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Responding to Change: Shipping Deployments in the Baltic Trade of the Tyne, 1860-1880

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Adrian George Osler, BSc Hons

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Summary of Thesis submitted for PhD degree

By Adrian George Osler

On

Responding to Change: Shipping Deployments in the Baltic Trade of the Tyne, 1860-1880

This thesis explores two related propositions: that shipping providers engaged in the Baltic Trade of the Tyne, 1860-1880, responded rationally to change; and, that the role of the Baltic trade in the development of Britain's steam-powered merchant marine has been underrated. Whilst previous discussions of this trade and its shipping are speculative in part or examine the broad national outline only, this study provides an alternative, regionally-based approach employing rigorous quantitative analysis. Reliance is placed upon critical examination of a little used primary source, the *Newcastle Bill of Entry and Shipping List*, 1860-1880, supported by information extracted from contemporary regional sources, consular reports, and Parliamentary papers concerning the coal and shipping industries.

The Baltic trade's volume, nature, direction and carriers are investigated from the viewpoint of the principal British exporter, the port of Tyne, providing for its re-assessment nationally, and deepening understanding of the growth of this (little studied) major English port. The concept of rationality of response is applied to explain observed changes in the shipping employed – British and foreign, sail and steam – gauging providers' reactions against a clear measure of the degree (and speed) of shifts and opportunities that occurred in the economic and technical environments. More specifically, the introduction of the bulk carrying steamer into the Baltic is revealed as having had a marked influence on the development of British shipowners' tramp fleets.

Between 1860 and 1880 the Tyne's exports to the Baltic grew at unprecedented rate, a demand-led situation that placed great pressure upon the available shipping tonnage. Stability of supply was ensured not only through the capacity of carriers to respond by the adoption of innovative technologies and practices, but by the select responses that allowed pre-existing supply chains and techniques to persist. Complementarity and interdependence, rather than competition alone, was the key to expansion.

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Note – Charts derived from Tables are appended at the end of each respective chapter.

Acknowledgements

Foremost acknowledgement goes to Dr. David J. Starkey who has guided, but rarely chided, the author during a lengthy and fitful passage. To him I am most grateful. Secondly, to the Winston Churchill Memorial Trust, whose Fellowship award (1994) allowed me to traverse the Baltic's newly independent littoral, engendering thoughts that later became embedded in this work.

For access to printed sources I am especially indebted to the staff, past and present, of Newcastle Central Library's local studies department who have unfailingly been helpful. This sentiment applies equally to the staffs of the two major archives involved, Tyne and Wear Archives Service, and the Northumberland County Record Office, together with those at the National Archive, Hartlepool Reference Library, and the library of Newcastle's Literary and Philosophical Society. A former colleague, Ian Whitehead, provided vital access to journals and (rare) maritime works held in the 'Chapman Library' of Tyne and Wear Museums.

All those engaged in the study of North East maritime history inevitably find themselves indebted to two great compilers, Joe Clarke and Dick Keys, who – as authors and individuals alike – are simply monumental. Bob Balmer's liberal approach to the use of his hard-won Blyth transcripts, together with Ian Hustwick's guidance on Scottish material, allowed me great insight into the world of the sailing collier. Similarly, access to material compiled by Dr. Neil Ashcroft, Peter Hogg, Alan McBurnie, Dr. Graeme Milne and Charles Waine did much to enrich this work. All contributed through information and discussion – Graeme especially so.

Sources and information, however, are not sufficient alone; it is the interest and backing of others that carries one through. Principal amongst them was the late Dr. Basil Greenhill, whose enthusiasm for all things Baltic (and the Maritime Historical Studies Centre, University of Hull) was unbounded – and was communicated as such. Nearer to hand, Dr. Tony Barrow and Professor Patrick Salmon gave much needed confidence to an academically inexperienced author. Beyond all else, there has been the support and understanding of my wife who, oftentimes I know, has held her own professional peace as this work was so laboriously pieced and stitched together.

CHAPTER 1: INTRODUCTION

Trade and Shipping

Although world trade almost doubled in the first forty years of the nineteenth century, its growth accelerated even more swiftly during that century's second half. A two-and-a-half fold expansion occurred between 1850 and 1870, whilst world export volumes increased eight-fold between 1850 and 1913.[1] However, within this pattern of worldwide growth there were differing rates of increase among seaborne commodity flows; for example, between 1840 and 1887 coal movements expanded some ten times as fast as timber.[2]

Similarly, the economic expansion that underpinned the growth of seaborne trade between 1860 and 1880 did not always proceed smoothly, with even the economically stable 1860s suffering a brief downturn around 1867. Between 1850 and 1875 mild inflation interrupted the nineteenth century's general deflationary trend, a trend that was marked by falls in primary product prices from 1870 onwards.[3] Overall, the trade cycle peaked in the unparalleled boom of 1871-1873, following which – up until 1880 and beyond – it entered the more uncertain (and disputable) territory of the 'great depression'. It was this perceived downturn that caused the British-led spread of international 'free trade' to be questioned, leading some countries to implement protectionist policies once more.[4]

Since the expansion of worldwide trade was largely conditional upon carriage by sea, the growth of the world's merchant shipping followed, but did not necessarily mirror, 'the trade's increase'. Despite the eight-fold expansion in world trade between 1850 and 1913 the comparable increase in global shipping's tonnage was just four-fold (150 percent between 1860 and 1880), but this apparent shortfall was more than

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[1] Y. Kaukiainen, *Sailing into Twilight* (Helsinki, 1999), p. 17; E. Hobsbawm, *The Age of Capital, 1848-1875* (reprint, London, 1999), p. 49.

[2] M.G. Mulhall, *Dictionary of Statistics* (4th edition, London, 1898), p. 130; coal movements grew from 1.4 to 49.3 million tons, and timber movements from 4.1 to 12.1 million tons.

[3] P. Mathias, *The First Industrial Nation: An Economic History of Britain, 1700-1914* (2nd edition, London, 1983), p. 289.

[4] M.M. Postan and H. J. Habbakuk, *The Cambridge Economic History of Europe, Volume VI, The Industrial Revolutions and After* (Cambridge, 1965), pp. 815-16; Hobsbawm, *Age of Capital*, pp. 50, 356-57.

compensated for by the increased carrying capacity that resulted (largely) from the higher proportion of steamships in global service.[5] The British fleet, which provided around one-third of global tonnage and dominated world shipping throughout the late nineteenth century, led this trend towards steam.[6] Although its registered tonnage rose by only 40 percent between 1860 and 1880, the steep growth of its steam-powered sector (from 24 to 68 percent) saw the entire fleet's carrying ability more than double. Considered in its own right, British steam's carrying capacity rose six-fold, with the greatest rate of increase occurring in the 1870s, when it almost tripled. Meanwhile, the growth of British-owned tonnage under sail slowed and declined, and by 1880 it was slightly under the figure for 1860.

Coal, which increasingly became the leading maritime as well as land-based power source, was a major element in the growth of worldwide trade. Although this primary domestic product had long pre-occupied British coastwise tonnage, the coal industry was, paradoxically, 'the last of the [British] staple industries to develop overseas markets'.[7] However, stimulated by the spread of industrialisation – especially in continental Europe and Russia – Britain's coal exports began to expand rapidly after mid-century, increasing by 254 percent between 1861-65 and 1876-80. Consequently, the growing economic asymmetry between existing regions of production and those less well placed nations where the urban and industrial demands for coal continued to multiply, created a favourable market environment for the international trade in coal. Shipping was the crucial link that transformed this latent demand into practical exchange. Coal became an agent both of cause and of effect, satisfying the energy-raising demands of industrialising nations on the one hand, and supporting the introduction of higher capacity marine (steam) carriers on the other. Despite its former focus on domestic supply, in respect of capacity and geography the 'Great Northern Coalfield' of North East England was well situated for meeting increased demand for coal in northern and continental Europe. Moreover, its modestly

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[5] Kaukiainen, *Sailing Into Twilight*, pp.17-18.

[6] S. Palmer, 'The British Shipping Industry 1850-1914', in L.R. Fischer and G.E. Panting, eds., *Change and Adaptation in Maritime History, the North Atlantic Fleets in the Nineteenth Century* (St. John's, Newfoundland, 1979), pp. 89-94.

[7] S. Palmer, 'The British Coal Export Trade, 1850-1913', in D. Alexander and R. Ommer, eds., *Volumes not Values: Canadian Sailing Ships and World Trades* (St. John's, Newfoundland, 1979), p. 334.

priced products – medium grade steam and household coals – matched the relatively unspecialised needs of these developing market areas.

Parameters

The parameters selected for this study comprise: spatial definitions of the Tyne and the Baltic; a temporal focus on the period 1860 to1880; and the (conjoint) topics of shipping and seaborne trade.

Spatially, 'the Tyne' is relatively easy to define. The town of Newcastle held exclusive riparian and economic rights over the river Tyne's navigable waterway from early medieval times, and although this hegemony was increasingly challenged by the two river-mouth boroughs, North Shields and South Shields (natural foci for the common shipping trades), Newcastle's dominance was not seriously eroded until the mid-nineteenth century. Then, through government enquiry and a subsequent Act of Parliament (1849-1850), power over the river's conservatorship, its development, and finances were vested in a new joint body: the River Tyne Commission.[8] Topographically, the riparian boundaries altered little, but the river-mouth boroughs later gained customs (and registry) port status, and the river's three constituent ports of Newcastle, North Shields, and South Shields, were assigned the administrative designation, 'Tyne Ports'.[9] Therefore, given deference to period and context, the terms 'port of Newcastle', 'port of Tyne', and 'Tyne Ports', may be used interchangeably. Where, however, the river's urban-industrial environs are also included, the term 'Tyneside' is generally used.

Spatial definition of 'the Baltic' is more difficult. Even the concept of a Baltic region, or regions, bordering the Östsee (the Baltic Sea) is a disputable one – maybe resulting from a peculiarly British viewpoint.[10] Consequently, in discussing the maritime trading economy a pragmatic approach has been adopted, selecting a coherent area for navigation and trade, rather than a politically or culturally defined

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[8] BPP, *Admiralty Enquiry on the State of the Navigation of the Tyne under Acts 11 and 12 Victoria 129*, 1849.

[9] D.J. Starkey *et al*, eds., *Shipping Movements in the Ports of the United Kingdom, 1871-1913, A Statistical Profile* (Exeter, 1999), p. 13.

[10] D. Kirby, 'Locating the Baltic', in P. Salmon and T. Barrow, eds., *Britain and the Baltic, Studies in Commercial, Political and Cultural Relations 1500-2000* (Sunderland, 2003), pp. xvii-xxiv; D. Kirby and M-L. Hinkkanen, *The Baltic and the North Seas* (London, 2000).

one. This functional, rather than conceptual, Baltic region has been constructed by assessing the port's late-nineteenth century trading relations as described in its flourishing (commercially oriented) press and published trade statistics.[11] As a result, it embraces the broad sweep of the Baltic Sea's southern and eastern (i.e. non-Scandinavian) littoral together with its river-ports and their immediate hinterland: running from Kiel in the south west, east-about via the Curonian shore and Gulf of Riga to the furthest extremities of the Gulf of Finland, before returning along the highly indented northern shore to terminate at Åbo (Turku) – in effect, the junction of the Baltic Sea with the Gulf of Bothnia. (see Appendix II, Map)

Temporally, the study is mainly confined to a period of just twenty years, 1860-1880, with minor extensions to incorporate specific subjects and/or sources that have direct bearing upon points discussed (broadening the chronology in parts to 1840-1885). For the two core decades, the 1860s and 1870s, much use is made of comparative samples based on detailed analyses of the end-point years,[12] with more complete annual sequences being constructed as required. These two decades allow deliberate appraisal of a local, published primary source that is rich in quantifiable detail, *The Newcastle Bill of Entry and Shipping List* (March 1861-March 1880), and also permit comparison with its counterparts elsewhere.

Topics central to the study throughout are trade and shipping. These are regarded as essential components within a maritime trading economy, one that is generally defined as comprising the mutually beneficial exchange of goods between regions (trade), vessels in which to carry them (shipping), and transshipment points (ports and havens).[13] The particular remit here is to consider the relationship between select bulk cargo trades and the provision of dedicated shipping services during 1860-1880, a period of extraordinary change in trade and shipping, in which the

[11] Concurring broadly with the old adage that 'Rooshia, Prooshia, Memel an' Shiel's' formed the four corners of a Tyne seaman's globe.

[12] Though using 1861 rather than 1860, since data for 1861 is entire.

[13] D.J. Starkey, 'The Ports, Seaborne Trade and Shipping Industry of South Devon, 1786-1914', in M. Duffy *et al*, eds., *The New Maritime History of Devon, Volume II: From the Late Eighteenth Century to the Present Day* (London, 1994), p. 32; although the significance of ports is not denied, for the purposes of this study they are considered an ancillary issue.

liberalization of markets, unparalleled growth in the volume of trading activity, and radical technological innovation, if not invention, were key elements.[14]

Historiography

Literature having relevance to the Tyne's Baltic trade and its shipping, 1860-1880, may be divided into three categories. First, contemporary and turn-of-century accounts of a non-critical, factual kind published largely to extol Tyneside's progress through industrial technology and urban reform.[15] Second, re-appraisals of the region's urban and industrial growth carried out by social or historical geographers and regional historians during the mid- to late-twentieth century.[16] Third, specific studies of the last thirty years dealing with the broad economic issues surrounding nineteenth-century European shipping and trade, the application of business study methods to matters such as shipping information networks, company development etc., and, more recently, investigations into the evolving dynamics and mobility of maritime industrial complexes and ports.[17]

Although drawing much corroborative substance from the first-named, and owing a great deal to the descriptive analyses contained within the second, this thesis is principally concerned with issues of the kind raised by the third. Central to these are questions of method and interpretation. How far may the processes of change in nineteenth-century shipping be analysed through a methodological approach using (large-scale) theoretical models? And, to what degree can shipowners' responses to the opportunities provided by the technological change from sail to steam be interpreted as providing a ready transition that had direct, beneficial impacts upon productivity?

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[14] J. Mokyr, 'Technological Change, 1700-1830', in R. Floud and D. McCloskey eds., *The Economic History of Britain Since 1700, Vol. 1, 1700-1860* (2nd edition, Cambridge, 1994), pp. 13-14.

[15] For example, W.G. Armstrong *et al*, eds., *The Industrial Resources of the Tyne, Wear and Tees* etc. (2nd edition, London and Newcastle, 1864); R.W. Johnson, *The Making of the Tyne: A Record of fifty years' progress* (London, 1895).

[16] For example, N.R. Elliot, 'Tyneside, a Study in the Development of an Industrial Seaport, Part I and Part II ', *Tijdschrift voor Economische en Sociale Geografie,* No. 53 (1962); N. McCord, *North East England: The Region's Development, 1760-1960* (London, 1979).

[17] In particular, G.J. Milne, *North East England, 1850-1914: the dynamics of a maritime-industrial region* (forthcoming).

North's groundbreaking theoretical work concluded that, whilst innovation in marine propulsion (steam) was indeed reflected in downward shifts in the supply curve, this did not directly engender the late-nineteenth century's marked fall in ocean freight rates. Harley, using similar techniques and theories, subsequently opposed North's interpretation by re-affirming the prior (commonly held) opinion that the saved factor inputs and competition consequent upon technological change were instrumental in causing freight rate decline – highlighting continuous improvements in the efficiency of marine steam engines.[18]

Unlike North, Rosenberg also ascribed a crucial role in productivity growth to slow continuous technological change, emphasising that the rate of change, which was difficult to quantify, depended upon the speed with which it was possible to overcome supply-side problems.[19] Hornby and Nilsson, although in broad agreement with Rosenberg, did not altogether discount the older Schumpeterian reasoning that technological change was accompanied by radical discontinuity. They adopted, in respect of Danish shipping at least, the provisional stance that strategic shifts might well result from such discontinuities embedded in a gradual, more continuous, process.[20]

As pointed out by Kaukiainen such 'neo-Schumpetarian' views also imply that 'know how and entrepreneurship' may play decisive roles as agents of change, although he stresses that qualitative features like these – as allowed for in the concept of total productivity – are very difficult to measure or assess.[21] Similarly, what constitutes 'rational behaviour' by shipowners faced with change must be carefully defined, and Gjølberg's pragmatic definition is adopted here.[22] That is, rational

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[18] D.C. North, 'Ocean Freight Rates and Economic Development 1750-1913, *Journal of Economic History*, XVII, Dec. (1958); C.K. Harley, 'Ocean Freight Rates and Productivity, 1740-1913: The Primacy of Mechanical Invention Reaffirmed', in *Journal of Economic History*, Vol. XLV111, No.1 (1988).

[19] N.R. Rosenberg, 'Factors Affecting the Diffusion of Technology', *Explorations in Economic History*, Fall (1972), pp. 6-33.

[20] O. Hornby and C-A. Nilsson, 'The Transition from Sail to Steam in the Danish Merchant Fleet, 1865-1910', *The Scandinavian Economic History Review*, Vol. XXVIII, No.2 (1980), p. 112.

[21] Y. Kaukiainen, *Sailing into Twilight* (Helsinki, 1999), p. 124.

[22] O. Gjølberg, 'The Substitution of Steam for Sail in Norwegian Ocean Shipping', 1866-1914, A Study in the Economics of Diffusion', *The Scandinavian Economic History Review*, Vol. XXVIII, No.2 (1980), pp.137-139.

behaviour is a response directed by information conveyed through signals from the market, including: trends in prices, costs, profits, and an assessment of technological shifts (if any). Synthesis of these information streams determines the rational owner's future expectations, and the decisions needed to realise them. Profit, Gjølberg stressed, is the driving force behind the process, and vernacular sailing ship owners faced with business options, including the changeover from sail to steam, probably made decisions not in accordance with economic theory but with 'simple rules of thumb, based on historic short-run average profits'.[23] Rationality should be judged not so much by absolute outcomes, but by the consistency of decision making in the light of available knowledge.

Fischer and Nordvik highlighted the dearth of research into the nature of the late nineteenth century (post-Sound Tolls, 1860) shipping engaged between Britain and the Baltic.[24] Their findings upgraded the status of the British tonnage employed, although continuing to predicate its involvement on the inward wood trades. Through further analysis and theoretical modeling, Fischer then quickly revised his own views, suggesting that outward coal freights were a significant element in shipowners' deployment decisions.[25] Fischer's revised stance also directly challenged Harley's earlier conclusion that – in respect of earnings – the carriage of coal to northern Europe was unimportant for British steamship owners, similarly contradicting Aldcroft's implied position that the Baltic was no more than of 'marginal' interest to them.[26] Based upon a provisional investigation that focussed on the liner trades, Pearsall also adopted a position distinct from Fischer's, supposing that the Baltic presented only 'limited opportunities' for bulk carrying steamers, with the (assumed) lack of interest amongst owners in major British ports other than Hull hinting at its

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[23] A view effectively endorsed by Kaukiainen, *Sailing into Twilight*, pp. 126-27.

[24] L.R. Fischer and H.W. Nordvik, 'Myth and Reality in Baltic Shipping: The Wood Trade to Britain, 1863-1908', *Scandinavian Journal of History*, XII, No.2 (1987).

[25] L.R. Fischer, 'A Flotilla of Wood and Coal: Shipping in the Trades between Britain and the Baltic, 1863-1913', in Y. Kaukiainen, ed., *The Baltic as a Trade Road*, VII Baltic Seminar at Kotka 1989 (Kotka, 1989).

[26] D.H. Aldcroft, 'British Shipping and Foreign Competition: The Anglo-German Rivalry, 1880-1914', in D.H. Aldcroft, ed., *Studies in British Transport History 1870-1970* (Newton Abbot, 1974).

'relative unattractiveness'.[27] Nevertheless, Pearsall did note the introduction of compound-engined 'tramp steamers' into the Baltic in the 1870s.

Despite Fischer's firm pointer to the contrary, the negative appraisals of Harley and others have influenced subsequent research, resulting in little attention being paid to the role of the Baltic bulk carrying trades in the development of Britain's steam-shipping services. Consequently, the rationale of British owners engaged there during a significant period in the transition from sail to steam (1860-1880) has neither been investigated nor tested.

Aims and Arguments

This thesis explores two related propositions: first, that the major shipping providers engaged in the Baltic Trade of the Tyne, 1860-1880, responded rationally to the considerable economic and technical changes of the period; and second, that as an element in the development of Britain's steam-powered merchant marine, the role ascribed to the Baltic trade has been underrated.

Accordingly, the work seeks to examine and account for the responses of shipping providers engaged in the Tyne-to-Baltic trade during a relatively short, but unusually rapid, period of expansion and change, 1860-1880. Utilising a previously unexamined primary source,[28] initial emphasis is placed upon establishing a statistically sound descriptive foundation, one that details the trade's volume, its nature, direction, and carriers. This new and original examination has as its principal objective a determination of the actual, rather than the perceived, patterns of the port of Tyne's (and England's) Baltic trade. This comprehensive analysis of trade flows and shipping is intended to provide a fresh platform from which to review existing interpretations of the Baltic trade during the period concerned. On this basis, it is possible to ascertain the degree to which these prior explanations and arguments continue to hold good, or may require revision in the light of the study's new, and quantitatively detailed, knowledge.

Evaluation is also made of shipowners' responses to the Baltic trade's shifting demands, with particular attention afforded to the significance, or otherwise, of

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[27] A. Pearsall, 'British Steamships in the Baltic, 1820-1870', in Y. Kaukiainen, ed., *The Baltic as a Trade Road*, VII Baltic Seminar at Kotka 1989 (Kotka, 1989).

[28] *The Newcastle Bill of Entry and Shipping List*, 1861-1880.

variations in ship numbers and materiel – both sail and steam – amongst the various national fleets. This largely quantitative approach offers insight into the business behaviour of shipping providers by gauging their responses against a clear measure of the degree (and speed) of the shifts and opportunities that occurred. Moreover, in looking to reveal lines of continuity and points of discontinuity alike, attention is focussed not only upon those shipowning interests that sought to adopt new solutions but, equally as well, upon those who continued to pursue existing practices. Whilst it might be anticipated that a shipowner's or shipper's prime motivation was the maintenance or increase of profit, individual decision-making may also have been influenced by factors of cultural conformism and, or, personality.

