 1870s. For the 1880s this pattern is reversed. With the introduction of a national policy of protected industrial development in 1879, gross output in Canadian manufacturing shot up by 4.2% per

annum while Yarmouth's shipping output shrank by -9.2%. In manufacturing there was no appreciable growth in output per establishment, and this at least softens the implications of declining vessel productivity of -1.8% per annum.

Although freight rates were sagging in the Atlantic economy in the 1870s and 1880s so were other prices. This suggests that our third estimate of output should be deflated with a price index in order to provide an index of real output growth for the fleet and the average vessel. As always the choice of an appropriate index is a problem. Since the vessels were largely operating out of the British, European and American economies it would seem that an international price index would be the most appropriate. On the other hand the Yarmouth investor would be assessing his shipping investments in terms of prices in the Canadian economy, which suggests using a Canadian index. Since most costs and earnings were incurred abroad and net revenues, if any, probably repatriated to Canada through trade, then a compromise between the two is to deflate with the Canadian import price index. Real gross output in the industry is then estimated by,

$$(4)\quad \overline{GO} = \overline{REV} + \overline{SV} + \overline{FRW}$$

where $\overline{FRW}$ is the rate of growth of freight rates indexed by the Canadian import price index. This adjustment substantially modifies the estimates provided by the third relationship for it now shows real gross output to be rising at a strong 7.4% in the 1870s and declining by a relatively modest -1.6% in the 1880s. The adjustment also shows gross productivity rising by 4.1% in the 1870s and improving to 5.8% in the 1880s.

A productivity growth of 4.1% does not seem impossible for the 1870s but surely continued gains in the 1880s is unlikely? Indeed if Firestone's GNP implicit index for Canada was applied it would be negative, for he estimates only a very minor price decline in Canada in the 1870s and 1880s.[15] It is likely that using the import price index exaggerates the real growth in productivity but there are still reasons for believing it to be positive. The physical productivity index generated by the second index indicated a small positive rate of growth. The fleet was ruthlessly pruned of older and smaller vessels in the 1880s and the remaining stock was shifted out of the North Atlantic into the South American and Far Eastern trades. And finally the costs and earnings incurred were those characterized by overseas economies and not the heavily protected and high cost Canadian environment. Given that sailing vessels required heavy and constant repairs, even if the capital cost of the hull had been written off within a few years of launching, it is unlikely that 100,000 tons of ocean shipping would still be on registry in 1890 if gross output per vessel was falling in the 1880s at -1.8% per annum.

If these estimates of output growth begin to approach the reality, then it is readily apparent why investments in shipping grew so rapidly at Yarmouth in the 1860s and 1870s. In the 1870s by these estimates, market opportunities existed for an expansion of output at a rate of 5.5% per annum in current dollars. In the iron and iron products sector of the economy gross output was expanding by only 2.0%, in food and beverages by 2.7% and wood products by 3.0%. It was only in textiles and clothing at 5.1%, that there was an equivalent expansion of opportunities.[16] The decline of the industry from the 1880s has been explained in terms of technological obsolescence; but that simply begs the question why shipowners in Atlantic Canada did not move into iron and steam vessels? The answer very probably lies in the reversal of investment opportunities after the introduction of the policy of heavily protected industrialisation. In the 1880s gross output in food and beverages grew by 3.7%, wood products by 4.6%, textiles and clothing by 5.2% and iron

TABLE 14

GROSS OUTPUT AND PRODUCTIVITY

	1863-1879		1879-1890	
	FLEET	PER VESSEL	FLEET	PER VESSEL
Always Laden				
(1) $\overline{GO} = \overline{EN} + \overline{SV}$	+12.3%		-8.5%	
$\overline{GOV} = \overline{EN} + \overline{SV} - \overline{FL}$		+8.9%		-1.1%
Revenue Entries				
(2) $\overline{GO} = \overline{REV} + \overline{SV}$	+9.4		-6.9	
$\overline{GOV} = \overline{REV} + \overline{SV} - \overline{FL}$		+6.0		+0.5
Freight Rate Weighted*				
(3) $\overline{GO} = \overline{REV} + \overline{SV} + \overline{FR}$	+5.5		-9.2	
$\overline{GOV} = \overline{REV} + \overline{SV} + \overline{FR} - \overline{FL}$		+2.2		-1.8
Real Freight Rate Weighted**				
(4) $\overline{GO} = \overline{REV} + \overline{SV} + \overline{FRW}$	+7.4		-1.6	
$\overline{GOV} = \overline{REV} + \overline{SV} + \overline{FRW} - \overline{FL}$		+4.1		+5.8

*1869-79 only

**Isserlis freight index deflated by the Taylor Canadian import price index

and iron products by 5.8%.[17] We know that Yarmouth shipowners began switching their investments into these sectors as well as transportation, finance, and other non-marine sectors.[18] In the circumstances this made perfect sense. Price levels were firm in the domestic economy, external competition was restrained by high tariffs, and the level of domestic efficiency and competition was still very low. By contrast price levels were sagging in the shipping industry, and to stay in the industry would require large investments in an unfamiliar technology already dominated by Europeans. Thus shipowners turned smartly to the apparently easier and less risky domestic economy. In the years of shipping expansion they had accumulated the capital required for the plunge into new ventures at home, and while the transition was being made in the late 1870s and 1880s there was no reason not to continue working their depreciating fleet until the ships sank or found an interested Greek or Italian buyer. They were businessmen, not prophets or romantics, and it would be another twenty years before it was established beyond doubt that for Atlantic Canada the transition into industrial workshop of the new Dominion had wound down into failure.

NOTES

1. This paper is based upon computer data set of vessels, voyages and men which was constructed from the Official Registers of Yarmouth, Nova Scotia and the Agreement on Account of Crew for the British Empire. The latter does not include records relating to local coasting traffic, and hence this paper is limited to the port's international, deep sea fleet. The file consists of over 4,000 voyages and 55,000 seamen and only a very limited amount of this data has been used for this paper; namely, the record of vessel entrances and clearances.

2. Investment trends have been analyzed in detail in David Alexander and Gerry Panting, "The Mercantile Fleet and its Owners: Yarmouth, Nova Scotia, 1840-1889", *Acadiensis* (Vol. 7, 1978) pp. 3-28.

3. And also 20 vessels under that limit.

4. The curve plots the number of voyages begun in a year. This should be noted for in subsequent pages when we speak of port entries in say 1880, we really mean port entries of voyages begun in 1880.

5. D. Aldcroft, *British Economic Fluctuations, 1790-1939* (London, 1972) p. 9.

6. The relevant equations are:

Voyages, $\ln Y = 5.10 + 0.78t$, $r = +0.94$
Tonnage, $11.49 + 0.69t$, $r = +0.98$
Voyages, $4.93 - 0.13t$, $r = -0.95$
Tonnage, $11.78 - 0.048t$, $r = -0.98$

7. This is somewhat misleading for vessels bound for Montreal normally called at Quebec both going up and down river.

8. Entrances are measured as all ports of call and the terminal for a voyage begun in a specified year. Should a vessel call at two ports in the same region, however, only one regional entrance is counted. Thus, a vessel from Havanna touching Falmouth for orders, discharging at Gloucester and loading at Cardiff for Rio would credit the United Kingdom with only one regional entrance. In a very few cases this results in an underestimate, such as a vessel out of Liverpool loading at Montreal for Rio, and returning to Montreal to load for Liverpool would only credit Canada with one entrance. Mid-decade entrances have been interpolated on the same basis as in the calculation of voyage growth rates.

9. That is the correlation of annual changes of entries into, say, the UK with annual changes in entries into the USA, Europe, etc.

10. The number of entries into UK ports exceeds the number of entries into the region because any one regional entry can involve calls at one or more ports within that region. For this reason the error contribution to regional growth rates is also likely to be larger.

11. $LnY = 2.64 + 0.192t$, $r = +0.90$.

12. Paul Bairoch, "Europe's Gross National Product: 1800-1975", *Journal of European Economic History* (Vol. 5, 1976) p. 279.

13. O.J. Firestone, "Development of Canada's Economy, 1850-1900", National Bureau of Economic Research, *Trends in the American Economy in the Nineteenth Century* (Princeton, 1960) p. 222 and 234.

14. *Ibid.*, p. 231.

15. See O.J. Firestone, *Canada's Economic Development, 1867-1953* (London, 1958) p. 178.

16. Calculated from *Ibid.*, p. 213.

17. *loc. cit.*

18. See Alexander and Panting, "The Mercantile Fleet", *op. cit.*

6. SOURCES OF PRODUCTIVITY CHANGE IN THE HALIFAX OCEAN FLEET, 1863-1900

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SOURCES OF PRODUCTIVITY CHANGE IN THE HALIFAX OCEAN FLEET, 1863-1900

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Halifax was the commercial and distribution centre of Nova Scotia in the nineteenth century and the fleet of ships registered there grew initially in response to opportunities in local carrying trades. Halifax was also conveniently located adjacent to the major shipping lanes of the North Atlantic. The port's location, the early development of its coastal shipping and the existence of a long established merchant community all suggest that the town was poised to become a major centre of ocean shipping in the early nineteenth century. But Halifax did not have substantial local resources of timber for ship building and few among its entrepreneurs had extensive experience in the shipping of timber, British North America's (B.N.A.) major bulk cargo of the early nineteenth century. Such advantages as the port possessed, therefore, encouraged its merchants to develop a service sector in coastal shipping, and the fleet of vessels registered in Halifax became one of the largest coastal fleets in the Atlantic region. The port also developed a fleet of medium sized vessels for West Indian and North Atlantic trades, but Halifax's shipowners, with only one or two exceptions, did not invest heavily in ocean shipping before the 1860s. In that decade the port's shipowners abandoned their earlier caution and invested more heavily than ever before in large ocean going carriers. The new ocean going fleet and its performance in ocean trades are the subject of this paper. It is not yet possible to estimate overall changes in output and productivity for the fleet, but we can indicate some of the ways in which Halifax's shipowners struggled to maintain their competitive position in ocean trades within the limits allowed by sailing ship technology. The results although necessarily tentative, suggest that the fleet did become more efficient over time and that even so late in their history wooden sailing ships were capable of previously undocumented improvements in performance.[1]

The Halifax fleet grew at an unprecedented rate in the 1860s as the port's shipowners took advantage of opportunities in the North Atlantic carrying trades. Tonnage on registry grew at an annual rate of 7.1% in the decade.[2] Growth was most rapid among larger classes of vessel: in 1860 there were only four vessels of five hundred tons or more on registry in Halifax; in the next fifteen years 114 such vessels were added to the fleet. In the same period 418 vessels between one hundred and five hundred tons were added to the fleet, so that the port also possessed a substantial

carrying capacity in small and medium sized vessels. Gross physical investment and tonnage on registry both reached their peaks in 1874, a few years earlier than in other major ports in the Maritimes. The decline which began in 1875 was less rapid than the growth of the 1860s but it was virtually continuous, and the fleet declined at an annual rate of over five percent in the late 1870s, 1880s and 1890s. Our analysis of the voyages of Halifax vessels will concentrate on the growth period from 1863 to 1874 and on the beginning of the decline from 1875 to 1890. Where sufficient data exists results will be presented for the 1890s as well.

The sample of Crew Lists on which this analysis is based is much smaller than the samples which exist for the ports of Yarmouth and Saint John.[3] This is partly because the ocean going fleet of Halifax was smaller than the fleets of those ports. The smaller sample also results from the fact that Halifax shipowners registered a proportionately larger number of vessels in the smaller tonnage classes: these vessels were often deployed in North American coastal trades, in which case Crew Lists were not submitted to the Registrar General in London. It also appears that the masters of smaller vessels were less consistent in submitting Crew Lists even for foreign voyages. In the data set used here therefore, some classes of vessels registered in Halifax are inevitably under represented. The sample is large enough, however, to allow some conclusions about ocean voyages undertaken by the fleet. Slightly more than two thirds of available Crew Lists for Halifax vessels have been analyzed. In the resulting sample of 937 voyages, vessels between 100 and 250 tons are least well represented: 425 such vessels were registered between 1858 and 1890 and voyage records are included for only sixteen percent of these. The larger classes of vessel are better represented: forty one percent of the 157 vessels of 250-499 tons registered between 1858 and 1900 are included; forty seven percent of the 500-999 ton vessels, and sixty six percent of the vessels over one thousand tons appear in the sample. An average of 4.5 voyages have been analyzed for each vessel in the sample, but again the larger vessels (those over five hundred tons) are better represented with an average of 5.9 voyages. If we assume that the average vessel made fifteen voyages in its lifetime (since vessels above five hundred tons had an average registry life of seven years and made an average 2.2 voyages per year), then the seventy seven larger vessels registered in Halifax might have made a total of 1,155 voyages.[4] Since our sample includes 520 voyages for these vessels the sample is unlikely to include less than forty five percent of all voyages undertaken by these vessels. There were, however, 152 vessels above five hundred tons registered in Halifax between 1858 and 1900. If these vessels undertook fifteen voyages each then our sample includes twenty three percent of all

voyages undertaken by Halifax vessels in this class. The sample is large enough to permit some cautious generalizations about the deployment of the Halifax ocean fleet. The voyages in our sample are evenly distributed across the period from 1863 to 1890: there are an average of thirty seven voyages a year in the 1860s, thirty nine voyages per year in the 1870s, and twenty one voyages per year in the 1880s. The conclusions drawn in this paper do not relate to the Halifax fleet as a whole, however, since the smaller classes of vessel which were very numerous on the Halifax registry, are substantially under represented here.

The analysis of vessel deployment in ocean trades suggests that the Halifax ocean fleet developed as an extension of a locally based coastal fleet. Between the 1850s and the 1870s Halifax's shipowners shifted their investments in a steady progression from vessels of less than 250 tons to vessels of five hundred tons in the 1860s and vessels of one thousand tons in the 1870s (vessels under 250 tons accordingly represented a declining proportion of new tonnage, from seventy eight percent in the 1850s, to forty two percent in the 1860s, and thirty percent in the 1870s). The ocean fleet was deployed more often from B.N.A. ports than were the vessels of Yarmouth or Saint John. The contrast with Yarmouth is particularly striking: only seven percent of voyage starts by Yarmouth vessels were from Canadian ports, whereas, as Table 1 shows, Nova Scotia alone accounted for fourteen percent of clearances at the beginning of voyages by Halifax vessels, and B.N.A. accounted for twenty percent of voyage origins. More Halifax voyages began in the United States than did

TABLE 1

REGIONAL ORIGINS OF VOYAGES, 1863-1900

REGION	PORTS CLEARED	NO. CLEARANCES	% PORTS	% CLEARANCES
U.K.	40	396	38	42
U.S.A.	13	202	12	22
EUROPE	19	152	18	16
NOVA SCOTIA	20	128	19	14
OTHER B.N.A.	9	52	9	6
OTHER	5	5	4	
MISSING DATA		2		

Source: Agreements on Account of Crew for Halifax registered vessels (Maritime History Group Archive, Memorial University of Newfoundland). Unless otherwise indicated tables in this paper are constructed from this source.

Yarmouth voyages and fewer began in Europe or the U.K. While the centre of operations for the Yarmouth fleet was on the other side of the Atlantic from its ownership base, the centre of operations for Halifax vessels was somewhat closer to home: forty two percent of voyages by Halifax vessels began on the American side of the Atlantic, compared to twenty percent for Yarmouth's vessels.[5]

In its period of rapid growth from 1863 to 1874 the Halifax fleet remained particularly close to its B.N.A. base, and shifted in the next period into a wider complex of trades. If we compare clearances in the growth period with clearances during the next sixteen years the declining importance of B.N.A. as shown in Table 2 is particularly striking. Clearances from ports of call are included here in order to provide a more complete picture of vessel employment.[6] In the growth period B.N.A. accounted for almost twenty two percent of all clearances, and fifty eight percent of clearances were accounted for by North America and the West Indies. By the mid-1870s, however, Halifax shipowners had committed a larger number of five hundred to one thousand ton bulk carriers to the North Atlantic trades and in particular to trade routes between the United States and the U.K. and Northern Europe. Clearances from the mid-Atlantic American ports (between New York and Baltimore) increased by seventy percent in the second period, and these ports were responsible for the increase in overall American departures shown in Table 2. At the same time departures from Northern Europe increased by almost fifty percent.

TABLE 2

REGIONAL ORIGINS OF CLEARANCES FROM STARTING PORTS AND PORTS OF CALL

	1863-1874		1875-1890	
	NO.	%	NO.	%
U.K.	301	25.8	268	23.0
B.N.A.	256	21.9	147	12.6
U.S.A.	253	21.7	357	30.6
WEST INDIES	154	13.2	64	5.5
EUROPE	109	9.3	151	13.0
SOUTH AMERICA	74	6.3	115	9.9
AFRICA	7	0.6	14	1.2
INDIA/ASIA	11	0.9	32	2.8
AUSTRALIA	3	0.3	16	1.4

Halifax's shipowners had shifted their assets away from their traditional base in B.N.A. and the West Indies and had followed Yarmouth's owners into the transport of American bulk cargoes to Europe and the U.K. Here they were entering into direct competition with steam vessels in a period of declining freight rates. One response was to deploy more vessels in longer voyages where competition from steam was less intense, and so in the period we see an eighty six percent increase in the number of appearances in ports outside the North Atlantic. But the North Atlantic remained the centre of Halifax's trading operations. In spite of the increase in voyages outside the North Atlantic, Halifax's shipowners had not moved far from the trades which they knew best. If their fleet was to survive, it must do so by maintaining a competitive position in the trades between the U.S.A., Britain and Europe.

A more sensitive measure of the importance of these North Atlantic trades may be obtained by analyzing the amount of tonnage entering the ports of various regions. The number of entrances or departures does not tell us where the largest vessels, representing the heaviest of shipowners' investments, were deployed in the expectation of making profits. Table 3 suggests that even though some of the largest vessels were employed on long distance routes, nevertheless the bulk of tonnage was committed to the North Atlantic. Fully eighty two percent of tonnage entering all ports was accounted for by Britain, the United States, Europe and B.N.A. Britain and Europe accounted for forty two percent of tonnage entering, U.S.A./B.N.A. for forty percent, the West Indies and South America for thirteen percent and the rest of the world for only four percent. This pattern of vessel employment appears very close to that of Yarmouth and very different from that of Saint John. Only in the latter port was there a very substantial commitment to non-Atlantic voyages before the late 1880s.

Within these broad regional divisions a small number of ports accounted for the majority of entrances. Table 4 includes only those ports which saw twenty five or more entries over the period. These were 5.5% of all ports entered by Halifax vessels, but they saw sixty nine percent of all entrances, and fifty eight percent of all tonnage entering all ports. Only four of these ports were in the West Indies or South America and none was outside the Atlantic. Again the pattern is closer to that of Yarmouth's fleet deployment than to that of Saint John. St. John's, Newfoundland, appears as a major port here because a few steamers in the 1880s and 1890s made regular stops there while crossing between Halifax and the U.K.

One final measure of the importance of North Atlantic trades remains to be considered. Voyages and passages have been categorized according to general trade routes, and a separate category was established for all voyages which included entrances and departures in

TABLE 3

PORT OF CALL AND TERMINAL ENTRANCES BY REGION, 1863-1902

	NUMBER OF ENTRANCES	%	TOTAL TONNAGE ENTERING	%	MEAN TONNAGE
U.K.	603	32.8	506,017	31.1	839
U.S.A.	457	24.9	373,019	23.0	816
EUROPE	223	12.1	183,712	11.3	824
B.N.A.	222	12.1	272,823	16.8	1,229
WEST INDIES	151	8.2	84,153	5.2	557
SOUTH AMERICA	128	7.0	129,444	8.0	1,011
ASIA	19	1.0	36,351	2.2	1,913
AFRICA	14	0.8	12,985	0.8	928
AUSTRALIA	12	0.6	14,748	0.9	1,229
INDIA	7	0.4	8,496	0.5	1,214
MISSING DATA/OTHER	3	0.1	2,578	0.2	
TOTAL	1,839		1,624,326		

Note: 'Missing Data/Other' is accounted for mainly by vessels whose voyages terminated at sea.

the North Atlantic only (i.e., the U.K., B.N.A., the East Coast of the United States, and Western Europe excluding the Mediterranean). Our sample is not large enough to allow analysis of growth rates in particular trades but we can compare all tonnage employed in exclusively North Atlantic voyages with all tonnage on voyages making at least one entry outside the North Atlantic. By this measure the North Atlantic increased in importance over time. In the 1860s such North Atlantic voyages accounted for sixty one percent of all tonnage. This proportion remained the same in the first half of the 1870s. In the quinquennium which saw the beginning of the decline in investment in shipping in Halifax, the port's shipowners committed an even larger share of their existing assets to the exclusively North Atlantic routes. In the late 1870s seventy one percent of all tonnage undertook North Atlantic voyages and this proportion increased to seventy two percent in the first half of the 1880s before declining steeply in the late 1880s. When faced with competition from steam and with diminishing returns from their investments Halifax's shipowners clung to the familiar. The experiment with longer distance trade routes was both limited and tardy. Instead these shipowners decided to curtail further investments in the industry, to commit themselves even more deeply to the American European trades, and to maintain a competitive position by improving productivity and

TABLE 4

MAJOR PORT ENTRANCES, 1863-1900

PORT	NUMBER OF ENTRANCES	RANK	TONNAGE ENTERING	RANK	MEAN TONNAGE
NEW YORK	243	1	165,658	1	682
LIVERPOOL	184	2	149,681	2	813
LONDON	114	3	79,837	4	700
HALIFAX	85	4	91,439	3	1,076
ANTWERP	65	5	53,673	5	826
PHILADELPHIA	63	6	50,210	7	797
BALTIMORE	59	7	36,424	8	617
CARDIFF	47	8	32,306	10	687
BOSTON	45	9	24,365	12	541
MONTEVIDEO	45	9	35,337	9	785
ST. JOHN'S, NFLD.	42	11	59,658	6	1,420
ST. THOMAS	39	12	15,351	17	394
BUENOS AIRES	37	13	23,477	13	634
GLASGOW	36	14	25,391	11	705
QUEBEC CITY	35	15	21,795	14	623
GREENOCK	29	16	13,092	18	451
SAINT JOHN	27	17	16,484	16	611
BRISTOL	25	18	11,806	19	472
HAVRE	25	18	20,335	15	813
HAVANA	25	18	10,179	20	407

efficiency.

The decision to combine retrenchment with a deeper commitment to American trades may appear in retrospect to have been fatally over cautious. But before we make such a judgment it is worth pointing out that there were solid reasons for adopting this strategy. Vessels were most profitably deployed where they were most assured of finding a cargo and in the 1870s there were still cargoes for sailing vessels in the American ports. The turn around times in American ports, as we shall see later, were well below average in the 1860s and 1870s. Further, it appears that the availability of cargoes in American ports was least affected by seasonal changes. This was a very important consideration since the export of staple products was traditionally a highly seasonal activity and it was imperative to maintain vessels in employment for as many months of the year as possible. An analysis of monthly departures by Halifax vessels in the two periods 1863-74 and 1875-90 suggests that Halifax's shipowners

were reasonably successful in maintaining their vessels in employment on a year round basis. The average number of departures in each month was ninety seven in both periods and the variation from the mean remained the same (the coefficient of variation was 12.6% in the first period and 12.8% in the second period). Departures fell in the winter months and peaked in the summer but winter departures approached significantly closer to the mean in the second period compared to the first. Departures in winter from B.N.A. were least numerous of course, and variation from the mean of monthly departures was highest in both Canada and the West Indies for climatic reasons and because of the seasonal output of staple products in these regions. In the second period Halifax's vessels withdrew from both these regions and the withdrawal from B.N.A. in the winter months is particularly noticeable (fifteen percent of all departures from B.N.A. occurred between December and April in the first period, compared to eight percent in the second). A larger number of vessels were making their way to and from American ports in winter, and fifty eight percent of the increase in American departures between the two periods was accounted for by winter clearances. American ports appeared to offer better opportunities for year-round employment, and better turn around times, and by moving more tonnage into American trades Halifax shipowners appear to have avoided a costly increase in seasonal under-employment of vessels.

Having been committed so heavily to the North Atlantic trades how did the Halifax fleet perform when faced with declining gross freights and competition from steam? David Alexander has concluded that gross output in the Yarmouth fleet increased rapidly in the 1870s and that gross productivity rose by 4.1% per annum in the 1870s and remained positive in the 1880s.[7] The small sample of Halifax voyages does not allow similar estimates to be made for the Halifax fleet, but it is possible to indicate some of the ways in which Halifax's shipowners succeeded in improving productivity and efficiency in their fleet. One component used in Alexander's estimate of average productivity per vessel was average carrying capacity. This was a principal source of productivity change in Halifax shipping in the three decades after 1863, and the improvement shown in Table 5 is particularly striking in the period from 1875 to 1890 when competition in ocean shipping was most intense. The mean tonnage of vessels on registry increased rapidly up to the peak in investment in 1874 (the mean tonnage of vessels on ocean voyages increased less quickly because our voyage sample is biased from the beginning towards larger vessels). The mean tonnage of vessels on registry actually declined during the second period, but vessels on ocean voyages and vessels in the North Atlantic grew in average capacity more rapidly than ever before.

Even as Halifax shipowners failed to reinvest in ocean going vessels they continued to deploy ever larger vessels in ocean trades. There were undoubtedly many fewer Halifax vessels in the North Atlantic in the late 1880s than in the 1860s but they were about 139% larger than they had been twenty years before. It was in fact their small and medium sized carriers, vessels between one hundred and five hundred tons, which Halifax owners disposed of most rapidly in the 1880s.[8] In the effort to reap the advantages of greater vessel size it was the small and medium sized fleet which suffered first. This was the fleet traditionally employed in West Indian trades, and it would appear that by concentrating on North Atlantic routes Halifax's shipowners sacrificed advantages in the West Indian trades. Our voyage sample suggests that the average capacity of Halifax vessels in the West Indies increased very little between the two periods (from 292 tons to 335 tons). In spite of this increase average capacity was actually declining rapidly within the 1875-90 period. By 1890 Canadian registered vessels clearing Canada for the West Indies were less than a third as large as British vessels, and less than half the size of foreign vessels in the same trade, and Canadian vessels were diminishing in numbers.[9] If there was a price paid for increased efficiency in North Atlantic trades it was the simultaneous dwindling of investment in the coastal and West Indian fleets which had once been the basis of Halifax shipping.

The withdrawal of investments from smaller and medium sized vessels was part of the general effort to reduce costs and to increase productivity in the fleet as a whole. The smaller and medium sized vessels were less efficient in their use of labour, which is reflected in the relatively high man-ton ratios of vessels employed in the West Indian trades shown in Tables 6 and 7. The least efficient rigs were also traditionally employed

TABLE 5

ANNUAL GROWTH RATES OF MEAN TONNAGE IN SELECTED TRADES

	1863-1874		1875-1890	
	GROWTH RATE	**MEAN**	**GROWTH RATE**	**MEAN**
NORTH ATLANTIC	+1.6%	514	+4.6%	839
SOUTH AMERICA	+8.7	468	+6.5	631
WEST INDIES	+3.3	292	-7.6	335
ALL VOYAGES	+2.2	448	+4.6	751
VESSELS ON REGISTRY	+5.1	119	-2.6	126

Source: Crew List Data File; B.T. 107/108 ship registries.

in West Indian trades: our voyage sample suggests that seventy one percent of West Indian voyages were undertaken by schooners, brigs and brigantines. Exactly the same proportion of North Atlantic voyages was undertaken by the most efficient rigs — barques, barquentines, and ships. The preference given to North Atlantic routes was even more striking than these proportions suggest, however. The 184 barques and ships added to the fleet in the 1860s and 1870s were clearly intended for use in the North Atlantic: in our existing sample of 549 voyages by these rigs, sixty four percent of voyages by barques and seventy two percent of voyages by ships were in the North Atlantic. The trend towards larger vessel size was not only an attempt to reap the advantages associated with increased carrying capacity; it was also an attempt to reduce the costs of labour relative to the amount of cargo carried.

Halifax shipowners appear to have reduced substantially the overall costs of labour within the fleet. Man-ton ratios were declining at a rate of 1.6% per annum in the growth period to 1874, but thereafter the pressure to reduce costs was even greater and in the next twelve years man-ton

TABLE 6

MAN-TON RATIOS BY TONNAGE CLASS AND RIG

TONNAGE CLASS	MEN PER 100 TONS
50-249	4.2
250-499	2.6
500-999	1.9
1000 +	1.4

RIG	MEN PER 100 TONS
Steam	1.4
Schooner	6.1
Brig	2.8
Brigantine	3.1
Barque	2.1
Barquentine	1.8
Ship	1.5

Note: Man-ton ratios were calculated for the first leg of voyages only, since the crew is assumed to be most complete at the beginning of voyages. Crew data has been coded for fifty percent of all vessels for which Crew Lists are available.

ratios fell by 5.3% per annum. The improvement was most substantial on vessels employed in the North Atlantic routes where vessels used 1.2 fewer men per hundred tons in the 1890s than they had in the 1860s. This represented a very substantial net saving to the shipowner. Even if we assume that the wages of an able bodied seaman remained constant at fifteen dollars a month, and if we assume that the vessel was at sea for nine months in every year, then a saving of twelve men on a thousand ton

vessel represented a saving of $1,620 per year or $11,340 over the average registry life of such vessels. Since the initial cost of a new vessel was roughly $35 per ton in the 1870s this saving of 1.2 men represented about a third of the initial capital invested. By the same kind of calculation the total wage bill of a five hundred ton West Indian trader might have been only ten percent less than the total wage bill of a ship twice its size in the North Atlantic. When retrenchment became necessary it is little wonder that brigs and brigantines in the one hundred to five hundred ton class were disposed of first.

The improvement in man-ton ratios over time was accounted for entirely by improvements in the fleet of vessels above five hundred tons and by the growing proportion of those vessels in the fleet. Man-ton ratios for vessels between fifty and five hundred tons actually increased between 1863-74 and 1875-90. Clearly the shipowners of Halifax concentrated on improving labour productivity on larger vessels while adopting a different solution for smaller vessels. But the improvements on North Atlantic routes noted in Table 7 were in fact greater than the improvements on vessels above five hundred tons: man-ton ratios in the

TABLE 7

MAN-TON RATIOS BY TRADE

	1863-74	1875-90	1890-99	1863-99
NORTH ATLANTIC	2.5	1.7	1.3	2.1
SOUTH AMERICA	2.4	2.4	1.4	2.3
WEST INDIES	2.8	2.7	n.a.	2.7

Note: For South America in the 1890s, the number of cases is only four. Ratios are calculated as men per one hundred tons.

North Atlantic fell by thirty two percent between 1863-74 and 1875-90, while the ratio on vessels above five hundred tons fell by only fifteen percent. It was the increasing use of the larger vessels in the North Atlantic and the stringent efficiencies imposed upon them which accounted for most of the saving in labour between the two periods. The total labour costs in the industry, and particularly in the North Atlantic, fell very sharply even if we assume constant average wages. Thus the fleet doubled in capacity between 1860/61 and 1880/81, but the greater proportion of five hundred to fifteen hundred ton vessels in the fleet and the declining man-ton ratios for that class of vessel, meant that the total labour force required had increased by only forty five percent. The improvement in

labour productivity suggested by the decline in man-ton ratios continued in the 1890s, and for the whole period to 1900 the improvement was at the rate of two percent per annum. This was roughly comparable to Deane and Cole's estimate of growth in labour productivity in Britain in the later nineteenth century, and as we have noted the improvement in the Halifax fleet was very much faster in the late 1870s and 1880s.[10]

Did the decline in man-ton ratios result in a loss of efficiency in the fleet? An analysis of the reasons for the closing of vessel registries suggests there was a very substantial increase in marine disasters as causes of registry closure in the 1870s and 1880s. Only twelve percent of all vessels above 250 tons registered in the 1850s went off registry because they were wrecked, sunk, or lost at sea. But twenty four percent of such vessels registered in the 1860s were lost through marine disasters, and this proportion rose to thirty four percent for vessels registered in the 1870s and thirty two percent for vessels registered in the 1880s. This increasing loss rate may not have been caused by the use of fewer men per ton of vessel, but it does indicate that owners and captains were taking greater risks with their vessels at a time when there was increasing competition for cargoes and increasing pressure on profit margins.

If we consider other factors, however, there does not appear to be any decline in efficiency in the fleet. An analysis of voyage duration suggests there was a marked improvement in sailing times in the 1870s and 1880s. Even though crews were smaller efforts were clearly being made to improve passage times, especially in the North Atlantic. In most of the major trade routes as Table 8 shows there was a significant improvement in passage times between 1863-74 and 1875-90. There was an improvement of fifteen percent in sailing times in both directions between the East Coast of the United States and Northern Europe. No improvement was recorded between the West Indies and the U.S.A. and there was a sharp increase in sailing times from the U.S.A. to the West Indies: again this trade route appears to have experienced the least gains in improved performance. While a gain of six days' sailing time between destinations in the United States and Europe may not seem very important, it was significant in terms of the lifetime of a vessel and its overall output. Assuming a constant turn around time of twenty five days on both sides of the Atlantic, the gains between Europe and the United States meant that a vessel could complete one extra passage across the Atlantic and one extra stop in port over a two year period. In the period to 1874 a complete voyage from the Eastern United States to Northern Europe and back, including twenty five day turn around times on both sides of the Atlantic, took an average of 149 days. In the second period the same voyage with the same turn around time required 134 days. Assuming that vessels were

TABLE 8

MEAN PASSAGE TIMES IN SELECTED TRADES, 1863-1890

TRADE ROUTE	1863-74	1875-90	% CHANGE
EAST COAST U.S.A. TO U.K.	39.2	35.9	8.4
U.K. TO EAST COAST U.S.A.	49.6	44.8	9.7
EAST COAST U.S.A. TO NORTHERN EUROPE	42.7	36.2	15.2
NORTHERN EUROPE TO EAST COAST U.S.A.	56.5	48.1	14.9
WEST INDIES TO EAST COAST U.S.A.	22.8	22.6	0.9
EAST COAST U.S.A. TO WEST INDIES	22.6	25.6	-13.3
B.N.A. TO U.K.	33.8	31.9	5.6
U.K. TO EAST COAST SOUTH AMERICA	70.1	63.1	9.9

Note: On the accuracy of dates of entry and departure see footnote 3.

operating with full cargoes, this saving of fifteen days meant an increase of ten percent in gross output between the two periods (a vessel operating after 1874 would complete eleven voyages whereas a vessel before 1874 would complete only ten in the same amount of time). Since this trade route accounted for a growing proportion of available tonnage across the two periods, this improvement in output must have affected a growing proportion of the fleet.

It is not yet clear whether these improvements in passage time were the result of faster sailing times over the same distances. Before we consider this possibility, it is worth noting that whatever may have caused the improvement the gains in output were presumably the same. It is possible for instance, that some portion of the improvement resulted from shorter distances covered. Thus more vessels in the later period may have been sailing from more northerly American ports and terminating in Irish ports or European ports west of Amsterdam. Even if this were so the gains in output remained since presumably vessels terminated their passages where they were most likely to find a market for their cargoes. The improved passage times meant that vessels were taking less time to find ports in which to deposit their cargoes. The practice of stopping at ports for orders may have assisted this process, for it clearly did not cause a decline in passage times between the two periods. The improvement in passage times in the major trade routes is all the more remarkable when

we consider that all passage times as shown in Table 9 were increasing slightly after 1874 because of the movement into more distant trades. There was a very large deviation from the mean passage times in all three periods, and the growth rates are consequently very rough estimates of the general trend. The lengthening of passage times between 1875 and 1889 suggests that vessels were having to travel longer distances in order to find cargoes. Much of the increase resulted from the growing proportion of voyages outside the North Atlantic in the 1880s. Voyage

TABLE 9

MEAN PASSAGE TIMES (ALL VOYAGES) AND VOYAGE DURATION

	MEAN	ANNUAL GROWTH RATE	MEAN VOYAGE DURATION	ANNUAL GROWTH RATE
1863-74	42.9	-0.4%	144.0	-1.0%
1875-89	45.6	+0.8	138.2	+3.0
1890-99	28.9	-7.7	109.8	—

Note: The voyage duration growth rate is not calculated for 1890-99 because of insufficient cases.

duration is perhaps a less meaningful statistic, since the termination of a voyage is sometimes an arbitrary decision taken in the process of coding data from Crew Lists. But the termination of a voyage more often occurs with the final discharge of crew and the submission of the Crew List. Mean voyage durations were actually declining, particularly in the 1890s, although voyage duration was increasing within the period from 1875 to 1889. This increase occurred because of the growing number of voyages outside the North Atlantic in the late 1880s and confirms that vessels were travelling longer distances in order to find cargoes. It does not suggest that a significant number of vessels were engaged in tramping — travelling without specific orders and entirely at the captain's discretion to ports in search of cargoes. The shorter times for the 1890s suggest that vessels were travelling much shorter distances in order to find cargoes. What in fact occurred was that the number of long distance ocean traders had rapidly diminished and a few large sailing vessels and steamers remained on short coastal routes and on voyages to the U.K. The much shorter passage times appear largely because a few steamers undertook regular passages between Halifax and London or Liverpool, stopping at St. John's or Cork en route. We are left then, with the conclusion that longer passages were required in order to find cargoes in the period immediately after the fleet reached its maximum size. But in spite of this overall

lengthening of passages there were significant improvements in passage times and hence in output on the routes where the majority of carrying capacity was deployed.

It is unlikely that the improved passage times indicated in Table 8 resulted either from shorter distance travelled or from an increase in the number of steamers on these routes. The proportion of entrances and clearances at northerly American ports did not increase in the second period (in fact the proportion of entrances and clearances from New England declined). The proportion of entrances and clearances at Irish ports or ports in Western France did not increase. And the number of steamer passages before 1890 is too small to affect the overall results. In his study of Saint John voyages, Lewis Fischer has discovered similar improvements in passage times between particular North Atlantic ports.[11] Further confirmation that sailing speeds were increasing may be provided by selecting voyages by sailing vessels only, and by choosing a more limited range of ports. For this purpose in Table 10 we have selected only those direct passages which occurred between American ports from New York to Baltimore, and either U.K. ports or European ports between Amsterdam and Havre. This substantially reduces the possibility that shorter distances rather than faster sailing time might account for the improvement in passage time. It is worth noting that the ports considered in this sample include eleven of the twenty ports into which Halifax vessels entered most frequently. The results confirm that there was a substantial improvement in sailing time across the Atlantic and the improvement is even greater than the results in Table 8 suggested. Sailing eastwards six and a half days were saved between the 1860s and 1880s representing an improvement of sixteen percent; in the other direction eleven and a half days were saved which means that sailing times improved by twenty percent. The average voyage across the Atlantic and back, including two turn around times, occurred in twelve percent less time in the 1880s than in the 1860s. Sailing time had improved even with fewer men employed. This improvement may have resulted from the increased use of barques and ships on North Atlantic routes, vessels whose rigging allowed for greater speed. It is also likely that captains under pressure from vessel owners were simply working their crews and vessels harder. Shipowners were clearly demanding improved performances within the limits of sailing ship technology rather than abandoning that technology. Although the improved sailing speeds suggested here come from a limited sample, they do suggest that improved sailing speeds were still possible. Douglass North's conclusion that increased speed did not contribute significantly to productivity change in shipping in the nineteenth century clearly needs to be re-

TABLE 10

NORTH ATLANTIC PASSAGE TIMES, 1863-1889

	SUM	NO.	MEAN	% CHANGE
FROM NEW YORK/BALTIMORE TO U.K. OR AMSTERDAM/HAVRE				
1863-74	2017	50	40.3	
1875-79	1576	41	38.4	4.7
1880-89	1998	59	33.9	11.7
FROM U.K. OR AMSTERDAM/HAVRE TO NEW YORK/BALTIMORE				
1863-74	1797	31	58.0	
1875-79	1787	36	49.6	14.5
1880-89	2924	63	46.4	6.5

examined.[12]

Douglass North also concluded that the most significant changes in turn around times in port occurred in the eighteenth century and that little change occurred in the nineteenth century. The sample of voyages by Halifax vessels is too small to allow an accurate estimate of overall changes in port times relative to time spent at sea. But the available evidence does suggest there were significant changes within the limited time periods considered here. In order to examine port times by region, turn around times at the end of voyages have been added together with days spent in ports of call, and the results are presented in Table 11. Although turn around times were usually longer than days in ports of call (since a new crew and new orders as well as a cargo had to be found at the end of a voyage), the procedure adopted here is justified because we wish to consider how total times spent in port changed over time. The results suggest, moreover, that turn around times and port of call times were very similar throughout our period (mean turn around time was twenty six days, whereas mean port of call time was only fractionally less). And in the second period after 1874, turn around at the end of voyages was on average faster than port of call time. This suggests that captains were discharging crew, signing a new crew, and finding new orders more rapidly than they were depositing cargoes in ports of call. Turn around times improved by seventeen percent between 1863-74 and 1875-89. This is a remarkable improvement considering that in this period the supply of carrying capacity in world trades was growing faster than the demand for vessels. Overall port of call times also declined, by 7.2%, between the two periods. The faster times in the 1870s are further evidence that Halifax shipowners were continuing in the industry only

TABLE 11

MEAN TURN AROUND AND PORT OF CALL TIMES

	1863-74	1875-89	1890-99	1863-99
U.K.	30.5	22.1	14.5	23.9
B.N.A.	23.0	14.0	9.6	15.3
EAST COAST U.S.A.	24.3	25.6	33.8	25.6
EUROPE	25.8	22.5	—	23.9
WEST INDIES	20.8	16.7	15.8	19.2
TURN AROUND: ALL CASES	29.6	24.6	18.1	26.0
DAYS IN PORTS OF CALL: ALL CASES	27.9	25.9	17.3	25.9

where they could make very stringent economies: the shorter times are largely accounted for by the short stops made by a few steamers on the run from Halifax to the U.K.

Port times shortened considerably in most of the regions where Halifax vessels appeared frequently. The change in port times in B.N.A. ports is particularly striking although the number of cases in the second period is not large. Port times in the U.K. improved by 27.5% between 1863-74 and 1875-89 (the number of cases being 145 in the first period and 162 in the second); in Europe port times also shortened considerably. Only in Eastern American ports did port time lengthen, although it was in the 1890s that greatest difficulties were encountered in American ports. It would appear that sailing vessels were taking longer to find cargoes in American ports as time passed. This deteriorating situation becomes more clear from Table 12 where we consider growth rates of port times within

TABLE 12

ANNUAL GROWTH RATES OF TURNAROUND AND PORT OF CALL TIMES

	1863-74	1875-89	1890-99
U.K.	-2.5%	+0.9%	-10.6%
B.N.A.	-1.1	-1.5	+0.9
EAST COAST U.S.A.	+1.8	+2.5	—
EUROPE	-4.8	-1.7	—
TURN AROUND: ALL CASES	-2.9	+0.2	-4.6
DAYS IN PORTS OF CALL: ALL CASES	+0.4	+0.5	-6.8

each period. The most significant improvements in turn around times were in fact being made in the first period, and overall turn around times and port of call times changed little during the second period. Times were lengthening considerably in American ports in the late 1880s particularly, and it was in these same years that the proportion of total tonnage employed in North Atlantic routes fell steeply. Any gains made in sailing and port times in other regions were quickly nullified by the difficulty of finding cargoes in American ports in the late 1880s, and Halifax's shipowners were forced to retreat from the trades in which the majority of their fleet had been employed for almost three decades.

The decision to depend so heavily upon returns from investment in the North Atlantic trades was justified however, by the gains in output and productivity achieved in those trades before the late 1880s. If the gains in sailing time reported in Table 10 are considered together with the gains in port times, the resulting improvement is particularly impressive. In the period to 1874 the complete voyage from the U.S.A. to the U.K. and back, with stops on both sides of the Atlantic, took 153 days; in the 1880s the same voyage took 128 days on average, and this represented a potential gain in gross output of sixteen percent (assuming that voyages in both periods carried similar amounts of cargo). The complete voyage with port times from the U.S.A. to Europe and back took twenty fewer days between the 1860s and 1880s, which meant a potential gain in output of almost fourteen percent. The improvement in sailing times and port times alone may, therefore, have yielded a potential growth rate in gross output of about one per percent annum between the two periods. This assumes of course a constant proportion of tonnage with cargo relative to tonnage in ballast, and we know that the proportion of ballast must have increased rapidly in the second period. The difficulties encountered in finding cargoes in competition with steam would certainly have nullified any possible increase in output allowed by faster sailing and port times.[13] What is remarkable however, is that such substantial gains in productivity of both labour and vessels were achieved in a deteriorating market. The few factors considered here — mean carrying capacity, man-ton ratios, sailing and port times — help to substantiate Alexander's conclusion that productivity gains were still being made in the 1880s. Further gains could be made only by disposing of large numbers of vessels and by withdrawing rapidly from trades in which steam competition left little demand for sailing fleets.

The first response of Halifax's shipowners to declining demand for carrying capacity was not to dispose of their assets by selling them more rapidly but to wrest whatever productivity gains they could from their existing stock. They adjusted supply to meet demand by failing to replace

vessels as they went off registry, and accordingly gross physical investment declined more rapidly than did tonnage on registry between 1873 and 1890. There was, surprisingly, no significant increase in the proportion of vessels sold or transferred from the port even in the 1880s. Whereas sixty four percent of vessels above 250 tons registered in the 1850s were sold to foreigners or transferred, the proportion fell to fifty one percent for such vessels registered in the 1860s, rose slightly to fifty four percent for vessels registered in the 1870s, and fell again to fifty one percent for vessels registered in the 1880s. There was no panic stricken rush to sell assets, but in an industry where the rate of depreciation was very rapid the failure to replace aging vessels meant a very steep decline in fleet size. Thus by1889 the ocean going fleet of Halifax was only a quarter as large as it had been fifteen years before.

The improvements in productivity of the late 1870s and 1880s and the attrition in fleet size were the result of enormous pressure upon gross returns in the sailing ship industry. An index of North Atlantic sailing ship freights constructed from data collected by Keith Matthews suggests that gross freights were declining at an annual rate of 8.4% from 1873 to 1879 and at a rate of 9.6% in the 1880s.[14] The improvements in output and productivity suggested in this paper, although impressive in their own right, could not compensate for so steep a decline in gross returns. It is perhaps not surprising that Halifax shipowners entered the deep sea trades as quickly as they did in the 1860s given the existing market opportunities, particularly in the carrying trades of the North Atlantic. One might reasonably ask, however, why Halifax shipowners did not reinvest the profits of the 1860s and 1870s in new technologies, if only to return to the B.N.A. trades with which they had previously been most familiar. The answer is partly in the nature of the B.N.A. trades themselves. By the late 1880s steam had encroached deeply into the Canadian coastal trades, but these trades offered diminishing opportunities because of the effect of railways and because of the growing importance of Montreal as Eastern Canada's major entrepot. The total tonnage of vessels clearing Halifax was still increasing in the 1880s and 1890s but at a much slower rate compared with previous decades. Coastal vessels in Canadian trades were very inefficient in their use of labour, and the traffic was not sufficiently dense to tempt investors.[15] And by the 1880s the old West Indian trades appeared to offer no alternative: the value and volume of Nova Scotian exports to the West Indies declined sharply in that decade. This is only part of the answer, however. By the 1870s and 1880s there were more promising opportunities for investment in landward sectors of the economy.[16] To these opportunities the shipowners of Halifax and their sons now responded, not in undue haste, but with the same prudent

calculation which earlier had guided them into the ocean trades of the North Atlantic.

NOTES

1. See, however, Douglass North, "Sources of Productivity Change in Ocean Shipping, 1600-1850", *Journal of Political Economy* (September-October, 1868), pp. 953-970.

2. Data on vessels on registry in Halifax is taken from the Board of Trade series 107 and 108 vessel registries. All growth rates in this paper are estimated from regression equations of the form Log Yt = a + bt. Much of the growth in Halifax registered shipping in the 1860s and 1870s was accounted for by owners resident outside the town of Halifax. About one third of all new tonnage registered in these decades was held by owners on the Fundy rim.

3. The analysis of voyages in this paper is based on a computer data set of vessels, voyages and crew taken from the Agreements on Account of Crew for Halifax registered vessels. These "Crew Lists" are contained in the archive of the Maritime History Group at Memorial University of Newfoundland. Crew agreements were signed by all crew when they joined the vessel. The documents also give an accurate account of voyages, since upon entry into a foreign port the captain was legally obliged to submit the document within 48 hours of arrival to the harbour master or to a British consular official. This official noted both the date of arrival and date of departure of the vessel. All changes in crew were also recorded on the document. See Olga Prentice, "Laws of British Ship Registration" (unpublished Maritime History Group technical paper, 1977).

4. The average life of seven years is average life on registry; actual vessel life from date of build was slightly longer. The difference occurs because vessels sold or transferred shorten average registry life.

5. For Yarmouth voyages see David Alexander, "Output and Productivity in the Yarmouth Ocean Fleet, 1863-1901", *this volume.*

6. Departures rather than entrances are used here for two reasons: first, this is not an analysis of productivity (in which case entrances would probably be preferable); second, since some voyages were coded where the terminal port was unknown, using departures allows a larger sample from which to discuss fleet deployment.

7. David Alexander, *this volume.*

8. Growth rates of tonnage on registry by tonnage class for the 1880s are as follows: 100-249 tons: -6.9%; 250-499 tons: -7.6%; 500-999 tons: -5.5%; 1000-1499 tons: -2.2%. The growth rate for vessels above 1500 tons was positive but there were no such vessels on registry at the beginning of the decade.

9. Calculated from Trade and Navigation Returns, Canada *Sessional Papers.* This point is discussed further in my paper "The Shipping Fleet of Halifax, Nova Scotia, 1820-1903", (Presented to the Atlantic Canada Studies Conference, Fredericton, 1978).

10. Phyllis Deane and W.A. Cole, *British Economic Growth, 1688-1959* (Cambridge, 1967), p. 283. Deane and Cole estimate change in labour productivity to be slightly over 2% per annum during the last four decades of the century.

11. "The Great Mud Hole: Some Notes on the Voyages and Productivity of the Ocean-Going Sailing Vessels of Saint John, New Brunswick, 1863-1912", *this volume.*

12. North, "Sources of Productivity Change", pp. 953-970.

13. On the successful encroachment of steam into these trades see Keith Matthews, "The Canadian Deep Sea Merchant Marine and the American Export Trade, 1850-1890", *this volume*. On the transition to steam see also C.K. Harley, "The Shift from Sailing Ships to Steamships, 1850-1890: A Study in Technclogical Change and its Diffusion", in Donald N. McCloskey (ed.), *Essays on a Mature Economy: Britain after 1840* (London, 1971), pp. 215-234.

14. See Matthews, *this volume*. Isserlis' general index of tramp shipping freights suggests a decline of 3.4% per annum between 1873 and 1889.

15. A return printed in the Canada *Sessional Papers* in 1881 on vessels in Canadian coastal trades suggests that the man-ton ratio on coastal steamers was 4.3 men per 100 tons, and 6.8 men per 100 tons for sailing vessels.

16. On these opportunities see Alexander, this volume, and David Alexander and Gerry Panting, "The Mercantile Fleet and its Owners: Yarmouth, Nova Scotia, 1840-1889," *Acadiensis,* Vol. VII, No. 2, (Spring, 1978), pp. 3-28.

7. THE GREAT MUD HOLE FLEET: THE VOYAGES AND PRODUCTIVITY OF THE SAILING VESSELS OF SAINT JOHN, 1863-1912

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THE GREAT MUD HOLE FLEET: THE VOYAGES AND PRODUCTIVITY OF THE SAILING VESSELS OF SAINT JOHN, 1863-1912

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The fleet of ocean going vessels registered during the nineteenth century in Saint John, New Brunswick was by far the largest in Atlantic Canada. Between 1830 and 1914, 5,394 vessels with a carrying capacity of 1,819,059 tons were newly registered at the port. If we compare new registrations between 1840 and 1889 — a period for which we have reliable data for most of the major ports in the region — tonnage registered at Newfoundland was only twenty two percent of the Saint John total, while even Yarmouth at twenty nine percent, Halifax at thirty two percent, and Prince Edward Island at forty two percent seem tiny in comparison. More significantly, at Saint John a higher percentage of marine assets were ocean going craft of over 250 tons than at any other port in the region: over forty percent of all new registrations, representing about five sixths of the port's carrying capacity, was accounted for by such vessels. In gross terms this was an impressive accomplishment for residents of a port often referred to derisively as 'that great mud hole.'[1]

The general structure of the Saint John fleet has been discussed more fully elsewhere.[2] In this paper the focus will be on the voyages undertaken by vessels registered at Saint John. After briefly sketching the ways in which local owners deployed their maritime assets, we will turn our attention to the question of productivity, examining changes in a number of gross variables over time.

In 1863 Saint John had 257 vessels of over 250 tons with a carrying capacity of almost 183,000 tons on registry. The fleet grew for another decade and a half reaching its historic peak in 1877 when the port's registry book contained 307 such vessels and over 265,000 tons of ocean going shipping. During this growth period the size of the average vessel also increased rising from 711 to 864 tons. While this expansion in mean vessel size was much less pronounced than at the neighbouring port of Yarmouth it still represented a gain of about twenty two percent over the period. Fleet size also grew at a slower rate than at Yarmouth, averaging just under 2.5 percent per annum between 1863 and 1877.

Investment in the growth period was characterized by several trends. Gross investment declined in each year between 1863 and 1869, enjoyed a brief resurgence through 1872, and then declined annually through 1877. Tonnage on registry showed less distinct trends. The tonnage of the fleet increased in 1864, declined in 1865, rose briefly the next year, declined through 1868, and then rose in a relatively linear fashion to its peak in 1877. The inverse relationship between gross and net investment throughout most of this period can be explained by reference to the 'transfer trade' in newly built vessels between Saint John and the United Kingdom. Before 1863 approximately half of all vessels over 250 tons first registered at Saint John were eventually transferred to new owners across the Atlantic. After 1863 this practice virtually ceased as declining demand for colonial built sailing vessels made such transfers far more difficult and risky.[3] The result of the diminution in transfers was that although fewer tons of shipping were added to the register a greater proportion was retained for use by local owners, thus increasing the size of the fleet.

After reaching its peak in 1877 the Saint John fleet began to decline, although the rate of disinvestment was slower than at other ports in the region. In 1890 the fleet still contained over 200,000 tons of ocean going shipping, and on the eve of the First World War the port was still home to over 100,000 tons of carrying capacity capable of venturing into the ocean going trades. Saint John owners did not conduct a 'fire sale' of their major assets during the period of decline. Instead they operated them either until they were lost at sea, worn out, or found new homes with Scandinavian, Italian, Greek or other foreign purchasers.

In order to study the deployment of the Saint John ocean going fleet we are fortunate to be able to rely upon a unique set of documents, the 'Agreements on Account of Crew.' These documents are currently housed in the archives of the Maritime History Group at Memorial University of Newfoundland and contain records for a vast majority of ocean going vessels registered in the British Empire between 1863 and 1914.[4] These 'crew lists' were the actual articles signed by crew members with masters of ocean going vessels. They contain a rich lode of data on individual crew members, but more important for our present purposes they allow us to trace the voyage patterns of Saint John registered vessels with a precision heretofore impossible. When a vessel entered an overseas port British maritime law required the master to deposit these agreements with either the local shipping master or a resident consular official within forty eight hours. In turn the official was required to place an endorsement on the document stating the name of the port and the official dates of entrance and clearance.[5] While these laws were not always obeyed, available

evidence suggests that the procedure was followed in the vast majority of cases. Through this information we are able to trace the actual voyages.[6]

At present the Saint John file contains data on 580 vessels and slightly over five thousand voyages and passages. However, despite its size the file is not yet complete: approximately thirty percent of the voyages for which records exist remain to be entered. As a result our discussion of the voyage patterns of Saint John vessels must remain for the moment on the macro-level. But even this type of examination, however, reveals some interesting and significant trends.

Over the period 1863-1912 we currently have voyage data on some 4,597 voyages and passages outward bound from 210 ports around the world.[7] Table 1 indicates that fifty seven percent of these 'starting ports' were located in the United Kingdom, and sixty four percent of all voyages and passages began in that country. European ports accounted for an additional ten percent of voyage starts. Only twenty six percent of all voyages and passages began in the Western Hemisphere with over half of these originating in Canada. The majority of voyages outward from Canadian ports involved newly registered vessels bound for the United Kingdom either for sale to new owners or to begin their careers operating out of ports on that side of the Atlantic. The industry, at least in an operating sense, was clearly separated by an ocean from its port of registry.

In eighty five percent of all cases voyage destinations were explicitly stated on the Crew Agreements. When specific destinations were given, Saint John vessels actually called at the intended port about ninety-seven percent of the time. Of the intended destination as indicated in Table 2,

TABLE 1

REGIONAL ORIGINS OF VOYAGES, 1860-1914

REGION	NO. PORTS CLEARED	NO. CLEARANCES	% PORTS	% CLEARANCES
Total	210	4,597	100	100
U.K.	119	2,964	57	64
Europe	30	466	14	10
U.S.A.	16	467	8	10
Canada	39	690	19	15
West Indies	2	3	1	0
South America	3	6	1	1
Asia	1	1	0	0

Source: "Agreements on Account of Crew," Maritime History Group, Memorial University of Newfoundland. Unless otherwise indicated, all Tables in this paper are derived from this source.

TABLE 2

DECLARED DESTINATIONS, 1860-1914

REGION	NO. PORTS	NO. DESTINATIONS	% PORTS	% DESTINATIONS
Total		4,597		100
U.S.A.	52	1,133	15	25
Canada	50	854	14	19
U.K.	72	551	21	12
South America	38	468	11	10
Europe	54	123	15	3
West Indies	35	339	10	7
Africa	14	32	4	1
Asia	17	71	5	2
India	7	171	2	4
Australia	11	70	3	2
Total Declared	350	3,810		85
Missing Data		787		

twenty five percent were in the United States and an additional nineteen percent in Canada. Thus forty four percent of all voyages and passages were destined for North America, which was by far the highest percentage for any region in the world. Yet North America was not nearly as dominant as a destination for Saint John vessels as it was for those registered in the port of Yarmouth: among voyages made by vessels registered at that Nova Scotian port sixty one percent of the stated destinations were in North America.[8] The difference between the two ports is accounted for by the greater interest of Saint John owners in voyages outside of the North Atlantic. Declared destinations in South America, the West Indies, Africa, Asia, India and Australia were seventeen percent higher among the Saint John fleet than in Yarmouth. If declared destinations are any kind of reasonable guide it would appear that the trade engaged in by Saint John owners was far more diverse than that of their Yarmouth counterparts.

But regional starts and declared destinations can be misleading since voyages were often far more complex than a simple 'out and back' pattern. A voyage undertaken by the 1077 ton ship *Hermon* in 1871 is a good example. She cleared from Liverpool in July bound for Cardiff where she picked up a cargo of coal. The vessel then sailed for Rio de Janeiro, but instead of loading there for a return voyage to the United Kingdom she sailed to Chittagong. Her circuitous voyage then took her to Port Louis, Rangoon, and New York before she arrived back in Liverpool in January of 1874. This type of voyage, while clearly not the norm, was not an extreme either.

One method of gaining a clearer picture of vessel deployment is to analyze Saint John voyages by trade route. For this analysis Saint John trading patterns have been divided into twenty broad trade routes. An examination of the data in Table 3 shows that the North Atlantic routes did indeed form the backbone of the Saint John deep sea trades. But these routes accounted for less than half of all voyages and passages made by Saint John vessels, a far smaller percentage than was found for Yarmouth voyages. Of more significance, almost thirteen percent of Saint John voyages involved no ports of call in either North America or the West Indies.

While this once again highlights the relative diversity of the trading patterns of the fleet it unfortunately conceals almost as much as it reveals. The designation of trade routes is at best somewhat arbitrary. If a vessel cleared from the United Kingdom for Melbourne, for example, and then continued on to Callao and the guano islands it was coded as a voyage to the West Coast of South America. The necessity of making such coding decisions obscured much of the complexity of trade and tended to over represent some parts of the world at the expense of others.

A better method of viewing the deployment of the fleet is to count entrances into various ports around the world. Clearances from starting ports have been excluded: this decision was made because to include them would lead to double counting since the port at which a voyage started was almost always the port at which the last voyage terminated. Further, it may be assumed that a vessel terminated at a particular port for a commercial reason, either because it had a cargo for that port or expectations of obtaining one there. On the other hand we know that a vessel could have begun a voyage in ballast and then proceeded to a second port for loading. The starting port thus may have had little real significance in an economic sense. This pattern occurred frequently in British ports where a vessel would often proceed in ballast to Cardiff, Penarth, Barry or Newport to load its cargo.

The Saint John file currently contains almost fourteen thousand such entrances into either ports of call or terminal ports. If these entrances are examined on a regional basis, Table 4 shows that the United Kingdom accounts for fully thirty eight percent of all entrances by number and thirty five percent by tonnage. These were substantially higher percentages than for Yarmouth vessels; however, the corresponding proportion of European entrances for Saint John vessels (eight percent by number and nine percent by tonnage) was much lower than for Yarmouth craft. This discrepancy can be partially explained by an observed gap in the Saint John file: the 1870s and early 1880s, the period in which vessels were most likely to enter European ports, are seriously under represented

TABLE 3

SAINT JOHN TRADE ROUTES, 1863-1912

ROUTE	NO.	%	TONS	% TONS	MEAN TONNAGE
North Atlantic	2,274	49.5	1,706,349	47.7	751
North Atlantic and West Indies	347	7.5	156,680	4.3	452
British Coastal	288	6.3	131,453	3.6	458
U.S. Gulf	278	6.0	260,098	7.2	939
Indian Ocean	226	4.9	260,898	7.2	1,154
West Indies	201	4.4	81,626	2.2	249
South America — West Coast	195	4.2	225,330	6.3	1,156
Europe (U.K.)/South America/North America	165	3.6	135,214	3.8	824
South America — East Coast	141	3.1	137,707	3.9	977
Europe — U.K.	76	1.7	70,360	2.0	925
World	75	1.6	86,036	2.4	1,147
Europe (U.K.)/South America/North America/ West Indies	67	1.5	75,268	2.1	1,123
East Indies	47	1.0	59,551	1.7	1,267
Oceana	44	1.0	42,688	1.2	970
North American Coastal	44	1.0	13,471	0.4	306
Mediterranean and North Atlantic	41	0.9	66,391	1.9	1,619
North American — West Coast	29	0.6	35,205	1.0	1,213
Mediterranean	20	0.4	16,340	0.5	817
Baltic	12	0.3	5,704	0.2	475
Africa	11	0.2	7,558	0.2	687
Other	15	0.3	7,610	0.2	507
Total	4,597		3,581,517		779

Note: North Atlantic and West Indies includes voyages with ports of call in both the West Indies and North America; Europe/South America/North America and Europe/South America/North America/West Indies includes voyages with at least one port of call in each region; Mediterranean and North Atlantic includes voyages with ports of call in both the Mediterranean and North America; British Coastal Passages included; British Coastal Voyages excluded.

TABLE 4

PORT OF CALL AND TERMINAL ENTRANCES, 1863-1912

REGION	NO.	%	TONS	%
Total	13,932	100	11,296,727	100
U.K.	5,263	38	3,965,151	35
U.S.A.	2,371	17	1,886,553	16
Canada	1,740	13	1,231,343	11
Europe	1,068	8	1,028,002	9
South America	1,552	11	1,468,574	13
West Indies	1,032	7	417,979	4
India	319	2	338,902	3
Asia	313	2	521,908	5
Australia	153	1	280,161	3
Africa	121	1	158,154	1

in the data collected thus far. When the file is completed it is logical to expect that the proportion of entrances into Europe would rise at the expense of the United Kingdom entrances.

Even taking this problem into consideration however, it is clear that the United Kingdom was more important to Saint John than to Yarmouth. This is most likely explained by the lesser importance of the North Atlantic trade to Saint John owners. As David Alexander has shown, trade emanating from the United States in particular was highly correlated with European entrances.[9] Since the dependence upon this trade was apparently less among Saint John owners it is not surprising that Europe should be less important for the vessels that they operated.

Regardless, the proportion of entrances over the period into United Kingdom and Europe combined, which was forty six percent, was exactly the same as the Yarmouth percentage. But United States and Canadian ports accounted for forty one percent of Yarmouth entrances while they contributed only thirty percent to the Saint John total. Eighty seven percent of Yarmouth's entrances were accounted for by ports in either Western Europe or North America; the Saint John percentage (eighty two percent) was significantly lower. The trading patterns of Saint John vessels were indeed different.

Within these broad regions certain ports stood out as being particularly important harbours for Saint John vessels. There were ninety ports throughout the world in which at least twenty five entries — an average of one every two years — were recorded. These ports accounted for slightly in excess of eighty percent of all entrances by both numbers

and tonnage. Among these leading ports in Appendix I, three clearly stood out: Liverpool, New York and Saint John. Together these three giants accounted for about twenty two percent of all entrances by either number or tonnage over the period. A second tier of five ports — Cardiff, Callao, Philadelphia, London and Quebec City — contributed an additional twelve percent of entrances and fourteen percent of tonnage. A final seven ports — Havana, Newport, Boston, New Orleans, Rio de Janeiro, Antwerp and Dublin — were closely grouped and accounted for ten percent of both entrances and tonnage. Taken together these fifteen ports, representing but seventeen percent of the leading ninety entrepots, accounted for forty four percent of the total entrances and forty six percent of tonnage. While this is an impressive concentration, it gives evidence of greater diversity than at Yarmouth where the leading fourteen ports contributed fifty five percent of total entrances.

Among the fifteen leading ports five were in the United Kingdom, four in the United States, two each in Canada and South America and one each in Europe and the West Indies. And when all ninety ports were considered, thirty one were in the United Kingdom, fifteen in the United States, eleven each in Canada and South America, eight in Europe, six each in the West Indies and the Indian Ocean regions and two in Australia. In contrast, for Yarmouth vessels only six of the leading fifty one ports (twelve percent of the total) were located outside of the dominant United Kingdom/Europe/ North America trading area as opposed to twenty five ports for Saint John (twenty eight percent of the total).

When ports are analyzed according to tonnage entered the top rankings do not show much change: eight of the ten leading ports in terms of number of entrances remain in the top ten by tonnage entered. Rio de Janeiro enters the top ten as does Antwerp, while Havana and Newport seem less important. The key to understanding these and other shifts is to be found in examining the mean tonnage per entrance column in Appendix I. The average tonnage of all vessels entering ports over the period was about 781 tons. Those ports with mean tonnages per entrance which exceeded that figure generally seem more important when tonnage is employed as the criteria, while those with lower mean tonnages appear relatively less significant. In general an analysis by tonnage tends to lessen the importance of West Indian ports while making ports in South America, India and Asia seem more noticeable.

Table 5 shows those ports which were either major beneficiaries or suffered a major decline in comparison rankings. Norfolk was the major beneficiary of the different ranking procedure and the discrepancy is easily explained. Thirty of the thirty two entrances by Saint John vessels into that port occurred after 1890 and all but three of these were made by large steamers. As a result the mean tonnage per entrance for Norfolk was

over two thousand tons. Similarly Hull, Hamburg, Barry and North Shields had a disproportionate number of steamer entrances after 1890. Newcastle, Melbourne, San Francisco and Calcutta, on the other hand, were all ports which were entered exclusively by large vessels throughout the period, thus explaining their relative gains.

The ports which appeared much less important when tonnage ranking was used all had low mean tonnages per entrance. Metanzas, and indeed all six of the major West Indian ports appeared less important when ranked by tonnage for this reason. But of even greater interest are the other nine ports which suffered major declines. In every case seventy

TABLE 5

MAJOR RANKING SHIFTS BETWEEN NUMBER OF ENTRANCES AND TONNAGE ANALYSIS

	ENTRANCE RANK	TONNAGE RANK	RANK DIFFERENCE
		Major Beneficiaries	
Norfolk, Va.	73	38	+35
Hull	68	39	+29
Newcastle, N.S.W.	69	41	+28
Hamburg	41	18	+23
Barry	70	48	+22
Bremerhaven/Bremen/ Brake	60	40	+20
Melbourne	55	35	+20
San Francisco	78	60	+18
North Shields	62	45	+17
Calcutta	38	22	+16
		Major Declines	
Dundalk	28	71	-43
Maryport	18	56	-38
Cork	32	69	-37
Troon	30	63	-33
Ardrossan	36	64	-28
Castletown	59	87	-28
Londonderry	21	46	-25
Richibucto	57	81	-24
Swansea	61	82	-21
Matanzas	17	36	-19

percent or more of the entrances occurred prior to 1875. This is of particular interest because it has previously been determined that between 1865 and 1875 Saint John owners briefly reversed a century long trend and shifted their investments away from one thousand ton ships and into barques of between four and five hundred tons.[10] The reason for this shift previously remained obscure but this data now clarifies it. Saint John owners in this decade, when first confronted by the rising challenge of steam coupled with uncertain markets for freight, briefly invested in smaller vessels to allow trade into smaller ports which were less likely to be able to handle large bulk cargoes all at once. Dundalk, Maryport and Castletown were primary examples of this phenomenon. With demand for carrying capacity rising and a renewed stability in markets by the mid-1870s, Saint John owners rapidly reverted to more traditional behaviour and almost completely lost interest in these secondary ports.

There were definite changes in the deployment of vessels over time. While the analysis of these shifts is constrained somewhat by the incomplete nature of the file, the general outlines of these changes can be noted in Table 6. In the growth period of investment 1863-77 Saint John owners deployed their vessels in a wide variety of trades. Over thirty eight percent of all entrances were into ports in the United Kingdom; of particular interest is the concentration in Irish ports which relates in part to the phenomenon discussed above. Interest in Europe was apparently low with less than six percent of entrances into either a Northern or Southern European port. Canadian ports accounted for over a sixth of entrances while just over sixteen percent were into ports in the United States. Almost half of American entrances were into ports in the mid-Atlantic region, particularly into New York, Philadelphia, and Baltimore. The West Indies was also important and entrances into that region exceeded the proportion into the mid-Atlantic United States. Connections with South America were overwhelmingly with the West Coast where Callao and the Chincha and Guanape Islands of Peru were the most important ports of call. The relatively early interest by Saint John owners in other regions of the world was evidenced by the fact that almost seven percent of all entrances were accounted for by India, Asia, Australia and Africa.

By the 1880s several shifts were apparent. The percentage of entrances accounted for by the United Kingdom remained virtually unchanged but the Welsh ports were becoming increasingly important while Scottish ports were beginning to decline. Europe was becoming more important and now accounted for thirteen percent of world entrances. Entrances into Canada had declined to under eleven percent while the importance of the United States increased at the expense of

TABLE 6

ENTRANCES BY PERIOD

REGION	1863-1877	1878-1890	1891-1912	1863-1912
Canada	13.4%	10.8%	9.9%	12.5%
England	21.9	21.9	17.8	21.5
Wales	3.5	5.0	6.0	4.1
Scotland	4.5	3.4	0.8	3.9
Ireland	8.5	8.5	7.3	8.3
Europe — North	4.4	11.8	6.2	6.2
Europe — South	1.1	1.2	3.9	1.4
U.S.A. — New England	2.6	1.0	2.7	2.3
U.S.A. — Mid-Atlantic	7.7	10.5	9.1	8.5
U.S.A. — South Atlantic	2.6	2.1	2.6	2.6
U.S.A. — Gulf	3.3	3.4	3.5	3.3
U.S.A. — West Coast	0.2	1.2	0.6	0.5
West Indies	8.8	4.1	5.3	7.4
South America — East Coast	3.7	7.2	16.0	5.7
South America — West Coast	7.1	2.3	0.7	5.4
Africa	0.7	0.8	2.0	0.9
India	3.0	1.1	0.0	2.3
Asia	2.0	2.5	3.3	2.2
Australia	1.0	1.2	2.3	1.1

Canada. United States ports contributed about eighteen percent of entrances in the period and the mid-Atlantic ports accounted for more than sixty percent of these. Noticeable declines could be observed in the New England and South Atlantic ports while trade into the Gulf of Mexico remained relatively stable. The West Indies and the West Coast of South America also declined noticeably; in their places entrances into the East Coast of South America and into ports along the Pacific Rim were increasing in importance. For example the proportion of vessels entering ports along the Atlantic Coast of South America almost doubled, entrances into ports along the West Coast of the United States rose from 0.2 to 1.2 percent and Australia and Asia also increased substantially in importance. Decline was setting in on the Indian Ocean trades; this was but a precursor of the total collapse of this once important trade in the 1890s.

The final period saw the culmination of many of these earlier trends. Of particular importance was the decline in significance of the United

Kingdom ports. Less than a third of all entrances between 1891 and 1912 were into ports in the United Kingdom, as steam vessels overwhelmed sail in that part of the globe. The steepest declines were in English and Scottish ports but even the previously stable Irish connections were showing signs of weakening. Only Wales, which ironically promised owners of sailing vessels bulk cargoes of coal largely destined for bunkering stations for steamers, increased in importance. Northern Europe also witnessed a decline in entrances but this was counterbalanced to some extent by greater activity into Mediterranean ports. In North America the last two decades of the pre-World War I period saw the continued decline in importance of Canadian ports with only Montreal and to some extent Saint John maintaining some equilibrium. Both the mid-Atlantic and West Coast regions of the United States declined in importance as ports of call. The Gulf trades remained stable but surprisingly both New England and the South Atlantic regions assumed greater importance for Saint John vessels; the West Indian ports made similar gains. Elsewhere the period witnessed the continuation of previous trends. The routes to the West Coast of South America and the Indian Ocean declined precipitously. The major beneficiaries of these shifts were the East Coast of South America, Asia and Australia. This is hardly surprising but the proportional increases were sometimes staggering. As a proportion of the whole entrances into ports along the East Coast of South America increased by 122 percent over the previous period, while entrances into Australia and Asia were ninety two percent and thirty two percent more significant respectively.

As Table 7 indicates not all types of vessels were used on all of the various trade routes. Between 1863 and 1877 vessels of under five hundred tons were most likely to be engaged in trade with Irish ports. These craft were employed most often in the North Atlantic and West Indian trades with only an occasional voyage to South America, generally with cargoes of cod. There is no evidence to suggest that Saint John owners tried to send these smaller vessels into the more far flung crosstrades in this period.

Those vessels of between five hundred and one thousand tons were more likely able to compete in the long distance trades. However, in this period their owners confined their operations for the most part to the North Atlantic and these craft were the most predominant carriers in the trade with the United States. In all probability this concentration in the North Atlantic in the first period was caused by the ability of vessels of this size to compete successfully for the increasingly lucrative bulk cargoes which began emanating from the United States following the conclusion of the Civil War.

REGIONAL ENTRANCES BY TONNAGE CLASS AND PERIOD

	1863-1877				1878-1890				1891-1912			
REGION	1*	2	3	4	1	2	3	4	1	2	3	4
Canada	10.8%	15.1%	13.5%	4.1%	10.3%	15.0%	11.6%	3.2%	15.2%	14.6%	8.3%	2.6%
England	14.2	29.2	30.1	26.5	16.9	28.7	27.9	19.8	18.2	22.2	20.9	11.0
Wales	1.6	5.2	4.6	3.1	1.8	5.0	6.1	5.4	3.0	6.1	7.3	7.2
Scotland	6.2	2.7	3.0	4.0	6.0	3.1	0.4	2.2	3.0	4.2	0.3	n.a.
Ireland	19.1	3.1	1.7	1.0	21.3	3.4	0.9	1.8	9.1	7.8	1.0	2.2
Europe — North	0.2	8.0	5.4	4.9	1.1	7.2	16.3	13.4	n.a.	1.2	12.7	14.1
Europe — South	1.6	0.4	1.0	0.7	0.9	1.0	1.0	1.4	n.a.	1.2	5.1	5.2
U.S.A. — New England	3.9	1.7	0.3	n.a.	3.7	1.2	0.3	n.a.	6.1	3.5	n.a.	0.5
U.S.A. — Mid-Atlantic	9.6	16.1	7.9	4.8	10.4	21.1	9.9	8.3	19.1	16.2	8.0	4.9
U.S.A. — South Atlantic	0.1	4.9	2.2	3.4	3.1	1.0	1.3	2.0	6.1	2.8	1.0	4.9
U.S.A. — Gulf	0.1	5.2	6.4	2.9	1.0	3.9	5.8	3.7	n.a.	3.9	5.6	4.9
U.S.A. — West Coast	n.a.	0.3	0.3	0.6	n.a.	n.a.	3.4	2.8	n.a.	n.a.	1.6	2.6
West Indies	26.0	5.6	3.7	1.7	21.4	3.7	0.2	n.a.	12.3	4.1	n.a.	1.3
South America — East	5.9	2.0	6.9	3.0	2.1	4.1	9.6	12.0	3.0	7.5	19.4	22.7
South America — West	0.7	0.4	11.4	17.3	n.a.	0.2	2.2	5.1	3.0	n.a.	n.a.	0.3
Africa	n.a.	n.a.	0.2	2.4	n.a.	n.a.	n.a.	3.4	n.a.	n.a.	n.a.	6.3
India	n.a.	0.1	1.0	7.7	n.a.	0.6	0.7	2.0	n.a.	n.a.	n.a.	n.a.
Asia	n.a.	n.a.	n.a.	9.1	n.a.	0.7	2.0	10.1	1.9	3.5	6.4	4.9
Australia	n.a.	n.a.	0.4	2.8	n.a.	n.a.	0.4	3.4	n.a.	1.2	2.4	4.4

Note: Tonnage Class 1 is 250-499 tons; Class 2 is 500-999 tons; Class 3 is 1000-1499 tons; Class 4 is 1500+ tons.

Vessels of between a thousand and fifteen hundred tons were less likely to be found trading with either Canada or the United States than their smaller cousins, but they were the most common type of vessel in the cotton and petroleum trades from the United States Gulf ports. In this period they were also the favoured carriers in trade with the East Coast of South America and they were also important in the guano and copper trades of the Peruvian and Chilean coasts. Occasionally these craft were utilized in the Pacific trades but such voyages were still relatively rare before 1877.

The largest class of vessels, those with carrying capacities in excess of fifteen hundred tons, were the least likely in this period to be employed in the North Atlantic. Over a sixth of all entrances by these vessels were into ports along the West Coast of South America and an additional twenty percent were at ports in the Pacific and Indian Ocean regions. On those few occasions that Saint John owners dispatched their vessels into the African trades, these vessels were used almost exclusively.

There were few radical shifts in vessel deployment between 1878 and 1890 but there were the beginnings of some noticeable shifts. For example there was the start of a major decline in the use of vessels of under five hundred tons in the West Indian trades. Vessels in the five hundred to one thousand ton class continued to be used primarily in the North Atlantic, where their concentration in ports in the mid-Atlantic region increased substantially. There was also the beginning of a major shift by vessels of over one thousand tons into the East Coast of South America. These vessels were also increasingly likely to terminate their voyages not in the United Kingdom but in Northern European ports such as Havre, Antwerp, Hamburg and Bremerhaven.

The final period was characterized by increased specialization in vessel usage as owners cast about for solutions in the face of the overwhelming challenge of steam. For vessels of under one thousand tons the North Atlantic was the primary arena for operations. In particular the mid-Atlantic ports of the United States and the West Indies saw these craft most frequently. Vessels of over one thousand tons however, were seen in North Atlantic ports less often. Instead their voyages were increasingly concentrated in the East Coast of South America and Pacific Rim trading areas. It was in these two regions that the Saint John sailing vessels made their last stands against steam. They were the eventual losers to be sure, but their owners demonstrated by their willingness to re-deploy vessels into these trades that they were prepared to attempt to prolong the working lives of their threatened technology.

David Alexander has estimated that for the port of Yarmouth the average vessel was increasing in gross productivity at an annual rate of about 4.1 percent in the period 1869-79 and at approximately 5.8 percent between 1879-90.[12] While the incomplete nature of the Saint John file makes it impossible to calculate similar figures for this port or to fully examine the myriad of factors that might explain this dramatic rise in productivity, it is feasible to examine in at least a tentative way the methods used by owners in an attempt to improve both productivity and efficiency when faced with the twin challenges of declining freight rates and steam.

The avenues open to shipowners attempting to make their vessels more productive may be grouped under three broad headings: improvements in markets, improvements relating to the vessel and improvements in labour productivity. We have already examined the first of these areas. It will be recalled that Saint John owners re-deployed many of their assets — and particularly their largest ones — after 1880 in an attempt to find stable markets. In particular the consistent trade with ports such as Rio de Janeiro, Bahia, Buenos Aires, Montevideo and Rosario after the mid-1880s indicates that the owners found at least some success. Few of the Saint John owners had to dispatch their vessels on a random search for cargo; in most cases the South American markets offered sufficient cargoes to allow the larger vessels to operate with a minimum of difficulty.

But what about the vessels themselves? How could Saint John owners improve their productivity and efficiency? One method was to increase their carrying capacity. This was a logical response adopted by shipowners in many parts of the globe and Saint John owners paralleled the trend. The average ocean going vessel operating between 1863 and 1877 had a capacity of eight hundred tons; this figure grew by 36.4 percent to 1093 tons for vessels making voyages between 1878 and 1890, and further increased to 1497 tons (a thirty seven percent increase) for voyages beginning between 1891 and 1912. By 1914 the average size of ocean going vessels registered in Saint John had increased to almost fifteen hundred tons, a rise of about twenty five percent over 1890. Only a small proportion of this last increase was due to an increase in the mean size of sailing vessels, however. In fact the average size of vessels which used wind as the primary means of propulsion increased slightly less than five percent between 1890 and 1914. Instead mos. of this growth was accounted for by the introduction of a number of large steamers and sailing steamers in the first decade of the twentieth century.

Saint John owners not only increased the size of their new investments but also disinvested in smaller vessels. Craft of less than five hundred tons

left the fleet at a far faster rate in the 1880s and early 1890s than did their larger cousins. As a consequence of the removal of these smaller ocean going vessels the mean vessel size increased even more rapidly than would have been possible by the simple addition of larger ships.

These larger vessels were employed in different ways, as we have already seen. Table 8 illustrates the changes in mean tonnages on various key trade routes. The largest gains between 1878 and 1890 were recorded on the North Atlantic, Indian Ocean and Mediterranean routes. But between 1891 and 1912 Saint John owners disengaged their vessels from the Indian Ocean routes and removed most of the larger craft from the North Atlantic trades. As a result the routes showing the largest increases were found elsewhere. Of particular significance was the huge growth in mean vessel size on voyages to the East Coast of South America. The growth in the Mediterranean continued to be strong and major increases in vessel size were observed in the Pacific areas and even in the North Atlantic. This last route presents something of an anomaly, however, for the increase of almost twenty three percent was accounted for entirely by steamers. In fact the average size of a sailing vessel on the North Atlantic routes actually declined by seven percent over the period.

Another alternative open to shipowners was to attempt to find ways to allow their vessels to make more voyages. An obvious method of accomplishing this goal would have been to improve passage and voyage time and to find ways for their vessels to move in and out of ports more

TABLE 8

MEAN TONNAGE ON SELECTED TRADE ROUTES, 1863-1912

ROUTE	1863-1877	1878-1890	% Change	1891-1912	% Change	1863-1912
North Atlantic	684	983	+43.7	1,208	+22.9	780
West Indies	405	401	-1.0	418	+4.2	406
Mediterranean	599	787	+31.4	1,971	+150.4	817
South America — West Coast	1,045	1,202	+15.0	1,183	-1.5	1,156
South America — East Coast	584	649	+11.1	1,373	+111.6	976
Indian Ocean	1,013	1,381	+36.3	n.a.	n.a.	1,156
U.S. Gulf	873	998	+14.3	1,094	+9.6	939
Oceana and East Indies	1,048	1,290	+23.1	1,536	+19.1	1,267
All Vessels	801	1,093	+36.4	1,497	+37.0	—

quickly. An examination of passage time between various ports of call as shown in Table 9 suggests that the owners were successful in reducing sailing times, at least in the period 1878-90. The average passage in that period took about fifteen percent less time than between 1863-77. All sizes of vessels showed improved times with the exception of the 250-499 ton class. Vessels over one thousand tons showed particularly striking reductions in passage time. After 1890, however, the trend was reversed. In the two and a half decades before World War I only the smallest vessels made shorter passages. All others showed increases with the longer passages for vessels in the over one thousand ton classes being particularly pronounced.[13]

Of course this type of gross examination does not necessarily indicate greater speed. In fact the mean passage times for individual vessel classes correspond quite closely to vessel deployment patterns. The shift of

TABLE 9

PASSAGE TIMES, 1863-1912

VESSEL CLASS	1863-1877	1878-1890	% CHANGE	1891-1912	% CHANGE
250-499	54.2	58.1	+7.2	37.7	-35.1
500-999	60.5	53.7	-11.2	54.9	+2.2
1000-1499	79.6	56.2	-29.4	60.0	+6.8
1500+	108.2	72.6	-32.9	109.4	+50.7
All Vessels	65.8	56.1	-14.7	73.8	+31.6

Note: Passages calculated in days, steamers excluded.

vessels under fifteen hundred tons into the North Atlantic in the 1878-90 period goes far toward explaining the declining passage times for vessels between five hundred and fifteen hundred tons. Vessels over fifteen hundred tons did not make the shift into the North Atlantic, but two factors appear to explain the dramatically reduced passage times for these craft. First of all the shift away from voyages to the West Coast of South America in favour of trips to the East Coast of that continent dramatically shortened passage times. As well, the average number of ports of call on the routes to Asia increased by twenty nine percent over the earlier period. As a result the distance between ports decreased with a corresponding decline in mean passage times.

After 1890 passage times increased for most vessel classes. The one exception was the 250-499 ton class, which was becoming less important

anyway. These vessels were concentrated in the North Atlantic, however, and the mean number of ports of call per voyage increased on that route by almost a third in this period. Again, shorter distances led to decreased passage times. For the other classes of vessels the massive shift into the longer trade routes was likely the most important contributing factor to the rise in passage times.

But this still does not tell us whether the owners were able to increase productivity of their vessels by increasing speed. The only rational method of answering this question is to compare passage times on specific legs of voyages. This has been done in a limited way in Table 10. The trade routes selected were chosen not merely because of the importance of the ports involved but also because all of the passages contained sufficient cases to allow for a meaningful comparison. The data clearly demonstrates that passage times were declining in the period 1878-90. Of the fourteen routes surveyed twelve showed decreased passage times with

TABLE 10

PASSAGE TIMES ON SPECIFIC TRADE ROUTES, 1863-1912

	1863-1877	1878-1890	% CHANGE	1891-1912	% CHANGE	1863-1912
			Liverpool to:			
New York	51.4	45.8	-10.9	42.9	-6.3	46.3
Boston	47.7	43.8	-8.2	n.a.	n.a.	47.1
Philadelphia	58.6	43.3	-26.1	n.a.	n.a.	59.4
New Orleans	55.6	54.9	-1.3	n.a.	n.a.	59.9
Saint John	43.8	45.1	+3.0	44.5	-1.3	44.8
Callao	118.0	104.0	-11.9	n.a.	n.a.	116.8
Quebec City	42.6	41.4	-2.8	n.a.	n.a.	42.3
Havana	66.8	65.0	-2.7	n.a.	n.a.	66.5
Rio de Janeiro	57.1	58.6	+2.6	53.7	-8.4	57.9
			New York to:			
Liverpool	28.3	27.9	-1.4	27.0	-3.2	27.9
London	30.1	29.6	-1.6	28.9	-2.3	29.8
Havana	24.3	23.3	-4.1	21.0	-9.9	23.1
			Saint John to:			
Liverpool	25.6	24.8	-3.1	24.9	-0.4	25.1

Note: Passages measured in days, steamers excluded.

improvements ranging from 1.3 percent on the Liverpool-New Orleans route to 26.1 percent on the Liverpool-Philadelphia run.[14] Only the Liverpool-Saint John and Liverpool-Rio de Janeiro passages increased in average time, but neither rise was especially significant.

The improvements in passage time were particularly noteworthy on east-west voyages. For passages operating in the opposite direction improvements, while consistent, were more moderate. The runs to both Liverpool and London from New York were characterized by decreases but in both cases the decline was less than two percent. The reasons for this discrepancy between directions are not altogether clear but it may have had something to do with the nature of the evolving technology of sailing vessels and their rigging.

Improvements in passage times continued after 1890. Even the two routes which had increases in passage times in the previous period showed improvements. The Liverpool-Rio de Janeiro run, for example, was made in just over eight percent less time on average in the final period. All routes showed declines with the exception of the Saint John-Liverpool run, but its increase in passage time of 0.4 percent was hardly significant.

The data leads inescapably to the conclusion that the Saint John owners were successful in speeding up the passages of their vessels.[15] The improvement was consistent and noticeable over a variety of trade routes. By decreasing the time needed to complete various passages they at least opened up the opportunity of increasing the number of voyages made in a year, and thus perhaps earning sufficient revenue to offset the decline in sailing ship freight rates which began in the 1880s.[16]

Increased speed on the high seas however, would have meant little unless the time spent in port was decreased. To examine this we may first turn our attention to turnaround time in terminal ports. At these ports cargoes had to be unloaded, since it is likely that almost all vessels carried cargoes into their final destinations. As well, a new cargo often had to be loaded, fresh articles had to be drawn up, a new crew recruited and a decision made as to the nature of the next voyage. For all of these reasons it seems logical to examine turnaround time separately from time spent in other ports of call.

An analysis of turnaround times is presented in Table 11. All vessel classes showed improvement in the 1878-90 period as compared to the earlier growth period. By and large the greatest decreases in turnaround time accrued to the largest vessels, with those in excess of fifteen hundred tons making the turnaround in less than two thirds the time required between 1863 and 1877. This improvement was sustained in the final period for these largest vessels, but all other classes spent more time in

TABLE 11

TURNAROUND TIME, 1863-1912

	1863-1877	1878-1890	% CHANGE	1891-1912	% CHANGE	1863-1912
Tonnage Classes						
250-499	25.6	21.0	-18.0	29.1	+38.6	24.9
500-999	29.7	24.2	-18.5	25.1	+3.7	28.2
1000-1499	38.7	30.5	-21.2	31.3	+2.6	35.8
1500+	50.5	32.3	-36.0	21.9	-32.2	30.1
Regions						
Canada	24.9	24.5	-1.6	25.8	+5.3	25.3
U.K.	25.2	24.9	-1.2	31.2	+25.3	29.5
Europe	33.0	27.8	-15.8	20.9	-24.8	30.2
U.S.A.	24.5	22.3	-9.0	46.8	+109.9	25.0
All Ports	27.3	25.4	-7.0	32.0	+26.0	29.1
Specific Ports						
Liverpool	24.1	23.2	-3.7	26.1	+12.5	
London	27.8	27.6	-0.7	30.3	+9.8	
Newport	26.2	26.1	-0.4	28.7	+10.0	
New York	21.3	18.6	-12.7	31.9	+71.5	
Saint John	23.4	22.1	-5.6	30.8	+39.4	
Antwerp	30.6	24.3	-20.6	21.2	-12.8	

Note: Turnaround calculated in days, steamers excluded.

their terminal ports after 1890. This probably indicates that the larger vessels were engaged in more secure trade routes in which their carrying capacities remained in demand longer. The smaller vessels and particularly those engaged in the North Atlantic trades, were less capable of rapidly finding ports with ready cargoes.

This hypothesis is born out by the analysis of turnaround time by region in Table 11. Turnaround time increased especially in the United States and the United Kingdom, the two principal terminals of the North Atlantic trade. The only region which showed improved turnaround time in the final period was Europe, which increasingly for Saint John vessels was the final destination of voyages from the East Coast of South America, the most important part of the globe for the larger vessels.

The six ports with the greatest number of terminal entrances were also analyzed separately. All six showed improvements in turnaround time in

the 1878-90 period with Antwerp and New York registering the largest gains in efficiency. But in the final period only Antwerp was able to sustain this trend. The turnaround time in New York increased by an incredible 71.5 percent to almost thirty two days. Outward cargoes were increasingly difficult for sailing vessels to obtain as the advantages of steamers attracted more of their traditional customers.

Turnaround time could have changed for a number of reasons. Many of them were almost always beyond the control of owners, but at least one was not — the ability to get a vessel away from the dock at a specified time. Obviously vessels could be delayed for reasons beyond the owners control as well, such as by inclement weather or because of problems with loading cargo. But when a crew member signed the articles a specific date for joining was always given. Since this was the day that the crew member's wages began it was to the owner's advantage to ensure that the seaman had more to do than merely sit around.[17]

We have measured this delay factor by calculating the difference in days between the time that most crew members were asked to be onboard the vessel and the last day that the vessel could possibly have been in port. Obviously delay is part of turnaround and not a separate component itself, but it is worth examining because of the vital interest that owners and masters had in assuring on-time departures. The results in Table 12 indicate that almost without exception owners and masters strove successfully to increase the productivity of their vessels by reducing the delay time. The average vessel was delayed by 2.9 days between 1863-77 but this was reduced by 10.3 percent to 2.6 days between 1878-90. The mean declined by a further 11.6 percent in the final period to 2.3 days. All classes of vessels participated in this improvement.

Most regions were part of this trend as well, but none with as much impact as Europe. European ports had by far the highest incidence of delays in the first period as the average vessel was held up for an additional 4.7 days per voyage. This figure declined by more than twenty five percent in each of the two final periods, and between 1891-1912 the average delay in European starting ports was less than in American ports. In fact the United States ports were the only ones to ever show an increase in delay, as their average time increased from 2.4 to 2.5 days between 1891 and 1912. This phenomenon parallels the similar, albeit more dramatic, increase in turnaround times in American ports in the same period.

Two of the six sample ports had higher delay times in the final period. Both New York and Saint John were also the two ports with the highest increases in turnaround time in the similar period. Again, Antwerp which had recorded the greatest declines in turnaround time, had the largest

TABLE 12

DELAY TIME, 1863-1912

	1863-1877	1878-1890	% CHANGE	1891-1912	% CHANGE	1863-1912
			Tonnage Class			
250-499	2.7	2.5	-7.4	2.3	-8.0	2.5
500-999	2.9	2.6	-10.4	2.4	-7.7	2.6
1000-1499	3.0	2.7	-10.0	2.4	-11.1	2.7
1500+	3.6	3.4	-5.6	2.9	-14.8	3.3
			Regions			
Canada	2.4	2.3	-4.2	2.2	-4.4	2.3
U.K.	2.8	2.3	-17.9	2.3	0.0	2.6
Europe	4.7	3.5	-25.6	2.4	-31.4	3.6
U.S.A.	2.7	2.4	-11.1	2.5	+4.2	2.5
All Ports	2.9	2.6	-10.3	2.3	-11.6	2.7
			Specific Ports			
Liverpool	2.3	2.2	-4.3	2.0	-9.1	
London	2.7	2.7	0.0	2.5	-7.4	
Newport	2.7	2.4	-11.1	2.3	-4.2	
New York	2.4	2.2	-8.3	2.3	+4.5	
Saint John	2.4	2.2	-8.3	2.4	+9.1	
Antwerp	3.7	3.0	-18.9	2.5	-16.7	

Note: Delay calculated in days, steamers excluded.

improvements in reducing delay as well.

Even if an owner succeeded in getting his vessel out of its starting port with increased efficiency he still faced the possibility of delays in intermediate ports of call. As Table 13 indicates vessels managed to record impressive declines in the amount of time spent in ports of call between 1878 and 1890. Just as with turnaround time, the larger vessels were the recipients of the largest percentage gains. This obviously was not the mere result of their size however, since vessels in excess of fifteen hundred tons took the most time to clear port through 1890. Instead the improved port times were most likely the result of the location of the port and the demand for carrying capacity.

In the 1878-90 period the greatest improvements in port time were found in the American and East Coast South American trades. For those vessels which used European cities as ports of call rather than terminals

the gains were also impressive. But after 1890 the regions which offered the most stable employment to sailing vessels were also those which showed the greatest improvements in port time. Europe, the East Coast of South America, Australia, the West Indies and Asia were the only regions to show continued gains in the last period. All of these would have been predicted except for the West Indies, where the improvement in port time was more a function of the increased use of St. Thomas as a port for orders than anything else.

We can examine a greater selection of ports here than for previous variables, mainly because the number of ports with sufficient entrances was larger than for terminals. Of the twenty two ports surveyed in Table 14, all but three — Newport, Quebec City and Callao — experienced reduced port times in the 1878-90 period. The major improvements in port times were found, as might have been expected, in Europe, the United

TABLE 13

PORT OF CALL TIMES, 1863-1914

	1863-1877	1878-1890	% CHANGE	1891-1912	% CHANGE	1863-1912
			Tonnage Class			
250-499	24.1	20.7	-14.1	28.4	+37.2	24.0
500-999	27.3	24.5	-10.3	24.6	+0.4	25.7
1000-1499	36.1	30.1	-16.7	31.5	+5.3	31.8
1500+	42.8	31.3	-26.9	21.3	-31.9	27.0
			Regions			
Canada	28.1	27.3	-2.8	28.1	+2.9	27.9
U.K.	23.8	23.5	-1.3	29.4	+25.1	24.5
Europe	35.1	29.2	-16.8	21.2	-27.4	27.3
U.S.A.	24.5	20.3	-17.1	37.2	+83.3	26.2
South America — East	27.8	26.1	-6.1	20.4	-21.8	22.8
South America — West	41.1	43.4	+5.6	43.4	0.0	42.7
West Indies	30.2	30.1	-0.3	27.1	-10.0	30.0
Mediterranean	23.6	23.4	-0.8	23.5	+0.4	23.5
India-Asia	28.1	24.6	-12.5	23.2	-5.7	24.3
Australia	35.4	33.8	-4.5	29.9	-11.5	32.4
All Ports	27.8	25.0	-10.1	26.6	+6.4	26.9

Note: Port of call times measured in days, steamers excluded.

TABLE 14

PORT OF CALL TIMES AT SELECTED PORTS, 1863-1912

	1863-1877	1878-1890	% CHANGE	1891-1912	% CHANGE
Liverpool	24.0	23.2	-3.3	25.6	+10.3
Cardiff	21.0	20.6	-1.9	20.7	+0.5
London	25.8	25.8	0.0	26.4	+2.3
Newport	21.9	22.3	+1.8	22.6	+1.3
Saint John	23.3	22.4	-3.9	23.3	+4.0
Quebec City	22.9	23.7	+3.5	29.9	+26.2
Boston	22.1	18.0	-14.0	19.4	+7.8
New York	21.3	18.6	-12.7	32.4	+74.2
Philadelphia	26.4	25.7	-2.7	33.9	+31.9
Baltimore	22.0	20.6	-6.4	25.4	+23.3
Savannah	31.7	30.0	-5.4	38.5	+28.3
New Orleans	36.1	35.0	-3.0	34.3	-2.0
Rio de Janeiro	27.7	25.2	-9.0	20.3	-19.4
Buenos Aires	29.8	26.4	-10.7	21.2	-19.7
Callao	4.9	5.3	+8.2	6.0	+13.2
Bombay	29.2	26.1	-10.6	24.7	-5.7
Calcutta	25.6	24.6	-3.9	21.2	-13.8
Rangoon	28.0	26.1	-6.8	23.1	-11.5
Melbourne	35.8	34.3	-4.2	31.6	-7.9
Havana	26.4	26.1	-1.1	25.7	-1.6
Antwerp	30.4	26.7	-12.2	17.3	-35.2
Havre	28.5	25.9	-9.1	18.1	-30.1

Note: Port of call times measured in days, steamers excluded.

States, and the East Coast of South America. After 1890 the American port times increased dramatically with New York once again suffering the most. Major improvements were confined to the European ports of Havre and Antwerp, the East Coast South American ports of Buenos Aires and Rio de Janeiro, four ports in Asia and the Pacific — Bombay, Calcutta, Rangoon and Melbourne — and Havana.

Thus far we have discovered that in most instances passage time, turnaround time, delay and port of call times all improved between 1878 and 1890. This was reflected in overall declines in voyage duration in the period as shown in Table 15. All vessel classes showed improvement in voyage times as compared to the 1863-77 period with the exception of a slight increase for vessels in the 250-499 ton class. But while such

findings confirm trends observed elsewhere, by themselves they are not terribly significant since voyage duration is composed of many other factors, such as distance and number of ports of call.

The data on trade routes presented in Table 15 suggests strongly however, that the decline in voyage duration was in fact largely a result of improvements discussed previously. For example the average passage time in the 1878-90 period between Liverpool and New York was 45.8 days, port of call time in New York averaged 18.6 days, and the return passage took 27.9 days on average. The resulting addition (92.3 days) is reasonably close to the mean voyage duration time in the North Atlantic in the period (99.3 days). Similar calculations for other ports and trade routes also yield reasonably good fits. Thus it is not surprising that the average duration of voyages was declining at roughly the same rates as

TABLE 15

VOYAGE DURATION, 1863-1912

	1863-1877	1878-1890	% CHANGE	1891-1912	% CHANGE	1863-1912
			Tonnage Class			
250-499	150.8	155.9	+3.4	165.9	+3.8	154.4
500-999	161.3	147.1	-8.8	169.8	+15.4	160.0
1000-1499	257.9	202.9	-21.3	302.8	+33.0	233.9
1500+	361.4	341.3	-5.9	333.6	-2.3	352.9
			Selected Trade Routes			
North Atlantic	110.9	99.3	-10.5	115.3	+16.1	108.7
West Indies	119.0	102.6	-13.8	100.7	-1.9	113.0
Mediterranean	129.5	123.2	-4.9	126.1	+2.4	126.8
South America — West Coast	406.2	439.7	+8.2	563.2	+28.1	449.9
South America — East Coast	243.2	216.3	-7.4	203.8	-5.8	240.0
India	419.2	416.1	-0.7	n.a.	n.a.	418.6
Africa	291.3	286.1	-1.8	283.4	-0.9	288.6
U.S. Gulf	169.2	173.2	+2.4	161.0	-7.6	169.9
Asia	435.5	408.3	-6.2	508.1	+24.4	451.4
Australia	491.3	373.8	-23.9	258.6	-30.8	361.9

Note: Voyage duration measured in days, steamers excluded.

the improvements in the other variables. Similarly a comparison of trends in the 1891-1912 period of all the other variables with voyage duration shows an equally high correspondence.

It thus appears that improvements in these variables likely explain much of the gains in gross output that Alexander discovered although the incomplete nature of the file precludes a more sophisticated analysis. At the very least the data discussed here lends credence to his suggestion that gross output per vessel was increasing in the 1880s. On the other hand, the shifting trends after 1890 suggest the likelihood that gross output per vessel may have been declining in that period.

There is one final way in which owners may have attempted to increase the efficiency of sailing vessels by the more efficient use of manpower. Aside from the actual cost of the vessel itself, wages paid to seamen were the largest costs faced by the owners of a vessel. It therefore stands to reason that any possible reduction in the manpower required to operate a vessel would reduce an owner's costs, perhaps sufficiently to allow him successfully to continue to operate his sailing vessels.

Man-ton ratios have been calculated in Table 16 to measure this factor. In this paper they should be read as measuring the number of men per hundred tons of carrying capacity. The data demonstrate that the manning requirements of a vessel were related to its rig and size. Steamers, barques, and ships were the most efficient in this regard while schooners and brigantines were the least so. One interesting discovery in the analysis by rig was the relatively high man-ton ratios on barquentines. There were 112 of them in our file — a sufficiently high number to have some confidence in the calculations — and on average they were only marginally more efficient than brigs, a notoriously inefficient rig. At present it is impossible to explain this but it does suggest that the cliché that barquentines were particularly labour-efficient needs to be questioned.

There was also a direct relationship between vessel size and man-ton ratios, with the largest vessels requiring the fewest number of men per hundred tons. Owners were well aware of this and the shift into ever larger vessels was at least partially an attempt to capture these efficiencies. For example, the movement of a thousand tons of cargo across the Atlantic in the 1863 period could have been accomplished by four 250 ton vessels or by a one thousand ton craft. The former would have required at least twenty six men while the latter only about twenty. If one assumes an average AB's wage from an English port to have been £3 in the period, and if the voyage required approximately four months, an owner could have saved approximately twenty five percent in his wage bill by operating a larger vessel. The actual difference, about £72 per voyage, might at first seem insignificant, but at three voyages per year (about the North Atlantic

TABLE 16

MAN-TON RATIOS

	1863-1877	1878-1890	1891-1912	1863-1912
		Rig		
Steam	4.74	—	0.68	0.78
Schooner	4.46	2.85	2.17	3.46
Brigantine	2.93	2.45	—	2.85
Brig	2.66	—	—	2.66
Barque	2.18	1.42	1.34	1.79
Barquentine	3.62	2.10	1.91	2.41
Ship	1.94	1.58	1.03	1.84
All Vessels	2.25	1.58	1.05	1.88
		Tonnage Class		
100-149	4.68	—	—	4.68
150-249	3.99	5.81	—	4.19
250-499	2.64	2.38	2.06	2.59
500-999	2.01	1.64	1.42	1.89
1000-1499	1.88	1.43	1.20	1.64
1500+	2.03	0.95	0.70	0.91
All Vessels	2.25	1.58	1.05	1.88

Note: Expressed as men per one hundred tons of shipping.

average) such savings would allow an owner to undertake four voyages for the price of three every sixteen months.[18]

Improvement was general across most tonnage classes between 1863 and 1912, with the exception of vessels under 250 tons. Perhaps the best way to compare these changes is by using the growth rates in Table 17. These indicate that the fleet was becoming more efficient throughout the entire period. Between 1863 and 1912 output per man increased at an annual average rate of just under 2.3 percent per year, a figure which is almost identical with Deane and Cole's estimate of 2.2 percent as the per capita increase in output for all workers in Britain between 1861 and 1901.[19]

In the period 1863-77 man-ton ratios improved on average by 1.3 percent per annum. Schooners and vessels under 250 tons were the largest beneficiaries, but the extremely high rate of improvement for schooners is somewhat misleading since it includes thirty three large three masted schooners registered in the period. The largest vessels were the least likely candidates for improved man-ton ratios, which may reflect

the fact that with the industry prospering, cargoes plentiful and freight rates relatively high, few owners felt constrained to dramatically reduce their complements of crew.

Conditions began to alter between 1878 and 1890 and the result was an increased rate of improvement in man-ton ratios. Barques and vessels of between five hundred and a thousand tons showed the greatest improvements in manning efficiency. But as we have seen previously owners were able to take advantage of improved passage, turnaround, and port times to raise gross productivity. As a result the reduction of crew, while desirable, was not likely yet a major priority.

After 1890 however, the avenues open to the increasingly beleaguered owners diminished dramatically. As a consequence it is probable that owners began to look ever more seriously at the possibility of cutting the number of crew. The man-ton ratio on the average Saint John vessel declined by about 5.1 percent per year, a dramatic improvement not previously achieved. And the greatest beneficiaries were for the first time the largest vessels. In this period the larger the vessel the greater the

TABLE 17

MAN-TON RATIO GROWTH RATES

	1863-1877	1878-1890	1891-1912
		Rig	
Steam	n.a.	n.a.	+0.2
Schooner	-9.4	n.a.	n.a.
Brigantine	-2.1	-1.3	n.a.
Brig	-2.5	-2.1	n.a.
Barque	-2.3	-6.9	-0.6
Barquentine	n.a.	-3.4	-5.7
Ship	-1.1	-2.1	-7.5
		Tonnage Class	
100-149	-2.9	n.a.	n.a.
150-249	-2.3	n.a.	n.a.
250-499	-2.1	-1.7	n.a.
500-999	-1.8	-2.7	-2.2
1000-1499	-0.7	-1.7	-4.7
1500+	-1.3	-1.1	-7.3
All Vessels	-1.3	-2.1	-5.1

Note: Growth rates are calculated by regression equations and expressed as percentages per annum.

TABLE 18

MAN-TON RATIOS ON SELECTED TRADE ROUTES, 1863-1912

	1863-1877	1878-1890	% CHANGE	1891-1912	% CHANGE	1863-1912
All Routes	2.25	1.58	-29.8	1.05	-33.5	1.88
North Atlantic	2.15	1.59	-26.0	1.09	-31.4	1.92
West Indies	3.03	1.86	-38.6	1.81	-2.7	2.97
Mediterranean	2.07	1.89	-8.7	0.78	-58.7	1.64
South America — West Coast	1.88	1.77	-5.9	1.27	-28.2	1.76
South America — East Coast	1.93	1.55	-19.7	1.02	-34.2	1.53
India-Asia	1.98	1.32	-33.3	1.30	-1.5	1.85
Africa	1.89	1.73	-8.5	1.41	-18.5	1.75
U.S. Gulf	1.99	1.55	-22.1	1.05	-32.3	1.66
Australia	3.23	2.19	-32.2	1.02	-53.4	1.93

improvement. Where cutting the number of sailors might have provided an extra cushion of return in earlier periods, it is likely that after 1890 the lowering of crew complements became virtually the only way open to the operators of sailing vessels to turn a profit.

Table 18 indicates that not all trade routes were affected in the same way or at the same time. By and large improvements in man-ton ratios were more substantial in the 1891-1912 period than earlier, but this was not true for either the Indian-Asian routes or the West Indian trades. The North Atlantic routes achieved savings of less than the mean in both periods, while the Australian trades were the only route which bettered the mean in both periods. In general the more important trade routes after 1891 showed the most substantial increases in labour efficiency. This suggests a conscious effort on the part of owners to keep their vessels competitive on those routes which had the greatest economic impact.

Given the problems with using trade routes for analysis discussed earlier, it is also desirable to examine man-ton ratios on specific voyage legs. Table 19 presents some data on man-ton ratios between the port of departure and the first port of call. This type of analysis is more desirable because crew complements were based on an owner's perceptions of the requirements for the first leg of a voyage rather than for subsequent ones. After all owners realized that if additional crew were required for later portions of a voyage they could be procured at most intermediate ports of call.

TABLE 19

MAN-TON RATIOS BY PORT OF DEPARTURE AND FIRST PORT OF CALL, 1863-1912

	From: U.K.			Canada			Europe			U.S.A.		
TO:	1863-77	1878-90	1891-12	1863-77	1878-90	1891-12	1863-77	1878-90	1891-12	1863-77	1878-90	1891-12
U.K.	—	—	—	1.90	1.34	1.09	1.34	1.17	1.04	2.34	1.74	1.32
Canada	2.04	1.53	1.14	—	—	—	2.18	1.47	0.96	2.06	1.93	1.62
Europe	1.27	1.18	0.97	1.86	1.41	1.01	—	—	—	2.32	1.99	1.56
U.S.A.(East)	2.21	1.62	1.33	2.19	1.99	1.67	2.71	1.93	0.78	—	—	—
U.S.A. (West)	2.13	1.72	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	—	—	—
West Indies	3.23	2.19	1.86	3.46	2.97	2.45	n.a.	n.a.	n.a.	3.72	3.08	1.72
South America — West	1.84	1.77	1.27	1.84	1.81	1.79	1.96	1.83	n.a.	1.86	1.67	n.a.
South America — East	1.94	1.62	1.39	2.00	1.87	1.67	n.a.	1.43	1.00	2.41	1.91	1.62
Asia-India	2.02	1.40	1.32	n.a.	n.a.	n.a.	n.a.	n.a.	1.23	1.91	1.29	1.04
Australia	3.23	2.19	1.11	n.a.	n.a.	1.40	n.a.	n.a.	1.02	2.91	1.93	0.96

In the North Atlantic trades vessels travelling from east to west almost always had higher man-ton ratios than those craft operating in the opposite direction. That this should have been the case might at first seem odd, especially since the table also shows that on almost all other routes man-ton ratios were *lower* if a vessel originated in the United Kingdom or Europe. Two possible explanations suggest themselves to explain this phenomenon. First of all given the direction of the prevailing winds in the North Atlantic, it may be that the higher number of crew on westbound voyages is a reflection of the need for more men to work the sails on these legs. It is also possible that this higher ratio is indicative of a kind of "hidden immigration." It is not yet possible to determine if that were the case on Saint John vessels, but it has been shown elsewhere that a position on a sailing vessel was a favoured method of obtaining passage to the New World on Prince Edward Island vessels. It seems likely at present that both of these factors help to explain the higher ratios on westbound craft, but the exact importance of each has yet to be determined.

We cannot explain at present precisely why man-ton ratios should generally have been higher for vessels operating out of North American ports. However, since all vessels leaving ports along the East Coast of North America had to traverse either the North Atlantic or West Indian waters to reach all destinations, a greater number of crew may be a reflection of the owners' experiences with marine disasters. On a per voyage basis these two regions were the areas where a vessel was most likely to suffer a marine disaster, and it may have seemed prudent to exercise some caution by increasing the staffing on voyages passing through these waters.

3

This paper has sketched some brief hypotheses which need to be explored further. But it seems clear at this point that the owners of Saint John registered vessels did not plunge into the new opportunities offered by the expanding domestic economy as rapidly as did their colleagues in Yarmouth and Halifax. Instead they made a continuing attempt to operate their sailing vessels. In the 1880s Saint John owners took advantage of improvements in passage, turnaround, and port of call times to remain competitive. When the possibility of further improvements in these areas seemed less certain after 1890 the owners turned instead to their labour costs, rapidly pruning the number of men required to operate their vessels. They even made an attempt to turn to steam although they did so tentatively and apparently without great success.

The 1890s marked a critical turning point in the history of Saint John. Up to that decade it was still unclear to most observers whether Saint John

or Halifax would emerge as the dominant metropolis in the Atlantic region.[20] The question was answered decisively in the 1890s as Halifax forged rapidly ahead. It may be overstating the case to argue too strongly that by clinging to an increasingly obsolete technology residents of Saint John were sealing their fates. After all the city was growing and the shipowning segment of the population, while large, was not necessarily the most important component. Still it is possible that had the capital accumulated by years of successfully operating sailing vessels been invested in the domestic economy in the critical 1890s, the longterm prospects of the city's economy might have been improved. But given the failure of other urban areas in the region successfully to make the transition into industrial workshops, perhaps the Saint John owners were not so unwise in attempting to prolong the industry they knew best.

NOTES

1. See, for example, the vitriolic attack by H.L. Chipman in the *Halifax Daily Echo,* 20 January, 1897.

2. See my "From Barques to Barges: The Shipping Industry of Saint John, New Brunswick, 1820-1914," (Paper presented to the Atlantic Studies Conference, Fredericton, N.B., April, 1978).

3. The fluctuations in the transfer trade is discussed more fully in my *"Enterprise in a Maritime Setting: The Shipping Industry of Prince Edward Island, 1787-1914"* (Forthcoming, St. John's, Maritime History Group, 1980), especially pp. 66-78. Since Prince Edward Island's dependence on this trade was far more pronounced than other ports, it makes a splendid case study on the problems of this trade.

4. The crew lists for the period 1914-1939 have recently been acquired as well, but these agreements are not yet available for analysis.

5. Major points of British Maritime Law are conveniently summarized in Olga Prentice, "Laws of Nineteenth Century British Shipping," (Unpublished research report, Maritime History Group, 1977).

6. For a fuller description of the crew lists and the procedure used to collect data from them, see David Alexander, "Objectives and Methodologies of the Atlantic Canada Shipping Project," *The Great Circle: The Journal of the Australian Association for Maritime History* (Forthcoming, Fall, 1979).

7. In this and subsequent analysis, British coastal voyages, but not passages, have been excluded unless specifically indicated. Saint John vessels did participate in the British home trades, but in order to retain the focus on ocean going activities, these voyages have been omitted here.

8. This and other comparative examples for Yarmouth are derived from David Alexander "Output and Productivity in the Yarmouth Ocean Fleet, 1863-1901," *this volume.*

9. *Ibid.*

10. Fischer, "From Barques to Barges," pp. 23-26.

11. These shifts after 1890 likely characterized the responses of owners in Yarmouth, and to a lesser degree Halifax, as well. In fact, it is possible that despite the obvious nature of the shifts by Saint John owners, the responses by owners elsewhere will seem even more overwhelming. If so, one should bear in mind the fact that Saint John had participated in these more far-flung trades all along, with the result that shifts into distant reaches of the globe were likely to be less dramatic.

12. Alexander, *this volume.*

13. The equation for growth rates in the various periods was as follows:

1863-1877: LnY = 4.185 - .007, growth rate = -0.7% per annum
1878-1890: LnY = 4.050 - .020, growth rate = -2.1% per annum
1891-1912: LnY = 3.625 + .095, growth rate = +9.1% per annum

14. The dramatic improvement in passage time as yet escapes explanation. One possible reason for the improvement might have been because vessels in the 1878-90 period were proceeding directly to Philadelphia rather than calling at a port for orders. However, the number of vessels with a first port of call in Philadelphia which used a port for orders as its intended destination, actually increased after 1878. And at any rate, the only port for orders used was Delaware Breakwater, which did not require any deviation in route. Another possible explanation was the time of year in which voyages were made. It might be assumed that due to the fickleness in weather, a higher percentage of winter voyages in the earlier period could have boosted the passage time. An analysis of seasonality on this route, however, showed that sixteen percent of arrivals occurred between January and March in the first period and eighteen percent in the second.

15. The data presented here calls into question Douglass North's contention that most improvement in passage times occurred before 1860. See North, "Sources of Productivity Change in Ocean Shipping, 1600-1850," *Journal of Political Economy,* LXXVI, No. 5 (September/October, 1968), pp. 953-970.

16. On freight rates in the North Atlantic, see Keith Matthews, "The Canadian Deep-sea Merchant Marine and the American Export Trade, 1850-1890," *this volume.*

17. Depending on the nature of particular charter arrangements, owners may not have incurred severe financial obligations by delays in leaving port. Since these delays would inevitably affect the number of possible voyages, however, it seems valid to examine this variable. It should also be noted that the tasks performed by sailors in port were undergoing changes. Early in the century seamen also doubled frequently as stevedores, loading and unloading vessels. By the late nineteenth century this practice had vanished in most parts of the world. See for example, Judith Fingard, "The Decline of the Sailor as a Ship Labourer in the 19th Century Timber Ports," *Labour/Le Travailleur* (Vol. 1, 1977).

18. Wage rates have not yet been analyzed, nor is it clear at what rank these savings were made. Obviously, if an OS or a Boy rather than an AB was reduced, savings would be less.

19. Phyllis Deane and W.P. Cole, *British Economic Growth, 1688-1959: Trends and Structure* (Second Edition, Cambridge, 1967), p. 283.

20. On the question of landward investments, see David Alexander and Gerry Panting, "The Mercantile Fleet and Its Owners: Yarmouth, Nova Scotia, 1840-1889," *Acadiensis* VII, No. 2 (Spring, 1978), pp. 3-28. The opportunities in the 1890s are summarized in T.W. Acheson, "The National Policy and the Industrialization of the Maritimes," *Acadiensis,* I, No. 2 (Spring, 1972), pp. 3-28.

APPENDIX I

MAJOR PORT ENTRANCES, 1863-1912

PORT	NO. ENTRANCES	RANK	TONS	RANK	MEAN TONS
Liverpool	1,492	1	1,298,398	1	870
New York	809	2	600,578	2	742
Saint John	777	3	540,647	3	696
Cardiff	396	4	361,786	5	914
Callao	354	5	424,577	4	1,199
Philadelphia	330	6	220,111	9	667
London	303	7	272,040	7	898
Quebec City	292	8	285,070	6	976
Havana	238	9	132,271	17	556
Newport, Mon.	224	10	110,102	19	492
Boston	216	11	142,093	15	658
New Orleans	189	12	183,444	11	971
Rio de Janeiro	188	13	225,064	8	1,197
Antwerp	184	14	205,809	10	1,119
Dublin	182	15	108,995	20	599
Buenos Aires	162	16	159,194	12	983
Matanzas	161	17	69,152	36	430
Maryport	154	18	39,536	56	246
Greenock	147	19	89,707	28	610
Savannah	145	20	151,569	14	1,045
Londonderry	144	21	47,208	46	328
Queenstown	141	22	104,032	21	738
Bombay	132	23	154,470	13	1,170
Bristol	129	24	96,002	26	744
Cardenas	128	25	50,834	42	397
Baltimore	126	26	100,378	25	797
Montevideo	124	27	101,190	23	816
Dundalk	116	28	28,385	71	245
Chincha Is., Peru	111	29	133,933	16	1,207
Troon	106	30	33,571	63	317
Belfast	105	31	66,336	37	632
Cork	101	32	28,836	69	286
Havre	100	33	100,492	24	1,005
Charleston	93	34	83,067	30	893
Glasgow	90	35	42,797	53	476
Ardrossan	89	36	33,460	64	376
St. Thomas, W.I.	89	36	44,655	49	502

Calcutta	88	38	101,481	22	1,153
Pensacola	88	38	86,501	29	983
Gloucester, Eng.	85	40	44,460	50	523
Hamburg	76	41	115,586	18	1,521
Mobile	73	42	70,118	34	961
Rosario	73	42	89,812	27	1,230
Sydney, N.S.	70	44	35,844	61	512
Rotterdam	68	45	79,541	31	1,170
Aden	66	46	74,323	32	1,126
Chatham/Newcastle/Miramichi	64	47	38,831	57	607
Galveston	63	48	45,144	47	717
Halifax	61	49	37,083	58	608
Rangoon	61	49	70,178	33	1,150
Newry	61	49	29,795	67	488
Cienfuegos	59	52	31,818	65	539
Falmouth	56	53	49,938	43	892
Montreal	56	53	40,846	55	729
Dalhousie, N.B.	55	55	44,312	52	806
Melbourne	55	55	69,615	35	1,266
Valparaiso	50	57	48,665	44	973
Richibucto	50	57	19,651	81	393
Castletown	49	59	12,951	87	264
Bremerhaven/Bremen/Brake	48	60	53,227	40	1,109
Swansea	46	61	19,219	82	418
North Shields	45	62	47,869	45	1,064
Barrow	41	63	29,475	68	719
Guanape Is., Peru	41	63	44,381	51	1,082
Plymouth	40	65	42,276	54	1,057
Portland, Me.	40	65	22,050	77	551
Bahia	39	67	36,414	59	934
Hull	38	68	54,327	39	1,430
Newcastle, N.S.W.	37	69	50,847	41	1,374
Hillsborough, N.B.	34	70	18,037	84	531
Moulmein	34	70	34,018	62	1,001
Barry	34	70	44,683	48	1,314
Dunkirk	32	73	30,523	66	954
Norfolk, Va.	32	73	65,323	38	2,041
Demerara	32	73	12,212	89	382
Fleetwood	30	76	20,537	80	685
Limerick	30	76	20,987	79	700
Preston	29	78	18,765	83	647
San Francisco	29	78	35,861	60	1,237
Bordeaux	28	80	24,489	73	875

Sharpness	27	81	24,257	74	898
Shediac	27	81	12,933	88	479
Amsterdam	27	81	22,318	76	827
Sagua la Grande, Cuba	27	81	10,384	90	385
Recife	27	81	25,849	72	957
Dundee	26	86	28,791	70	1,107
Wilmington, N.C.	26	86	15,034	86	578
Port Louis, Mauritius	26	86	21,585	78	830
Pictou	25	89	15,774	85	631
Brunswick, Ga.	25	89	23,407	75	936

Note: Tonnage Ranks are only for those ninety most important ports based on number of entrances.

8. DISCUSSION FOLLOWING PAPERS BY ALEXANDER, SAGER AND FISCHER

CRAIG asked if the conference could be given a detailed explanation of how the data used in these papers was collected and analyzed.

ALEXANDER, SAGER and FISCHER explained that their papers were based upon analysis sub-files of three large machine-readable Master Files compiled from the ship registers and the 'Agreement on Account of Crew' which have survived and which relate to the vessels registered in the three ports. The Master Files are hierarchical files consisting of six segments — physical characteristics of the vessel, registered owners, voyages, ports of call, masters and crewmembers. Each segment is linked to the others through the vessel official number and where applicable a voyage number. This allows any particular piece of information to be linked with any other piece of information in the various segments. The process of coding, data entry, verification, correction and sub-file creation and analysis was detailed. They pointed out that data entry had been completed only for Yarmouth, and that the Master File for that port included information on some 2500 vessels, 5000 investors, 4000 voyages with associated ports of call, and some 50,000 seamen. The files for Saint John and Halifax were still to be completed and the data entered thus far had yet to be 'cleaned'. The papers offered were based on sub-files which included only a small fraction of the data in the Master Files, although the sub-files did have some 115 variables attached to each voyage, which was the unit of analysis.

JANNASCH asked Alexander if he had examined entrances in terms of vessel age. The softwood ships from the Maritimes were lucky to maintain an A-1 classification for seven years. By the time they were ten most could not get a general cargo and would be forced out of the main trades.

ALEXANDER agreed that was so, and thought it was part of the explanation for the movement into South America in the 1880s. But at this time no analysis had been done of vessel movements by age.

CRAIG stressed that this was very important. Once you start putting a ship into the guano trade you were not likely to get any good wheat cargo. It was possible to cleanup a ship, but it was very labour intensive.

JANNASCH added that this was the great advantage of iron hulls which were easier to clean, for once a cargo smell had got soaked into a wooden ship it was very hard to get out.

FINGARD observed that her work was concerned with Maritime ports, whereas these papers were oriented around the tonnage registered at these ports. She thought this different orientation might result in differing interpretation of what was going on. For example most of Saint John vessels do have owners resident in the city, and she wondered to what extent their behaviour as shipowners was determined not by economic factors, but by perception of what was happening in their own port city.

FISCHER replied that he did not think that local perceptions were all that important. The majority of the very large owners at Saint John — and they owned some eighty percent of the ocean going tonnage — established companies in Liverpool and were closely in touch with the British scene, which was the centre of world shipping at that time. Thus one could not say that these owners were out on the periphery making decisions on the basis of unreliable data.

FINGARD then asked Sager why he had defined ocean going vessels at Halifax as those over 250 tons when so much of the port's tonnage was under that limit.

SAGER replied that by ocean going he really meant tonnage of a size capable of participating in the cross trades. It is only these vessels for which Crew Lists have survived. He agreed that it was essential to collect information on the coastal fleet, for a very large number of vessels even up to 500 tons do not appear in the Crew List Archive. The difficulty in solving the problem is one of sources, for the Colonial Crew Agreements have not survived and newspaper shipping intelligence is often very unsatisfactory.

FINGARD asked what proportion of Halifax registered vessels were using the port of Halifax.

SAGER replied that he did not know but thought it must have been very small by the 1870s and 1880s. They were in Halifax much more in the 1860s, but he suspected that the ocean going fleet emerged out of a coastal and West Indian fleet into one deployed from American ports. The cargoes from Halifax, he thought, were carried mainly in British registered vessels.

CAPIE noted that all of the papers were concerned with productivity but none used the measure that most economists would like to see, which is output per unit of capital employed, and wondered whether reductions in sailing times would be offset by more expensive ships?

ALEXANDER replied that the Group had not yet derived a series for capital values. In the past two and a half years all of the Group's time

had been absorbed in collecting and processing data, and that was why the Isserlis index of tramp shipping freights had been used rather than one constructed to reflect the likely rates prevailing for Maritime vessels. Now that the bulk of data collection was done attention would turn to matters of this kind.

PALMER was also concerned about the productivity measures. The papers emphasized the elements of volition on the part of shipowners in improving productivity but there are many areas of the industry where productivity is completely outside the control of owners, such as port improvements.

FISCHER replied that the intention was not to imply that all these factors were under owners' control, but certainly owners take advantage of external economies and benefit from them.

CRAIG emphasized that it was important to keep clearly in mind who was acting and who was being acted upon. For example Alexander mentioned that Yarmouth was squeezed out of Antwerp and turned more to Havre. But what this reflects is the decision of charterers to charter steamships to Antwerp because the demurrage rates are higher on steamships. Therefore you can rank ports to the extent that they were, so to speak, processing steamships as distinct from those that processed sailing vessels.

ALEXANDER replied that there was no disagreement, but took the point that there was need to be careful in ascribing motivations and competence to observable effects.

CRAIG thought the most interesting thing about the papers was that their findings on sailing times run counter to the received wisdom about sailing ships in the 19th century, which is that they were the cheapest warehouses in the world, and because of this, charterers had no interest in speeding up passages. Many merchants, it is said, liked to charter sailing ships because they could put into Queenstown or Falmouth, and then could look at the price of grain at Gothenburg, Stockholm, Havre or Hamburg. And if there was a two cent per bushel difference in the price of wheat in one place as opposed to another, they would gain on the price because it is a floating cargo that is being sold as a job lot and the demurrage is much less than what would be gained on being able to order that ship from Falmouth to Dublin or Stockholm, or whatever. What these papers do is fly directly in the face of all that evidence. The picture one has of British sailing ships in the 1880s and 1890s is of great four masted barques with no pretentions to speed whatsoever. Speed is not the object of the exercise, although economy in running the ship is important. What is happening out in the Maritimes which distinguishes these ships? Why are they trying to

push up productivity rates in various ways, when presumably the men doing the chartering in the London or Liverpool market are precisely the same people for either British or Maritime ships?

SAGER was confident there were not errors in calculations, because they are based only on those cases where we have an official date of leaving a port and an official date of entry. The passage time is then calculated on those dates, or if there are more precise dates (say from desertions or substitutes signed on after clearance) then from those more accurate dates.

FISCHER added that he was becoming more and more skeptical of the generalizations from the literature. For example the literature says that turnaround time ought to be faster in Antwerp than in Havre. But between 1863-77 the turnaround time in Havre for Saint John vessels is 28.5 days compared to 30.4 days at Antwerp. From 1878-90 it is 25.9 days at Havre and 26.7 at Antwerp. It is only after 1891 that turnaround times are faster at Antwerp. Secondly, over the years ships were increasingly clearing for ports for orders rather than for specific ports. And yet despite this the passage times were still decreasing. The productivity gains we are seeing may in fact be even greater in terms of passage time than we are reporting here.

CRAIG did not dispute the evidence. His point was that it simply contradicted the conventional wisdom found in the parliamentary papers where merchants are constantly asserting this whole business of floating cargoes from the 1860s onwards. It seems there is a distinction to be drawn between the softwood ships of the Maritimes and the iron and steel sailing ships out of British ports. He could offer no hypothesis why this was so, but wondered if it was not advisable for the Group to control what they have done on the Maritimes by looking at some British ports.

SAGER asked if the anomaly uncovered might not be related to the commodity carried — that the 'floating warehouse' was specific to the grain trade, rather than say petroleum?

CRAIG agreed that it was most commonly associated with grain, but it was also claimed for Philippine sugar and presumably rice.

SAGER speculated that the increasing speed might be related to a problem of lack of return cargo from Europe — they were concerned to get back to North America as quickly as possible.

CRAIG thought it was important for the Group to start looking at Bills of Entry and their European equivalents in order to determine exactly what these ships were carrying. But they could scarcely have operated on the basis of only fifty percent utilization if they were going to make money out of it. For most trades they got some cargo both

ways, such as coal and iron out of South Wales, rock salt from Liverpool, empty barrels or salt or chalk from the Continent.

GREENHILL had several points to make about South America. He thought one shouldn't expect a large number of entrances into East Coast South America before the 1880s because the region was so underdeveloped. After that it would be incorrect to say that ships were simply pushed out of the North Atlantic trades, for there was undoubtedly a pull into the South Atlantic with Argentina's substantial export trade in cereals.

ALEXANDER agreed that the movement into South America should not simply be interpreted as a push, for if South America were not attractive then more Yarmouth vessels would have been in the Pacific trades. But he also had a hypothesis, yet unproven, that South America and the U.S. Gulf were alternative destinations. From 1863-73 entrances into South America East Coast were quite numerous, but then fall off with the recovery of the South from the Civil War. Then in the 1880s with increased competition from steam there was a movement back into South America.

FISCHER added that Saint John was quite different in that there was a long term commitment to East Coast South America.

CRAIG had some disagreement with Greenhill about earlier opportunities at the River Plate. Most of the vessels there in the 1860s and 1870s were quite small and were picking up cargoes of wet and dry hides and bones for conversion into bone meal for fertilizer.

GREENHILL accepted that these were the cargoes in the early years, because up to the late 1870s Argentina was primarily a producer of low quality livestock. But from 1878-79 grain became much more important, and as exports expanded the very poor loading facilities in South America brought congestion and delays in turnaround.

CRAIG added that the great problem in South America was the lack of warehousing facilities to hold crops for export and the fact that the merchant communities did not have the capital to invest in stocks. Given this, plus the seasonality and relative perishability of crops like wheat, sugar and coffee, it was advantageous to employ a number of small ships rather than a few very big ones. Factors like these determine not only the turnaround time of the ship but also the size of the cargo which can be loaded to make an effective commercial operation both for the charterer and the merchant.

FISCHER noted that his turnaround figures for East Coast South America were not especially gloomy. Between 1863/77 and 1878/90 there was a slight increase in turnaround from forty one to forty three days, but after that improved by around twenty percent to 1914. Moreover

Rio had very good turnaround in all periods of around twenty seven days in the 1860s and 1870s, twenty five days in the 1880s and twenty days from the 1890s, which was about the fourth best rate of the twenty two ports surveyed in detail.

9. BRITISH STATISTICS OF GRAIN IMPORTS FROM CANADA AND THE U.S.A., 1791-1900

SUSAN FAIRLIE

London

BRITISH STATISTICS OF GRAIN IMPORTS FROM CANADA AND THE U.S.A., 1791-1900

Susan Fairlie

From 1791-1900 the grain trade was more important to Canada than to Britain. Furthermore in the context of the Corn Laws and Colonial Preference, which are discussed in Appendix I, it was in the earlier and not the later half of the period that conscious attention was paid to that trade on both sides of the Atlantic. Indeed the quantities of grain involved, especially of wheat and wheatflour, although quite small were relatively more important to Britain before 1846 than after that date. Nonetheless absolute quantities of wheat and wheatflour traded directly did not usually decline after 1846, and actually tended to increase. Besides this Canada sometimes had a lead in the often neglected trade in pease, and had a small share in the oat trade. The period under consideration ends just as Manitoba and the Western Territories were about to take the great leap forward into British markets. Significantly an article which was published in a British journal in 1904 entitled "The Granary of the British Empire" was in fact almost entirely devoted to Manitoba.[1]

From the initiation of Colonial Preference in 1791 until the end of the Napoleonic Wars in 1815 there were intermittent imports of wheat and wheatflour from the Canadas to Britain.[2] Table I shows British imports of wheat and wheatflour for the years 1791-99. If these figures are compared with those given by MacGibbon[3] for total grain exports from Quebec for 1783-1830[4] it becomes clear that the early Canadian peak of 1793 does coincide with relatively large British import totals shown in Table I, but there is no Canadian response to the further peak import year of 1796 when Quebec showed up poorly, probably because of bad harvests.[5] Moreover according to MacGibbon's figures Quebec flour exports (in grain equivalents) were usually smaller than those of wheat proper, although they did exceed wheat exports in 1797 when English prices slumped. In the further British scarcity year of 1799 Quebec exports of wheat and wheatflour were by no means large, and the same was true of 1800. However in 1801 Quebec exports reached records, expecially in flour, although flour exports were smaller than those of grain. A further record in 1802 was predominantly grain. These two Quebec peaks show up in British figures of imports of wheat and wheatflour from British North America starting in 1800, as shown in Table 2. In 1800 and 1802 the Quebec and British wheat and wheatflour figures compare as follows. In 1800 they were 40,000 and 21,000 quarters for Quebec exports and

TABLE 1

TOTAL GROSS AND NET IMPORTS OF WHEAT AND WHEAT FLOUR INTO GREAT BRITAIN 1791 — 1799: '000s WINCHESTER QUARTERS

	GROSS IMPORTS	NET IMPORTS
1791	469	398
1792	22	—
1793	490	414
1794	328	173
1795	314	295
1796	879	855
1797	462	407
1798	397	337
1799	463	424

NOTE: Table includes imports from Ireland. Source: Sources for all tables in the text are detailed in Appendix III.

TABLE 2

GROSS WHEAT AND WHEAT FLOUR IMPORTS INTO THE U.K. (G.B.), 1800-1816: '000s QUARTERS

	TOTAL	B.N.A.	U.S.A.
1800	1,264	21 (26)	78
1801	1,424	68 (69)	245
1802	538	75 (77)	79
1803	312	43 (44)	109
1804	391	21 (21)	4
1805	837	2 (2)	13
1806	208	10 (10)	80
1807	360	27 (27)	250
1808	41	18 (19)	13
1809	388	19 (19)	171
1810	1,440	24 (25)	98
1811	189	.3 (.3)	18
1812	130	24 (27)	11
1813	342	— (—)	.8
1814	628	— (—)	—
1815	195	— (—)	46
1816	211	— (—)	7

British imports respectively. In 1801 they were 83,000 and 68,000; and in 1802, 144,000 and 75,000. In other words the trends were the same at this point. It is noticeable that the Quebec trade was largest at the end of the relevant British scarcity periods.