With the object of furthering a wider understanding of British shipowners' policies and deployments during the mid- to late-nineteenth century, detailed scrutiny is made of the character, purpose, and economic significance of the North East shipping assets engaged in the Tyne's Baltic trade, giving prominence to ownership issues that may have arisen within its investment constituencies. Correspondingly, aspects of the still evolving debate that surrounds the exact timing, and nature, of the changes that occurred in Britain's shipping stock during the 1860s and 1870s are examined, highlighting the (little discussed) introduction of bulk carrying steamers into the intermediate, as well as long haul, trades. In particular, the study's statistically supported analysis of the appearance, and subsequent diffusion, of such steamers in the Baltic supply chain promises to inform an assessment of the degree to which these deployments were either limited in their impact, or, had a wider economic significance within British shipping's dispositions and dominance of the period.

Sources, Method and Contents

Although as a primary source the *Bills of Entry* should definitely 'not be viewed as a panacea' when studying British seaborne trade, the particular records upon which this study is built, *The Newcastle Bill of Entry and Shipping List* (March 1861-March 1880), are extraordinarily valuable.[29] Compared with *Bills of Entry* published elsewhere, Newcastle's listings supply singular details of exports rather than

[29] Fischer, 'Flotilla of Wood ', pp. 45-46.

imports.[30] This particular feature facilitates the comprehensive analysis and breakdown of the Tyne's Baltic exports and their carriers that is undertaken in this thesis using the methods discussed in Appendix I. The regional quantifications that are yielded by this research process are then supplemented by, and correlated with, the national statistics published in parliamentary papers, together with secondary works derived from them.[31]

Specialist, customs-based trade and shipping statistics were also published in *Browne's Export List* (1872-1891), a coal and iron trade journal compiled in Newcastle, as well as in more formal collective summaries.[32] Although variable in content and frequency, the commercial reportage in the leading Tyneside newspapers provides rich comment and hard information (e.g. freight rates, chemical prices) for much of the period.[33] Similarly, an innovative local publication, *Turnbull's Register of Shipping* (North Shields,1849-1899), gave annual listings of sail and steam vessels and their principal owners, listings that still allow ready identification of those who invested in the North East- and London-registered steamers involved in the Baltic trade. For sail alone, Key's monumental *Dictionary of Tyne Sailing Ships, 1830-1930* contains comprehensive build and ownership data transcribed from official registers, together with extraordinary detail on the careers and fates of individual ships.[34]

Documentary sources specific to the Tyne's Baltic trade and its shipping in the nineteenth century are scarce, but the few ships' accounts that survive facilitate the construction of representative case-studies. At an international level, consular comments in parliamentary papers provide valuable insights into trading conditions abroad, together with occasional snapshots of the shipping engaged. However, given the huge amounts of quantifiable trade and voyage information that may be retrieved from the 'Bills of Entry' (including those of Hull and London), only limited reference

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[30] E. Carson, 'Sources in Maritime History (1): Customs Bills of Entry', in *Maritime History*, Vol. I, No. 2, 1971, pp.176-189; N. Ashcroft, 'Customs Bills of Entry', seminar notes, University of Hull, 1998.

[31] BPP, Annual Statements of Trade and Navigation, 1853-1870; BPP, Annual Statements of Navigation and Shipping, 1871-1913; Starkey, *Shipping Movements*.

[32] For example, B. Plummer, *Newcastle-upon-Tyne Its Trades and Manufactures* (Newcastle, 1874).

[33] In particular, the *Newcastle Daily Chronicle*'s 'State of Trade' column.

[34] R.E. Keys, *Dictionary of Tyne Sailing Ships* (Newcastle, 1998).

has been made to the Board of Trade's 'Official Agreements and Accounts of Crew' – records which generally exclude mention of cargoes carried.[35]

Although wide-ranging in nature and extent, few secondary sources – contemporary or recent – make more than incidental mention of British shipping's Baltic activities in the nineteenth century and, with the singular exception of Fischer (1989), those that do highlight wood imports rather than coal exports. Consequently, and in marked contrast to the attention afforded by Scandinavian and Finnish authors to their nations' Baltic- and North Sea-going tonnage, the Baltic component of British shipping's global deployments remains poorly defined. This situation, combined with the fragmentary nature of relevant secondary sources, heightens the need for an understanding of the associated historiography presented above.

This thesis is organised thematically, with attention afforded to trade (chapters 2-5), shipping supply (chapters 6 and 7), and carrier response (chapters 8 and 9). The port of Tyne is identified as Britain's principal coal exporter to the Baltic, servicing much of that region's demand through the two major Baltic ports of Russia and Prussia-Germany: Cronstadt and Swinemunde/Stettin respectively. Russia's slow progress in developing its own coal supplies and merchant marine created a particularly favourable market environment for exporters and shipping working out of the Tyne (1860-1880).

Magnified by the Tyne-to-Baltic trade's exceptional export/import asymmetry, and its short (ice-determined) season, there were considerable strains on the port's supply of sailing ships. And these demands generated a multinational response that involved the mercantile fleets of the major trading partners, together with those from elsewhere in northern Europe. Nevertheless, sail's inherent limitations and its established shipping practices resulted in productivity constraints. Lack of movement in the long-standing, but relatively inelastic, supply of sail shipping caused a growing mismatch between ship providers' capacity and coal consignors' requirements – especially that for contracted serial shipments.

Despite acting to expand the collective tonnage supply during the 1860s, owners of British and foreign sail appeared superficially unresponsive to the Baltic trade's demand-led changes. In reality, they were constantly responding to short-term

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[35] K. Matthews, 'Crew Lists, Agreements and Official Logs of the British Empire, 1863-1913', *Business History*, XVI, No. 1, 1974, pp.78-80.

horizon challenges that included falling freight rates, rising operating costs and, in the case of British owners, a need to manage an ageing stock of vessels. Obtaining greater economies of scale through the employment of larger vessels was unrealistic on the Baltic trade's awkward routes, and even that region's shipowners deployed only their smaller craft on what (to them) were 'North Sea' voyages. Consequently, if the response of owners in sail appeared negative all told, it was in fact a rational one: pre-meditated stasis.

Since British sail's deployments into the Baltic and the Home trades were operationally and economically interlocked, the viability of this Baltic-going sail was increasingly, if indirectly, undermined by the freight rate reductions engendered by the introduction of bulk carrying steamers into the Home and coastal trade. Direct steam competition on Baltic routes was slight, and even the development of a Tyne-owned steam 'liner' system for carrying high revenue exports and imports failed – though for reasons more of commerce than technology.[36]

Nevertheless, the rising secular demand for bulk carrying capacity on the Baltic trade's outward and inward legs offered incentives for a more positive response, with a conjunction of events and resources in the early 1870s precipitating the deployment of an innovatory class of North East-built iron steamers: compound-engined bulk carriers of under 1,200 tons. This type's enhanced economy and range immediately enabled it to prosecute – amongst others – the Baltic trade. Viable only when deployed to a limited number of Baltic ports, these ships were effectively segregated in use, leaving largely foreign-owned sail to provide complementary services to the region's other ports. As with their counterparts in sail, the profitability of these steamers rested upon 'joint production' returns, with their earnings on the outward (coal carrying) leg crucial to overall viability. The creation of year-round deployment regimes that involved trades beyond the Baltic remained the mechanism of ownership success.

The introduction of these bulk carrying steamers into the Baltic (and allied) trades marked a significant technological discontinuity, one that was accompanied by matching responses at other levels. On the Tyne these included marked changes to

[36] C.E. Fayle, *A Short History of the World's Shipping Industry* (London, 1933), p. 268; '[a port] specialising in the shipment of one heavy bulk product... is always unsuitable for liner services, especially if the imports are also restricted in character.'

coal shipping's long-standing business practices, together with a radical new approach to investment in – and the management of – ships. A marked disjunction occurred in the shipowning constituency as a new, far more concentrated, group of significant promoters (supported by 'small capitalists') drove these higher capitalised steam shipping ventures forward. Such undertakings were characterised by diversity of origin, reliance on coal exporting, and adherence to sixty-fourth ownership structures, whilst the company fleets that emerged remained relatively small-scale.

In the picture that emerges from the chapters that follow, the Tyne's Baltic trade was both a driver of exporting activities and a major attraction for shipping – both British and foreign. Over the period under review, the various carriers engaged in the trade experienced not only a massive increase in demand, but also the effects of radical changes in shipping technology and commercial practice. These challenges were actively met through a range of rational responses based upon existing and newly acquired strengths, some of which made a significant contribution to Britain's maritime economy outwith the bounds of the Baltic arena.

CHAPTER 2: COAL EXPORTS TO THE BALTIC, 1861-1880

Appraisals of the United Kingdom's coal exports in the late nineteenth-century have largely centred upon gross quantities, values, and trends at the national level, relying in particular upon statistics contained within the various *Annual Statements*.[1] Such appraisals have, in turn, assisted analysis and comment concerning the more exact volumes, natures and roles of those exports, with the contributions of Thomas, Palmer, and Harley particularly pertinent in the current context.[2] However, at a local (riparian) level Elliot provided much needed definition, for his seminal findings identified the countries of the northern seas as the prime marketplace for the Tyne's coal exports in the late nineteenth century.[3] More recently, Milne re-affirmed the conclusion that it was the production of coal – and in particular its export – that underpinned Tyneside's economic growth between 1850 and 1914.[4]

Coal Exports, 1861-1880: Nation and Region

The broad inference to be drawn from national statistics is that, in general, 'Newcastle' (i.e. the port of Tyne) contributed a quarter of all Britain's coal exports during the period under consideration.[5] However, when examined more closely, it can be seen that relative to the two and a half-fold expansion of British coal exports Newcastle's growth rate had a slight tendency to lag behind national trends. This was especially evident in the late 1870s, although even then Newcastle outperformed the North-East region as a whole. (see Table 2.1; Chart 2.1)

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[1] *ASTN*, 1853-1870; *ASNS*, 1871-1913.

[2] 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); Palmer, 'British Coal Export'; C.K. Harley, 'Coal Exports and British Shipping, 1850-1913', *Explorations in Economic History*, XXVI, No. 3 (1989).

[3] N.R. Elliot, 'Tyneside, A Study in the Development of an Industrial Seaport' (Unpublished PhD thesis, University of Durham, 1955); N.R. Elliot, 'A Geographical Analysis of the Tyne Coal Trade', *Tijdschrift voor Econonomische en Sociale Geografie, No.* 59 (1968).

[4] G.J. Milne, *North East England, 1850-1914: the dynamics of a maritime-industrial region* (forthcoming), chapters 2 and 3.

[5] The actual proportion lay marginally above a quarter until the mid-1860s, but began to decline slightly below it in the late 1870s.

Table 2.1 Coal Exports of United Kingdom and Newcastle, 1861 to 1880 (million tons; percentage; index from baseline of 1861=1.0)

	UK Total (000,000 tons)	Newcastle Total (000,000 tons)	Newcastle Share (%)	UK Trend (index)	Newcastle Trend (index)
1861	7.86	2.10	27	1.0	1.0
1862	8.30	2.11	25	1.1	1.0
1863	8.28	2.06	25	1.1	1.0
1864	8.81	2.33	26	1.1	1.1
1865	9.17	2.43	27	1.2	1.2
1866	9.95	2.56	26	1.3	1.2
1867	10.42	2.68	26	1.3	1.3
1868	10.84	2.57	24	1.4	1.2
1869	10.59	2.67	25	1.3	1.3
1870	11.50	3.02	26	1.5	1.4
1871	12.75	3.43	27	1.6	1.6
1872	13.20	3.34	25	1.7	1.6
1873	12.62	3.22	25	1.6	1.5
1874	12.40	3.70	30	1.6	1.8
1875	14.54	3.62	25	1.9	1.7
1876	16.30	4.01	25	2.1	1.9
1877	15.42	3.42	22	2.0	1.6
1878	15.49	3.47	22	2.0	1.7
1879	16.44	3.95	24	2.1	1.9
1880	18.72	4.50	24	2.4	2.1

Compiled and calculated from: BPP, *Annual Statement of Trade and Navigation* [*ASTN*], 1853-1870; BPP, *Annual Statement of Navigation and Shipping* [*ASNS*], 1871-1913.

Intra-regionally, Newcastle's exports closely mirrored the growth of production in the Great Northern Coalfield, for throughout the period 1860-1880 the North East maintained its dominant share: just below 25 percent of national output. Inter-regionally the other coalfields that were well placed to supply the Baltic market, Scotland and Yorkshire, managed only to maintain their shares of ten and thirteen percent respectively.[6]

Coal Export Trends, 1861-1880

Although parliamentary statistics provide the basis for both consideration of national export trends and those of Newcastle itself, they prove of limited value when seeking to disaggregate export totals by region of destination. In particular, these publications' preferred presentation of exports by nation, or other political entity, fails to separate out those that were consigned specifically to the Baltic Sea's shores.[7] Some such regional, or port-by-port, aggregations may be achieved through the use of other sources, but problems of consonance and continuity remain.

Despite such limitations the comparison of statistics derived from variously aggregated sources still provides confirmation of trends. For example, both for the 'Baltic' as defined by Harley, and, Russia's 'Northern Ports' as commonly iterated in parliamentary reports, there is a progressive doubling of exports between the early 1860s and late 1870s whilst, expressed as a percentage of British coal exports as a whole, their relative shares remained stable (see Table 2.2).[8] Valuable as such indications of longer term Baltic trends are they inevitably mask short-term fluctuations that resulted from international or local events. For instance, the uncertainties surrounding Prussia's moves to annex Schleswig Holstein aroused commercial concerns that inhibited growth from 1863 to1865, and trade also stultified in the late 1870s when the closure of the Black Sea during the Russo-Turkish war led

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[6] R. Church, *The History of the British Coal Industry, Vol.3, 1830-1913: Victorian pre-eminence* (Oxford, 1986), Table 1.1.

[7] Especially in respect of 'Russia', where it aggregates exports to: the southern Baltic; Finnish; Arctic; Black Sea; and Far Eastern shores, without distinction. Similarly, statements for exports and imports to and from 'Russia: Northern Ports', appear to include (at the least) the White Sea and Arctic.

[8] Harley, 'Coal Exports', p. 312. Harley, 'includes not only ports within the Sound but also other European ports north of the Elbe', encompassing all of Denmark, much of Scandinavia, and the Gulf of Bothnia in his definition of 'the Baltic'.

Tyneside shippers to fear a blockade – or British naval action – in the Baltic. At a local level this latter period was also marked by supply side shortages, a consequence of major strikes by the north-east's miners in 1877 and 1879.

Table 2.2 Quinquennial British Coal Exports, 1861-1879: the Baltic (after Harley) and 'Russia: Northern Ports' (BPP)[9]
(million tons per annum; percentage)

	After Harley			From BPP	
	Global (000 000)	Baltic (000 000)	Baltic (UK %)	Russia: Northern Ports (000 000)	Russia: Northern Ports (UK %)
1861-64	7.9	1.9	24	0.4	4.6
1865-69	9.9	2.28	23	0.5	4.6
1870-74	12.4	2.98	24	0.6	4.9
1875-79	15.1	3.78	25	0.9	5.8

Compiled from: Harley, 'Coal Exports', p. 313; *ASTN*, 1861-1870; *ASNS*, 1875-1880.

However, the most notable export fluctuations occurred in the period 1868-1874 when, after peaking in 1871 as a consequence of the ready availability of inward freights during the 'timber boom' and the Franco-Prussian war, the subsequent downturn of 1872-1873 appeared especially severe. The onset of this era's much-debated 'great depression' and accompanying 'coal famine' though, proved to be no more than a temporary stay to the upward trend that had begun in the mid-1860s. Though whether the advances in 1865-1868 that had heralded this long-term pattern of growth had been spurred on by Britain's (final) abolition of duties on imported Baltic timber (1866), or, the concurrent resolution of the Schleswig Holstein affair, is an open question.(see Table, 2.3; Chart 2.2)

[9] Harley, 'Coal Exports', p. 313; *ASTN*; *ASNS*.

Table 2.3 Comparative Trends in British Coal Exports, 1861-1880 [10]

(million tons)

	Newcastle's Global (000 000 tons)	UK to Russia: Northern Ports (000 000 tons)	UK to The Baltic (000 000 tons)	Newcastle to The Baltic (000 000 tons)
1861	2.10	0.35	2.0	0.31
1862	2.11	0.37	1.9	
1863	2.06	0.42	2.0	
1864	2.33	0.40	1.9	
1865	2.43	0.38	2.2	
1866	2.56	0.49	2.2	
1867	2.68	0.47	2.2	
1868	2.57	0.52	2.6	
1869	2.67	0.51	2.3	
1870	3.02	0.65	2.8	
1871	3.43	0.71	3.1	
1872	3.34	0.59	2.9	
1873	3.22	0.51	2.5	0.31
1874	3.70	0.71	3.2	
1875	3.62	0.70	3.5	0.51
1876	4.01	0.95	4.1	
1877	3.42	0.94	3.8	0.61
1878	3.47	0.95	3.5	
1879	3.95	1.04	3.7	
1880	4.50	1.21	4.2	0.98

Compiled from: *ASTN*; *ASNS*; Harley, 'Coal Exports'; *NBESL*, 1861, 1880; Plummer, *Newcastle-upon-Tyne*; *Browne's Export List*, 1875, 1877.

[10] Newcastle's Global Exports, and, UK Exports to Russia: Northern Ports, compiled from *ASTN, ASNS.* UK Exports to The Baltic, compiled from Harley, 'Coal Exports', pp. 332-33. Newcastle's Exports to the Baltic compiled from: *NBESL*, 1861, 1880; Plummer, *Newcastle-upon-Tyne*, pp. 103-105; *Browne's Export List*, 1875, 1877.

The quite marked annual fluctuations of coal exports to the Baltic, 1861-1880, reinforce the qualitative impression that, as a consequence of its unusual geographical and political environment, it was a particularly volatile commercial region. And there are indications that macro-economic factors triggered exaggerated swings in the Newcastle-to-Baltic trades. For instance, in the general downturn of 1872-1873 Newcastle's coal exports to the Baltic dropped far more sharply than its overall global exports did, falling back to levels last seen in 1861.

Regions of Supply

Consideration also needs to be given as to how far Newcastle's exports satisfied the Baltic's entire import market for coal but, unfortunately, no sequence of British statistics can readily be used to answer that question. Nonetheless, sampling suggests that at the end of the period under discussion Tyneside's pre-eminence was as great as has been posited by Fischer: '[Newcastle] was... the principal coal exporting port to the Baltic (a point that he [Harley] asserts but that I am willing to accept)'.[11]

In 1880 Newcastle's Baltic exports appear to have comprised 59 percent of the British total and, altogether, shipments from the North East made up 76 percent; Scotland and Yorkshire supplied much of the rest. (see Table 2.4) This was probably a long established supply situation, differing little from a qualitative estimate of 1857 that, of the three major participants in the Baltic trade, Newcastle originated 60 percent of the shipping involved, with Hull and Leith accorded 25 percent and fifteen percent respectively.[12] Given allowance for developments in South Wales and in Lancashire, the levels of regional engagement thus remained broadly similar in 1857 and 1880.

Within the Baltic itself, Newcastle's exports possessed an outstanding lead in the premier Russian marketplaces of Cronstadt and St. Petersburg – only the Humber ports made further significant contributions. Most remarkably, in Swinemunde and Stettin – Germany's largest markets for seaborne coal – Newcastle and the other North East coal ports achieved near-complete hegemony. Nevertheless, the port of Tyne had to work hard to improve its supply side infrastructure so as to maintain its

[11] Fischer, 'Flotilla of Wood ', p. 48, citing statement in Harley, 'Coal Exports'.

[12] BPP, *Report from the Select Committee on Harbours of Refuge*, 1857, pp. 64-65.

position as the outlet of choice for the Great Northern Coalfield;[13] though in respect of Baltic exports it always maintained leadership. For instance, in 1880 it shipped 71 percent of the coalfield's exports to the Baltic, whilst its nearest rivals, Sunderland and the Hartlepools, achieved just thirteen and twelve percent respectively.[14]

Table 2.4 Coal Exports to the Baltic by UK Region of origin: 1880 (sample) [15]
(tons; percentage)

	Exports to the Baltic (tons)	Export Percentage (%)
Port of Tyne	295428	59
Other North-East coal ports	85674	17
Yorkshire ports	49083	10
Scottish ports (east & west)	47865	10
South Welsh ports	17376	3
Lancashire ports	4041	1
Total	499467	

Compiled and calculated from *Browne's Export List*, 1880

Volumes not Values, 1861 and 1880 compared

Contemporary qualitative sources together with more recent quantitative appraisals all suggest that coal would have dominated the Tyne's mid-nineteenth century exports to the Baltic.[16] This is confirmed and reinforced by an analysis of the port of Newcastle's Customs returns for 1861 which reveals that coal products accounted for around 93 percent (by weight) of bulk commodity exports to the Baltic.[17] (see Table 2.5)

[13] R.W. Rennison, 'The Development of the North-east Coal Ports, 1815-1914; The Contribution of Engineering' (Unpublished Ph.D. thesis, University of Newcastle, 1987), p. 336.

[14] *Browne's Export List*, 1880. Compiled from a full year's entries, the other coal ports: Amble, Blyth, Seaham, and Middlesborough accounted for merely 4%.

[15] Sample comprises June and September, months with average levels of shipment.

[16] Johnson, *Making of the Tyne*; Elliot, 'Geographical Analysis'.

[17] *Newcastle Bill of Entry and Shipping List* [*NBESL*], 1861.

Table 2.5 Bulk Commodity Exports to the Baltic, 1861

(tons; percentage)

	Coal Products	Chemicals	[18]Earth Products	Iron & Lead	Total
Tons	314696	8811	7001	5269	335777
Percentage	93.7	2.6	2.1	1.6	

Compiled from *NBESL*, 1861

Through its coastal and export trades combined the Tyne of the early 1860s shipped some 4,000,000 tons of coal products annually.[19] Locally, it was estimated that effectively a half (1,920,000 tons) of this was shipped in the foreign-going trades; a figure broadly in agreement with that compiled nationally for 1861, 2,100,000 million tons.[20] Consequently, the 315,000 tons shipped to the Baltic in that year indicates that region's considerable market significance. It absorbed just over fifteen percent of the Tyne's foreign exports of coal, comprising eight percent of the port's entire (domestic and export) trade in sea-borne 'coals'. Since the 'declared real value' of all coals exported from the Port of Newcastle in 1861 was £903,109 from a volume of 2,095,670 tons,[21] the value of the Baltic component was approximately £135,615 (*pro rata* @ £0.431 per ton). Nationally, the coal products shipped into the Baltic region in 1861 had an aggregate declared value of £338,260 on shipments of 850,972 tons, so the Tyne's share of all British coal product exports to the Baltic was

[18] Principally: firebricks, fireclay, grindstones and millstones.