According to both the British and the Quebec figures Canada failed to benefit from British scarcities in 1805 except in flour, the relatively large trade of 1807 arriving in a relatively low price year. Large exports from Quebec in 1808 are not reflected in the British figures. Conversely the British figures show more Canadian imports — mostly grain — in the high price year of 1810, though Quebec export figures show an actual decline. Both sets of figures confirm the tradition of a substantial trade in 1812, while thereafter in 1813-16 the trade fell off almost to nothing.[6]

Although it may be assumed that during this period most of the Canadian trade was still from Lower Canada[7], exports from Upper Canada were already growing rapidly.[8] Data on flour mill construction in the Niagara area at the turn of the century confirm this view with respect to wheatflour,[9] and indeed problems of navigation made conversion of wheat into flour essential for Upper Canada.[10] Imports from the U.S.A. during the wars consistently exceeded those from Canada except not surprisingly in 1812. Since Colonial Preference had been inoperative in the war period and the Erie Canal was not yet built we can probably take the British import figures up to 1816 at their face value in terms of origin of the grain.

The years 1815-46, shown in Table 3, represent the Corn Law period *par excellence.* As might be expected trade from the Canadas to Britain was intermittent but relatively significant in some years. In 1817 flour actually exceeded wheat in Quebec exports but this was not the case in 1818.[11] Canada also sent relatively large quantities to Britain in 1820-21, years of rapidly falling English prices. This is consistent with the pattern of delayed Canadian response to British scarcity already noticed. Not surprisingly the trade was relatively large in the Canadian Bonded Corn era of 1825-27[12] and actually exceeded that from the U.S.A. Furthermore according to the British figures wheat exceeded flour in 1825, 1826 and 1828[13], and in 1827 according to the Canadian figures.[14] However Canadian imports were relatively small in the renewed British scarcities of 1828-31 except, typically, in the last year when they reached a record of 218,000 quarters of wheat and wheatflour.[15] In 1832-35 they remained relatively large despite falling English prices, and not only exceeded the trade from the U.S.A. but constituted as much as a third to a quarter of total gross imports. Grain predominated until 1835.

There followed a strange interval. By 1835-36 there was a notorious glut of wheat and wheatflour in Britain and even net total re-exports[16],

TABLE 3

GROSS WHEAT AND WHEAT FLOUR IMPORTS INTO THE U.K. (G.B.), 1815-1846: '000s QUARTERS

	TOTAL	B.N.A.	U.S.A.
1815	195	— (—)	46
1816	211	— (—)	7
1817	1,031	25 (28)	311
1818	1,586	54 (54)	182
1819	472	10 (10)	28
1820	592	41 (41)	91
1821	138	41 (41)	38
1822	48	23 (23)	4
1823	24	.2 (.2)	4
1824	85	.2 (.9)	34
1825	385	94 (94)	13
1826	577	27 (27)	16
1827	304	57 (57)	19
1828	741	19 (19)	14
1829	1,663	6 (6)	114
1830	1,662	77 (77)	184
1831	2,304	218 (218)	463
1832	447	104 (103)	39
1833	298	100 (101)	10
1834	176	57 (56)	10
1835	67	17 (17)	2
1836	242	5 (5)	—
1837	560	3 (3)	—
1838	1,372	11 (11)	6
1839	2,875	8 (8)	12
1840	2,433	145	355
1841	2,771	250	113
1842	3,040	183	125
1843	1,065	113	26
1844	1,379	228	86
1845	1,142	229	94
1846	2,344	327	808

which occurred partly because of coincidental shortages in North America especially in the U.S.A. as Table 4 (a) and (b) show. However both Canada and the U.S.A. were in receipt of these re-exports, especially in 1835-38, and in both cases the net balance of the transatlantic trade now ran from east to west. Thus it is no surprise that neither country contributed significantly to renewed British shortages in 1838-39.[17] Both recovered in 1840-42, Canada sending a record of 250,000 quarters of wheat and wheatflour in 1841[18], as can be seen in Table 3. There followed the Corn Law of 1842 and the Canada Act of 1843. Presumably because of these, and despite favourable English harvests in 1842-44 and falling and low prices to 1846, total gross imports into Britain continued relatively large as did the trade from Canada. After 1825 — except in 1829-31 and 1839-40 — Canada consistently outpaced the U.S.A. and from 1836 to the 1850s the Canadian trade consisted overwhelmingly of flour. Indeed Canada supplied a considerable proportion of total gross British flour imports in 1840-46 and again in 1848. Corn Law Repeal in 1846 brought the end of another era.

During the period 1815-46 there seems little doubt that Canada West was achieving predominance in the trade. During the 1820s, according to

TABLE 4 (a)

WHEAT AND FLOUR RE-EXPORTS FROM THE U.K., 1828-1840:
'000s IMPERIAL QUARTERS

	TOTAL		B.N.A.		U.S.A.	
	Wheat	Wheat Flour	Wheat	Wheat Flour	Wheat	Wheat Flour
1828	59	17	—	4	—	—
1829	52	20	—	5	—	—
1830	25	10	—	3	—	—
1831	43	20	—	3	—	—
1832	236	24	—	6	—	—
1833	34	59	6	6	1	—
1834	114	32	5	3	—	—
1835	85	47	25	2	7	2
1836	174	81	64	14	81	5
1837	216	92	100	19	87	—
1838	95	61	67	17	15	—
1839	8	31	1	2	—	—
1840	32	52	—	1	—	—

TABLE 4 (b)

OTHER GRAINS RE-EXPORTS FROM THE U.K., 1832-1840: '000s IMPERIAL QUARTERS

	Total	B.N.A.	U.S.A.	Total	B.N.A.	U.S.A.
		BARLEY			OATS	
1832	—	—	—	84	1	—
1833	10	2	—	19	6	—
1834	44	2	1	13	1	—
1835	18	3	3	31	3	4
1836	11	6	—	56	17	9
1837	20	13	1	47	9	—
1838	—	—	—	54	9	—
1839	—	—	—	40	2	—
1840	—	—	—	36	—	—
		RYE			BEANS and PEASE	
1836	3	1	2	2	—	—
1837	6	1	5	5	1	—
1838	6	2	3	5	1	2

Easterbrook and Aitken[19] both Canadas were exporting to Britain. However only Upper Canada had a genuine surplus and, together with the U.S.A., was supplying local deficiencies in Lower Canada.[20] After the disasters of 1836-37 we can assume that Lower Canada no longer figured. This is indicated in the post-1836 Canadian export figures by the predominance of flour which could be carried more economically on the still far from perfect St. Lawrence system.[21] The new availability of steamers down river from Niagara would also help[22] since flour could bear the higher freights charged by them. The continued development of milling in and around Niagara confirms the general picture. Actual consignments from the Ontario hinterland from about 1841 are implied by Douglas McCalla.[23]

From 1808 onwards Canada also sent to Britain small quantities of pease, although these were — except in 1845 — an insignificant proportion of totals which were themselves small. Theoretically, the pease could have come either from Lower Canada[24] or from Upper Canada.[25] Canada also appears to have supplied the bulk of Britain's tiny imports of 'Meal and Flour not Wheat' in 1841-45, as Table 5 shows.

This is the classic period when we have to assume that much of the apparently Canadian trade originated in the U.S.A. Duty privileges, the

relative freedom of shipping in the Great Lakes, the availability of the Erie Canal and the Welland and Lachine Canals after 1825, and the positive wish of the Canadians that U.S. grain should travel by the St. Lawrence[26] all set the scene. The predominance of wheatflour from 1836, shown in Table 6, supports the supposition that U.S. wheat was milled in Upper Canada. So likewise do the abrupt changes in 1845-48, the years before and after Repeal. Canadian imports of wheat and wheatflour rose steadily to 1847 then slumped in 1848.[27] Imports from the U.S.A. however leapt dramatically in 1846-47, U.S. flour imports being no less than one and a half million quarters in grain equivalents in 1847. Similarly the U.S.A. which, as Table 5 shows, had had no share at all in the 'Meal and Flour not

TABLE 5

GROSS IMPORTS OF MEAL AND FLOUR (NOT WHEAT) INTO THE U.K., 1841-1850: '000s CWTS.

	TOTAL	B.N.A.	U.S.A.
1841	13	12	—
1842	21	19	—
1843	6	5	—
1844	4	3	—
1845	3	2	—
1846	157	10	132
1847	2,305	54	1,420
1848	276	8	198
1849	162	37	103
1850	19	—	17
Average 1841-50			
Thousand Cwts.	296	15	187
Thousand Imperial Quarters (Grain)	90	9	54

Wheat' trade until 1845, sent 132,000 hundredweights in 1846 and no less than one and a half million hundredweights in 1847 compared with Canada's 54,000 hundredweights in the same year. This non-wheat flour from the U.S.A. was probably mostly maize meal for Ireland. However figures about actual place of origin, whether the U.S.A. or Canada, remain elusive.[28]

We come to the post-Repeal era. From the British point of view, it was now theoretically possible for conditions abroad to dominate the trade,

TABLE 6

GROSS IMPORTS OF WHEAT AND WHEAT FLOUR SEPARATELY INTO THE U.K. (G.B.), 1822-1850: '000s QUARTERS

	TOTAL		B.N.A.		U.S.A.	
	WHEAT	WHEAT FLOUR	WHEAT	WHEAT FLOUR	WHEAT	WHEAT FLOUR
1822			22	1		
1823			—	—		
1824			1	—		
1825			91	—		
1826			27*	1		
1827			—	—		
1828	715	43	14	5	—	14
1829	1,545	132	4	2	1	113
1830	1,475	202	59	18	6	178
1831	1,837	467	191	28	43	422
1832	391	56	90	14	6	33
1833	248	49	79	21	—	10
1834	133	43	45	12	—	10
1835	43	24	14	3	—	2
1836	169	73	—	5	—	—
1837	456	104	—	3	—	—
1838	1,241	130	—	11	1	6
1839	2,635	241	—	8	4	12
1840	1,994	439	8	137	74	281
1841	2,410	361	70	180	11	103
1842	2,717	323	34	150	16	109
1843	940	125	20	93	—	26
1844	1,099	280	36	192	2	83
1845	872	270	39	191	23	70
1846	1,433	912	68	259	171	637
1847	2,656	1,808	89	310	424	1,410
1848	2,581	501	27	159	78	218
1849	3,845	957	10	131	108	505
1850	3,739	1,091	9	71	101	436
Average 1841-50	2,229	663	40	174	93	340

NOTE: It will be noticed that the sums for B.N.A. in 1826 do not tally exactly with the wheat and wheatflour totals given in Tables 2 and 3. This may be for geographical reasons.

whereas before 1846 British home conditions had normally been primary. But in fact, in British sources, the years 1846 to roughly 1875 are described as the 'Agricultural Golden Age' rather ignoring the odd conditions of the immediate post-repeal years of 1848-53. In other words the expected flood of imports did not for the time being materialise, the standard explanation being that, after all, conditions especially in the U.S.A. but also in Russia during the Crimean War in 1853-56 did not permit of it. From about 1875 British conditions are seen as being dominated by cheap floods of American grain — that is grain from the U.S.A. However this periodization does not make much sense in Canadian terms, since the levels of Canadian imports for the rest of the century do not coincide with the theoretical situation and depended more on Canadian than on British conditions.

From 1846 until the end of the period, the Canadian wheat and wheatflour trade was consistently tiny in relation to that from the U.S.A. However as shown in Tables 7 and 13, Canada now achieved predominance in the small trade in pease and continued, as can be seen in Table 8, to take a larger share of the total oat imports than the U.S.A. until 1888, with the exception of the single year of 1885.

Nonetheless if we discount the period 1840-47, Canadian wheat and wheatflour sales to Britain were consistently larger in absolute terms after Repeal than they had been before, though not by much in relation to the leaping overall totals. In spite of everything a healthy level was maintained in 1848-52 — except in 1850 — backed by 'excellent harvests' in 1847, 48, 49.[29] On the other hand Canada failed noticeably to benefit from the British shortages in 1853 and the post-war import flood in 1856, and made a very poor showing in 1854-55 which was shared by the U.S.A. in 1855 as Table 9 shows. The Canadian share of total imports to Britain was marginally better in 1857-58 but slumped again, as did the U.S. share, in 1859. Table 10 shows that flour continued to exceed wheat until 1854 whereafter the reverse normally held true except in 1859, a year of very low trade. These trends — except for the drop in 1859 — are not really reflected in Innis and Lower's 'St. Lawrence' exports which show a marked overall increase.[30] This presumably provides the basis of Easterbrook and Aitken's remark that after 1849 wheat succeeded timber as Canada's main export staple.

This is not the place to argue the toss about 'slump' in Canada in 1847-51 and 'boom' in 1852-56. It is assumed that the St. Lawrence trade was now virtually completely supplied from Ontario, which did apparently enjoy boom conditions in these years in spite of continuing trouble from the wheat midge and a declining yield.[31] The predominance of flour in Canadian exports to Britain until 1854 suggests that in spite of

the U.S. bonding acts, U.S. wheat continued to flow into Canada until the Reciprocity Treaty of 1854. But thereafter it seems probable that the flow was reversed and went from Ontario to the U.S.A. In spite of the completion of the St. Lawrence canals in 1848[32] new north-south railways were adding to the southwards pull.[33] MacGibbon gives gross overland exports of 759,000 quarters wheat and wheatflour in 1856 and 562,000 quarters — all grain — in 1857[34], which could theoretically account for a substantial proportion of U.S. sales to Britain in these years. But the probability seems to be rather that Canada was supplying local deficiencies in the U.S.A.[35] and perhaps the Maritimes.[36]

1860 was a year of bad harvests in Britain and record gross wheat and wheatflour imports. This record was shared by the U.S.A. but not by

TABLE 7

GROSS IMPORTS OF PEASE (AND BEANS) INTO THE U.K. (G.B.), 1846-1866: '000s QUARTERS

	TOTAL	B.N.A.	U.S.A.
1846	213	27	2
1847	158	16	7
1848	216	13	—
1849	234	15	2
1850	180	14	1
Average 1841-50	148	17	1
1851	99	8	—
1852	106	15	1
1853	101	19	—
1854	109	11	1
1855	113	7	—
1856	86	34	6
1857	160	21	3
1858	158	44	5
1859	156	39	6
1860	314	122	30
Average 1851-60	140	32	5
1861	400	185	43
1862	228	100	15
1863	303	83	9
1864	248	57	27
1865	174	62	7
1866	269	124	24

TABLE 8

GROSS IMPORTS OF OATS INTO THE U.K., 1846-1888:
'000s IMPERIAL QUARTERS (CWTS. ÷ 2.75)

	TOTAL	B.N.A.	U.S.A.
1846	789	6	
1847	1,706	31	
1848	967	—	
1849	1,267	—	
1850	1,154	—	
Average 1841-50	728	5	
1851	1,199	—	
1852	989	1	
1853	1,028	2	
1854	1,015	—	
1855	1,034	—	
1856	1,147	6	
1857	1,710	5	
1858	1,856	11	
1859	1,678	4	
1860	2,291	44	
Average 1851-60	1,395		
1861	1860	74	
1862	1610	31	
1863	2362	9	1
1864	1997	8	—
1865	2769	59	1
1866	3175	397	139
1867	3377	183	104
1868	2912	151	18
1869	2843	114	8
1870	3888	142	6
1871	3918	138	7
1872	4142	126	—
1873	4275	96	3
1874	4088	99	2
1875	4464	143	11
1876	4015	395	66
1877	4635	220	15
1878	4586	242	15
1879	4836	176	1
1880	4964	269	21
1881	3706	199	3
1882	4896	67	—
1883	5434	32	—
1884	4639	101	91
1885	4688	276	529
1886	4841	257	150
1887	5192	79	6
1888	6739	9	—

NOTE: B.N.A. distinguished where feasible. 1846-62, U.S.A. not distinguished.

TABLE 9

GROSS WHEAT AND WHEAT FLOUR IMPORTS INTO THE U.K. (G.B.), 1847-1866: '000s QUARTERS

	TOTAL	B.N.A.	U.S.A.
1847	4,465	399	1,834
1848	3,082	186	296
1849	4,802	141	614
1850	4,830	80	537
1851	5,330	130	912
1852	4,165	110	1,232
1853	6,318	168	1,583
1854	4,533	52	1,172
1855	3,253	18	451
1856	6,209	202	2,137
1857	4,111	168	1,085
1858	5,414	164	1,116
1859	5,016	40	100
1860	7,430	306	2,174
1861	8,784	791	3,642
1862	11,677	1,194	5,079
1863	7,207	746	2,769
1864	6,729	427	2,351
1865	6,030	123	350
1866	6,853	14	230

Canada, which sent less direct than she had in 1846-47. There follow the years of the U.S. Civil War 1861-65. Canadian sources consulted stress how Canada benefited from increased sales of horses, provisions, etc., to the belligerent northern U.S. states, but are virtually silent on the curious behaviour of the joint grain trade to the U.K. in the period. British figures of wheat and wheatflour imports from both sources leapt to records in 1861, leapt again to new records in 1862 and then fell back in 1863-64 but were still relatively large, being mostly grain in both cases. British wheat harvests do appear to have been poor in 1861-62, but the fact that the concomitant English price rise was minor suggests that it was the abnormally high imports which dominated the market at this point. Why?

The basic answer is that before the Civil War, the American North West and presumably Ontario were supplying wheat to the southern states of the U.S.A. down the old U.S. river system and also along new railways. When war came there was no market for these supplies and they

TABLE 10

GROSS IMPORTS OF WHEAT AND WHEAT FLOUR SEPARATELY INTO THE U.K. (G.B.), 1851-1866: '000s QUARTERS

	TOTAL		B.N.A.		U.S.A.	
	WHEAT	WHEAT FLOUR	WHEAT	WHEAT FLOUR	WHEAT	WHEAT FLOUR
1851	3,812	1,518	22	108	202	709
1852	3,060	1,104	36	75	484	748
1853	4,915	1,320	85	83	713	869
1854	3,431	1,042	19	33	418	735
1855	2,668	544	15	3	249	195
1856	4,073	1,134	112	87	1,279	826
1857	3,438	622	115	51	651	419
1858	4,242	1,102	101	61	595	504
1859	4,001	951	7	32	37	62
1860	5,881	1,453	183	118	1,499	644
Average 1851-60	3,952	1,079	69	65	613	571
1861	6,913	1,758	550	230	2,507	1,084
1862	9,469	2,059	861	317	3,725	1,286
1863	5,623	1,491	483	252	2,009	723
1864	5,353	1,289	283	139	1,822	500
1865	4,838	1,115	71	51	272	74
1866	5,344	1,421	2	12	147	80

were diverted east across the Atlantic.[37] The question remains, why should the St. Lawrence be affected? MacGibbon's explanation — that Canada was replacing the U.S.A. in European markets[38] — is clearly wrong. Did the extra St. Lawrence trade consist of Canadian grain anyway, or was it supplemented by U.S. wheat travelling north-east by that river to avoid hypothetical congestion on west-east routes inside the U.S.A.? In fact MacGibbon's own figures for 1863 support this hypothesis, since they show a healthy *import* balance of wheat from the U.S.A. into Canada, amounting to a rough 351,000 quarters of wheat. This compares with nominal Canadian wheat imports into the U.K. in the same year of 483,000 quarters odd.[39] Figures in MacGregor for 1863 may confirm the picture.[40] Canada's apparent recovery, shown in Table 11, of her share of 'Other Meal and Flour not Wheat' in 1861-63 when the figures end, could be part of the same pattern. In any case in 1863 the trade fell substantially and in 1866-86 imports from both Canada and the U.S.A. to Britain dropped almost to nothing. This suggests that both were affected

TABLE 11

GROSS IMPORTS OF MEAL AND FLOUR (NOT WHEAT) INTO THE U.K., 1851-1863: '000s CWTS.

	TOTAL	B.N.A.	U.S.A.
1851	19	1	11
1852	2	—	1
1853	17	—	16
1854	59	—	56
1855	18	—	10
1856	21	5	10
1857	6	—	1
1858	10	—	5
1859	4	1	2
1860	71	38	13
Average 1851-60			
Thousand Cwts.	23	5	12
Thousand Imperial Quarters (Grain)	8	3	4
1861	97	50	47
1862	18	8	8
1863	12	9	9

by general North American shortages connected with the aftermath of the Civil War.

Confederation in Canada in 1867 was obviously a crucial turning point. On the face of it, it was followed in 1869 by substantially increased wheat — but not flour — imports into the U.K. as shown in Table 12, jumping from 129,000 quarters of wheat in 1868 to 628,000 quarters in 1869.[41] U.K. harvests were bad in the latter year. The wheat imports continued at a comparable level until 1879 when they peaked again at just over a million quarters.[42] 1879 was the traumatic year in Britain when harvests were notoriously bad but prices fell because of record total imports. What were the sources of this newly enlarged trade? Insofar as they were genuinely Canadian, we may assume that Ontario was still dominant although Canadian grain trade writers are not unnaturally obsessed with the development of Manitoba and Winnipeg after about 1870. Individual consignments are recorded from Winnipeg to Glasgow and Liverpool in and after 1877, but these are known to have travelled via the U.S.A.[43]

But the overall picture seems still to have been similar to that encountered in 1861-63. Confederation brought with it national trade

figures, as reproduced by M.C. Urquhart and K.A. Buckley.[44] These show that in spite of everything, Canada as a whole had a definite wheat and wheatflour import balance in 1868-78.[45] The import balances involved were actually not large and always less than recorded imports from Canada to the U.K. Nonetheless we have to presume that even if Ontario was sending grain down the St. Lawrence direct to the U.K., a deficiency in

TABLE 12

GROSS IMPORTS OF WHEAT AND WHEAT FLOUR SEPARATELY INTO THE U.K. (G.B.), 1867-1879: '000s QUARTERS

	TOTAL		B.N.A.		U.S.A.	
	WHEAT	WHEAT FLOUR	WHEAT	WHEAT FLOUR	WHEAT	WHEAT FLOUR
1867	7,995	1,027	158	35	967	207
1868	7,532	888	129	55	1,363	193
1869	8,699	1,543	628	154	3,042	489
1870	7,131	1,373	655	129	2,855	614
1871	9,090	1,137	756	115	3,089	512
1872	9,721	1,245	400	97	2,012	209
1873	10,122	1,776	868	127	4,568	452
1874	9,583	1,782	880	111	5,329	941
1875	11,972	1,753	836	102	5,428	651
1876	10,259	1,703	559	81	4,459	663
1877	12,524	2,108	681	72	4,935	505
1878	11,517	2,237	605	87	6,707	1,035
1879	13,752	3,065	1,103	11	8,317	1,961

other parts of Canada was being made good from the U.S.A.[46] Attempts to quantify hypothetical exports from Ontario to the U.K. seem irrelevant in this context.

The oats shown in Table 8 and pease shown in Table 13, for which Urquhart and Buckley do not give full data, were probably genuinely Canadian, the oats possibly originating in both Quebec and Ontario[47] and the pease by now also in Ontario.[48]

As Table 14 shows, Canadian imports to Britain remained high in 1880 but with exceptions in 1886-87 were probably lower on average in the 1880s than in the previous decade. This was not generally true of the trade from the U.S.A. except in 1888-90, and not at all true of the gross totals. Canada however recovered markedly in 1891, as did the U.S.A.,

TABLE 13

GROSS IMPORTS OF PEASE (AND BEANS) INTO THE U.K. (G.B.), 1867-1900: '000s QUARTERS

	TOTAL	B.N.A.	U.S.A.
1867	352	176	106
1868	248	91	50
1869	234	60	6
1870	400	148	36
1871	225	69	12
1872	288	108	29
1873	265	84	14
1874	406	167	64
1875	359	172	111
1876	358	159	154
1877	338	130	78
1878	405	234	104
1879	430	268	96
1880	477	327	105
1881	441	290	107
1882	470	201	108
1883	421	155	75
1884	431	166	77
1885	449	237	112
1886	455	254	132
1887	665	233	159
1888	541	103	39
1889	377	127	77
1890	409	182	139
1891	538	209	139
1892	556	231	186
1893	512	195	114
1894	505	151	85
1895	538	10	54
1896	671	231	85
1897	627	427	139
1898	484	225	126
1899	612	168	106
1900	500	189	129

TABLE 14

GROSS IMPORTS OF WHEAT AND WHEAT FLOUR SEPARATELY INTO THE U.K. (G.B.), 1880-1900: '000s QUARTERS

	TOTAL		B.N.A.		U.S.A.	
	WHEAT	WHEAT FLOUR	WHEAT	WHEAT FLOUR	WHEAT	WHEAT FLOUR
1880	12,753	3,017	897	150	8,352	1,964
1881	13,188	3,245	664	74	8,327	2,196
1882	14,825	3,731	621	97	8,109	2,229
1883	14,801	4,666	415	144	6,029	3,221
1884	10,916	4,313	406	197	5,225	2,954
1885	14,192	4,524	403	80	5,602	3,352
1886	10,947	4,197	711	220	5,688	3,264
1887	12,878	5,161	916	274	7,046	4,246
1888	13,214	4,831	252	224	3,379	3,588
1889	13,512	4,192	270	334	3,926	2,869
1890	13,956	4,507	260	267	3,969	3,426
1891	15,303	4,778	732	294	5,584	3,915
1892	14,978	6,316	894	389	7,822	5,562
1893	15,107	5,831	729	309	7,445	5,141
1894	16,183	5,467	653	341	5,690	4,550
1895	18,866	5,248	426	669	6,250	3,750
1896	16,160	6,091	835	552	7,083	4,545
1897	14,479	5,337	1,113	437	7,985	4,018
1898	15,053	6,005	1,157	563	8,715	4,985
1899	15,378	6,556	1,213	714	7,997	5,259
1900	15,847	6,157	1,463	341	7,521	5,108

and maintained a wheat and wheatflour total of over one million quarters in every year to 1900, peaking at two million odd in 1899. This further rise was shared by the U.S.A. and the gross totals. The proportion of wheatflour, having fallen from about 1867[49], recovered from about 1883 in the Canadian trade, actually exceeding grain in grain equivalents in 1889-90 and 1895[50] but fell again in relative importance in the key year of 1891.

Canada's large trade to the U.K. in 1879 was reflected in her own export figures which registered their first significant export balance in 1878-79. The surplus became even larger in 1881-82 and was maintained, with exceptions in 1883-84 and 1888-89, to the end of our period. It is thus paradoxical that Canada's registered imports to the U.K.

were relatively stagnant in the 1880s.[51] However a further increase in the Canadian export balance in 1891 does coincide with the permanently enlarged British trade — and from this point on, in contrast to the 1880s, the absolute quantities of export balance and recorded imports were about the same.

Canada's new export balance in the 1880s was presumably associated with increasing harvests and the building of harbours, elevators, railways, etc., in Manitoba, especially in association with Winnipeg.[52] The further increase after 1891 is also associated with continued growth in Manitoba.[53] But what of the apparent decline in the trade to Britain in the 1880s? MacGibbon[54] writes that 'The earlier supplies drawn from the west — i.e., Manitoba — apparently chiefly made good deficiencies in Quebec and the Maritime Provinces', but this does not account for the export surplus. Canadian and British figures together suggest that wheat from Winnipeg was being exported to the U.S.A. and perhaps arriving in the U.K. under American guise, though paradoxically we are told that the first all-Canadian shipment of wheat — direct to Glasgow — occurred in 1884.[55] The comparatively large proportion of Canadian flour bought by the U.K. in 1883-89 may be the significant detail. Milling facilities for hard wheat were now available in and around Winnipeg[56], and as usual flour may have been more able than wheat to bear the costs of the tortuous rail and lake journey east.[57]

The picture in the 1890s is straightforward. First, the Canadian export balance was roughly equal to the U.K. imports in and after 1891. Second, there seems little doubt that Manitoban wheat was now making its way directly east across Canada, by the new railways and the newly improved waterways. Third, it was in November 1892 that Manitoba wheat as such was first quoted in Liverpool.[58] Finally, the imports really did increase after 1896, when tradition has it that the U.S. frontier was closed and world wheat prices began to rise.

NOTES

1. Robert Machray in *Nineteenth Century and After* (Vol. LIV, July-December 1903), 315 ff.

2. Although, ironically the period opened in 1789-90 with acute shortages in Quebec in 1789 (Donald Creighton, *The Empire of the St. Lawrence* (Toronto, 1956), p. 107); requests for help from Britain in 1790 (B.P.P., Wilmington edition LIIV, no. 4186, p. 99); and a prohibition on exports in the same year (Duncan Alexander MacGibbon, *The Canadian Grain Trade* (Toronto, 1932), p. 8).

3. MacGibbon, *Grain Trade,* p. 9.

4. The wheat and wheatflour are given separately, the former in quarters and the latter in barrels of 196 lb. H.A. Innis and A.R.M. Lower, (Eds.), *Select Documents in Canadian Economic History 1783-1885* (Toronto, 1933), pp. 265-6, give wheat and wheatflour

aggregates only, in bushels, from 1793 to 1830, ("Canada") and from 1838-1861 ("St. Lawrence"). They state that a barrel of flour was taken as the equivalent of 5 bushels of wheat, that is five eights or .625 of a quarter. This gives a flour extraction rate of barley seventy per cent. See Appendix II.

5. Creighton, *Empire,* p. 120.

6. Belying W.T. Easterbrook and Hugh G.J. Aitken, *Canadian Economic History* (Toronto, 1956), p. 281.

7. Creighton, *Empire,* p. 121.

8. *loc. cit.,* also Easterbrook and Aitken, *History,* p. 157.

9. Innis and Lower, *Documents,* pp. 261-63 and 267-68.

10. Creighton, *Empire,* p. 243.

11. MacGibbon, *Grain Trade,* p. 9.

12. See Appendix I.

13. I have no separate British figures for 1827.

14. To repeat, Innis and Lower give aggregates only, pp. 265-6. Breakdowns for Quebec in 1823 and 1827-31 are available in John Macgregor, *Commercial Statistics. A Digest* (London, 1850) V, pp. 252, 254 and 258. These figures continued to move in general concert with the British figures.

15. This figure corresponds remarkably closely with details of wheat and wheatflour exported from Quebec to Great Britain up to 5 January 1832 given by John Macgregor, *Statistics,* p. 258.

16. These are not discernible in my Table 3, but see for example B.R. Mitchell and Phyllis Deane, *Abstract of British Historical Statistics* (Cambridge, 1962), p. 97.

17. In 1839 there was a further general crop failure in Upper Canada, Easterbrook and Aitken, *History,* p. 286.

18. The U.S. record of 355,000 quarters occurred in 1840.

19. Easterbrook and Aitken, *History,* p. 283.

20. *Ibid.,* p. 289, mention untypical exports from Prince Edward Island to Britain in 1831.

21. Creighton, *Empire,* p. 243. See also Easterbrook and Aitken, *History,* pp. 280-81 for the 1830s and 1840s.

22. Innis and Lower quoting the *Montreal Gazette* of May 17, 1830, itself quoting a Niagara newspaper, *Documents,* p. 264.

23. "The Canadian Grain Trade in the 1840s: The Buchanan's Case", *Historical Papers* (Ottawa, 1974), p. 111, fn. 21.

24. Where they were a traditional staple. Creighton, *Empire,* p. 120.

25. Where they could form part of a rotation on old land, or, with other crops, follow wheat on new land. Easterbrook and Aitken, *History,* pp. 278-79.

26. *Ibid,* p. 183.

27. The Innis and Lower figures also show this trend.

28. See the valiant attempts by Thomas F. McIlwraith, "The Logistical Geography of the Great Lakes Grain Trade, 1820-1850" (Unpublished Ph.D. Thesis, U. of Wisconsin, 1973)

and "Freight Capacity and the Utilization of the Erie and Great Lakes Canals before 1850", *Journal of Economic History,* XXXVI (1976). I am indebted to Professor Morton Rothstein for these references. See also MacGregor, V, p. 266. Moreover, Canadian sources suggest that the internal North American trade could still flow either way; Creighton, pp. 243, 250-2 and 341, and Easterbrook and Aitken, p. 286.

29. *Ibid,* p. 291.

30. Presumably to the Maritimes.

31. MacGibbon, p. 9. See also Innis and Lower, pp. 547-8.

32. Easterbrook and Aitken, p. 351.

33. *Ibid,* p. 369.

34. MacGibbon, *Grain Trade,* pp. 18-19.

35. See *Wheat — its History — by the Old Norfolk Farmer* (London, 1863), p. 142. Also Easterbrook and Aitken, p. 291. McCalla also, p. 108, agrees that trade from Ontario to Liverpool via Montreal and New York was insignificant in the 1850s.

36. Easterbrook and Aitken, p. 369, also MacGibbon, p. 13.

37. There is a detailed discussion of this phenomonen from the U.S. point of view with full references in Chapter I of an unpublished Ph.D. thesis by Prof. Morton Rothstein of the U. of Wisconsin, on the Anglo-American Grain Trade.

38. 'One result of the war was to curtail American exports to Europe, and thus allow the Canadian trade to expand in that direction'. MacGibbon, *Grain Trade,* p. 20.

39. *Ibid,* pp. 19-20. Canada seems to have had a genuine export balance in flour, of 264,561 barrels to the U.S.A., and of 252,000 quarters grain equivalents to the U.K.

40. MacGregor gives only gross exports from the U.S.A. to Canada 'and British North America'. His gross figure is 6,583,695 bushels of wheat compared with MacGibbon's gross figure of 4,210,900 bushels to 'Canada.' MacGregor, *Statistics,* p. 458.

41. The U.S.A. sent 1,363,000 and 3,042,000 quarters respectively, and gross totals were 7,532,000 and 8,699,000 respectively.

42. U.S. wheat reaching 8,317,000 and grand totals 13,752,000 quarters plus 3,065,000 quarters of wheatflour in grain equivalents.

43. Machray, p. 318; MacGibbon, p. 27. See also John Smith, "The Economic Geography of the Nene Basin Grain Milling Industry" (Unpublished M.A. Thesis, U. of London, 1951), p. 183, for a consignment of strong flour to Glasgow in 1880, route unspecified.

44. *Historical Statistics of Canada* (Toronto, 1965).

45. With an insignificant exception in 1875. I have assumed that Urquhart and Buckley's figures, being for crop years, should be put back by one calendar year.

46. This is indeed implied by MacGibbon, *Grain Trade,* p. 19. Flour as such normally showed a small export balance.

47. Innis and Lower, pp. 546-8, and MacGibbon, pp. 20-1.

48. Innis and Lower, p. 546.

49. It exceeded grain in the low import year of 1866.

50. The proportion of wheatflour in the U.S. trade increased again after about 1878 and actually exceeded wheat in 1888. The years 1888-90 were years of small trade from both

countries.

51. Though the Canadian deficiencies in 1883-84 show up in the British figures of 1883-85, and those of 1888-89 in 1888-90. In general until 1891, the actual size of Canada's export balance was still considerably less than recorded imports into the U.K.

52. MacGibbon, pp. 29-30 and Innis and Lower, pp. 758-9. I have not had time in this paper to discuss the problem of hard and soft wheat, especially Red Fife, which became predominant in Manitoba after 1882, MacGibbon, p. 480. The good Manitoba harvest of 1887 (*ibid,* p. 29), did coincide with large Canadian grain imports into the U.K.

53. Indeed to quote MacGibbon, p. 29, 'It was not until 1892 that exports of wheat from Canada began to show the influence of the western yield'.

54. MacGibbon, *Grain Trade,* pp. 29-31.

55. G. Wilson Craw, "Red Fife Wheat", in Ronald Borg (Ed.), *Peterborough, Land of the Shining Waters* (Peterborough, 1967). See also MacGibbon, p. 28. Innis and Lower, p. 759, describe a direct shipment to Liverpool in 1885.

56. Apparently from 1881; MacGibbon p. 404.

57. It will be remembered that the 1880 consignment to Glasgow consisted of strong flour. John Smith, "Economic Geography", p. 183.

58. MacGibbon, p. 30, quoting G.J. Broomhall.

APPENDIX I

NOTES ON COLONIAL PREFERENCE

In 1791 a new Corn Law was passed[1] but its duty provisions were submerged in the grain trade dislocations of the succeeding war decades. Nonetheless the Act is notable for various new departures, among them the incorporation of Colonial Preference in the duty scales.[2] At this time the actual advantages were small, amounting to a mere two shillings on a Winchester Quarter of wheat, and on other grains in proportion. But even these, like the duties to which they were tied, soon became meaningless in the context of the chronic scarcity which followed. A subsequent Corn Law in 1804[3] increased the nominal import duty scales, in line with the intervening rise in prices, and also the degree of Colonial Preference. This was now ten shillings on a Winchester Quarter of wheat and British North America was mentioned by name. But this Act too soon became submerged in renewed shortages.

The ending of the wars brought the notorious Corn Law of 1815.[4] This prohibited wheat and wheatflour imports until home wheat prices were eighty shillings a Winchester Quarter or over. However British North America was specifically named and received a competitive advantage of thirteen shillings a quarter on wheat, nine shillings on rye, pease and beans, seven shillings on barley, bere and bigg and five shillings on oats. Furthermore, she was granted other special privileges which in effect gave her six weeks extra time in which to enter imports at a particular (high) price. These privileges were reiterated in the ineffective Act of 1822[5] at roughly similar levels; and in 1825 a special temporary Act[6] allowed in wheat from British North America at a flat rate duty of five shillings per Imperial Quarter for home consumption, from June 22, 1825 until July 1827. This did not cover flour.[7] But a new Act in 1827 remedied this deficiency, made the other terms even more generous[8] and saw Canada through to the subsequent major Act of 1828.[9] This brought in the famous 'Sliding Scale'. The colonial duty advantage on wheat at the pivotal home price of above sixty six shillings the Imperial Quarter was now not only higher at 15/8 (i.e. a duty of 5/ - compared with one of 20/8); but was in effect not a sliding scale at all, since at English prices above 66/11 a flat rate of only six pence was payable. The maximum duties on barley, oats, rye, pease and beans were almost negligible, and were also only six pence a quarter, flat rate above the respective pivotal prices. However the advantages were now not confined to British North America, but applied to all British Colonies 'out of Europe'.

In 1842[10] when the duty scales were in general reduced, the differential on wheat, still applicable to all British Possessions outside Europe, was still at the fourteen to fifteen shilling level (at the pivotal price); but it varied, since foreign wheat and 'British' wheat now worked on separate duty scales. There followed the Canada Act of 1843[11] which allowed in Canadian wheat and wheatflour to the U.K. at a flat rate of one shilling the Imperial Quarter (and its equivalent in flour) so long as Canada maintained her own new import duty of three shillings a quarter on all non-British wheat.

The Repeal Act of 1846[12] did not officially come into force until February 1, 1849; until which time there was a temporary scale of duties still granting some Colonial Preference. But this was out of action from January 26, 1847 until March 1, 1848; and the year 1846 effectively marks the demise of Colonial Preference in grain. A registration duty of one shilling the Imperial Quarter on all grains (and 4½d. a hundredweight on all meal and flour) was retained from 1849 until 1869 when all duties were entirely repealed.[13]

NOTES

1. 31 Geo III c 30.
2. Though the first mention of colonial preference for wheat had occurred in 1766 during acute but temporary scarcities — B.P.P. 1903 LXVIII, p. 449, (150).
3. 44 Geo III c 109.
4. 55 Geo III c 26.
5. 3 Geo IV c 60.
6. 6 Geo IV c 64.
7. Donald Creighton, *The Empire of the St. Lawrence* (Toronto, 1956), p. 243.
8. Creighton, pp. 244 and 407. 7 & 8 Geo IV c 57.
9. 9 Geo IV c 60.
10. 5 & 6 Vict c 14.
11. 6 & 7 Vict c 29.
12. 9 & 10 Vict c 22.
13. 32 & 33 Vict c 14. The duty on grain became three pence a hundredweight in 1864.

APPENDIX II

NOTES ON THE STATISTICS

The statistics of grain imports into Great Britain and the United Kingdom have never, so far as I know, been properly described in modern secondary works. The following discussion touches on points relevant to the Canadian import trade.

Until 1828 — even though Ireland was officially united with England, Wales and Scotland in 1800 — gross import statistics were still of imports into Great Britain excluding Ireland. Indeed they included imports, both domestic and re-exported foreign grain, from Ireland — as in Table 1. After 1828, official returns were of gross imports into the U.K. — that is they included foreign and colonial imports into Ireland but not exports from Ireland to Great Britain. The tables in B.R. Mitchell and Phyllis Deane[1] and W. Page[2] do not really make this clear. The former[3] gives gross imports and re-exports to the 'U.K.' from 1792-1840, but quotes a source in which the Irish imports were presumably taken out of the 'G.B.' totals.[4] Page's figures starting in 1815 are also imports into the 'U.K.' throughout[5] but no sources are given.

Furthermore for a large part of the period there were no less than three separate types of grain import table into G.B./U.K. which are not always properly identified in secondary sources. The major series throughout was of gross imports. To obtain net imports we have to subtract exports and re-exports. While these were usually insignificant in our period it is necessary to bear in mind that when dealing with 'imports from countries' we are in fact using gross imports, since it was normally only in association with these that breakdowns of countries of origin were supplied. There are virtually no abstracts of re-exports by country of origin. Normally the same applies to re-exports by country of destination, but the great fuss about re-exports in the mid-1830s is the exception which proves the rule.

The third series, after 'gross imports' and 'net imports', was tied up with the operation of the Corn Laws, and was known roughly as 'grain paid duty and entered for consumption'. In 1791 — and possibly before, though the evidence is unclear — a bonded warehouse system for grain was introduced. Foreign grain could be stored in these warehouses, and if re-exported did not pay duty. Thus the amount of grain which actually paid duty and reached the British consumer was not necessarily the same as the net import series since stocks could be held over, and in particular years wheat and wheatflour entered for consumption could exceed net imports — or *vice versa*. The system was refined in 1815 when it was hoped — mistakenly — that Britain would become an important grain entrepôt. In 1824 wheat in bond was allowed to be ground into flour free of duty if for re-export, presumably to encourage the milling industry. For obvious reasons the system died with the Corn Laws in 1869[6], but I have seen a late nineteenth century table of 'Imports for Consumption' which consisted in fact of net import figures. A useful table of 'Wheat Etc., Barley Etc., and Oats Etc.' 'Imported into the United Kingdom, Re-exported and retained for Consumption 1800-1866' is given by J.R. McCulloch.[7] Abstracts for individual countries in this context are not usually given, but some short series have been found for British North America.

Nineteenth century imports of 'Corn, Grain etc.' conventionally included the following commodities, in rough order of precedence: wheat (meal and flour), barley (and meal), oats (and meal), maize or Indian Corn (and meal), rye (and meal), buckwheat, bere or bigg — an inferior type of barley sometimes lumped with barley — and pease and beans which were sometimes lumped together. Barley, rye, buckwheat and beans virtually do not figure in this study.

There are problems with the meal and flour especially with regard to wheat. They are not the same thing. Flour is the product of grinding, but refined in various ways to take out the

'offal'. Meal was normally the whole product, 'offal' included. The term 'flour' is virtually synonymous with 'wheatflour'. Units of wheatflour are not the same as units of wheat — even if, for example, both are given in hundredweights — unless the term 'grain equivalent' is explicitly used. Only wheatflour was normally significant in the foreign trade — 'other' meal and flour was generally irrelevant — but see Tables 5 and 11. Malt was technically a grain, but its import was prohibited at least until 1880.

Tables of 'wheat' imports in secondary sources usually include wheatflour equivalents. Sometimes this is made explicit as by John Marshall in the figures quoted in Tables 2 and 3 for 1800-1831. Sometimes it is not, particularly in the tables reproduced in Page and also used in Tables 3 and 9. Mitchell and Deane[8] made no attempt to separate total wheat and wheatflour imports before 1840, and the (wheat) imports from countries starting in 1828[9] show only grain and not flour. The problem was largely one of weights and measures. It is worth remarking at this point that I know of virtually no good breakdowns of individual grains from countries — other than wheat and wheatflour — in modern secondary sources.[10]

Weights and measures are a constant problem. The basic choice is between units of capacity like the quarter and bushel, there being eight bushels to the quarter; and units of weight, like the hundredweight and the ton. I have opted for the quarter because it was the official British import unit until 1863; and persisted in other British official contexts until the 1920s. For the North American it also provides easy conversion into bushels. From May 1, 1825 the earlier Winchester Quarter and Bushel were succeeded by the very slightly larger Imperial Quarter and Bushel[11]. I do not know if the change applied to the Canadian bushel.

After 1863 all U.K. grain imports were recorded in hundredweights. Matters are complicated by the fact that capacity/weight equivalents differed widely, not only between different grains, but also between good and bad qualities of the same grain. I have used the official U.K. import conversion rates current after 1863. According to these, there were 4¼ cwts. to the quarter of wheat, 3½ cwts. to the quarter of barley, 2¾ to one of oats, 4 and 2/7 to one of maize and 4½ to one of pease. Thus for example oats expressed in quarters may be said to look more significant than they really were. Worse still, wheatflour had always been entered in hundredweights. Thus a conversion rate from flour by weight to grain by capacity was required from the outset.[12] In the eighteenth century standard wheaten flour was held officially to weigh seventy five per cent of its grain equivalent. For technical reasons the proportion fluctuated but not so much as to make a flat conversion rate meaningless. Here I have again followed the post-1863 U.K. customs officials in reckoning that 3.5 cwts of wheatflour were the equivalent of a quarter of wheat in grain, omitting throughout the intermediate conversion from cwts. of flour to cwts. of grain[13].

'Canadian' or 'British North American' imports meant in practice those from the St. Lawrence, or more particularly Quebec and later Montreal. Since it is well recognised that Canadian wheat and wheatflour could reach Britain from seaports in the U.S.A., I have shown comparative figures throughout for grain imports from that country.

NOTES

1. *Abstract of British Historical Statistics* (Cambridge, 1962).
2. *Commerce and Industry* (London, 1919 and New York, 1968).
3. B.R. Mitchell and Phyllis Deane, *Abstract,* p. 97.
4. B.P.P. 1849 L.
5. Page, *Commerce,* 140 ff.
6. See Appendix I.

7. *Dictionary of Commerce and Commercial Navigation* (London, 1869) p. 451.

8. *Abstract,* p. 97.

9. *Ibid,* p. 100.

10. With the honourable exception of William Freeman Galpin, *The Grain Supply of England during the Napoleonic Period* (New York, 1925).

11. 5 Geo IV c 74 (17 June 1824). As the Winchester Quarter was .969447 of an Imperial Quarter, I have ignored the change; C.R. Fay, *The Corn Laws and Social England* (Cambridge, 1932), p. 70.

12. Ibid, p. 3.

13. At 4 1/3 cwts. of wheat in grain to the quarter, and 3 1/3 cwts. of flour ditto, the implied flour extraction rate is nearer eighty per cent, which takes us to the higher end of the normal range.

APPENDIX III

SOURCES FOR THE TABLES

TABLE 1

B.P.P. 1814-1815, V, p.1155 (121). The first page number is the volume page number of the British Museum copy. The number in brackets is the 'paper' page number.

TABLES 2, 3 and 9

Gross Total Imports into G.B./U.K.
1800-1824: G.B. B.P.P. 1825 XX p. 258 (26)

1825-1839: U.K. B.R. Mitchell and P. Deane, *Abstract of British Historical Statistics,* (Cambridge, 1962), p. 97. Their source was B.P.P. 1849 L. Their series starts in 1792, but does not always tally with B.P.P. 1814-1815 V and B.P.P. 1825 XX, especially in 1800.

Gross Totals from Countries.

1800-1831: John Marshall, *Digest of the Accounts* (London, 1833), II, p. 90. Marshall used B.P.P. 1825 XX p. 233 for figures up to 1824, and 'manuscript sources' for 1825-1831.

1832-1839: Calculated from separate totals of wheat and wheatflour as given in Tables 6, 10, 12 and 14.

1840-1866: Page (New Edition, New York, 1968), II, pp. 142-4. The figures for British North America in brackets, 1800-1839, are from F.W. Burton, 'Wheat in Canadian History', *The Canadian Journal of Economics and Political Science,* III, (1937), p. 213. Burton quoted 'Imperial Blue Books', May 8, 1843.

TABLE 4

B.P.P. 1842 XL p. 392 (52) wheat, p. 397 (57) wheatflour (cwts. ÷ 3.5), p. 393 (53) barley, p. 394 (54) oats, p. 395 (55) rye and p. 396 (56) beans and pease.

TABLES 5 AND 11

Conversion into Imperial Quarter Grain Equivalents not feasible, as these are aggregate totals of different grains. It will be noted that the factors used by contemporary clerks in converting the averages differ in each case. Meals specified were from oats, maize, rye, barley, buckwheat and 'other'. B.P.P. 1864 LVIII p. 178 (10).

TABLES 6, 10, 12 AND 14

1822-1826: Wheat and wheatflour in grain equivalents from British Possessions in America. B.P.P. 1826-7, VI, p. 776 (144). Wheatflour = cwts. ÷ 3.5.

1828-1840: B.P.P. 1842 XL p. 397 (57). Wheatflour in grain equivalents = cwts. ÷ 3.5.

1841-1863: B.P.P. 1864 LVIII pp. 170, 177, (2) and (9). Decennial averages as given in the same source. The flour cwts/wheat quarters conversion rate is used here for the averages.

1864-1865: B.P.P. 1878 LXXVII wheat — grain p.44, wheat meal and flour p. 45.

1866-1886: B.P.P. 1887 LXXV pp. 300-3 (2-5). All figures given in Imperial Quarters, wheat explicitly at 3½ cwts. to the quarter. Compare 1841-1863 above. These rates seem to give totals consistently smaller than those in Tables 2, 3 and 9, which were taken from Page,

Commerce and Industry. Page must have used different conversion rates, but gives no details.

1887-1888: B.P.P. 1889 LXXXII, p. 75. "Wheat-grain" = cwts. ÷ 4.3333. Grain equivalent of "wheat meal and flour" = cwts. ÷ 3.5.

TABLES 7 AND 13

1846-1863: B.P.P. 1864 LVIII: Pease to U.K. '000s Imperial Quarters.

1864-1877: B.P.P. 1878 LXXVII p. 49 (49): Pease to U.K. 000s cwts. ÷ 4.5 (exact).

1878-1888: B.P.P. 1889 LXXXII pp. 80-81 (80-81): Pease to U.K. 000s cwts. ÷ 4.5.

1889-1900: B.P.P. 1901 LXXXVI, pp. 96-97 (90-91): Pease to U.K. '000s cwts. ÷ 4.5.

TABLE 8

1841-1860: B.P.P. 1864 LVIII, p. 172 (4). U.S.A. not distinguished.

1864-1877: B.P.P. 1878 LXXVII p. 47 (47): cwts. ÷ 2.75. (Totals in '000s Imperial Quarters, from Page, *Commerce and Industry,* (1919) p. 140.

1878-1888: Totals as in 1864-1877. B.N.A. and U.S.A. from B.P.P. 1889 LXXXII pp. 78-79 (78-79): cwts. ÷ 2.75.

10. THE CANADIAN DEEP SEA MERCHANT MARINE AND THE AMERICAN EXPORT TRADE, 1850-1890

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THE CANADIAN DEEP SEA MERCHANT MARINE AND THE AMERICAN EXPORT TRADE, 1850-1890

Keith Matthews

The merchant marine of Canada in the second half of the nineteenth century embraced every possible segment of activity. The fleet was numerous and highly developed in fishing, coasting, 'short sea' trades and most remarkable of all in deep sea international trades. Given British North America's vastness, settlement patterns and the backward state of land communications, the existence of a large coasting fleet was both necessary and inevitable. The seas off Eastern America provided ample employment for a fishing fleet while the strong links with the United States and the West Indies ensured good opportunities for Canadian participation in the export and import trade between British North America and those regions. Given this it would be amazing had Canada not possessed a fairly large shipping industry.

There was, however, no particular reason why Canada's deep sea industry should have become so important. For most of the period only grain and lumber were exported to Europe in any significant quantities and the small size of the Canadian economy limited the volume of imports. Climatic conditions meant that the bulk of the Canadian ports were closed for half the year — even Saint John, New Brunswick exported very little across the Atlantic during the winter months until the 1860s. With the repeal of the English Navigation Acts all nations were able to partake freely in the carriage of Canadian goods, and Canadian owners had no special advantages in this commerce. Thus Canadian foreign trade afforded at best partial employment for any Canadian merchant vessel, and even had the trade been closed to all but Canadian ships, an impossibility, lack of employment opportunities during the winter months must have prevented the development of a deep sea marine of any significant size. Therefore in developing a foreign going merchant fleet Canadian owners had to become 'cross traders', employing their vessels in trades between foreign countries. Between 1850 and 1880 they were remarkably successful in this, with the result that Canada's merchant marine increased nearly four hundred percent from 370,000 tons in 1850 to 1,333,000 tons in 1879.[1] The bulk of this increase was won in the deep sea trade, and the decline of Canada's role in those trades after 1880 saw a rapid decline in the size of her total merchant marine.

Canadian success is even more remarkable given that from beginning to end its deep sea marine was composed entirely of wooden hulled, sail driven vessels, and that the fleet expanded at a time when

steamers and iron or steel hulled vessels were rapidly taking over the carrying trade of the world. This paper is not concerned with the question of why Canadian owners failed to make the transition to steam and iron; rather it attempts to discover how they were so successful in the operation of wooden sailers. Briefly, it is argued that the principle reason for Canada's success is to be found in the history of the export trade of the United States during the era. Free access to that trade, indeed free access (as part of the British merchant marine) to most of the deep sea trades of Europe, enabled the Canadian owners to employ their vessels on a year round basis. Expansion of the deep sea marine depended on the rate of growth of American staple exports aided by the decline of America's own merchant marine. Decline due to the invasion of steam was delayed because between 1870 and 1880 American exports expanded at a faster rate than the provision of steam shipping to carry them. From the point of view of the sailing ship owner the key to survival lay in the rapid expansion of the American grain trade and the discovery and continuous growth of the international petroleum trade. Furthermore, during the era American exports tended to diversify from an overwhelming dependence upon the United Kingdom market into a much wider spread of destinations throughout Europe and the Mediterranean.

Wider European demand for grains and above all the rapid introduction of American petroleum into every region of the world, were the main factors behind this diversification which opened up new opportunities for the employment of sailing vessels as industrialization and the growth of steam shipping slowly closed down the opportunities in North Western Europe.

2

Between 1851 and 1880 the value of American exports quadrupled from under $200 million to over $800 million. Although there were periods of depression and decline, most notably during the Civil War, this growth was on the whole continuous and ensured the long term prospects for the employment of shipping in her carrying trade. In the early 1880s a collapse in commodity prices caused some decline in the value of American exports,[2] which had extremely adverse consequences on freight rates, but the volume of exports, which was more important than values as far as opportunities for shipping were concerned, continued to increase. From the beginning the United States had depended heavily upon European markets as outlets for its produce, but as the nineteenth century progressed this dependence became more pronounced. As Table 1 shows the European share of American exports rose from an average of

TABLE 1

PERCENTAGE OF AMERICAN EXPORTS DESTINED FOR EUROPE

YEAR	%	YEAR	%	YEAR	%
1821	66	1845	69	1868	75
1822	66	1846	70	1869	76
1823	65	1847	79	1870	81
1824	59	1848	72	1871	80
1825	65	1849	76	1872	80
1826	58	1850	75	1873	81
1827	65	1851	77	1874	81
1828	61	1852	74	1875	80
1829	67	1853	74	1876	81
1830	67	1854	72	1877	81
1831	62	1855	67	1878	82
1832	68	1856	73	1879	84
1833	65	1857	74	1880	86
1834	73	1858	73	1881	85
1835	72	1859	72	1882	80
1836	78	1860	75	1883	80
1837	77	1861	67	1884	79
1838	76	1862	66	1885	81
1839	76	1863	64	1886	80
1840	75	1864	59	1887	80
1841	72	1865	55	1888	79
1842	72	1866	81	1889	78
1843	76	1867	77	1890	80
1844	72				

NOTE: 1821-1842 years ending 30 September; 1843-1890 years ending 30 June, with nine months for 1843. Source: U.S. Bureau of Statistics, Treasury Department, *Statistical Tables Exhibiting the Commerce of the United States with European Countries, 1790-1890* (Washington, 1893) pp. viii and ix. Hereafter cited as *Treasury Tables.*

fifty eight to sixty five percent in the 1820s to seventy eight to eighty six percent in the period between 1870 and 1890. Figure I illustrates the growth of American exports to Europe between 1851 and 1890, but in many ways it also understates that growth, due to the decline in commodity prices during the last quarter of the nineteenth century.[3]

From the viewpoint of the shipowners changes in the volume of exports were more important than changes in value, and it was in volume that the expansion of American exports to Europe was most marked. Figures II to V illustrate growth in the four most important American

export staples; grain, cotton, petroleum and tobacco, in the years between 1871 and 1890[4] while Table 2 shows developments in the naval stores trade between 1871 and 1890. In all commodities exports increased sharply from about 1870 onwards, but the scale and nature of the expansion varied among commodities. The increase was most marked in grain and petroleum. Exports of grain to Europe ranged between one and twenty million bushels in the 1850s, increased to between four and fifty one million bushels during the 1860s and increased sharply from 1872 to reach a peak of 244 million bushels in 1881. Thereafter exports declined sharply, but by now the era of sail in the North Atlantic was fast coming to an end. Petroleum exports expanded rapidly and continuously from under six million gallons in 1861 to 465 million in 1890. Since the carriage of petroleum was more or less monopolized by sailing vessels

FIGURE 1

U.S.A. VALUE OF EXPORTS TO EUROPE (MILLIONS OF DOLLARS)

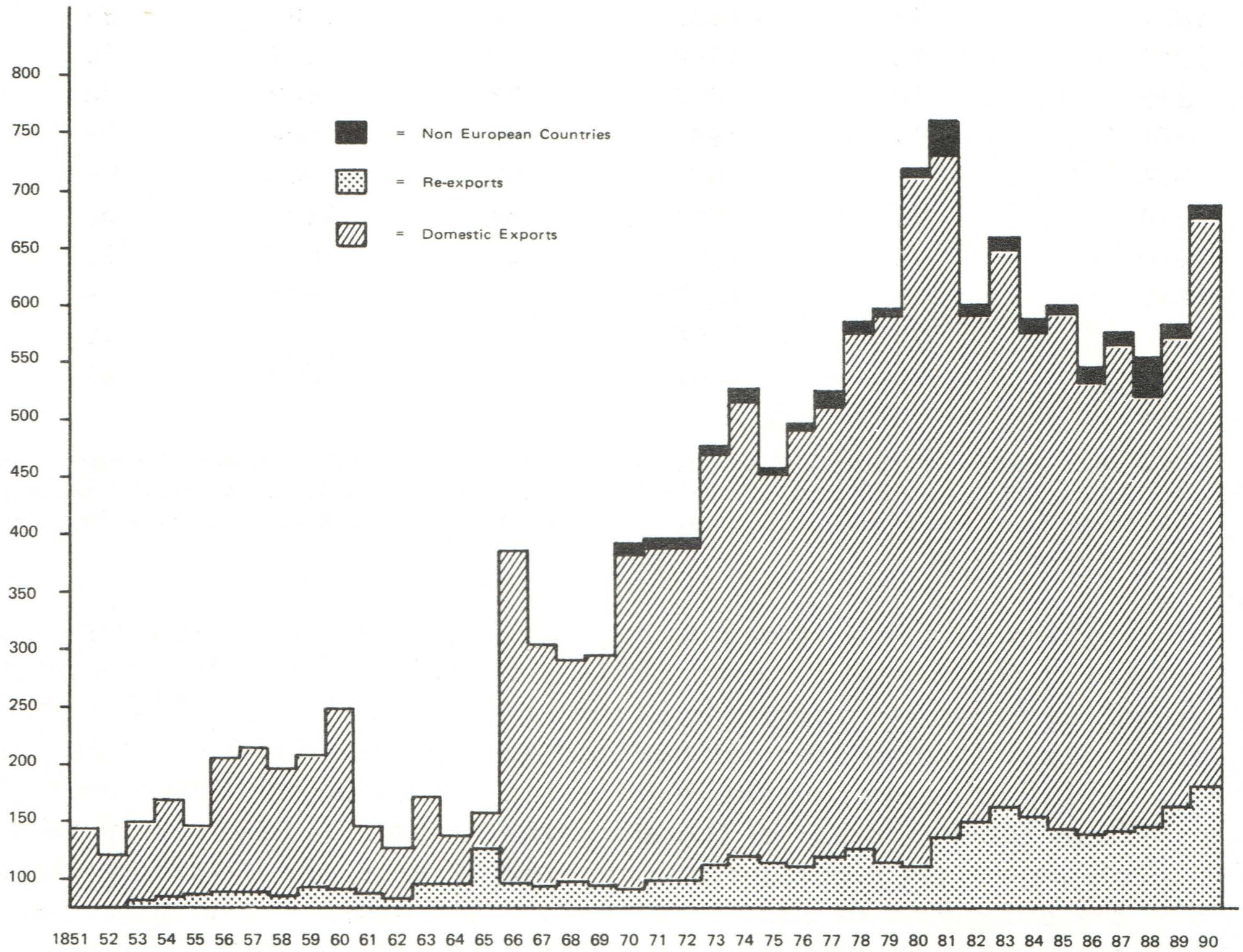


FIGURE II

GRAIN EXPORTS U.S.A. – EUROPE (MILLION BUSHELS)

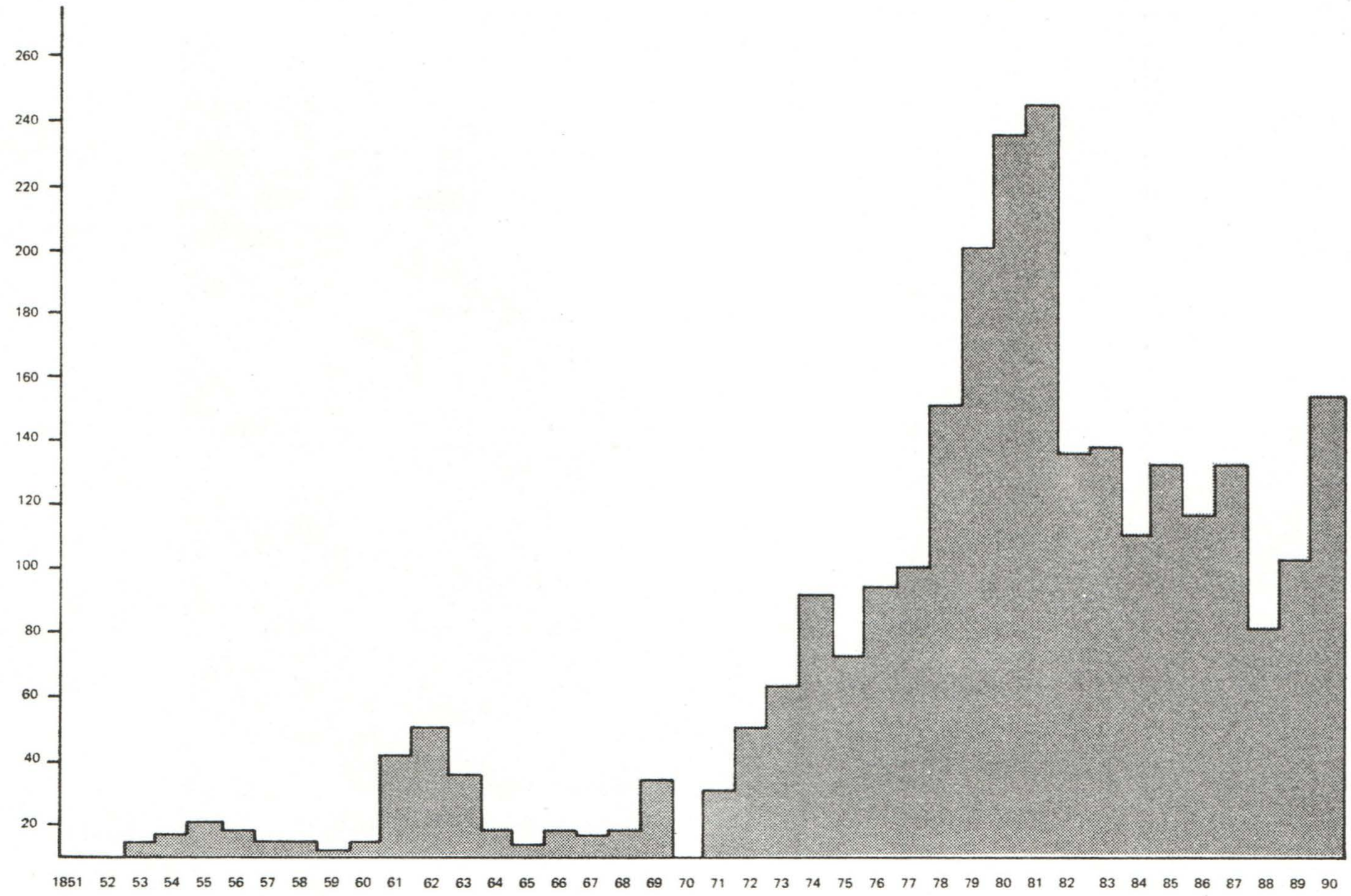


Figure III

EXPORTS OF COTTON: U.S.A. – EUROPE (MILLION lbs.) UNCOMPRESSED

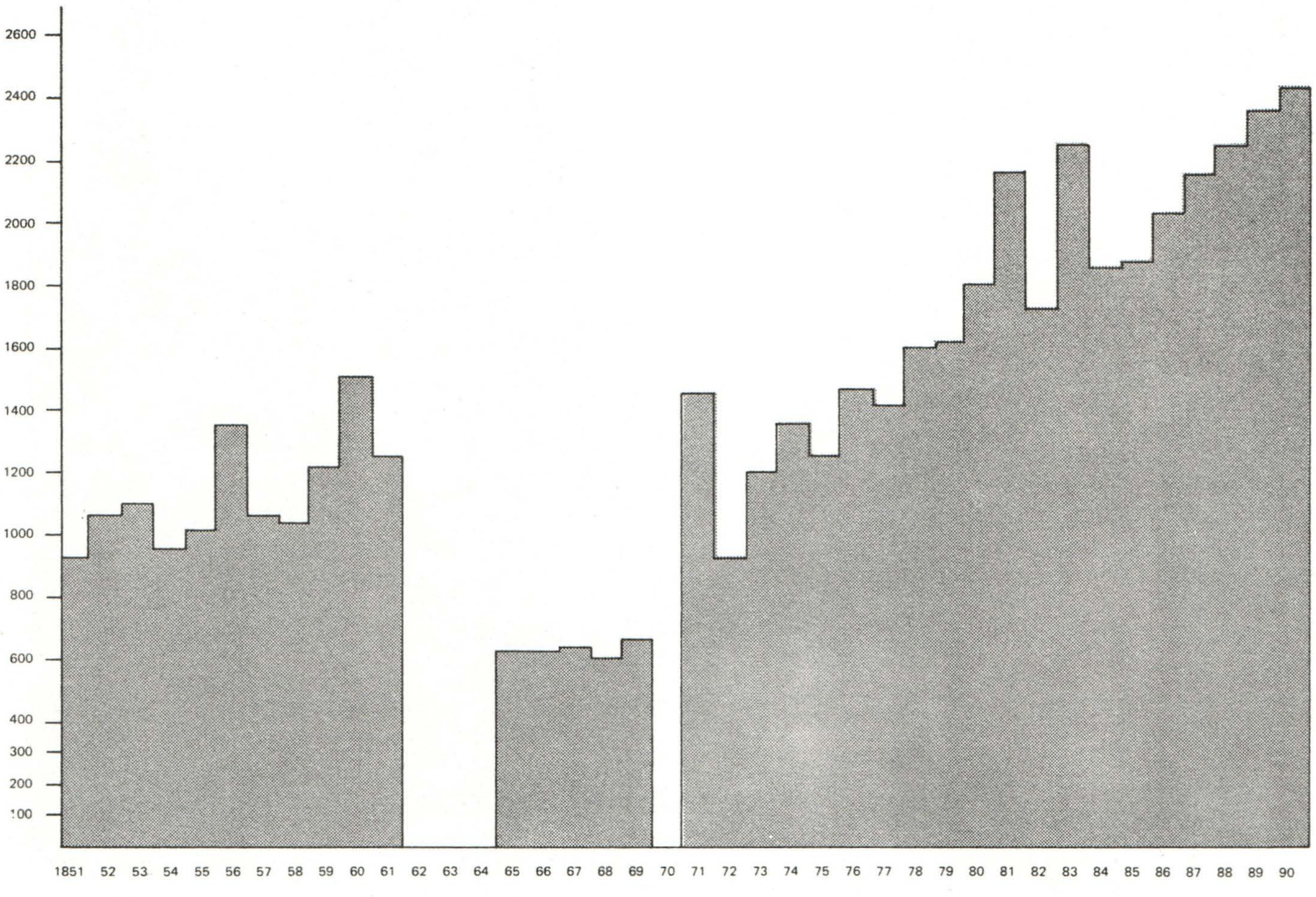


FIGURE IV

PETROLEUM EXPORTS FROM U.S.A. – EUROPE, 1863-1890 (MILLION GALLONS)

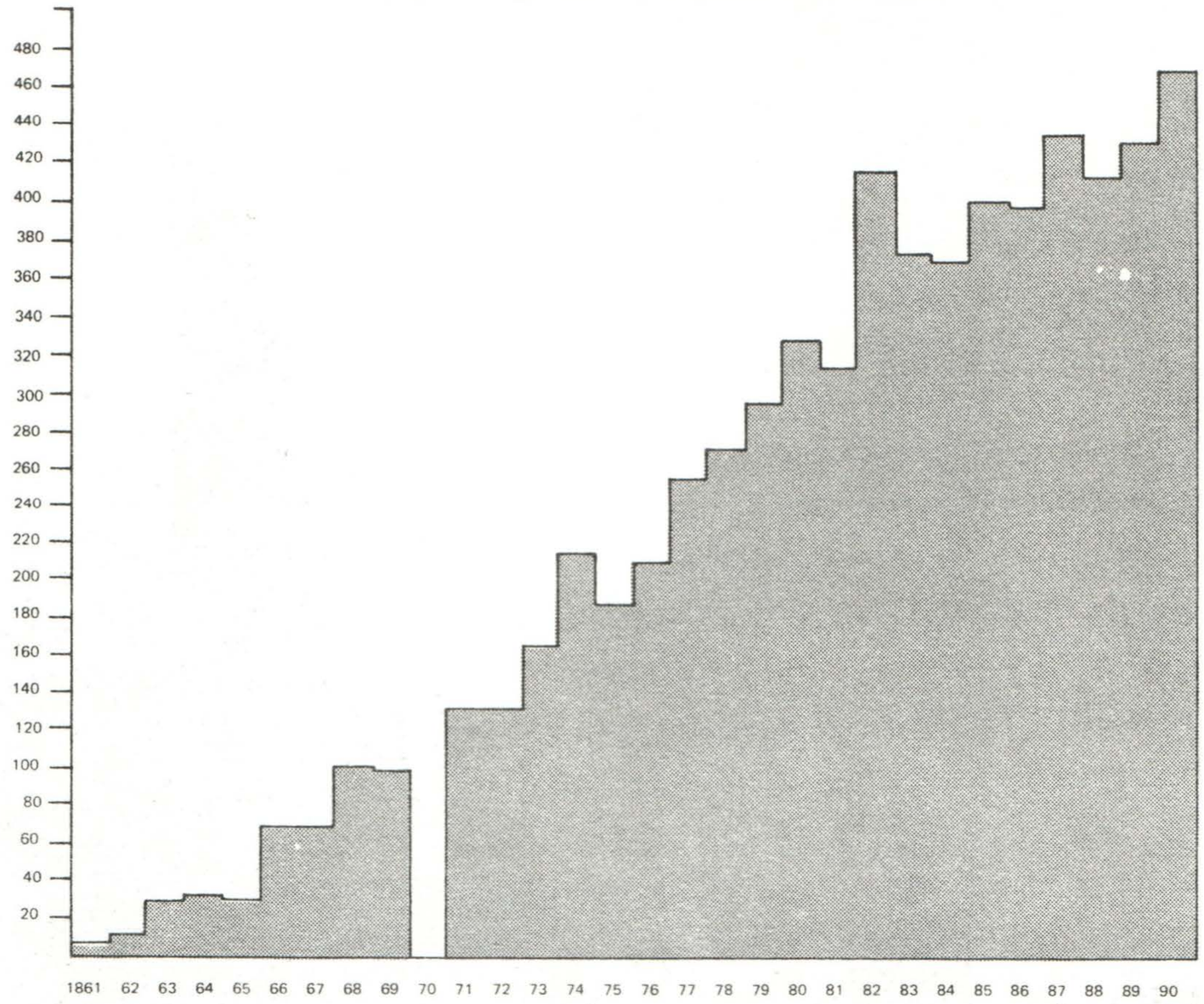
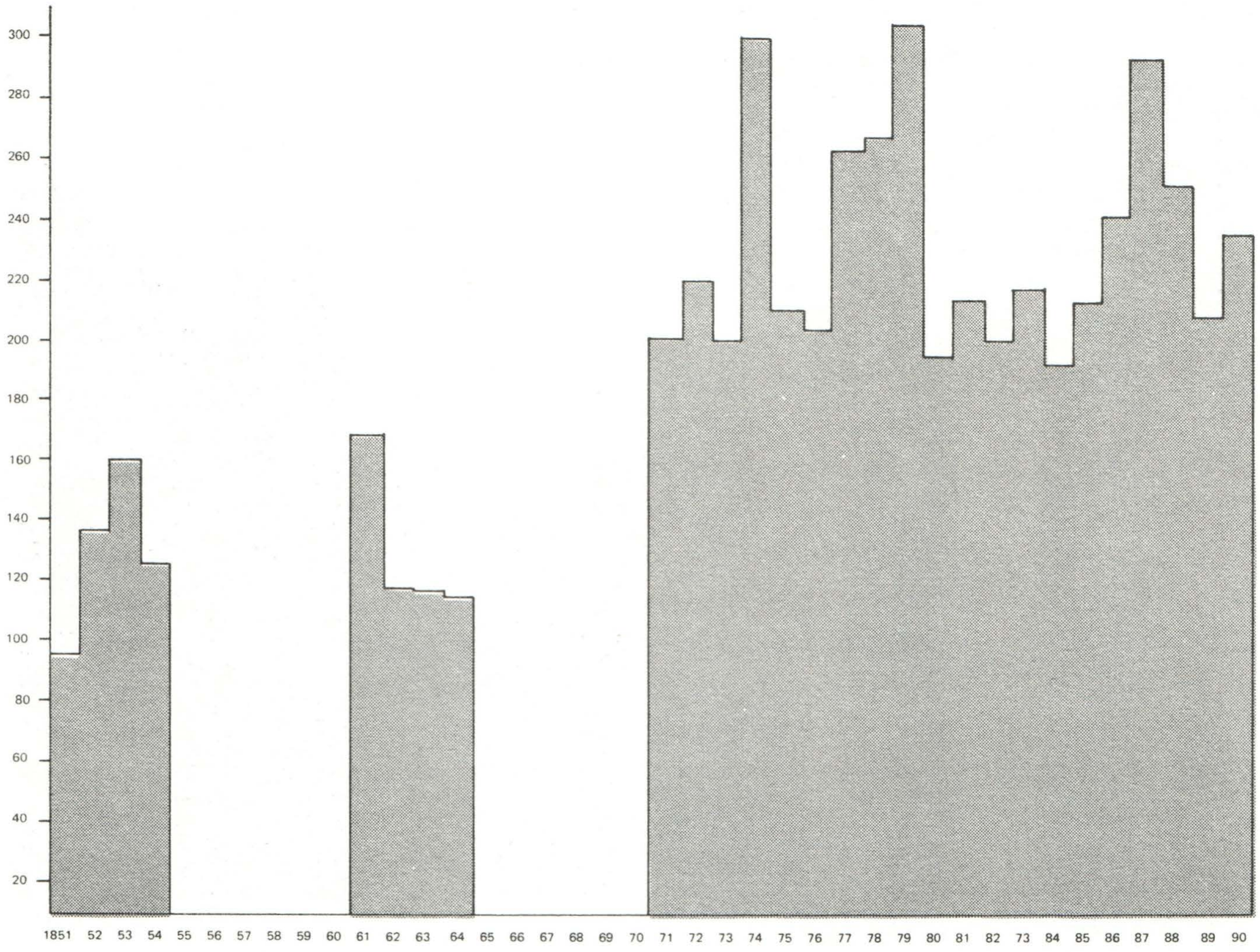


FIGURE V

TOBACCO EXPORTS FROM U.S.A. – EUROPE: VOLUME (THOUSAND HOGSHEADS)



until 1887, then petroleum must have been the main underpinning for the prolonged life of the sailing vessels, tending to increase the general level of freights during the 1870s and providing (together with American timber) the only available freight of significance after the collapse of grain exports in 1882. Cotton, by far the most important American export during the 1850s, suffered drastically as a result of the Civil War and shipments did not rise above the peak levels of the 1860s until 1878. By that time steam was making rapid inroads into the cotton trade and opportunities for the sailing vessel were becoming scarcer. Both naval stores and tobacco exports were higher after 1870; but as will be demonstrated below, these commodities were almost completely monopolized by steamers as early as 1870. Other export staples, wet and dry provisions, tallow and timber, for example, have not been graphed because in the case of the first three their carriage was captured by steam at an early date, and in the case of timber it was not a major commodity in terms of total American trade although from 1882 it was of increasing importance to the aging Canadian wooden sailing fleet.

Within Europe the United Kingdom was traditionally America's leading customer, and indeed her share of the European market for American produce tended to increase, rising from around one third in the 1820s to a peak of about fifty four percent from the second half of the 1860s to the first half of the 1880s. Britain's importance as a customer rested largely upon her position as a consumer of American grain and cotton, but even in these commodities her position tended to decline from 1870 onwards. In naval stores she tended to hold on to her position, but in the petroleum industry, of key importance in both the expansion of American trade and in the prospects for the sailing ship, she was much less prominent. In the grain trade the emergence of a large market in Belgium and France and to a lesser extent Germany, Holland and Portugal created new opportunities and new trade routes for shipping from 1874 onwards (Tables 3 and 4). In cotton, France and Germany and to a fluctuating extent Russia, were becoming increasingly important purchasers from the United States during the 1870s as shown in Tables 5 and 6. In tobacco Germany and France were heavy importers, and in general the trade was well diffused throughout Western Europe as indicated in Tables 7 and 8. Britain was always the leading purchaser of naval stores and Tables 9 and 10 show that much of the remaining demand came from Germany and Holland. It was in the petroleum trade that the market was most diffused, Tables 11 and 12 showing Belgium, France, and Germany as being of equal or even greater importance than Britain.

TABLE 2

UNITED KINGDOM SHARE OF AMERICAN EXPORTS TO EUROPE, 1861-1890

YEAR	GRAIN	PETROLEUM	COTTON	TOBACCO	NAVAL STORES
	%	%	%	%	%
1861	89.7				
1862	77.4				
1863	97.8				
1864	98.4				
1865	97.4				
1866					
1867					
1868					
1869					
1870					
1871	91.5	14.8	76.1	29.9	54.2
1872	89.3	10.8	75.6	20.4	45.2
1873	96.7	13.3	71.6	19.8	48.4
1874	85.4	15.0	66.9	20.9	46.9
1875	89.8	15.9	72.6	25.8	54.8
1876	89.6	15.3	64.7	17.7	52.1
1877	87.1	15.5	71.4	25.7	44.3
1878	82.7	17.0	65.2	23.7	44.3
1879	60.9	14.5	61.1	21.4	40.4
1880	57.5	18.0	67.5	17.4	47.6
1881	55.6	18.5	63.1	20.9	49.3
1882	69.3	19.8	69.1	17.7	42.7
1883	68.7	19.8	61.7	13.2	46.2
1884	65.8	16.1	64.7	21.5	38.2
1885	66.9	19.0	64.6	22.5	50.9
1886	70.5	21.7	60.3	29.6	44.3
1887	60.3	20.4	63.4	25.6	38.7
1888	69.4	21.1	62.7	27.9	40.3
1889	72.0	19.6	62.7	20.3	38.9
1890	66.4	19.2	59.8	34.0	42.8

Source: *Treasury Tables,* p. xi.

TABLE 3

USA GRAIN EXPORTS TO EUROPE (MILLION BUSHELS)

YEAR	Belgium	Denmark	France	Germany	Gibraltar	Italy	Holland	Portugal	Spain	Sweden/ Norway	United Kingdom	TOTAL
1871	.955		.633	.266	.002		.187	.476	.123		28.491	31.133
1872	1.416		1.591	1.500	.020		.416	.443	.010		44.831	50.227
1873	.175		.135	.900		.018	.711	.157	.018		61.164	63.278
1874	4.260		2.676	2.455	.024	.232	3.469	.300	.005		78.212	91.633
1875	2.235	.023	.373	1.513	.002	.032	1.644	1.595	.024	.009	65.464	72.914
1876	2.218	.111	.918	1.722	.289		2.403	2.079	.043	.038	84.806	94.627
1877	2.127	.965	2.991	4.149	.089	.130	.877	1.230	.112	.349	87.681	100.700
1878	5.521	1.908	7.942	2.754	.145	1.458	3.478	2.202	.155	.401	124.412	150.376
1879	13.139	1.211	46.703	5.065	.317	1.036	4.201	4.518	2.207	.241	122.361	200.999
1880	16.928	2.697	52.304	9.159	1.586	5.436	4.262	4.235	3.566	.285	135.845	236.303
1881	18.432	5.323	34.478	14.192	.404	.755	11.520	3.007	.324	1.145	136.484	244.206
1882	16.856	1.016	12.796	4.315	.159	.833	2.217	2.782	.664	.131	94.439	136.208
1883	11.767	1.124	16.714	3.869	.103	.090	3.682	3.933	1.978	.175	95.506	138.941
1884	9.904	2.001	9.972	8.598	.004	.120	2.984	3.566	.170	.047	71.870	109.236
1885	10.674	2.503	12.117	6.843	.001	.520	3.773	3.859	1.716	.402	91.572	132.980
1886	7.064	1.633	10.825	4.922	.340	1.416	2.688	3.568	1.294	.468	81.894	116.102
1887	12.061	1.815	21.505	3.629	.132	2.786	3.639	4.011	2.584	.330	79.650	132.142
1888	7.043	1.187	5.349	1.738		.297	3.129	4.277	1.454	.016	55.592	80.082
1889	5.878	1.867	14.220	4.767		.236	1.525	1.907	.036	.164	73.696	102.396
1890	10.871	5.873	15.250	12.054		.472	3.802	2.832	.385	.249	102.184	183.972

Source: *Treasury Tables,* pp. 283-440

TABLE 4

PERCENT SHARE USA GRAIN EXPORTS

YEAR	Belgium	Denmark	France	Germany	Gibraltar	Italy	Holland	Portugal	Spain	United Kingdom	Norway/ Sweden
1861										89.7	
1862										77.4	
1863										97.8	
1864										98.4	
1865										97.7	
1866										97.4	
1867										98.4	
1868											
1869											
1870											
1871	3.06		2.03	0.85			0.60	1.53	0.40	91.51	
1872	2.82		3.17	2.99	0.04		0.83	0.88	0.02	89.26	
1873	0.28		0.21	1.42		0.20	1.12	0.25	0.03	96.66	
1874	4.65		2.92	2.68	0.02	0.25	3.79	0.32		85.35	
1875	3.07	0.03	0.51	2.08		0.04	2.25	2.19	0.03	89.78	
1876	2.34	0.12	0.97	1.82	0.30		2.54	2.20	0.04	89.62	0.12
1877	2.11	0.96	2.97	4.12	0.08	0.13	0.87	1.22	0.11	87.07	0.35
1878	3.67	1.27	5.28	1.83	0.10	0.97	2.31	1.46	0.10	82.73	0.27
1879	6.54	0.60	23.24	2.56	0.16	0.52	2.10	2.25	1.10	60.88	0.12
1880	7.16	1.14	22.13	3.88	0.47	1.62	1.27	1.26	1.51	57.49	0.12
1881	7.55	2.18	14.12	5.81	0.17	0.31	4.61	1.23	0.14	55.89	0.47
1882	12.38	0.75	9.39	3.17	0.12	0.61	1.63	2.04	0.49	69.33	0.10
1883	8.47	0.81	12.03	2.78	0.07	0.06	2.78	2.83	1.42	68.74	0.13
1884	9.07	1.83	9.13	7.87		0.11	2.73	3.26	0.16	65.79	0.04
1885	8.03	1.88	9.11	5.13		0.39	2.84	2.90	0.54	66.86	0.30
1886	6.08	1.41	9.32	4.24	0.29	1.22	2.32	3.07	1.11	70.54	0.40
1887	9.13	1.37	16.05	2.75	0.09	2.11	2.75	3.04	1.96	60.28	0.25
1888	8.79	1.82	6.68	2.17		0.37	3.91	5.29	1.82	69.42	0.01
1889	5.74	1.82	13.88	4.66		0.23	1.49	1.86	0.04	71.97	0.16
1890	7.06	3.81	9.90	7.83		0.31	2.47	1.84	0.25	66.37	0.16

Source: *Treasury Tables,* pp. 283-460

TABLE 5

USA COTTON EXPORTS TO EUROPE (MILLION POUNDS)

Year	Austria	Belgium	Denmark	France	Germany	Italy	Holland	Portugal	European Russia	Spain	Norway/ Sweden	United Kingdom	Total
1871	2.164	17.933		59.611	103.986	21.457	55.702	.168	31.135	47.156	6.887	1101.422	1447.621
1872		10.098		88.187	42.516	5.922	22.785		24.684	32.571		703.915	930.678
1873	1.378	12.146		113.370	95.342	15.284	19.086		49.573	27.722	5.458	857.650	1197.009
1874		8.553		177.365	114.613	12.298	19.004		54.091	53.359	9.020	903.572	1351.875
1875		3.114		155.140	75.285	9.042	4.070	.005	65.708	29.813	1.432	911.941	1255.550
1876		15.538		203.976	108.546	23.379	34.276	.734	80.897	47.561	7.497	957.330	1479.734
1877		2.299		219.089	77.605	11.548	26.856	.612	25.109	46.031	6.601	1020.365	1429.514
1878	1.818	14.192		236.031	121.649	18.111	27.954	.239	85.429	40.685	10.044	1039.948	1596.100
1879	1.267	9.564		196.987	137.484	23.809	25.867	.836	153.324	70.607	6.028	983.775	1609.548
1880	.849	8.948		179.846	153.990	29.563	32.663		102.250	66.936	10.310	1216.627	1801.982
1881	2.109	9.159		276.927	233.096	37.572	33.751	.678	133.857	63.870	8.155	1364.836	2164.010
1882	.095	2.366	2.589	166.771	162.481	22.037	16.910	.052	92.116	57.632	5.762	1180.897	1709.709
1883	2.338	21.028	2.755	214.414	269.291	40.303	28.805	.046	173.677	98.469	10.956	1188.205	2250.287
1884	.881	15.432	1.161	228.685	181.528	25.862	26.957	.147	96.819	67.964	4.299	1192.127	1841.862
1885	1.949	42.832	2.056	180.731	234.487	39.521	18.965		67.565	67.660	6.773	1209.917	1872.456
1886	2.626	62.535	.687	200.821	284.718	55.237	15.836		92.462	84.207	7.192	1222.241	2028.562
1887		55.144	5.079	233.045	280.832	36.611	21.867	.683	75.633	69.249	5.181	1356.757	2140.071
1888		65.395	4.356	196.098	280.311	55.188	13.862	2.424	108.499	84.666	4.655	1419.263	2234.717
1889	2.804	73.904	4.044	200.098	330.778	65.534	22.177	4.826	72.018	90.767	4.358	1470.400	2346.534
1890	.150	46.794	1.978	242.379	418.820	64.875	8.719	2.235	96.581	87.670	5.562	1452.396	2428.158

Source: *Treasury Tables,* pp. 283-460

TABLE 6

PERCENT SHARE USA COTTON EXPORTS

Year	Austria	Belgium	France	Germany	Italy	Holland	Portugal	Russia	Spain	Sweden/ Norway	United Kingdom
1871	0.15	1.24	4.12	7.18	1.48	3.84	0.01	2.15	3.26	0.48	76.08
1872		1.10	9.47	4.57	0.64	2.45		2.65	3.50		75.63
1873	0.12	1.01	9.47	7.97	1.28	1.59		4.14	2.32	0.46	71.64
1874		0.63	13.12	8.48	0.91	1.41		4.00	3.95	0.67	66.85
1875		0.25	12.36	6.00	0.72	0.32		5.23	2.37	0.07	72.63
1876		1.05	13.78	7.34	1.58	2.31		5.47	3.21	0.51	64.70
1877		0.16	15.33	5.43	0.80	1.89		1.77	3.22	0.46	71.37
1878	0.11	0.89	14.79	7.62	1.13	1.75	0.01	5.34	2.55	0.63	65.15
1879	0.08	0.59	12.24	8.54	1.48	1.61	0.05	9.52	4.39	0.37	61.12
1880	0.05	0.50	9.98	8.55	1.64	1.81		5.67	3.68	0.57	67.52
1881	0.97	4.23	12.80	10.77	1.74	1.56	0.03	6.18	2.95	0.38	63.07
1882		0.14	9.75	9.50	1.29	0.99		5.39	3.37	0.34	69.07
1883	0.10	0.93	9.53	11.97	1.79	1.28		7.72	4.38	0.49	61.69
1884		0.84	12.42	9.86	1.41	1.46		5.26	3.69	0.23	64.72
1885	0.10	2.29	9.65	12.52	2.11	1.01		3.60	3.61	0.36	64.62
1886	0.13	3.08	9.90	14.04	2.72	0.78		4.55	3.68	0.35	60.25
1887		2.58	10.89	13.12	1.71	1.02		3.35	3.23	0.24	63.42
1888		2.93	8.78	12.54	2.47	0.62	0.10	4.86	3.79	0.21	63.51
1889	0.12	3.15	8.53	14.10	2.79	0.95	0.21	3.10	3.87	0.19	62.66
1890		1.93	9.98	17.25	2.67	0.36	0.09	3.98	3.61	0.23	59.81

Source: *Treasury Tables*, pp. 283-460

TABLE 7

USA TOBACCO EXPORTS TO EUROPE (THOUSAND HOGSHEADS)

Year	Austria	Belgium	Denmark	France	Germany	Gibraltar	Italy	Holland	Portugal	European Russia	Spain	Norway/ Sweden	United Kingdom	Total
1871	2.313	6.815		15.230	61.241	8.668	12.194	21.995	1.969		10.851		60.270	201.546
1872	5.256	7.526		38.107	71.074	2.259	21.987	19.165	3.204		8.878		45.052	220.508
1873	4.375	4.951		24.649	66.692	4.135	18.245	17.968	4.431		15.494	.012	39.797	200.749
1874	5.478	11.864	.057	35.211	100.371	9.457	36.522	19.220	5.148	.028	13.867	.017	62.855	300.095
1875	5.984	4.312		21.215	56.334	3.612	32.420	16.893	1.263		13.738		54.261	210.032
1876	3.764	11.632		28.651	59.209	4.557	22.070	15.347	1.555		21.325	.014	36.299	204.423
1877	3.516	10.460		28.488	76.340	2.851	33.824	23.379	1.563		15.286		67.723	263.430
1878	1.970	15.499	.900	30.389	76.105	3.885	25.665	24.525	.788		24.483	.021	63.417	267.647
1879	2.086	15.698		44.785	112.099	2.442	26.968	22.517	.495		11.491	.006	65.010	303.597
1880	.689	17.584	.002	26.922	59.496	3.003	23.047	18.594	.555		11.535		33.996	195.423
1881	.414	10.341	.034	37.039	48.612	4.675	35.007	15.579	.722		16.593	.011	44.595	213.622
1882	.240	8.870	.150	31.737	52.872	2.179	29.559	14.260	.811		23.991	.102	35.342	200.113
1883		21.419	.711	37.966	41.810	1.113	39.944	17.936	1.398		27.254	.005	28.825	218.381
1884	.152	3.728	.514	32.436	61.315	1.352	12.956	16.309	1.950	.003	20.568	.003	41.368	192.654
1885	1.554	9.973	.446	30.032	48.856	1.710	28.478	17.920	.631		26.060	.023	47.958	213.641
1886		12.033	.574	29.724	72.241	1.914	35.362	21.776	1.090		24.267	.523	71.366	241.146
1887		16.015	.861	31.140	76.667	2.819	32.294	23.166	.498		30.115	.398	73.480	287.453
1888	.156	12.324	1.326	23.833	55.439	2.388	38.740	21.753	.213		24.315	.332	70.103	250.922
1889		14.788	.795	23.715	49.958	2.423	31.111	19.871	.439		22.748	.615	42.420	208.883
1890		17.695	.658	22.805	57.334	1.824	21.855	18.612	1.054		14.425	.761	80.419	236.681

Source: *Treasury Tables,* pp. 283-460

TABLE 8

PERCENT SHARE USA TOBACCO EXPORTS

Year	Austria	Belgium	Denmark	France	Germany	Gibraltar	Italy	Holland	Portugal	Spain	Norway/ Sweden	United Kingdom
1871	1.14	3.38		7.56	30.39	4.13	6.05	10.91	0.98	5.39		29.90
1872	2.38	1.60		17.26	32.23	1.02	5.53	8.69	1.45	4.03		20.43
1873	2.17	2.47		12.28	33.29	2.06	9.09	8.95	2.21	7.72		19.82
1874	1.83	3.93		11.73	33.45	3.15	12.17	6.40	1.72	4.62		20.95
1875	2.85	2.05		10.10	26.84	1.72	15.35	8.04	0.60	6.54		25.83
1876	1.84	5.69		14.02	28.96	2.23	10.80	7.51	0.76	10.43		17.76
1877	1.33	3.97		10.81	28.98	1.08	12.84	8.87	0.59	5.80		25.71
1878	0.74	5.79	0.03	11.35	28.43	1.45	9.59	9.16	0.21	9.15		23.69
1879	0.69	5.17		14.75	36.92	0.80	8.88	7.42	0.14	3.78		21.41
1880	0.35	8.90		13.78	30.44	1.54	11.79	9.51	0.28	5.90		17.40
1881	0.19	4.84	0.02	17.33	22.76	2.19	16.39	7.29	0.33	7.77		20.88
1882	0.12	4.21	0.07	15.86	26.42	1.09	14.77	7.13	0.40	11.48	0.05	17.66
1883		9.81	0.32	17.38	19.14	0.51	18.29	8.21	0.64	12.48		13.20
1884	0.07	1.94	0.27	16.84	31.83	0.70	6.73	8.47	1.01	10.68		21.47
1885	0.73	4.67	0.21	14.06	22.87	0.80	13.33	8.39	0.30	12.20	0.01	22.45
1886		4.99	0.24	12.33	29.96	0.79	14.66	9.03	0.45	10.06	0.21	29.59
1887		5.57	0.30	10.83	26.67	0.98	11.23	8.06	0.17	10.48	0.14	25.56
1888	0.06	4.91	0.53	9.50	22.09	0.95	15.44	8.67	0.08	9.69	0.15	27.94
1889		7.08	0.38	11.35	23.92	1.16	14.89	9.51	0.21	10.89	0.29	20.31
1890		7.48	0.28	9.64	24.22	0.77	9.23	7.86	0.44	6.09	0.32	33.98

Source: *Treasury Tables,* pp. 283-460

TABLE 9

USA NAVAL STORES EXPORTS TO EUROPE (BARRELS)

Year	Austria	Belgium	Denmark	France	Germany	Gibraltar	Italy	Holland	Portugal	European Russia	Spain	Norway/ Sweden	European Turkey	United Kingdom	Total
1871	26518	9267		3020	92135	1150	2035	44147	2801	22329	9141	1103	2139	254953	470738
1872	27692	22402	1199	6382	186376	11254	11222	36708	3184	16344	8038	290	855	320991	710612
1873	25449	32887	601	3242	218525	803	15124	60840	5220	30620	11257	1077	1511	782021	789177
1874	19630	51261	3898	3886	230477	3277	14785	81792	5824	43957	3798	1560	3685	413374	881204
1875	36810	33734	5779	6932	210069	420	17828	100591	8891	32765	10789	479	2246	401747	869080
1876	25975	27266	5730	10376	129629	400	17616	90138	5670	31915	10880	2213		434578	792386
1877	39625	31941	6300	21613	173289	65	16854	86425	5314	7145	15677	4707		444363	853318
1878	53133	39188	7477	23788	225261	4767	22364	92190	5307	45683	11467	4203		425785	960813
1879	50834	76432	17477	29889	213299	3510	18045	110194	7676	90606	7148	5773		427425	1058308
1880	45672	45036	750	18223	197795	1666	17404	115016	7536	50923	3847	3042		458691	963860
1881	52764	53431	2557	31182	165326	119	26487	67146	9635	53065	11980	407	594	462162	936955
1882	65846	50138	2642	18767	255627		22271	104013	5022	73127	13294	80		455014	1065841
1883	59802	69386	1031	33015	253127	12204	19565	119119	13708	84266	12420	1015		573685	1242373
1884	57087	71419	4540	40280	369048	5191	56269	160720	11522	104336	27861	944		561596	1471013
1885	49776	51906		4567	241997	110	20699	123012	8161	61299	12635	3033		599237	1178432
1886	47213	43344		15679	219743		33889	91526	10943	76124	17856	1700		443071	1001088
1887	47283	59099	256	13281	313996		38844	137453	20484	121174	6977	1538		479179	1239564
1888	64193	53795	6037	6713	294689	16	55973	172593	9500	140391	11075	650		552975	1372586
1889	55321	56776	1115	8167	339778		48426	121420	6794	132523	10273	100		497197	1277890
1890	57359	52245		2375	311443		70237	160155	5462	134628	17892	1600		609754	1423185

Source: *Treasury Tables,* pp. 283-460

TABLE 10

PERCENT SHARE USA NAVAL STORES EXPORTS

Year	Austria	Belgium	Denmark	France	Germany	Gibraltar	Italy	Holland	Portugal	Russia	Spain	Norway	Turkey	United Kingdom
1871	5.63	1.97		0.64	19.57	0.24	0.43	9.38	0.60	4.74	1.94	0.23	0.45	54.16
1872	3.90	3.15	0.17	0.90	26.23	0.16	1.58	5.17	0.45	2.30	1.13	0.04	0.12	45.17
1873	3.22	4.17	0.08	0.41	27.69	0.10	1.92	7.71	0.66	3.88	1.43	0.14	0.19	48.41
1874	2.23	5.82	0.44	0.44	26.15	0.37	1.69	9.28	0.66	4.99	0.43	0.18	0.42	46.91
1875	4.24	3.88	0.66	0.80	24.17	0.05	2.05	11.57	1.02	3.77	1.24	0.06	0.26	46.23
1876	3.28	3.44	0.72	1.31	16.36		2.22	11.38	0.72	4.03	1.37	0.28		54.84
1877	4.64	3.74	0.74	2.54	20.31		1.98	10.13	0.62	0.84	1.84	0.55		52.07
1878	5.53	4.08	0.78	2.48	23.44	0.50	2.35	9.59	0.55	4.75	1.19	0.44		44.31
1879	4.80	7.22	1.65	2.82	20.15	0.33	1.71	10.41	0.73	8.56	0.68	0.55		40.39
1880	4.74	4.67	0.07	1.89	20.52	0.17	1.81	11.93	0.78	5.28	0.40	0.32		47.59
1881	5.63	5.70	0.27	3.33	17.65	0.01	2.75	7.17	1.03	5.66	1.28	0.04	0.06	49.33
1882	6.18	4.70	0.25	1.76	23.98		2.09	9.76	0.47	6.86	1.25			42.69
1883	4.81	5.58	0.08	2.66	20.37	0.98	1.57	9.59	1.10	6.78	1.00	0.08		46.18
1884	3.88	4.86	0.31	2.74	25.09	0.35	3.83	10.93	0.78	7.11	1.89	0.06		38.18
1885	4.22	4.40		0.39	16.46	0.01	1.76	10.44	0.69	5.20	1.07	0.43		50.85
1886	4.72	4.33		1.57	21.95		3.39	9.14	1.09	7.61	1.78	0.17		44.26
1887	3.81	4.77	0.02	1.07	25.53		3.13	11.09	1.65	9.78	0.56	0.12		38.66
1888	4.68	3.92	0.44	0.49	21.47		4.08	12.57	0.69	10.23	1.10	0.05		40.29
1889	4.33	4.44	0.09	0.64	26.59		3.79	9.50	0.53	10.37	0.80	0.01		38.91
1890	4.03	3.67		0.17	21.88		4.94	11.25	0.38	9.46	1.26	0.11		42.84

Source: *Treasury Tables,* pp. 283-460

TABLE 11

USA PETROLEUM EXPORTS TO EUROPE (MILLION GALLONS)

Year	Austria	Belgium	France	Germany	Gibraltar	Greece	Italy	Holland	Portugal	European Russia	Spain	Sweden/ Norway	Turkey	United Kingdom	Total
1871	3.4	20.3	7.0	36.1	9.9	0.1	7.0	8.0	1.1	7.6	5.4	1.2	4.0	19.1	130.2
1872	2.7	19.2	13.4	37.5	8.9	0.2	6.1	10.4	1.2	5.4	5.4	2.4	3.2	14.1	130.1
1873	2.5	24.2	15.4	55.5	7.5	0.1	6.1	9.9	1.2	8.0	6.5	3.0	1.6	21.7	163.2
1874	3.8	35.6	18.0	75.1	7.6	0.1	9.2	14.0	1.3	7.3	5.7	2.1	3.4	32.2	215.4
1875	3.7	30.4	16.0	65.6	4.0	0.1	8.5	10.2	1.0	4.0	6.1	3.5	1.5	29.2	183.8
1876	5.4	34.6	21.6	70.5	3.9	0.8	10.9	12.4	1.0	6.3	7.3	2.9	1.2	32.2	211.0
1877	8.7	32.7	25.5	91.1	8.4	0.8	11.4	9.0	1.7	4.8	13.3	7.7	1.3	39.6	256.0
1878	9.1	40.7	24.8	90.2	8.5	0.2	16.0	15.6	1.8	2.0	9.3	5.0	2.3	46.3	271.8
1879	12.6	43.0	25.3	107.7	2.3	2.2	16.6	18.1	2.3	3.1	7.9	7.1	5.2	42.9	296.3
1880	16.5	38.6	28.6	117.3	3.4	0.8	17.0	22.9	2.2	1.7	10.0	5.5	3.1	58.8	326.4
1881	15.2	34.2	32.2	96.4	8.5	1.1	12.7	19.7	2.7	1.4	14.6	11.2	5.0	57.9	312.8
1882	24.2	49.0	36.0	130.3	6.3	3.1	25.0	22.3	3.0	2.9	12.0	10.7	8.3	82.4	415.5
1883	17.5	45.7	43.2	125.1	2.4	0.9	14.4	24.6	2.5	1.3	12.4	7.0	2.7	74.1	373.8
1884	23.2	44.7	47.5	114.4	5.1	2.0	20.2	25.0	2.7	0.5	13.1	7.0	3.9	59.2	368.5
1885	23.5	50.8	46.7	107.0	2.9	2.2	27.4	26.6	3.4	0.3	18.8	9.0	4.1	75.9	398.6
1886	16.0	49.6	50.9	106.5	2.1	1.4	16.2	39.2	2.6	0.3	13.8	9.0	2.2	85.8	395.6
1887	6.8	46.3	60.7	124.0	0.9	1.8	29.0	45.5	3.2	—	14.9	9.4	3.2	88.6	434.3
1888	1.6	47.9	60.0	120.9	1.7	2.0	19.2	35.0	3.8	0.1	24.7	7.9	2.1	87.5	414.4
1889	4.6	40.7	63.3	148.1	3.0	1.8	19.0	43.0	4.2	0.1	6.5	11.1	0.2	84.3	429.9
1890	3.3	43.7	78.3	147.1	0.8	1.8	20.4	49.3	4.3	0.2	14.1	12.5	—	89.0	464.8

Source: *Treasury Tables,* pp. 283-460

TABLE 12

PERCENT SHARE USA PETROLEUM EXPORTS

Year	Austria	Belgium	France	Germany	Gibraltar	Greece	Italy	Holland	Portugal	European Russia	Spain	Sweden/ Norway	Turkey	United Kingdom
1871	2.61	15.59	5.38	27.73	7.60	0.08	5.38	6.14	0.84	5.84	4.15	0.92	3.07	14.67
1872	2.08	14.76	10.30	28.82	8.84	0.15	4.69	7.99	0.92	4.15	1.15	1.84	2.46	10.84
1873	1.53	14.83	9.44	34.00	4.60	0.06	3.74	6.07	0.73	4.90	3.98	1.84	0.98	13.30
1874	1.76	16.53	8.36	34.87	3.53	0.05	4.27	6.50	0.60	2.65	0.97	0.98	1.58	14.95
1875	2.03	16.54	8.70	35.69	2.18	0.05	4.62	5.55	0.54	2.18	3.32	1.90	0.82	15.89
1876	2.56	16.40	10.23	33.41	1.85	5.16	5.16	5.88	0.48	2.99	3.46	1.37	0.57	15.26
1877	3.40	12.77	9.96	35.59	3.28	0.31	4.45	3.51	0.66	1.88	5.19	3.01	0.51	15.47
1878	3.35	14.97	9.12	33.19	3.12	0.07	5.89	5.74	0.66	0.74	3.42	1.84	0.85	17.03
1879	4.25	14.51	8.54	36.35	0.78	0.74	5.60	6.11	0.78	1.05	2.67	2.40	1.75	14.48
1880	5.06	11.82	8.76	35.94	1.04	0.24	5.21	7.02	0.67	0.52	3.06	1.69	0.95	18.01
1881	4.86	10.93	10.29	30.82	2.72	0.35	4.06	6.30	0.86	0.45	4.68	3.58	1.60	18.51
1882	5.82	11.80	8.66	31.36	1.52	0.75	6.01	5.37	0.72	0.70	2.89	2.58	2.00	19.83
1883	4.68	12.22	11.56	33.47	0.64	0.24	3.85	6.58	0.67	0.35	3.32	1.87	0.72	19.82
1884	6.30	12.13	12.89	31.04	1.38	0.54	5.48	6.78	0.73	0.14	3.55	1.90	1.06	16.06
1885	5.90	12.74	11.72	26.84	0.73	0.55	6.87	6.73	0.85	0.08	4.72	2.26	1.03	19.04
1886	4.04	12.54	12.87	26.92	0.53	0.35	4.10	9.90	0.66	0.08	3.49	2.28	0.56	21.69
1887	1.57	10.56	13.98	28.55	0.20	0.41	6.68	10.48	0.74	—	3.43	2.16	0.74	20.40
1888	0.39	11.56	14.48	29.17	0.41	0.48	4.63	8.45	0.92	0.02	5.96	1.91	0.51	21.11
1889	1.07	9.47	14.72	34.45	0.70	0.42	4.42	10.00	0.98	0.02	1.51	2.58	0.05	19.61
1890	0.71	9.40	16.85	31.65	0.17	0.39	4.39	10.61	0.93	0.04	3.03	2.69	—	19.15

Source: *Treasury Tables,* pp. 283-460

We may summarize the course of European markets during the era as follows. Total volume expanded more or less continually except during the American Civil War and during short term fluctuations and depressions. The trade was dominated by England and much of the rest of American exports were directed to North West Europe — the old English 'home trade' limits of Brest to the Elbe. Thus most of the opportunities for shipping lay in the routes to North West Europe. This region was the most highly industrialized in the world, the leader in developing steam shipping fleets and in placing those fleets on its own trade routes. From the outset, therefore, Canadian wooden ship owners had to place their vessels in the routes most directly and speedily affected by the competition of steam. To what extent did they do this? How successful were they and to what extent did the voyage pattern of Canadian vessels in the American trade match the general pattern of American exports to Europe?

No statistics exist which would allow us to measure the involvement of Canadian shipping in the trade of the United States since the contemporary statistics merely distinguish between American and Foreign shipping. The research of Alexander, Sager and Fischer into the crew lists of Canadian vessels will soon throw much more light upon the subject, but for the purpose of this paper it has been possible to identify the minimum number and tonnage of Canadian vessels in the deep sea trade of the United States in 1883. By deep sea is meant all voyages except those to British North America, the Caribbean and to some extent the East Coast of South America. One contemporary shipping journal, the *New York Maritime Register,* identified vessels homeward bound to American ports by the national flag, or in the case of Canadian vessels the actual port of registry. The same data was provided for vessels advertised as clearing from New York. From this data a card index was constructed for each Canadian vessel listed, and the results were tabulated. Since we have no means of knowing whether the journal identified every Canadian vessel in American trade we cannot say that the totals are accurate. However we do know that they represent the minimum Canadian involvement in that year. One should note that by 1883 the sailing ship was rapidly being excluded from most of the American-European trades and that the Canadian fleet was already in decline. Hence Canadian participation in the American trade was probably higher in the preceeding years, especially in the boom of the early 1870s.

Table 13 indicates the fleet size and share of each Canadian port in the homeward deep sea trades of the United States in 1883. As one might expect the ports of Saint John, Yarmouth and Windsor predominated, although the intensity of dependence upon the American trade (the total number of voyages undertaken by vessels from the same port) varied

TABLE 13

CANADIAN SHIPS BOUND TO THE USA BY PORT OF REGISTRY

PORT	NO. VESSELS	REG. TONNAGE	VOYAGES	TONNAGE	MEAN
Annapolis	16	13444	30	24787	840.25
Amherst	1	1099	2	2198	1099.00
Chatham	12	8197	15	11293	883.08
Canning, N.S.	1	1249	4	4996	1249.00
Digby	9	6475	11	7655	719.44
Dorchester, N.B.	18	17729	39	43777	957.17
Gaspe	1	148	1	148	148.00
Guysboro	1	145	1	145	145.00
Halifax	37	27321	65	52503	738.40
Lunenburg	1	287	1	287	287.00
Maitland	25	21522	39	35659	860.88
Moncton	1	1032	2	2064	1032.00
Miramichi	1	693	1	693	693.00
Montreal	2	2210	2	2210	1105.00
Parrsboro	10	8625	24	26346	862.50
Pictou	19	13339	24	18464	702.05
Prince Edward Island	29	14708	35	17766	507.17
Quebec	16	16385	21	20986	1024.86
Richibucto	3	2343	5	3943	781.00
Rockland, N.B.	1	599	1	599	599.00
St. Andrews	7	7086	8	7086	1012.29
St. John, N.B.	142	133199	213	190152	938.02
St. John's, Nfld.	10	2006	12	2447	200.60
Sackville, N.B.	1	393	2	786	393.00
Weymouth, N.S.	3	2699	5	4153	899.67
Windsor, N.S.	78	80013	170	171002	1025.81
Yarmouth, N.S.	106	107321	193	201724	1012.46
Shelburne	4	2872	6	5200	718.00
TOTAL	554	493139	932	859069	765.48

NUMBER OF TRIPS TO U.S.A. PER VESSEL

1 voyage	317	
2 voyages	136	
3 voyages	84	
4 voyages	16	(all transatlantic)

NOTE: 'Number of vessels' is the number of individual vessels voyaging to America; 'voyages' is the number of voyages made by vessels registered in each port. Source: *New York Maritime Register,* 1883, "Vessels in the Port of New York and Vicinity" and "Vessels Homeward Bound for the Port of New York". Hereafter cited as *Maritime Register.*

considerably, implying that some ports and perhaps owners were more heavily engaged in and dependent upon the United States than others. In general the table would seem to indicate that a majority of vessels (those making only one voyage to the U.S.A.) were only partially dependent upon America, combining it with voyages in the Canadian or South American trade. However, 236 vessels made between two and four passages to the United States and these must have been more or less wholly employed in the carrying trade of America.

A total of at least 554 Canadian vessels with a registered tonnage of 492,994 tons participated in the homeward deep sea trade of America in 1883. In that year the total tonnage registered in all Canadian ports, including the tonnage engaged in coasting, fishing and short voyages, amounted to only 1,276,000 tons. Thus in that year thirty nine percent of the entire Canadian marine was to some extent involved in the American carrying trade. As yet it is impossible to quantify Canadian involvement in the short trades between Canada and the United States/West Indies. However Tables 14 to 16 show the voyages of Canadian vessels clearing to all destinations from the port of New York in 1883. The heavy concentration upon North Western Europe is apparent. Table 15 indicates that the larger vessels tended to be either in the North European or the Pacific trades. The routes to South America or the Mediterranean apparently preferred small vessels, and from internal evidence it is apparent that most of the 'Unknown' brigs and schooners cleared for British North America. In general these tables strongly demonstrate the vital importance of the United States for the Canadian shipping industry in the second half of the nineteenth century. By 1883 the Canadian shipping industry had captured a very substantial proportion of the cargoes available for wooden sailing vessels. In that year, 1560 foreign sailing vessels cleared from New York.[5] The Canadian share amounted to almost twenty percent.

To what extent did the employment of Canadian shipping reflect the general patterns of American trade? Table 17 is an analysis of the ports of departure for all Canadian vessels clearing from deep sea foreign ports for the United States in 1883. The most significant feature is obviously the overwhelming importance of the United Kingdom and the continental ports 'Brest to Elbe', reflecting the importance of that area for American exports which was noted earlier. If anything, Canadian shipping may have been over represented in the North West European trades and under represented in those to Iberia, the Mediterranean and the Baltic. This is interesting for it meant a concentration in the routes most dominated by steamers whereas the trades to the Baltic, Iberia and the Mediterranean remained far more accessible to the sailing vessel. These regions had a small share of the American export trade, but total exports were growing

TABLE 14

CANADIAN CLEARANCES FROM NEW YORK BY PORT OF REGISTRY, 1883

Port	SHIPS No.	SHIPS Tonnage	SHIPS Voys.	SHIPS Tons	BARKS No.	BARKS Tonnage	BARKS Voys.	BARKS Tons
Amherst					1	1099	1	1099
Annapolis	1	1655	1	1655	8	7406	16	13990
Arichat								
Barrington								
Chatham								
Charlottetown	1	699	1	699	12	6551	15	7990
Cornwallis								
Digby					2	1734	2	1734
Dorchester	2	2807	4	5867	9	9492	23	24745
Gaspe								
Guysboro								
Halifax	5	6108	9	11234	16	11085	25	18158
Liverpool					3	1822	3	1822
Lunenburg					1	479	1	479
Maitland	3	3912	5	6210	10	9140	16	15423
Parrsboro	3	4279	7	9163	3	2598	9	7794
Pictou	3	3681	3	3681	7	5006	7	5006
Port Hawkesbury								
Pugwash								
Quebec	2	2418	3	3638	4	4091	6	5968
St. Andrews	1	1296	1	1296	3	1916	5	2893
St. John, N.B.	8	10998	8	10998	57	46598	88	72445
St. John's, Nfld.					6	1402	8	1858
Sackville					3	1751	3	1751
Shelburne					1	891	1	891
Sydney, C.B.					2	796	2	796
Weymouth, N.S.					3	2693	3	2693
Windsor, N.S.	19	25078	41	52088	46	38958	104	88745
Yarmouth, N.S.	12	14832	12	14832	20	16743	25	20412
TOTAL	60	77763	95	118173	217	172251	363	296692

TABLE 14 (Cont'd.)

CANADIAN CLEARANCES FROM NEW YORK BY PORT OF REGISTRY, 1883

BRIGS				SCHOONERS				TOTAL			
No.	Tonnage	Voys.	Tons	No.	Tonnage	Voys.	Tons	No.	Tonnage	Voys.	Tons
1	364	1	364					2	1463	1	1463
2	931	2	1424	4	564	10	1436	14	10556	30	18505
1	482	3	1446					1	482	3	1446
2	320	2	320					2	320	2	320
				1	146	1	146	1	146	1	146
14	3144	29	6118	2	195	5	496	29	10589	50	15303
				1	146	2	292	1	146	2	292
3	984	3	984	1	134	1	134	6	2852	6	2852
				4	855	8	1687	15	13154	35	32299
1	148	1	148					1	148	1	148
				2	194	4	388	2	194	4	388
17	3932	27	6030	12	1673	17	2458	50	22799	78	37880
8	1622	8	1622	3	374	4	506	14	3818	15	3950
5	1449	5	1449	2	294	3	437	8	2222	9	2365
1	304	1	304	2	359	4	718	16	13715	26	22655
8	1762	17	3714	18	3525	45	11405	32	12164	78	32076
2	762	2	762	1	360	1	360	13	9809	13	9809
1	229	1	229					1	229	1	229
1	223	6	1338					1	223	6	1338
2	449	3	731	2	199	2	199	10	7157	14	10536
1	189	2	378	9	1000	13	1488	14	4401	21	6055
21	6284	24	7048	106	13500	343	44184	192	77380	463	134715
3	491	3	491					9	1893	11	2349
2	647	3	1013	1	194	1	194	6	2592	7	2958
4	1082	8	2292	4	382	4	382	9	2355	13	3565
				4	496	8	1103	6	1292	10	1901
								3	2693	3	2693
16	4471	41	11688	17	3454	33	7987	98	71961	219	160508
8	1663	14	3218	5	520	8	694	45	33758	59	39156
125	32246	208	51133	203	28794	521	77364	603	317074	1187	544362

Source: *Maritime Register*

TABLE 15

CANADIAN VESSELS OUTWARD BOUND FROM NEW YORK BY DESTINATION, 1883

Destination	Ships	Barks	Brigs	Schooners	Total
UK/Continent	73	212	11	nil	296
Atlantic Europe	nil	16	5	1	22
West Mediterranean	nil	12	2	nil	14
B.N.A.	1	20	35	267	323
U.S.A. (Ballast)	nil	1	1	2	4
Caribbean & Central America	nil	14	57	23	94
South America	nil	27	32	10	69
West Coast America	1	7	nil	nil	8
China/Japan	4	6	nil	nil	10
Philippines	1	20	nil	nil	21
India	6	3	nil	nil	9
Australasia	3	4	5	nil	12
Unknown	6	21	60	215	302
TOTAL	95	363	208	521	1187

NOTE: 'UK/Continent' includes the region between Havre and Bremen; 'Atlantic Europe' includes Biscayan France, Atlantic Spain, Portugal and Madeira; 'West Mediterranean' includes Italy; 'B.N.A.' includes St. Pierre and Miquelon; and 'China/Japan' includes Hong Kong and Singapore. Source: *Maritime Register.*

TABLE 16

PERCENT CLEARANCES FROM NEW YORK BY PORT OF REGISTRY, 1883

Port	% Vessels	% Tonnage	% Voyages	% Tonnage Cleared
Annapolis	2.31	3.40	2.53	3.40
Amherst	0.33	0.47	0.08	0.27
Arichat	0.17	0.16	0.25	0.27
Barrington	0.33	0.10	0.17	0.06
Chatham, N.B.	0.17	0.05	0.08	0.03
Charlottetown	4.79	3.42	4.21	2.81
Cornwallis	0.17	0.05	0.17	0.05
Digby	0.99	0.91	0.51	0.52
Dorchester	2.48	4.24	2.95	5.93
Gaspe	0.17	0.05	0.08	0.03
Guysboro	0.33	0.06	0.34	0.07
Halifax	8.26	7.35	6.57	6.96
Liverpool	2.31	1.23	1.26	0.60
Lunenburg	1.32	0.72	0.76	0.43
Maitland	2.64	4.45	2.19	4.16
Parrsboro	5.29	3.92	6.57	5.89
Pictou	2.15	3.16	1.10	1.80
Port Hawkesbury	0.17	0.07	0.08	0.04
Pugwash	0.17	0.07	0.51	0.25
Quebec	1.65	2.30	1.18	1.94
St. Andrews	2.31	1.42	1.77	1.11
St. John, N.B.	31.74	24.96	39.06	24.75
St. John's, Nfld.	1.49	0.61	0.93	0.43
Sackville	0.99	0.83	0.59	0.54
Sydney, C.B.	0.99	0.42	0.84	0.35
Shelburne	1.49	0.76	1.09	0.65
Weymouth	0.50	0.87	0.25	0.49
Windsor	16.20	23.21	18.45	29.49
Yarmouth	7.44	10.89	4.97	7.19

Source: *Maritime Register*

TABLE 17

CANADIAN SHIPS HOMEWARD BOUND TO THE USA BY PORT OF DEPARTURE, 1883

U.K.	
Sunderland	1
Dublin	9
Liverpool	157
Hull	11
London	66
Glasgow	4
Belfast	11
Barrow	6
Sharpness	6
Bristol	18
Fowey	2
Plymouth	5
Fleetwood	5
Londonderry	2
Newport	2
Cork	5
Cardiff	4
Gloucester	2
Newry	1
Troon	1
Maryport	1
Boness	1
Sheilds	1
Portsmouth	1
Dover	1
Leith	1
Newcastle	2
Total	326
SCANDINAVIA AND BALTIC	
Reval	3
Pillau	2
Gefle	1
Total	6
ATLANTIC	
Madeira	2
GERMANY	
Bremen	22
Hamburg	51
Total	73
HOLLAND	
Amsterdam	21
Rotterdam	22
Total	43
BELGIUM	
Antwerp	95
NORTHERN FRANCE	
Calais	1
Dunkirk	21
Havre	31
Rouen	12
Dieppe	1
St. Nazaire	3
Bayonne	1
Bordeaux	23
St. Loubes	2
Bona	1
Total	96
ATLANTIC SPAIN	
Passajos	1
Santander	6
Huelva	2
Marbela	1
Total	10
PORTUGAL	
Lisbon	2

GREENLAND	
Ivigtut	1
MED. SPAIN	
Carthagena	5
Cadiz	6
Malaga	1
Palma (Majorca)	2
Barcelona	5
Alicante	1
Valencia	2
Total	22
MED. FRANCE	
Marseilles	7
ITALY	
Leghorn	7
Genoa	3
Trapani	16
Palermo	1
Total	27
AFRICA	
Algoa Bay	1
Natal	1
Cape Town	1
Total	3
INDIAN OCEAN	
Mauritius	1
Ceylon (Colombo)	2
Total	3
INDIA	
Calcutta	25
Madras	1
Bombay	1
Total	27
THE EAST	
Maceio	3
Phillippines	21
Hong Kong	2
Singapore	6
Shanghai	1
Hakodate	1
Yokahama	2
Hiogo	1
Total	35
WEST SOUTH AMERICA	
Valparaiso	13
Iquique	9
Aracaju	2
Taltal	1
Acapulco	1
Total	25
AUSTRALASIA	
Wellington, N.Z.	1
Melbourne	2
Auckland	1
Newcastle, N.S.W.	2
Sydney, N.S.W.	2
Total	8
ATLANTIC SOUTH	
St. Helena	1
EAST COAST SOUTH AMERICA	
Rio Janeiro	22
Montevideo	28
Bahia	22
Pernambuco	25
Rio Grande Del Sul	1
Buenos Ayres	10
Para	3
Rio Grande Do Norte	2
Maranham	1
Aragagu	1
Total	115
UNIDENTIFIED	
Marbella	1
Axim Ca	1
Christovao	1
Total	3

Source: *Maritime Register*

and hence opportunities for the sailing vessel were for a period at least growing with them. Scandinavia, Spain, Portugal and Italy, all maintained and indeed increased the size of their sailing ship fleets during the era. They apparently found more opportunities in the carrying trade between their own regions and America than did the Canadian cross traders.

It is apparent from Table 18 that just as the Canadian fleet was heavily dependent on the North West European ports it was, if anything, even more dependent upon the port of New York in the United States. Of course New York was always the premier American port throughout the era, but there can be no doubt that the Canadian fleet was over dependent upon it. Since New York was the most highly developed North American port for steam shipping the vulnerability of the Canadian purely sailing ship industry becomes ever more apparent.

We may summarize Canadian involvement in the trade of the United States in 1883 as follows. The Canadian shipping industry was very heavily dependent upon the United States export trade. Within that trade it was overdependent upon the industrialized regions and ports of North West Europe and hence in competition with the most highly developed steamer routes. Despite this, even during the 1880s, Canadian owners clinging to obsolescent vessels and designs continued to maintain a strong presence in the trades. How was this possible?

4

The basis for the expansion and later survival of the Canadian involvement in American trades was found in the dramatic rise of American exports and as Table 19 shows the rapid decline of America's own shipping industry from 1862 onwards. Both of these factors helped in the expansion and sustaining of the Canadian fleet, but in the end they were more than offset by the rapid growth of the world's steam shipping industry from the mid 1860s. Commentators were forecasting the demise of the sailing vessel in the North Atlantic trades as early as the mid 1850s.[6] At that time, with only a handful of regular steam lines engaged in transatlantic trade the arguments for this were largely theoretical, but more concrete evidence appeared during the American Civil War. In November 1863 during a period of slack trade, steamers were reported as monopolizing most of the available export cargoes in New York.[7] In April 1866, admittedly at a time when cotton shipments were still very low as a result of the war, steamers were reportedly carrying most of the offerings to England and Europe,[8] and by December steamers were reported as by now almost monopolizing the entire import trade from Europe.[9] Since by this time the emigrant traffic had been completely taken over by steamers,

TABLE 18

DESTINATION OF VESSELS BOUND FOR U.S.A., 1883

New York	498
San Francisco	37
Delaware Breakwater	15
Pensacola	26
Norfolk	23
Savannah	13
Tybee Roads	29
Philadelphia	69
New Orleans	32
Hampton Roads	35
Charleston	22
Galveston	13
Mobile	9
Boston	18
Brunswick, Ga.	4
Baltimore	28
Gloucester	15
Southwest Pass	10
Woods Hole	1
Bull River, S.C.	4
Apalachicola	1
Portland, Me.	2
Wilmington, Del.	6
Portland, Ore.	3
Providence	1
Key West	2
Eastport, Me.	1
Richmond	1
Wilmington, Cal.	2
Booth Bay, Me.	1
Pascagoula	1
U.S.A.	12

Source: *Maritime Register*

TABLE 19

PERCENTAGE OF VALUE OF EXPORTS CARRIED BY U.S.A. AND FOREIGN VESSELS

Year	U.S.	Foreign
1851	70.1	29.9
1852	66.2	33.8
1853	66.9	33.1
1854	69.5	30.5
1855	74.1	25.9
1856	70.9	29.1
1857	68.4	31.6
1858	75.6	24.4
1859	69.8	30.2
1860	70.4	29.6
1861	72.8	27.2
1862	55.5	44.5
1863	40.0	60.0
1864	30.6	69.4
1865	24.7	75.3
1866	38.0	62.0
1867	39.5	60.5
1868	36.1	63.9
1869	33.3	66.7
1870	37.3	62.7
1871	33.1	67.9
1872	29.4	70.6
1873	25.1	74.9
1874	24.0	76.0
1875	22.6	77.4
1876	24.9	75.1
1877	23.1	76.9
1878	22.1	77.9
1879	17.1	82.9
1880	13.1	86.9

Source: U.S. *Congressional Papers,* 48th Cong. 1st Session, Doc. 7, XXVII U.S. Serial Set No. 2197.

sailing vessels were increasingly forced to rely upon the proceeds of the outward voyage to offset the low or in many cases non existent freights available homeward from Europe.

In August 1867 during another slack period, steamers were said to be dominating the grain trade; the sailers "get little except what steamers do not want and thus usually, the coarser freight at low rates";[10] and in December "it became more and more apparent that the bulk of the cotton crop will find its way by steam via New York."[11] Fourteen months later a New York correspondent reported that "the movement of cotton, like most other staples, is every year gravitating more and more to steam, and with new lines inaugurated the indications are that sailing vessels will soon also lose this hitherto valuable support."[12] By 1870 not only had regular steam lines been established between all the major ports of the United States and Europe, but a new type of vessel, the 'outside steamer', which we would later know as the 'tramp', was also appearing in large numbers in American waters. But these predictions were being made ten years before the Canadian fleet reached its peak. Obviously Canadian owners did not share the pessimism of other members of the commercial community. Perhaps it was because the predictions were made during a fairly depressed period in American trade, for with the rapid rise in exports after 1870 they almost disappeared from the newspapers.

What proportion of American trade was open to the sailing ship in the period 1855-85? Is it possible to measure the gradual takeover of that trade by steamers? From 1869 onwards American statistics broke down entries and clearances into steam and sail, but this was not done for the earlier years. Furthermore the statistics give us no information on the shares of each commodity taken by steam and sail, while many of the vessels entering and clearing did so in full or partial ballast. If we are to understand why the sailing ship and the Canadian ship in particular continued in strong demand long after its predicted demise in the mid 1860s, we must analyse not only trade routes but also the degree of sailing ship participation in the carriage of the various staples.

Although published data is not available it is possible to establish a rough indicator of the opportunities open to sailing vessels throughout the era. Two contemporary newspapers, the *New York Maritime Register* and the English *Mitchell's Maritime Register,* published weekly freight reports for the major American ports and major export commodities throughout the period. These reports included spot freight rates for individual vessels reported as loading for all destinations and for each commodity. The reports were voluminous and sufficient to establish what staples were available for export to a wide range of markets every week. These rates were extracted, and for this paper tables were compiled to

show the destination of sailing vessels from the major American ports as reported every second week. The tables have been compiled for each major commodity, and the frequency of shipments of any particular commodity to any particular destination has been used as an indicator of the volume and flow of cargoes exported in sailing vessels.

In 1855 all types of cargo and all routes were open to sailing vessels. By 1885 the range of possible trade routes was narrowing rapidly and the sailing vessel was being restricted to the carriage of petroleum and lumber, with the great staples of grain and cotton at last falling to the steamship. The data shows clearly that by 1870 the steamship was already monopolizing many trade routes and the carriage of many commodities. The sailing vessel was saved by the expansion and diversification of grain exports, the recovery in cotton shipments and above all by the development of the petroleum trade, which did not even exist in the 1850s. The full data tables are too voluminous to be included in this paper, but Table 20 is an example. It shows the number of fortnightly periods in each year in which sailing vessels were reported as being chartered to carry grain from New York to the various European destinations. The complete tables show by the destination, shipments of grain from Philadelphia, New York and Baltimore; tobacco from New York and Baltimore; oil cake, rosin, tallow, turpentine, provisions, flour, cotton, beef, pork and bacon from New York; and petroleum from New York.

From these tables the following observations can be made. The collectively important provisions, beef, pork and bacon, flour, tallow and (from New York only) naval stores, and oil cake trades all reached their peaks in terms of carriage by sailing vessels either immediately before or during the American Civil War. By 1873 steamers had captured the carriage of these commodities to almost every destination in Europe. Judging by these commodities, it is possible to understand predictions of the demise of the sailing vessel made in the late 1860s. The tobacco trade remained open to sailing vessels for a longer period but only due to an unforeseen circumstance: the tobacco export to North Europe was captured by the steamer in exactly the same manner and timing as the above commodities, but from 1865 onwards the nations of Southern Europe began to import significantly larger quantities. These routes were far less rapidly penetrated by steam, although unfortunately this was the region where Canadian vessels were underrepresented. The New York cotton trade for sailing vessels reached its height before the Civil War, and although there was some revival, especially to Liverpool between 1865 and 1873, the decline was marked and again masked by some improvement in the demand for sailers to carry cotton to Southern Europe.

The last sailing vessel to carry cotton from New York sailed in the boom year of 1881. It should be pointed out that sailing vessels continued in demand for carriage of cotton from the Southern ports but even there it was almost at an end by 1884.

It is in the tables for shipments of grain and petroleum that the salvation of the sailing vessel can be seen. For grain the demand for sailing vessels to Northern Europe continued and indeed increased from 1870 until 1882, when the collapse of demand for grain in Continental Europe saw them rapidly elbowed out by the voracious steamers. Furthermore a significant demand for grain developed in the Baltic, Iberia and the Mediterranean from 1875 onwards. Once again, however, Canadian vessels seem to have played little part in those routes. The carriage of grain by sailing vessels from New Orleans was not high until 1868 — indeed it would appear the peak was not reached until 1876 — again due to the growth in demand from Southern Europe. Baltimore, a

TABLE 20

PATTERN OF GRAIN EXPORTS FROM NEW YORK

Destination	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871
Liverpool	20	16	5	17	24	27	23	19	14	19	19	14	16	15	22
London	2			9	19	16	19	7	6	17	12	11	13	22	23
Glasgow	5	7	1	13	13	14	6	6	3	4	4	5	8	3	7
Ireland		1		3	9	13	9	2	5	6	7	4	16	5	4
Other U.K.				4	13	11	16	10	6	9	7	10	6	19	19
Cork/Orders					7	7	13	13	8	6	7	16	16	12	21
Continent															4
French Chann.	3	1			21	9	6				1	1	2	3	13
French Atl.	1				3										4
French Med.	1				1	1	1							1	
Belgium		3		4	7	7	9	2	1	1			2	8	13
Holland					5	4	1			3			1	4	6
Germany					1	6	1		2	1	3	2		1	1
German Baltic															
Spain Atl.															
Spain Med.	1														
Portugal					2	3	3	3				1	6	3	6
Russia Baltic															
Italy															
Denmark															
Swed. & Nor.															
Adriatic															
North Africa															

TABLE 20 (Cont'd.)

PATTERN OF GRAIN EXPORTS FROM NEW YORK

Destination	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886
Liverpool	20	20	22	22	20	22	23	20	13	2					
London	19	21	22	22	20	23	23	23	17	3					
Glasgow	2	1	3	1		1	1	2	1						
Ireland	5	2	1	8	6	6	6	3	6	4	1		2	6	1
Other U.K.	17	18	21	17	16	8	24	20	13	7	4	2	3	5	2
Cork/Orders	19	22	23	21	24	24	24	24	23	20	15	9	5	2	2
Continent		11	10	7	15	6	21	24	16	6					
French Chann.		3	4	1	2	3	14	18	17	6	1		1		
French Atl.					1		10	18	17	4	4	1			
French Med.		2		1		3	18	12	6	5	5		2		
Belgium		4	5	2	2	3	8	13	17	4					
Holland	1	4	3	1	2	3	12	6	6	4					
Germany	1	4			6	1	3	6	8	4					
German Baltic					2	2	1		11	4					
Spain Atl.								13	13	3	13	4	4	2	3
Spain Med.															
Portugal	1	1	4	10	13	6	18	16	16	18	19	18	17	20	21
Russia Baltic		1								5					
Italy		3			2	2	9	12		3	3			1	2
Denmark			1		8	14	15	11	14	6		2		1	
Swed. & Nor.						4	3	3	10	7			1		
Adriatic								2							
North Africa									1	1					2

Note: Number of two week periods in which the commodity was exported to each destination. Source: *Maritime Register* and *Mitchell's Maritime Register,* weekly freight reports.

late developing port, may well have chartered more sailers to carry grain in 1880 and 1881 than ever before, but the trade for sailing vessels collapsed completely in 1882.

The great sustainer of the sailing vessel was clearly the petroleum trade. Only discovered in 1859, America practically had a world monopoly on production and trade until the 1880s when Russia and Romania developed rapidly. One is mildly startled to learn of American exports to such places as the Levant, Turkey and Egypt, or to note in the newspapers quotations for Port Said or Algiers. Not only did it create an entirely new trade for the employment of shipping, until 1887 it was for practical purposes a monopoly for the wooden sailing vessel due to a combination of low freights, fire risk and a general prejudice against the employment of steel hulls or steam engines.[13] A few steamers were employed from 1878 onwards in the carriage of 'case oil' to the

Mediterranean or the Pacific but most shipments were made in the wooden barrels which only wooden vessels were considered fit to carry. Only the invention of the tank ship changed this situation. Thus throughout our period the anxious sailing shipowner could always fall back upon this protected trade and when the monopoly came to an end the Canadian owners were already abandoning the industry.

We may now summarize our conclusions concerning the opportunities for sailing vessels in the American export trades. Most commodities were by 1868 clearly falling into the hands of the steamship operators, while it was already becoming difficult to obtain freights homeward from Europe. Only the expansion of trade in grain and petroleum coupled with a declining but still substantial share of the cotton trade and a continued dominance (due to the wretched freight) in the carriage of timber from both the United States and Canada, allowed the sailing vessel and especially the wooden Canadian sailing vessel to continue in business after 1870.

5

The collapse of the wooden sailing ship in the North Atlantic occurred very rapidly after 1881. It is significant that the Canadian fleet reached its greatest size two years before this in 1879. So far we have established the course of American exports to Europe and of the opportunity and scale of Canadian participation in those trades but have not attempted to explore the question of profitability. Given the importance of the American-European trade Canadian owners must have based their investment plans largely upon their expectations as to its future course, which expectations were of course based upon the returns they had obtained from it in the past. In this paper we cannot attempt to estimate the profitability of sailing vessels in general, let alone the collective or individual returns to the Canadian owners in particular. However if we can establish a series of freight rates for the shipment of major staples from America to the most important European ports of destination, then it is possible to construct graphs which would illustrate the trend of freights throughout the period and to identify periods of prosperity and depression.

Contemporaries devoted much attention to the question of freights and one broker at least published a retrospective calculation for the period from 1869-1919.[14] More recent indices have also been published,[15] but for our purposes suffer from several defects. They cover only a limited range of commodities and a limited range of North American ports. They do not distinguish between the freights for steam and the freights for sail nor do they distinguish between the considerable variations which were paid for wooden as against steel or iron hulls.

Furthermore a host of national prejudices entered into the area. Until the Civil War American sailing vessels commanded higher rates than did foreign. During the Civil War the situation was reversed, while after 1865 the rates tended to equalize. Steamers, especially during the 1860s, commanded much higher rates than did sailing vessels. In the long run we need to be able to estimate the gross freights earned by particular Canadian vessels, and for this we need to construct statistics which apply not only to the purely wooden sailing vessel but even to the Canadian wooden sailing vessel.