[19] Even reliable observers rarely agreed exactly: Johnson, *Making of the Tyne*, appendix; Plummer, *Newcastle-upon-Tyne*, pp. 46-47.

[20] *ASTN*, 1861.

[21] *ASTN*, 1861, p. 230, Table 34.

nominally 40 percent by product value, and 37 percent by tonnage shipped.[22] In practice though, the share by value may have been slightly lower.[23]

The Baltic, as with most other export destinations of the early 1860s, absorbed the three most common North East coal products: large coals, which were the prime, relatively unbroken, 'export' grade; small coals, a much inferior grade; and coke (often listed as 'cinders'). Large coals, which held the dominant supply position in 1861, constituted over 90 percent of all the coal products shipped from the Tyne to the Baltic and were consigned to all the major and minor Baltic ports considered here. By comparison, small coals and coke appear to have satisfied little more than niche markets at that time.[24] (see Table 2.6)

Table 2.6 Coal Products shipped from the Tyne to the Baltic, 1861
(tons; percentage)

	Large Coals	Small Coals	Coke	Total
Tons	291948	16814	5934	314696
Percent (%)	92.8	5.3	1.9	

Compiled from *NBESL*, 1861

In 1861 the intake of small coals was largely confined to minor ports, particularly those in the Low Baltic (e.g. Burg, Colberg and Neustadt). Demand for coke was also selective, but its top consumers were large cities with growing industrial and transport needs: Riga, St. Petersburg with Cronstadt, and Stettin. But, although poor levels of coke export in 1861 might be taken as an indicator of the

[22] This calculation is based upon the statistics given for 1861 in *ASTN*, 1865, Table 42. Compounding the totals for: Russia, Northern Ports; Prussia; and Mecklenburg-Schwerin closely approximates the geographic area under consideration in this thesis.

[23] *ASTN*, 1865, statistics for 1861. Analysis of these reveals a (weighted) value per ton figure which is slightly below that of the national average: £0.398 per ton rather than £0.431, producing a slightly lower yield, £125,123, representing a 37% share of product value also. However, Customs officials readily admitted that their valuations, as opposed to volumes, were often notional.

[24] Coal composites, known as 'patent fuel', were not recorded as exports from the Tyne to the Baltic in 1861, but slightly later they were frequently shipped from Sunderland.

relatively low degree of industrialization which prevailed in the Baltic region, contemporary Tyneside comment suggests that 1861 was a particularly poor year.[25] Baltic demand was normally a more significant component, spurred on by coke's use as a fuel in an expanding rail network.[26]

By 1880, coal products still dominated the Tyne's Baltic exports, and there had been a remarkable increase in volume: shipments now approached 980,000 tons per annum. This had been achieved despite the Russian Government's avowed intention to substitute domestically produced coal and wood for foreign imports,[27] and Germany's rather more effective opening up of the Westphalian coalfield. However, the Tyne's threefold increase in coal exports to the Baltic, 1861-1880, represented secular growth rather than a continuous upward curve for, as a commodity, coal's share had slipped slightly (3.2 %) whilst chemicals and metals had shown complementary growth. (see Table 2.7)

Table 2.7 Bulk Commodity Exports to the Baltic, 1880
(tons; percentage)

	Coal Products	Chemicals	[28]Fertilisers	[29]Earth Products	Iron, Lead, & Copper	Total
Tons	975458	36641	4014	24496	36816	1077425
Percent (%)	90.5	3.4	0.4	2.3	3.4	

Compiled from *NBESL*, 1880

Nevertheless, the Baltic portion of the Tyne's global coal exports had risen from some fifteen percent in 1861 to just over 20 percent in 1880 – a significant increase in share.[30] This Baltic component was worth around £404,000 to its Tyneside

[25] D. Kirby, *The Baltic World 1772-1993* (London, 1995), pp. 164-67.

[26] 29 October 1860, 5 August 1861, *NDC*.

[27] 18 February 1880, *NDC;* indicates that local opinion was sceptical of Russia doing this.

[28] Fertilisers comprised manure and superphosphate.

[29] Earth products principally comprised: firebricks; fireclay; grindstones and millstones.

[30] The Tyne's global export of coal products in 1880 amounted to 4,496,379 tons (*ASNS*, 1880), indicating that its Baltic exports (975,458) tons represented a market share of 21.7%.

vendors, its absolute gross worth and volume having tripled alike since 1861.[31] Regrettably, surviving U.K. evidence does not allow calculation of the exact degree to which the Tyne's exports occupied the Baltic demand for seaborne coal. Some indication of these export's importance though is given by the fact that coal and coke shipments to Russian ports within the Baltic (619,840 tons) represented half of the officially-recorded British coal exports to Russia's 'Northern Ports' (a more extensive geographic designation including the White Sea ports).[32] It is reasonable to conclude that Tyneside suppliers satisfied well over half the needs of the Baltic's important Russian market, a marketplace where there was 'demand for use in steamboats, manufactories, and, to a certain extent, in railways; they are also used in workshops and factories'.[33] Wood no longer met Russia's demands as a fuel and the coalmines in the Urals were not expected to 'open out' for several years. Meanwhile, Tyneside's suppliers were in the advantageous position of pricing their steam coals at 24 shillings per ton (household coals at 30 shillings) at a time when pit-head prices were approximately five shillings a ton.[34]

By 1880 the Newcastle Customs House returns no longer made the distinction between 'large coals' and 'small coals' – although it is clear that a wide variety of grades continued to be shipped – and coal export shipments were being recorded in tons rather than in the old-established unit, the Newcastle chaldron.[35] Great attention in the market place (but not in the Customs House records) was now paid to differentiation by source, since this was the factor that determined a coal's nature and its suitability for various end uses: whether for steam-raising, coking, gas production, or household purposes. Despite a multitude of local designations – based upon a colliery's location and its seams – broadly two kinds of coal were mined in, and

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[31] *ASNS*, 1880, p. 128, 130. Calculated as £0.414 per ton, on the basis of the Tyne's global coal product exports at 4,496,379 tons with a value of £1,863,173.

[32] Russian ports within the Baltic compiled from, *NBESL*, 1880. 'Northern Ports' from, *ASNS*, 1880, Table 29.

[33] 23 July 1860, *NDC*.

[34] Church, *History of British Coal*, *Vol.3*, pp. 53-54.

[35] Eight chaldrons, or one Keel, equated to 21.2 tons. The change from chaldrons to tons seems indicative of rationalisation in the coal handling process, and maybe also marked a shift of emphasis away from the producer – with whom such terms originated – towards the needs of the bulk export shipper. Confusingly, the phraseology of shippers' charter parties long continued to quote freights per 'Keel of 21.2 tons'.

exported from, the Great Northern Coalfield: the soft, long-flame Northumberland coals which were favoured for household use and also served for low grade steam-raising; and the slightly better quality Durham (and south Northumberland) coals which were suited to gas production and coking, although rather smoky burners. The Baltic seems to have provided a favoured marketplace for the softer Northumberland coals since they satisfied consumers' needs for low cost, general purpose industrial coals with additional household uses.[36] However, as industrialisation proceeded in the Baltic and, as the coalowners in the Great Northern Coalfield became more intimately involved in the supply chain, the specialist coals of Durham rose in prominence.

Correspondingly, coke exports to the Baltic increased seven-fold between 1861 and 1880, reflecting not only the demand-led results of industrial and railway expansion in the Baltic but also enhanced supply side capacity of coke-making within the Great Northern Coalfield, notably in County Durham.[37] (see Table 2.8)

Table 2.8 Coal Products shipped from the Tyne to the Baltic: 1861 and 1880 (tons; percentage)

	1861			1880		
	Coals	Coke	Total	Coals	Coke	Total
Volume (tons)	308762	5934	314696	931668	43790	975458
Share (%)	98.1	1.9		95.5	4.5	

Compiled from *NBESL*, 1861, 1880

These increased exports of coke were especially significant for carriers since coke took up twice the volume of an equivalent weight of coal and, as a consequence, it took up nearly ten percent of the cargo space employed for coal products in 1880. Geographically, the major demands for coke continued to come from the established markets of St. Petersburg/Cronstadt (25,363 tons), Riga (4,646 tons), and

[36] G. Harbottle, *Quayside Life and the Commercial Exchange* (Newcastle, 1979), pp. 52-53. A standard Baltic 'shipper's choice' of the early 1900s (dating from the 1870s, or earlier) was known as 'DCB's', made up from various Northumberland 'Hartley' coals.

[37] Many locomotive furnaces were then designed to burn coke.

Stettin/Swinemunde (3,939 tons), though Danzig/Newfairwater had now joined this premier group (4,600 tons). The former Prussian capital, Königsberg, together with the Russian province of Estland each absorbed around 2,000 tons. As a result this specialist trade helped to expand the Tyne's foreland as well as to augment its export totals.

Destinations, 1861 and 1880

In 1861, Prussia and Russia dominated the demand for Tyne shipped coal in the Baltic, absorbing 87 percent between them. Each took a near-equal share with the remainder consigned to the German Confederation's northern states, i.e. those having Baltic shorelines.[38] (see Table 2.9)

Table 2.9 Coal Product Exports by Territorial Destination, 1861
(percentage; tons)

	Share (%)	Coal Products (tons)	Large Coals (tons)	Small Coals (tons)	Coke (tons)
Russian Empire	44	136977	129384	4304	3290
Prussia	43	136311	128599	5491	2221
German Confed.	13	41408	33965	7020	423

Compiled and calculated from *NBESL*, 1861

Examination on a port-by-port basis reveals that 32 percent (101,911 tons) of all the coals consigned in 1861 were despatched to the Russian port of Cronstadt. Only the Prussian city of Stettin and its outport at Swinemunde received anything comparable, 26 percent (81,084 tons). These two major import points: Cronstadt and Stettin/Swinemunde thus shaped the equality of national demand between Russia and Prussia, accounting for nearly 60 percent of all the coal imported into the Baltic from the Tyne in 1861. These two major importers lay at the eastern and western

[38] The relatively low level of German imports probably reflected alternative routing via the North Sea ports (especially Hamburg) and their inland waterways where, incidentally, Tyneside exports also played a very significant role.

extremities of the Baltic Sea, a geographic split that encouraged very different voyage routines for the shipping servicing them. This immediate focus of demand reflected a wider pattern of concentration as well, for although 32 Baltic ports received coal products from the Tyne, 75 percent of it was accounted for by just six alone. The eleven top-ranked ports (i.e. those taking more than two percent each) accounted for nearly 90 percent of the whole.[39] (see Table 2.10)

Table 2.10 Coal Product Exports, 1861: Top-ranked Ports of Destination (percentage; tons)

Baltic Port	Territory	Share (%)	Coal Products (tons)
Cronstadt	Russian Empire	32.4	101911
Stettin/Swinemunde	Prussia	25.8	81084
Lübeck/Travemunde	German Confederation	4.5	14167
Danzig/Newfairwater	Prussia	4.4	13959
Riga/Muhlgraben	Russian Empire	4.1	12960
Kiel	German Confederation	4.0	12450
Wolgast	Prussia	3.8	12068
Königsberg	Prussia	3.3	10361
St Petersburg	Russian Empire	2.9	9202
Rostock	German Confederation	2.4	7480
Stralsund	Prussia	2.2	6867
	Totals	89.8	282508

Compiled and calculated from *NBESL*, 1861

A brief review of the extent of the Tyne's Baltic foreland for coal in 1861 shows that exports to the Russian Empire were much concentrated on the Cronstadt/St. Petersburg route and, although Riga absorbed some four percent of the

[39] Twenty minor ports: eleven in Russia (4½%), five in Prussia (4%), and five in the German Confederation (2%), absorbed the remainder.

entire Baltic total, ports in Russia's peripheral Baltic provinces: Estland, Livland, Kurland and the Grand Duchy of Finland, accounted for a negligible amount. Similarly, the major portion of Prussia's share was channeled through Stettin/Swinemunde, with half-a-dozen subsidiary ports – including Danzig/Newfairwater and Königsberg – accepting much of the rest. (see Table 2.10)

Consequent upon Prussia's unification of the North German Federation in 1866 and the declaration of a united German Empire in 1871, however, the basis of national import divisions changed. After 1871 the apportionment of coal exports to the Baltic lay between Russia and the newly-declared state of Germany alone, and during the 1870s the balance shifted away from the German foreland. By 1880, Russia's share had reached 64 percent, whilst recently unified Germany's lay at 36 percent. Between 1861 and 1880 there was thus a clear reversal in share, for in 1861 the coal imports of Prussia and the German States combined had provided for 56 percent of the entire Tyne-to-Baltic coal market whilst Russia's 44 percent had barely equalled that of Prussia alone. (see Table 2.11)

Table 2.11 Coal Product Exports by Territorial Destination, 1880

(percentage; tons)

	1861	1880			
	Share,1861 (%)	Share,1880 (%)	Coal Products (tons)	Coal (tons)	Coke (tons)
Russia	44	64	620457	587488	32969
Germany	56	36	354201	343380	10821

Compiled and calculated from *NBESL*, 1880

Although the two principal import centres of Cronstadt/St. Petersburg and Stettin/Swinemunde remained unchallenged between 1861 and 1880, the growing importance of the Russian market was reflected in the changing volumes that each handled. By 1880, Cronstadt/St. Petersburg had achieved remarkable dominance, absorbing 48 percent of the Tyne's coal exports into the Baltic arena. Even the second-ranked port of Stettin/Swinemunde had slipped from 26 percent in 1861 to just nineteen percent by1880. By then, imports had become even more concentrated, directed mostly to thirty or so participating ports of which the top ten alone absorbed 94 percent (the top five took 80%). Since the overall number of ports engaged in the trade remained much the same as in 1861, the remaining traffic, just six percent, was spread increasingly thinly around twenty or so other recipients – including port cities of such regional status as Helsingfors and Königsberg.

However it was viewed, there was an extraordinary increase in coal imports into Russia – through Cronstadt/St. Petersburg – from the Tyne between 1861 and 1880. Absolute volumes quadrupled to 355,766 tons yearly and the ports' share of Baltic imports as a whole escalated from 35 percent (1861) to 48 percent (1880). Relative to this, the role of the second-ranked Prussian (German) port complex of Stettin/Swinemunde diminished for, against an overall tripling in Tyne-shipped coal to the Baltic, its volume had little more than doubled. Nevertheless, Stettin/Swinemunde still recorded a significant increase in volume, to well over 100,000 tons per annum. This accorded with the observation that all branches of industry were in 'a flourishing condition' there from the late 1870s onwards, whilst it was also confidently reported that, despite the State Railway's introduction of an artificially low rail tariff for German-produced coal, this had not had 'the desired effect of diminishing the importation of British coal'.[40]

Destinations which had shown rather higher than average (fivefold) levels of expansion by 1880 comprised: the ex-Prussian ports of Danzig/Newfairwater and Pillau, and the Russian port complex of Riga/Muhlgraben (Livland). Two further Russian ports, Reval (Estland) and Libau (Kurland), showed extraordinary rates of growth in imports of Tyne-shipped coal: fifty- and thirty-fold increases respectively. These two had effectively become new ports, ones whose development had been driven by the complementary capabilities of servicing steamships and accessing the growing Russian rail network. Consequently, the once minor port of Reval far outstripped St. Petersburg as an importer during the 1870s, acting as its outport for some goods.[41] (see Table 2.12)

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[40] BPP, *Second Report of the Royal Commission Appointed to Inquire into the Depression of Trade and Industry, Part II*, 1886, pp. 179-81; evidence of Mr. Reid, British Vice-Consul, Stettin and Swinemünde.

[41] BPP, *Second Report, Depression of Trade, Part II*, p. 291; evidence of J. Michell, British Consul, St. Petersburg.

Elsewhere, however, there were some notable cases of a decline or stagnation in imports of Tyne-shipped coal. The old Hanseatic German ports of Lübeck/Travemunde recorded the same level of imports in 1880 as in 1861, falling from third ranked port to tenth. Also within the Low Baltic region, the imports of several former West Prussian and German Confederation ports suffered significant decline, with reductions in the region of: 1,000 tons each for Rostock and Colberg, 3,000 tons for Stralsund, and more than 8,000 tons at Wolgast. Imports through Königsberg, the former Prussian capital, dropped from some 10,000 tons in 1861 to 6,000 tons in 1880. But this particular decline was more than compensated for by the fact that its outer (deepwater) port at Pillau – the natural discharge point for steamers – experienced a complementary increase of around 13,000 tons.

Table 2.12 Coal Product Exports, Top-Ranked Destinations: 1880 and 1861 (tons; percentage; factor, where tons in 1861 = 1.0)

	Coal Prods: 1880 (tons)	Increase over 1861 (tons)	Share: 1880 (%)	Share: 1861 (%)	Factor: 1861-1880 (1861=1.0)
Cronstadt/St. Petersburg	466879	355766	48	35	4.2
Swinemunde/Stettin	184933	103849	19	26	2.3
Danzig/Newfairwater	72072	58113	7	6	5.2
Riga/Muhlgraben	66277	53317	7	4	5.1
Reval	48787	47923	5	0	56.5
Kiel	18769	6319	2	4	1.5
Pillau	16352	13511	2	1	5.8
Libau	14844	14333	2	0	29.0
Memel	14713	10124	2	1	3.2
Lübeck/Travemunde	14279	112	1	5	1.0

Compiled and calculated from *NBESL*, 1861, 1880

Few of the lesser ports, that is, those occupying the lower half of the rankings in 1880, showed significant increases in coal handled. On the contrary, most showed absolute and relative declines. Against this trend, however, Russia's Port Kunda (east Estland) appeared as a newcomer amongst coal importers, and its receipts (2,100 tons) together with appreciable increases at Pernau (west Estland) showed that Russia's minor, as well as major, ports might benefit from increased demands throughout the Empire. Conversely, Germany's small ports suffered, for the national growth of coal imports there slowed relative to that of production- and distribution-poor Russia.

Shipping Capacity

The threefold increase in Tyne-to-Baltic coal product exports between 1861 and 1880 resulted in rather more than an equivalent tripling of demand for shipping tonnage, a result of the higher proportion of coke in 1880's shipments – coke occupied twice the cargo space of a similar weight of coal. Indeed, 1880 marked a milestone in shipping volumes, as cargo tonnage requirements actually exceeded one million tons. (see Table 2.13)

Table 2.13 Coal Product Exports and Shipping Capacity: 1861 and 1880 (tons; cargo tons)

1861			1880		
Coal (tons)	Coke (tons)	[42] Capacity (cargo tons)	Coal (tons)	Coke (tons)	Capacity (cargo tons)
308762	5934	320630	931668	43790	1019248

Compiled and calculated from *NBESL*, 1861, 1880

In reality, the demands on shipping were even greater than the basic cargo tonnage calculations suggest, for shipowners were concerned with the duration of their individual ships' voyages as well as their capacities.[43] Despite inherent uncertainties, it is possible to assess the main implications of this ownership equation

[42] Cargo tons required (1861 and 1880) calculated on the basis of coke occupying twice the shipping volume of an equivalent weight of coal

[43] Admittedly, it is difficult to establish average voyage durations for particular routes – especially when carried out under sail.

by factoring route distances with tons carried to give an approximate measure, in tonnage-miles, of the shipping committed.[44] A comparison of the shipping capacities committed to the two premier coal importers: Stettin/Swinemunde, and Cronstadt/St. Petersburg in 1861 and 1880, suggests a 394 percent expansion in aggregate commitment. However, carriers prosecuting the long, faster-growing Cronstadt/St. Petersburg route had furnished much the greatest proportion of this, for capacity needs there had increased fourfold (457%). Meanwhile, the shorter, slower growing route to Stettin/Swinemunde was provided for by barely half that (231%). (see Table 2.14)

Table 2.14 Service needs of Cronstadt and Stettin/Swinemunde: 1861 and 1880 (cargo tons; ton-miles; percentage change 1861 to1880)

	Cronstadt		Stettin/Swinemunde		Aggregate	
	Cargo Tons (000)	Ton-miles (000 000)	Cargo Tons (000)	Ton-miles (000 000)	Cargo Tons (000)	Ton-miles (000 000)
1861	103	132	82	63	184	194
1880	469	602	189	145	658	764
Change (%)		457%		231%		394%

Compiled and calculated from *NBESL*, 1861, 1880

Collectively, it can be argued that prospective carriers were faced with a choice during the development of these two premier Baltic routes: whether to engage in a fast growing but relatively long-haul market that implied considerable resource commitment, or alternatively, whether to deploy lower resource levels into a short-haul market of relatively low growth. However, even such a clear deployment choice as this was but part of a much greater whole. Shipping's overriding requirement was the achievement of an extraordinary increase in capacity in order to service the expansion of the entire Tyne-to-Baltic coal trade. Capacity had to be raised from some

[44] For example: 1,000 tons of coal to Cronstadt, 1,284 nautical miles distant, required the commitment of 1,284,000 ton/miles of carrying capacity.

300,000 cargo tons in 1861 to just over 1,000,000 tons in 1880, that is, around 330 percent in just nineteen years.[45]

Meeting these radically increased tonnage demands between 1861 and 1880 would seem to imply the successful adoption of one, or more, of several possible input strategies. These input options may be predicated as including: the commitment of larger numbers of ships of pre-existing size and character; making significant productivity advances beyond existing practice, afloat or ashore; increasing the number of voyages made annually; or, providing efficiency gains through the use of larger, or, technically superior, vessels. An initial base-line against which to assess whether these or other factors came into play, and to identify sectors of growth or decline, is provided by detailed analysis of the relevant data in the *NBESL*, 1861 (see Table 2.15).

Table 2.15 Shipping Engaged in the Tyne-to-Baltic Trade, 1861: by Nationality (register tons despatched; register tons; number)

	Total Tonnage Despatched (tons)	Register Tonnage Engaged (tons)	Ships Engaged (No.)	Average Size (tons)	Clearances (No.)
Britain	88190	68649	308	223	393
Germany	95952	78078	461	169	589
Dutch Repub.	10830	10269	95	108	101
Others (6 of)	19389	17783	139	128	175
Totals	214361	174779	1003	157	1258

Compiled and calculated from *NBESL*, 1861 [46]

[45] That is, an annual rate of increase of 17% against original capacity.