An index has been constructed using the weekly freight reports published in *Mitchell's Maritime Register* supplemented for 1884-86 by those in the *New York Maritime Register.* Middle spot rates were extracted covering the entire spectrum of American-European trade and for each of the major export commodities. These rates were then tabulated on a fortnightly basis to show the rate for a given commodity between given ports in North America and Europe. They are too voluminous to be included in this paper but the average annual freight rates for the movement of commodities between the largest ports was calculated and a set of graphs (Figures 6-16) constructed. We assume that in a free trading environment the rates established for the carriage of a commodity from New York to Liverpool for example, must in the fairly short term reflect the rates established to other European destinations, and that the freight rates from New York would tend to reflect those from other American ports. However, especially in the days before steam short term variations might be pronounced due to the miscalculation of either shipper or shipowners. In these differentials lay the success or failure of the shipowner. The graphs reflect purely sailing ship rates as given for non-American vessels. Since the sailing vessels disappeared from various routes and commodity carriage at different times the period of years covered varies for each graph. This affects the average level of freights calculated for each graph, but taken together the graphs reflect a similar picture.

In general we may categorize 1860-63 and 1871-77 as the periods of greatest prosperity when Canadian owners might have been expected to increase their investments in shipping while 1856-59 and to a lesser extent the period 1865-69 were periods not conducive to investments unless owners, taking an optimistic view of medium or long term trends, thought that the inherent expansion of world trade warranted it. It is not surprising to discover that new registries of Canadian shipping reached a peak in 1873, for demand had been high for all kinds of shipping since 1870 and rising freights fully supported optimism — except to those who remembered that things which go up must at some time come down. And despite the current opportunities for sailing vessels the steam fleet must,

in the end, sweep the former from the seas. Generally both steam and sailing shipowners reacted to the same influences. Rising world trade and freight rates encouraged new construction and declines due to hiccups in trade and the resulting temporary overcapacity in tonnage tended to force them out of the new building market.

Many owners in England and other European countries used the prosperity of the early 1870s to enter the steam ship trade. Canadian owners must have realized like everyone else that the sailing ship was doomed, especially in the North Atlantic. The trade flow tables show clearly the way in which, as successive booms in trade ebbed away, the steamers constantly grew in number and efficiency, increasingly monopolizing trade in the periods of depression. With the exception of petroleum the sailing vessel was forced to rely upon the carriage of freight for which the steamer was either unavailable or uninterested. With the end of the temporary grain boom in 1882 very little cargo was left except petroleum and timber.

The freight rates established in the graphs mask a critical change in the opportunity for profitable sailing ship operation. Until 1865 return cargoes from Europe could be obtained fairly readily. From then onward they became increasingly difficult to secure, especially in the vital Northern European trades and with the decline in bulk iron shipments to America and Canada. Until 1865 outward freights from America may have represented only half or even less of the gross earnings of the sailing ship. By 1880 the sailer must have been entirely dependent upon the export trade of American staples, except for the pittance to be earned through bringing back empty petroleum barrels.

On the basis of these data one can easily understand why the Canadian industry survived the first onslaught of steam, and why even after the decline in new investment in wooden vessels after 1873, Canadian owners were able to operate and even enlarge their fleets into the 1870s. What cannot be determined are the reasons why, unlike their foreign rivals but like the owners of the United States marine, they did not use the profits earned in the early 1870s to purchase steamers, or at least iron or steel hulled sailing vessels. The depression in freights from 1877 onwards seems to have affected wooden sailing vessels much more than the steel hull sailer or steamship. Even in the early 1880s large profits were being made by owners of the latter craft. As late as 1884 English commentators were confidently predicting that the Canadian owners must soon appear in the new building market in large numbers in order to replace their aging and obsolete fleet.[16] These expectations were on the whole completely unfulfilled.

FIGURE VI

TOBACCO BALTIMORE-BREMEN:
SHILLINGS PER HOGSHEAD

FIGURE VII

COTTON NEW YORK – LIVERPOOL: PENCE PER 64 lb.

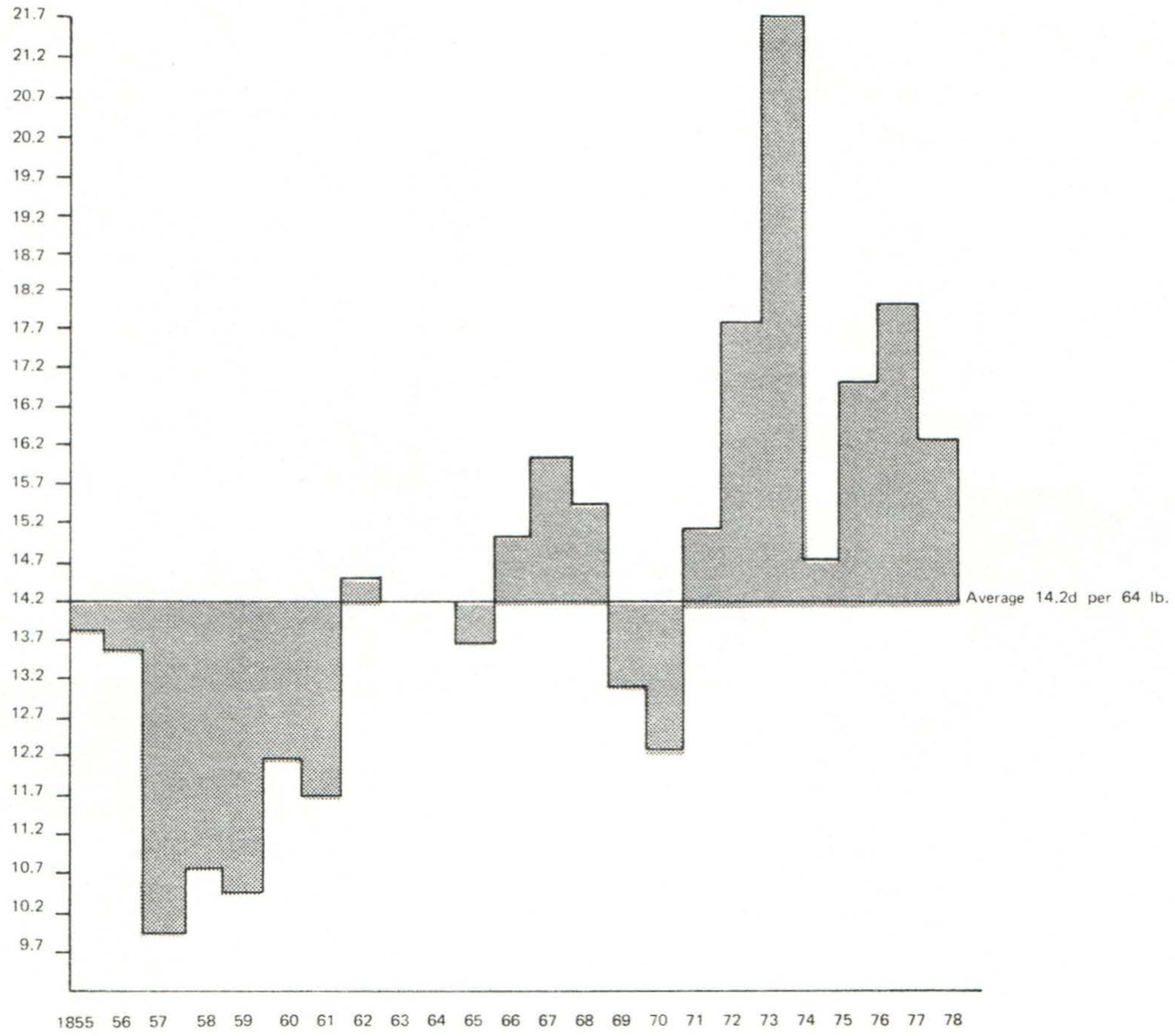


FIGURE VIII

GRAIN NEW YORK – LIVERPOOL: PENCE PER BUSHEL

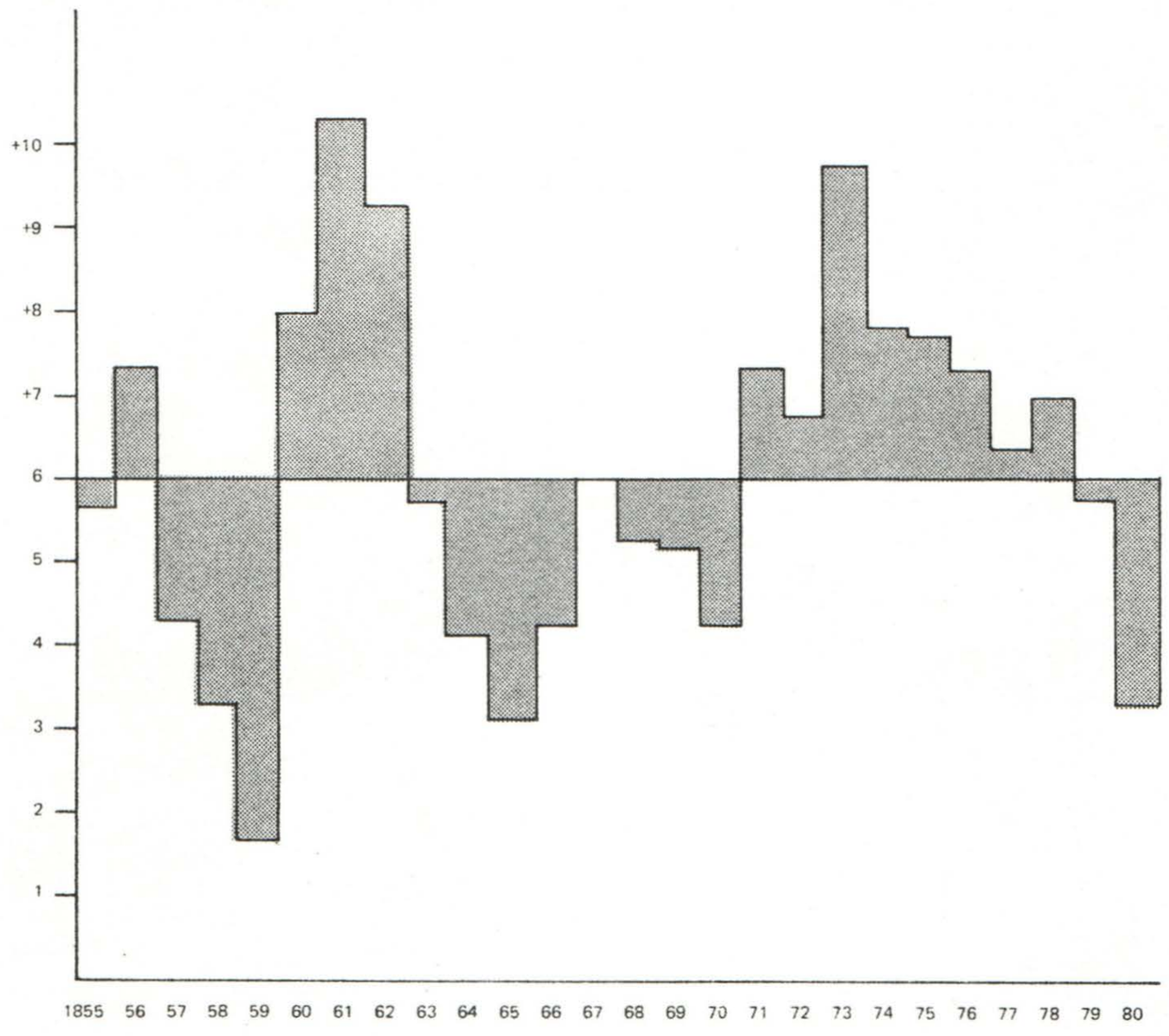


FIGURE IX

DEALS SAINT JOHN, N.B.-LIVERPOOL 1857-1886: SHILLINGS PER STANDARD

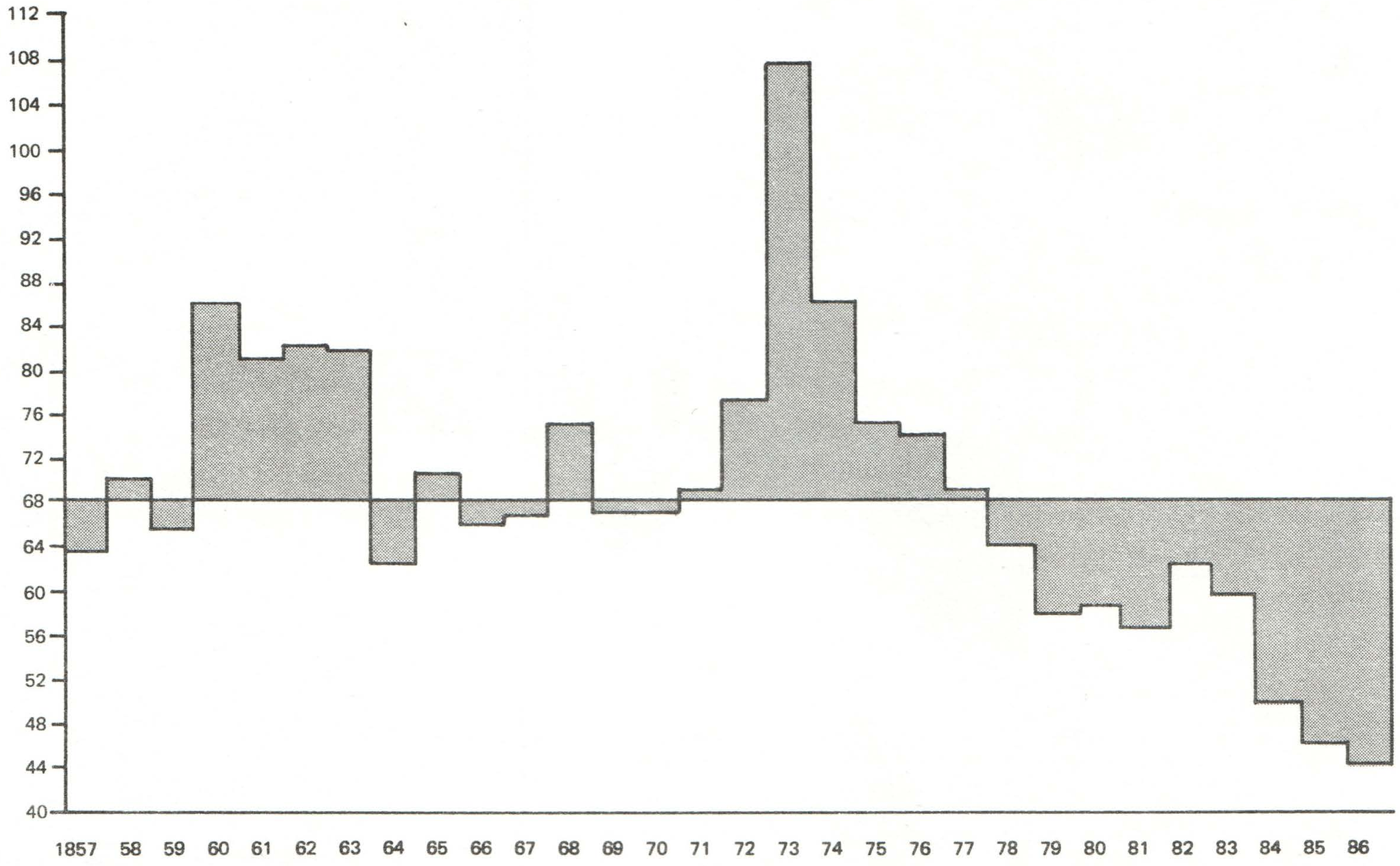


FIGURE X

GRAIN NEW YORK TO CORK FOR ORDERS: SHILLINGS PER QUARTER

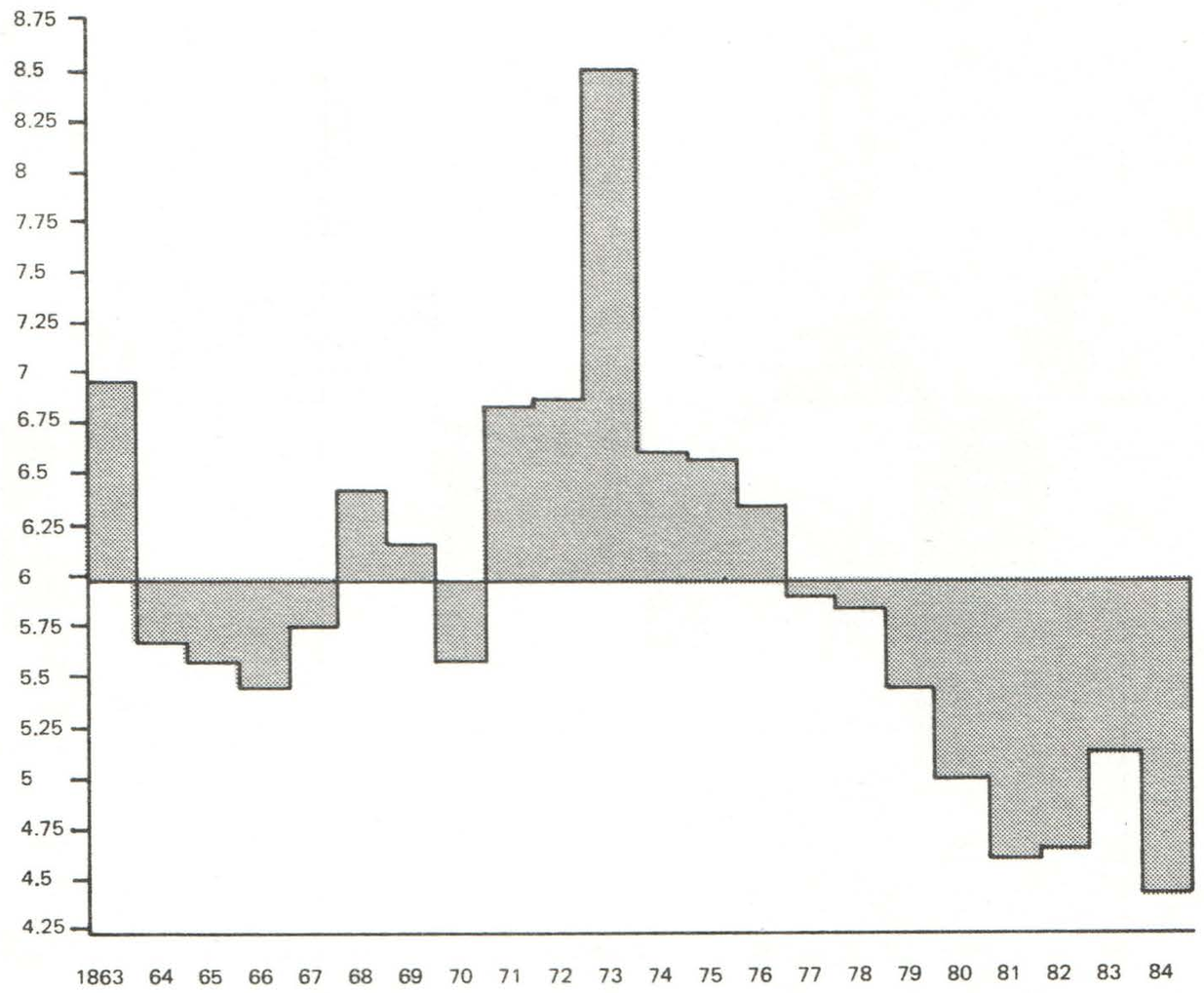


FIGURE XI

PETROLEUM NEW YORK-LONDON: SHILLINGS PER GALLON

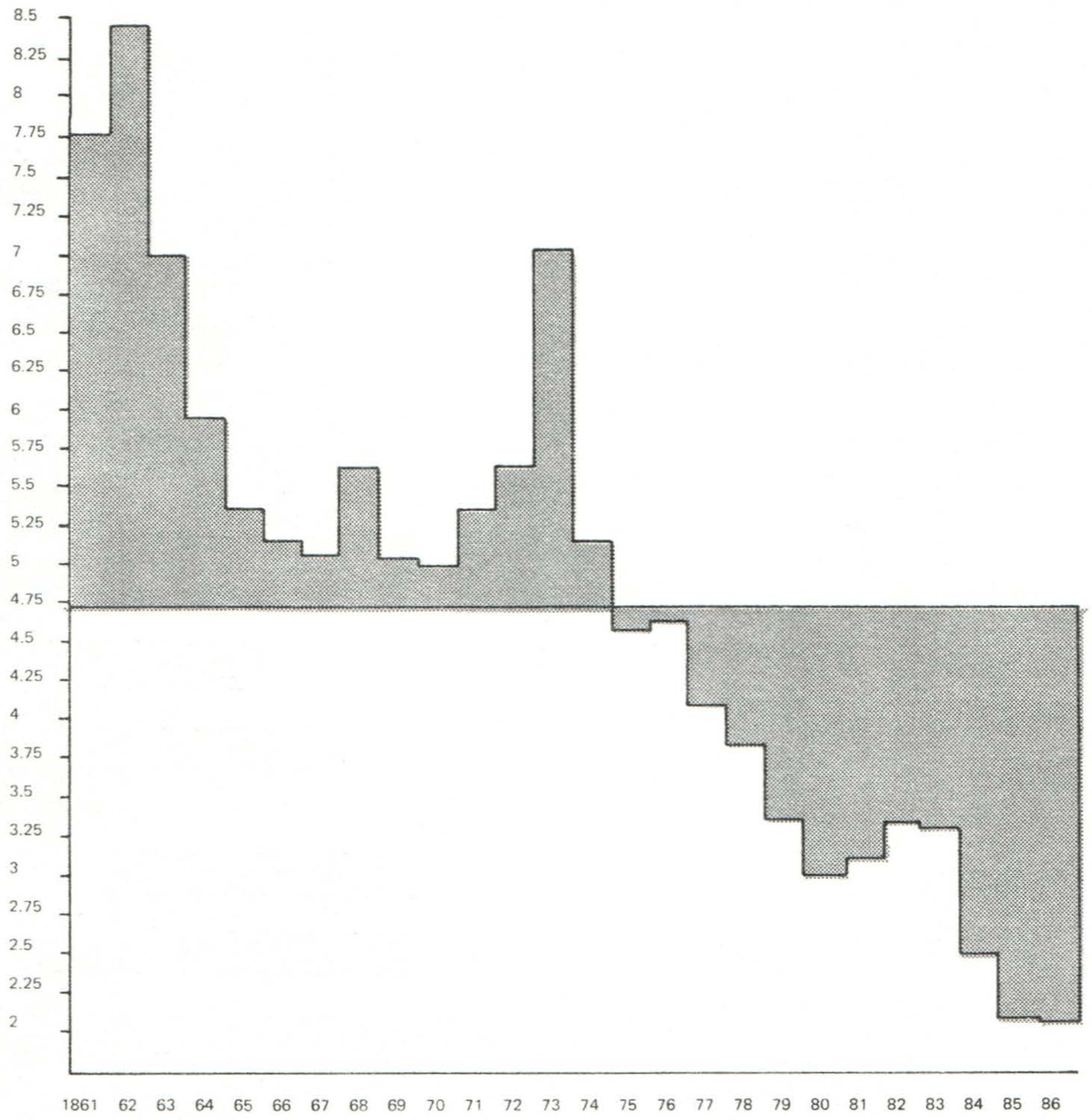


FIGURE XII

UNCOMPRESSED COTTON NEW ORLEANS – LIVERPOOL: PENCE PER 64 LB. BALE

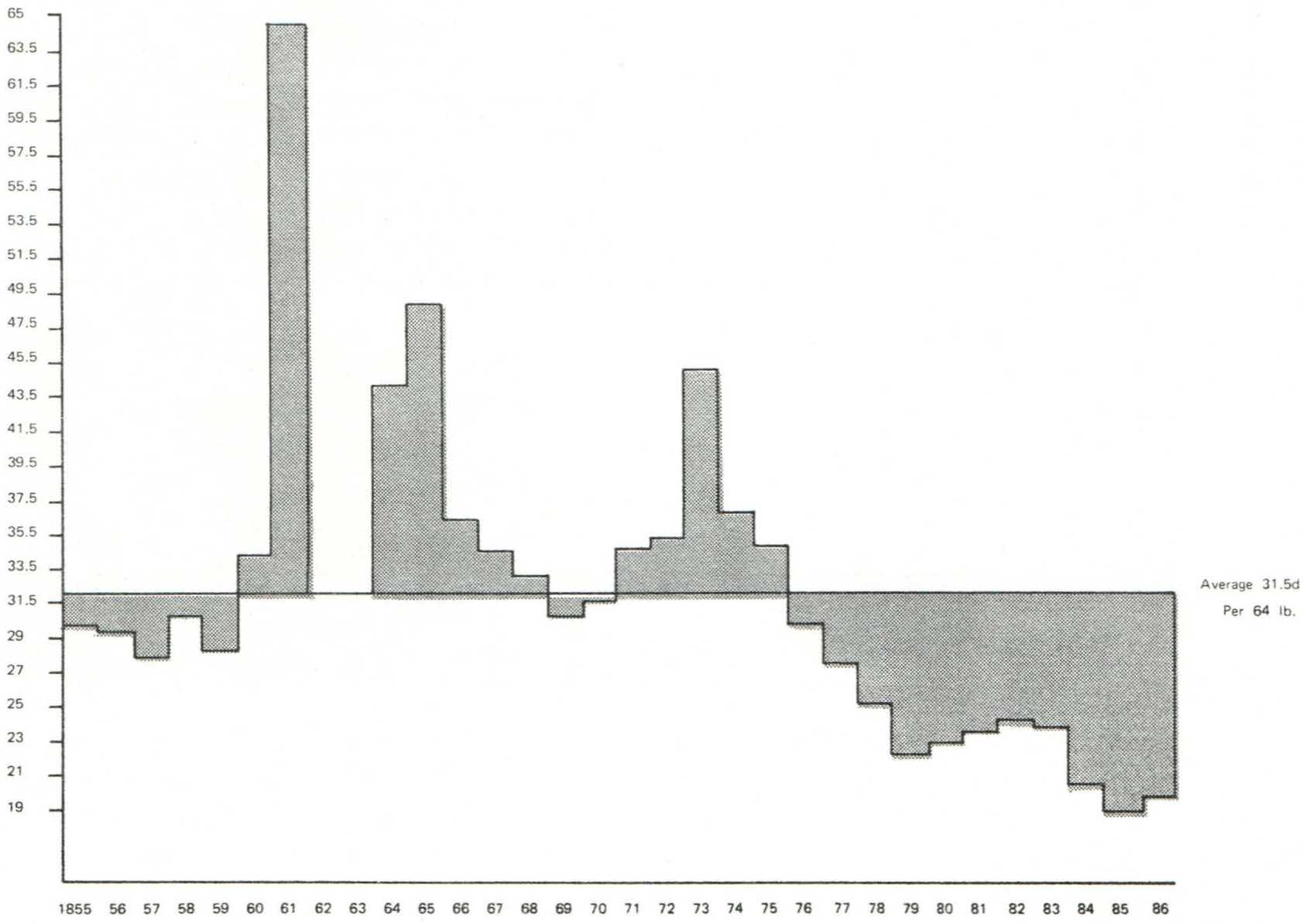


FIGURE XIII

ANNUAL HIGHEST AND LOWEST FREIGHT RATE

PETROLEUM NEW YORK-LONDON: SHILLINGS PER GALLON

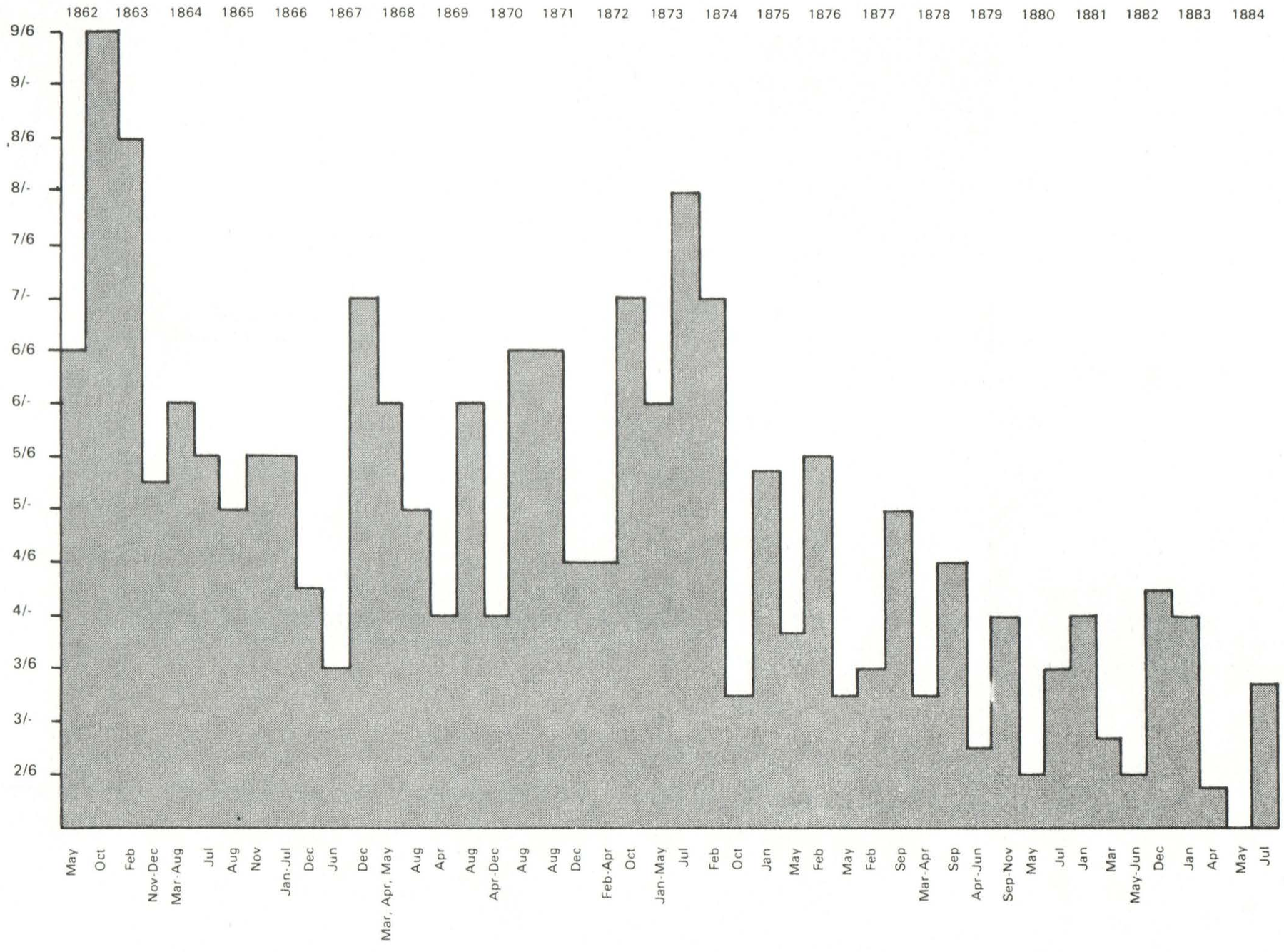


FIGURE XIV

ANNUAL HIGHEST AND LOWEST FREIGHT RATE

GRAIN NEW YORK – CORK FOR ORDERS SHILLINGS PER QUARTER

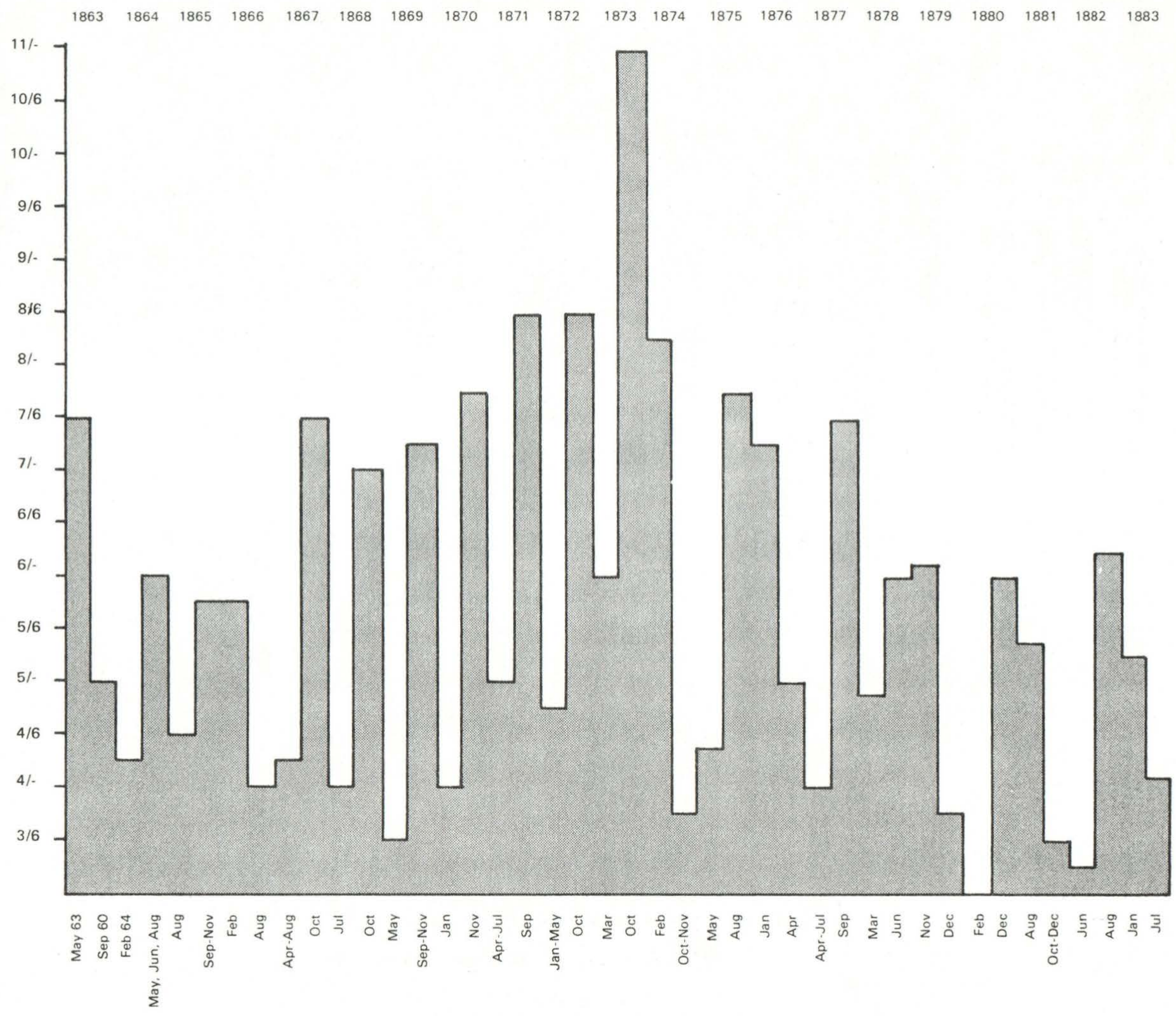


FIGURE XV

ANNUAL HIGHEST AND LOWEST FREIGHT RATE

GRAIN, NEW YORK TO LIVERPOOL: PENCE PER BUSHEL

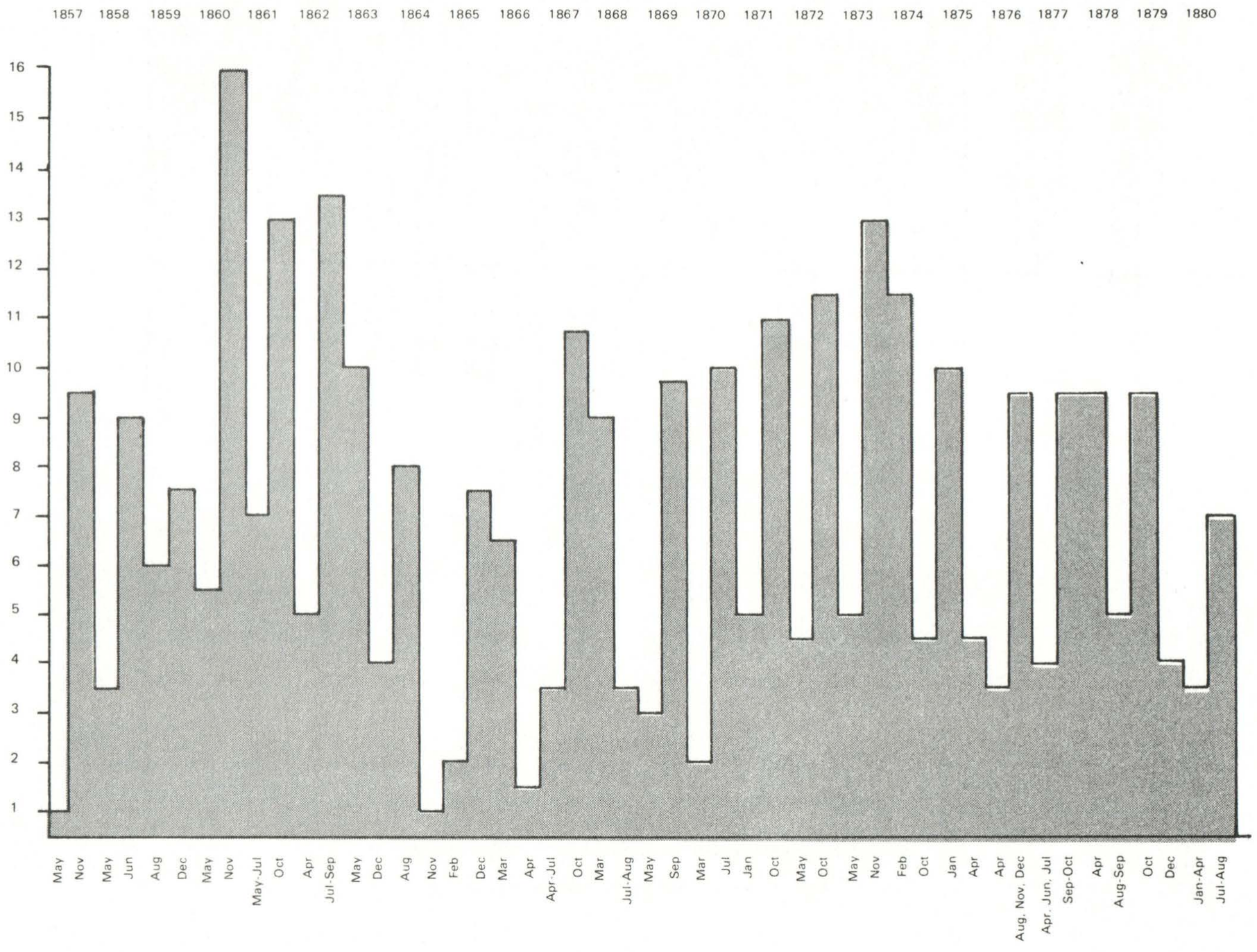


FIGURE XVI

ANNUAL HIGHEST AND LOWEST FREIGHT RATE

DEALS SAINT JOHN – LIVERPOOL

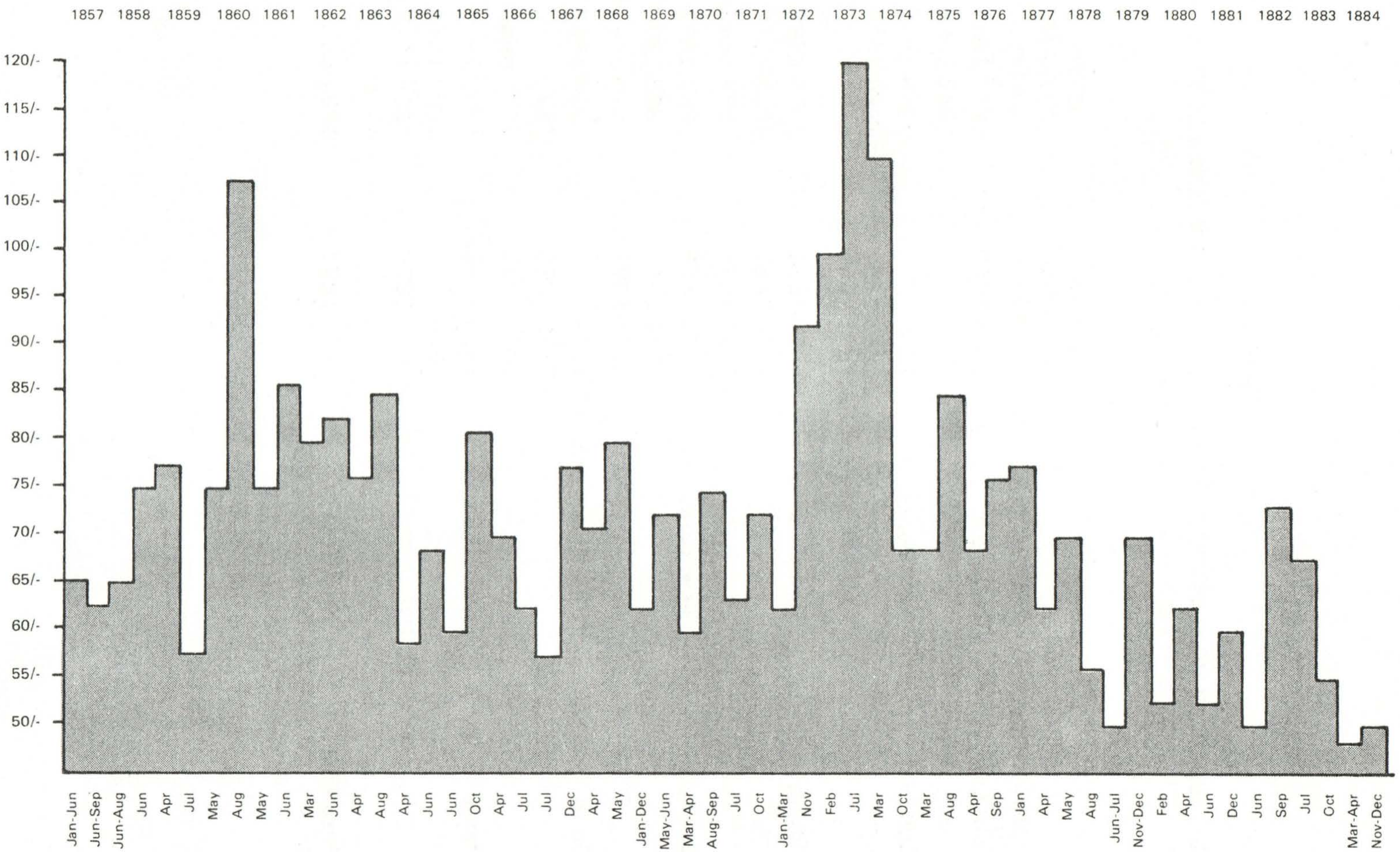


TABLE 21

PROSPERITY AND DEPRESSION IN THE FREIGHT MARKET FOR SAILING SHIPS 1857-1885

COMMODITY	FROM	ABOVE AVERAGE YEARS	BELOW AVERAGE YEARS
Tobacco	Baltimore	1860-1863	1857-1859
			1864-1869
Cotton	New York	1862	1855-1860
		1865-1867	1869-1870
		1871-1877	
Cotton	New Orleans	1860-1861	1855-1859
		1864-1867	1868-1869
		1870-1874	1874 onwards
Grain	New York	1855-1856	1857-1859
		1860-1862	1863-1870
		1871-1877	1879 onwards
Grain	New York-Cork	1863	1864-1867
		1868-1869	1870
		1871-1876	1876 onwards
Deals	Saint John	1860-1863	1857-1859
		1868	1864-1867
		1872-1876	1869-1871
			1875
Petroleum	New York	1861-1873	1874 onwards

NOTES:

1. Keith Matthews, "The Shipping Industry of Atlantic Canada: Themes and Problems", Keith Matthews and Gerald Panting, Eds., *Ships and Shipbuilding in the North Atlantic Region* (St. John's, Maritime History Group, 1978).

2. Augustus Sauerbeck, *The Course of Average Prices of General Commodities in England* (London, 1908).

3. **loc. cit.**

4. These Figures were compiled from United States Bureau of Statistics, Treasury Department, *Statistical Tables Exhibiting the Commerce of the United States with European Countries, 1790-1890* (Washington, 1893).

5. United States *Congressional Papers,* 48th Congress, 1st. Session, Doc. 7, **XXV, XXVI,** U.S. Serial Set No. 2197.

6. *Hunt's Mercantile Magazine,* Vol. 31, 1854, p. 381.

7. *New York Maritime Register,* 14 Nov. 1863.

8. *Ibid.,* 7 April 1866.

9. *Ibid.,* 23 December 1866.

10. *Ibid.,* 28 August 1867.

11. *Ibid.,* 18 December 1867.

12. *Ibid.,* 13 February 1869.

13. *Ibid.,* 1 January 1884 and 9 January 1884.

14. E.A.V. Angier, *Fifty Years' Freights 1869-1919* (London, 1920).

15. Douglass North, "Ocean Freight Rates and Economic Development, 1750-1913", *Journal of Economic History,* Vol. 18, 1958.

16. John Hughes and Company, *Annual Circular,* 1 January 1884.

11. LATIN AMERICA'S EXPORT TRADES AND BRITISH SHIPPING, 1850-1914

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LATIN AMERICA'S EXPORT TRADES AND BRITISH SHIPPING, 1850-1914

Robert G. Greenhill

This paper examines two areas which had until recently attracted little scholarly attention. The role of British shipping in Latin America had remained largely unexplored except by introductory essays[1] and somewhat unsatisfactory house histories,[2] which often ignored the full range of primary sources. As late as 1962 Derek Aldcroft regretted that "so far only one really first-class study of a shipping firm has been produced, namely, Professor Hyde's Blue Funnel,"[3] which of course, examined the Far East trades.[4] Similarly the development of Latin America's foreign trade had provoked little academic interest inside the United Kingdom. Lately, however, scholars have directed their attention to both areas. Professor Hyde's excellent analysis of T. & J. Harrison is an example of recent monographs, which in part have examined British shipping enterprise in Latin America.[5] Further the region's commercial growth has now an established literature, amongst which Professor Platt's *Latin America and British Trade 1806-1914* is an important contribution.[6]

It is perhaps now possible to link these two subjects. What was the role of British shipping in the developing republics of Latin America? How responsive were British companies to the changing conditions and new opportunities in the sub-continent? What was the impact of Britain's maritime enterprise on the region's foreign trade? The theme of this paper is, therefore, twofold. First it describes and explains the history and organization of regular British steamship links with Latin America during the nineteenth century within the wider context of the region's financial and commercial development, and of the changes in world shipping. Second it analyses the significance of these maritime links for the growth of Latin America's overseas trade, especially the expanding commodity exports, and hence for the area's economic growth. Its conclusions, tentative and without quantification rather than definitive, suggest an essentially modest role for British shipping in less developed region.

1

Britain's shipping links with Latin America did not, with rare exceptions, acquire a permanent or regular character until the 1840s when the Royal Mail Steam Packet Company obtained a contract of £240,000 per annum from H.M. Government to operate a twice monthly

mail service from Southampton to the Caribbean and Central America. This was reinforced in 1852 by a much smaller annual payment of £30,000 to load for Brazil and the River Plate,[7] and the Pacific Steam Navigation Company (PSN) operated a subsidized service to the West Coast from Liverpool.[8] Before these developments ocean going steamships were practically unknown in Latin America, where irregular links were maintained by sail. The numbers and significance of sailing ships in Latin America, the presence of which increased sharply during the independence movements from Spain early in the nineteenth century, should not necessarily be underrated. The *asiento* had permitted limited British tonnage in Spanish America during the eighteenth century, and the Admiralty had for some years run mail carrying sailing ships to the Caribbean, where a lively contraband trade with Spain's mainland colonies also existed. In the years 1809-10 it was reported that forty one British ships arrived in the River Plate with goods worth £2.7 million.[9] Similarly Harold Blakemore shows that in 1825 some ninety British vessels called at Valparaiso in Chile rising to 166 by 1840, which far outstripped tonnage from her chief maritime rivals, the United States and France.[10] Further, some Latin American trades like guano and nitrate from the Pacific Coast continued to depend on fleets of sailing ships well after 1850.[11]

Nevertheless, although merchants and shipowners could trade profitably, the significance of Anglo-Latin American maritime and commercial links before the last quarter of the nineteenth century should not be exaggerated. Heavily subsidized mail contracts at first arranged privately and not by public tender, gave Royal Mail and PSN a practical monopoly of steamshipping in their respective trades, effectively deterring potential interlopers and hence restricting the volume of tonnage. The West India and Pacific Line, a brief competitor, declared in 1873 that "the large subsidy enables the Royal Mail Company...to carry goods at lower rates than will pay",[12] while PSN's contracts with Whitehall and West Coast governments protected the company against 'wanton competition.'[13] Moreover the significance of ordinary commercial traffic, particularly for Royal Mail, may be questioned. At least until 1850 when its postal contract still provided nearly sixty percent of gross revenue, the company was regarded primarily as a mail carrier. The huge quantities of fuel in early steamships powered by inefficient engines and boilers, ensured that cargoes of one hundred tons or more were rare.[14] In the absence, therefore, of regular commercial services, merchants often operated their own tonnage either as owners or charterers, to reach ports ignored by the established companies, prevent delays, avoid unreasonable tariffs, or in emergencies to obtain cheap storage. "Like most

merchants in the nineteenth century", commented Wallis Hunt, "Balfour Williamson & Company were shipowners as well as shippers".[15] Archibald Balfour preferred liquidity but Stephen Williamson, the senior partner, persistently enlarged his commitment to shipowning and by 1876 operated twenty sailing vessels. Indeed, merchants on the Pacific Coast like Balfour Williamson, were important shipowners in the mid-nineteenth century, quite eclipsing local entrepreneurs.[16]

The fact that Latin America was not at first a commercial paradise partly explains this reluctance to establish further regular maritime links from Britain. At the beginning of the nineteenth century the area offered simply a temporary solution to the short term problem of restricted European markets during the Napoleonic Wars. Consumers in the New World frustrated by blockade in Europe, welcomed the new trading opportunities which the British stimulated once Independence removed colonial commercial regulations, but obvious limits existed to the volume of goods Latin America could either absorb or export. Contact restricted to coastal links was irregularly maintained by local middlemen who, without efficient internal transport, usually failed to penetrate the interior. Limited quantities of specie and the cessation of large overseas loans after the financial crises of 1825-26 ensured that the small, scattered and largely subsistence population in Latin America provided only a disappointingly narrow market.[17] Since independence did not accelerate population growth, redistribute income or raise demand, only the wealthy, sophisticated minority in the major cities wanted or could afford imported luxuries priced at high margins to cover the enormous risks. One or two mixed cargoes of textiles and hardware ordered when supplies were scarce, soon overstocked markets and sharply depressed prices. John Owens, a Manchester merchant with interests in Brazil and the River Plate, knew that South America rarely supplied more than a moderate portion of sales.[18] As late as 1858 Stephen Williamson, lamenting the arrival of too many English manufactures in Valparaiso reported that "this market is at best a small one and cannot take them off."[19] Once peace returned to Europe and Latin America's immediate needs were satisfied trade resettled at not much above its old level.

Political disorder, endemic in Latin America in the first half of the nineteenth century, also slowed the pace of economic development. Not until the second half of the century was a workable national administration established in Brazil, which as late as 1863 *The Economist* still considered subject "to the most incomplete and unsatisfactory sort of government."[20] In Argentina relative peace and unity did not exist until after the 1870s. Provincial trade barriers, local vested interests and the closure of navigable rivers by the dictator Rosas, prevented up-river contact while his military campaigns, lengthy sieges of Montevideo and

an Anglo-French blockade limited opportunities in the River Plate until the 1850s.[21] Renewed civil strife and war with Paraguay brought no relief. "Until...the energies of the native population are diverted from politics and fighting," the British consul at Buenos Aires reported in 1867, "little prospect can be held out of any material change."[22] This unsettled political pattern inevitably implicated British shipowners whose commercial interests, control of transportation and communication, and investment in ancillary shore services were obvious targets. The experiences of PSN during the Chilean Revolution in 1891 — when ports were blockaded, ships denied entry or clearance, trade damaged and cargoes appropriated because the conflicting claims of the legitimate Government and the rebels were impossible to resolve — afford striking examples of the difficulties facing expatriate commercial enterprises in unstable political conditions.[23]

Primitive navigational and port facilities also proved an obstacle to rapid maritime development in Latin America, and certainly contributed to Royal Mail's early unhappy reputation for shipping disasters. The Caribbean, badly charted at a time when ships' instruments remained imperfect and sudden weather changes made navigation pure guesswork, was a graveyard for many of the company's steamers like the *Medina* wrecked off the Bahamas in 1842, the *Forth* lost in 1849, and the four vessels destroyed at St. Thomas in a hurricane in 1867.[24] Lighthouses and buoys were few and not always effective. Modern port equipment in Latin America remained at a premium throughout the nineteenth century constraining the range and volume of traffic handled, raising costs and delaying shipping. At Dominica and Jacmel (Haiti) disembarcation was effected directly onto the beach. "If the weather be quiet," wrote Antony Trollope who sailed to the West Indies as a Post Office official, "one gets out by means of a strong jump, if the surf is high...one is, of course, upset."[25] Open roadsteads were common until the end of the century necessitating the hazardous and expensive use of lighters. One observer estimated that the cost of landing at Buenos Aires exeeding the carriage costs from Europe. Narrow channels had silted, forcing steamers to anchor ten or twelve miles down river and preventing tugs or tenders from approaching the customs piers, so that passengers and goods were transferred into high wheeled, horse drawn carts.[26] Even at the end of the century South American ports remained notorious, Santos alone in Brazil having modern facilities before 1900. Bunkering, obviously a crucial shorebased service which Royal Mail and PSN themselves supplied at the larger ports, was elsewhere at the mercy of erratic local suppliers. Even worse, lack of adequate internal transport to and from the ports increased the problems of congestion in Latin America.

Finally, the incidence of tropical diseases at ports and along coastal settlements added to the problems facing British shipowners and further checked commercial and maritime development. A high mortality rate among British businessmen deterred enterprise, delayed penetration of the hinterland and added to already substantial costs and risks. At St. Thomas, Royal Mail's transfer station in the West Indies, "the very centre of yellow fever among all these hot and unhealthy regions,"[27] where serious epidemics occurred in 1852-53, 1857 and 1866-67 British crews and passengers were seriously depleted.[28] Brazil, which maintained only one lazeretto serving 4000 miles of coastline, also had an unfortunate reputation.[29] What measures were imposed increased rather than relieved the problems for shipowners. Erratic regulations in the Caribbean until 1904, when a uniform practice was introduced, and the consequent transfer of shipping activities to uninfected islands disrupted trade and raised costs. Unselective quarantine in South America forced companies to curtail voyages and omit ports which were often free of epidemic.[30]

2

Thus well into the second half of the nineteenth century Britain's maritime and commercial links with Latin America, where she had few formal imperial interests, remained weak. The obstacles to economic development — in particular a sparse population, political instability and poor communications — were not new nor unique but faced by all expatriate businessmen in the tropics.[31] It was not yet a question of providing the maritime links for Latin America's integration into the international economy but of supplying the essential infrastructure for domestic production and distribution. By the last quarter of the century, however, prospects appeared brighter as improvements in one direction encouraged developments in the others.[32] Railways, commercially viable in Brazil and Argentina by 1870, opened up land for settlement and brought products to market from collection points. Immigrants attracted by these opportunities, settled the land and provided the expanding traffic on which railway profitability depended. The unifying effect of railways reinforced political stability, the precondition of investment, much of it British.

The failure of imports to provide adequate business encouraged merchants to diversify into financing, handling and marketing local produce for export, forcing Latin America into the mainstream of international trade as demand abroad rose. Latin America had met some of Europe's expanding needs for food and raw materials even before the mid century, and her trade in precious metals and tropical goods though slow was never stagnant. Brazil, producing cotton, coffee, tobacco and

sugar, was well placed, and a crude triangular trade existed in *tasajo* from the River Plate to Brazil and Cuba where commodities were loaded for the United States and Europe.[33] Thus during the 1870s Antony Gibbs & Sons, traders on the West Coast for half a century, anticipated that their "business here will soon be almost a produce one and we shall have to try to conduct it with more keenness and special study than hitherto."[34] Similarly Balfour Williamson abandoned their plans to import goods on commission in favour of developing local commodities, although the pace at which British merchants rationalized their businesses should not be exaggerated. Like British coffee shippers in Brazil, both houses remained principally importers before 1914.[35]

The export pattern that emerged in Latin America during the late nineteenth century exhibited the familiar heavy dependence on a narrow range of primary products typical of less developed countries. From 1850 Brazil became a major force in the world's coffee trade raising her share to over seventy percent just before the First World War. First introduced on a commercial basis in the Paráiba Valley behind Rio de Janeiro but spreading south and west into São Paulo (which soon produced three quarters of Brazil's output), Minas Gerais and Espirito Santo, coffee earned more than three fifths of Brazil's foreign exchange for the purchase of manufactured imports and the service of overseas loans and provided a similar proportion of government revenue through an export tax.[36] Chile on the other hand, victorious in the War of the Pacific against Peru and Bolivia in 1879, shifted from dependence on copper which experienced falling prices, to nitrate of soda the windfall wealth of which constituted up to sixty percent of her foreign exchange earnings after 1880.[37] Peru thus deprived of her lucrative nitrate fields, turned to sugar production which with a diminishing guano output and continued mining, became her chief source of foreign earnings. In Ecuador, Venezuela, Colombia and Central America exports of coffee and cocoa exercised a profound influence as Table 1 suggests. The islands in the Caribbean, like Cuba, a leading producer of sugar and tobacco, were similarly dependent for their export earnings.[38]

With few exceptions the countries of Latin America and the Caribbean accelerated their economic growth during the later nineteenth century as their principal export commodities entered world markets. Successful cultivation or mining stimulated immigration, urbanization and industrial development, financed public works, and provided rising incomes and employment. But the diversification of exports between 1850 and 1880, as countries developed a successful product, had slackened by 1913 when, as Hanson shows, the leading sixteen primary commodities in international trade still accounted for seventy percent of total exports from the less developed countries.[39] Argentina was a grain importer until

TABLE 1

DOMINANCE OF SELECTED COMMODITIES IN LATIN AMERICA'S EXPORTS

	Main Export*	% Total Exports**	
		1860	1900
Argentina	livestock, arable products	47	32
Bolivia	silver, tin, rubber	n/a	n/a
Brazil	coffee, sugar, rubber, tobacco	53	60
Chile	copper, nitrate	63	66
Colombia	coffee, rubber, tobacco	n/a	n/a
Costa Rica	coffee, bananas	85	55
Cuba	sugar, tobacco	n/a	n/a
Ecuador	cocoa	n/a	n/a
Guatemala	coffee	n/a	n/a
Peru	guano, sugar, nitrate	50	33
Uruguay	livestock	50	27
Venezuela	coffee, cocoa	n/a	n/a

*Accounting for at least 60% of total exports.
**Percent total exports accounted for by largest product.
Source: John R. Hanson II, "Diversification and concentration of LDC Exports: Victorian Trends", *Explorations in Economic History (Vol. 14, 1977) pp. 64-65.*

1878 and Uruguay diversified from low quality livestock goods like hides and *tasajo* into arable products and higher grade refrigerated meat, but their dependence on farm produce remained substantial. Table 1 shows that Brazil and Chile actually experienced an increased export concentration. There was an increase in the number of products exported from Latin America but the bulk of export earnings remained concentrated in a few well established groups, which may imply that the region's structural change was limited before 1913. Although a country can experience dynamic changes in economic structure without exhibiting much export diversification, experience of the now developed countries attests to a close association between economic development and export diversification.[40]

It has been argued that the dynamic gains from trade may be less than expected not only because of the weak linkages between external stimulus and internal development but also because the export sector, small relative to the rest of the domestic economy, was concentrated into a few hands, mainly foreign. In Chile where the leakage abroad of earnings in factor payments, amortization and profits constituted a major area of friction, the gross nitrate revenues were almost equally divided between production costs, the export tax and profits, of which the majority were

repatriated.[41] The British developed an enclave economy in the sparsely populated province of Tarapáca, the centre of nitrate mining, economically and geographically isolated from the rest of Chile.[42] Difficult conditions necessitated the import of the expensive factors of production so that the bulk of the country, in which agriculture remained the chief employer, was untouched by nitrate's wealth. Since revenue went abroad as British managers transferred their earnings and shareholders demanded dividends, while low wage local labour barely stimulated domestic demand, nitrate had little dynamic effect on either native entrepreneurship or domestic incomes. The position may be more problematic in Brazil where enterprising coffee *fazendeiros* helped finance the industrialization of São Paulo.[43]

Nor should the role of Britain as a consumer of Latin America's products be exaggerated. Although Britain remained the world's largest importer, buying around twenty percent of all goods traded internationally in 1913, less than one tenth of this total came from Latin America. "Britain," explains Professor Platt, "was a selective market for Latin American exports, both in the quality demanded and in the range of products imported."[44] It was only interested in a limited range of goods in which Argentina's exports dominated. Britain bought meat, grain, rubber, tin and copper but by the late nineteenth century was not significant in world markets for many of the more important Latin American products like coffee, nitrate, cocoa and sugar. The tendency to substitute an Empire product, often unplanned, inevitably redirected demand away from Latin American products. Existing colonial suppliers and cheap European beet sugar limited British capacity to absorb sugar from Cuba, Brazil and Peru. Similarly the development of cocoa production in the Gold Coast undermined the exports of Brazil, Ecuador and Venezuela. Consul Chambers reported from Guayaquil that cocoa formerly shipped to Britain now went direct to European ports "as the English market is principally supplied with cocoa from her own colonies."[45] British industrialists anxious to secure their sources of raw materials would look first to Europe and then to the Empire, relegating Latin America to the role of marginal supplier.

As much as quality or alternative sources, taste also ensured that some Latin American exports made little impact in the United Kingdom. British consumers drank tea from India and China rather than coffee.They also preferred the milder flavours of Costa Rican coffee which enjoyed a high reputation, over the much more widely available Brazilian blends which found a far better market in the United States and Germany. Similarly once nitrate replaced guano as a fertilizer, Germany took the greater part for her beet sugar crop while British farmers experiencing in places severe agricultural depression during the late nineteenth century,

sharply reduced their purchases. Latin American goods were handled by British merchant houses: and may even have reached Britain for re-export, although this latter feature was less pronounced by the end of the nineteenth century, but were not widely consumed in Britain.[46]

Despite these reservations the quantity and value of Latin America's exports increased rapidly during the last quarter of the nineteenth century, and as Table 2 shows Britain's purchases also expanded, especially when the price fall from the 1870s is taken into account. Consequently it would not be unreasonable to expect Britain, the world's largest shipowning nation, to develop stronger maritime links with Latin America during the period, both in U.K. trade and in those cross trades which did not call at British ports. It is therefore now appropriate to examine the impact of British shipping on Latin America's exports.

TABLE 2

IMPORTS FROM SELECTED LATIN AMERICAN COUNTRIES INTO THE UNITED KINGDOM 1875-1913

Actual Values, £ Millions, Quinquennial Averages

	1875-9	1880-4	1885-9	1890-4	1895-9	1900-4	1905-9	1910-13
Argentina	1.3	1.0	2.1	4.6	8.5	16.3	28.5	35.0
Bolivia	0.4	0.3	0.2	n/a	n/a	n/a	n/a	1.6
Brazil	5.6	5.8	4.7	4.1	4.0	6.2	9.0	12.0
Chile	3.4	3.1	2.7	3.7	3.6	4.7	6.3	5.0
Colombia	0.8	0.9	0.3	0.5	0.6	0.5	0.4	1.1
Costa Rica	n/a	n/a	n/a	0.5[1]	0.5	0.4	0.5	1.2
Cuba	n/a	n/a	n/a	n/a	n/a	0.2[2]	0.5	2.5
Ecuador	0.3	0.3	0.2	0.1	0.2	0.2	0.3	0.5
El Salvador	n/a	n/a	n/a	0.2[1]	0.2	0.2	0.1	0.1
Guatemala	n/a	n/a	n/a	0.1[1]	0.3	0.2	0.1	0.1
Mexico	0.7	0.6	0.6	0.5	0.5	0.5	1.6	2.2
Nicaragua	n/a	n/a	n/a	0.1[1]	0.1	0.1	0.1	0.1
Peru	4.8	2.4	1.7	1.2	1.4	1.7	2.6	3.3
Uruguay	0.7	0.7	0.5	0.3	0.4	0.6	0.9	2.0
Venezuela	0.1	0.3	0.2	0.2	0.1	0.1	0.2	0.7

[1]1892-94 average only
[2]1903-04 average only
Source: D.C.M. Platt, *Latin America and British Trade 1806-1914* (London, 1972) pp. 320-23.

Latin America's dependence on overseas shipping was substantial before 1914. The Chilean Compañía Sud-Americana de Vapores and Lloyd-Brasileiro were the only two domestic lines of any consequence in the sub-continent which loaded for European and North American ports.[47] Indeed much of the riverine and coastal service was in expatriate hands although here flag discrimination slowly limited the opportunities available to foreigners. Consequently overseas tonnage carried most of Latin America's foreign commerce and a substantial portion of her coastwise trade. The fact that Latin America exported almost all her major commodities, rather than consumed them at home, added to her dependence on foreign shipowners as part of a complementary marketing organization to distribute produce abroad. If not the main agrarian staple — the values of world production of rice, wheat and sugar were larger — the proportion of coffee, pre-eminently Brazil's, entering international trade was the highest of all agricultural goods before 1914.[48] Probably ninety five percent of Brazil's coffee was exported giving the foreign interests at the ports of Rio and Santos an undeniable economic influence. Similarly nearly all Chilean nitrate was shipped abroad where a better price could be obtained from richer European farmers, boosted by beet sugar subsidies, rather than used locally. Argentina, quite unable to consume the quantities of cereals and meat which her fertile *pampas* produced, thus sought wider overseas markets and the cocoa crops of Ecuador and Venezuela were almost entirely exported.

What was the role of British shipowners in Latin America before the First World War and what impact did they have on the region's commodity exports? With a headstart in the development of international steamshipping and enjoying established maritime links with Latin America, Britain inevitably supplied the bulk of transoceanic shipping on which the republics depended. As Table 3 shows she accounted for more than fifty percent of foreign tonnage at Buenos Aires and Bahía, and on the West Coast her share if less marked was still substantial. From the 1870s enterprising British merchants and shipowners like Lamport & Holt, dissatisfied with existing services as trade expanded, increased the frequency of their sailings, widened the range of their ports of call and improved the quality of their operations, sweeping aside the quasi-monopoly which firms like Royal Mail had once enjoyed. In 1869 five regular lines contested the Brazilian trades; in 1872 *The Economist* reported almost daily communication between Argentina and Britain as PSN and Lamport & Holt introduced weekly services from Liverpool; and from 1875, observed Mulhall, the River Plate's busy harvest season

TABLE 3

BRITISH AND GERMAN CALLS AT SELECTED PORTS 1903-1911*

Year	Buenos Aires				Bahía			
	Britain		Germany		Britain		Germany	
	'000 tons	%	'000 tons	%	'000 tons	%	'000 tons	%
1903	1939	56	421	12	528	49	332	29
1905	2398	59	452	11	483	40	320	27
1907	2237	57.5	517	14	860	57	358	25
1909	3128	58	638	12	1003	57	468	28
1911	3655	61	645	11	1034	56	485	27

*Percent of total foreign calls at the port. Source: British Parliamentary Papers, *Annual Consular Reports.*

attracted nearly fifty steamers a month.[49] In response Royal Mail introduced a second monthly line to the East Coast; in 1888 additional sailings were announced and soon regular freighters were being loaded. Just before 1914 when Owen Philipps (later Lord Kylsant) was chairman the company rapidly expanded its services and operating frequency.[50]

Not only more frequent sailings but a wider and more flexible itinerary characterised British shipping in Latin America during the nineteenth century, responding to and accelerating the pace of development in the republic's commodity trades. The Brazilian coffee trade (in which apparently Britain, who consumed relatively little was badly placed) reflected such changes.[51] By 1913 British shipping carried some five million of the thirteen million bags exported by Brazil, as Lamport & Holt and the Prince Line loaded for New York against determined German opposition. Royal Mail made Santos a terminal for two services loading for Le Havre where much coffee for Europe was shipped, and later for New York.[52] Express services were introduced to exploit the increasingly lucrative opportunities at the South Atlantic ports by omitting the smaller calls, but modest subsidies later encouraged the shipping lines to load at minor ports like Maceio in northern Brazil, thereby developing trade there.

Such changes, which sharply redefined Britain's role in the Latin American trades, inevitably required larger ships with higher speeds. The pace of change should not be exaggerated. Although steam represented the bulk of long haul entries at Rio de Janeiro from the 1870s,[53] the shipment elsewhere of low value cargo — coal out, grain or nitrate homewards — employed sail long after its disappearance elsewhere.[54] Indeed the quality of British tonnage on the South American routes

according to some observers was sub-standard, especially the steamers of the Royal Mail Steam Packet Company which resisted the compound engine until the 1870s and did not order its first steel ship, the *Orinoco,* until 1887.[55] "The English steamers," noted Turner in 1892, "are much below the average...both for speed and comfort. Some of them are veritable 'old tubs'."[56] As late as 1911 Towers, H.M. Minister at Buenos Aires, reminded Royal Mail of the continuing dissatisfaction.[57] Royal Mail in fact continued to give preference to its subsidised service to the West Indies, providing little purpose built tonnage for South America. They were reluctant even to introduce the refinements of late nineteenth century ocean travel — electric light, airy saloons and quarters amidships.[58]

Nevertheless, as elsewhere established, shipowners in Latin America exploited the technological advances in engines, boilers and steel hulls which enlarged carrying capacity and increased performance in order to defeat rivals. By the outbreak of war in 1914, Royal Mail under Philipps's chairmanship operated purpose built lines of steamers to the East Coast of Latin America, thus signalling "the beginnings of a vigorous and go-ahead policy" in Moorgate Street.[59] From 1905 the 'A' class passenger liners like the *Aragon* and *Arlanza* as well as the 'P' class of freighters showed that the struggle for technological supremacy against the German companies was no less keenly fought at Rio and Buenos Aires than on the North Atlantic. "Royal Mail," reported H.M. representative at Buenos Aires in 1905, "has improved its passenger service very much of late as far as accommodation is concerned."[60]

British shipowners increasingly ordered specialized tonnage for the South Atlantic, profoundly influenced by the growing importance of the refrigerated meat trade[61] where Britain, the major consumer, enjoyed promising opportunities. Salted and dried meat from the River Plate with a ready market in Latin America, gained no outlets in Europe, while regular shipments on the hoof, important for a time, ended when Britain imposed import restrictions on livestock to prevent the spread of foot and mouth disease. Refrigeration which was demonstrated successfully as early as 1875 brought a new dimension to the meat trade, although it was slow to develop. Meat shipments from the United States were established earlier and in the 1890s Australia and New Zealand shipped nearly double the volume of frozen mutton which the River Plate exported. But from the 1880s British capital entered the meat packing industry, and British shipowners introduced freezing capacity to their fleets. Although Royal Mail adapted the *Tagus* to carry frozen meat in 1883 for the River Plate Fresh Meat Company, founded a year earlier, it was Houlder Brothers loading for James Nelson & Co. at Sansinena, and H. & W. Nelson with

their own fleet and establishing their *frigorifico* at Las Palmas, who first became leading meat carriers.[62] Other shipowners like MacIvers — whose shallow draught steamers loaded at upriver *frigorificos* — Lamport & Holt and Donaldsons also entered the trade. From the turn of the century, however, as declining exports from the United States and the successful carriage of chilled beef from the River Plate rapidly expanded Argentina's meat traffic, Royal Mail reappraised its position and introduced refrigerated holds to all new liners, constructing specialist carriers for a direct service to Liverpool and arranging exclusive shipping contracts with the major meat packers.[63]

British shipping companies which borrowed on favourable terms in London, invested in a range of harbour facilities, lighterage and coaling to complement their shipping operations and to fill gaps in existing services. Although not on the scale developed by British shipowners elsewhere,[64] PSN formed the Callao Dock Company in 1863 becoming an important supplier of such ancillary services at the multiplicity of small ports and open roadsteads on the West Coast.[65] Both Royal Mail and PSN owned land off Rio and Panama for bunkering and anchorage while the Booth Steamship Company worked lighter and tug services at the Amazon ports.[66] Such services not only extended shipping facilities but contributed to providing Latin America's essential infrastructure at low cost.

Thus improved technology, the widening of routes and services and the introduction of higher quality and specialized tonnage brought a revolution in international transport and communications for Latin America which removed the obstacles to overseas trade imposed by distance, and reduced costs. The building of bigger and better shipping, boosted by substantial investment and government subsidies, increased carrying capacity faster than cargo which inevitably lowered freight rates. More efficient ports, shorter turn round times, ancillary services and the opening of the Panama Canal cheapened and shortened voyages, bringing Latin America closer to markets and sources of supply. Voyage times from Europe to the East Coast fell sharply to around three weeks, accelerating postal communications, the arrival of orders and the transit of perishable meat products. Merchants, assured of regular stock replacement, held smaller inventories and had fewer goods in transit (which cut costs), and they disinvested from shipowning, which lowered their capital needs, their fixed costs, and hence their margins. Frequent overseas transport diminished commercial risks. Shipments of Latin America's commodities when demand was buoyant no longer encountered the problem of falling prices on arrival after months at sea. The establishment by the British of regular international steamship services with Latin America was consequently of importance to the

development of her trade and therefore to her economic growth. A further result was that the interest and investment engendered by Britain's shipping companies played a crucial role in ensuring that Latin America developed an essential infrastructure for the local economy.

4

The developmental role of British shipping in Latin America's export trades in the late nineteenth century represents only one side of the relationship between expatriate shipowners and less developed countries. A high degree of dependence on foreign tonnage can create a perceived community of interest, but more often arouses hostility associated with fears of overcharging and complaints of poor service. Britain's share of tonnage in Latin America, admittedly substantial, is not alone evidence of control or exploitation since her businessmen, perhaps more efficient than their rivals, may still have acted harmoniously with local interests. What needs to be established is where the points of friction lay between British shipowners and Latin America and which options were available to the republics. In short what were the limits to, and extent of, the influence of British shipowners in the control of trade and development in Latin America?[67]

Exclusive contracts and concessions obtained by both Royal Mail and PSN from the 1840s, which prevented free competition and protected privileged monopolies, constituted one area of friction. In addition to their subsidized mail contracts from H.M. Government which angered rival British owners, they negotiated smaller subventions in Latin America, and as mail carriers enjoyed a range of concessions in local ports. Supporters of *laissez-faire* in England widely condemned the contracts, while English observers in Latin America like William Hadfield believed that Royal Mail's monopoly was "exercised injuriously for the interests of the countries they were trading to."[68] Senator MacIver from Chile condemned contracts with PSN which "have given bad results for our commerce."[69] The damage of these privileges to competition and development in Latin America should not be overrated. Very often insufficient business to attract ordinary commercial services in the long haul trades, when steamships carried little cargo but burned much fuel, necessitated subsidies. The major ports which handled the bulk of Latin America's exports experienced little shortage of tonnage, as shipowners responded to the expanding commercial opportunities offered by the quickening pace of economic development at the end of the century.

A far greater cause of dispute between Latin America and British shipowners was rate control and the limitation of competition, which raised transportation costs in the commodity trades. Issues of mutual

interest like berthing arrangements forged links between shipowners; and Royal Mail and PSN despite intervals of independent working, cooperated closely at the Isthmus of Panama where their services were linked by rail.[70] Rate control, apart from the apportionment of revenue under through passages and bills of lading, developed later as shipowners invaded each other's territory. In 1862 Royal Mail negotiated an agreement to blunt the competitive edge of the Compagnie Generale Transatlantique in the Caribbean, and in 1868 proposed a 'discussion of mutual interests' with PSN which was loading for the Plate.[71] In the changing market conditions at the end of the nineteenth century, when available cargo space outstripped the rising volume of trade and hence lowered freights and profits, "working agreements...became a sheer necessity."[72]

Shipping in Latin America was slow to develop the conference procedure first introduced to the Calcutta trade in 1875. The seasonal nature of business, continued use of sail for the low value cargoes, and uncertain development in the republics all delayed the first formal agreement until 1896, the international Brazil and River Plate conference, and the West coast lines did not come together until 1904.[73] Conferences particularly suited liner companies like Royal Mail and PSN, whose highly capitalized business and inelastic operations required high density payloads but who were vulnerable when casual poaching by tramp steamers creamed off trade at seasonal peaks. By 1913 most of the major shipping lines in Latin America either maintained membership or tacitly adhered to the rules of conferences, which arranged spheres of influence and adopted a range of tactics like fines for breaches of agreements, secrecy, oral as well as written undertakings and restricted membership.[74]

Conferences were pricemakers on a large scale, introducing a comprehensive classification of goods with common tariffs but permitting differentials to members with inferior services. Grounds for concern on prices and profits existed since rates profitable to the weakest member may be excessive to the stronger, preventing shippers from enjoying the economies of efficiency. To retain more continuous control conferences limited output and apportioned business under spatial monopolies to avoid direct clashes on berths. Firms loaded exclusively for Northern or Southern Brazilian ports, while each member line shipping coffee for New York accepted a quota of sailings. Members' earnings might be pooled and divided pro rata to ensure a fixed distribution of revenue, while large contracts were shared amongst member lines, identical quotations preventing the shipper from obtaining better terms. Tying arrangements like discounts on long term contracts and the deferred rebate, by which shippers were repaid a portion of their freights after a period (usually six

months) of exclusive loyalty to the conference, raised barriers to entry still further. "The regular lines, by means of the rebate system," Vice-Consul Sandall reported, "have striven for a number of years...to keep the bulk of the coffee trade exclusively in their hands."[75] Conferences also berthed 'fighting ships' which offered loss making rates to expel an unwanted outsider. The South American routes, explained Professor Hyde, had "emerged from an initial period of unregulated growth and now became subject...to systematic control."[76]

Other commercial links in Latin America extended the power of British shipowners to the possible detriment of commodity exporters. Railways like those linking the Pacific to the Atlantic formulated exclusive through agreements, which tied shippers dependent on railways for an export outlet to privileged steamship companies, a tactic which blatantly discriminated against Ecuador's cocoa, a high-value, perishable commodity perforce shipped across the Isthmus.[77] The fact that British steamship agencies were held by large merchant houses who handled Latin America's commodity exports at ports like Santos, Buenos Aires and Valparáiso, seemed to reinforce expatriate control over the domestic producer, the small native merchant and the local economy. Richard Graham, for example, writes that "Great Britain's control of the world's largest shipping trade gave it one more stake in Brazil's import-export economy."[78] Both shipowners and merchants had a vested interest in raising handling charges and in maintaining the monocultural export orientated economy at the expense of import substitution and diversification, which might damage their long term interests.

Concentration of financial and administrative control by amalgamation and merger additionally restricted competition and imposed terms more permanently. From 1900 a small number of large liner companies absorbed an increasing share of British tonnage especially of twelve knot ships of four thousand tons or more. Royal Mail in addition to acquiring interests in the Mediterranean, Africa and the Far East, purchased three of its main rivals in the South American trades, PSN (1910), Lamport & Holt (1911) and Nelson (1913).[79] Furness-Withy worked Manchester Liners, Houlder Brothers, the Prince Line, and the British & Argentine Line, which all loaded for the East Coast. The merger policies of British liner companies may have placed Latin America at the mercy of an oligopoly of corporate shipowners.

While firm conclusions may not be possible it seems likely that local fears of exploitation, particularly through the conference system's powers to effectively lower Latin America's export earnings and to raise import costs,[80] were overdrawn. Clear limitations on the discretion of foreign shipowners existed. Large shippers who played off members against each other, chartered outsiders or operated their own tonnage, exercised

considerable countervailing power. Consequently it was in the interests of shipowners to preserve the small man against the dominance of the larger houses, rather than destroy him. Nor were conference agreements maintained for long without interruption as ordinary market forces proved a continuing restraint on members. Despite substantial barriers no monopoly was safe for long in the international shipping trade, in which units attracted by rising rates were easily transferred. Conferences remained unable to control the bulk, low value trades which tramp ships loaded, a substantial part of Latin America's cargoes. Moreover internal instability, as disaffected conference members offered 'illegal' rebates and sought a larger market share, prevented permanent control. Further, non-price competition was not eliminated.[81]

Official intervention both at the local level and by the central authorities also restrained British shipowners, less to help all shippers — the largest were foreign and well able to take care of themselves — but to protect the smaller native producer whose net income was threatened by rising rates. Rigorous application of port regulations and the withholding of berthing privileges reminded British shipowners of the powers available if their tactics became unacceptable. Local competition, admittedly weak before 1914, gave Latin American governments a further weapon against foreign shipowners. Coastal and riverine services were increasingly limited to native concerns, subsidies were offered to competing shipowners and the promotion of local ocean tonnage by Chile and Brazil offered direct competition.

Conferences offered shippers real advantages — frequent, efficient, stable services by first class tonnage, whether full cargoes were available or not — which permitted confident forward planning. Merchants like Hard Rand, coffee shippers at Santos, expressed strong preferences for quality shipping even under higher rates (which only formed a fraction of final cost) and did not oppose the deferred rebate if it guaranteed regular shipment and safe handling of valuable cargoes.[82] In fact the real cost of ocean transport fell sharply during the late nineteenth century and did not return to its old levels even by 1914,[83] which does not suggest that the power of organized shipowners was excessive or that ordinary market forces did not apply. "Despite some noticeable exceptions," explained Professor North, "the ocean freight market was competitive...and the long-term secular decline in the nineteenth century reflected the operations of an impersonal market."[84]

5

It was customary to assume that ocean steamshipping forged a crucial link in the chain of international economic interdependence,

integrating advanced economies with the less developed and overcoming the inefficiencies of internal transport which prevented contact overland. The impact of innovations in transportation has since been questioned, as the controversy surrounding the effects of railways on economic growth[85] and the concept of 'social saving' demonstrates. 'Social saving' examines the importance of an innovation from observed facts and from postulations, measuring the difference in the costs of economic output under two states, the actual which includes the innovation, and the hypothetical alternative which excludes it. This technique which has been applied to steamshipping,[86] might on *a priori* grounds induce caution about the impact of British shipping in Latin America.

From observed data too, it is probable that the initial economic impact of steamshipping in Latin America was unimpressive. Expensive early tonnage was better suited to short haul trades, and without steamships the use of sail would have continued. An inadequate infrastructure, commercial backwardness and political instability all prevented the acceleration of economic performance until the last quarter of the nineteenth century and discouraged the use of steamships. And even from the end of the century it is still debatable whether British owners opened the way to economic growth in Latin America particularly to the export of primary commodities, or whether they simply responded to the opportunities created by other influences. Indeed if the British had refrained from steamship enterprise in Latin America, the gap thus created would have been filled by German, Italian or French lines, all with a sizeable stake in the republic overseas trade.

The problem still remains whether British owners far from promoting economic development in Latin America, in fact exercised an unwelcome influence over the commodity trades. Local merchants, officials and the public resented what they took to be a dependence on expatriate shipowners. Senor Subercasseaux expressed his fears to fellow deputies in Santiago of "complete absorption of the Chilean flag by foreigners, the purchase of our companies by foreigners; once this is realized, the companies which dominate the Pacific could impose rates at the maximum that trade and passengers could bear."[87] The American Consul at Pará agreed that British shipping firms "have not used their monopoly in such a way as to win popularity."[88] Lines loading at small ports enjoyed enormous advantages, which apparently reinforced Britain's commercial and monopolistic position. Subsidies, the conference system and deferred rebates reduced the level of competition and raised charges to local producers. Moreover British shipping could be regarded simply as part of that agro-export business, benefitting only the partnership of expatriate capitalists with their rich and powerful local allies in Latin America, which condemned the republics to producing one or two primary

commodities without concern for their long term economic interests.[89]

Argentina apart, Latin America remained of somewhat peripheral interest to Britain's trading and maritime network before 1914, which further reduces the force of the British connection. For Britain's owners the North Atlantic or routes linking the Dominions always assumed more prestige and importance. Even those companies like Royal Mail which had pioneered steamship links with Latin America abandoned most of their coasting services and small ports of call to the Germans or local carriers,[90] and diversified into other trades.[91] The strong links and substantial investment which companies like Elder Dempster developed in West Africa, anticipated or owed much to the extension of Britain's formal rule there[92] — conditions quite different from those facing Royal Mail and PSN in South America.

With these reservations in mind it is clear that by the end of the nineteenth century, whatever hypothetical alternatives might be suggested, modern steamship links had become in practice essential to Latin America. They formed part of the infrastructure crucial to growth, since the republics depended on shipping abroad a narrowly based range of primary commodities. Within this export pattern British shipping dominated foreign tonnage in Latin America's ports, providing an increasing range of high quality services in its own interests but with benefits to the local economy. Without British investment in shipping and ancillary services which increased trade and attracted further funds, economic growth in Latin America would probably have begun later and at a slower pace. In the final analysis the influence of British shipping on Latin America's economic performance and especially on her exports may be less than has been previously supposed. But on balance that influence was still substantial, a force for growth if not always for development.

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77. Lincoln Hutchinson, *Report on the Trade Conditions in Central America and on the West Coast of South America,* Special Agents Series 9 (Washington, 1906); C.M. Pepper, *Report on Trade Conditions on the West Coast of South America,* ibid 21, (Washington, 1908).

78. Graham, *Britain and the Onset of Modernisation in Brazil,* p. 88.

79. E.T. Chamberlain, "Liner predominance in Transoceanic Shipping," *Trade Information Bulletin,* p. 448 (Washington, 1928), passim; S.G. Sturmey, *British Shipping and World Competition* (London, 1962), pp. 364-9.

80. P.P., *Consular Reports (Brazil),* 1914-16, LXXI, p. 179 suggests that freights rose from 15.3 to 18.3 per cent of Brazil's import bill, 1905-12.

81. Greenhill, "Shipping, 1850-1914," in Platt (ed.), *Business Imperialism,* 136 et seq.

82. Alexander Committee, evidence, pp. 60-83 and report, pp. 162-3; see also P.P., *Royal Commission on Shipping Rings,* QQ. 19155-66.

83. A.K. Cairncross, *Home and Foreign Investment 1870-1913* (Cambridge, 1953), pp. 132 and 176; E.A.V. Angier, *Fifty Years' Freights, 1869-1919* (London, 1920); E.S. Gregg, "Vicissitudes in the Shipping Trade, 1870-1920," *Quarterly Journal of Economics,* XXXV (1921), pp. 603-17; Aldcroft, "The Depression in British Shipping," p. 14.

84. Douglass C. North, "Ocean Freight Rates and Economic Development 1750-1813," *Journal of Economic History,* XVIII (1958), p. 539.

85. Kent T. Healy, "Transportation as a Factor in Economic Growth," *Journal of Economic History,* VII (1947), Supplement, pp. 72-88. The literature on the effects of railways is vast.

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86. Gerald Gunderson, "The Nature of Social Saving," *Economic History Review,* XXIII (1970), p. 209, note 3.

87. Chile, *Cámara de Diputados, Diario de Debates,* 15 December 1909, p. 909.

88. United States Monthly Consular Reports, February 1901, LXV, No. 245, pp. 216-17.

89. See, for example, Hernán Ramírez Necochea, *Balmaceda y la Contrar-revolucion de 1891* (Santiago, 1972), pp. 36-41; R. Graham, "Sepoys and Imperialists: Techniques of British Power in Nineteenth Century Brazil," *Inter-American Economic Affairs,* XXIII (1969-70), No. 2, pp. 23-37.

90. P.P., *Consular Reports (Rio Grande do Sul),* 1892, LXXXI, pp. 364-7 and 1902, CV, pp. 378-9; Platt, *Latin America and British Trade,* pp. 119-20; *The Economist,* 28 September 1901, p. 1437.

91. Royal Mail diversified into the Far East (Shire and Glen Lines), Australia (Orient-Pacific Line), West Africa (Elder Dempster), South Africa (Union-Castle), Mediterranean (Mersey Steam Ship Company) in a series of mergers just before 1913, see Sturmey, *British Shipping and World Competition,* p. 336.

92. Davies, "The Impact of Expatriate Shipping Lines," passim.

12. DISCUSSION FOLLOWING PAPERS BY FAIRLIE, MATTHEWS AND GREENHILL*

ALEXANDER wondered if Greenhill's primary interest in the steamship trades between South America and Britain might lead to an underestimate of the opportunities for sail before 1880? That is, a very common trading pattern for Yarmouth vessels was to load in South Wales and clear for Argentina or Brazil and discharge in Europe rather than the U.K. Hence if you were looking at the return traffic to Britain, South America might look unimportant before the late 1870s, but not if you were looking at it from the European side.

WILLIAMS also thought it was possible to underestimate South American trade particularly in the first half of the nineteenth century when commodities such as coffee and sugar could not enter the British market because of the very heavy differential duties. Hence vessels always went up to the Northern European ports, such as Antwerp and Hamburg, and then came back to Britain.

GREENHILL agreed that on the basis of what he had heard the previous day he might have underestimated the opportunities for sail. There were opportunities in the West Coast guano trade from the 1850s, and from as early as the 1820s there were export surpluses from Brazil in sugar, cotton and some coffee. The great growth in the coffee trade, however, is after 1860 for it depended upon the railways bringing the coffee down from the plantations to ports like Rio and Santos. However the quantities were small relative to what would develop in the last quarter of the nineteenth century, and while British vessels were involved in the cross trades South America was not a substantial area for British maritime development until 1870. He was still convinced that South America was not an early developer, although one of the problems of establishing this point more firmly is the continuing absence of comprehensive national income estimates.

ALEXANDER referring back to the discussion on Capie's paper asked if Greenhill would agree the rather slower development of trade with South America was connected to the fact that the region was not part of the Empire?

GREENHILL thought it was. Britain took goods from Latin America only if she could not get supplies from the Empire. Empire and South American supplies were frequently competitive and the quality of products from the Empire, as with the New Zealand meat trade was often better than products coming from Argentina and Uruguay. Only about ten percent of British trade was with Latin America despite the

fact that around twenty five percent of her investments were there, and so trade did not follow investment.

CAPIE disagreed with this in respect to the meat trade. He had calculated price and income elasticities of demand for meat from Argentina, Australia and New Zealand and had found that New Zealand lamb and Argentina beef were quite close substitutes. If Britain was looking for imported beef she would go to Argentina.

GREENHILL agreed that Argentina was much more competitive in the beef trade. The frozen beef, however, was not of very good quality and the better quality chilled beef came out of the U.S. in the 1890s. Around 1900 American chilled beef exports began to fall as domestic consumption expanded. As a result Argentina was able to fill the gap, and after 1900 chilled beef exports begin a very rapid rise. For shippers the barriers to entry into this trade were high because of the cost of outfitting vessels. For this reason most of the big packers had to sign long term contracts with shipowners, and before 1914 Furness Withy and Royal Mail dominated the Argentine-U.K. trade and put quite a squeeze on the packers. After World War I the Vestey Group with large amounts of capital available and packing operations in Australia as well as Argentina, got fed-up with this situation and built their own fleet, the Blue Star Line.

CRAIG had several points to make. First, there were a number of profitable cross trades with Latin America, such as Brazilian coffee to South Africa, and during the Boer War the live horse trade from Argentina. Secondly, reefer ships were very expensive. To fit out an ordinary dry cargo ship for refrigerated cargoes in the late nineteenth century could cost as much as £20,000 merely for the cost of putting in the insulation, the fittings for hanging the meat and the equipment for refrigeration. You could build a new ship for the same price. One of the consequences of this was that these ships were significantly faster — two or more knots faster than the standard cargo vessel. This in turn encouraged owners to turn these ships into passenger vessels to ship live meat — people — as well as dead meat — refrigerated meat.

GREENHILL added that we should not forget that in the 1890s Argentina also shipped live animals, in dreadful conditions, to the British market, with the cattle being slaughtered at places like Deptford and Liverpool. Under the pretext of controls against foot and mouth disease, but actually in response to pressures from British farmers, this was stopped around 1901 which gave an impetus to the expansion of the chilled meat trade.

ALEXANDER asked Fairlie if she thought the engine of the Canadian grain trade was British demand or Canadian supply given that between the 1840s through the 1860s Ontario grain surpluses were

largely absorbed in filling Quebec deficits?

FAIRLIE replied that from the British viewpoint the answer is quite simple: it is a question of availability of supply tied in with freight rates. Moreover until the 1890s settlers tended to go to the American rather than the Canadian West because it was just that degree more congenial and accessible. After that the American frontier was closed and settlers shifted into Manitoba when the transport situation was improved. Transport as far as the direct trade to Britain is concerned, was always a crucial factor plus after 1896 the rising prices. What is interesting is that the various sources of supply do alternate. You get periods when Russia was important, and then for internal reasons she goes down and America comes up, and vice versa. You can argue about whether it is America that calls the pace; I think on the whole it is, certainly there was alternation.

FISCHER asked if there is any evidence of sailing shipowners trying to develop a conference system?

CRAIG replied that there were efforts particularly after the Boer War and the end of the Spanish American War when freights had simply vanished, and various efforts were made to bring together tramp owners both steam and sail to withdraw tonnage. But the great trouble with tramp tonnage is that it is international and it is very difficult to bring all these people together.

GREENHILL added that the conference system for South America was quite late in developing. On the East Coast the deferred rebate system was not established until about 1896 and on the West Coast not until 1904. None of this had much impact on sail because they were loading very different kinds of cargoes than the liners.

FISCHER asked why it was that Canadian voyages to West Coast South America fall off in the 1870s and do not pick up in the 1880s.

GREENHILL thought it was probably because in the 1870s the best guano deposits had been mined out. In the 1880s when Chile took over the nitrate fields from Peru there was a very rapid increase in exports, but the destinations for these exports in the 1880s was different from those of guano in the 1860s. In the first period Britain bought quite a bit of guano, but very little of the nitrates in the 1880s when Central Europe was the big consumer.

CRAIG added that it was more efficient to move these cargoes in iron-hulled vessels. In addition since the trade was mainly into Europe, this provided the basis for the Germans and French with their big iron hulled barques to monopolize the trade.

FISCHER wanted to know the extent to which liners had penetrated the South American trades by the late 19th century.

GREENHILL thought that in Latin America the distinction between liners and tramps was less rigid than elsewhere. A lot of Brazilian coffee was carried by tramp ships, shippers refusing to pay the high freights of the conference lines. But in trades like refrigerated meat the tramp simply could not operate.

FAIRLIE noted that in the North American grain trade it was principally steamers and liners from about 1870 on the East Coast, but on the West Coast the sailing vessel carried on in the trade until a surprisingly late date.

BATTICK commented that with a number of these trades in South America and the Pacific, the longevity of sail is explained by the shortage and high cost of coal. For example lumber was still being imported into Hawaii in schooners up to the Second War. In South America the expansion of steam was restrained by the fact that coal was not mined there.

*NOTE: Illness prevented Professor Matthews from attending the conference. His paper was read by Professor Gerald Panting.

13. THE COPPER ORE TRADE

ROBIN CRAIG

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THE COPPER ORE TRADE

Robin Craig

Oftimes to me come memories of fifty years ago
Of Valparaiso, Carrizal, Coquimbo, Callao;
Of sweltering in the tropics, freezing off the Horn,
Pamperos off the River Plate — sails to ribbons torn.
Of running down the Easting, rolling in the Bay,
Soundings in the Channel (counting up our pay).
Slush lights lit the forecastle — a dark and dismal den,
Menu, salthorse, pantiles; wages two pounds ten.
Groping up the Channel, light gleams on our lee;
Daybreak — Lundy Island, first landfall to see.
Faces then were smiling, never a sneer or frown;
For we knew we'd shortly be in 'dear old Swansea Town'.
But age is ever creeping on, my action's getting slow,
It won't be long 'ere eight bells strike my final watch below.

Most of the world's commodity trades, if we think of them as the shipowner does in quantitative rather than value terms, were conducted in rather humdrum ships which tend to be neglected by maritime historians. The trades which gave sustenance to literally thousands of bulk carrying cargo vessels, both sail and steam, are rarely explored or analysed. It is very appropriate therefore, that Memorial University's Maritime History Group should direct the attention of scholars to some of the implications of a few of the world's major commodity flows from the point of view of the shipowner, the shipbuilder and the seafarer.

On most of the world's main trade routes at any time there would exist a demand for vessels having certain optimal characteristics. Routes no less than cargoes might determine, especially for most of the nineteenth century, the choice of sail or steam. The facilities offered by ports and harbours would be a critically important consideration to be carefully assessed by shipowners, charterers and merchants and would influence the kind of vessel to be employed. The relative volume/value ratio of the cargo to be carried would play its part in determining the freighting operation, and any peculiarities of the cargo itself would similarly modify the methods adopted in conducting the trade. Special skills or know-how would come to reside in shipowners and shipmasters who made particular trades their principal concern. So called entrepreneurial failure or decline may sometimes have been no more than the collective wisdom of men who quite rationally elected to bow out of operations when the demand for their particular specialism declined. Most entrepreneurs

are, after all, the ultimate prisoner of their enterprises. These considerations are illustrated by the copper ore trade centred in the Swansea region of south Wales,[1] and this paper explores some aspects of this activity in the hope that some of the conclusions may prove to have some more general implications.

1

The copper ore trade of the Swansea region attracted the attention of writers as various as Charles Darwin,[2] Basil Lubbock,[3] Joseph Conrad,[4] and Frank T. Bullen[5] as well as more than one generation of shiplovers and maritime historians since their day. This must be my excuse for examining some aspects of a maritime activity, which was not of great international significance, but which has some points of continuing interest.

Copper smelting in the Swansea district dates back to the seventeenth century, and from the outset it involved a good many ships even though the traffic was for long confined to coasters and short sea traders. However, some copper ore reached Swansea from distant parts and at least one vessel brought a cargo of copper ore from New York in the early eighteenth century.[6] The Swansea region soon became the world centre for non-ferrous metal smelting, owing its pre-eminence to the abundance of suitable smelting coal, the presence of three fairly easily navigable rivers, and its proximity by sea to the main early source of ore, namely Cornwall. The factor that contributed most to Swansea's success in this field was the relative cheapness of water transport, and the fact that because such large quantities of coal were required to produce one ton of refined copper it was cheaper to bring ore to coal than vice versa, bearing in mind the absence in Cornwall and Devon of indigenous coal. As mining technology began to demand the use of the steam engine for pumping, ventilation and haulage, the South Western counties began to increase their imports of coal from the Swansea region and this traffic, by providing freights in both directions, materially reduced the cost of sea transportation.

As with other forms of smelting, copper refining was capital intensive and required an exceptionally skilled labour force: both capital and labour were attracted to Swansea and the investment in plant and the great skills accumulated by the workers gave the area a head start in the refining not only of copper but other non-ferrous metals also. It was soon established that the process of smelting was enhanced by mixing ores from different mines (as was the case with other kinds of metal smelting), so that contrary to a commonly held belief it was not just South American copper ore that came to be used, but ore drawn from a number of different

places including Newfoundland. It is to be hoped that aspects of the Newfoundland trade will soon be studied.

Nearly all the copper ore smelted at Swansea in the eighteenth century was shipped from Cornwall, or to a lesser extent from Devonshire, and perhaps fifty to seventy five small vessels were regularly employed by the second half of the century. Some indication of the strategic importance of the trade in wartime is suggested by an examination of the Admiralty register of 'protections' issued to exempt certain vessels from the attentions of the pressgangs. In 1776 for example, eleven vessels obtained protections "...employed in the service of the Cornish mines", of which eight of 780 tons were owned at Neath or Swansea, and three owned in Devon or Cornwall.[7] In the year 1793 there is mention of the very important trade in copper products — copper sheathing, bolts and nails shipped on Navy account and consigned to H.M. Dockyards.[8] In April 1803 twenty seven Swansea vessels aggregating 2,314 tons were protected in the copper and coal trades. By the 1820s more than 100 vessels were regularly employed in the traffic between Cornwall, Devon and the Welsh copper works.[9]

Not all these early ships in the trade were owned in Wales. Devon and Cornishmen were attracted, and many of them settled in the Welsh port and contributed considerably to the economic growth of the region in the nineteenth century. Their skills not only resided in shipowning and seafaring however, since it was a Cornishman by the name of John Wedge who prepared some of the most useful charts of the estuaries to which their vessels traded. Some of these charts served two generations of shipmasters trading to the South Wales harbours.[10] Bristol merchants also participated in the trade, since there is some evidence to suggest that colonial American copper ore was shipped across the Atlantic to Bristol in the eighteenth century and transshipped into smaller vessels for the short voyage to the South Wales ports. This transshipment of ore into smaller vessels, especially in the port of Liverpool, was to remain a feature of the trade in the nineteenth century: David Williams has noted that copper ore was shipped as ceiling freight in the cotton ships loading at Mobile. This ore had its origin at Puerto Cabello.[11]

The depth of water available in the harbours at Swansea, Neath, Penclawdd, Loughor and Llanelly were constraints upon the achievement of economies of scale in the consignment of ore. Because of limitations imposed by the predominantly tidal estuaries most vessels employed in this coastwise trade measured under one hundred tons. Similarly the vessels carrying the valuable cargoes of manufactured copper were also small.[12] This was often mirrored in the loading places of South West England, where conditions were little better than those of the Welsh ports. Paradoxically Swansea was among the last ports in South Wales to enjoy

the conveniences of a floating dock, despite the fact that Swansea's copper ore trade attracted more deep sea ships carrying more valuable freights than any other port in Wales in the first half of the nineteenth century. Wet docks in which vessels could load and discharge always afloat, were being constructed elsewhere on the South Wales seaboard from the 1820s, but most were the fruits of enterprise by individual entrepreneurs, of whom the Marquis of Bute at Cardiff was the most celebrated example.[13] Swansea was cursed with a Harbour Trust in which many interests were represented, but there was no dynamic leadership from any individual or group who could reconcile the diverse concerns of those entitled to express a view. Thus other South Wales ports developed floating harbours before Swansea had taken the plunge, yet manifestly Swansea's needs for such facilities were greater.[14]

The nature of the cargo itself posed exceptional problems for shipbuilders, shipowners and seafarers. Copper ore was among the densest of cargoes to be shipped. With a stowage factor of ten to fifteen it strained the hulls and top hamper of the wooden ships of the period to the utmost. When carried on the ceiling of the vessel the great weight rendered the centre of gravity extremely low, imparting great strain to the masts and spars in heavy weather or rough seas. The weight of the cargo was such as to leave much space in the holds, and without special precautions it was liable to shift, exposing ships carrying it to tremendous hazards. The stowage problem was exacerbated by the primitive conditions prevailing at most of the places where the copper ore was loaded, and it was very rare for the cargoes to be trimmed in the hold before the carrying ships sailed for Britain.

Recourse was had to the fitting of a wooden 'trunk' within the ship which raised the centre of gravity in the hull. By constructing the trunk with sides that sloped inwards towards the hatches the dangers of the cargo shifting were reduced. Despite such devices the trade made quite exceptional demands on the ships. Trunks were being fitted on board as early as the 1840s, and the phrase 'Swansea fitted' became known throughout the shipping world to denote a vessel equipped to carry copper ore.[15] The fitting of such a trunk (illustrated in some detail in the various editions of *Stevens on Stowage)* militated against the carriage of other cargoes, and it became the custom for ships to carry trunks that could be moved or dismantled when other cargoes were being carried. But the trunk was an expensive fitment[16] and it became the unpleasant duty of the ship's carpenter or bo'sun to crawl through the bilges when copper ore ships were exposed to heavy seas, in order to check that the trunk had not shifted or come adrift.

Risks were not confined to the vessels when they were at sea. Because the berthing facilities at Swansea were so poor ships lay aground in the

mud on the river bank at low water — a problem made worse by the high tidal range which existed in the Bristol Channel. The working of frames and planking as the tides flowed and ebbed can be imagined. This particularly affected the coppersheathed vessels employed on the more distant routes on which vessels were deployed after the 1820s.

If the shiplover knows anything about the Swansea copper ore trade, he knows that the trade required vessels to 'double' Cape Horn, that most notorious graveyard of sailors and ships. That is, ships had to sail from the Welsh ports with heavy cargoes of coal, coke, firebricks and fireclay, beat into the prevailing westerlies round Cape Horn and then sail up the West Coast of South America, returning to Wales with an even heavier cargo. Ships were involved in a remorseless, long distance shuttle that took little account of the seasonal dangers of the route. However this trade, important though it was, represented only one voyage pattern: there was not just one copper ore trade but several, and each had particular characteristics which tested the skills of those engaged in it.

Copper ore and its products came to Swansea from a variety of sources, of which we may notice here the most important. Anglesey,[17] Ireland, the Isle of Man, Sweden, Chile and Norway became sources in the first and second decades of the nineteenth century. The first Cuban cargoes arrived in 1831[18] as did the first freights from Venezuela.[19] Spain

TABLE 1

MAIN SOURCES OF COPPER ORE IMPORTS AT SWANSEA (TONS)

1873			1878			1883		
	Ore	Regulus		Ore	Regulus		Ore	Regulus
Portugal	1,493	—	France	2,170	—	Norway	1,423	—
Spain	1,612	—	Portugal	5,743	—	Portugal	1,541	—
Italy	2,771	—	Spain	4,389	—	Spain	1,956	7,165
S. Africa	7,985	—	Italy	3,234	—	Italy	5,278	—
Nfld.	4,940	—	Algeria	3,672	—	Algeria	5,161	—
Bolivia	1,023	—	S. Africa	12,317	—	S. Africa	19,551	—
Chile	—	17,165	Nfld.	18,248	1,082	Venzla.	22,534	3,020
			Venzla.	5,777	—	Bolivia	1,029	2,029
			Bolivia	4,234	2,247	Chile	—	4,373
			Chile	1,975	7,795+			
					1,676 unwr.			

Source: P.R.O., Customs 23/1,6,11.

was sending cargoes (via Bristol) in 1834, and partly smelted ore arrived from Philadelphia in 1836,[20] the same year as cargoes of copper slag were received from Rotterdam for further extraction of copper by the superior Welsh process.[21] Australia where the Kapunda and Burra mines began work in 1843 and 1845 sent cargoes from 1846, and cargoes arrived from New Zealand in the following year.[22] The first samples of the South African Orange River ores arrived in 1850 and mining began seriously in 1853[23] with Port Nolloth as the main shipping outlet. Ore from Bilbao in Northern Spain in 1854, Cathagena and Algiers in 1853, San Sebastian in 1857, and Huelva in the 1860s required tonnage on much shorter sea routes, but with undeveloped loading facilities vessels were exposed to considerable dangers, especially since many of the brigs and brigantines chartered for the traffic were the unsubstantial products of the Prince Edward Island shipyards. Californian ore was being sent to Swansea direct as early as 1861,[24] and the first cargoes from Tilt Cove, Newfoundland arrived in 1864/5.[25] Sudbury, Ontario was furnishing ores for the Welsh smelters in the 1870s,[26] while Betts Cove, Newfoundland became an exporter between 1874 and 1875.[27] Subsequently ore was imported from Sestri Levante and Skiensfjord in Norway. These shipments brought together an extraordinarily diverse assemblage of ores of very variable quality, ranging from little more than 12% to as much as 60% pure copper content.[28]

Although Swansea continued to receive copper ore well into the present century, the proportion of ore to semi-refined copper produce declined significantly from the 1850s when long term changes began to affect the traffic. These changes were encouraged rather than the reverse by the alterations in both tariff policies and the Navigation Laws in the first half of the nineteenth century. Although the duty on imported copper ore was relatively high before 1825 and remained substantial even after the tariff reductions permitted in that year, smelters had been accorded the facilities of smelting imported ore in bond for the purpose of re-exporting the resultant manufactured copper. While the Swansea smelters demanded a reduction in import duties, such a concession was stoutly resisted by the traditionally powerful Cornish mining interest despite the oft-repeated assertions of the Welsh smelters that high duties encouraged smelting overseas and robbed Britain of lucrative outlets for refined copper in Continental Europe.

In 1842 the duty on foreign copper ore was reduced, but this reduction was accompanied by the abolition of the privilege of smelting in bond — a retrograde step so far as the Welsh smelters were concerned. Before 1842 smelting in bond had allowed the possibility of ore being sent to Wales in ships of any nationality. Thereafter the Navigation Acts again prevailed so that the importing vessels had either to be British or vessels

belonging to the countries producing the ores. At this date there were precious few of the latter, whilst there was a dearth of the former thanks to the advent of the Peruvian guano trade. Freight rates homewards rose markedly as a consequence, and foreign tonnage was encouraged to carry copper ore direct to Continental ports to be smelted there rather than in Britain.[29] Of even greater long term significance was the stimulus afforded to producer countries to smelt on or near the sites of the mines. Thus in Chile for example, where inferior deposits of local coal could be utilized for smelting if mixed with a proportion of bituminous coal obtained from Wales, there was an incentive at least partially to smelt the ore, so that regulus or Chile Bars could be freighted to Britain at much lower comparative cost.

Although the repeal of the Navigation Laws threw open the trade to vessels of any nationality, a stimulus had been given to smelting in producer countries if adequate coal to achieve that purpose could be conveniently found. One of the effects of this was the attraction to such places of considerable numbers of Welsh smelters together with their families.[30] This gave a new source of income to shipowners putting their ships into the copper ore trade to Chile, South Africa and Australia, and the coal, firebricks, fireclay and machinery also helped to provide useful outward freight. It was very exceptional for the vessels employed on these deep sea, protracted voyages to have to sail in ballast from Britain.

Not all the copper ore, regulus or other copper produce came to Swansea direct. Consignments were imported through Liverpool[31] and to a lesser extent London, brought in vessels whose size prevented their breaking bulk at Swansea. Once the steamship liner trade was established on the West Coast of South America, with the inauguration of regular services by the Pacific Steam Navigation Company and Royal Mail Steam Packet Company, it was found that it was worth sending consignments of semi-manufactured copper (which could stand higher freight rates) to Liverpool for transshipment into small brigantines, schooners and ketches which made their way to Swansea, Briton Ferry, Neath, Llanelly or Burry Port where the main smelting houses were located. By the 1870s and 1880s an increasing proportion of this coastwise transshipment traffic was won by steamships, especially those operated on a liner basis. Similarly the trade in ores from the Iberian Peninsular, the Mediterranean and North Africa was increasingly taken over by cargo steamers rather than sailing vessels, the latter being relegated to the peripheral and minor loading places. Relatively few Swansea shipowners ventured capital into the steamships that played an increasingly predominating role: most tonnage was chartered by the copper smelters from elsewhere in Britain.

One of the salient features of industrial activity in South Wales in the eighteenth and nineteenth centuries was the extent to which entrepreneurs were drawn there from without by the economic prospects rather than generated from within the indigenous population. This was particularly the case both with the smelting of ore and the provision of transport services engendered thereby. We have already noted that Devon and Cornish shipowners and shipmasters were quick to avail themselves of the new opportunities that arose when ore resources in those counties were exploited. A similar trend was made manifest when Anglesey copper ore mines were developed.[32] A number of Anglesey shipowners and shipmasters, notably Treweek and Thomas,[33] participated in the coastwise shipment of copper ore from North Wales to South, and established connections with South Wales which were to persist even when the resources of the Anglesey mines were exhausted. Another early example of outside provision of transport services was the outcome of enterprise manifested by John Puxley, proprietor of important Irish copper mines who commissioned a small fleet of handsome schooners expressly for the purpose of conveying ore to the port of Swansea.[34] But the great inflow of outside capital and expertise was triggered not so much by coastwise shipments, but by the rapid growth in the import of foreign ore in the 1830s and 1840s (See Appendix I).

The proprietors of the smelting works were almost entirely non-Welsh. The Vivian and Bath families from Cornwall were perhaps the most prominent and they were joined in the Swansea district by such men as Richard Nevill, Henry William Schneider, Richard Bankart, Charles Lambert, and Pascoe, Grenfell & Co. Several of these firms owned their own ships which carried both ore and copper produce, but they often registered their vessels in the port of London rather than Swansea. Some of these firms were early pioneers in the use of the cargo carrying steamship, notably Schneider, Bankart and Vivian, while Nevill, and especially Bath, invested in sailing ships.

The non-Welsh element in the trade was exemplified by the new influx of shipowners who did so much to develop the import of foreign ores. John Richardson migrated from South Shields to Swansea and established a business as a copper ore merchant. He was also to become one of Swansea's biggest shipowners and an important shipbuilder of vessels designed expressly for the copper ore trade. A number of London shipowners became especially important in prosecuting the copper ore trade from Australia and New Zealand in the 1840s, notably Duncan Dunbar,[35] Sir John Pirrie and Wigram & Sons. These shipowners had wide even global interests, and the new opportunities presented by ore were

but a small part of their trading interests. None of these major London men was tempted to settle in the Welsh town. It was a different story however, for a number of Sunderland shipowners, who perhaps played the predominant role in exploiting the trade, to the extent that their activities were sometimes looked upon with some resentment by the local businessmen.[36] Outstanding among the Sunderland men was William Ord, who did not himself move to Wales but employed two north country shipmasters, Lawrence Tulloch and J.H. Simpson as managers in Swansea of his copper ore fleet. Both men stayed in Swansea and in turn formed considerable sailing ship fleets of their own. Other outsiders included Henry Hoskin and Bernard Hennessy, who both made names for themselves as shrewd shipowners in the Welsh port. Of the local Swansea men, none achieved greater success than William Richards and his children.[37] Enjoying close business and personal relationships with James Yeo of Prince Edward Island, William became an important Prince Edward Island shipbuilder, and forged links between Swansea and the Island that were to be maintained until the last decade of the nineteenth century. The Richards family and their associates, became owners of a vast fleet of softwood built sailing vessels engaged not only in copper ore shipments but in practically every type of shipping venture open to the sailing ship. The sleek barquentines constructed on Prince Edward Island up to the last decade of the nineteenth century were the outcome of two generations of experience in the shrewd deployment of sailing vessels on distant sea routes. Two other families deserve mention: the brothers Bowen came to own many fine sailing ships, some ordered new in the 1870s, others acquired secondhand from very celebrated London shipowners. John operated from Swansea, and William, father and son, from Llanelly, the adjacent port. Finally there was Simon Goldberg, one of that relatively rare breed, the Jewish shipowner. He had set up as a pawnbroker in Swansea but branched out into shipowning and came to own a splendid fleet of ships, mainly deployed in the copper ore trade in the 1870s and 1880s. Goldberg's iron barque *Hinda* was typical of the Swansea copperoresmen of the day, and all her voyages under Goldberg's houseflag are summarised in Appendix II.

The Bath family were ubiquitous, entering into every aspect of the copper trade. In the 1860s Edward Bath and his associates began an ambitious shipbuilding programme which resulted in the commissioning of a splendid little fleet of exceptionally well-found copper ore barques, all named after letters of the Greek alphabet. Bath and his partners adopted joint stock company organization in 1873 as the Swansea Merchant Shipowners Co. Ltd.,[38] with a nominal capital of £250,000 in £50 shares. The biggest shareholders in 1874 were Edward Bath, described as metal broker, J.C. Richardson, the ex-South Shields shipowner and shipbuilder,

and two colliery proprietors, Frank Ash Yeo and John Glasbrook. Shares were very widely distributed among the middle classes in Swansea and district, and among their number were farmers, metallurgists, drapers, hotel keepers, commercial travellers, a butler, a fishmonger and James Harris, a marine artist of some distinction who left behind him many fine portraits of copper ore ships depicted in Swansea Bay or off that characteristic landmark, Mumbles Head. The firm reduced its capital in 1888, with the ore trade in decline, and was voluntarily wound up in 1895. Another joint stock company was floated at Swansea in 1873 as the Swansea Merchants Co., with a capital also of £250,000. This was the Swansea Shipping Co., Ltd., with Thomas Cory, Thomas Ford and the shipowner and broker J.E. Burgess as its principal shareholders.[39] Most of the participants in this firm came from much the same background as the other Company mentioned, but capital was forthcoming from a rather wider geographical area. Shareholders included a ship chandler and a shipbroker in Valparaiso, and the well known Hamburg shipowner of Scottish descent, Robert Sloman.

3

The copper ore trade was renowned not for its shipowners, but more especially for its sailors and its ships, and any account, however brief, that failed to take account of both would be incomplete. First we must note that the trade was an excellent nursery for seamen of the best type. Men who had served on the Swansea copper ore barques could be ensured employment in any branch of the merchant service by reason of the training and experience that their arduous lives induced. The Chilean trade was especially testing of both men and vessels: extreme climatic conditions took a very heavy toll of both. Sometimes ships would spend many weeks endeavouring to round Cape Horn, and not a few came to grief in extreme southerly latitudes in which ice and icebergs were dangers as extreme as gales. It has to be remembered that the main characteristic of the vessels was that they were small — a vessel of five or six hundred tons gross was regarded in the trade as a large ship — and these small vessels were exceptionally heavily laden in both directions. Thus crews were subjected to extreme discomfort and often many weeks of continuous physical danger. Many ships went missing at sea, victims of ice, fog or the spontaneous combustion of their coal cargoes; some were lost within a year or so of being built, despite the acknowledged excellence of their construction.[40] Other ships were wrecked or had to be abandoned near Cape Horn, and their crews might struggle ashore to an inhospitable landfall, perishing in the severe environment in which they found themselves. Often the struggle to save a stricken ship was

protracted in the extreme. Such was the case of the iron barque *Kate Helena* of Swansea, owned by one of the most important local shipowners. Built in 1875, of 665 tons gross, she was only five years old when she left Swansea with 630 tons of coal and bricks on 1 August 1879. She encountered severe weather off Cape Horn against which she battled for no less than six weeks, with an increasingly exhausted crew constantly wet and bitterly cold. She was then struck by a hurricane which resulted in the loss of the entire main and mizzenmasts, the foretopmast and jibboom. With her bulwarks broken with the fall of her iron masts, and the decks torn apart round the mainmast, and with heavy seas breaking over her and entering the holds, the crew fought a long and exhausting battle to jettison the cargo and thus lighten the ship. For several days the men worked virtually without food, since during the storm the lazarette was broken open and such provisions as were not washed overboard were spoiled by the sea. Finally, the crew, utterly exhausted, were forced to abandon ship, which they did in Latitude 55° South, Longitude 73° West on 7 November 1879. Fortunately a passing ship picked them up, and most of the crew were brought back to the Mersey by the Pacific Steam Navigation steamship *Potosi* in January of the following year. Events such as these were the common lot of seamen employed in this dangerous trade which drew the very best qualities from the crews.

Undue emphasis must not be placed on the hazards of the Cape Horn trade, since other routes subjected seamen to equally severe dangers of an entirely different kind. The trade to Cuba and Venezuela was notorious for yellow fever. Many ships were sailed home to Swansea desperately short handed with crews decimated by the incidence of the fever. Not a few were lost almost within sight of home, as the pitiful remnants of an exhausted crew lacked the strength to withstand the hazards so often encountered in the gales which frequently swept the Western approaches. Many of the tombstones on the Gower coast are mute memorials to men who died on the homeward passage from Puerto Cabello or Santiago de Cuba.

Because the wage levels were relatively high in the immediate environs of Swansea, relatively few of the seamen were born and bred in Swansea itself. However, the Gower coast to the westward of Swansea furnished many seamen, and a characteristic figure was Captain James Bevan, a Gower man who went to sea at the age of fifteen and retired aged fifty eight. During his years at sea, he went round Cape Horn no fewer than fifty six times, many of them in command of the finest sailing ships to sail out of Swansea, notably vessels such as *Pembroke Castle, Foxhound, Agnes Lilian, Vanduara* and *Brynymor.* But perhaps the most fruitful recruiting place for young sailors was the county of Cardiganshire in extreme West Wales where economic alternatives to a life at sea were few and far between. The economy of the County was predominantly rural,

and pastoral agriculture furnished few jobs for the younger sons of farming folk. There was, however, a strong seafaring tradition reinforced by several generations of seafarers, and such small places as Aberayron, Llanon and Cardigan itself produced an exceptional number of well trained, skilful and resourceful master mariners. These men clung tenaciously to the skills and traditions of life under sail and were slow to embrace with any real enthusiasm life in steamships.

Wages were no real incentive for the life of seafaring. The Swansea Brig *Sketty Belle* was one of several vessels that made voyages to Newfoundland in the late 1870s and early 1880s, and typically the master received nine pounds per month and a commission on homeward freight; on a monthly basis the mate was paid £5.5.0, the bosun £3.10.0, the cook/steward £2.5.0, A.B.'s £3.5.0, O.S.'s £2.10.0 and the boy £1.5.0. Most ships were poorly victualled, with salt pork and the inevitable 'Liverpool pantiles' the staple diet. On the Chilean voyages particularly, victualling was a problem since the voyage might be accomplished quickly (the Swansea owned *Pacific* once went to Valparaiso in 68 days, and many vessels made the voyage in about 70 to 75 days) but could be very protracted. Voyages lasting 150 days or more were not unheard of, and crews would be on iron rations long before a landfall had been achieved.

4

A large proportion of the copper ore trade remained for a long time the preserve of the sailing ship. This was largely because of the geographical accident that much of the ore was found in the remoter regions in which steamships were at a disadvantage because of the lack of adequate bunkering stations and suitable coal. The West Coast of South America and the North Pacific Coast were among the last commercially profitable refuges of the sailing ship, and it was in such regions that Swansea sailing shipowners best found employment for their tonnage in the two or three decades before World War I. But there were other factors that encouraged the survival of sail in the Pacific and also inhibited the use of the steamship in other copper exporting ports. One was the draught limitation in the often primitive harbours, and another was the slow rates of loading and discharge.

We have already noted that the poor port facilities in Wales acted as a constraint upon the employment of large vessels in the copper ore trade. Facilities at Swansea improved markedly once wet docks were constructed from the early 1850s, but this had to be contrasted with the tardiness in improving the loading places where the ore was shipped. Many of the small loading places had but one commodity to offer, and

were unlikely to be a worthwhile object of heavy capital expenditure. But even in places which did have a various and growing trade, port facilities could still be a problem. Most of the Chilean ports were notoriously backward in this respect. At ports such as Iquique vessels anchored in an open roadstead, and cargoes were loaded and discharged almost entirely by the crews of the vessels using hand winches, until the advent of the donkey boiler. The working of cargo was, as a consequence, very slow and a rate of fifty tons in a twelve hour day was regarded as exceptional. It was not only the limits to the physical capacities of the ship's crew and gear that protracted port time, but also the size, availability and number of boats and lighters to convey cargo to and from the land.

Of the other places where copper ore was shipped we may note that the two shipping places in Newfoundland differed markedly in their facilities. Betts Cove was suitable for steamships of some size: a vessel of between 1,200 and 1,700 tons deadweight was being sought in 1878.[41] Tilt Cove on the other hand, has been described as "a cleft in the rocks where there is only room for one ship at a time". There was a diminutive tramway with two wagons bringing two tons of copper ore from the mines at a time. In bad weather the vessel on the berth had to put to sea.[42] Port Nolloth was similarly poorly equipped with a pier which had only eleven feet of water alongside. Larger vessels had to anchor off the shore exposed to hazards whenever the easterly wind blew. Vessels were often unable to work cargo for more than three days in a week.[43] Again, Puerto Cabello had a berth for only one vessel with no more than sixteen feet of water alongside, and all cargo had to be worked by ship's gear.[44] Considerations such as these militated against the use of steam in many of the copper loading ports: poor turn-round time made the employment of steamers uneconomic and this in turn persuaded Swansea owners to continue to invest in sail.

It cannot be argued with conviction that Swansea shipowners were merely innately conservative. The Swansea district could claim to have been a centre for the construction of early steamships. The Price family at Neath Abbey Ironworks were designing and constructing steam vessels and marine engines from the early 1820s, and men such as Joseph Tregelles Price had a considerable reputation in the engineering world.[45] The Ironworks turned out a number of interesting steamships between 1823 and the early 1850s which embodied many distinctive innovations, including patent feathering paddles, the use of high pressure steam, the surface condenser and the multi-tube boiler. The firm also played an early part in the use of iron in the building of ships, indeed the iron barque *La Serena,* built by the Neath Abbey Company in 1848 expressly for the copper ore trade, was the first iron sailing vessel to round Cape Horn. The vessels built by the short lived Swansea Iron Shipbuilding Company in

the 1840s also embraced many novelties. The diminutive iron screw steamer *Fire Fly,* of 81 tons gross built in 1849, had a surface condenser, boilers working at a pressure of 35 pounds to the square inch, and watertight bulkheads. She was steamed to Coquimbo and was the first steamer to pass through the Straits of Magellan.[46]

Many of the smelting firms had shown themselves alive to the potentialities of the iron screw steamship, and several such vessels were familiar in the port of Swansea from the 1840s. In 1865 Henry Bath took delivery of the iron auxiliary screw barque *Zeta,* a vessel of 734 tons designed by J.S. Spencer, his son-in-law,[47] and built by Alexander Stephen and Son at his Kelvinhaugh, Glasgow, shipyard. This vessel was also built for the West Coast of South America trade, and combined some of the characteristics of the splendid barques that sailed from Swansea in that trade with the possibilities inherent in the auxiliary steam engine. This vessel, and her much larger successor *City of Valparaiso,* built in 1875, of 1,983 tons gross, seemed to prove conclusively that steam was the inappropriate answer to the transport problems which faced the copper ore refiners in Wales: both vessels were soon withdrawn from service.

So it was that Swansea was wedded to sail. All the management and manning skills were concentrated in sail, and even when the copper trade languished as more smelting was undertaken near the mines, Swansea owners clung to the trades they knew and the regions of the world where their commercial links had been forged in an earlier generation. If copper was unobtainable then Swansea ships turned to nitrates, guano, Pacific wheat, manganese and phosphate rock. As Table 2 shows, an analysis of the deployment of Swansea's sailing ship fleet in 1881 graphically illustrates the point. It was not for nothing that it was asserted on more than one occasion that Swansea "owned the Pacific".[48]

It is instructive to compare the registration of sailing ships and steamships of Swansea with those of the neighbouring port of Cardiff. Shipowners at the latter port were much slower at first than those at Swansea to adopt the steamship, but by the 1870s and 1880s the ports present a vivid contrast, as may be seen from the figures presented in Table 3.

Clearly the coal trade gave a dynamic impetus to the adoption of the steamer which was both carrier and consumer. Much of the coal trade was short haul traffic between industrial centres, loaded and discharged with an abundance of mechanical devices in berths designed to achieve considerable economies of scale. But by the last two decades of the nineteenth century copper could provide no comparable stimulus. Swansea did have an important coal trade, but it did not manifest

TABLE 2

DEPLOYMENT OF SWANSEA SAILING SHIPS IN 1881

Region	Number	Tons
Iberian Peninsula	2	308
North Atlantic	50	16,567
South Atlantic	33	9,136
Africa	16	6,000
Far East	4	2,914
Pacific Coast	83	46,611
Mediterranean	4	980
	182	82,516

Source: Cardiff and Swansea Registers. These data were obtained by identifying the names of all the vessels owned in the port of Swansea and its dependent sub-ports, whether registered at Swansea or not, and then determining the voyages of each vessel in the year 1881.

TABLE 3

VESSELS REGISTERED AT CARDIFF AND SWANSEA

	Swansea		Cardiff	
Year	Sail	Steam	Sail	Steam
1850	19,063	787	5,354	1,168
1860	18,158	891	14,124	482
1870	47,399	2,397	22,182	3,847
1880	73,304	4,032	20,273	70,129
1890	50,801	8,006	7,250	166,729
1901	25,854	33,284	4,511	263,829
1910	4,175	52,142	1,297	450,270
1913	2,408	66,179	1,070	342,517

Note: Steamship registries at Swansea exaggerate Swansea's involvement in steam, as most were owned by F.C. Strick, whose centre of operations was London. The decline in Cardiff steamship registrations in 1913 was due to a number of Cardiff owners transferring the registry of their ships to London.

anything like the explosive growth of Cardiff and its associated ports of Penarth and Barry, as may be seen from the figures in Table 4.

Swansea shipowners almost invariably obtained outward freights of coal, and in the late nineteenth and early twentieth centuries such freights were supplemented by increasing exports of anthracite and patent fuel, which was often consigned in large sailing vessels to the Pacific ports, particularly San Francisco. So even Swansea's coal trade was given some sailing ship bias, since sailing ships still predominated on this route. However as often as not, the big four masted sailing vessels chartered were from the heavily subsidised French flag about which British sailing

TABLE 4

SHIPMENTS OF COAL, CULM, COKE AND PATENT FUEL (TONS)

Year	Swansea	Cardiff
1850	358,449	731,329
1860	613,399	1,923,900
1870	935,955	3,303,063
1880	1,156,356	6,056,364
1890	1,611,442	10,988,689
1900	2,582,746	16,121,055
1910	3,817,182	20,532,766
1913	4,937,735	22,107,930

Source: *British Parliamentary Papers, Accounts and Papers passim.*

ship owners bitterly complained. After the post-Boer War years, few Swansea sailing ships were earning dividends.[49]

But something else helped to lure capital in the Swansea region away from shipowning altogether. This was the rapid expansion in the tinplate industry which furnished many men of moderate capital with a means by which they could hope for rich returns. The tinplate industry and the building of new steel plants to furnish the tinplate works with their tinplate bars, undoubtedly captured the interest and enthusiasm of just the kind of business people who had invested in ships and who now found tinplate works an outlet for their limited entrepreneurial drives.[50] As the copper trade declined, steel and tinplate expanded — trades in which local shipping found little stimulus. Increasingly, the export of tinplate was monopolized by the major steamship liner companies who were induced to make Swansea a port of call. In this new economic activity an ageing shipowning community, nurtured by the sailing ship, could play no part.

NOTES

1. On the general background to the copper industry, see A.H. John, *The Industrial Development of South Wales, 1750-1850* (Cardiff, 1950), and D.T. Williams, *The Economic Development of Swansea and the Swansea District* (Swansea, 1940). There is useful information in J. Grant-Francis, *The Smelting of Copper in the Swansea District* (London, 1881), whilst technical aspects of copper smelting are examined by J. Percy, *Metallurgy; Fuel; Fire-clays; Copper; Zinc; Brass etc.* (London, 1861), pp. 289-308. Two papers by R.O. Roberts are of particular importance: "Copper and economic growth in Britain, 1729-1784", *National Library of Wales Jnl.* X, 1 (Summer, 1857), pp. 65-74; and "The development and decline of the copper and other non-ferrous metal industries in South Wales", *Trans. Hon. Soc. Cymmrodorion* (Sess. 1956), pp. 78-115. On smelting at Neath, see D. Rhys Phillips, *The History of the Vale of Neath* (Swansea, 1925), pp. 266-284.

2. *The Voyage of the Beagle* (1905 ed.), p. 256.

3. *The Last of the Windjammers* I (Glasgow, 1927), pp. 384-389.

4. *Mirror of the Sea* (1906), pp. 12-13.

5. *The Men of the Merchant Service* (London, 1900), pp. 32-34.

6. P.R.O. C05/1223 records the clearance on 5 Sep. 1722 of *Macworth* (built at Neath in 1717) from New York for Swansea with 200 casks of copper ore. See also Customs 73/64, Board to Collector, Swansea letter 29 Nov. 1722.

7. P.R.O., Adm. 7/382 (5 Nov. 1776).

8. P.R.O., Adm. 7/384 (16 May 1793).

9. On the coastwise copper ore trade, see P.H. Stanier, "The copper ore trade of south west England in the nineteenth century", *Jnl. Transport History* (N.S.) V, 1 (Feb. 1979), pp. 18-35.

10. John Wedge's *Chart of Burry Bar and Harbour* was presented *gratis* to shipmasters trading to Llanelly and neighbouring creeks for many years.

11. "The shipping of the North Atlantic cotton trade in the mid-nineteenth century", *this volume.*

12. On the insured value of copper products cargoes loaded at Margam for London in the early years of the nineteenth century, see *Rep. S.C. on Marine Insurance* (B.P.P. IV (1810)), Appx. 8.

13. M.J. Daunton, "Aristocrat and the traders: the Bute Docks, 1839-1914", *Jnl. Transport History* (N.S.) III, 2 (Sep. 1875), pp. 65-85, and the same writer's *Coal Metropolis: Cardiff, 1870-1914* (Leicester, 1977), pp. 17-36.

14. On the development of the port, see W.H. Jones, *History of the Port of Swansea* (Carmarthen, 1922). The problems associated with discharge at Llanelly and Swansea are made explicit in the Collector, Llanelly, and Collector, Swansea, to Board Letter Books, in the 1830s and 1840s. For example, permission had to be obtained to lighter cargo from *Havannah Packet* in 1831, she having been built for the packet service and a 'sharp built' vessel, she could not lie aground. A petition was presented to the Customs by the smelters in 1839 seeking permission from the Board to discharge vessels 'after Hours' because of the risk incurred by vessels lying aground at Swansea. A Board Order of 16 July 1841 permitted the discharge of vessels into lighters in Mumbles Roads, but the smelters still had occasion to complain of difficulties which arose from the 'bunching' of ships which could only come to the wharves at Swansea on high water spring tides.

15. See, for example, Guildhall, London, R.O., Gibbs, Bright & Co., *Commodity Book,* f. 110.

16. P.R.O., Customs 73/38, Collector, Swansea, to Board letter dated 4 Oct. 1848, refers to the cost of the trunk fitted to the sailing vessel *Matilda* as over £110.

17. See J.R. Harris, *The Copper King: a Biography of Thomas Williams of Llanidan* (Liverpool, 1964), and John Rowlands, *Copper Mountain* (Llangefni, 1966).

18. J. MacGregor, *Commercial Statistics* IV (London, 1848), p. 63, pp. 69-70; R. Allen, *Copper Ores* (London, 1923), p. 145; Charles Brownell, *A Letter on the Copper Ore Duties* (etc) (London, 1847), p. 14, gives freight payment on Cuban ores shipped as follows:

1842	£59,444
1843	49,295
1844	53,354
1845	42,541
1846	37,321

For a contemporary account of a voyage in a Cuban copper ore vessel, see "Sketches of the Merchant Service", *The Bristol Magazine* XXVI (1841).

19. For a splendid eye witness account of the life (and death) of miners (mainly Irish and Welsh) at Aroa, see W. Dupouy, *Sir Robert Ker Porter's Caracas Diary, 1825-1842* (Caracas, 1966). On the harbour, see *Nautical Magazine* V (Aug. 1836), p. 456.

20. P.R.O., Cus. 73/35, Collector, Swansea, to Board, 29 Apl. 1836.

21. P.R.O., Cus. 73/35, Henry Bath & Son, Swansea, to Collector, Swansea, 13 May 1836.

22. R. Allen, p. 82; *The Economist* 14 Nov. 1846; University College London, Huth Letterbooks contain information on the Australian trade in 1847; see also *S.C. (H. of L.) on Navigation Laws* (B.P.P. XX, 2 (1847-1848)), Appx. K.

23. J.A. Chalmers, "Notes on the Namaqualand Copper District", *Trans. Inst. Mining & Metallurgy* VIII (1899-1900), pp. 395-407.

24. See Report of British Consul at San Francisco for 1861 (B.P.P., LIX (1862), p. 426).

25. A. Murray & J.P. Howley, *Geological Survey of Newfoundland* (London, 1881), pp. 32-3, 103-4, 110, 113-4.

26. *R.C. on Mineral Resources of Ontario* (Toronto, 1890), pp. 100-102, 402-3.

27. Murray & Howley, pp. 488-9, 491.

28. B.P.P. LIX (1847), p. 65, where English copper is described as yielding 5-10% of copper, Cuban 12-25%, whilst Chile ranged from 20 to 60%.

29. On these matters, see R.O. Roberts, "Development and Decline"; *S.C. (H. of L.) on Navigation Laws* (B.P.P. XX, 2 (1847-8)) *passim;* Copies of all the memorials and petitions respecting the duties on copper, B.P.P. LIX (1847), pp. 59-97; and Copy of all the memorials in reference to copper duties, B.P.P. XXXIX (1847-8), pp. 327-334.

30. The official emigration statistics appear to be at variance with references to emigrants leaving noted in the local press. There was an annual exodus of experienced smelters to Central and South America: an average of 64 persons per annum (according to the official statistics) left between 1854 and 1872. Groups of men left for South Australia in 1848-9; for the West Indies (probably Cuba) in 1854-5; and a handful of men to Canada in 1857. Men also left for South Africa from 1864 onwards.

31. Liverpool imported 22,663 tons of copper ore and regulus, and 3,472 tons of unwrought copper in 1857, according to Thomas Baines, *Liverpool in 1859* (London, 1859), p. 57.

32. See Aled Eames, *Ships and Seamen of Anglesey* (Llangefni, 1973), pp. 184-213.

33. Eames, *Ships and Seamen,* 204 ff on Treweek, 271 ff on Thomas.

34. On Puxley's interests in the Berehaven copper mines, see G.H. Blenkinsop, "Notes on Berehaven Copper Mines", *Trans. Inst. Mining & Metallurgy* XII (1902-3), pp. 813-4. On the schooners, see Jones, *Port of Swansea,* p. 361.