[46] Based on *NBESL* listings for 'Exports' and [ships] 'Entered Outwards'. Nationalities consolidated to allow for direct comparison with the statistics for 1880: Britain, includes England and Scotland; Germany, includes Prussia and the states of the German Confederation.

In 1861, approximately 214,000 register tons of shipping carried exports comprising some 315,000 tons of coal products and 21,000 tons of other bulk items.[47] The carrying fleet required for this work was composed of vessels representing eleven nations, with English and Scottish ships together with those from Prussia and the German Confederation supplying 85 percent (including repeat voyages) of the tonnage deployed. It was these country's vessels that also accounted for a similar proportion, by aggregate tonnage, of the thousand-strong shipping stock then engaged. (see Table 2.15)

Notwithstanding the fact that nearly ten years later, in 1870, the sailing ship element of the carrying fleet still bore close resemblance to that of 1861, a singular change had occurred in the composition of the Baltic-going fleet towards the end of that period. For the first time, the newly introduced bulk-cargo steamers provided more than one-third of the total tonnage employed in the Tyne-to-Baltic carrying trade, and from then onwards they increased their share unremittingly.[48] As a consequence, the nature of the carrying fleets involved had changed beyond recognition by the late 1870s, and this despite the fact that the number of vessels employed in 1880 was almost exactly the same as in 1861.

Although in sheer numbers sail still provided the largest component (672 ships) in 1880, it now contributed less than a quarter of the cargo tonnage employed, and the sailing vessels employed were almost entirely foreign owned. By stark contrast, although they were numerically much inferior, it was steamships that now (1880) supplied over three-quarters of the trade's carrying capacity. (see Table 2.16) These were overwhelmingly under domestic rather than foreign ownership, for 262 out of the 367 steamers engaged in the Tyne-to-Baltic trade in 1880 were registered in British ports. Moreover, it is argued that steam delivered the one crucial change that sail had not. Iron-built steamers substantially increased the average size of the vessels employed in the trade. Already in 1880 most of the British steamships involved in the Tyne-to-Baltic trade were of over 700 tons, whilst the (largely foreign) vessels still

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[47] This matches the norm of the period, with one register ton of shipping equating to one-and-a half tons of coal carrying capacity. See, for instance, R.W. Stevens, *On the Stowage of Ships and Their Cargoes* (1st edition, London, 1863).

[48] A.G. Osler, 'Coal, Chemicals and Change: Tyneside's Baltic Trade 1861-80', in P. Salmon and T. Barrow, eds., *Britain and the Baltic, Studies in Commercial, Political and Cultural Relations 1500-2000* (Sunderland, 2003), pp. 207-14.

operating under sail averaged barely 200 tons – making them inferior in size to the English sailing vessels commonly employed in 1861. Shipowners who wished to could also exploit the speed and regularity of a steamer's passage times in order to make multiple sailings over the Baltic's limited season, and this became a notable feature of the Baltic's bulk-carrying steamer trade.

Such regularity of deployment had the revolutionary effect of concentrating the usage of shipping assets to a much greater degree than previously. Over half of the Tyne-to-Baltic's entire coal exports could now be carried by less than one-third of the ships engaged. Conversely, passage times attained under sail were still relatively slow and unimproved, militating against multiple seasonal voyaging. Consequently, the sailing fleet's use of its assets remained diffuse, and nearly three-quarters of coal exports under sail were still delivered by vessels that made only a single seasonal trip.

Table 2.16 Shipping Engaged in the Tyne-to-Baltic Trade, 1880
(cargo tons; register tons; numbers)

	Total Tonnage Despatched (cargo tons)	Steam Tonnage (cargo tons)	Steam Share (%)	Register Tonnage Engaged (tons)	Ships (No.)	Clearances: Sail & Steam (No.)	Clearances: Steam (No.)
Britain	431295	421244	60	196328	304	641	599
Germany	134765	56921	8	85150	329	470	113
Denmark	50936	37450	5	28626	119	152	53
Norway	33394	6873	1	28819	112	125	12
Others	55174	24095	3	39664	175	212	44
Totals	705564	546583	77	378587	1039	1600	821

Compiled and calculated from *NBESL*, 1880

Conclusions

The Great Northern Coalfield maintained a quarter share of the United Kingdom's rapidly expanding coal exports during the 1860s and 1870s, during which time the Tyne's Baltic sector regularly outperformed the North East's exports of coal as a whole and, clearly, the Tyne was by far the largest supplier of British coal to the Baltic littoral. These findings confirm and add greater definition to those of Elliot.[49] However, the Baltic was not a homogenous marketplace, and the wide geographic spread of its ports combined with user preferences forced suppliers to specialise, creating variety amongst the consigning community.

Similarly, significant alterations to the pattern of demand (away from Prussia/Germany towards Russia) necessitated a flexible approach to supply and, slow though it was, Baltic industrialisation required limited supply side shifts. Further divisions also occurred on the demand side, chiefly as a consequence of asymmetry amongst the receiving ports, and demand-led pressures – combined with limitations in port provisions – led to polarisation of coal imports by 1880, concentrating them at the Baltic's extremities: Stettin/Swinemunde; and, Cronstadt/St. Petersburg.

Despite the vagaries of the trade, the Tyne's aggregate coal exports to the Baltic show that volumes tripled in the period 1861-1880, a rate significantly higher than that indicated by Palmer nationally.[50] This poses the question as to how shippers met the resultant (year-on-year) increased demand for tonnage. Two markedly different structural responses were exhibited by the operators of sail and of steam: sail owners expanded the number of units engaged, and steam owners increased voyage frequencies. Also, the majority of consignors and shippers had to respond to a critical deployment choice, either committing their vessels on shuttle trips into the German west Baltic (in a climate of low growth), or dispatching them on the longer route to the fast expanding Russian ports of the east Baltic (where profitable return cargoes had to be secured). A third option, the seasonal servicing of the Baltic's minor 'by ports' was generally unattractive to all but small operators.

It is apparent that steam shipping was a crucial component in the process that enabled the Tyne's suppliers to meet the massive secular growth in the Baltic's demand for coal, for steamers carried three-quarters of all such exports by 1880. But the growth of physical shipping capacity was not enough of itself, the effective direction and management of this enhanced capacity was required as well.

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[49] Elliot, 'Geographical Analysis', pp. 85-87.

[50] Palmer, 'British Coal Export', p. 333.

Chapter 2, Charts:

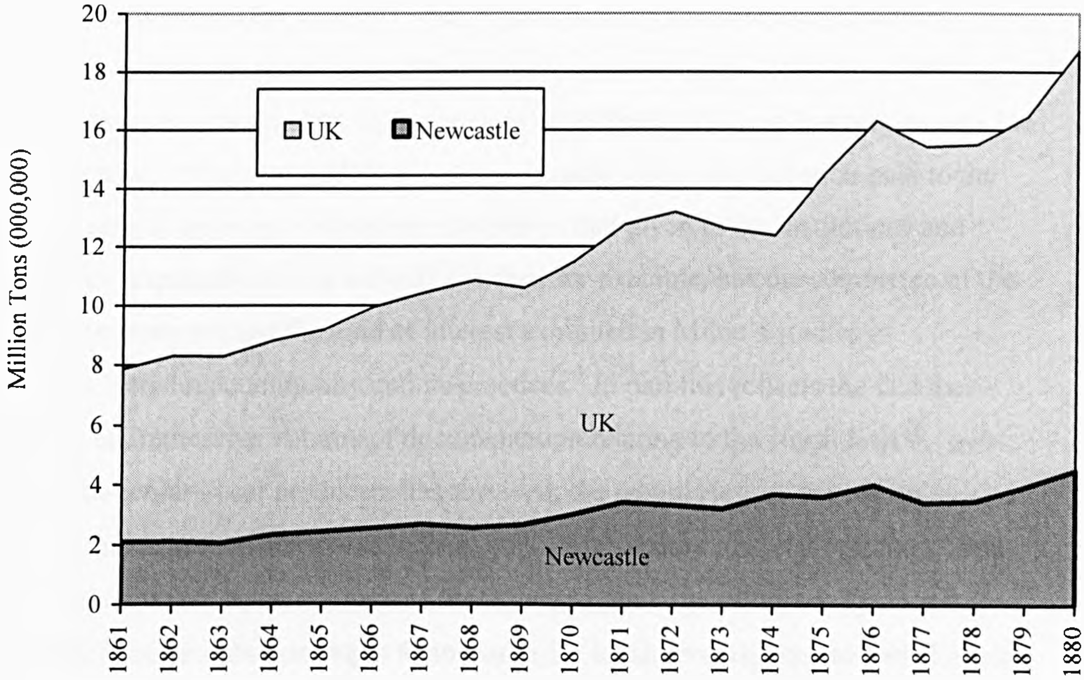

Chart 2.1 Coal Exports of the United Kingdom and Newcastle, 1861-1880
(Source: see Table 2.1)

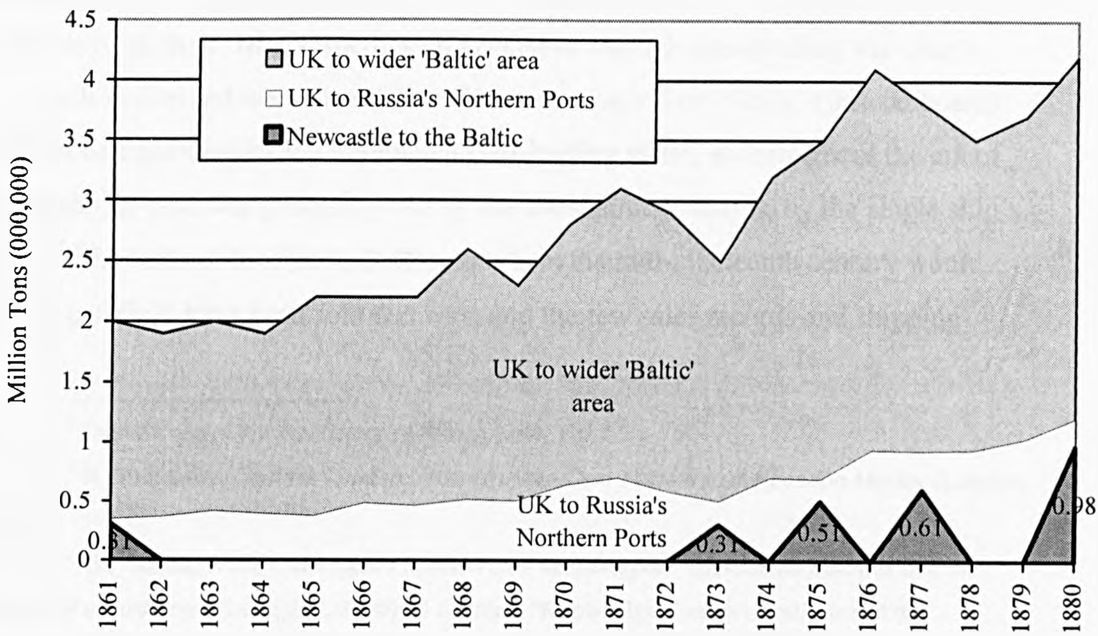

Chart 2.2 Comparative Trends in British Coal Exports, 1861-1880
(Source: see Table 2.3. Note – 'Newcastle to the Baltic' exports shown for 1861, 1873, 1875, 1877, and 1880 only)

CHAPTER 3: COAL TRANSACTIONS FOR THE BALTIC, 1861-1880

The shipment of coal for export is often regarded as a given, but even a cursory examination of the trade in coal indicates that it was a complex matter executed by closed groups of practitioners. Although works on the British coal industry outline the broad patterns of the coal trade's export transaction chain,[1] the attention paid to the nation's coastal trade in coal has far outstripped that given to the institutions and companies responsible for its export.[2] Neither, for example, has the commerce of the North East ports excited the kind of interest exhibited in Milne's studies of Liverpool's trading community and its practices.[3] In part this reflects the fact that although an impressive volume of documentation relating to the North East's nineteenth-century coal producers has survived, the records left by the region's shippers and exporters are sparse indeed: very little primary material pre-dates 1900. Nevertheless, aided by an analysis of the informed (and often statistically detailed) commercial comments that began to appear in the local newspapers and trade journals of the time, sound inferences may still be drawn from reliable secondary sources.

Consigning Coal for Export

Traditionally, collieries sold much of their output in relatively small parcels, either direct through their 'fitters' (dedicated agents) or through intermediary merchants. The coals concerned were then delivered overland at a fixed 'f.o.b.' (free on board) price to be transshipped at a nominated coal-loading staith, so throughout the era of sail seaborne coal was generally sold by the consignment, that is, by the single ship's cargo.[4] The bulk of the Tyne's Baltic exports in the mid-nineteenth century would almost certainly have been sold this way, and the few sales records and shipping

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[1] In particular, Church, *History of British Coal, Vol.3*.

[2] R. Smith, *Sea-Coal for London: History of the Coal Factors in the London Market* (London, 1961).

[3] G.J. Milne, *Trade and Traders in mid-Victorian Liverpool: Mercantile business and the making of a world port* (Liverpool, 2000); G.J. Milne, 'Knowledge, Communications and the Information Order in Nineteenth-Century Liverpool', *International Journal of Maritime History*, XVI, No.1 (2002), pp. 209-24.

[4] Church, *History of British Coal, Vol.3*, p. 75; initially, sale by consignment was adopted even for selling railway-delivered coals.

manifests that survive support this conjecture.[5] Although the placement of large-scale coal contracts by the gas industry and major urban buyers became a significant feature of Britain's domestic market during the third quarter of the century, such methods are generally regarded as having had less significance for exporters.[6] For them, the daily market trade at Newcastle's Coal Exchange – which included forward buying – remained of great importance.

Nevertheless, even by the early 1860s there were indications of a movement towards the placement of bulk export orders in the Tyne's Baltic trade.[7] Twenty years later, in 1880, these demand-led moves towards the placement of bulk export orders seem to have become more marked.[8] Early 1880 saw 'considerable contracts to supply steam coals to the Russian Ports of the Baltic [already] under negotiation', whilst gas companies in Riga and Moscow respectively placed orders for 10,000 and 80,000 tons of Durham gas coals for export from the Tyne.[9] Such large-scale contracting took place two to three months in advance of the Upper Baltic's 'first open water', whilst there was a corresponding rush of activity during mid-September in order to 'complete [the summer's] contracts before the end of the season'.[10] From the point of view of shipping tonnage supply these forward contracts helped shipowners to plan the future use of their ships, and such a hedge (at pre-determined freight rates) could help tide them over unpredictable flat periods in the spot market. For example, in mid-May 1880 an assassination attempt upon the Russian Czar resulted in political uncertainties that reduced the many Tyneside merchants and shipowners engaged in the Cronstadt trade to 'a hand to mouth existence', leaving them temporarily reliant

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[5] NCL, Local Studies Collection, Accession No. 498043A, *Export Book No.1* (1854 -1856); records of a Quayside merchant (possibly Leidemann & Co.) specialising in chemicals and coal. NCL, Local Studies Collection, R. Balmer, 'The Life of John Herron, 1816-1895', unpublished typescript.

[6] Church, *History of British Coal, Vol.3*, p. 80.

[7] For example, *NDC:* 23 July 1860, annual procurement of 35,000 tons of coal for St. Petersburg by Russian Government; 24 June 1861, tender for 25,000 tons of locomotive coal by Grand Russian Railway.

[8] Milne, *North East England*, chapter 6; also notes the trend towards large-scale purchase by contract.

[9] *NDC*, 15 January 1880, 6 February 1880.

[10] *NDC*, 15 September 1880.

upon contracts and shipping charters for gas coals, steam coals and coke that had been cautiously concluded at an earlier date.[11]

The regular market trade in coal though, remained the principal concern of the majority of the Tyne's Baltic exporters. This fact is reflected by the sheer numbers of intermediaries engaged in the business, together with the concern shown in the local press for real-time reportage of the continually fluctuating (and subtle) shifts in coal prices, tonnage supply and freight rates. The advantages which accrued to the main producers, the big coalowners, through engaging groups of day trading and speculative 'middlemen' in the export transaction chain are spelt out by Church:

> ...because of the greater risks relating to freight rates and price movements in the foreign markets, middlemen continued to play the central role in the export trade; in general, most colliery owners owned neither ships, agencies, nor depots, preferring to sell f.o.b. It was left to the merchants to undertake the financial risks contingent upon freight fluctuations and the mode of c.i.f. [cost includes freight] payment, to familiarize themselves with the various markets, to supervise the mixing of coals at the docks, and to undertake arrangements for chartering ships, loading, and for discharge at points of delivery.[12]

Given Church's overview, it is of value to test his generalizations against a full consideration of the Tyne's Baltic export trade during the two sample years under review, 1861 and 1880 (particularly the latter, for which greater commercial detail exists). However, in comparing Church's general principles of the export trade with Tyneside's own Baltic practices, regard must be paid to the regional peculiarity that the relationship between the coalowners and middlemen in the Great Northern Coalfield was not an untrammeled one. Even in 1880 the export transactions of some collieries were still tied to the historic (coastal trade) system of fitters – their own retained agents.

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[11] *NDC,* 13 May 1880.

[12] Church, *History of British Coal, Vol.3*, p. 80.

The Overseas Dimension: Northern Europe

Since market development was crucial to the successful prosecution of Baltic exports it is important to observe that, as with Newcastle's Merchant Adventurers before them,[13] Tyneside's nineteenth-century middlemen traveled abroad in order, as Church puts it, to 'familiarize themselves with the various markets'. A couple of instances from 1880 suffice: in mid-January it was noted that more Newcastle agents were out seeking 'continental business than ever before', and a month later there were 'several Newcastle merchants on the continent and in Russia, and foreign merchants are now on the [Newcastle] Quayside'.[14] That similar references are absent in 1861was probably because lesser weight was then given to commercial reportage together, maybe, as a result of the travel difficulties caused by political instability in Prussia and Poland.

The intimate commercial relations enjoyed with the Baltic in 1861 were contrasted favourably to those of other, more distant, trades: 'with the United States, Italy, and the ports in the Black Sea, the Tyneside merchants, no doubt, conduct much valuable commerce; but with none of these countries do they come in such daily contact as with the towns on either side of the Baltic.'[15] Although difficult to quantify, much of that 'daily contact' resulted from the mobility of individuals at both an international and a regional level.[16] For instance, what might be regarded as North European surnames were exhibited in around one-quarter of the titles of businesses engaged in Baltic exporting both in 1861 and 1880. And, since some two-thirds of the exporting partnerships extant in 1861 had disappeared by 1880, the implication is that this influx of North Europeans was ongoing, representing a dozen or so new entrants over 20 years. Admittedly, some inmigrants founded relatively small Baltic-based businesses only, as with Maxfield, Bahlrus and Co. (est.1876), but others, most notably A. P. Andersen (a founding partner in Nielsen, Andersen and Co., est.1869),

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[13] M. Ridley, *The Merchant Adventurers of Newcastle upon Tyne* (Newcastle, 1998).

[14] *NDC*, 6 January 1880, 17 February 1880.

[15] *NDC*, 21 January 1861.

[16] TWAS, DTE/NCE/6/1, *Strangers Book of Newcastle Exchange*. 1880's entries include eight Russian and one Baltic German merchant and, by comparison, 1873's six Low Baltic Germans and three Russians (all from port towns).

became prominent outwith the Baltic trade itself.[17] Indeed, the mutually beneficial employment of respectable foreign 'volunteers' in Newcastle's coal shipping offices was well recognised practice:

> It has always been the custom among coal exporters on the [Newcastle] Quayside to take into their offices young men from coal importing firms on the Continent for varying periods. These were normally known as 'Volunteers' and the idea was primarily to give them the basic knowledge of how the trade was run... and to see how we organized ourselves here... It is quite true that the volunteer of today can be the managing director of tomorrow and it is of great help when conversing with a businessman abroad to know that he fully understands this end of the trade and appreciates its problems. Such contacts can indeed be valuable in the long run.[18]

The need for business networks, the establishment of personal trust, and an engagement in foreign travel were much the same principles that had guided the commercial success of the eighteenth-century Newcastle merchant Ralph Carr in respect of his European dealings.[19] On a much broader front these practices, as employed by Tyneside's eighteenth and nineteenth century coal exporters alike, helped contribute to that 'near monopoly of European coal markets at mid-century [nineteenth], which established connections only broken with some difficulty by later competitors.'[20]

Some, at least, of the Tyneside-based consignors of North European origin in 1880 enjoyed special relationships with particular Baltic regions and ports, as was the

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[17] Anon., *Tyneside Industries. Tyneside, Newcastle and District. An epitome of results and manual of commerce* (Newcastle, 1889), p. 134; A.G. Osler, 'Newcastle's West Jutland Trade: The formative years, 1870-1914', in E. Damgaard, M. Guldberg, and P. Holm, eds., *A North Sea Region: West Jutland and the World, II* (Esbjerg, 1998).

[18] Harbottle, *Quayside* Life, p. 54.

[19] Bill Purdue, 'Ralph Carr: a Newcastle Merchant and the Baltic Trade in the mid-eighteenth century', in P. Salmon and T. Barrow, eds., *Britain and the Baltic: Studies in Commercial, Political and Cultural Relations 1500-2000* (Sunderland, 2003).

[20] Palmer, 'British Coal Export', p. 336.

case of Jonassohn, Wiener & Co. (ranked 4th; 66,195 tons). They placed particular emphasis on the Lower Baltic region, in particular servicing its smaller – and generally declining – ports through the employment of German-owned sail. Even more unusually, they regularly consigned steamers with full coal cargoes direct to Stettin town. Although Cronstadt absorbed the greater part of the coals consigned to the Upper Baltic, there were significant subsidiary markets elsewhere around the Gulf of Finland. In 1880, Bessler, Waechter & Co. (ranked 12th; 19,664 tons) dispatched over 10,000 tons direct to St. Petersburg, half the Russian capital's direct ship-borne imports from the Tyne. At Helsingfors, the long-established Newcastle merchant R.Thiedemann (ranked 14th; 15,727 tons) held sway, with over half the weight of coals consigned, whilst the relatively new partnership of Borries, Craig & Co. (ranked 11th; 21,873 tons) supplied another quarter – and the same proportion at the burgeoning port of Reval.

An essential component of forecasting and responding to demand was the middleman's intimate understanding of products, quality and cost. This is well illustrated by a series of remarks upon trends during the 1880 season when it was recognised that 'Durham second class and coking coals are [now] selling for the Baltic. This is somewhat of a new feature in the coal trade. Foreigners are evidently buying more of these sorts'. And it was projected that, although the Baltic merchants held good (mid-summer) stocks, future prospects for demand were bright since 'our north country coals are elbowing them [the German coalowners] out of the Baltic market'.[21] Conversely, a demand for lower-priced 'second class' coals from other coalfields (principally Scotland) had arisen since Baltic consumers were now using them 'in lieu of the high class [North East] coals which previously monopolised the Baltic market'.[22]

Despite the fact that in Germany competition was soon to be expected from its domestic mines, Tyneside merchants of the late 1870s were confident of retaining their position as that nation's main source of supply. In 1878 it was reported that Westphalian-mined coal was more expensive than British even in the German North Sea ports, whilst along the Baltic littoral itself 'all efforts to get a more extended market for the Silesian coal in the East Sea [Baltic] Provinces were rendered

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[21] *NDC,* 15 June 1880.

[22] *NDC,* 31 May 1880.

unavailable by the high transport dues and, in Stettin alone, was there any trace of former activity'.[23] The maintenance of low shipping costs, rather than just cheap pit-head prices alone, was the key to Tyneside's primacy in the Baltic coal market.

Although British pit-head prices had a competitive edge over German and French coals in the 1860s,[24] it was the continuing ability of British exporters to effect North European deliveries with steady reductions in port-to-port costs that supported British coal's advantage in the marketplace. Such reductions were of exceptional benefit when dealing with a low-value commodity whose seaborne transport costs (per unit) approached, or even exceeded, its production costs. In 1861 when pit-head prices were around 5s. per ton the cost delivered to the shipping staith was generally slightly less than 10s. f.o.b. (i.e. including overland costs), meanwhile the freight rate to Cronstadt commonly stood at 12s.3d.[25]

By 1880, the differential between seaborne transport costs and production costs had been reversed. Absolute freight costs had been reduced to the extent that, typically, they now lay 20-30 percent below coal's (little-altered) commodity price. In advance of the 1880 Baltic season, Tyneside merchants were paying a little under 10s. per ton for 'best steam coals' whilst rightly anticipating that the early season (premium) freight rates for Cronstadt would be about 7s. per ton.[26] Rates for the nearer Baltic ports were lower, with Swinemunde from 5s.6d. to 5s.9d. at a time when contracted 'gas coals' were priced around 7s.6d. per ton (f.o.b.). However, although freight costs declined (both in relative and absolute terms) between 1861 and 1880, the actual freight rates applied were far more volatile than the commodity price.[27]

In part, at least, this stable commodity price resulted from the actions of the region's major coalowners who – since they were few in number – might exercise

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[23] J.B. Simpson, 'An Account of the Mining Industries of Prussia', *Transactions of the North of England Mining and Mechanical Engineers*, XXVII (1878). Even Germany's subsequent rail subsidies did not overturn British coal's dominance.

[24] Kennedy P., *The Rise and Fall of the Great Powers* (New York, 1988), p. 232.

[25] Commodity and freight quotations in the commercial columns of the *NDC*, 1861, indicate: 12s 3d (£13 per keel of 21.2 tons). 'All Exports', cited in, B.R Mitchell and P. Deane, *Abstract of British Historical Statistics* (Cambridge, 1962), chapter XVI, Table 8, gives: 9.19 shillings, f.o.b., 1861.

[26] *NDC*, 28 February 1880.

[27] Church, *History of British Coal, Vol.3*, p. 54, Table 1.9; for example, the (indexed) pithead price for British coal was exactly the same in 1881 as in 1861.

direct control over supply volumes, using to advantage the resultant, if slight, variations in pit-head price. The simple technique of manipulating production levels often achieved their aims (as with OPEC today). For example, in order to keep pits working during mid-winter when exports were slack they would offer substantial discounts in order to encourage merchants to conclude forward buying deals. But as pre-season demands increased the same pits might, within just a week or two, reverse their position, holding out for higher prices or turning away their former buyers.[28] This leverage on supply was especially marked when commercial (or political) intelligence suggested heightened demand during the coming season.

Speculative buying by exporters could yield good profits, or go badly awry. For instance, late in September 1880 it was rumoured that W.J. Taylor and Co., a well-regarded Newcastle firm of brokers and minor shipowners (ranked 7th; 44,194 tons), was in 'stoppage' (i.e. insolvent) as a result of having failed to find 'a ready market' for the large forward purchases of coke they had made for the Baltic season.[29] Contemporaries sympathized, comforting themselves that all but one of Taylor's creditors were 'substantial houses' and that there would be no further business failures – confirming the robustness of the internal credit system operated by Newcastle's Quayside merchants. Taylor's had, for whatever reason, concentrated their activities for 1880 in an unusual way. Firstly, its exports of coke almost equalled those of coal, a curious balance, for few (non-manufacturing) consignors normally shipped more than a fraction of their total exports as coke. Secondly, they had positioned themselves to ship virtually half (21,761 tons) of the Tyne's entire Baltic coke exports – more than three-quarters of it to Cronstadt (15,558 tons) and Riga (2,799 tons) alone.[30] This was an extraordinary level of concentration and, although they had successfully cornered a very large share of a specialist market, they had very badly miscalculated demand and/or buyer resistance.

In general, however, merchants and shippers seem to have been content to work on the steadier margins that arose from two recognised premises. Firstly, that the price of coals for export would vary around seasonal norms rather than fluctuating

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[28] *NDC*, 23, 27 January, 1880.

[29] A company rated as 'good' to 'very good' as a credit risk in the *Newcastle District and Hull Commercial List*, Estell & Co. (London, 1876).

[30] Compiled from, *NBESL*, 1880.

wildly,[31] and secondly, that freight rates would shift rather more irregularly in response to short term uncertainties that included: local economics; weather; and, international politics. All three of these short-term factors can be demonstrated to have influenced freight rates during the 1880 season, whilst the general run of mercantile events well illustrates Church's salient point that it was not the coalowners, but the middlemen and shipowners, who sustained the export trade's major risks – or occasionally reaped its rewards.

The Consigning Community and Change, 1861-1880

Although the companies that consigned coals to the Baltic and the volumes that they handled are relatively easy to delineate, any assessment of the commercial role (or roles) played by individual firms is far more circumstantial. In particular, attempts to track the production source of a consignor's shipments generally prove nugatory owing to the loss of commercial records.

Considering the threefold increase in exports to the Baltic between 1861 and 1880, it is surprising to find that the numbers of businesses engaged in consigning coal remained little changed over that period: 1861, 96; 1880, 93. This suggests that market mechanisms limited the number of intermediaries that might, at any one time, find profitable occupation in the transaction chain that linked the coalfield's producers to the principal buyers in the Baltic. It does not, however, reflect stability within the consignor community, far from it. Of the 96 companies or individuals that cleared consignments in 1861, only 27 can be traced (directly or indirectly) right through until 1880 with certainty. At best this suggests continuity for only 30 percent of consignors, and wholesale changes also occurred in the trade's leadership (see Table 3.1).

However, these alterations in relative status took place against a background in which the overall number of significant participants changed little: in 1861, some 75 percent of all coal exports to the Baltic were consigned by just nineteen firms, and, in 1880, the same proportion was handled by fifteen. Nevertheless, remarkable changes had occurred in the leading group. Of all of the consignors present in the top-ranking list of 1861 only one relatively lowly placed firm, R. Thiedemann, remained in the equivalent list for 1880. In addition, it is apparent that the nine leading consignors of

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[31] The only real exception to this predictability, 1860-1880, was the short-lived but highly publicized 'coal famine' of the early 1870s.

1861 who continued until 1880 suffered significant loss of standing – ten of 1861's top nineteen had disappeared from the Baltic, or any, trade.

Table 3.1 Leading Consignors of Coal Products, 1861 and 1880
(rankings)

Consignor Company: 1861	Rank, 1861	Rank, 1880	Consignor Company: 1880	Rank, 1880	Rank, 1861
Hunter and Erichsen	1	17	Pyman, Bell and Co.	1	
Palmer, Hall and Co.	2	13	Milburn W. and Co.	2	P56
Hutchinson W.J.	3		Reay J.	3	
Schmalz G. and Co.	4		Jonassohn and Wiener	4	55
Swan R. and Co.	5	31	Cory, Lohden and Co.	5	
Dickinson W.	6		Fawcus H. and Co.	6	
Carr J. and Son	7		Taylor W.J. and Co.	7	
Rogerson J. and Co.	8	64	Adler and Proctor	8	
Gray A. and Co.	9		Hall J.R. Bros.	9	
Harris A. and Co.	10		Ridley J., Son and Tully	10	24
Bilton, Williams and Co.	11	20	Borries, Craig and Co.	11	P22
Lotinga and Co.	12		Bessler, Waechter and Co.	12	
Thiedemann R.	13	14	Palmer, Hall and Co.	13	2
Geipel and Co.	14	21	Thiedemann R.	14	13
Stevenson, Vermehren Co.	15	81	Joicey J.and Co.	15	74
Intelmann, Rose and Co.	16				
Christiansen, Schier Co.	17				
Clapham H.	18				
Fedden Bros.	19	46			

Note- Prefix P, column 6, indicates companies (of 1880) in which one of the principals was active for a different partnership in 1861.

Compiled from *NBESL*, 1861, 1880

By comparison with this, half of the fifteen top ranked consignors of 1880 were relative newcomers to Newcastle's Baltic trade (i.e. they entered post-1861) and the remainder – nearly all of whom had been minor participants in 1861 – had risen markedly up the rankings since then. (see Table 3.1) The bulk of the Tyne's coal consigning business to the Baltic had thus changed hands during a twenty-year period, and there had been a substantial alteration in the transaction community in less than one business generation. It may be concluded that the processes which underlay these changes indicate a radical structural shift in the export chain, not an evolutionary one. However, it is difficult to isolate the commercial (or human) factors that drove these changes, for evidence is sparse and circumstantial. Nevertheless, examination of what is known about the various consignor groupings sheds light upon potential causes and mechanisms between 1861 and 1880. And it is apparent that these consignment changes also elicited direct responses amongst the shipowning fraternity.

Collectively, it would seem that the major consignors of 1861 were companies whose partners had firmly established roots within the traditional commercial fabric of the seaborne-centred coal trade of Newcastle Quayside. This was so even for those of foreign antecedence where, for example, individuals such as George Schmalz or Charles Lange (Lange Bros. and Leidemann and Co.) occupied Newcastle's consular positions for important Baltic territories.[32] Unfortunately, the exact nature of the individual businesses engaged in the Baltic coal trade in 1861 is rarely clear cut, but even cursory examination indicates that the majority acted as brokers and/or as merchants. Brokers were specialised agents who took a fixed percentage of a ship's gross freight receipts in return for negotiating its charter party, i.e. the contract of hire between a shipper (nominal cargo owner) and a shipowner.[33] Merchants took the calculated risk of profiting by the sale of coal consignments purchased on their own account. Customarily, foreign buyers bought from Newcastle's merchants on an f.o.b. basis, undertaking to arrange shipment, usually through Tyneside brokerages, themselves; the agreed freight costs were then paid out (usually by bill of exchange) to the carrier, the shipowner, upon delivery at a nominated port abroad.

[32] Schmalz for Prussia, and Lange – who had become a British subject in 1846 – for Mecklenburg.

[33] The cargo remained the property of its (rarely identified) sellers and buyers.

In addition to the brokers and merchants, some consignors engaged in shipping coals in the Baltic trade were 'fitters', sole agents dedicated to servicing the sales of a single colliery or a group of collieries worked under one ownership. Fitters generally extended the formal transaction chain further, to the final point-of-sale, working through a series of factors or retained agents in principal ports elsewhere. And a fitter's reward was usually tied to the tonnage handled or the values realised by sale.[34] However, despite the fact that nearly a quarter of all Baltic consignors were designated as fitters, genuine fitters handled only slight volumes of such exports in 1861.[35] In reality, the fitter's once-exclusive trade was already (1861) becoming less clear cut, as was tacitly acknowledged by a local Directory's advice that 'Nearly all Ship and Insurance Brokers fit [arrange specific] Coals to order.'[36]

It was companies that advertised their services as 'Brokers', not 'Fitters', who preponderated in the Baltic export trade in 1861, with 42 out of the 93 companies clearing coal consignments content to adopt that description. A couple of dozen of consigning companies were cited as 'Merchants' pure and simple, but the picture was a complex one, for a similar number of brokerage firms offered dual services: as merchants and brokers. Coal consignors rated principally as coalowners or manufacturers were greatly in the minority (seven and four of each), and no coalowners appeared in the leading group of nineteen consignors. Surprisingly perhaps, the coupling of timber importing – or merchanting – with coal shipping was uncommon, featuring prominently in the activities of only one top-ranked partnership, Palmer, Hall and Co. (ranked 2nd). Linkage through corn merchanting was actually more frequent of occurrence, and a couple of designated 'Corn Merchants' appeared in the leading Baltic coal consignors: R. Swan (ranked 5th) handled coals outward to Russia together with some parcels of Baltic cereals inwards, whilst R. Thiedemann (ranked 13th) concentrated his coal exports to Lower Baltic and Finnish ports with rare cargoes of German wheat inward.[37] Some consignors showed a much more diverse approach to commerce than was shown by any of the regular merchants or brokers.

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[34] Church, *History of British Coal, Vol.3*, p. 72.

[35] The three fitters amongst the top ranking nineteen exporters supplied 16% of total Baltic exports between them (probably even less, for two operated independent brokerages).

[36] *Ward's Directory: Newcastle, Gateshead* etc., 1861 (Newcastle, 1861), p. 439.

[37] Swan's activities characterise the export/import imbalance: 45 cargoes of coal outwards and only four part-cargoes of wheat and peas inward.

An entrepreneur like John Rogerson (ranked 8th) was not only the successful fitter for a company that became a leading coal and iron producer (Weardale Iron and Coal Co.), but also maintained a substantial holding in one of Tyneside's pioneer industries – iron shipbuilding – proving to be an innovative shipowner too.

Nonetheless, the extension of a top ranking Baltic consignor's interests into shipowning was the exception rather than the rule and only a handful appear amongst the (admittedly imperfect) contemporary, classified listings of shipowners.[38] Sampling of the middle- and lower-ranked consignors reveals that the practice of holding shares in Newcastle-registered sailing ships was relatively uncommon, comparatively no more so than amongst other Tyneside business and professional groups at the time.[39] This seems to have been true even where consignors were of moderate wealth and likely commercial disposition, as with the successful fitter and coal merchant J. O. Scott (ranked 35th). His family's practice of maintaining shareholdings in 'coal and Baltic traders' declined throughout the 1850s and finally lapsed entirely,[40] although his affairs as a fitter, then coalowner, and (secondarily) as an investor in steam colliers prospered later.

There was considerable separation between the occupations of small-scale shipowning and brokering in Newcastle in 1861.[41] This was reflected not only in the rarity of brokers' shareholdings in ships, but also in the mutual antipathy that appears to have existed between the two groups. The conflict was so severe that in the 1840s and 1850s it encouraged a local shipowner, Ralph Darling, to wage a public campaign against the 'Evils of the Broking System'.[42] Even for a region whose particularist

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[38] Occupational analyses based on entries in, *Ward's*, 1861: pp. 13-14, 112-25, 156-61, 438-61, 500-509. In 1861only one top consignor, Richard Swan, effected the Baltic clearance of a self-owned, Newcastle-registered ship (*Lucy* for Cronstadt).

[39] A one-in-three sample of such consignors designated 'Merchants' indicates no more than sparse coincidence with the comprehensive listings of Newcastle-registered ships' shareholders in: Keys, *Dictionary*. S.P. Ville, 'Patterns of Shipping Investment in the Port of Newcastle Upon Tyne, 1750-1850', *Northern History*, XXV (1989).

[40] Keys, *Dictionary*; entries for J.O. Scott and his father.

[41] Only one in 120 Newcastle-registered vessels (*Ivy Green*) that sailed for the Baltic in 1861 had owners designated as 'shipbrokers'. Nevertheless, two of the Tyne's most successful shipowners, James Knott and William Milburn, used brokerage as an entry point during mid-century.

[42] Ralph Darling, a Blyth shipowner with London partners, commenced a public campaign in the short-lived radical newspaper *Tyne Pilot*, 1842, supplementing it with his pamphlet, *The Coal*

shipping interest had been promoted by Gardner's public broadside,[43] Darling's polemic against brokers ('harpies' and 'vampires') was extraordinarily vituperative. But his arguments were also unusually (if colourfully) descriptive of day-to-day transaction practices:

> Suppose you want a freight ... you apply to one of a swarm of loungers that crowd our [Newcastle] Quayside, called brokers. You are invited to accompany him to a dirty chare [alley], court [courtyard]or passage, and after toiling up half-a-dozen flights of old, mouldering stairs, you arrive at a dungeon-looking room, which he elevates by title of an office, and there you commence business, which, when concluded... should you send your ship to France, or to the Baltic... you are charged 2½ percent by the broker who charters you, then 2 percent on the charter-party, which is termed 'address money', but more properly 'distress money', then again, on the same charter, you are charged 2½ percent more by the broker at the port of discharge, for transacting your business, or rather, we should suppose, of taking care of his own; so that you have to pay no less than 7 percent on the gross amount of your freight, merely to go to a French port, or to the Baltic.[44]

Darling elaborated on this last topic: the brokerage differentials that existed between ships chartered for export and domestic runs. For example, although seven percent was the normal charge for a Baltic voyage, a ship making a coastal or London trip paid just two and a half percent. But he considered even the coastal charge unwarrantedly high because, as he strenuously pointed out, the brokerage charge always had to be met 'whether you [the shipowner] make any or no profit by your voyage', whilst the broker, with his fixed charge, took no such trading risk. He

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Trade No.1, Exposure of the Unprincipled Conduct of the Newcastle Coal and Quayside Trade, etc., North Shields, 1842.

[43] Ralph Gardner, *England's Grievance Discovered in Relation to the Coal-Trade* (North Shields, 1655).

[44] R. Darling, *Darling On Shipping, Showing The Evils Of The Broking System*, etc. (Newcastle, 1853), pp. 16-17.

scathingly argued that this system of fixed charges encouraged slack practices (or willful malpractice) amongst brokers engaged in the export trades.

He considered that it was particularly inequitable that no loss was incurred by a Quayside broker when, upon arrival in a foreign port, a ship's master found out that the broker's nominated foreign counterpart was an unreliable individual who did not show up, or proved to be a 'man of straw'. Both were commonplace, and not only occasioned the ship's master costly uncertainties of discharge but often left the shipowner bereft of his freight monies. Most shipowners had no (affordable) means of redress against these Newcastle brokers and, furthermore, none of the brokers' practices were transparent.[45] Notwithstanding this, and despite all the pitfalls, the established transaction chain meant that a shipowner of average means had no real alternative but to employ a broker to negotiate the chartering of his ship, and this was particularly so when foreign parties were involved.

Rather less controversial was Darling's mildly pejorative description of the archaic environment in which Newcastle's brokers then worked (1853). Although the 'Great Fire' of Newcastle Quayside was to destroy the appalling slums at its western end in 1854, thus opening the way for that area's redevelopment as a commercial centre, the eastern Quayside remained in a quasi-medieval state until the mid-1860s. The antiquated premises of Baltic consignors such as H.T. Allan (fitter) and Featherston and Elder (coal consignors, Russian hemp importers, and merchant services) well illustrate this.[46] Following 1854's event, both firms removed to accommodation in the older, not the redeveloping, areas of the Quayside and, significantly, neither survived as Baltic consignors until 1880. Their fate reflects the broader alterations that occurred amongst the Quayside's Baltic practitioners and the changing nature of the Quayside business environment between 1861 and 1880.

It is concluded that, in respect of the Baltic trade at least, the mid-1860s saw significant new entrants and notable partnership changes amongst coal consignors, and, that these moves were accompanied by the growth of a small group of well established businesses (see Table 3.2).

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[45] Darling, *Darling On Shipping*, pp. 1-4. For instance, despite a legally binding charter party, few shipowners (or masters) knew who really owned the cargo of coals for which they took absolute responsibility.

[46] I. Ayris and P. Sheldon, *On the Waterfront: an Historical Tour of Newcastle's Quayside* (Newcastle, 1995); p. 20, 22.

Table 3.2 Leading Consignors of Coal Products, 1880
(rankings; tons; percentage)

Rank	Consignor	[47]Roles	Coal (tons)	Coke (tons)	Total (tons)	Percent (%)
1	Pyman, Bell and Co.	B, E, F, M, S, T	155989	4086	160075	16.4
2	Milburn W. and Co.	B, E, S	97945	0	97945	10.0
3	Reay J.	F, S	80274	0	80274	8.2
4	Jonassohn and Wiener	C, E	66130	65	66195	6.8
5	Cory, Lohden and Co.	B, F, S	52482	555	53037	5.4
6	Fawcus H. and Co.	E	49627	0	49627	5.1
						51.9
7	Taylor W.J. and Co.	B, S	22433	21761	44194	4.5
8	Adler and Proctor	M	36544	0	36544	3.8
9	Hall J.R. Bros.	E	30357	286	30643	3.1
10	Ridley J., Son and Tully	B, M	25962	0	25962	2.7
						66.0
11	Borries, Craig and Co.	B, E, M, T	20239	1634	21873	2.2
12	Bessler, Waechter and Co.	E	18184	1480	19664	2.0
13	Palmer, Hall and Co.	E	16850	297	17147	1.8
14	Thiedemann R.	M	14912	815	15727	1.6
15	Joicey J. and Co.	C, F	14967	0	14967	1.5
						75.1

Compiled from: *NBESL*, 1880; *Ward's Directory*, Newcastle, Gateshead etc., 1881, 1882; *Newcastle District and Hull Commercial List*, 1876; *Jackson's Directory: Newcastle, Gateshead* etc., 1880.

[47] B, Broker; C, Coalowner; E, Coal Exporter; F, Fitter; M, Merchant; S, Shipowner (not minor shareholder); T, Timber Merchant. From the late 1870s onwards, local directories listed the specific designation 'Coal Exporter', rather than 'Broker' and/or 'Merchant'.

Collectively, the companies concerned were to take a leading role in Baltic and other coal exports by 1880, and there were increasing signs of concentration: half of all the Baltic exports of 1880 were handled by just six consignors (against eight in 1861), and three-quarters by only fifteen (against eighteen in 1861). Firms drawn from the upper echelons of this leading group proved largely able to dominate Tyneside's wider coal exporting scene right up until 1914.