35. See Dunbar's evidence to *S.C. (H. of L.) on Navigation Laws* (B.P.P. XX, 2 (1847-8)) QQ. 7856-7886.

36. See the letter signed 'Competition', *The Cambrian* 2 June 1848: 'Had the Swansea shipowners been blessed with a Navigation Law which would prevent any but Swansea vessels from carrying the ores from Cuba to this port [Swansea], in what position would that trade have been now? How lustily they would have protested against the admission of Sunderland ships! Fortunately, no obstacle existed to their admission, and the result has been that the miner in Cuba saves 12/6d. per ton freight for his ores, and our shipowner has taken a leaf out of the Sunderland shipowner's book, gets a Sunderland ship, sails her in Sunderland fashion, and makes almost Sunderland profits; and will do so when he is perfect in his lessons, for he is not quite, yet.'

37. See Basil Greenhill & Ann Giffard, *Westcountrymen in Prince Edward's Isle* (Newton Abbot, 1967), pp. 174-5.

38. P.R.O., BT 31/1906/7751.

39. P.R.O., BT 31/1904/7719.

40. For example, the Llanelly-built iron barque *Oliver Cromwell* sailed on her maiden voyage to Caldera in May 1864, and went missing on her homeward passage. No trace of her or her crew was ever found.

41. See the freight offered for a steamship to load at Betts Cove in E.A.V. Angier, *Fifty Years of Freights* (London, 1922), pp. 33-4.

42. See letter from 'Riversider', *Sea Breezes* XX (New Series, Oct. 1955), pp. 314-5.

43. G.D. Urquhart (ed.), *Dues and Charges on Shipping in Foreign Ports* (London, 1872), p. 873.

44. Urquhart, pp. 678-9.

45. Price was a well-known Quaker: the little rhyme printed in Appendix XII to A.E. Pease (ed.) *The Diaries of Edward Pease* (London, 1907), highlights his preoccupations:

Joseph Price, Joseph Price
Thou art mighty precise,
Methought t'other night in a dream
That thous really walked,
Slept, ate, drank, and talked
And prayed every Sunday by steam.

He took out several patents, and was known and respected by figures such as John Scott Russell. See his paper read to the British Association, "On a method of condensing steam in marine engines etc." *Report of 21st British Association Meeting, held Ipswich, 1851* (London, 1852), pp. 116-7.

46. *Fire Fly* was to play an important part in the Chilean Revolution of 1851, as a fighting ship. See Claudio Veliz, *Historia de la Marine Mercante de Chile* (Universidad de Chile, 1961), pp. 81, 108, 118.

47. J.F. Spencer was employed in the Swansea Iron Shipbuilding works. He became well known for his advocacy of the auxiliary steamship, and for his work on the surface

condenser. He advised Antony Gibbs & Co. on the potentialities of the nitrate industry, and designed the plant for the Antofagasta Nitrate Works. He established one of the best known British marine engine firms, North-Eastern Marine Engineering Co. at Sunderland. See his obituary in *The Engineer* 16 Apr. 1915, p. 385.

48. Jones, *Port of Swansea,* p. 292.

49. When Simon Goldberg died in 1907, his son Hyam sought from C.W. Kellock & Co. a valuation of two large sailing vessels partly owned by him at his death. The accounts submitted reveal that *Andorinha* lost £1,149 on her round trip Barry/Montevideo/Bahia/Blanca/Australia/San Francisco/Portland (Oregon)/Limerick, between Sep. 1902 and July 1904, and lost £550 on her next voyage from Port Talbot/Taltal/Newcastle, N.S.W./Mollendo/Taltal/Antwerp, between Sept. 1904 and June 1906. Similarly, *Vanduara* showed a deficit of £616 on her voyage Antwerp/San Diego/Newcastle N.S.W./Penes/Birkenhead, between Apl. 1903 and Oct. 1904, and lost £1,039 on her next voyage Liverpool/Sydney N.S.W./Newcastle N.S.W./Antofagasta/Portland (Oregon)/Liverpool, between Jan. 1905 and June 1906. National Maritime Museum: (uncatalogued) C.W. Kellock papers *Valuations Book,* p. 109, f. 32.

50. See W.E. Minchinton, *The British Tinplate Industry* (Oxford, 1957), pp. 93-107.

APPENDIX I

COPPER AND COPPER PRODUCTS IMPORTED TO SWANSEA (TONS)

	Ore	Old For Manufacturing	Unwrought	Part Wrought	Regulus	Manufactured	Total
1800							
1801							
1802							
1803							
1804							
1805							
1806	2,198						
1807	3,614						
1808	3,330						
1809	1,857						
1810	1,324						
1811	320						
1812	234						
1813	242						
1814	488						
1815	906						
1816	753						
1817	125						
1818	378						
1819	1,732						
1820	2,478						
1821	2,246						
1822	2,336						
1823	n/a						
1824	4,021						
1825	5,664						
1826	32						
1827	33						
1828	256						
1829	1,189						
1830	n.d.						
1831	1,267						
1832	1,736						
1833	2,562						
1834	4,276						

(continued)

	Ore	Old For Manufacturing	Unwrought	Part Wrought	Regulus	Manufactured	Total
1835	7,007						
1836	9,074						
1837	12,665						
1838	16,043						
1839	21,174	—	218	—	—	—	21,392
1840	33,771	—	162	—	—	—	33,933
1841	38,996	—	75	—	—	—	39,071
1842	40,604	1	72	—	—	—	40,677
1843	43,911	236	—	—	—	—	44,147
1844	48,358	2	15	—	—	—	48,375
1845	46,091	—	9	—	—	—	46,100
1846	41,106	—	26	—	—	—	41,132
1847	35,396	3	—	—	—	—	35,399
1848	35,753	—	95	—	—	—	35,848
1849	34,688	—	—	—	611	—	35,299
1850	31,697	—	18	214	3,727	—	35,656
1851	26,960	4	191	661	4,116	—	31,932
1852	29,286	—	997	347	3,049	—	33,679
1853	29,049	1	635	289	3,636	—	33,610
1854	35,191	—	168	673	5,107	—	41,139
1855	35,762	—	1,154	788	6,654	—	44,358
1856	40,605	—	496	15	8,935	—	50,951
1857	41,498	—	213	261	16,136	—	58,108
1858	40,194	—	1,348	—	13,612	—	55,154
1859	39,693	11	5,581	—	8,790	—	54,075
1860	38,453	423	1,595	—	9,793	—	50,264
1861	36,448	427	4,346	—	15,338	10	56,569
1862	38,680	5	3,861	—	23,437	—	65,983
1863	48,763	10	2,880	5	15,870	—	67,528
1864	37,126	10	5,790	9	16,215	n.d.	
1865	51,424	13	3,809	303	27,232	—	82,781
1866	55,913	8	4,074	1,249	24,291	—	85,535
1867	31,159	8	3,010	1,996	15,940	—	52,113
1868	37,628	32	390	5,351	21,785	—	65,186
1869	30,884	7	440	5,541	26,292	—	63,164
1870	26,591	7	8	5,952	28,682	—	61,240
1871	20,722	26	3,904		21,002	—	45,654
1872	23,406	88	6,521		21,017	—	51,032
1873	33,930	38	1,718		18,065	—	53,751

(continued)

	Ore	Old For Manufacturing	Unwrought	Part Wrought	Regulus	Manufactured	Total
1874	27,799	112		588	19,509	—	48,008
1875	34,107	33		4,143	18,861	—	57,144
1876	54,013	n.d.		n.d.	13,163	n.d.	
1877	74,973	n.d.		n.d.	14,904	n.d.	
1878	62,984	620		1,795	12,188	—	77,587
1879	57,823	609		7,513	18,690	—	84,635
1880	68,025	606		11,808	22,465	—	102,904
1881	68,861	408		8,680	16,714	—	94,663
1882	73,106	n.d.		n.d.	18,393	n.d.	
1883	59,777	230		1,739	17,360	—	79,106
1884	60,301	151		3,608	22,084	—	86,144
1885	73,181	28		5,184	25,425	—	103,813
1886	62,439	72		4,263	27,304	—	94,078
1887	66,738	57		915	35,715	42	103,467
1888	83,005	282		88	43,789	40	127,204
1889	95,361	186		2,278	41,644	142	139,611
1890	67,294	132		5,688	42,552	125	115,791
1891	57,384	55		7,752	50,483	32	115,706
1892	64,777	41		3,607	54,888	34	123,347
1893	48,375	109		3,228	48,327	—	100,039
1894	50,519	109		7,778	47,405	20	105,831
1895	59,021	93		4,794	52,535	—	116,443
1896	62,580	42		4,493	53,818	30	120,963
1897	64,148	108		4,625	55,818	24	124,723
1898	63,026	207		5,279	46,856	—	115,368
1899	79,286	569		4,169	48,880	(£855)	132,904
1900	46,372	1,824		4,107	56,812	(£4,474)	109,115
1901	45,033	834		3,867	48,456	—	98,190
1902	38,377	753		10,847	29,513	(£4,877)	79,490
1903	31,677	299		12,264	33,754	(£1,384)	77,994
1904	34,083	438		6,412	16,284	(£1,239)	57,217
1905	29,980	792		5,387	18,322	(£3,450)	54,481
1906	31,040	545		4,427	17,599	(£723)	53,611
1907	29,106	399		4,300	18,361	(£116)	52,166
1908	28,818	127		9,108	20,026	(£442)	58,079
1909	17,345	21		4,641	22,203	(£35)	44,210
1910	18,583	67		7,431	20,783	(£498)	46,864
1911	20,961	138		9,181	22,140	(£1,372)	52,420
1912	21,678	45		6,371	23,104	(£2,243)	51,198
1913	24,642	121		6,679	17,284	—	48,726

(continued)

	Ore	Old For Manufacturing	Unwrought	Part Wrought	Regulus	Manufactured	Total
Port Talbot Imports							
1905	—	—	6,622		13,535	—	20,157
1906	210	—	5,600		15,632	—	21,442
1907	643	—	3,631		13,270	—	17,544
1908	—	—	5,791		13,944	—	19,735
1909	7	—	6,126		9,736	—	15,869
1910	15	—	4,797		7,182	—	11,994
1911	—	—	4,748		4,743	—	9,491
1912	—	—	5,057		5,057	—	10,114
1913	—	—	1,396		85	—	1,481

Totals Port Talbot and Swansea	
1905	74,638
1906	75,053
1907	69,710
1908	77,814
1909	60,079
1910	58,858
1911	61,911
1912	61,312
1913	50,207

NOTE: Until 1855, years ending 5 January of following year, and thereafter 31 December. Ore imports omitted from Ireland from 1826 and the Isle of Man from 1844. In 1843, "Old for manufactured" includes 233 tons of plate and coin, 416 tons from France in 1860, and 427 tons in 1861. Port Talbot shown separately from 1905. Source: *British Parliamentary Papers, Accounts and Papers passim.*

APPENDIX II

VOYAGES OF A TYPICAL SWANSEA COPPER ORE VESSEL

Voyage No.	Route	Cargo	Date Completed
1	Llanelly/Chile/Swansea	Coal/Copper	Dec. 1870
2	Swansea/Chile/Swansea	Coal/Copper	Oct. 1871
3	Swansea/Chile/Swansea	Coal/Copper	Sept. 1872
4	Swansea/Chile/Swansea	Coal/Copper	July 1873
5	Swansea/Chile/Swansea	Coal/Copper	Apl. 1874
6	Swansea/Chile/Swansea	Coal/Copper	Jan. 1875
7	Swansea/Chile/Swansea	Coal/Copper	Dec. 1875
8	Swansea/Chile/Montrose	Coal/Nitrate	Oct. 1876
9	Newcastle/Chile/Dublin	Coal, machinery & 3 locomotives etc./Nitrate	Oct. 1877
10	Swansea/Chile/Hull	Coal, coke, bricks/Nitrate	Oct. 1878
11	Hull/Port Nolloth/Swansea	Coal ?/Copper	June 1879
12	Swansea/Cape/Port Noll./Swansea	Coal/Copper	Dec. 1879
13	Swansea/Cape/Port Noll./Swansea	Coal/Copper	Aug. 1880
14	Swansea/Chile/Swansea	Coal/Copper	July 1881
15	Swansea/Chile/Swansea	Coal/Copper	May 1882
16	Swansea/Cape/Port Nolloth/Swansea	Coal/Copper	Dec. 1882
17	Swansea/Algoa Bay/Port Nolloth/Swansea	Coal/Copper	Sep. 1883
18	Swansea/Cape/Port Nolloth/Swansea	Coal/Copper	Mar. 1884
19	Swansea/Cape/Port Nolloth/Swansea	Coal/Copper	Sep. 1884
20	Swansea/Algoa B./Port Nolloth/Swansea	Coal/Copper	Apl. 1885
21	Swansea/Algoa B./Port Nolloth/Swansea	Coal/Copper	Nov. 1885
22	Swansea/Cape/Port Nolloth/Swansea	Coal/Copper	June 1886
23	Swansea/Algoa B./Port Nolloth/Swansea	Coal/Copper	Dec. 1886
24	Swansea/Algoa B./Port Nolloth/Swansea	Coal/Copper	Nov. 1887
25	Swansea/Algoa B./Port Nolloth/Swansea	Coal/Copper	July 1888
26	Swansea/P. Natal/Port Nolloth/Swansea	Coal/Copper	Apl. 1889
27	Swansea/P. Natal/Port Nolloth/Swansea	Coal/Copper	Dec. 1889
28	Swansea/P. Natal/Port Nolloth/Swansea	Coal/Copper	Sep. 1890
29	Swansea/Algoa B./Port Nolloth/Swansea	Coal/Copper	May 1891
30	Swansea/Port Nolloth/Swansea	Coal/Copper	Dec. 1891
31	Cardiff/Tucacas/Swansea	Coal/Copper	June 1892
32	Swansea/Bahia/Gulf of Mexico/ Falmouth	Coal/?Logwood	Apl. 1893
33	Swansea/Rosario/River Plate/Bristol	Coal/Wheat	Jan. 1894
34	Cardiff/Rosario/Plymouth	Coal/Wheat	Oct. 1894
35	Cardiff/Port Nolloth/Swansea	Coal/Copper	Aug. 1895

(continued)

APPENDIX II (cont'd)

VOYAGES OF A TYPICAL SWANSEA COPPER ORE VESSEL

Voyage No.	Route	Cargo	Date Completed
*36	Swansea/Port Nolloth/Swansea	Coal/Copper	Mar. 1896
37	Swansea/P. Natal/Port Nolloth/Swansea	Coal/Copper	Dec. 1896
38	Swansea/P. Natal/Port Nolloth/Swansea vessel sold to Italians	Coal/Copper	Sep. 1897

NOTE: Iron barque *Hinda,* 476 tons gross, 700 tons deadweight, Simon Goldberg owner. Launched 1870, maiden voyage February 1870. Outward cargo from Swansea to Chile generally included some bricks, fireclay etc., and homeward freight from Chile was generally semi-refined copper. From Africa the homeward freight was nearly all copper ore. Source: Derived by author from *Shipping & Mercantile Gazette.*

14. THE SHIPPING OF THE NORTH ATLANTIC COTTON TRADE IN THE MID-NINETEENTH CENTURY

DAVID M. WILLIAMS

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THE SHIPPING OF THE NORTH ATLANTIC COTTON TRADE IN THE MID-NINETEENTH CENTURY

David M. Williams

Professor Hobsbawm's famous comment that "whoever says Industrial Revolution says cotton,"[1] might be taken a stage further to observe that whoever speaks of Britain's industrial greatness and domination of world trade in manufactures throughout the nineteenth century, speaks of cotton.[2] Cotton was not merely the first industry to demonstrate the superiority of modern technology and large scale organisation, it remained Britain's chief manufacturing industry down to 1914 and cotton goods which supplanted woollens as Britain's leading export in the 1790s maintained their primacy for more than a century. Equally, to the United States, cotton was of crucial importance. It was the great staple of the South and after replacing tobacco as the country's principal export around 1815 it grew to account for well over half of United States' exports in value terms by the mid-century. Understandably therefore cotton is possessed of a vast literature, studies of the extremes of plantation and factory are numerous and the commercial organization of the cotton market on both sides of the Atlantic has been the subject of detailed examination,[3] interestingly as early as 1858 in the British case with Thomas Ellison's *The Cotton Trade.*[4] Yet for all the attention lavished on cotton both by contemporary observers and subsequent historians, one element of cotton's spectacular nineteenth century expansion, namely the trade in raw cotton, has gone largely unconsidered. Of course the massive growth of British imports of cotton is well documented as is the development of a sophisticated market system associated with the introduction of the telegraph, but the actual transporting, the shipping of cotton across the Atlantic, has never been fully examined.[5]

This neglect is all the more surprising when one views the quite incredible growth of the trade in raw cotton. In the forty years before 1860 imports of cotton into Britain increased almost tenfold. Liverpool was the chief port of receipt, accounting throughout the period for never less than 80% of Britain's annual imports. Within Liverpool's imports, cotton from the U.S.A. predominated. Table 1[6] which shows imports of cotton into Liverpool from the U.S.A. reveals the dramatic expansion which occurred. The scale of cotton shipments across the North Atlantic and the nature of cotton as a bulky, though light, commodity imposed heavy demands on shipping and the aim of this paper is to examine the shipping involved in the Anglo-American cotton trade and to pose a limited number of basic

TABLE 1

RECEIPTS OF COTTON FROM THE UNITED STATES AT LIVERPOOL 1820-60

(BALES)

1820	272,574	1834	664,023	1848	1,284,689
1821	240,257	1835	700,359	1849	1,342,771
1822	274,832	1836	708,994	1850	1,084,644
1823	390,914	1837	769,408	1851	1,346,505
1824	265,413	1838	1,066,790	1852	1,646,804
1825	419,490	1839	787,900	1853	1,479,731
1826	371,143	1840	1,155,270	1854	1,584,502
1827	579,134	1841	843,755	1855	1,587,799
1828	403,255	1842	931,612	1856	1,703,613
1829	422,109	1843	1,291,807	1857	1,410,122
1830	570,808	1844	1,028,811	1858	1,758,468
1831	560,181	1845	1,370,455	1859	1,958,756
1832	581,695	1846	933,833	1860	2,492,138
1833	612,031	1847	809,809		

Source: H. Smithers, *Liverpool* (Liverpool, 1825); E.J. Donnell, *Chronological and Statistical History of Cotton* (New York, 1872).

questions. First, how many voyages were required to transport these vast quantities of cotton? This involves a consideration of the size of vessels, the number of ports engaged in the shipping of cotton and the extent to which cotton figured within the cargo of an individual vessel. Second, a more pertinent question not to be confused with the first, how many vessels were engaged in the trade, or to put it another way, how far was the trade conducted by vessels which made a series of voyages freighting cotton or by vessels which participated but occasionally in the trade? Such questions embrace the issues of how far the trade possessed seasonal characteristics and the duration of voyages. Third, the paper considers two aspects of the vessels themselves, namely tonnage and the sources of shipping, that is nationality and ports of registration. Answers to these questions have been sought through a detailed analysis of cotton arrivals at Liverpool in selected periods using the Customs Bills of Entry as a source.[7] It should be stressed that this is very much a preliminary survey and one based on British sources.

The Customs Bills of Entry were a daily publication published by the Customs for the convenience of the mercantile community. Bills relating to London appear to have commenced in the mid-seventeenth century and Bills for Bristol date from the 1770s but it was not until the nineteenth century that Bills came to be generally produced for the main outports.

The earliest set of Bills for Liverpool held in the Customs Library is dated 1820 but the Library's holdings are incomplete until 1852 when a full sequence commences. The information contained in the Bills changed over time but basically they provide a full picture of the trade and shipping of the port. Each Bill commenced with 'Ships Reports' which detailed the arrival of each vessel in the port, and there followed summaries of imports and exports and lists of vessels cleared for loading, loading and cleared outwards. For the purpose of this paper it is the ship's reports which are of prime importance. The reports listed the vessel's name, port of registration, master and tonnage, port of origin, dock and ship's agent in Liverpool, together with a full account of cargo and consignees. At various times the reports also listed crew size and date of sailing from the port of origin.

The statistical survey embodied in this paper is based on two three-year periods, 1830-32 and 1853-55. The choice of periods was influenced by the availability of source material and the need to choose periods of relative stability. While the secular trend of United States exports of cotton to Liverpool was dramatically upward, annual figures could vary considerably as they did, for example, in the years 1823-28 and 1837-41. It was thought desirable to avoid periods of excessive fluctuation where the demands on shipping would have been very different from one year to another.[8] In Table 1 which shows receipts of United States cotton at Liverpool between 1820 and 1860 it will be observed that the years of 1830-32 and 1853-55 were periods of comparative stability.

The great growth in the North Atlantic cotton trade in the forty years before the Civil War was accompanied by significant changes in the position of the various ports engaged in the export of cotton to Liverpool. The focus of the trade throughout the period was the four major cotton ports of the South, Charleston in South Carolina, Savannah in Georgia, New Orleans in Louisiana and Mobile in Alabama. Originally the trade centred on Charleston and Savannah but gradually these ports were overtaken in volume of business by the old French ports of New Orleans and Mobile. New Orleans came to hold a position of overwhelming superiority. Table 2 shows exports of cotton to Britain from the major cotton ports in the two periods with which this paper is concerned. In the early 1830s the four major ports accounted for eighty five percent of United States cotton exports to Britain and in the mid-1850s the proportion was about the same. The relative importance of the four individual ports had changed considerably, however, for while exports from New Orleans and Mobile had risen about fourfold, those of Charleston had risen by little more than a quarter and Savannah's trade had virtually stagnated. This changing pattern reflected the westward shift in the cultivation of cotton away from the Carolinas and Georgia

TABLE 2

COTTON EXPORTS TO GREAT BRITAIN FROM UNITED STATES' PORTS

	1830-1832		1853-1855	
	Bales	%	Bales	%
New Orleans	623,631	33.67	2,453,150	50.90
Mobile	161,362	8.71	683,770	14.19
Savannah	371,004	20.03	386,848	8.03
Charleston	424,768	22.94	558,378	11.59
Virginia	63,972	3.45	500	—
Florida	—	—	43,708	0.91
New York	189,701	10.24	654,360	13.58
Others	17,421	0.94	38,899	0.80
Total	1,851,859		4,819,613	

Note: Three year periods ending 30 September. For Virginia and Florida, combined exports from ports in the state. Source: compiled from E.J. Donnell, *Chronological and Statistical History of Cotton* (New York, 1872).

towards the more fertile soils of Alabama, Mississippi and Louisiana, and it was this shifting pattern of cotton culture which accounted for the demise of Virginia and the rise of Florida, the two minor suppliers which appear in the table. A further factor underlying the relative decline of Charleston and Savannah as cotton ports was the diversion of a considerable part of their trade in cotton to New York through the development of coastal packet services.[9] The expansion of such services and the increasing quantities of cotton carried north explain the growing cotton exports of New York, although the importance of that port within the overall volume of United States cotton exports to Great Britain should not be over emphasized.[10]

The great quantities of cotton annually exported from the United States to Liverpool involved the employment of a large amount of shipping space. Table 3, which lists arrivals in Liverpool of vessels carrying significant amounts of cotton, indicates the level of demands made by the trade on shipping.[11] It is important to stress that the table refers simply to 'arrivals' and that the amount of cotton associated with an 'arrival' could vary enormously depending on the size of a vessel and the nature of its cargo. In consequence no special importance should be attached to any particular figures and when considering inter-year comparisons the different level of imports in each year should be borne in

mind. Notwithstanding these qualifications the table clearly reveals the basic trends, namely that in the early 1830s the United States/Liverpool cotton trade involved over five hundred voyages per year, while in the mid-1850s around seven hundred voyages per year were involved. The issue of the tonnage of vessels engaged in carrying cotton is to be considered in a later section of this paper, but at this stage it can be observed from Table 3 that the huge increase in cotton shipped to Liverpool between the 1830s and 1850s must have been accomodated largely by an increase in the size of vessels engaged in the trade and only to a lesser extent by a growth in the number of voyages.

TABLE 3

ARRIVALS AT LIVERPOOL OF VESSELS CARRYING SIGNIFICANT AMOUNTS OF COTTON

	1830	1831	1832	1853	1854	1855
New Orleans	160	185	151	313	364	252
Savannah	115	97	113	45	46	84
Charleston	111	107	113	84	75	94
Mobile	46	59	52	73	83	76
Virginian Ports	31	19	18			
Wilmington	4	3				
Apalachiola				25	21	13
Galveston				5	4	6
New York	92	62	75	160	188	171
Philadelphia	2	5	1	1		
Boston			1	2	2	1
Baltimore		1	2	1	1	1
Total	561	538	526	709	784	698

Note: Virginia Ports are Norfolk, Richmond and Petersburg. In 1853 Apalachiola includes one vessel from Key West. Source: Compiled by the author from Customs Bills of Entry for Liverpool.

Whether a vessel transported cotton to the full extent which its size permitted depended on the proportion of its cargo space which was devoted to cotton. The number of voyages involved in transporting cotton to Liverpool each year was significantly influenced by the extent to which vessels carried cargoes consisting solely or largely of cotton, or mixed cargoes. Cotton was invariably shipped as a bulk cargo, that is in large quantities, but in the case of United States' cotton a clear distinction can be made in the period under review between the cargoes of vessels sailing from Southern ports and those of vessels sailing from New York. Southern

port vessels generally carried cargoes comprised solely of cotton. An examination of arrivals of cotton carrying vessels at Liverpool in 1832 showed that eighty three percent of all vessels from Southern ports had cargoes exclusively of cotton, or cotton accompanied by such derisory amounts of reeds, staves, fustic, treenails, logwood and ballast, that to all intents and purposes they were carrying nothing but cotton.[12] In the cargoes of the remaining seventeen percent of vessels from Southern ports, cotton dominated in every case. A few vessels from New Orleans carried significant amounts of hides, and some vessels from both New Orleans and Virginia carried tobacco. Some Charleston vessels included turpentine, tar and rice in their cargoes while a number of vessels from Mobile carried copper ore taken aboard at Puerto Cabello. In the main vessels from southern ports were carrying little other than cotton, a situation which reflected the limited range and small quantities of commodities other than cotton which the South had available for trade at

In the 1850s produce entering Southern trade was more diverse. As the steamboats on the Mississippi and its tributaries opened up a vast hinterland, New Orleans had developed a quite considerable trade in foodstuffs: bacon, pork, beef, flour, maize, lard and oil. The export of pitch pine from Savannah was also beginning to expand.[13] Cargoes from New Orleans, Savannah and Charleston were certainly more mixed than before and within such cargoes cotton dominated far less. Cargoes from Mobile however continued to be comprised almost wholly of cotton as that port was almost barren of alternative cargo. Even so the proportion of Southern port cargoes which were exclusively or largely composed of cotton remained high, at seventy six percent of all cotton carrying vessels from Southern ports. Perhaps a more interesting aspect of the diversification of Southern produce was that in the 1850s a few vessels from New Orleans, Charleston and Savannah docked in Liverpool carrying no cotton, a situation almost inconceivable twenty years earlier.

Whereas cotton predominated in the cargoes of vessels from Southern ports, the reverse was the case with vessels from New York. These vessels carried mixed cargoes which reflected the varied produce of New York's hinterland and its prosperous entrepot trade. In 1832 only three of the seventy five vessels carrying cotton to Liverpool carried solely cotton and in 1855 not a single vessel out of the 171 which carried cotton had an exclusive cargo. Cotton arrived from New York in company with a wide assortment of produce: flour, wheat, ashes, turps, flaxseed, beef, pork, bacon, cheese and apples were commonly featured, and the list could be extended almost indefinitely to include the two vessels which docked in Liverpool in April 1855 with mixed cargoes of cotton and guano.

The different character of cargoes from Southern ports and those from New York explains why New York features more significantly within total

arrivals than is warranted by its share of total cotton exports to Liverpool. The figures for New York apart, the arrivals from various ports bear out the relative position of the different ports engaged in the trade. In particular the growth of New Orleans' dominance is plainly shown, while the disappearance of Virginia and rise of Florida in the mid-century is also apparent. Above all the table reveals the very limited number of ports involved in the shipping of cotton, especially in the mid-1850s.

3

The annual number of arrivals of cotton carrying vessels at Liverpool points to the overall demands made on shipping by the North Atlantic cotton trade but does not indicate the number of vessels engaged in the trade. In general, series of figures of annual arrivals or sailings have little bearing on the number of actual vessels employed unless, in the trade under consideration, a full voyage (that is, outward and inward passages together with associated stays in port) has a duration of about a year. Many factors influence the number of vessels taking part in a specific trade but of crucial significance are those of voyage times and the existence or otherwise of seasonal characteristics in the trade. Both these features influenced the number of vessels involved, and the nature of that involvement, in the annual shipping of cotton.

Table 4 shows the number of vessels which carried cargoes of cotton to Liverpool in the periods 1830-32 and 1853-55. The table reveals that in the earlier period a total of 756 different vessels conveyed cotton from the U.S.A. to Liverpool on at least one occasion and that in the later period the figure was 1153. These figures of total number of vessels in each period are broken down according to the number of arrivals in Liverpool made by a vessel. This breakdown enables the pattern of vessel participation in the shipping of cotton to be considered.

The shipping of any trade can be divided into two basic categories, those of regular and occasional traders; regular traders being vessels which spend all or most of their time on a particular route or in a particular commodity trade, and occasional traders being vessels which make only a single voyage, or engage but irregularly in a particular trade during the period under consideration. Now the working definition of a regular trader will vary according to the trade and period being examined and the source material available. In this study, based on arrivals of cotton carrying vessels at Liverpool, the criterion used for assessing regular trading can only be that of the achievement of a certain number of arrivals at Liverpool during the three year period under review. After a survey of the pattern of arrivals of all vessels and a consideration of the factors of voyage time and seasonal characteristics in the trade (both to be

TABLE 4

NUMBER OF ARRIVALS AT LIVERPOOL OF VESSELS IN THE COTTON TRADE

Number of Arrivals	1830-1832		1853-1855	
	Vessels	Arrivals	Vessels	Arrivals
1	372	372	662	662
2	164	328	248	496
3	95	285	107	321
4	51	204	54	216
5	41	205	39	195
6	15	90	18	108
7	7	49	12	84
8	8	64	8	64
9	2	18	5	45
10	1	10		
	756	1625	1153	2191

Note: 'Number of Arrivals' is number made in the three year period. Source: Compiled by the author from Customs Bills of Entry for Liverpool.

discussed below) it was decided to define a regular trader as a vessel which, in a three year period made either four arrivals in Liverpool having sailed from a Southern cotton port, or six arrivals in Liverpool if New York was the port of departure. The differential was introduced to take account of the different character of the New York trade and the shorter distance involved. Where a vessel had a mixed pattern of departures from both New York and Southern ports, the lower requirement of four arrivals operated. On the whole the definition was pitched on the low side to permit vessels which made their first arrival in Liverpool late in the first year or early in the second year of the three year periods a chance of meeting the requirement. One further case where it was felt appropriate to apply the classification 'regular trader' was that where a vessel made only three arrivals but made one in each year which indicated that it was following a regular pattern of employment in which carrying cotton was a significant part.

Such a definition is obviously open to criticism; the situation of vessels which made five arrivals from New York is clearly marginal, and arguably some account might have been taken of the differences in passage length between various Southern ports and Liverpool though complexities would have arisen where vessels made departures from both Atlantic and Gulf ports. Again, there is the issue of vessels which during the period under review did not attain the requirement of the definition yet which, through their pattern of employment immediately before or after

the period, may have qualified as regular traders. This latter problem inevitably arises unless one makes a complete survey of a very long period, which in this case source materials do not permit. However, whatever the weaknesses of the chosen working definition of a regular trader, it has the virtue of simplicity and there can be little doubt that the vessels which it excludes would be deemed 'occasional traders' by any standard. Moreover, it should be stated that the aim of the analysis is simply to provide an informed estimate of the division of the trade between regular and occasional trading vessels and not to state categorically which precise proportions of the trade were carried by one or the other.

Table 5 divides the arrivals of cotton carriers at Liverpool between regular and occasional traders using the definition established above. The table reveals that in each period a relatively small number of vessels accounted for a significant proportion of total arrivals. In the period 1830-

TABLE 5

'OCCASIONAL' AND 'REGULAR' COTTON TRADERS

Number of Arrivals	1830-1832		1853-1855	
	Vessels	Arrivals	Vessels	Arrivals
Occasional Traders				
1	372	372	662	662
2	164	328	248	496
3	64	192	67	201
4	2	8	9	36
5	6	30	9	45
	608	930	995	1440
Regular Traders				
3	31	93	40	120
4	49	196	45	180
5	35	175	30	150
6	15	90	18	108
7	7	49	12	84
8	8	64	8	64
9	2	18	5	45
10	1	10		
	148	695	158	751

Note: Number of arrivals at Liverpool from the U.S.A. in the three year period. Source: Compiled by the author from Customs Bills of Entry for Liverpool.

32, 148 vessels, less than twenty percent of the total number of vessels which took part in the trade, accounted for 695 arrivals, around forty three percent of all cotton arrivals. In the mid-1850s, 158 vessels, some fourteen percent of the total, accounted for 751 arrivals (thirty four percent). The presence of such a group of regular trading vessels is in no way surprising. The cotton trade was large, long established and based on only a few ports. There was obviously scope for regular trading which brought with it clear advantages to both shippers and shipowners. Amongst vessels designated as regular traders a few stand out through their achievement of an unusually high number of arrivals in Liverpool. Most remarkable was the performance of the *Brittania* which made ten arrivals at Liverpool carrying cotton in the earlier period. The *Brittania* was a packet of the Black Ball Line and other packets were amongst those vessels which made seven or more arrivals in the earlier period. Northern packets of the Black Ball, Red Star, Blue Swallowtail and Dramatic lines featured even more strongly in the mid-century when nearly all vessels achieving seven or more arrivals were New York packets. It would appear that because of the existence of packet services, regular traders played a more significant role in the shipping of cotton from New York than was the case with cotton shipped from Southern ports. But it should not be thought that New York packets alone shipped cotton from New York or that they dominated the Northern branch of the trade. Moreover, it might be observed that while some New York packets can be described in the context of this paper as regular traders in cotton, they were first and foremost regular traders in the sense of the route they operated on rather than in the commodity they carried.[14]

The majority of vessels in the regular trading category achieved between three and six arrivals. Such vessels followed various patterns of trading. Those which made four to six arrivals at Liverpool appear either to have been engaged in a regular shuttle between Liverpool and Southern ports or to have followed the three cornered route of the cotton triangle, namely sailing from a Southern cotton port to Liverpool, and then taking manufactures and emigrants from Liverpool to New York before returning coastwise to a Southern port in ballast or with some of those same manufactures. British based sources alone do not permit a full assessment of the extent of cotton triangle trading but from the available material it does not appear to have been the predominate form of trading. Of the vessels designated 'regular traders' which made only three arrivals, but one in each year of the period, some certainly were operating on the cotton triangle but more interestingly a significant number were engaged in a combination of the North Atlantic timber and cotton trades; undertaking a sailing from Southern ports to Liverpool, normally arriving between May and July, and then sailing for British North America. After

returning to Liverpool with a cargo of timber the pattern was repeated with a further voyage in the cotton trade.

A brief but unsustained participation in the varied trading patterns followed by regular traders — Southern port shuttle, cotton triangle and cotton/timber combination — can sometimes be observed amongst vessels classified as occasional traders which made two or three arrivals; but the most noticeable feature of the occasional trader category is the presence of very large numbers of vessels which made only one arrival in Liverpool. The magnitude of the figure in each period requires some comment for it might be argued that it is swelled by the inclusion of vessels which either concluded their involvement in the cotton trade at the beginning of the period, or entered it at the very end. No doubt such an element of distortion is present but it is unlikely to have been very great because in each of the two periods around a third of the vessels which made only one arrival did so in the central year of the period, i.e. 1831 and 1854, and thus had an opportunity for previous or further participation in the trade. It would appear then that in each year of the two periods examined a considerable number of vessels, around one hundred in the early 1830s and two hundred in the mid-1850s, made what was for them a very occasional voyage in the cotton trade.

A number of factors can be advanced to account for the division of cotton carrying between occasional and regular traders. Of particular significance was the fact that — the New York trade excepted[15] — the shipping of cotton from the United States was not evenly distributed throughout the year. This stemmed directly from the nature of cotton as an annual crop with definite times for planting and harvesting which imparted a seasonal character to the shipping of cotton. While variations occurred according to area and each year's weather conditions, the rhythm of cotton culture was basically that of planting around March and the commencement of picking about the middle of August. Picking continued until the turn of the year. Once picked, cotton was packed into bales and despatched to the shipping ports. The first supplies usually arrived on the coast about October and cotton continued to arrive at the ports for the next six months or so because of the prolonged picking season and the often lengthy journey from the plantations.

The commencement and duration of the shipping season was subject to some slight variation from year to year depending on the size of crop, transportation to the ports, the state of the market and a host of other influences but the season can reasonably be described as occurring from very late in the year until the early spring. Albion in his examination of the seasonal variations in the supply of cotton cargoes for northbound coastal packets stated that the season got under way in October. "By midwinter", he observed, "the movement was in full swing until it began to taper off

after April."[16] My own examination of the sailing dates of cotton carriers in the 1850s (by which time such information was included in the Bills of Entry) suggests a similar pattern but with perhaps a later start, more towards late November and December, and the tailing off after May rather than April. An analysis of the sailing dates of cotton carrying vessels from Southern ports which arrived in Liverpool in 1853 and 1854 showed that in 1853 eighty five percent of vessels had sailing dates in the months of December to May. In 1854, when the season appears to have been less concentrated, December to May sailing dates accounted for seventy two percent of vessels. Sailing dates in the months of June to November were correspondingly low and in the months of July to October sailings dwindled markedly, accounting for only eleven percent of vessels in 1854 and a mere four percent in 1853.[17] The uneven pattern of sailings from the United States was in turn duly reflected in the timing of arrivals at Liverpool which were at their highest between February and July and at a low ebb from September until the turn of the year. The presence of peak and slack periods in the shipping of cotton influenced the relative involvement of occasional and regular traders in the trade, for during the peak period the high demand for shipping drew vessels into the trade[18] while the existence of a lengthy slack period limited the number of regular traders which the trade could sustain.

The tendency for a large number of vessels to make only a single trip in the trade during the year, and that in the peak period, was reinforced by the factor of voyage length. The extent of employment a vessel can gain in a trade with a seasonal peak is greatly influenced by the relative durations of the season and a full voyage in the trade. In the cotton trade the duration of a full voyage from a Southern port comprised the total of the time spent in eastward and westward crossings of the Atlantic together with that involved in unloading and loading — turn around time — in Liverpool and the Southern port. The Bills of Entry provide useful information only on eastbound passages[19] and on turn around time in Liverpool[20] but a good indication of full voyage times can be obtained through an examination of the dates of arrival in Liverpool of individual regular traders. Such a survey indicated that New York packets took around three and a half to four months for a full voyage, while regular traders sailing from Charleston and Savannah, though occasionally achieving this sort of figure, normally spent around five months on a full voyage. For the more distant Gulf ports of New Orleans and Mobile, five to six and a half months was the usual duration.[21] These times applied for both the periods examined, there being no evidence to suggest any significant change in voyage times between the 1830s and the 1850s. It should be emphasized that the quoted voyage times relate to regular traders which were likely to have enjoyed some advantages through the routine nature of their

business, notably those of masters familiar with the sailing routes and, more important, close associations with experienced ships' agents in Liverpool and Southern ports which would greatly facilitate a rapid turn around.

The significance of voyage duration in the cotton trade lies in the fact that with a full voyage from Southern ports to Liverpool taking from four to six months — and the shift of the trade towards the Gulf ports tended towards the longer term — it was unlikely that more than one sailing from the United States could be made during the peak period of shipping activity unless the first sailing occurred at the very outset of the shipping season. In consequence many vessels which took part in the cotton trade during the peak period did not return to a Southern port because of the diminished opportunity for obtaining a further cotton cargo.

Another factor militating against a full round voyage was that of the problem of return cargoes. Throughout the nineteenth century British exports, being principally manufactures, required a much lower volume of shipping space than that involved in the delivery of imports of bulky primary products. Moreover the predominance of New York as the chief receiving port for American imports from Europe, and the tendency for Southern needs of European goods to be met via New York, all restricted the possibility of obtaining cargo for a return passage to Charleston, Savannah or the Gulf ports. One witness giving evidence before the Select Committee on the Navigation Laws in 1847 went so far as to claim that all vessels which sailed from Liverpool to American ports for cotton went in ballast.[22] The Bills of Entry however record only a few instances of vessels leaving for Southern ports in ballast,[23] but it is unlikely that many sailed with a full cargo.

Thus with the exception of that section of the regular trading category which engaged in the Southern ports to Liverpool shuttle, it was not customary for vessels which carried cotton to Liverpool to return to a Southern cotton port. As mentioned earlier other regular traders followed the triangular route and thus sailed from Liverpool to New York while those which combined the timber and cotton trades left generally for Quebec. The chief destination of occasional cotton carriers leaving Liverpool was North America. As a rule American vessels, which comprised the majority of vessels, sailed either for New York, which offered the principal opportunities for the freight of goods and emigrants, or for their home ports. In the 1850s New York was by far the commonest destination as railway construction and a peak period of emigration provided ready return cargoes of iron and steerage passengers.[24] Where vessels sailed for home ports other than New York it seems that a variation of the classic cotton triangle was being followed with ports such as Baltimore, Newburyport, Philadelphia and Portland substituting for New

York. Apart from the North Atlantic trades, the only other trades worthy of comment which American vessels went into, were the Mediterranean and Indian trades which featured in the 1850s. For British and colonial registered vessels, New York or ports in British North America were the common destinations though the Crimean War diverted a few to Balaclava in 1855.

It would appear then that most sailings from Southern cotton ports to Liverpool were followed by a return passage across the Atlantic but how far vessels then continued to operate on North Atlantic trade routes is not clear and could only be ascertained through a survey of vessel movements from both American and European ports over a long period. This lack of knowledge of the sailing patterns of individual vessels over time needs to be borne in mind when considering the position of the large number of occasional traders in the cotton trade. Such vessels were certainly occasional traders in the context of the United States to Liverpool cotton trade but it would be dangerous to regard them all as generally operating on a tramp or transient basis. Some, perhaps most, were transients, picking up cargoes wherever they might be found and undertaking a haphazard series of voyages; others, however, may have operated in a more regular fashion within the North Atlantic while a few may even have had a further commitment to cotton through taking part in the much smaller trade in cotton between the United States and continental European ports.

4

In the shipping of the North Atlantic cotton trade United States vessels comprised the major element. Table 6 shows the shipping of the trade divided according to nationality. In the early 1830s United States vessels numbered 490, sixty five percent of the total, compared with 253 British and thirteen Colonial vessels which together comprised the remaining thirty five percent. Very similar proportions prevailed in the period 1853-55 when United States vessels numbered 738 (sixty four percent), against 326 British (twenty eight percent) and 61 (five percent) Colonial. Within the category of regular traders United States vessels were even more prominent accounting for seventy six percent of the category in 1830-32 and seventy three percent in 1853-55. The presence of such a high proportion of United States vessels in the cotton trade is not particularly surprising in view of the rise of United States shipping in the first half of the nineteenth century. Superior and cheaper shipbuilding and reputed greater operating efficiency enabled United States vessels to gain a growing hold on Atlantic trade generally and their control of the lion's

TABLE 6

ARRIVALS AT LIVERPOOL BY NATIONALITY

	Regular Traders	Occasional Traders	Total
1830-1832			
American	113	377	490
British	35	218	253
Colonial		13	13
Foreign			
1853-1855			
American	115	623	738
British	35	291	326
Colonial	8	53	61
Foreign		28	28

Source: Compiled by the author from Customs Bills of Entry for Liverpool.

share of cotton freighting was a part of this wider dominance. Two minor features of Table 6 worthy of comment are those of the modest growth of colonial vessel involvement and the appearance in the 1850s of foreign vessels, mostly German from Bremen, though a very few vessels were from Norway and Sweden. It was the repeal of the British Navigation Laws in 1849 which enabled foreign vessels to take part in the trade and in the context of protectionist shipping policies it is perhaps worth commenting that restrictions by both the British and United States governments on certain trades had an influence on shipping patterns in the cotton trade. While the British Navigation Laws were in operation United States vessels could not combine the cotton and British North American timber trade; similarly United States restrictions on coastal traffic inhibited the full participation of British vessels in the cotton triangle.

A full analysis of the ports of registration of vessels taking part in the cotton trade is prevented by the fact that in the early 1850s the Bills of Entry ceased to list the ports of registration of United States vessels and instead simply used the designation 'American.' Even so it is clear from the available evidence that were such an analysis possible it would touch on almost every Atlantic seaboard port in both Britain and America. For example, in 1830-32 the 113 American regular traders were drawn from no less than twenty six different ports. This multitude of ports however, conceals the true position. In fact over half the American regular traders came from just two ports, New York and Boston, which provided thirty

four and twenty four vessels respectively. Of the other ports, only Portland in Virginia and Newburyport in Massachusetts with six vessels each were of any significance.[25] Similarly, of the thirty five British regular traders in 1830-32, twenty one were Liverpool registered and a further seven were from Belfast. Liverpool registered vessels again made up the bulk of British regular traders in 1853-55 accounting for twenty four of the thirty five vessels, and all eight colonial regular traders in the 1850s were Saint John, New Brunswick registrations. In the occasional trader category, New York, Boston and Liverpool were again the most prominent ports though their share was less overwhelming. As might be expected therefore, the leading shipowning ports on either side of the Atlantic were the chief contributors to the shipping of the cotton trade.[26]

Information on tonnages provided in the Bills of Entry enables the size of cotton carrying vessels to be examined. However, as the listed tonnages are registered tonnages certain problems arise when comparing the periods 1830-32 and 1853-55 because during the 1830s changes occurred in the basis of measurement. In the early period registered tonnage in both Britain and America was calculated on a similar basis, the Carpenter's Measure or Old Customs House Measurement, which continued to be applied in the United States until 1865. In Britain a new tonnage law was introduced in 1836 but the new law was wholly optional until 1855.[27] In consequence the registered tonnages for the later period are a mixture of old and new systems, but in order to permit comparisons every effort has been made to use old measure tonnages when compiling the tonnage distribution of British and Colonial vessels for 1853-55. Some element of new measure tonnage may remain but it was not sufficient to seriously distort the distribution.

Table 7 divides the shipping of the cotton trade in the periods 1830-32 and 1853-55 into tonnage ranges distinguishing between regular and occasional traders and between vessels of different nationality. The picture which emerges from Table 7 is an interesting one and indeed a dramatic one. What stands out, and this is the key feature of the table, is the huge increase in the size of vessels over the two periods. Whereas in the earlier period virtually all vessels were under five hundred tons and the largest 723 tons, in the later period only ten percent of vessels were below five hundred tons while 293 vessels (twenty five percent) exceeded one thousand tons. Nine vessels were of over two thousand registered tons. The tremendous development in the size and design of sailing ships in the first half of the nineteenth century is not our prime concern here though it was clearly associated with the growth of bulk trades. What must be stressed is that it was this great increase in the size of vessels which enabled the huge expansion of the cotton trade to be accommodated. Had this increase in vessel size not occurred, the number of voyages required

TABLE 7

TONNAGES OF COTTON CARRYING VESSELS

TONNAGE	1830-1832						1853-1855							
	REGULAR			OCCASIONAL			REGULAR				OCCASIONAL			
	A	B	C	A	B	C	A	B	C	F	A	B	C	F
2000+											9			
1900-1999											1			
1800-1899							1				9			
1700-1799							5				6	1		
1600-1699							5				9	2		
1500-1599							4				12			
1400-1499							13				21	3	2	
1300-1399							8				25	12	3	1
1200-1299							10		2		33	14	3	
1100-1199							12	1			48	16	3	
1000-1099							10	1	1		38	16	5	1
900- 999							16	4	1		61	32	4	1
800- 899							10	8	1		71	44	9	
700- 799	1						8	9	1		75	38	9	1
600- 699	4			6	1		7	7	2		77	28	5	6
500- 599	9	1		11	2		5	3			69	37	3	4
400- 499	23	5		41	30	3		1			35	17	5	4
300- 399	63	19		159	92	6	1	1			13	23	1	3
200- 299	13	9		149	83	3					2	7	1	4
100- 199		1		8	9	1								2
0- 99														
No data				3	1						9	1		1
Total	113	35	0	377	218	13	115	35	8	0	623	291	53	28

Note: Tonnages are Registered Tonnages (Old Measure). The letters A, B, C, F at the head of the columns refer to nationality: A — American, B — British, C — Colonial and F — Foreign. Source: Compiled by the author from Customs Bills of Entry for Liverpool.

each year to ship cotton to Liverpool would have risen enormously. As it was, the three fold expansion of the United States to Liverpool cotton trade between the early 1830s and mid-1850s resulted in a comparatively small increase in the annual total of cotton carrying voyages, from around five hundred to around seven hundred voyages.

The material presented in Table 7 enables some assessment to be made of the tonnage profile of cotton carrying vessels in both periods and comparisons between different categories and nationalities of vessels. An examination of all vessels in 1830-32 suggests the following picture of tonnages in the cotton trade: a typical vessel was between two hundred and four hundred tons; vessels between four hundred and five hundred tons were not infrequent, but vessels over five hundred tons were unusual. Attempting a similar appraisal for 1853-55 is by no means so straightforward. Whereas in the early 1830s the tonnage of a typical vessel could be defined within a fairly narrow range, in the 1850s it would appear that a typical vessel could be anything from five hundred tons to certainly one thousand tons, and arguably up to twelve hundred tons. Only above fifteen hundred tons did vessels become unusual. This situation has some bearing, albeit negative, on the interesting question of whether vessels in the cotton trade possessed any special features or characteristics. Only a detailed survey of American registers would supply the answers to this question, but the great range and variation in the tonnage of vessels engaged in the trade is apparent in both the regular and occasional trader categories. This, along with the way in which cotton carrying was combined with a variety of other trades, and the ease with which large numbers of vessels entered the trade would imply that there were no special requirements for cotton freighting. However, this is not to deny the possibility that some regular traders may have possessed certain adaptations associated with their customary cargo or their usual ports of call. Certainly very large vessels with a relatively shallow draught were built for the New Orleans trade where the bar presented problems. One feature which is detectable in Table 7 is that the tonnage distribution of regular traders, compared with that of occasional traders, is skewed relatively more towards larger tonnages, so that the typical regular trader was likely to be of a greater tonnage than the typical cotton carrier generally. In part this reflected the general tendency for American vessels to be of greater tonnage than British, a trend which is visible when the tonnage distribution of American vessels is compared to that of British in both the regular and occasional trader categories. American vessels tended to be larger and in each period the really big vessels, over five hundred tons in the early 1830s, and over fifteen hundred tons in the mid-1850s, were well nigh exclusively American. This tendency serves to enhance the role of American shipping in the trade. Larger vessels were

thus the crucial feature of the development of cotton carrying in the mid-nineteenth century, and within the shipping of the cotton trade the more numerous and larger American vessels maintained the dominance which they had firmly established by the early 1830s.

5

In the mid-nineteenth century the cotton trade was one of the great commodity trades of the North Atlantic employing a volume of tonnage only exceeded by the trade in colonial timber. The nature of the cotton trade, its demands on shipping, and how these demands were met, have been examined in the preceeding sections of this paper. The scale of cotton shipments from the United States to Liverpool required a large number of voyages every year though the great expansion of the trade was accommodated chiefly by an increase in the size of vessels. The shipping of the trade was drawn from the United States, Britain and the North American Colonies, but throughout the mid-century period vessels of the United States occupied a dominant position. A significant part of the freighting of cotton was undertaken by vessels operating on a regular basis but the majority of vessels which took part in the trade did so on a casual basis, partly because of seasonal characteristics in the shipping of cotton and because of the factors of voyage duration and return cargoes. It is hoped that these conclusions contribute to a better understanding of one of the North Atlantic's greatest trades.

One feature however which emerges from the examination embodied in this paper and which is most clearly demonstrated by the presence of such a large number of occasional traders, is that the cotton trade was not self-contained but was part of a much larger and complicated pattern of commodity dealings and shipping employment which made up the overall trade of the North Atlantic. All the various elements of North Atlantic trade, each with their own particular characteristics, joined together to produce a complex interrelationship; an interrelationship which was continuously being modified by both short and longterm factors. A full appreciation of this interlocking network of trade and shipping can only be gained through a detailed study by historians in America and Europe of the pattern of ship movements in the Atlantic. Only when such a survey has been made will the role of the cotton trade in North Atlantic commerce be fully apparent.

NOTES

1. E.J. Hobsbawm, *Industry and Empire* (London, 1968), p. 40.

2. The material for this paper was obtained chiefly from the Customs Bills of Entry for Liverpool which are stored in the Customs House Library in London. I am grateful to the

Librarian for permission to consult the Bills and for assistance and facilities at the Customs House. I should also like to thank Dr. Phillip Cottrell of the University of Leicester and Mr. Robin Craig of University College, London, for assistance and advice at various stages of my research.

3. See for example, N.S. Buck, *The Development of the Organisation of Anglo-American Trade* (New Haven, Conn., 1925); H.D. Woodman, *King Cotton and His Retainers: Financing and Marketing the Cotton Crop of the South, 1800-1925* (Lexington, Ky., 1968); R.W. Hidy, *The House of Baring in American Trade and Finance: English Merchant Bankers at Work, 1763-1861* (Cambridge, Mass., 1949); E.J. Perkins, *Financing Anglo-American Trade, The House of Brown 1800-1880* (Cambridge, Mass., 1975).

4. T. Ellison, *A Handbook of the Cotton Trade* (London, 1858). Of even greater value are two other works by Ellison: *The Cotton Trade of Great Britain* (London, 1886), and "History of Cotton Prices and Supply, 1790-1862", *Exchange Magazine,* 1 (1862), pp. 306-15, 11 (1863), pp. 45-54.

5. Albion discussed aspects of the shipping of cotton in two books, but in neither was it the chief theme of his study. See, R.G. Albion, *The Rise of New York Port* (New York, 1939), and *Square-Riggers on Schedule* (Princeton, 1938).

6. Both Smithers and Donnell used brokers' circulars in compiling their tables. Donnell, whose massive statistical survey appears to have been little used in the past, relied on the circulars of the firm of Collman and Co.

7. E. Carson, "Customs Bills of Entry", *Maritime History,* 1 (1971), pp. 176-90.

8. It would be interesting to discover the impact on shipping of massive fluctuations in the annual level of cotton shipments. For example, in 1827 and 1838 when shipments dramatically exceeded those of the previous year, was the additional demand for shipping met by a transfer of shipping from other branches of North Atlantic commerce or were vessels normally engaged in trades outside the North Atlantic drawn into cotton carrying?

9. Albion, *Square Riggers,* pp. 49-76.

10. New York's importance in the cotton trade lay not so much in its exports of cotton but rather in its role in the finance and organisation of the trade. On this see the various works listed in note 3.

11. For the purpose of this survey a 'significant amount' was defined as anything over 400 bales. By the period under review United States bales were relatively standardised and weighed around 400 lbs. On the dimensions of bales see: Albion, *New York Port,* p. 98.; B. Poole, *The Commerce of Liverpool* (Liverpool, 1853). An examination of imports in 1832 showed that over 95% of imports were accounted for by this definition.

12. Reeds and staves may very well have been used in the stowing of cotton cargoes. See R.W. Stevens, *On the Stowage of Ships and their Cargoes* (London, 5th. Ed., 1869), pp. 138-9.

13. For a discussion of commodities other than cotton exported from southern ports see Albion, *Square-Riggers,* pp. 70-3; 309-12.

14. New York packets carried whatever cargo was available at the time of sailing. Cargoes were invariably mixed. See Albion, *Square-Riggers,* pp. 307-8.

15. An examination of the months of arrival in Liverpool of cotton carrying vessels from New York in the periods 1830-2 and 1853-5 showed no pattern of a concentration of arrivals in any particular month or season.

16. Albion, *New York Post,* p. 110.

17. See Appendix 2.

18. I have been unable to locate a suitable series of freight rates from southern ports to Liverpool but it may be assumed that freight rate movements reflected the seasonal peak and slack periods of the trade. Freights for cotton carried coastwise from southern ports to New York certainly did so. See Albion, *Square-Riggers,* p. 73.

19. A survey of eastbound passage times in 1855 revealed that passage times could vary enormously but a fairly definite pattern of times emerged. Eastbound passages between New York and Liverpool, the shortest route and the one well served by regular packets, tended to be of 20 to 30 days duration. From Charleston and Savannah, passages were customarily of between 25 and 40 days. Vessels carrying cotton from New Orleans to Liverpool took between 35 and 50 days and similar times prevailed from the other Gulf port, Mobile. Such times could be improved upon, but while the scope for bettering the customary time was limited, that for exceeding it tended to the infinite. Unfavourable winds could result in passages of inordinate length. In 1855, particularly severe weather and strong easterly winds in the opening months of the year considerably extended passages: five vessels from New York took over 50 days and 19 vessels from New Orleans and Mobile exceeded seventy days.

20. Turn around time in Liverpool varied enormously. Two to four weeks appears to have been the customary time. A significant influence was that of the level of activity in the port. A large number of vessels arriving at about the same time (as was often the case in the cotton trade) served to prolong turn around time. It was noticeable that in such busy periods the most rapid times were achieved by regular traders.

21. See Appendix 1.

22. *Select Committee on the Navigation Laws,* 1847 (232) X, Qs. 1116.

23. The few instances recorded nearly all related to regular traders operating on the Southern ports to Liverpool shuttle.

24. *See Select Committee on Emigrant Ships,* 1854 (349) XIII.

25. Conspicuous by their absence were the cotton ports. Only one regular trader was registered at a cotton port, Mobile.

26. It might be noted also that the vessels of greatest tonnage were almost invariably New York, Boston or Liverpool registered.

27. On the thorny issue of registered tonnage measurement see G.S. Graham, "The Ascendancy of the Sailing Ship, 1850-85", *Economic History Review,* IX, (1956-57); R. Rice, "Measuring British Dominance of Shipbuilding in the 'Maritimes', 1787-1890", in *Ships and Shipbuilding in the North Atlantic Region* (St. John's, Newfoundland, 1978) being the proceedings of the 1977 Conference of The Atlantic Canada Shipping Project. Rice's paper cites the main literature on the issue.

APPENDIX I

ARRIVAL DATES AT LIVERPOOL OF SOME REGULAR TRADERS

Britannia of New York 630 tons.
(Black Ball Line Packet)
All arrivals from New York

20. 1.1830
17. 5.1830
13. 9.1830
14. 1.1831
20. 5.1831
24. 8.1831
19.12.1831
21. 4.1832
8. 8.1832
8.12.1832

John Jay of New York 502 tons.
(Red Star Line Packet)
All arrivals from New York

20. 3.1830
23.11.1830
18. 3.1831
21. 7.1831
18.11.1831
19. 3.1832
13. 7.1832
17.11.1832

Elisabeth of Boston 386 tons.
All arrivals from Charleston

19. 3.1830
5. 7.1830
6.11.1830
29. 3.1831
5. 7.1831
18.11.1831
2. 4.1832
6. 8.1832
4.12.1832

Lady Rowena of Liverpool 399 tons.
All arrivals from Charleston

20. 3.1830
22. 7.1830
11. 1.1831
7. 6.1831
24. 9.1831
30. 1.1832
6. 6.1832
3.10.1832

Olive Branch of Boston 355 tons.
All arrivals from Savannah

11. 2.1830
28. 6.1830
27.12.1830
4. 5.1831
19. 8.1831
4. 1.1832
8. 5.1832
3. 9.1832

London of Whitehaven 351 tons.
All arrivals from New Orleans unless stated

26. 2.1830
7. 7.1830
25. 2.1831
29. 7.1831 Mobile
3. 1.1832
14. 6.1832
17.12.1832

(continued)

Hermitage of Portland A.S. 332 tons.
All arrivals from New Orleans

20.3.1830
23.8.1830
28.2.1831
8.8.1831
6.4.1832

William Neilson of Liverpool 427 tons.
All arrivals from New Orleans unless stated

13.3.1830
24.8.1830
16.3.1831
12.8.1831
31.5.1832 Mobile

Columbia of New York 1050 tons.
(Black Ball Line Packet)
All arrivals from New York

4. 1.1853
13. 5.1853
13. 9.1853
12. 1.1854
9. 5.1854
13. 9.1854
8. 1.1855
18. 5.1855
1.10.1855

Universe of New York 1432 tons.
All arrivals from New York

3. 2.1853
11. 6.1853
14.10.1853
7. 2.1854
19. 7.1854
1.12.1854
19. 4.1855
23. 8.1855

Caroline of Charleston 782 tons.
All arrivals from Charleston

25.7.1853
14.1.1854
12.6.1854
28.2.1855
14.6.1855

Wateree American 680 tons.
All arrivals from Charleston

4. 3.1854
17. 8.1854
27. 2.1855
16. 7.1855
26.12.1855

Kitty Cordes of Liverpool 849 tons.
All arrivals from Mobile

31.1.1853
7.7.1853
19.1.1854
3.7.1854
26.2.1855
27.6.1855

Sisters of Liverpool 851 tons.
All arrivals from Mobile

22. 3.1853
27. 8.1853
31. 3.1854
11. 9.1854
7. 3.1855
5.10.1855

(continued)

Magistrate of Liverpool 519 tons. All arrivals from New Orleans	*Otseouthe* of Bath 1300 tons. All arrivals from New Orleans unless stated
24.2.1853	25.2.1853
16.7.1853	6.8.1853
16.1.1854	11.1.1854 New York
17.8.1854	17.7.1854
27.2.1855	1.3.1855
28.7.1855	17.9.1855

Source: Compiled by the author from Customs Bills of Entry for Liverpool.

APPENDIX II

MONTH OF DEPARTURE FROM SOUTHERN PORTS OF THE UNITED STATES OF COTTON CARRYING VESSELS WHICH ARRIVED IN LIVERPOOL IN 1853 AND 1854

MONTH	VESSELS	
	1853	1854
January	88	48
February	68	54
March	62	109
April	87	73
May	59	74
June	42	51
July	28	33
August	7	15
September	2	7
October	3	9
November	8	43
December	71	43
No data	20	34
Total	545	593

Note: Southern ports include New Orleans, Charleston, Savannah, Mobile, Apalachiola, Galveston and Key West. Source: Compiled by the author from Customs Bills of Entry for Liverpool.

15. THE BRITISH COAL EXPORT TRADE, 1850-1913

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THE BRITISH COAL EXPORT TRADE, 1850-1913

Sarah Palmer

Coal played an important strategic role in the early stages of Britain's industrialization but it did not make much direct contribution to national income until the second quarter of the nineteenth century, when industrial and transport developments rendered coal of relatively greater importance to producers than to domestic consumers.[1] The last of the staple industries to develop large overseas markets, the share of its output going overseas rose, as Table 1 shows, from about six percent at mid-century to a quarter by 1900 and almost a third on the eve of World War I. Coal and its immediate by-products[2] contributed in the region of nine per cent to the value of British exports[3] in the early twentieth century as against two percent in 1850, with the result that at the time when Britain was already feeling the effect of its slowing growth on export performance, coal trade earnings although not unaffected by competitive pressures, served to a degree to offset these losses. As other countries developed their coal resources Britain's share of world production fell (the United States

TABLE 1

GROWTH OF THE BRITISH EXPORT TRADE IN COAL

Year	('000 tons) Total Output	('000 tons) Total Exported	% Total Output Shipped
1855	64,307	4,977	7.74
1856-60	69,690	6,695	9.60
1861-65	88,660	8,482	9.46
1866-70	105,325	10,313	9.79
1871-75	125,885	16,644	13.22
1876-80	136,321	20,790	15.25
1881-85	158,906	28,451	17.90
1886-90	169,621	34,490	20.33
1891-95	181,906	40,517	22.27
1896-1900	208,964	51,039	24.42
1901-05	229,007	62,994	27.51
1906-10	261,727	83,115	31.75
1911-13	273,240	89,860	32.89

Note: Total exported includes coal shipped for bunkers in the foreign trade. Source: Coal Tables, *British Parliamentary Papers*.

overtook Britain as leading producer in 1899)[4] but in 1912 almost half the tonnage of world coal exports, overland and oversea, was British and its share of seaborne coal exports amounted to about seventy percent.[5]

The stimulus to increased world coal production in the later nineteenth century was the spread of industrialization; coal enjoyed almost a monopoly as a source of fuel and power. The stimulus to trade in coal was the uneven distribution of mineral resources. Imbalances between regionalized demand and local supplies of coal necessitated its international transfer on a large scale. Thus in 1922 Sargent in *Coal in International Trade* identified France, Austria-Hungary, Italy, Holland, Brazil and the River Plate as chief deficit regions; Baltic Russia, Scandinavia and the Iberian Peninsula as secondary deficit regions; and the United States, Germany and the United Kingdom as surplus regions.[6] Such characterization however obscures the importance of differences in types and quality of coal, a far from homogenous product. Demand for household coal, gas coal, coking coal and large steam coal created distinct sub-markets, making it sometimes necessary both figuratively and in fact to 'take coal to Newcastle'.

Given the limits set by geological distribution of coal resources the degree of exploitation of these depended on the market — the ability to sell at a profit. In seeking to explain developments in the coal export trade we must look both to the nature of the product and to its price at point of final sale, relative to competitive conditions. These factors were closely associated with changes in sea transport; coal was not only carried by ships, it was also consumed by them. But the interest of the British coal export trade for maritime historians extends beyond these aspects because this bulk trade played an important part in determining the character of Britain's general carrying trade. In 1918 the *Departmental Committee on Shipping and Shipbuilding,* reviewing Britain's progress as a maritime nation, argued that its dominance of world sea carriage was the product of three factors: the strong industrial position of the United Kingdom, the existence of a world wide empire with well distributed coaling stations, and the effect of provision of outward freights by the coal export trade.[7] In the claim by the Committee that "in many ways this trade is the key to an understanding of the carrying trade"[8] there was an echo of W.S. Jevons' comment made half a century earlier: "Our foreign trade has been, is, and will be an integral part of our system. It is the Alpha and Omega of our trade".[9]

2

Table 2, based on statistics presented in a paper by D.A. Thomas in 1905, shows the share of British coal exports taken by each of ten regions

TABLE 2

PERCENT SHARE OF BRITISH COAL EXPORTS TAKEN BY TEN WORLD REGIONS

	1*	2	3	4	5	6	7	8	9	10
1850-54	37.07	40.14	0.58	0.55	1.00	2.81	1.70	11.84	2.24	2.38
1855-59	35.89	43.80	0.58	0.48	1.29	2.69	2.03	9.48	2.28	1.46
1860-64	33.90	42.25	0.60	0.44	0.93	2.37	3.94	11.38	2.76	1.41
1865-69	33.60	43.22	0.63	0.42	1.17	3.35	3.29	8.20	4.23	1.78
1870-74	36.67	43.22	0.50	0.22	0.94	2.58	2.66	5.75	4.25	2.73
1875-79	36.66	44.81	0.60	0.60	0.77	3.02	3.19	4.78	3.42	2.14
1880-84	32.66	48.34	0.94	0.87	0.92	3.15	3.57	3.71	3.56	2.25
1885-89	32.21	49.80	1.09	0.86	1.02	3.04	2.72	2.56	5.23	1.44
1890-94	34.23	50.68	0.84	0.84	0.84	2.37	2.39	1.50	5.42	1.70
1895-99	37.38	47.70	1.05	1.02	0.79	2.07	1.70	1.19	5.90	1.18

*Note: 1. France, Mediterranean; 2. Baltic, Black Sea; 3. Brazil, Uruguay, Argentina; 4. West Africa; 5. British South Africa; 6. Indian Continent; 7. Middle and Far East; 8. Atlantic North America, Central America; 9. Peru, Chile, Pacific North America; 10. East Africa. Source: Compiled from D.A. Thomas, "The Growth and Direction of our Foreign Trade in Coal During the Last Half Century", *Journal of the Statistical Society,* 1903, Appendix A.

in five year periods between 1850 and 1900. From this it is clear that Europe was the major overseas market for British coal, taking seventy five to seventy seven percent of total exports up to 1870 after which the proportion became even higher, reaching eighty four percent by the end of the century. In 1913 eighty six percent of coal exports went to near destinations.[10] Of the more distant regions receiving British coal only South America was of any significance by 1900, most of the remaining coal carried on oceanic routes went to scattered destinations.[11] Significantly the series of government returns which provided statistical comparisons between Britain and other coal producing countries, beginning in 1897, listed separately only British exports to Brazil and the Argentine among non-European importers. (See Appendix I).

The long term consistency of this general geographical distribution reflects a number of factors. First and most obvious, with the exception of the United States and Japan industrialization was still in the nineteenth century a European phenomenon. Europe constituted the largest market; the process of industrial growth demanded coal to power forges and factories, to run new railways and provide warmth and lighting for an increasing population. Added to these sources of demand was that arising from the needs of steam shipping, both within Europe itself and in trades from Europe. Second, there was the effect of distance. Special freight market conditions could enable British coal to be sold at a profitable price on the other side of the world, but when these did not apply and when

competing producers were more favourably located, Britain was at a disadvantage. In Europe Britain had ready access to markets and until the mid-1890s the level of inland transport costs limited competition between British seaborne coal and that produced by the Central European fields. Third, there was the advantage gained in the long term from Britain's near monopoly of European coal markets at mid-century, which established connections broken only with some difficulty by later competitors.

The persistence of Europe as the dominant market for Britain's coal exporters may seem to suggest that conditions affecting the coal trade remained fairly constant, but this was not the case. Significantly when a revised edition of W.S. Jevons' classic work on the coal trade appeared in 1905, its editor W.A. Flux, saw fit to introduce substantial amending footnotes on its economics and rather than updating the statistics as elsewhere in the book, omitted entirely the discussion of the freight market on grounds of "the revolutionary changes which have occurred in the general and comparative levels of ocean freights".[12] Moreover the gains in the share of Europe in total British coal exports towards the end of the century reflect a falling away of the tonnage taken by the more distant markets rather than positive gains made by those nearer to Britain. Always a trade peculiarly sensitive to short-term fluctuation in demand — the value of coal output varied markedly from year to year — the British coal trade was also much affected by long term pressures concerning both demand and supply.

These pressures can best be understood by looking in turn at each of the factors contributing to British coal sales overseas. To begin with the product itself, Britain was fortunate in a natural endowment of several different types of coal including that suitable for raising steam. Coal from the Welsh seams was generally recognized as the best steam coal; the Durham coal field also produced high calorific fuel but not of the same quality as the Welsh which was denser, occupying less bunker space per unit of energy output, more resistant to weathering, relatively more smokeless and less susceptible to spontaneous combustion.[13] Some of these properties were associated with the size of Welsh coal. All steam coal was sold as large coal but Newcastle steam coal contained a higher proportion of small coal, in part because of a natural tendency to break but also because of the effect of the 'drop' system of loading used on the Tyne and Wear.[14]

It is clear that by the early twentieth century Britain was not so much an exporter of 'coal' as of steam coal. In 1903 according to official figures the quantity of coal supplied for manufacturing other than steam raising amounted to only four percent of total exports.[15] Unfortunately coal exports were not classified by type until this date but as Table 3 shows the growth of shipments from the Bristol Channel ports (Swansea, Cardiff,

Newport, Llanelly, Gloucester, Bristol) reflects increased sales of steam coal.

How much of British steam coal went to meet the needs of shipping is difficult to establish without much further research — urgently needed in view of the strong claims made for this. Separate figures for coal taken for bunkers are available for years after 1872 but these do not include coal shipped to coaling stations. In 1874 when bunker shipments amounted to three and a quarter million tons, the Peninsular and Oriental Steamship Company exported 287,000 tons to its coaling stations overseas[16] and over a three year period between 1872 and 1875 the Royal Mail Steam Packet Company recorded bunkering shipments to Southampton of 113,642 tons and to foreign and colonial depots of 264,919 tons.[17] But these isolated examples merely serve to indicate the levels of magnitude encountered in particular cases at a particular time; they provide no general scale. Evidence given to the 1905 *Select Committee on Coal Supplies* which was seeking to establish the effect of the coal export tax introduced in 1901, is not particularly helpful. One witness thought that half the total of coal exported was used for bunkering (about twenty five million tons at this date), another that five million was the correct figure.[18] In the absence of precise information on the annual consumption of British coal at coaling stations it is impossible to provide a satisfactory estimate, but some rough guide is offered by collation of answers given to the Committee by Consuls who were asked to provide figures for coal taken by *British* vessels. These figures, relating mainly to Europe which took the bulk of coal exports, add up to about three and a half million tons and seem to suggest that with allowance for coaling by foreign vessels and for colonial depots not included, the amount taken for bunkers out of

TABLE 3

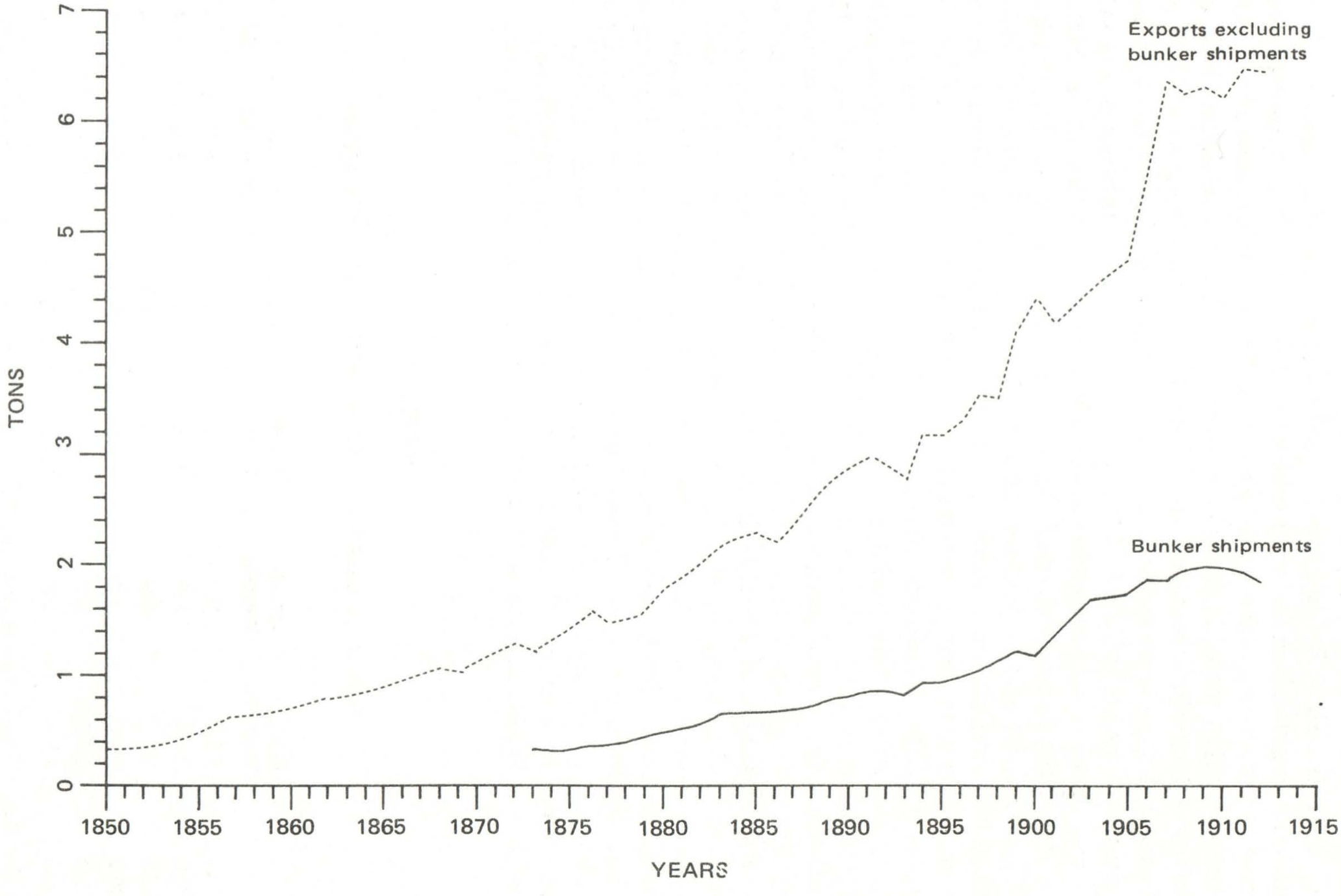
PERCENT SHARE OF COAL EXPORTS BY REGION

	Bristol Channel	North Western	North Eastern	Humber	East Scotland	West Scotland
1850	13.3	8.3	63.6	2.0	6.1	4.4
1860	24.4	8.6	53.5	3.4	5.8	3.4
1870	31.2	4.9	46.9	4.5	7.5	4.6
1880	39.0	3.4	39.5	6.7	7.8	3.0
1890	43.6	2.1	31.2	7.7	11.4	3.6
1900	41.9	1.6	29.7	9.5	13.1	3.6

Source: D.A. Thomas, "The Growth and Direction of Our Foreign Trade in Coal during the last Half Century", *J.S.S.*, 1903, p. 498.

FIGURE 1

COAL EXPORTED AND SHIPPED FOR BUNKERS



total coal exports may not have been more than ten million tons or one fifth of the whole. If this rough estimate is correct then railway demand assumes more importance in coal trade development than has sometimes been suggested.

Whatever the source of demand for steam coal Britain's share of the world market for this and other types of coal depended in part on the exploitation of alternative sources of supply. In Europe the development of the Westphalian field was the greatest threat to British coal exports; already in 1866 it was noted that in the interior of the continent "the comparative cheapness of German coal and the facilities of transport bid fair to drive British coal entirely out of the market",[19] but not until the establishment of the Westphalian Syndicate in the mid-1890s did German coal exports come into competition with British coal in European coastal regions,[20] and their impact proved to be less significant than the growth of home production by France, Britain's most important national market.[21] In Europe as W.R. Sargent noted, the two greatest coal producers divided the market between them.[22] Elsewhere in the world although demand for coal grew no less fast and in some cases faster than in Europe, Britain's coal exports suffered much more as the result of the development of other sources of supply. In the East, India and Japan became the main suppliers of coal; the Australian fields competed with Britain in Pacific America, as did the British Columbian field; in the West Indies, Central and North America, the United States was the dominant producer.[23] The level of Britain's exports to these regions in the mid-nineteenth century had been correctly interpreted by a Royal Commission in 1871 as a temporary phenomenon, although it was wrong in associating this also with Europe,

> As regard the future exportation of coal, although a very large increase has taken place within the period (1856-1869)...yet there is reason to doubt whether much further increase will take place in this direction...the probable development of the enormous coal fields of North America, and those of India, China, Japan and other countries, and the more effective working of the known coal fields, will probably prevent any considerable increase in the future exportation of British coal.[24]

But the effectiveness of this competition depended not only on the influence of distance on price, more pronounced in some cases than others, but also on the quality of the product. Some types of British coal were entirely lacking distinctive qualities which might offer protection from competition. As a witness to the 1905 Coal Supplies investigation commented in respect of one such case,

> Northumberland steam coal does not possess any qualities giving it an advantage over any other coal which can be used at

> home or abroad. It has, therefore, nothing of the value of a monopoly or quasi-monopoly in any foreign market and anything that can raise steam, be it wood, napthel, refuse, peat, will serve as a substitute for it, and in some centres can replace steam power entirely.[25]

In contrast Welsh steam coal, as already noted, proved superior in several respects and was particularly suitable for use in longer distance trades because of its economy in bunker space and resistance to deterioration in hot climates. In Northern European trades these characteristics were of no special value, hence as can be seen in Table 4 the cheaper North Country steam coal sold better. In the Mediterranean, with no alternative near

TABLE 4

PERCENTAGE OF TOTAL SHIPMENTS TO WORLD BY REGIONS

	Bristol Channel	North Western	North Eastern	Humber	East Scotland	West Scotland
France & Medit.	62	2	24	3	3	6
Baltic & Black Sea	8	2	42	18	28	1
Brazil, Uruguay Argentina	77	8	5	3	3	4
West Africa	96	1	3	—	—	—
British S. Africa	65	—	21	6	2	4
Indian Continent	69	12	7	7	—	4
Middle & Far East	98	2	—	—	—	—
Atlantic N. America, Central America	67	7	2	3	4	17
Peru, Chile, Pacific N. America	50	11	38	1	—	—
East Africa	97	2	1	—	—	—

Source: D.A. Thomas, "The Growth and Direction of Our Foreign Trade in Coal during the last Half Century", *J.S.S.*, 1903, p. 499.

sources of quality coal, Welsh steam coal reigned supreme. In the Far East, however, Japanese and Indian steam coals proved an acceptable substitute so that by 1903 D.A. Thomas noted, "In the more distant markets the demand is now limited to special coal for naval purposes and for the use of liners".[26]

But the rise of competing producers was not the only long term factor affecting coal exports; the general pattern of demand also underwent some alteration. Whatever the share of shipping demand in the coal export market, by the end of the century no further significant growth was to be expected from substitution of steam for sail; henceforth expansion would depend directly on increases in world trade.[27] Economies in fuel consumption, a factor encouraging adoption of steam propulsion,[28] in future would tend to dampen rather than promote demand. Because these economies were associated with the use of poorer quality coals, they had already by the late nineteenth century undermined the particular claims of best Welsh coal. As a shipping manager observed in 1905

> Now we are using coals, which, ten or twenty years ago we should not have thought of using; we used the very best steam coals we could get then — the largest — but now we take small coal, and we find it answers our purpose perfectly well. That is on account of the improvements in marine engines and the use of larger boilers and other improvements.[29]

Competition from oil did not seriously affect the coal industry until after 1918, but supply increased from under a million tons in 1870 to forty five million tons on the eve of World War I. In 1912 Lloyd's Register listed fifty sailing ships and 258 steamers carrying oil in bulk.[30]

The superiority of British coal enabled the industry to maintain its position in world markets longer than might have otherwise been the case, but the key to its initial expansion and subsequent development is the freight market. Given a basic comparability in the pit head value of coal of any particular type between all producers — only United States' coal was produced noticeably more cheaply[31] — the price of coal at its point of final sale depended on costs incurred in the interim. For British producers these costs were principally those of sea carriage; proximity of coalfields to coast kept land carriage costs low. With potential markets distant from Britain, the cost of shipping space for the carriage of coal — the freight rate — was the major influence on the nature and extent of its coal trade. All other things being equal, the length of the voyage might seem to be the main factor influencing the level of coal freights. This was certainly broadly true in the early twentieth century as Table 5 shows, but the fact that these rates do not increase precisely in relation to distance is indicative of the continued persistence of a factor crucial to the

development of coal exports in the mid-nineteenth century — the set of trade. With the growth of Britain's trade from the mid-eighteenth century the long term imbalance between the volume of its exports and imports had been further accentuated. British exports other than coal were generally high in value but low in bulk, whereas imports of raw materials and foodstuffs were the opposite. In consequence there was a surplus of carrying capacity on the outward voyage from Britain, and in the absence of a cargo vessels were forced to leave in ballast. With homeward freight assured, shipowners could carry coal at low freights for sale at low prices. Thus in 1850 a North American observed that there was no market for Nova Scotian coal in New Brunswick,

> Because its immense timber trade brings annually to St. John a vast number of vessels from England in ballast. As this costs from twenty five to fifty cents per ton, besides the expense of taking it in and discharging, it will, as oft as possible be substituted by English coal providing the latter can be sold in St. John's at a trifling advance on the price and export duty at Liverpool.[32]

In 1866 the British Consul at Danzig noted a similar relationship: "The large number of British ships coming out here to load grain or timber, and having to come in ballast for want of a cargo, gives particular facilities for the conveyance of coal".[33] The effect of the set of trade was to produce market differences in freight rates out and home, from which the coal trade was able to benefit. W.S. Jevons', *The Coal Question* provides many striking examples of such rates.[34] Where coal was available as an outward cargo, the effect was to depress homeward rates to a degree also. Thus Jevons noted that timber was charged fourteen shillings a load when shipped from Danzig to a coal exporting port, but seventeen shillings and threepence when sent to a non-coal port.[35] In those cases where the demand for coal itself was high, as at Marseille and the Spanish ports, then outward freight was higher than that charged on the voyage to Britain; but as Table 5 suggests in general coal freights benefited from the set of trade.

It is clear that by the end of the century coal exports owed less to the influence of ballast rates than had been the case in the 1850s and 1860s. After 1870 steam shipping was rapidly replacing sail; although the number of sailing vessels was three times as great, by 1885 gross tonnage of U.K. steam shipping exceeded sail. The transfer from sail to steam meant effectively an increase in the supply of shipping, not only because of the greater cargo capacity of steam vessels but also as a result of their speed which enabled more voyages to be made. This together with working economies[36] led both to a world wide general fall in freight rates

TABLE 5

AVERAGE FREIGHT RATES FROM CARDIFF TO FOREIGN PORTS, 1909-1911

	Nautical Miles	Average Rate per ton.		Rate per ton per mile.
N. Europe		*s.*	*d.*	*d.*
Copenhagen	1110	4	7	.049
Stockholm	1500	5	1	.041
Hamburg	822	4	0	.058
France				
Dieppe	415	4	5	.128
St. Nazaire	404	4	3	.126
Bordeaux	540	4	8½	.087
Marseilles	1846	6	8½	.043
Mediterranean				
Gibraltar	1155	5	4	.055
Algiers	1560	6	2½	.480
Barcelona	1665	7	5	.053
Genoa	2022	7	1	.042
Malta	2135	5	5	.030
Trieste	2808	7	0	.030
Port Said	3075	6	5	.025
Constantinople	2929	6	7	.027
Danube	3275	6	10	.025
Smyrna	2777	7	1	.031
Indian Ocean *(via Suez)*				
Aden	4490	8	8	.023
Bombay	6155	9	1	.018
Colombo	6608	9	6	.017
Far East *(via Suez)*				
Singapore	8188	10	3	.015
Hong Kong	9718	12	6	.015
Shanghai	10470	15	3	.017
Africa				
Madeira	1300	7	2	.066
Cape Town	6000	11	9	.024
Bona	1800	7	2½	.048
Tunis	1943	8	0	.049
Oran	1385	6	5	.056
West Indies				
Havana	4025	8	5	.025

(continued)

TABLE 5 (cont'd)

AVERAGE FREIGHT RATES FROM CARDIFF TO FOREIGN PORTS, 1909-1911

	Nautical Miles	Average Rate per ton.		Rate per ton per mile.
		s.	*d.*	*d.*
S. America				
Pernambuco	3945	13	9	.042
Rio de Janeiro	5030	14	0	.033
Monte Video	6140	13	11	.027
Buenos Ayres	6250	14	9	.028
America (Pacific)				
San Francisco	13000	23	0	.020
Valparaiso	8870	19	9	.027

Source: H. Stanley Jevons, *The British Coal Trade* (1915), pp. 685-6.

and a narrowing of differences between individual quotations. The opening of the Suez Canal altered the international trade route pattern so that by the early twentieth century outward rates to Bombay and Aden differed little.[37] With the general level of freight rates thus being lowered coal could be shipped cheaply without the benefit of high back rates. Moreover, as W.A. Flux noted in 1905, "low as coal freights are, modern ships can be built so as to be operated economically in the carriage of coal alone, any homeward freight being a source of additional profit".[38] Indeed in Europe particularly, the dominance of the coal trade in the closing decades of the century was such that the need for carriage of this one commodity exercised a major influence on freight rates generally.

No satisfactory index of coal freights is available although there are plenty of odd quotations. Most contemporary published series are contract prices so do not reflect the more typical rates arrived at in the open market. Figures presented by D.A. Thomas which may be taken as a fair guide to the general direction of freights, show a fall of a half to two thirds between 1872 and 1902.[39] Table 6 giving European rates only is taken from a Board of Trade report published in 1905, giving average annual coal freight rates per ton and based on local coal trade circulars recording average prices for individual, non contract shipments.[40]

If homeward cargoes no longer had as much importance for coal exports generally by the later nineteenth century, this factor was still of great importance for the coal trade to certain destinations and the absence of a return cargo in highly competitive conditions could prove crucial. The import by Europe of grain and nitrates from South America kept coal freights low and offered protection for British coal exports from United

TABLE 6

AVERAGE FREIGHT RATES FROM BRITISH PORTS TO EUROPE, 1884-1903

	Hamburg		Copenhagen		Stockholm		Stettin		Crondstadt		Cadiz		Gibraltar		Barcelona	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
1884	4	4¾	4	7½	4	8¼	5	1	4	6½	8	4	7	5¼	11	4¾
1885	4	4½	4	6¼	4	6¾	4	11	4	9	7	8½	7	1	11	0¼
1886	4	4	4	6	4	5½	4	11½	4	7	7	9	6	11½	10	10
1887	4	6½	4	3¾	3	11½	4	5½	3	10¼	7	5½	6	9	10	4¼
1888	4	9½	5	5¾	6	0	5	1	4	8	8	5¼	8	4½	11	0
1889	5	2¼	5	11	5	5	5	4	5	5	9	1½	8	7	11	6
1890	4	11	5	2½	4	6¼	4	10¾	4	7	7	10¾	7	2½	9	11¾
1891	4	9½	4	8½	4	4½	4	9	4	4¼	7	0¼	7	1	9	7½
1892	4	4	4	10	4	4¼	4	8¼	5	4½	7	0	6	7¼	8	8
1893	4	4½	4	7	4	1¾	4	10¼	4	5½	6	1¾	6	0	7	7
1894	4	1¾	4	3¾	3	11½	4	3½	3	11½	5	2	5	4½	7	1½
1895	4	1¼	4	0½	4	0	4	5¾	3	11¼	5	0	5	3½	7	9½
1896	4	2	3	10¾	4	1	4	4	3	8½	5	4	5	6¾	8	9¾
1897	4	4	4	4½	4	6½	4	9	3	11¾	5	9½	5	11¼	8	3¼
1898	4	5	4	11	5	4	5	6	5	3	6	7	6	10	9	7½
1899	4	7	5	10¾	6	0	5	9½	5	11¼	6	11½	7	0¼	9	8¾
1900	5	2½	6	9¼	6	2½	6	1	6	7	8	8½	8	8¼	11	0½
1901	4	0	4	6¾	4	4	4	6¾	4	0½	5	10½	6	0	7	4
1902	3	8½	4	0¾	4	0½	4	7¾	4	0¼	4	11½	5	3¾	6	0
1903	3	7¼	4	0½	3	10	4	3½	3	10	4	11	5	11½	5	4½

(continued)

TABLE 6 (cont'd)

AVERAGE FREIGHT RATES FROM BRITISH PORTS TO EUROPE, 1884-1903

	Marseille		Genoa		Malta		Venice		Constantinople		Tyne ports-Alexandria		Cardiff-Alexandria		Tyne ports-Port Said		Cardiff-Port Said	
	s.	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*	*s.*	*d.*
1884	11	2¾	9	9	6	6½	11	5¾	8	8¼	10	9	7	9	11	5¼	10	7½
1885	9	10½	8	8½	7	5	10	2½	7	10	9	3½	9	8¼	9	5½	9	9
1886	9	1½	8	9¾	7	10¾	11	1¾	8	3¼	9	0½	9	8¼	9	3¼	9	10½
1887	8	7	8	8	7	10½	10	6	8	3	8	9	9	6	8	7	9	6
1888	9	4½	8	11	7	3½	10	6¾	8	3½	8	10½	9	7½	8	10½	9	7½
1889	10	1	9	4½	8	5¾	11	4¼	9	3	9	4¼	11	6	10	0	11	3
1890	7	5	7	5¾	7	2¼	9	2	7	5¼	7	10¼	9	4½	8	1¾	9	1½
1891	7	2½	6	7½	5	11¾	8	0¼	7	2¼	6	8½	7	7½	7	2	8	1½
1892	7	2¼	6	9½	6	6¼	8	3	7	3¼	6	11¼	7	1½	7	0¼	8	0¾
1893	6	7½	6	1½	5	8¾	7	5¾	6	2½	6	2	6	6¾	6	0¾	9	1½
1894	5	4½	5	0¼	4	5	6	6	5	2	5	0½	5	6¾	5	3½	5	6
1895	5	5	6	1¼	4	5	6	6¼	4	11½	5	1	5	9¾	5	6	5	10½
1896	6	5¼	7	3¼	5	0¼	7	8	5	10½	6	5½	7	3¾	5	11¾	7	5¼
1897	7	6	8	6½	6	2	8	9	7	8½	7	4½	8	9	7	3¼	8	4½
1898	8	9¾	8	7¾	7	9	10	4¾	9	3¼	8	10	9	3	8	4½	9	3
1899	9	1¾	10	2½	7	11¼	10	5	8	11½	10	0½	10	10½	9	7¼	10	7½
1900	10	2¾	6	7½	9	10	12	10¾	10	11¾	12	0	12	9½	11	11¼	12	1½
1901	6	9¼	5	2¼	6	0½	8	0½	7	2	7	4½	7	4½	7	1	7	3
1902	5	5	5	6½	4	5	6	3½	5	2¼	5	4¾	5	7½	5	4	5	3
1903	5	9½	5	6	4	10	6	4¼	5	3¼	5	9¼	6	0	5	7½	5	9

Source: *British Parliamentary Papers*, 1905 (LXXXIV)

States' competition — the shorter distance from North America could not compensate for lack of a return cargo.[41] In the short term also grain exports had a marked effect on the coal market,

> In the San Francisco market the coals of the world compete, and the relative importance of this or that source varies from year to year in accordance with somewhat complex laws of supply. Foreign coal enters the port chiefly as ballast in tramp steamers seeking grain cargoes, so that the condition of the wheat export trade has a direct bearing upon the coal imports.[42]

But exchange was not always as direct as this account might suggest. Coal might be taken to the Mediterranean, then the ship proceed in ballast to South America where grain might be loaded for the return voyage.[43] Also, the country of import was not necessarily the final destination; Genoa was the most important coal port in the world but much of the coal shipped here was destined for other countries.[44] Neither did high return freights automatically ensure low outward freights. In the mid 1890s coal exports from South Wales were allegedly hampered by high freights, which prevailed despite good return freights because shipowners were not prepared to lose time loading coal.[45] In general then while freights were no less important in determining the scale and direction of the coal trade, variations due to opportunities for back cargo were less. In 1903 the economist W.A. Flux noted that,

> The differences of rates due to the greater facility for procuring a return cargo at one than another of ports not very far distant from each other is no longer measured in shillings per ton but in pence.[46]

But with these differences reduced other factors influencing freight became more significant in meeting foreign competition. The level of port charges (a greater proportion of costs in near trades), loading and discharge facilities and manning costs all played a part. These were at first felt in the growth of one coal port's trade at the expense of another but ultimately nationally. Significantly, by the early twentieth century the fact that Britain's coal exports were seaborne no longer seemed such an advantage to some contemporary observers, necessitating much handling of the coal and introducing several stages in the transportation from producer to consumer.[47]

3

This general survey of the direction and character of Britain's coal export trade in the later nineteenth century shows that the conditions

affecting the trade within and outside Europe were not the same. With distance no barrier, limited competition and expanding industrial and transportation markets, British coal found a ready sale in Northern and Mediterranean Europe with the result that up to three quarters of all British coal exports were sold here. In contrast, outside Europe British coal was burdened by large freights, there was competition from other sources of supply, and demand was to a great extent dependent on the needs of shipping. Not surprisingly the tonnage of coal sold in distant markets was a small and falling proportion. In view of this pattern it might be reasonable to ask why so much importance has been attached to Britain's oceanic coal trade? The answer lies not directly with the coal trade itself but in the development of Britain as the world's major shipping nation.

In 1912 the volume of world trade was somewhere in the region of 250 to 300 million tons. About half of this was Britain's own trade — imports fifty eight million, coal exports excluding bunker coal seventy seven million, other exports twenty million.[48] Although in terms of value British shipping carried more than its national share of international trade, these and other invisible earnings making up for the shortfall in trade balance, in terms of volume the share was less. This disparity arises from the regional distribution of Britain's exports and imports and the differing share taken by British shipping, both connected with the coal trade. The importance of coal in Britain's total volume of exports ensured that the bulk of its exports went to Europe.[49] In contrast, in terms of value Europe proved a less important market than the rest of the world. Countries outside Europe accounted for fifty nine percent of the value of British exports in 1912 but only fourteen percent of their weight.[50] The import trade showed a similar pattern with the greater part of the value of trade contributed by extra-European regions.

Despite the fact that most British coal was exported to Europe, the share of that trade carried in British vessels was less than half. "British vessels can have carried only from 25 to 26 million tons of the 65.6 million tons shipped to European and Mediterranean countries", reported the Departmental Committee in 1918.[51] This share was certainly less in 1913 than had been the case two decades previously, but the great import trades, grain and timber, which had provided the opportunity for coal to establish itself as a ballast cargo, were already dominated by foreign shipowners at mid-century. As coal became a cargo of importance in its own right Scandinavian shipowners tightened their hold on the Baltic routes. The share of British shipping in the Anglo-Mediterranean trades was more pronounced, a sixty percent proportion, but only in the distant oceanic trades was the bulk of Britain's exports and imports carried in British ships.[52] British shipping was thus dominant not in the regions taking most of British exports but in those contributing the greatest value.

But the development of these oceanic trades, and the monopoly of indirect carriage Britain established, owed much to the coal export trade and the lead it gave to British steamships. By the early twentieth century coaling stations were no longer an outlet only for British coal, and their services in some cases were becoming less vital, but three decades earlier they had given a crucial lead to British shipping. As Kirkaldy commented, "A great export trade in coal was developed by this country long before other countries were ready with steamships to enter into competition for the carrying trade of the world!"[53] Moreover the long distance coal trade continued to have a direct effect on the fortunes of Britain's shipowners, because the carriage of that fifteen percent of exports sent outside Europe was almost exclusively reserved to Britain.[54] When British coal exports declined after World War I, the effect on the country's tramp shipping was considerable.

NOTES

1. Phyllis Deane and W.A. Cole, *British Economic Growth 1688-1939: Trends and Structure* (Cambridge, 1962), p. 219.

2. By-products of coal were coke and patent fuel. Official figures of coal exports often include estimates of the coal content of these, but statistics presented in this paper refer only to the unprocessed product.

3. Coal prices fluctuated widely from year to year, hence annual estimates of the contribution made by the industry to national income and to the value of exports show marked variation.

4. A useful summary of statistics relating to world coal production is given in the Coal Tables for 1912, Great Britain, Parliamentary Papers, 1913 (LXVII), pp. 348-349. In drawing conclusions from such figures care has to be taken to take account of differences in tonnage measurement arising from the use of the Imperial Ton, adopted in the British Empire and the United States, and the Metric Ton, adopted in continental Europe. Coal exported in some instances includes that shipped for bunkers; in others a separate return of bunker coal was made, so here also it should not be assumed that figures are necessarily comparable.

5. H. Stanley Jevons, *The British Coal Trade* (London, 1915), pp. 677-681.

6. A.J. Sargent, *Coal in International Trade* (London, 1922), pp. 9-11.

7. *Report of the Departmental Committee on Shipping and Shipbuilding,* Great Britain, Parliamentary Papers, 1918, (XIII), Cd. 9092.

8. Departmental Committee, p. 145.

9. W.S. Jevons, *The Coal Question* (London, 2nd Ed., 1866).

10. Departmental Committee, p. 151.

11. Sargent (1922), p. 24.

12. W.S. Jevons, *The Coal Question,* W.A. Flux, ed., (London, 3rd Ed., 1905) pp. XXIV.

13. On qualities of coal see A.W. Kirkaldy, *British Shipping, Its History, Organisation and Importance* (London, 1914) Appendix XII, p. 611; D.A. Thomas, "The Growth and Direction

of our Foreign Trade in Coal during the Last Half Century," *Journal of the Statistical Society,* LXVI, 1903, pp. 488-490.

14. *Report of the Royal Commission appointed to inquire into the Spontaneous Combustion of Coal in Ships,* Great Britain, Parliamentary Papers, 1876, (XLI).

15. Thomas, "Foreign Trade in Coal", p. 468.

16. *Spontaneous Combusion,* Appendix E, p. 117.

17. *Ibid.,* Appendix D, p. 115.

18. *Report from the Select committee on Coal Supplies,* Great Britain, Parliamentary Papers, 1905 (XVI), pp. 21591-21594; 18929.

19. Consular Reports, Great Britain, Parliamentary Papers, 1866 (LXXI), pp. 50-51.

20. *Coal Supplies,* 1905, p. 23717.

21. In 1883 France produced 65.54 percent of its domestic needs, in 1893, 70.17 percent. See Coal Tables, Great Britain, Parliamentary Papers, 1898 (LXXXIV) p. 12.

22. Sargent, *Coal in International Trade,* p. 11.

23. D.A. Thomas, *Some Notes on the Present State of the Coal Trade* (London, 1896), p. 55; Kirkaldy, *British Shipping,* pp. 424-425.

24. *Report of the Royal Commission on Coal Supplies,* Great Britain, Parliamentary Papers, 1871 (XVIII), xiv.

25. *Coal Supplies,* 1905, p. 19320.

26. Thomas, "Foreign Trade in Coal", pp. 491-498.

27. Ibid., p. 501.

28. Ibid., pp. 475-476.

29. *Coal Supplies,* 1905, p. 22808.

30. Kirkaldy, *British Shipping,* p. 128.

31. For average values see W.S. Jevons, *Coal Question* (3rd Ed., 1905), pp. 91, 98; and Parliamentary Papers, 1898 (LXXXIV) 126, pp. 12-13.

32. W.R. Johnson, *The Coal Trade of British America* (Baltimore, 1850), p. 34.

33. *Consular Reports,* 1866, p. 53.

34. Jevons, *Coal Question* (2nd Ed., 1866), p. 267. These examples include:

	Out		Home	
	s.	d.	s.	d.
Calcutta	17	6	75	0
Singapore	27	0	75	0
Shanghai	40	0	72	10
Rio de Janeiro	28	0	45	0
Havana	27	6	55	0

35. *Ibid.,* pp. 268-269.

36. B.R. Mitchell with Phyllis Deane, *Abstract of British Historical Statistics* (Cambridge, 1962). See also B.M. Deakin with T. Seward, *Shipping Conferences* (Cambridge, 1973), pp. 15-19.

37. Jevons, *Coal Question* (3rd Ed., 1905), p. 306.

38. *Ibid.,* pp. 307-308.

39. Thomas, "Foreign Trade in Coal", p. 474; Appendix B.

40. Great Britain, Parliamentary Papers, 1905 (LXXXIV), pp. 264-266.

41. Sargent, *Coal in International Trade,* p. 28.

42. Jevons, *Coal Question* (3rd Ed., 1905), p. 309. Quoted from the *22nd Annual Report of the United States Geological Survey,* 1900-1901.

43. Thomas, "Foreign Trade in Coal", p. 456.

44. Consular Report.

45. Thomas, *Some Notes,* p. 20.

46. Jevons, *Coal Question* (3rd Ed., 1905), p. 307.

47. Coal Supplies, 1905, p. 19320.

48. S.G. Sturmey, *British Shipping and World Competition* (London, 1962), p. 21.

49. See Appendix I.

50. Sturmey, *British Shipping,* p. 24.

51. Departmental Committee, 1918, p. 159.

52. *Ibid.,* p. 151.

53. Kirkaldy, *British Shipping,* p. 456.

54. Deakin, *Conferences,* p. 14; Departmental Committee, 1918, p. 151.

APPENDIX I

ANNUAL SHIPMENTS OF BRITISH COAL TO THE PRINCIPAL IMPORTING COUNTRIES ('000 TONS)

	Europe France	Germany	Italy	Sweden	Norway	Denmark	Russia	Spain	Egypt
1870	2074	1560	768	369	248	694	805	480	374
1871	1968	2331	791	369	221	648	872	475	451
1872	2152	2074	898	486	246	637	770	501	509
1873	2393	1627	755	512	247	588	593	507	523
1874	2279	2026	896	577	306	657	862	476	617
1875	2606	2139	972	715	375	743	850	555	527
1876	3160	2243	1149	738	358	773	1128	594	544
1877	2953	2008	1029	744	423	760	964	658	519
1878	2964	1917	1096	646	412	703	1202	631	525
1879	3190	2023	1304	657	412	779	1148	719	512
1880	3566	2202	1453	847	433	857	1406	708	649
1881	3488	2113	1614	841	453	950	1307	803	870
1882	3941	2283	1728	964	518	990	1495	902	763
1883	4313	2383	2080	996	508	1089	1428	987	958
1884	4239	2442	2197	1044	554	1112	1462	1040	1116
1885	4129	2595	2510	1152	626	1144	1377	1060	1128
1886	3968	2804	2662	1111	604	1100	1387	1113	997
1887	4094	2748	3031	1134	571	1147	1217	1123	1264
1888	4077	3031	3287	1262	663	1274	1489	1274	1417
1889	3926	3420	3359	1475	739	1343	1695	1464	1451
1890	4953	3311	3642	1514	749	1320	1425	1608	1532
1891	5075	4109	3340	1552	812	1394	1434	1705	1568
1892	5112	3652	3560	1575	868	1446	1442	1753	1567
1893	4566	3675	3586	1567	826	1415	1567	1684	1423
1894	4951	3848	4431	1905	972	1524	1774	1818	1637
1895	4952	4105	4138	1885	1051	1627	1726	1746	1531
1896	5116	4463	3996	2009	1033	1637	1777	1915	1748
1897	5554	4957	4628	2228	1107	1828	1870	2020	1824
1898	5606	4668	4463	2369	1152	1977	2100	1192	1898
1899	6646	5029	5235	2990	1374	2015	3274	1529	2083
1900	8314	5938	5115	2968	1342	2056	3116	1695	1935
1901	7565	5819	5497	2794	1273	2101	2403	1835	2061
1902	7408	5814	5797	2856	1345	2134	2297	1928	1965
1903	6976	6110	6278	3077	1384	2246	2442	1896	2131
1904	6757	6410	6328	3229	1421	2405	2620	1943	2238
1905	6731	7626	6412	3178	1446	2333	2578	1970	2242

APPENDIX I (cont'd)

ANNUAL SHIPMENTS OF BRITISH COAL TO THE PRINCIPAL IMPORTING COUNTRIES ('000 TONS)

	Europe France	Germany	Italy	Sweden	Norway	Denmark	Russia	Spain	Egypt
1906	9444	7629	7810	3573	1494	2563	2878	2100	2604
1907	10964	10107	8317	3709	1606	2885	2863	1904	2929
1908	10415	9646	8742	4370	1940	2868	3414	1993	2495
1909	10408	9671	9081	3965	1896	2932	3330	2102	2606
1910	9588	9005	8784	3991	1982	2798	3224	1957	2564
1911	10272	8968	9223	3832	1968	2932	3439	2086	3104
1912	10190	8394	9180	4115	2201	2866	4046	2271	2925
1913	12775	8952	9647	4563	2298	3138	5998	2534	3162

	South America Brazil	Argentina		Brazil	Argentina
1870	261	59	1894	820	748
1871	316	62	1895	781	900
1872	315	62	1896	928	876
1873	380	68	1897	953	860
1874	372	80	1898	923	842
1875	351	49	1899	920	988
1876	311	48	1900	750	768
1877	331	58	1901	776	905
1878	360	51	1902	924	973
1879	307	74	1903	900	1120
1880	348	75	1904	965	1428
1881	389	119	1905	1044	1783
1882	353	133	1906	1158	2382
1883	432	186	1907	1304	2192
1884	467	255	1908	1301	2416
1885	437	292	1909	1291	2421
1886	449	303	1910	1531	2897
1887	489	460	1911	1684	3264
1888	572	452	1912	1625	3365
1889	691	742			
1890	628	551			
1891	741	415			
1892	763	646			
1893	709	641			

Source: Coal Tables, *British Parliamentary Papers.*

16. DISCUSSION FOLLOWING PAPERS BY CRAIG, WILLIAMS AND PALMER

BATTICK asked Williams what incentive there was to employ high rate packet ships in the cotton trade from New York.

WILLIAMS replied that cotton was only one commodity in a mixed cargo from New York, often less than 50% of the total cargo. On only two occasions in the six year period studied were there vessels from New York carrying nothing but cotton. It was basically a question of the organizers of packet services looking for cargo, and cotton was one item which was readily available.

CRAIG said the point which interested him was the suitability of ships for particular trades. In principle packet ships were most unsuitable for cotton because they were sharp built ships for rapid transit times. There must have been a very substantial number of regular traders especially designed to carry cotton.

WILLIAMS agreed there are references to vessels built for the cotton trade but these seem to be basically vessels built for New Orleans. These large vessels were probably also used in other trades as well, because the really large ones are sailing out of New York. There may have been a handful but only by looking at American registers would you be able to determine this.

ALEXANDER asked if there were cargoes that were particularly suitable for wooden hulls, such as tea?

CRAIG replied that tea was one but the volume was so small as to be unimportant. The problem with the early iron ships was sweated cargoes, and in the grain trade there was a disposition to believe that a wooden ship delivered the grain in better condition than an iron ship. And this was true until problems of ventilation were worked out. It must not be assumed that all ships were immediately interchangeable between one trade and another.

WILLIAMS added that commodities like grain or sugar required stout, tight vessels. Many British shipowners in the 1830s and 1840s faced with American competition on the Atlantic would argue that American vessels were fine for cotton, but not for heavy cargoes like railway iron.

JANNASCH asked Craig if ships in the copper ore trade, with very heavy cargoes and resulting problems of stability, put part of the cargo 'tween decks?

CRAIG replied that nearly all the copper ore ships were single decked because they were carrying coal outwards. The question of ratios of

volume to weight is very important. With cotton ships decks were piled high with two or three hundred bales on the deck. Timber ships were notorious for having cargo piled high on deck with chains tightened around the whole vessel so that nothing would come adrift. The ship became virtually a raft and it was hard luck for the crew if anything happened.

WILLIAMS noted that while Antony Gibbs in the South American nitrate trade was the first firm to introduce a loadline for vessels, there was legislation in the 1840s prohibiting deck cargoes from North America in certain seasons, and this was the first example of state intervention for the safety of shipping.

CRAIG added that apart from state intervention regulations were also imposed by the industry itself. If you examine the *Lloyd's Registers* they classify certain vessels as suitable for dry cargo, while they will exclude restored vessels from dry cargo trades. They would then be forced into coal, timber and the other basic commodities handled by ships that can no longer justify the capital expenditure to restore them to A-1 classification. Similarly, the regulations of the marine insurance clubs had very complicated rules on loading. For example vessels going to the West Indies or the Gulf in the hurricane months could load to eighty percent of capacity; or if it was railway iron, copper or lead ore it had to load within reduced limits.

JANNASCH asked Craig if he would compare the stowage problems of cotton and copper ore.

CRAIG replied that with cotton and wool the problem was to stuff as much volume into the hold as possible. In the ports you had enormously strong men who were employed to screw-in cargo so that you could get an extra tier or two into the hold. They had tremendous power these men and sometimes the main beam would crack and the deck would be forced apart by the pressure of the bales of cotton or wool.

BATTICK observed that on the Maine Coast there were vessels called stone schooners which carried huge granite blocks which had very high density relative to volume. This subjected the vessels to the same structural stresses as copper ore. Eventually they would be taken off the trade and put into another hazardous one which was the end of the line for most of them — the lime trade. The lime was put in barrels and if it got wet it combusted, and of course the fire could not be put out with water. He wondered if the small, specialized ships in the copper ore trade were put to a similar use at the end of their lives?

CRAIG replied that the copper ore ships were by and large run until they sank. The Prince Edward Island softwood ships in the trade went to the bottom in droves after six or seven years. With iron hulled vessels there was an entirely new environment with respect to what happened

when the ship got old because there was now a scrap value. But with a wooden ship there was no scrap value and so they were run until they sank.

GREENHILL asked Palmer if Britain's advantage in shipping coal outward meant, in the end, that too much coal was exported.

PALMER replied that this was a matter of great contemporary concern involving at least three Select Committees. In the long term perhaps too much was exported if only because the coal trade gave a sense of false security which was dissipated remarkably quickly after the First War. In that respect it was perhaps rather like oil today.

CRAIG disagreed with this conclusion. He accepted that people should have been more aware that Britain's exports were so dependent upon primary products rather than those with more value added; but on the other hand Welsh coal was exported at exactly the right time, for its value was rising at the end of the nineteenth century. This was because it had enormous advantages in the operation of steamships. It was reckoned that a hundred tons of Welsh coal in bunkers was equivalent to something like one hundred and thirty tons of Japanese in terms of thermal efficiency. This meant of course that you could carry thirty tons more cargo. But as steam engine technology improved the competitive advantage of the top steam coal declined.

PALMER recognized this, and the fact that Britain's dominance in the carrying trade after 1850 was intimately bound up with the coal trade. But in the long term looking at Britain's industrial development into the twentieth century, one must regret an economy which comes to specialize so much in a product with a long term demand that is going to fall because of technological factors. Nor did British coal exports necessarily speed the industrial development of other parts of Europe, for it is possible to argue that French economic development was retarded by access to Belgian and British coal up to the First War.

FINGARD returned the discussion to Williams' paper. She had observed that in the 1830s to 1850s the regular Quebec traders did go into the Southern U.S. trade to pick up cotton. They made two crossings in the timber trade from Spring to Autumn and then they went to the Southern U.S., which would make them look like both regular timber traders and regular cotton traders in the statistics, if they were doing that regularly. But they probably were not because often the regular Quebec timber traders were laid up for the winter in Britain and only occasionally went on a cotton voyage. Another point, a social one, is that in the 1850s when Quebec timber ships began turning to the Gulf timber trade for winter cargo it is interesting to note that the whole dockside of Quebec packed-up in the late Autumn and moved to Pensacola and similar ports. This included stevedors, crimps and

boarding house keepers and their departure and arrival back at Quebec was regularly noted in the press.

WILLIAMS responded on the first point that the number of vessels in the cotton trade, which combined with the timber trade, was very small in relation to the total shipping of the British North American timber trade. In 1850 there were around two thousand vessels a year entering Britain with timber, and the number of those that also brought a cargo of cotton was only about thirty or forty, and these were probably the vessels of big firms which were involved in both the timber and cotton trades.

17. CONFERENCE SUMMARY

ROBIN CRAIG

University College London

CONFERENCE SUMMARY

Robin Craig

This is my third visit to Memorial University and the Maritime History Group, and I want to thank them on behalf of us all for the hospitality, the friendship and comradery that the team now generates with all its friends both far and near. The second thing is to lament the absence through illness of Keith Matthews, and I would suggest that the conference collectively send him a cable of greetings and good wishes. The third thing I want to note is how excellent the papers have been. The Group themselves have done marvellous work in the last two years. I know something about the long and arduous hours they have spent to get these files created and I am impressed by the progress that has been made. The analysis is now much more sophisticated for there is a greater awareness of interrelatedness in the deployment of shipping: as no man is an island entire unto himself, so no ship is an island unto itself. The other recognition is that the Atlantic economy is now extended to embrace virtually the world. But it is worth noting how little the Group's work has penetrated the Far Eastern, the Middle Eastern and the Australasian trades. One obviously notes that Saint John ships penetrated these areas to a considerable extent, but there are vast tracks of trades that we have not considered. What we covered in this conference, apart from the papers generated by the Group, are rather an *ad hoc* collection of trades that were chosen out of our own interests and to some degree with consideration to their importance. There are a number of very important trades we have not yet mentioned.

One of the most important things that the Group has done is to investigate the methodology for organizing data of this kind. This is enormously important because it is performing a function here for the whole range of maritime history. What gives me particular pleasure is the use of the ships logs and crew agreements. I remember the battle we fought with the Public Record Office to have these preserved: we formed a committee, we wrote letters to the *Times,* had the British Record Association on our side, and we even had a room at the Institute of Historical Research to store some of the records. It was a battle that went on for months and the Public Record Office refused to take any notice of our pleas that these were important records. Therefore it has been an enormous gratification for me to see the work that is being done with them. The last volume of conference transactions was called *The Enterprising Canadians:* I will say Amen to that.

Let me turn to survey the papers we have enjoyed so much. Forrest Capie read an excellent paper which has set the stage for the subsequent discussion. He was appropriately skeptical in discussing theories of trade with the Empire. I am not entirely convinced by arguments that suggest that trade with Empire had at this time any special features which distinguish such trade from commerce with non-Empire countries. Certainly trade did not follow the flag, although there is better evidence for the notion that the flag followed trade, and followed it reluctantly. Colonies were extremely expensive but where sentiment stimulated trade flows it was sentiment based upon transfers of capital and human resources. Capital flows are strongly affected by security of investment which often proved more important than rates of return. If investment was directed in any special manner to Empire it was because of the security of settled governments and established relationships following the outward flow of 'kith and kin'.

For maritime studies the movement of raw materials is of particular importance because of their heavy demand for shipping. It is absolutely essential that there be no confusion between trade *values* and *volumes.* Values are not of the slightest use in establishing trade flows as they affect shipping services. Many of the most significant trade flows from the viewpoint of maritime history are concealed rather than revealed by the emphasis on quantifying values. It would be a useful exercise to convert all trade to volumetric measures, using the stowage factors given in Stevens *On Stowage.* If this was done it would be found that many commodities emerge from almost total obscurity and become highly significant determinants of shipping flows. Study of stowage factors would be highly instructive: it would depress the importance of cotton textile manufactures and would elevate the importance of raw cotton. Perhaps Keith Matthews' remarks about the petroleum trade would assume particular significance. So my text must be *volume* not *value!*

Rosemary Ommer has proved even better in reality than in reports and it is very nice to have an historical geographer working in the field. It is worth remembering that some of the finest work on ports has been done by geographers. I enormously enjoyed this paper because I am scheduled to do quite a bit of work on the Channel Islands over the next few years and I expect to learn a lot from Rosemary Ommer. I am a little skeptical even after her persuasive arguments whether in fact Jersey's rise was tied to the cod fisheries rather than privateering and smuggling. After all smuggling was one of the great eighteenth century industries in Britain, and its importance as a generator of incomes for the Channel Islands must have been enormous. The cod fishery was undoubtedly important in sustaining growth when smuggling and privateering were diminishing in importance — smuggling because of tariff reductions and privateering

because of the end of the French Wars — but Rosemary Ommer might want to move backwards in time to establish which of these staple industries provided the major impetus to growth.

The papers by David Alexander, Eric Sager and Lewis Fischer are based upon Crew Agreements. This was very exciting for me because I think this source is going to be exceptionally rich in asking and answering questions. Let me begin by sketching the general characteristics of the ports. The large Yarmouth fleet peaks in 1879 and then undergoes a precipitous decline in the 1880s and 1890s. Like the other ports there was no major impetus to new construction as there was in Britain from the rise in freight rates in 1890 and 1891, and at the end of the century from the Boer War, and this is something which needs explaining. Yarmouth's fleet was notably oriented to the North Atlantic trades and therefore narrowly based. There was a failure to move into iron and steam and there was a switch of investment away from shipping into other areas of the economy, which is what I also found to have happened at Swansea. In Halifax the peak of activity was in 1874 and the shipping of the port declined less steeply than it had risen in the 1860s. The trade of ships at this port was much more closely centred on Halifax than were the trades of vessels at the ports of Yarmouth and Saint John. The Halifax fleet was also closely tied to the North Atlantic trades, and again investors did not move into iron and steam but switched into domestic enterprises of a different kind. Saint John had the biggest fleet of the three ports. It peaked in 1877 and underwent a slower decline than Yarmouth or Halifax. The fleet was deployed more widely around the world trades although here again the North Atlantic trade was of the greatest significance. At Saint John there was apparently a greater delay in abandoning wooden sailing ship ownership, and this is a point I want to come back to.

Let me now turn to specific points raised by these papers. It would be worth looking at the brokers who were fixing these ships at London and Liverpool and then looking to see when control of these activities passed from the hands of masters into the hands of shipowners with the development of the telegraph and the mail service. Related to this, it is a mistake to associate owners with an 'interest' or a loss of 'interest' in ports: it is the charterers who have an interest or loss of interest not the shipowners, unless of course some of these ships are sailing on owners' account.

All of the papers offer evidence of improved productivity in the fleet, especially in the 1870s but even in the 1880s. Productivity is measured in terms of faster sailing times, increasing vessel size and economies in crew and there are a number of things to be said about each of these measurements. All three ports generate vessels of increased size from the 1860s. This was something that would inevitably concentrate their

trading opportunities into fewer ports. While the fleet was predominantly comprised of three to five hundred tonners the range of possible ports to which the vessels could trade was wide. Whether in fact they went to all these ports is a different question; the point is that they had a huge potential range. But as ship size increased this restricted the range of ports and the range of cargoes that they could carry. It is not to be supposed that there were infinite economies of scale in the procurement of cargoes of suitable size in the nineteenth and early twentieth centuries. Freight requires financing, and finance for large consignments was not always available. Many merchants would not handle big parcels of freight particularly if they were uncertain about prices at the market. I am sure Susan Fairlie will agree that many a grain merchant would prefer to deal in smaller parcels of two or three hundred tons rather than in larger ones of seven hundred or a thousand tons. This was simply in the interest of hedging his bets. Also in commodities like grain, millers did not want all wheat of one quality; they wanted mixtures of wheats for different purposes. So increasing the size of ships, while reflecting productivity growth in one way, could limit it in another by restricting the opportunities for employment.

Yesterday we discussed the issue of passage times and the puzzling fact that these Canadian ships perform very differently from the British merchant fleet. Britain was building big, heavy iron and steel barques with the intention of maximizing carrying capacity at the expense of speed. Now why were Canadian owners doing something different from this? This is my hypothesis. The Canadian shipowners did not sacrifice speed to carrying capacity because they were operating softwood ships in which the capital invested had to be written-down fairly rapidly. The time horizon of a man with a short lived ship, either a second hand ship or a new ship built of softwood, was quite different from that of a man who invested in a fine steel barque built at Port Glasgow. The owner in the Maritimes needed to earn a lot of money very quickly, whereas the British owner could earn modest amounts of money rather slowly. This ties in with Eric Sager's evidence on vessel casualty rates. The penalty paid for fast passages is heavier depreciation through loss of gear, masts, spars and sails. There is no way around this: the best skippers in the world are going to lose canvas if they press on sail. If you read the literature about Nova Scotia ships there is this constant theme of the Bluenose masters — those crude bully boys that bang their way around the world with belaying pins and pistols, taking pot-shots at people on the royal yards when they feel a little disturbed or unhappy. The picture is painted that they crack-on sail, they are tough, ruthless and all the rest of it. Now is there a connection between this passage time phenomenon and the need to depreciate the ship rapidly because the owners have a different time horizon from

owners in Britain? It would be valuable for the Group to correlate fast passage times with particular masters, and to determine if there was a relationship between passage times, casualty rates and the rapid rate of depreciation which forced ships off class to be sold to Greeks, or whatever lunatic was persuaded to buy the old rubbish.

One further point arises from the paper on Saint John where there is an apparent delay in the abandonment of wooden sailing ship ownership compared with Yarmouth or Halifax. To some extent this may be illusory. Because Saint John is the largest port in the region it is likely the city was populated by more managing owners than the other two ports. If this was so the decision to disinvest in ships would be more diffuse, giving an appearance that the fleet was being run down over a longer time. At Yarmouth and possibly Halifax, the fact there were fewer operators meant there were relatively few decisions being made.

There is a huge amount of data in Keith Matthews' paper. Put briefly his argument is that the shipping of the Maritimes assumed its characteristics under the influence of the U.S. export trade. There were the standard staples such as grain and cotton, but he adds a new expanding export staple, petroleum, as the employer of large numbers of sailing ships. This is a thesis that can actually be proved, for there are the Bills of Entry and petroleum entered a very limited range of ports. He mentions the emergence of the iron tanker in the mid to late 1880s, but it is worth noting that all this early tanker trade was with the Black Sea not across the Atlantic. Standard Oil for example was still employing sailing ships to carry both case oil and bulk oil in the 1900s. Finally it is worth emphasizing two other American trades which opened up at this time. One, as Judith Fingard has reminded us, was the important pitch-pine trade from the ports around Pensacola. The other was the trade in phosphate rock from South Carolina.

Susan Fairlie's paper was on the Canadian grain trade. We should also note the amount of flour which was shipped across the Atlantic as distinct from grain. The value added characteristic of flour makes it more amenable to shipment at relatively high freight rates, but suffers a disproportionate disadvantage in that it is stowed in barrels. These are expensive although saleable, but also result in what is known as broken stowage — when you ship cargo in barrels you are shipping a lot of air between the barrels. From the charterer's point of view there had to be a good compensatory value added in the flour to be worthwhile shipping in that condition. In respect to the grain trade, and indeed for all the great commodity trades, it would be an absolutely splendid exercise to correlate the fluctuations in freight rates with the supply of the commodity itself, and how the two meet at the interface in the shipping office or the exchange. Once again this is my point about looking at volumes.

Robert Greenhill has concentrated more on liners than bulk shipping, and this was extremely valuable for it was the only paper that did so, and liners assumed increasing importance after the 1870s. I am inclined to think he underestimates the transport requirement of early nineteenth century Latin America because here again the emphasis is on value rather than volume. But aside from this, Latin American exports may have been the especial preserve of liner operators because the main items traded were small parcels of freight rather than shiploads. This reflected problems of inland transport, scarcity of capital among merchants, inadequate warehousing at the ports, and climatic conditions which militated against long storage in a largely preindustrial economy. No account of Latin American trade could really be regarded as complete without mention of guano and nitrates and for that matter Chilean wheat exports, which became an important freight for sailing ships in the late nineteenth century. We must also take notice of freights of coffee, sugar, rubber and especially of hides and bones from the River Plate. All of these commodities made considerable demands on transport capacity. Values serve to conceal the significance of seaborne commerce and volumetric calculations are necessary to bring out the importance of Latin America to the shipping industry. But volume is not the only consideration. Given slow rates of productivity change in passage times, longer trades required proportionately more shipping than shorter trades. To take an extreme case, when comparing the demand for transport services derived from the shipment of wool, the substitution of Australia for Germany as the main source of supply for Britain made proportionately much bigger demands on sea transport. This equally applies to commodities supplied from the East and West coasts of Latin America.

Sarah Palmer's splendid paper on the coal trade corrected a lot of impressions about the direction and the quantity of coal that was being shipped from Britain. The significance of her paper lies in the fact that the productivity of shipping on the near continental routes was very high and on the long routes very low. Therefore you needed proportionately more shipping on the long routes than you did on the short ones. So it is a mistake to assume that you can merely look at aggregate tonnages and say 'X' commodity was not important but 'Y' commodity was, without converting the export figures into some sort of notional ton-mile figures. And of course you need to inject another variable, which is whether a commodity was moving by sail or by steam, so that you would have ton-mile-days as your measurement.

David Williams' paper on the cotton trade is extraordinarily interesting, and I hope he carries on with this line of work and extends it past the Civil War. For the workers in the Maritime History Group what his paper points out is the tremendous value of the Bills of Entry, and the

Group must begin using this data.

We have looked at a number of the important and interesting trades over the past two days but by no means all of those which require attention. The coal trade for example generated another trade which was parasitic upon it. At Cardiff a million tons of pitprops were imported every year, some of them shipped from Newfoundland. Coal also produced by-product trades such as coke. Esparto grass from Algeria for making paper was a very important trade using a lot of shipping because it was nearly as bulky as cotton. There was the iron and steel scrap trade which came with the advent of the Siemens-Martin open hearth furnaces. It is also important to look in some detail at the nature of the commodities themselves. We have discussed how flour shipments created a demand for barrels and American exports in general used a lot of barrels. I mentioned how the American grain trade sparked a trade in jute to bag the grain. There were other new trades that developed and grew — iron ore, petroleum, manganese, chrome ore and especially phosphates.

Another matter which must be briefly mentioned is this transition from sail to steam, which the Maritime History Group has yet to deal with. Note the relationship between the price of bunkers and movement into steam and you will find there is an excellent correlation. When bunker prices go up steamship construction goes down and sailing ship construction flourishes. The last time this happened seriously was in the coal strike crisis of 1891-92.

And finally some scattered observations. Do not neglect the volatility of the freight market, which by the 1880s and 1890s was an extremely sophisticated and near perfect market — probably the nearest thing we had to a perfect market in the world. Remember when you are using freight rate data that series like the Isserlis index can be misleading. When a man chartered a ship there were all sorts of reasons for the rate which was set. It might be a negotiated rate between the shipowner and the charterer because the owner was desperate for cargo and wanted to get his ship out of port. It might be a freight rate that was determined by expectations as much as six months ahead. It might be a rate on a coal contract as distinct from a single cargo. It might be a spot shipment or a shipment weeks or months ahead. There were many things implied by that simple word freight rate and you need to be aware of the context in which it was being used. There is a splendid surrogate for freight rates, which is the daily rate of hire expressed as the demurrage rate. The demurrage rate, which is the payment for detaining a ship, is the best measure of what that ship is worth to an owner day by day, and after all that is fundamentally what you need to know. Unfortunately the data are very scarce unless you have available a large collection of charter parties. Another matter you must look at rather more is seasonalities. You are moving into a period

when not only the Northern hemisphere was cultivated but the Southern as well. Nearly all these major commodities — jute, rice, grain, cotton, coffee, sugar and the rest, were influenced by seasonalities. And now I will conclude by repeating the point I have made again and again: in maritime history forget about *values.* All of you, go away and never say another word about values of cargoes; talk all the time and every day about *volume* and *weight,* and forget value altogether.

18. DISCUSSION FOLLOWING THE SUMMARY BY CRAIG

MACLEOD said that while he was interested in maritime history he was more interested in history on the land. In the economic history of the Atlantic region it is said that entrepreneurship has been deficient — that since the late nineteenth century our capitalists have been loath to take risks and make innovations. But it looks very different from the perspective of this conference. Those capitalists took risks that were too great. They had a shipping industry, but they moved their money out of a line of business with which they were familiar and shifted into textiles, utilities and other things which turned out to be disasterous. All they needed to do was to change their technology in the shipping business, which was a business they knew. If this is right, then the truth is that Maritimes capitalists were not conservative, stodgy and dull — rather they were too daring.

CRAIG replied that anyone in the shipping business takes great risks. It is one of the riskiest businesses in the world. That is why profits are so high when you are good at it. But there are legions of failed shipowners. Hundreds of thousands of coffins are filled with the bones of men who have lost a fortune in shipping. For example J.E. Oliver of Liverpool lost over a million pounds in 1850. It was a very risky business and this must be recognized in making any assessment of whether leaving the industry was a wrong decision. It is a generational matter. This is the point I was making in my Swansea paper. There was a generation of men who knew what they were doing and they did it well. But when the industry changed, they said I don't want to play. If you look at the cohort and you find it was coming to maturity in the 1870s, then you know they were thinking about retirement. They didn't want to do it anymore: it was all a bit risky; they were tired; they had gout; the wife was dead; the son wasn't very well. And then the sons and grandsons went off to do different things. Why should they do the same thing? — most sons don't.

PANTING responded that his work on the shipowners of Saint John, Yarmouth and Halifax supported this kind of argument. These people did tend to operate in cohorts. The Yarmouth shipowner Thomas Killam carried with him a large number of partners over the period from 1836 to 1868 when he died. But none of these partners owned very much, and one assumes they were simply going along with the 'great man'. The core of the business was the family. Thomas Killam had four sons from two marriages. The first, George Killam, died a

year before his father but the other three carried on as Killam Brothers. On the other hand Thomas Killam's brother Samuel, who was in shipping at the same time, lost two sons in their infancy while one son and three daughters survived. When Samuel dispersed his wealth at his death it basically went to the daughters and was dissipated out of the shipping business. If you look at investments by shipowners in the 1880s and 1890s the probate records show these people were basically playing for security — they bought bonds. In making settlements for their wives they were asking the executors to get municipal or provincial bonds and so their money was going in that direction rather than into risk investments.

CAPIE objected that generational issues might give us the life expectancy of firms, but it did not explain why there were no new entrants into the industry.

FAIRLIE agreed and thought the whole discussion was tautological. If there were opportunities some entrepreneur would seize them and it is quite irrelevant whether a particular generation of people had died out.

ALEXANDER was not so sure. That may be a valid point if you are talking about a large metropolitan centre like London or Hamburg. But a place like Yarmouth had a population of some 6000 people. In such a community, if you come to the end of a generation and it disposes of the industry assets — both the 'hardware' and the 'software' — there is not the dense business environment for a new generation to get back in. The start up costs are very high including risks arising from imperfect information.

BUCKNER responded that while this might be true of Yarmouth it surely could not be said of Saint John, which if not large certainly wasn't tiny.

FISCHER disagreed. As he had pointed out in his paper, for two years there was a small investment boom in Saint John at the turn of the century. In 1907 some 4300 tons of steam shipping was placed on registry. But it was all registered by one man — one lone entrepreneur. This was the one man who tried to create opportunities and failed because the city had lost the necessary pool of information and skills.

CRAIG added that the whole point about this period was that the technology was changing, so you were not getting a new generation coming into the business and doing the same thing. Furthermore the costs of the new technology had skyrocketed and the risk was infinitely greater.

FISCHER stressed that at Saint John, while the industry hung on a bit longer than elsewhere, it was not the big shipowners who were maintaining the momentum but a large collection of small owners. Moreover they turned over their vessels to an operating firm in

Liverpool, Moran Galloway and Company. This was about sixty five percent owned in Saint John but the management expertise was lost to the town itself.

PRYKE was still bothered by the issue of family continuities. Did not the Killam family actually show there was continuity, in that Killam Brothers succeeded at the death of Thomas?

PANTING replied that it was a question of scale. Only Thomas Killam Junior could be considered a major shipowner for the other two branched out into other areas.

ALEXANDER interjected that he did not really want to disagree with Capie, Greenhill and Fairlie. Investment decisions are based upon estimates of alternative rates of return. This was exactly the point made at the end of his paper: Yarmouth's shipowners made a calculation that it was profitable to move out of shipping and into manufacturing and utilities. But the problem in a place the size of Yarmouth, and even Saint John and Halifax, was that if a decision was made to go out of shipping, it could not be reversed if entrepreneurs decided the new ventures were a mistake. For one thing they would have to re-enter an international market not a home market. Very quickly the skills would be lost and it would be almost the same as saying to people in Yarmouth today, 'there are great opportunities in silicon chips, why don't you go into it'? They simply can't. So the point is that the shipping industry operating out of the Atlantic Provinces was a very delicate flower, and when the decision was made to disinvest it soon became almost impossible to reverse that decision.

BUCKNER argued there was a critical variable being ignored. At Saint John the wealthy men who owned ships did so because they were timber merchants, and it was the collapse of the timber trade that brought the movement into industrialization.

FISCHER had doubts about this. First of all the rise of shipping in these ports, which is normally associated with the rise of the timber trade, just doesn't seem to be the case. In looking at the port records it was not the locally registered ships that were carrying the timber, and by the 1860s there is simply no evidence that these major timber firms or the people we can associate with them were major shipowners.

BUCKNER replied that his point was somewhat different. Everyone is talking about these aging Saint John businessmen, but the dynamic element in the business community was the timber merchants not the shipowners and they moved in and out of shipping and other sectors as there was money to be made.

MACLEOD interjected that this was the point of his original question. What happened to the capital in the region: was it dissipated in new enterprises or did shipowners simply retire as rentiers?

CRAIG responded that nobody is denying the dynamic element in Saint John, or that there were new initiatives. What we are really talking about is whether a generation of shipowners was prepared to start *de novo* in late middle age into a new technology at high capital cost? To do so is most uncharacteristic. Sooner or later they will 'pack it in'. The capital is recirculated — it doesn't go under the mattress — but it is other entrepreneurs, whether timber merchants or whatever, who make use of it.

FINGARD wondered if the problem was the apparent inability of shipowners to co-operate amongst themselves in trade associations to pressure government for favourable legislation and policy.

PALMER answered that the experience in Britain with the London General Shipowners Association, which was the closest thing to a national body, was that the organization had a lot of difficulty maintaining its membership and it was not an effective lobbying group. Some of the more local associations in Glasgow and Liverpool were really social clubs circulating port rather than ideas. It seemed to her there was a lot of hindsight in this discussion. We are saying they made the wrong decision ultimately, and therefore why didn't they stay with what they knew?

WILLIAMS commented that there is great danger when one is discussing entrepreneurship in assuming that the long term interests of the economy coincide with the individual interest of the businessman. In fact they often diverge very greatly. Also we tend to asume that the entrepreneur is motivated by the desire to maximize returns when one suspects, particularly as he gets older, that security becomes a more significant element. We have been suggesting that this cohort of shipowners was dynamic. But we have also said they failed to avail themselves of the new technology. This raises the question of just how dynamic they really were.

BUCKNER added that if it is true that there was no chance of staying in wooden shipbuilding and there was no real chance of getting into steamships, then it really looks as if the whole thing was hopeless. It means that effectively the region had no future.

CRAIG replied that it is not a matter of the region having no future; it is just that this particular entrepreneurial activity had no future.

ALEXANDER objected that he wasn't prepared to reach that conclusion yet. The Scandinavians and Greeks faced the same kind of disadvantages vis-a-vis the British shipping industry but they made a successful transition. The Atlantic region did not, and in hindsight it is clear that it was not to its benefit to have missed the chance.

JANNASCH promised he would not go into a long tirade about the Åland Islands, but surely one reason for the decline of the Canadian

industry was purely geographical. Åland was a small island with few resources — the people had to go to sea. But here we had a whole continent to develop. Go West young man, go South; why stick it out in Yarmouth?

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