Leading Consignors, 1880

Notwithstanding the emergence of this new group of leading consignors, the companies concerned no longer formed a particularly homogenous body in terms of their origins, growth and activities. Although the top five consignors of 1880 all had partners with substantial interests in shipping, as a group their relationships with shipping interests (if any) plainly varied.[48] On the other hand, two of the major regional families involved: the Joicey's and the Jonasson's, were primarily coal producers, looking to assure outlets and accrue benefits through the integration of their production with the broking (or fitting) of their own coals. But this in turn encouraged the development of links with other individuals who were more directly concerned in ship ownership and ship management.

J. Joicey and Co. (ranked 15th; 14,967 tons) were leading exponents of a production-based shipment regime for they acted as fitters for all of their own Baltic-bound coals. Despite the fact that these were shipped exclusively in British steamers there is no evidence that the Joicey's extended their integration into direct holdings in Baltic-bound steamers. Nevertheless, nearly half their Baltic cargoes were shipped in vessels belonging to owners with whom they had taken up coastal coal trade shareholdings during the 1860s: the Fenwick's of London, and Cory's via Cory, Lohden and Co. (West Hartlepool).[49] These owners' experience of the Home trade and the complementary nature of their ships presumably suited Joicey's specialist shipment needs for, in 1880, all the Joicey's (presumably contracted) Baltic exports were destined for Stettin and Swinemunde – half to Stettin direct. This required careful ship placement, with steamers carrying less than 1,000 tons stemmed for the

[48] In particular: George Pyman and Thomas Bell; William Milburn; J. Reay; J. Jonasson; the Cory's, and J. Lohden.

[49] J.A. MacRae and C.V. Waine, *The Steam Collier Fleets* (1st edition, Wolverhampton, 1990), p. 26, 49.

upriver city of Stettin, whilst the (mainly newer) ships loading 1,500 tons or more were despatched to its deep-water outport at Swinemunde.

John Jonasson (variously spelt) of Jonasson, Wiener and Co. (ranked 4th; 66,195 tons) was another consignor with large asset holdings in the Durham coalfield. His production-based approach appears similar to Joicey's and his exporting branch also specialised in exports to the Lower Baltic. The son of a coalowner,[50] Jonasson became the sole partner of George Elliot M.P., working a group of five north Durham collieries at a time when Elliot – one of Britain's greatest coalowning managers – was pre-occupied with interests in South Wales. Jonasson acted as fitter for two of these five collieries and, moreover, formed a coal exporting partnership with a 30-year old German immigrant, Martin Wiener, shortly after the latter's arrival in Sunderland (1865), setting up offices to handle Durham coals in both Sunderland and Newcastle.

Jonasson's financial interests extended into shipping related industries on the Tyne and the Wear, for he was a founding shareholder of an ambitious (and eventually very successful) new firm of engine-builders, the North East Marine Engineering Company Ltd. and, in similar fashion, he diversified more directly into shipping.[51] He and Wiener built up a special relationship with two of Sunderland's fastest growing steamship fleets, those of T.C. Stamp (est.1872) and Stamp's offshoot company, Gordon and Stamp (est.1877). In 1880, ships belonging to the two companies carried eighteen out of the 38 consignments shipped by Jonasson, Wiener and Co. to the Baltic in British steamers.[52] Wiener seems to have predicated the partnership's export pattern, for some two-thirds of their consignments were destined for German ports in the Lower Baltic, with particular emphasis on direct shipments to Stettin. Unusually, they also made considerable use of north European sail (principally German-owned), and despatched over one-fifth of their tonnage under

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[50] His father, David Jonasson, maintained a brokerage on Newcastle Quayside in the 1850s.

[51] J.F. Clarke, *Building Ships on the North East Coast, Part 2. c.1914-c.1980* (Newcastle, 1997), pp. 26-28. Jonasson was a founding shareholder of the North East Marine Engineering Company Ltd., and a boiler order from him helped them survive early financial difficulties. He also diversified directly into steam shipping, for example, holding 7/64ths in *Iduna* (550 tons), Newcastle; in 1880 she made a Baltic run for fellow coal consignors and shipowners Cory, Lohden.

[52] In 1880, members of Jonasson's and Wiener's families in Sunderland and London held shares in Gordon's steamers *Sybil* and *Harington*; these carried several Baltic consignments for Jonasson, Wiener and Co. during the year. By 1885 the two partners held on average 12/64th in each of Gordon and Stamp's dozen steamers, with Jonasson the nominated manager of *Julia Wiener* (628 tons).

sail. Wiener clearly exploited his German links throughout,[53] though nearer his adopted home he vigorously backed Jonasson's politically minded partner, Sir George Elliot (conservative), and actively participated in Sunderland's civic affairs and those of the River Wear Commission. At his relatively early death, in 1882, Johnasson and Wiener was noted as 'one of the largest coal exporting businesses in the north...[it] is also connected with two shipbuilding businesses on the river [Wear], mines in Yorkshire, and the North Eastern Marine Engine Works'.[54]

Another consignor who operated in direct association with a coalowning company was J. Reay (ranked 3rd; 80,274 tons). He and his partner, R.B. Fenwick of Merton, were joint directors of the Pelton Main Colliery Company. Reay was based at the colliery offices in the late 1870s although, by 1880, it was Fenwick (as successor to W.J. Hutchinson) who was installed as fitter at Exchange Buildings, Newcastle Quayside. Most importantly, between 1876 and 1880, Reay and Fenwick made a very bold investment in steam shipping, purchasing three newly-built cargo steamers: *Pelton*, 516 tons, 1876; *Spero*, 553 tons, 1878; and *Presto*, 637 tons, 1879.[55] Although under joint-ownership, these steamers were managed by Reay alone. As a gas coal colliery Pelton Main's major Baltic markets appear to have been in the cities of Cronstadt and Stettin/Swinemunde, two-thirds of Reay's consignments were destined for the former and one-fifth to the latter. Shipment by British steamer was much preferred,[56] with a strong bias towards chartering vessels owned on Tyneside or England's east coast (they carried over one-third of exports). The three 500-ton steamers under Reay's own management figured prominently, loading twelve of the 49 cargoes that were consigned in British steam, with *Presto* and *Spero* shuttling to Cronstadt and Stettin (direct) as circumstances required. Despite this heavy schedule, they also carried out single runs to Stettin under the auspices of Newcastle's premier Baltic consignors, Pyman, Bell and Co.

Whereas Joicey, Jonasson, and Reay were – to a greater or lesser extent – concerned with coalowning and the desire to maintain colliery production levels

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[53] Wiener became German Consul in Sunderland, volunteered medical relief during the Franco-German War, and was subsequently decorated by the German government.

[54] Obituary (source unknown), June 1882.

[55] All three steamers were constructed at Charles Mitchell's shipyard, Low Walker-on-Tyne.

[56] Though North European sail was employed for nineteen small cargoes consigned to the niche markets of Memel and Lübeck.

through the sale and distribution of coals for export, George Pyman's background and business thrust lay much more in the operation of ships. His presence signaled another element too, the successful intrusion of operators from West Hartlepool into the commerce of Newcastle Quay. Pyman, who came from a long-established family of Whitby seafarers, was a master in sail at 21 years of age (1843), gaining direct experience of the Baltic trade. Leaving the sea c.1850 he moved to the newly-developed port of West Hartlepool, setting up a shipbroking and fitting partnership (for the Weardale Coal Co.) with Thomas Scurr. They soon added shares in sailing ships and steamers to their business interests, together with the full ownership of several old sailing colliers. After Scurr's early death (1861), Pyman continued in his own right as a shipowner and, notwithstanding his origins in sail, he quickly recognised its growing vulnerability, even in the export trade. He ordered his first (Hartlepool-built) 600-ton steamer in 1867, and such was his trading success that fifteen new-built steamers, many of well-deck configuration, were acquired over the next seven years.[57] Prior to this, in 1864, he had broadened his commercial reach by establishing a brokerage business on Tyneside (1864) to which (c.1870) he had added the complementary activities of fitting Durham coals and timber merchanting – together, of course, with shipowning. From the outset his Newcastle office was managed by Yorkshire-born Thomas Bell, an experienced (formerly Hartlepool-based) relative of his late partner, Thomas Scurr. After Bell's promotion to a full partnership in 1873 the Newcastle firm was re-styled Pyman, Bell and Co., with Pyman's third son, James, joining as third partner. The Pyman family's hold was further consolidated, as were its shipping interests, when this Newcastle firm commenced ship management and ownership in its own right, partly through the transfer of vessels from the parent company, George Pyman and Co. (Hartlepool). Later, in 1879, a branch of Pyman, Bell was established in Hull to pursue complementary activities.

To Thomas Bell has been attributed what was, arguably, the late-nineteenth century's most significant commercial innovation in the export of coal from the Tyne, the introduction of 'charge includes freight' (c.i.f.) consigning – of which Pyman's

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[57] P. Hogg and H. Appleyard, *The Pyman Story: Fleet and Family History* (Hartlepool, 2000), pp. 1-9.

became acknowledged exponents.[58] Sales made on the new c.i.f. basis built the actual cost of delivery into a buyer's final price, so c.i.f. sales were regarded as a particularly attractive option for coal exporters who were also shipowners.[59] Sales of the traditional f.o.b. type had been based simply upon the price of coals as conveyed 'to the [export] dockside', a system that left the foreign buyer to negotiate the unpredictable extra expense of shipborne carriage. The buyer, or his agent abroad, commonly resolved post-purchase practicalities through a shipping charter arranged by a Newcastle broker – a matter of no little cost and uncertainty. Attractively, however, acceptance of a c.i.f. sale assured the buyer's full costs at time of purchase and promised prompt delivery too. At the same time, it offered exporters who were also shipowners the option of employing their own ships, or time-chartered ones, for carrying the coals they handled. The advantages of c.i.f. to such dual-purpose companies were clear, increased continuity of employment for their own ships and, perhaps, the prospect of added value charges in associated affairs.[60]

Analysis of Pyman, Bell and Co.'s coal exports from the Tyne to the Baltic in 1880 confirms the link between c.i.f. consigning and the use of self-owned ships. Pyman's family-owned steamers, registered in Newcastle and Hartlepool, were employed for one-third of all the 75 sailings made by British-registered steamers (of recorded ownership) destined for the Baltic with coal consignments.[61] This was a remarkable proportion for the Tyne's leading consignor. Similarly, Pyman and Bell's continuing commercial allegiance to Hartlepool was reflected in the fact that 25 percent of all British steamers employed were registered in that port – their use of Tyneside-owned steamers was relatively low (barely 10%). Whether Pyman, Bell also took steamers on time-charter in 1880 in order to carry c.i.f. sales is uncertain, although the sailing pattern of the *Ethel* (Hammond and Emes, Hull) suggests it.[62]

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[58] Hogg and Appleyard, *Pyman Story*, p. 12; Harbottle, *Quayside Life*, p. 52.

[59] The acronym can also be read as: Cost, Insurance, and Freight. That is, a price given for all regular costs to the point of discharge.

[60] On the other hand, consignors who sold c.i.f. took a calculated chance. It numbered first amongst the principal 'speculative risks' listed by successful Newcastle shipowner E. R. Newbigin, *Speculation and Gambling in Business* (Newcastle, 1907).

[61] 80% of its Baltic coals were shipped in British steam.

[62] After an initial ballast passage from Hull to Newcastle, the 669-ton *Ethel* seems to have spent the full season carrying Pyman-consigned coals to the Baltic (chiefly Cronstadt).

Despite Pyman, Bell's emphasis on the integration of coal exporting activities with ship supply, they were not insensitive to the benefits of supply side links to coalowning. Their office (74, Newcastle Quayside) also housed the owner, T. M. Reay, of a small mine, Hamsteels Colliery, and they variously fitted the coals of Brancepeth, Middle Bitchburn, and Shildon collieries as well; hence the eponymous *Hamsteels* (1878; 1,600 tons) in their fleet, and *Shildon* (1876; 900 tons) in George Pyman's. Analysis of Pyman, Bell's exports shows a sharp and unambiguous marketing policy, with two-fifths of volume directed to Cronstadt, and a similar amount to Swinemunde/Stettin (predominantly Swinemunde). This reflected their policy of concentrating on the deployment of large steamers, with two-thirds of their loadings into British steamers amounting to 1,000-ton cargoes or more, and a quarter lifting 1,500 to 2,000 tons. A few large North European steamers also supplemented their service to Cronstadt, whilst several small foreign steamers fed the minor ports of Kiel and Libau; but their use of sail was comparatively low (just eighteen cargoes).

Bell's personal commercial success in becoming 'a prominent and well known Quaysider' was translated into civic recognition in Newcastle, and his rapid rise from councillor (1878) to Mayor and then Alderman (1891) argues for considerable social skills as well as 'shrewd business qualities'.[63] His later development of the port's 'Swedish trade' was singled out for notice, and there is no doubt that the long-term success of Pyman companies lay much in their ability to generate inward timber cargoes from the Baltic and Bothnia – although they directed no timber imports into the Tyne in 1880.

As the Tyne's leading consignors of coal to the Baltic in 1880, Pyman, Bell and Co. were followed by another company whose primary interest lay in shipowning: William Milburn and Co. (ranked 2nd; 97,945 tons) Although Milburn handled ten percent of the Tyne's Baltic coal exports, they represented no more than a secondary, dependable, commercial activity within his burgeoning worldwide shipping interests. Even for a man 'who practically lived for work', Milburn's stubborn rise amongst his Newcastle-based peer group had been nothing short of astonishing. Born in 1826, the son of a Northumbrian farmhand-cum-butcher, he progressed from butchering through broking and ship-husbanding to collier ownership in the 1850s. He then advanced his partnership's shipowning business by running good quality barques in

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[63] *NDC*, July 1891.

the far eastern trades, and, with great foresight, pioneered steam in the intermediate trades. Finally, his now family-owned company opened up select oceanic steamer routes and scheduled services via the Suez Canal.[64] By 1880, his involvement in the Baltic trade lay no longer in the deployment of his own steamers, but in supporting newly acquired coalowning interests, for in 1877 he had formalized his interest in the Ashington Colliery Company's pits (south east Northumberland) and, in 1879, he acquired a majority shareholding there. This provided the impetus for unleashing these pits' great potential, and the move also demonstrated to perfection the way in which the pursuits of coalowning, merchanting and shipowning could be (and often were) inextricably bound together on Tyneside – most particularly on Newcastle Quayside itself.

Ashington colliery's first shaft had been sunk in 1847, and John Harrison and Carl Lange of Harrison, Carr and Co. (brokers and merchants, Newcastle Quayside) were introduced as new investors there in1851.[65] Harrison, Carr were appointed to work and fit the coals from the new pit but, following irregularities, were dismissed as managers in 1855 and the colliery was re-structured as the Ashington Colliery Company.[66] However, they were retained as the colliery's fitters and also extended their own colliery and shipping interests in Northumberland (purchasing privately-owned Amble Harbour). In addition to his participation in the family business of Lange Bros. (brokers and agents, Newcastle Quayside), Carl Lange engaged in all this, and in 1867 became a shareholder at Ashington once more.[67] He soon (1869) attempted to induce fellow 'Quaysider' William Milburn to capitalise the sinking of a new pit, but Milburn's company (Watts, Milburn Co.) unexpectedly and abruptly 'declined the share offered to them at the price issued'; probably owing to William Watts' interests in South Wales. Lange continued influential in Ashington colliery

[64] J. Dobson, 'William Milburn Victorian Entrepreneur' (unpublished Local History Certificate Dissertation, University of Newcastle, 1989), pp. 23-27.

[65] NRO, Ashington NCB 15/5; John Harrison's participation together with his and Carl Lange's capital may have been solicited by one of the pit's five original investors, William Dickinson, a coal exporter and iron ore merchant (later, steamship owner) of Newcastle Quayside.

[66] NRO, 4279; introduction to papers of John Henderson, managing shareholder, 1849-1851.

[67] In 1875, although trading on their own account, the four Lange brothers also held partnerships as follows: Carl and Richard F., in Harrison, Carr and Co.; Julius and Theodore, in Leidemann and Co. (merchants, Newcastle Quayside).

affairs, but ten years elapsed before Milburn finally took up shares, and then in circumstances very different to those first envisaged. For, via a shareholder's resolution of 1879, it was agreed that 'the transfer of the interest of the late Mr. C. Lange in this Co. [Ashington Colliery Company] to Mr. Wm. Milburn be approved.'[68]

Milburn and Co.'s Baltic coal exports in the following year, 1880, were unequivocal in direction – to the Russian market. Three-quarters of their total exports were to Cronstadt, another fifth served Reval and, belying any trace of Lange's German influence, a mere 2,000 tons (out of 97,945 tons) went to the Lower Baltic. Three-quarters of all exports were cleared outwards in British-registered steamers, of which the largest contingents came from Hull (25%) and West Hartlepool (20%), whilst Tyneside figured less prominently (12%). Half the individual British steamers whose ownership can be readily ascertained belonged to Hull, particularly to Dearman, and the rest to tramp-ship operators of the north east coal ports, with Westoll (Sunderland) and Horsley (West Hartlepool) prominent among these. Despite the fact that Milburn's Baltic coals were shipped exclusively in steam, and largely in east coast steam at that, not a single cargo was consigned in a Milburn ship under his own management.[69]

Milburn was not the only shipowner amongst the leading Baltic consignors to eschew the use of ships under his ownership or management. Cory, Lohden and Co. (ranked 5th; 53,037 tons) who owned half-a-dozen suitable steamers despatched only a single Baltic cargo in one of them (a smallish one at that). Cory's, as major, long-established London coal factors and merchants, early made joint investments in steam colliers with north east coalowners and their alliance with a Hartlepool-based shipowner, Lohden, was a very small facet of their successful diversification into the worldwide coal export trade. And a short-lived Cory, Lohden branch in Newcastle appears to have been tied to supply side considerations, for they had become fitters for the Tursdale Colliery (south Durham) in the late 1870s.[70] Cory, Lohden's Baltic coal export pattern of 1880 was geographically diverse. Cronstadt and Newfairwater absorbed a quarter each, slightly less was consigned to Swinemunde, and the rest went

[68] NRO, ZMD 54/1.

[69] The only Baltic clearance by a Milburn-managed steamer was *Marcia* for Cronstadt, with coals consigned by J. Reay (Milburn family members held 16/64ths in her).

[70] The shipowning and fitting businesses occupied offices in the same premises, Cail's Buildings, Newcastle Quayside.

to various ports in the Lower Baltic or up to Riga. There was a resulting lack of definition in the company's employment of ships although, as was the norm, British steamers sailed with nearly three-quarters of cargoes. Hartlepool- and London-registered steamers were employed in more than half their sailings, Tyneside steamers markedly less, and there was no allegiance to particular owners. Unusually for a major exporter almost one-fifth of their entire Baltic volume was carried in sail, primarily German-owned. The diverse nature of their business presumably originated in the nature of the mixed partnership: the emphasis on the German Baltic arising from Lohden, whilst Cory's links were firmly in the London coal trade. This situation was then perhaps further confused, rather than strengthened, by dividing the company's activities up between three ports: Hartlepool, Newcastle and London.[71]

Yet another firm with Hartlepool antecedents, H. Fawcus and Co., lay in the top ranking group of Baltic consignors (ranked 6th; 49,627 tons). Henry Fawcus, however, was very much a middleman, a coal exporter whose shipowning interests extended only to a small number of shareholdings in local ships. His Baltic export business of 1880 was entirely with Russia, almost exclusively with Cronstadt (98%). Again, more than three-quarters of his exports were carried in British steam, with London and Hartlepool registered vessels used only slightly more often than those of Tyneside and Hull.[72] Though somewhat unusually, Fawcus also employed medium-sized Norwegian sailing ships, six of which carried 3,000 tons for Cronstadt.

Conclusions

Although coal's spot market remained the barometer of export and shipping activity, increased contractual forward buying – and changing patterns of Baltic demand – provided opportunities for consignors who could command dedicated, rather than purely casual (i.e. tramp), tonnage. This shift was reinforced by the increased ability of major coal producers to control and schedule their output levels.

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[71] Shortly after 1880 most of the shipowning side was transferred to London: Jackson Bros., and Cory. Lohden continued as an independent Newcastle broker, coal exporter and (Hartlepool-based) shipowner.

[72] Fawcus favoured vessels owned by the Mercantile Steamship Co. (London) and Joseph Robinson (Stag Line, North Shields). The latter most likely through a family network linked to Pow and Fawcus (Engineers), North Shields.

In a global context the Baltic was the most intimate of the Tyne's established export markets, and Newcastle's trading community had gained long term benefits through the absorption of north European in-migrants. Despite this apparent stability, investigation reveals that a near revolution occurred in the Tyne's coal consigning business to the Baltic between 1860 and 1880. This revolution's origins lay in three coincident factors: the continued growth of exports, the introduction of new consignment practices, and, a fortuitous re-development of the consigning community's archaic business district (helping promote new practices). Paradoxically, the resultant commercial mobility owed more to breaking the mould of riparian localism than, for example, to an influx of commercial migrants from overseas. In particular, it was the degree of participation by Hartlepool's shipowners and a few (entrepreneurial) coalowning interests in County Durham that was its most striking feature.

By the end of the period 1860-1880, there had been a gradual breakdown of the old mid-nineteenth century order in which there was relatively sharp separation between the functions of producer, middleman, broker, and shipowner. Now, producers were increasingly developing interests in direct sales and carriage by sea whilst, at another level in the transaction system, steamship owners could respond with advantage by allying coal broking activities to their core business – operating ships. These regional observations help both reinforce, and expand upon, the roles of the coal exporting 'middleman' as defined by Church.[73]

Overall, a much more diverse and robust system of consignment had emerged, one that was better able to satisfy the great rate of growth in export demand by expediting ever larger, and ever more time sensitive, shipments of coal. The considerable expansion of tonnage capacity provided by the steamship had been complemented by matching advances in local commercial practice.

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[73] Church, *History of British Coal, Vol.3*, p. 80.

CHAPTER 4: NON-COAL EXPORTS TO THE BALTIC, 1861-1880

As Tyneside was Britain's largest manufacturer of chemicals during the period under review, it is not surprising to find that this industry's products feature regularly in the lists of non-coal goods shipped to the Baltic. With regard to all non-coal commodities, the port of Tyne's (regional) hinterland provided a striking contrast with its (continental) Baltic foreland. The former, although limited in geographic area was already a highly advanced maritime-industrial region, whilst the latter, although comparatively large in its geography, possessed but a low degree of urban and economic development. It was this asymmetry that resulted not only in the Baltic's demand for a power source, coal, but increasing demands for a multitude of mundane and generally bulky products and manufactures – all demanding shipment by sea. However, such copious transfers of goods were not without political consequences,[1] and Baltic import tariffs had a marked impact on the Tyne's non-coal export trade.

Other than in published works that rely much upon secondary sources, and which understandably concentrate upon the shipment of coal, the port of Tyne's nineteenth- century trades have been little studied.[2] Indeed, with the exception of Elliot and specific studies by Osler then more – as is remarked by Milne – is probably known about the Tyne's maritime trade of the early modern centuries than that of the late nineteenth century.[3] This, however, was not considered to be so at that time, when a variety of commercial commentators (and industrialists) took pains to categorise, describe, and enumerate the products of its industries and manufacturers, often throwing light on the port's role in channeling those items overseas.[4] When combined with official statistics, the data in these – often laudatory – publications facilitates an assessment of the port of Tyne's general trade from 1861 to 1880.

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[1] See Chapter 1.

[2] For example: McCord, *North East England: 1760-1960*, pp. 111-114; O. Lendrum, 'An Integrated Elite: Newcastle's Economic Development, 1840-1914', in Bill Lancaster and R. Colls eds., *Newcastle upon Tyne, A Modern History* (Chichester, 2001), pp. 27-46.

[3] Elliot, thesis. Elliot, 'Tyneside, a Study'. Milne, *North East England.* Osler, 'West Jutland Trade'. Osler, 'Coal, Chemicals and Change'.

[4] Plummer, *Newcastle-upon-Tyne*. Armstrong *et al* eds., *Industrial Resources*. Johnson, *Making of the Tyne*.

Chemicals: Values not Volumes, 1861 and 1880

In the early 1860s, Tyneside was Britain's largest single manufacturing centre for chemicals, and over a half of this local industry's products (approximately 114,000 tons p.a.) were dispatched directly by sea.[5] Chemicals ranked as the Tyne's second largest export after coal, with contemporary qualitative assessments suggesting that foreign going shipments already exceeded those dispatched through the coastwise trade.[6] Amongst these exports it can be shown (by aggregation) that, in 1861, almost 9,000 tons of Tyneside-manufactured chemicals were shipped to the Baltic regions considered here, with alkali and soda comprising some 82 percent of the whole (see Table 4.1). Contemporary evidence also suggests that these Baltic shipments absorbed some eight percent of local manufacturing capacity annually and, furthermore, that they represented around a quarter of the port's entire chemical exports.[7] The Baltic was thus a significant market for this important Tyneside industry.

Table 4.1 Chemical Exports to the Baltic, 1861

(tons; percentage)

	Alkali and Soda	Other Chemicals	All Chemicals
Tons per annum	7195	1617	8808
Percentage (%)	82	18	

Compiled from *NBESL*, 1861

[5] W. A. Campbell, *The Chemical Industry* (London, 1971). Elliot, 'Tyneside, a Study', p. 233. Elliot, thesis.

[6] Many coastwise shipments were also destined for export, especially to America via London; see, for instance, *NDC*, 18 March 1861.

[7] For example, the 7,195 tons of alkali and soda dispatched to the Baltic in 1861 represented 24% of the Tyne's entire exports of these products (calculated from: *ASTN*, 1861, Table 34). A simple two-fold classification of chemical products has been adopted here: Alkali and Soda; and, Other Chemicals. This simplifies the problem of dealing with numerous contemporary product descriptions and the diverse categories found in official statistics. A very small volume of specialist chemicals (e.g. vitriol) are classified within 'Miscellaneous Products'.

Despite the fact that chemical shipments made up less than three percent of the total volume of bulk products shipped from the Tyne to the Baltic, they provided a high value component of the bulk trades, though estimates of their worth can only be arrived at indirectly.[8] Nevertheless, it is clear that the Tyne held a dominant position in supplying Prussian and Russian customers with the two products in greatest demand, alkali and soda, supplying almost half of Prussia's needs and three-quarters of Russia's (see Table 4.2).

Table 4.2 Alkali and Soda Exports to Russia and Prussia, 1861 (tons)

	[9]British Exports (tons)	Tyne Exports (tons)	Percentage Tyne (%)
Russian Empire	5130	3889	76
Prussia	4890	2282	47

Compiled and calculated from *NBESL*, 1861; and, *ASTN*, 1865, Table 42

The declared values of British alkali and soda exports to Russia and Prussia in 1861 totalled £94,806, and the Tyne's share may be calculated (*pro rata*) as approximately £60,000.[10] Even this figure must be treated with a degree of caution though, for the exact product mixes are not known, and alkali was twice as costly as soda.[11] Destination differentials also seem to have applied, for example, the customs valuations per ton for shipments of 'alkali and soda' were reckoned at: Mecklenburg

[8] Official statistics did not always equate with the geographic areas or products considered here.

[9] The geographic designation on which this is based: 'Russia Northern Ports', in the *ASTN*, 1865, includes exports for Russia's White Sea as well as Baltic ports. Consequently the statistics for British and Tyne exports to Russia are not exactly comparable.

[10] *ASTN*, 1865, Table 42.

[11] *NDC*, 1861, indicates common manufacturer's prices of: 'crystal soda in export casks', £4.25 per ton; and, 'best alkali', £8.87 per ton (but there were significant quality-based variations for alkali).

Schwerin, £5.50; Prussia, £8.70; and Russia, £10.20, indicating a sliding-scale (freight cost) valuation based on voyage distance.[12]

Seen against the north east region's annual chemical manufacturing worth of £1.5 million,[13] the Tyne's alkali, soda and other chemical sales to the Baltic (c. £60,000) in 1861 represented some four to five percent, by value, of gross regional output. Indeed, chemical exports to the Baltic realized almost half as much as Tyneside's premier Baltic-bound export commodity, coal. Clearly, although chemicals took up much less shipping capacity than coal, they represented a relatively high-value trade. Despite problems of stagnation and pricing, 1860-1880, Tyneside chemical manufacturers' exports to the Baltic accelerated at a faster rate, by volume, than did coal. Even though coal exports trebled, those of chemicals more than quadrupled, with Baltic exports – *ex* superphosphate and manure – reaching 41,363 tons in 1879, and 36,674 tons in1880 (see Tables 4.3 and 4.4).

Table 4.3 Chemical Exports to the Baltic, 1879 and 1880
(tons)

	Alkali & Soda (tons)	Sundry Chemicals (tons)	Super-phosphate (tons)	Chemical Manure (tons)	Total Chemicals (tons)
1879[14]	33787	7576	2612	unrecorded	43975
1880[15]	30386	6288	3224	790	40688

Compiled from *Browne's Export List*, 1879; and, *NBESL*, 1880

The well-established demand for 'alkali and soda' continued to provide for around 80 percent of this total, with sundry related chemicals and 'colours' (pigments) making up the rest. Calculated at the customs authority's rate of valuation in 1880 (£7.88 per ton to Russia's 'Northern Ports'), Newcastle's Baltic exports of alkali and

[12] That is, the 'alkali and soda' customs values in the *ASTN* did not represent factory-gate costs alone.

[13] Armstrong *et al* eds., *Industrial Resources*, p. 5.

[14] Compiled from *Browne's Export List*, 1879.

[15] Compiled from *NBESL*, 1880.

soda alone amounted to a nominal £239,442. In total, the returns from chemical exports must have approached £250,000. This compared very favourably with the equivalent Baltic exports of coal, just over £400,000 from some twenty-five times (975,458 tons) the equivalent volume.[16]

Table 4.4 Growth in Alkali and Soda Exports, 1861 to 1880[17]
(tons; pounds sterling)

	UK, All Exports (tons)	UK to Russia: Northern Ports (tons)	Newcastle, All Exports (tons)	Newcastle to Baltic, Exports (tons)	Newcastle to Baltic, Exports (£)
1861	71016	5130	29886	7195	60000
1865	128640	5993	47503		
1870	192670	11691	92626		
1875	251138	16086	109169		
1880	344421	17315	142455	30386	239442

Compiled and calculated from: *ASTN & ASNS*, 1861-1880; and, *NBESL*, 1861, 1880

By the late 1870s 'chemical manure' and 'superphosphate', destined for agricultural rather than industrial Baltic markets, had also emerged as significant export products. Pioneered on Tyneside in the 1840s, they did not feature as profitable, large-scale manufactures until the mid-1870s, when increased agrarian demand combined with supply side links with existing local industries (grindstones,

[16] The contrast must have been even more marked before the marked drop in chemical prices that occurred in the late 1870s; custom's valuations of the 1860s and early 1870s averaged £10 per ton.

[17] UK All Exports, and, Newcastle All Exports, compiled from: *ASTN* and *ASNS*, 1861-1880, Tables for 'Exports at Principal Ports'. UK to Russia, compiled from: *ASTN* and *ASNS*, 1861-1880, Table for 'Russia: Northern Ports, exports thereto'. Newcastle to Baltic, volume (tons) compiled from: *NBESL*, 1861 and 1880, with values (approx. £) calculated from *NBESL*, *ASTN*, and *ASNS*, 1861 & 1880.

animal waste, vitriol production etc.) brought them to prominence.[18] Baltic exports in 1880 – largely of superphosphate – amounted to just over 4,000 tons, approaching the aggregate volume of other sundry chemicals (see Table 4.3).

Although there was some relative slackening of the Russian demand for chemicals between 1861 and 1880, Germany's increased uptake of alkali and soda compensated for it. Consequently, Baltic demand continued to account for a quarter of Tyneside's alkali and soda exports.[19] However, price reductions in the late 1870s pegged back export values to barely a four-fold growth rate, as against the near five-fold increase in volume (see Table 4.4). Nevertheless, these were still quite exceptional rates of growth.

Chemicals: Destinations and Consignors

Although Russia and Prussia showed near parity in the import of coal from Tyneside in 1861, their demand for chemicals showed a marked disparity, with Russia taking slightly over one half of the total as compared to Prussia's one-third. And, as with coal, the ports of the German Confederation's Baltic shore took only a relatively small share. (see Table 4.5)

Table 4.5 Chemical Exports by Territorial Destination, 1861

(tons; percentage)

	Alkali and Soda (tons)	Other Chemicals (tons)	All Chemicals (tons)	Percentage Share (%)
Russian Empire	3889	710	4598	52
Prussia	2282	748	3030	34
German Confederation	1024	159	1183	13

Compiled and calculated from *NBESL*, 1861

[18] W. A. Campbell, *A Century of Chemistry on Tyneside, 1868-1968* (Newcastle, 1968), pp. 27-30. Chemical manure was produced by fortifying decomposed organic waste with phosphates, and superphosphate by treating phosphatic materials (bones, coprolites, guano etc.) with 'vitriol' (concentrated sulphuric acid); these processes were unsavoury and heavily polluting.

[19] 1861, 24%; 1879-1880, 27%.

Nearly 90 percent of these Baltic exports were directed to just half-a-dozen ports – St. Petersburg, Stettin and Danzig absorbing 75 percent of the entire total between them (see Table 4.6). Only nine received more than a two percent (175-ton) share. St. Petersburg was the largest recipient by far, taking over 40 percent of the total volume imported into the Baltic. Riga, Narva and Viborg provided Russia's secondary recipients and these ports, together with Königsberg and Rostock in Prussia, accounted for a few hundred tons each. Elsewhere, a handful of ports accepted even smaller parcels: 50-100 tons each.

Table 4.6 Chemical Exports by Destination, 1861: Six Top-ranked Ports (tons; percentage)

	Alkali and Soda (tons)	Other Chemicals (tons)	Total Chemicals (tons)	Percentage Share (%)
St Petersburg	3440	467	3907	44
Stettin	1477	337	1814	21
Danzig	640	249	889	10
Rostock	322	80	402	5
Kiel	295	27	322	4
Riga	189	124	313	4

Compiled and calculated from *NBESL*, 1861

Table 4.7 Chemical Exports by Territorial Destination, 1880 (tons; percentage)

	Alkali & Soda (tons)	Other Chemicals (tons)	All Chemicals (tons)	Percentage, 1880 (%)	Percentage, 1861 (%)
Germany	19748	3769	23517	64	47
Russia	10793	2519	13312	36	52
Totals	30541	6288	36829		

Compiled and calculated from *NBESL*, 1880, 1861

Over the subsequent twenty-year period, 1860 to1880, there was much change, and the territorial distribution pattern for chemicals reversed itself. The newly-constituted state of Germany replaced Russia as the Baltic's leading chemicals importer, whilst Russia's Tyneside imports dropped from 52 percent of the Baltic's total in 1861 to only 36 percent in 1880. Correspondingly, under the newly constituted state of Germany, the share enjoyed by the former ports of Prussia and the German Confederation had risen from 47 to 64 percent. (see Table 4.7) And the selective concentration of chemical imports into just a few ports remained a feature of the trade – just seven ports absorbed 90 percent of the total in 1880 – but the rankings had altered considerably (see Table 4.8). The former Prussian ports of Stettin and Danzig were now the clear leaders, with Stettin (37% of imports) occupying St. Petersburg's former role. In fact, St. Petersburg now trailed its Russian competitors of Riga (10%) and Reval (7%), for the convenience of shipment into these two emergent (rail-linked) steamer ports, and Cronstadt, had captured an increased share of Russia's chemical, as well as coal, imports.

Table 4.8 Chemical Exports by Destination, 1880: Top Six Ports [20]

(tons; percentage)

	Alkali & Soda (tons)	Other chemicals (tons)	All chemicals (tons)	Share, 1880 (%)	Share, 1861 (%)
Stettin	11353	2138	13490	37	21
Danzig	4907	923	5831	16	10
Riga	2951	873	3824	10	4
Cronstadt	3140	249	3388	9	1
Reval	1863	627	2490	7	1
Königsberg	2062	418	2479	7	3

Compiled and calculated from *NBESL*, 1880, 1861

[20] Statistics exclude manure and superphosphate.

Elsewhere, imports of Tyneside's well established chemicals were relatively slight in 1880. Despite its relative decline St. Petersburg still received 2,000 tons, a figure approached only by Rostock, almost 1,000 tons; Libau, Åbo and Lübeck each received between 400 and 500 tons. Even the Russian textile manufacturing town of Narva (a likely customer) took a mere 170 tons – a consequence of national tariff policies combined with local difficulties.[21]

This kind of import pattern was not, however, followed by the two most recent chemical manufactures: chemical manure and superphosphate (crop fertilisers). The older-established chemicals had found markets in areas undergoing industrialisation, and more especially in those with a strong textile- or glass-manufacturing background. These new products – principally 'chemical manure' – were directed to ports with agricultural hinterlands that were undergoing improvement. Hence Riga, with its huge agrarian Russian hinterland (serviced by water and rail), headed the list with 2,023 tons; whilst Stettin, which served the north German plain, ran it a close second, 1,527 tons. Pernau in Estland, together with the expanding rail-served port of Libau in Kurland took minor quantities as well (221 and 145 tons respectively), reflecting the fact that agricultural practices in these Russian provinces lagged behind those even of the nearby former East Prussian provinces of Germany.[22]

On the supply side, there were two dozen or so makers active at any one time during the period 1861-1880.[23] Their works were largely situated along the river line in order to take advantage of low cost water transport both for receiving the industry's bulky raw materials – especially salt shipped coastwise – and the distribution of the finished products by wherries (lighters) to the main shipping quays at Newcastle and Shields. Riverside localities also offered enhanced possibilities for cross-linking chemical manufacturing interests with related processes or products.[24]

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[21] U. Dresen, 'Maritime Trade in Narva at the End of the 19th Century and the Beginning of the 20th Century', in Y.Kaukianen ed., *The Baltic as a Trade Road*, VII Baltic Seminar at Kotka 1989 (Kotka, 1989), pp. 64-82.

[22] Kirby, *Baltic World*, pp. 295-296.

[23] The Alkali Act, 1863, registered nineteen Tyneside 'alkali' companies.

[24] For instance, G.H. Ramsay, originally a manufacturer of firebricks, coke and coal derivatives, purchased (1848) a bone crushing works that led him to produce phosphatic chemical manure. So his recorded Baltic exports of firebricks may early have been accompanied by chemicals.

Generally, chemical exports to the Baltic in 1861 were dispatched by a relatively small body of consignors who, although not manufacturers themselves, maintained close connections with producers. Just four consignors handled some 80 percent of this Baltic chemical trade, and it is significant that these four had distinctly foreign (north European) origins or partners – presumably helping sustain strong connections with Baltic recipients – and also ranked in the top quartile of coal consigning companies (see Table 4.10). Although many brokers, agents and, occasionally, manufacturers shipped parcels of a few tons (or even hundredweights) of chemicals as opportunity occurred, noteworthy consignors numbered less than 20. In consequence the broking and merchanting of chemicals was a far more restricted business than that of coal, though possessing a fair number of participants in common, and chemical trading was also little differentiated in respect of specific destinations. Only Boldemann, Borries displayed a marked geographic orientation, focusing on Stettin and Danzig in Prussia, although to a lesser extent Geo. Schmalz – ranked fourth for coal and third for chemicals – favoured the major Russian ports with both.

Table 4.10 Top Ranking Chemical Consignors to St. Petersburg, Stettin, and Danzig, 1861 [25]

(tons estimated; percentage)

	Estimated Exports (tons)	Share (%)	Ranking for Coal Export
Stevenson, Vermehren and Co.	1875	31	15
Boldemann, Borries and Co.	1153	19	22
Schmalz G. and Co.	1051	17	4
Leidemann A. and Co.	812	13	29
Scheele W.	280	5	30
Other Consignors (twelve of)	900	15	
Total	6071		

Compiled and calculated from *NBESL*, 1861

[25] Based on sample of one-in-four cargoes to these ports.

Over the next twenty years, 1861-1880, the disappearance, or loss of status, of formerly well-known firms, together with a corresponding rise in new entrants, indicates a significant shift in chemical consigning – one analogous to that which occurred in coal. So, by 1880, several important Tyneside chemical (and manure) manufacturers were consigning substantial volumes on their own account,[26] whilst some large coal exporting brokers and merchants occupied prime positions as chemical consignors too. Indeed, Pyman, Bell and Co. was the top chemical, as well as coal, consignor to the Baltic in 1880, exporting some 4,000 tons – about twelve percent of the total – whilst one of Tyneside's major chemical manufacturers, Tennant's, ranked third. Of the firms that had headed the rankings in 1861, only three remained in positions of any significance at all.[27]

The chemical consigning base had broadened in numbers and nature since 1861 though. A dozen leading consignors now participated, accounting for 86 percent of the Baltic chemical trade between them. (see Table 4.11) 'Manufacturers' and 'General merchants, Brokers' appeared in equal numbers but, surprisingly, there were only a couple of specialist 'Chemical Merchants and Brokers' (including Leidemann).[28] And below this leading group no less than 32 operatives – mostly handling under 100 tons each – contributed the remaining fourteen percent.

However, there were no overt links between chemical consigning and ship ownership in 1880, for unlike coal a consignment of chemicals was rarely large enough to form anything more than a part cargo. Consequently, simple merchant and freight carrier transactions continued, for there was little commercial pressure to look for savings by integrating the two functions.[29] Scheduled steam cargo liners – of independent ownership and capitalisation – thus possessed many advantages in servicing the needs of those manufacturers, merchants, or brokers who regularly consigned chemicals.

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[26] Including: C. Tennant & Co.; Newcastle Chemical Works Ltd. (founder, C. Allhusen); Langdale's Chemical and Manure Co.; The Bede Metal and Chemical Co.; and, J. Burrell.

[27] Borries, Craig (formerly, Boldemann, Borries); Stevenson and Vermehren; A. Leidemann.

[28] *Ward's Directory*, 1880, lists over two dozen 'Chemical Merchants and Brokers'. Perhaps the majority were concerned more with domestic than export trades.

[29] Later, an immigrant Baltic (German) merchant who became a chemical tycoon, Christian Allhusen, invested in shipping through Borries, Craig and Co. His Newcastle Chemical Works Ltd. lay directly opposite Borries offices on Newcastle Quayside.

Table 4.11 Six Top Ranked Chemical Consignors, 1880 [30]
(tons estimated; percentage)

	Role	Estimated Exports (tons)	Share (%)	Rank in 1861
Pyman, Bell & Co.	mcht./broker	4388	12	
Scott Bros.	merchant	4236	11	
C. Tennant & Co.	manufacturer	3364	9	
Borries, Craig & Co.	merchant	3128	8	2
Stevenson, Vermehren & Co.	merchant	3044	8	1
Newcastle Chemical Works Ltd.	manufacturer	2976	8	
Totals		21136	57	

Compiled and calculated from: *NBESL*, 1861; and, *Ward's Directory*, 1880

Chemicals: Cargoes and Shipping Capacity

Discrete, that is entire, cargoes of Baltic-bound commodities other than coal were rare in 1861.[31] Only some twenty percent (by weight) of the chemical products dispatched to the Baltic were loaded in this way. Surprisingly, the apparently simple cargo combination of chemicals and coal was uncommon, less than 200 tons of chemicals being shipped solely alongside coal. This probably resulted from differences in the two commodities' loading methods – staiths or drops for coal, and quays for chemicals – allied to a certain degree of stowage incompatibility; chemicals had to be kept dry, and many ordinary sailing colliers were wet and leaky.[32]

Characteristically, chemicals helped fill out mixed cargo manifests, and around 85 percent (by weight) was shipped in general cargoes. Parcels of chemicals

[30] Based on sample of one-in-four cargoes to all Baltic ports.

[31] Just eighteen entire chemical cargoes (1,891 tons) were despatched, eleven for St. Petersburg alone.

[32] R.W. Stevens, *On the Stowage of Ships and Their Cargoes* (5th edition, London, 1871), pp. 71-72.

were commonly combined with various other goods and coal (81 cargoes) or with non-coal goods alone (85 cargoes). Overall, there was a chemical component in more than half of the 323 mixed coal and goods cargoes that were dispatched to the Baltic in 1861. And, in shipments of this latter kind destined for Russia and Prussia, the chemical component matched (or exceeded) that of coal, rating them as 'chemical cargoes' (see Table 4.12).

Table 4.12 Chemical Imports in Mixed Cargoes, 1861: by Territory (number; tons)

	Cargoes (No.)	Chemicals (tons)	Coal products (tons)
Russian Empire	58	3536	3181
German Confederation	49	1087	6267
Prussia	59	2863	2589
Totals	166	7486	12037

Compiled from *NBESL*, 1861

Whatever the exact mix of all these chemical cargoes in 1861, chemical carriage was (in effect) carried out exclusively under sail.[33] Ships of the Dutch Republic and the German Confederation – rather than those of Britain – acted as the two major carriers, lifting just over half of the Tyne's chemical exports to the Baltic between them.[34] However, there was a clear subdivision of role between these leading carriers, with the Dutch commanding carriage to Russia whilst, understandably, the Germans led that to Prussia and the Baltic-shore states of the German Confederation. Nevertheless, St. Petersburg's demand for chemicals was so great that even the German fleet carried nearly twice as much there as it did to Stettin. English and Scots vessels accounted for barely half as much chemical carriage between them as did the Dutch and, rather unaccountably, British ships found much greater employment

[33] One modest shipment (69 tons) was despatched by steamship.

[34] The Dutch and German share may have been even greater, for twelve percent was exported in small vessels whose origins are uncertainly recorded in the *NBESL*, 1861.

carrying chemicals into Prussia rather than Russia – where they dominated coal carriage.[35] (see Table 4.13).

Around three-quarters of all chemical exports (by weight) were carried in rather small vessels (<150 tons), reflecting the nature of the two principal national fleets engaged.[36] And, on average, 2.44 tons of shipping was engaged for every ton of chemicals exported to the Baltic, a figure that accords well with an estimate of 1864 that 'for every 100 tons of chemicals manufactured, employment is given to 250 tons of shipping'.[37]

Table 4.13 Leading Carriers in the Export of Chemicals, 1861
(percentage; tons)

	Share (%)	Total (tons)	Russia (tons)	Prussia (tons)	German Confed. (tons)
Dutch Republic	29	2534	1942	437	156
German Confed.	26	2303	710	716	877
English & Scots	16	1308	388	895	26

Compiled from *NBESL*, 1861

This sail transport regime of the early 1860s proved especially vulnerable to the changes in ship technology and market orientation that occurred between 1865 and 1880. The shift in focus of Tyneside's (much expanded) chemical exports away from the established Russian market towards the industrialising cities of the German Lower Baltic must, for example, have dealt a great blow to the small Dutch carriers who prosecuted the trade to St. Petersburg. But this alone is far from explaining the extraordinary drop in the Dutch fleet's share of the Tyne-to-Baltic chemical carrying

[35] Prussia's own ships were surprisingly absent, loading only 367 tons.

[36] Stevens, *On Stowage* (5th), suggests that an entire cargo of alkali required 1.3 register tons of shipping per ton stowed. Baltic bound vessels of under 150 tons achieved 1.6 register tons, but larger ships were significantly higher (2 to 5 tons).

[37] Armstrong *et al* eds., *Industrial Resources*, p. (6); this estimate presumably included the tonnage used in shipping raw materials.

trade from top ranked position (29 %) in1861 to bottom position (1%) in 1880.[38] The explanation lies elsewhere, for amongst all the North European nations the Dutch had failed to deploy steamships into the trade.[39]

As with the carriage of coal in 1880 it was British tonnage – and exclusively steam tonnage at that – that now dominated a sector where Britain had formerly performed a lesser role. British shipping had now far outstripped its nearest competitor, Germany, whose fleets (both sail and steam) accounted for only 18 percent of the Tyne's carriage of Baltic-bound chemicals whilst British steamers commanded 67 percent; meanwhile, Denmark had become the third-placed carrier (see Table 4.14).

Table 4.14 Leading Carriers in the Export of Chemicals, 1880[40]

(percentage; tons)

	Total Share (%)	Steam Share (%)	Sail Share (%)	Exports to Russia (tons)	Exports to Germany (tons)	Total Exports (tons)
UK	67	67	0	6730	20129	26859
Germany	18	12	6	2645	4632	7277
Denmark	6	3	3	1151	1189	2340

Compiled and calculated from *NBESL*, 1880

In essence, chemical manufacturers and consignors benefited significantly from the introduction of steamships, taking particular advantage both of the steamer's ability to uplift much greater quantities in one lading and to extend the length of the shipment season. Whereas, in 1861, an individual ship's chemical ladings were relatively small – usually less than 50 tons – by 1880 the majority of consignments were incorporated into cargoes that contained between 200 and 500 tons (see Table

[38] Only a single (150-ton) cargo was shipped to St. Petersburg by a Dutch carrier in 1880.

[39] P. Schuman, 'Dutch Shipping Policy: Some Legal Aspects, 1860-1914', in *Maritime Industries and Public Intervention*, R. Ertesvag, D.J. Starkey and A.T. Austbo eds. (Stavanger, 2002), p. 103.

[40] Export totals include chemical manure and superphosphate.

4.15).[41] Similarly, the season's major steamer shipments began a month earlier, in March, and extended a couple of months longer, into October and November, when deliveries under sail were few and uncertain. Steam's promise of consistency in loading greater volumes over a longer period meant a very great deal to an industry whose production cycles were characteristically tied to short-term demand.[42]

Table 4.15 Comparison of Chemical Lading Size, 1861 and 1880
(number; percentage)

	1861		1880	
	Cargoes (No.)	Share of Chemicals (%)	Cargoes (No.)	Share of Chemicals (%)
500 or more tons	0	0	12	22
100 - 499 tons	1	3	103	69
50 - 99 tons	64	64	33	6
less than 50 tons	163	32	44	3
Total Cargoes	228		192	

Compiled and calculated from *NBESL*, 1861, 1880

However, individual exports of chemicals rarely became large enough to fill an entire Baltic-bound steamer's cargo space. Instead, they became a core export for steamers making up general cargoes, with shipowners and agents loading substantial parcels of chemicals mixed with other non-coal goods from Tyneside; and all these commodities might be supplemented with coal or coke. Compared with the sailing vessels still engaged the sub-divided hold space of a, comparatively large, steamer encouraged diversity of lading. Out of 193 steamer cargoes containing chemicals in 1880 nearly a half, 87, contained all three of Tyneside's principal non-coal export commodities: extractive products, metals, and miscellaneous items, whilst at least 40

[41] A dozen exceeded 500 tons in 1880, and one approached 1,000 tons.

[42] In 1880 the export rate remained steady throughout the season, with monthly loadings close to ten percent of the annual total in seven out of ten months.

incorporated coal products as well. As previously, chemicals were rarely loaded with coal or coke alone.

The cargoes discharged in the two major chemical receiving ports in 1880, St. Petersburg and Stettin, contrast the ladings enjoyed by steam and sail. Ten out of the sixteen cargoes that delivered chemicals to St. Petersburg were carried under sail, and the majority contained only one other kind of Tyneside export. By comparison, 33 out of the 35 chemical deliveries to Stettin were in steam, and more than a half included all three kinds of non-coal exports, while many were supplemented by a few hundred tons of coal products.[43]

Stettin, the leading chemical importer in 1880, was a peculiarly British preserve, with 96 percent of its Tyneside chemicals delivered in British steamers. The trade to Riga and Reval was also dominated by British steamers (96% and 70% respectively), but British and German carriers shared the service to Danzig and Cronstadt. These patterns of concentration owed much to the success of British steamship owners in providing scheduled cargo services to Stettin and Riga, in particular those established by the Wilson Line of Hull.

Services of this kind were well suited to the needs of chemical exporters, for example, of the twelve chemical cargoes of over 500 tons shipped in 1880, ten were despatched in Wilson Line steamers bound for Stettin. Wilson's also carried more than a third of the other large (100- to 500-ton) chemical shipments,[44] all bar a few of which were destined for Stettin or Riga. Elsewhere, supplies to the secondary chemical receiving ports were generally assured by the lesser North European carriers, with the Danes playing an especially active role in the Lower Baltic through a mixed use of sail and steam. The inroads of Sweden's carriers into the transport of Tyneside chemicals to the Baltic were (as yet) significant by intent rather than volume, although their steamers had gained an eight to thirteen percent share of this traffic to Danzig, Cronstadt and Reval.

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[43] The same contrasts could be observed elsewhere, for example, between the old (sail-served) Hanseatic port of Rostock and the new steamer port of Riga.

[44] Approximately 100 cargoes in all (compiled from *NBESL*, 1880).

Subsidiary Commodities: Composition, Value and Destinations

Although coal and chemicals dominated Tyneside's Baltic-bound exports, there were a number of well-defined subsidiary commodities – largely regional in origin – that provided significant economic value from relatively low volumes. The oldest recorded such exports – dating from early medieval times – were the millstones and grindstones traditionally hewn from numerous surface quarries located on select strata within Tyneside's eponymous 'millstone grit'.[45] These 'Newcastle Grindstones' retained a firm, if undistinguished, position in North European markets where they were in demand (for various milling purposes) well into the nineteenth century.[46]

More recent of origin was the humble, heat-resistant firebrick. Its manufacture and subsequent export dated only from the mid-eighteenth century when the commercial possibilities of its basic raw material, fire-clay, was first realised by extracting and processing the siliceous 'seat earth' layers underlying coal seams. The early, small-scale, manufacture of fire-bricks (and associated goods) was followed by inventive developments in the second quarter of the nineteenth century which met a growing, and technically more sophisticated, demand for refractory linings in the gas, alkali, iron, and coke industries. Similarly, the production of ordinary fire-bricks expanded hugely as they came to be specified for 'ordinary building purposes', and even domestic 'chimney tops' or exterior decorative features.[47] More practically, civil authorities increasingly specified that 'sanitary tubes' (sewer pipes) should be of durable fire-clay. Nevertheless, in 1861 the most recent construction-oriented potential export was not the firebrick, but construction grade 'Portland' cement – whose manufacture was based upon the use of local Tyneside limestone. This new industry's annual output rose rapidly after the appearance of a major manufacturer in 1856, reaching some 10,000 tons per annum in the early 1860s. Significantly, the economics of both firebrick and cement production demanded ready supplies of cheap coal.[48]

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[45] D.A. Robson, ed., *The Geology of North East England* (Newcastle, 1980), pp. 11-12.

[46] Hence the Tyneside saying: 'A Scot, a rat and a Newcas'le grindstone are found the world over'. Named Baltic exporters in the nineteenth-century included Newcastle-based Richard Kell and Co. (est.1784) whose large quarries lay on the Tyne's south shore.

[47] For instance, the *NDC*, 30 July 1860, commented 'The export of firebricks from the Tyne to the Baltic is at this moment most extensive… increasing daily in importance.'

[48] Armstrong *et al* eds., *Industrial Resources*, pp. 177-178, pp. 207-212.

Beyond these rather localised extractive products the Tyne's southern hinterland contributed much in the way of ferrous and non-ferrous metals for export. Lead products and a wide variety of iron goods were especially noteworthy, the former supplied from the region's long-established mines, smelters, or manufactories. Refined copper was also available for export by the late 1860s, its commercial production having been achieved by innovatory re-processing of local industrial waste. Less easy to quantify and categorise were exports of a diverse range of mainly Tyneside-made products, including pottery, foodstuffs, and glassware. In addition, there were limited quantities of distantly sourced export goods, including Welsh tinplate and, for a period, American raw cotton.

In 1861, Tyneside's Baltic exports of North East non-coal extractive commodities: millstones and grindstones; firebricks, retorts, pipes etc.; raw fireclay; and cement, amounted to some 7,000 tons, with firebricks exports alone, at 3,615 tons, effectively equaling those of iron. Indeed, the weight of metals exported lay below that of the extracted commodities: 5,000 as against 7,000 tons. However, in respect of aggregate values, rather than volumes, the comparison was more complex.

As a parochial export grindstones and millstones did not feature in the national Customs returns but, although there is scarce local reference to pricing, the total value of the 1,157 tons exported to the Baltic in 1861 was probably close to £2,000. [49] Although the price of firebricks in the early 1860s is better attested, exact valuations of exports remains problematic since the difference in cost between 'inferior' and 'superior' grades was substantial: £1.50 and £2.75 per 1,000 respectively (equivalent to £0.50 or £0.92 per ton).[50] Taken at an average supplier value of £0.71 per ton, then a Baltic export value of £2,500 is indicated. In volume, the 1,205,000 firebricks shipped to the Baltic in 1861 represented c.13 percent of the Tyne's annual exports of 9,500,000. And the fireclay industry gained further income from the export of 'retorts' and raw clay which, for Customs purposes, were classified separately.

Segregated export statistics for cement were not recorded at all nationally in 1861. However, as Portland cement dominated local manufacturers' inventories the Tyne's Baltic exports may be judged against local records of its price and production

[49] NCL, *Export Book No.1*; this Baltic consignor's ledger indicates that in 1856 supplier prices were £1.70 (bulk chaldron) and £1.90 per ton (individual stones). Both enumerations are recorded in the *NBESL*, 1861, but by 1880 entries were largely expressed in hundredweights.

[50] Armstrong *et al* eds., *Industrial Resources*, p. 210.

– most consignors specified exports as, 'Portland'. On a cited price basis of £2 per ton (1863), the 1,222 tons of cement exported to the Baltic possessed an estimated value of £2,444, and these exports absorbed some 12 percent of the region's total annual output, c. 10,000 tons.[51]

Table 4.16 Extractive Commodities: Volumes & Values, 1861; Volumes, 1880 (tons; pounds sterling; factor where 1861=1)

	Exports, 1861 (tons)	Value, 1861 (£)	Exports, 1880 (tons)	Increase (factor)
Mill/Grindstones[52]	1157	2000	3253	2.8
Firebricks[53]	3615	2500	16301	4.5
Raw Clay	1008		1486	1.5
Cement	1222	2444	3459	2.8
Totals	7001		24498	

Compiled and calculated from *NBESL*, 1861, 1880

Although these extractive, non-coal commodities – whose origins also lay quite literally in the rocks of the region – constituted less than two percent by volume (or value) of the Tyne's total Baltic exports in 1861, nevertheless they provided a significant producer outlet. More remarkably, over the next twenty years their average rate of growth at least matched that of Baltic coal exports. Shipments of those seemingly traditional, pre-industrial products: millstones and grindstones, almost trebled in volume; and firebrick exports fulfilled their early expansionary promise with more than a four-fold increase – matching that of chemicals. (see Table 4.16)

Notwithstanding the North East's reputation for heavy industry, the export of metals and metal products to the Baltic from the Tyne in 1861 was at a relatively low

[51] British Association, *A History of the Trade and Manufactures of the Tyne, Wear, and Tees* (2nd edition, Newcastle, 1863), p. 178; cites 8s 6d per 430lb cask, giving a slightly higher price (£2.21per ton), with a resultant export value of £2,700.

[52] Includes stones shipped by the chaldron (i.e. recorded by weight) only. Over 1,000 individual stones of unspecified weight and size probably aggregated c. 70 tons, worth £133.

[53] Not including other fireclay goods such as 'retorts'.

level, for that market absorbed only ten percent of the Tyne's global exports of iron. Conversely, 73 percent of the Tyne's (admittedly smaller) exports of lead were destined for the Baltic. (see Table 4.17)

Table 4.17 Newcastle's Metal Exports by Volume, 1861 and 1880 (tons)

	Iron		Lead [54]		Copper	
	1861	1880	1861	1880	1861	1880
All Exports	35868	94712	2152	6949	25	6342
Baltic Exports	3705	29587	1565	5948	0	1281
Baltic percent (%)	10	31	73	86	0	20

Compiled and calculated from: *NBESL*, 1861, 1880; *ASTN*, 1861, p 230, p234; *ASNS*, 1880, p128, p130.

So, if the Port of Newcastle's Baltic trade was relatively unimportant for North East iron producers in 1861, Baltic exports of lead were of vital concern to its processors and manufacturers, and continued to be so. For, as the Tyne's global exports of lead expanded threefold over the next twenty years (see Table 4.18), the Baltic market consolidated and took an ever greater share: absorbing 86 percent by 1880. The global growth of the port's iron exports was somewhat lower, but in relative terms the Baltic gained again, for tonnages to the Baltic increased eightfold and its share of these exports rose steeply: from ten to 30 percent. (see Table 4.17)

In its unfinished (smelted) form lead was generally exported as 'pig lead', and that comprised two-thirds of all Baltic-bound lead exports in 1861. The local lead industry's subsequent local processing was largely concerned with producing finished lead goods: milled lead (lead sheet), lead shot, and lead pipe.[55] Lead derivatives – obtained through chemical processing – were generally considered as lead industry products too, with red or white lead, and litharge (lead oxide) prominent amongst such

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[54] Calculated at one hundredweight per 'pig', the equivalence made clear in NCL, *Export Book No.1*. Some contemporary publications infer 1¼-1½ hundredweight per 'pig'.

[55] D.J. Rowe, *Lead Manufacturing in Britain, a History* (Kent, 1983), pp. 105-07, p. 140.

exports.[56] As a high worth item, Newcastle's global exports of lead had a declared value of £45,533 in 1861,[57] inferring that the value of Baltic exports (£21.16 per ton) was close to £33,000. However, despite the near fourfold increase (by weight) of these Baltic exports over the next 20 years, their value barely tripled, reaching just £98,083 in 1880 (see Table 4.18).[58] Competitive pricing in the increasingly efficient and over-productive regional lead industry seems the probable cause.

Table 4.18 Exports of Lead to the Baltic from Newcastle by Category, 1861 and 1880 (tons; percentage)

	1861		1880	
	Exports (tons)	Share (%)	Exports (tons)	Share (%)
Pig Lead	1034	66	3205	54
Goods & Derivatives	530	34	2743	46
Totals	1564		5948	

Compiled and calculated from *NBESL*, 1861, 1880

Iron was exported from Tyneside in three forms: pig iron; partial manufactures such as rod, sheet, bolt iron, bar iron, etc.;[59] and, fully manufactured goods ranging from individual castings of a few hundredweights or less (e.g. anchors and blocks) to major manufactures weighing several tons (e.g. chain cables). The bulk of Newcastle's iron exporting business to the Baltic in 1861 lay in manufactured goods and stock, pig iron shipments were negligible (See Table 4.19). Even as officially

[56] Contemporary practice often categorized lead derivatives as 'chemicals', but they are more conveniently aggregated under lead exports here (1861).

[57] *ASTN*, 1861, Table34.

[58] As calculated *pro rata* for Newcastle's lead exports, *ASNS*, 1880, p. 128, 130. The weights of the lead goods and lead derivatives shipped in 1880 were closely comparable (1,482 and 1,261 tons respectively), but such division is not possible for 1861.

[59] Referred to collectively here as 'stock'.

categorized, iron's marked disparities of price makes estimation of values difficult,[60] but calculation suggests approximate values for Baltic exports of: £7,850 for iron stock (including pig iron); and, £21,341 for manufactured iron goods.

Table 4.19 Exports of Iron to the Baltic from Newcastle by Category: 1861, 1880 (tons; percentage)

	1861		1880	
	Exports (tons)	Share (%)	Exports (tons)	Share (%)
Pig Iron	221	6	21379	72
Iron Stock	1482	40	7400	25
Iron Goods	2002	54	807	3
Totals	3705		29587	

Compiled and calculated from *NBESL*, 1861, 1880

Allowing for various uncertainties the value of iron exports from the Tyne to the Baltic in 1861 is reckoned to be near to £30,000.[61] By 1880, this had tripled in line with the threefold rise in export volumes to some £110,000.[62] However, these raw figures conceal a distinct shift in the range of iron products exported, with considerable diminution in iron goods and a massive (near hundred-fold) expansion in the weight of pig iron (see Table 4.19). This particular export opportunity had been the (unforeseen) product of Russia's anxiety to protect its own large manufacturers since a bounty system for steel rails – designed to encourage domestic pig iron production – was manipulated by Russia's wealthy producers in such a way that it

[60] *ASTN*, 1861, Table 34. Newcastle's exports of iron stock (including pig iron) reckon out at £4.61 per ton, whilst 'wrought' iron products rate £13.81 per ton. Official publications adopt either a variety of categories, or, use only 'wrought' and 'unwrought'. It is unclear how the compilers of the *ASTN* condensed the source statistics (as recorded in the *NEBSL*) into their more limited categories.

[61] Iron's much greater export volumes compared to lead compensated for its lower unit value; the two metals were thus close in gross export value.

[62] As calculated *pro rata* for Newcastle's iron exports, *ASNS*, 1880, p. 128, 130.

resulted in a substantial intake of British pig iron for processing, using imported coal.[63]

Tyneside's exports of copper were negligible in 1861,[64] and none was recorded as despatched to the Baltic except in the form of dedicated manufactures (e.g. telegraph cable). However, Tyneside's industrial chemists were already working on the extraction of metallic copper from chemical industry by-products and imported iron pyrites, and by the late 1860s they had developed commercially viable processes.[65] Consequently, by 1880 the Tyne's global exports of this (high value) metal stood at over 6,000 tons, with the Baltic commanding a 20 percent share: 1,281 tons valued at £53,853.[66] Two-thirds of this was shipped as refined ingots, with the remainder as partially processed 'copper cake' or cuprous precipitate. Though the weight of copper shipped was less than one-twentieth that of iron, it represented fully half as much in returns to the local economy.

Beyond the local extractive products and metals described, lay a diverse range of miscellaneous exports. Although relatively low in volume they are difficult of categorisation, quantification and valuation, often representing casual or opportunistic cargo components. Over 130 such miscellaneous artifacts and raw materials may be identified (1861 and 1880), though of these the more significant can be segregated into fifteen categories. Eight categories were especially prominent: non-ferrous metals other than lead and tinplate; specialty chemicals (including acids); formed fire-clay products and specified clays; foodstuffs (dry and liquid); glassware (domestic and industrial); very small iron or steel goods (e.g. files and shovels) and steel stock; machinery (industrial and agricultural) and millwork; domestic pottery (earthenwares and porcelain).[67]

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[63] The Tyne's very large shipments of raw pig iron to St. Petersburg in 1880 suggest that Tyneside manufacturers probably took advantage of this particular demand. BPP, *First Report of the Royal Commission Appointed to Inquire into the Depression of Trade and Industry,* 1886, p. 23, 29; evidence of C.M. Palmer.

[64] Just 25 tons, and this was likely processed outwith the region.

[65] Campbell, *Century of Chemistry*, pp. 53-55.

[66] As calculated *pro rata* for Newcastle's unwrought copper exports, *ASNS*, 1880, p. 128, 130.

[67] In practice, listings of many miscellaneous products were no more than a Customs House convenience, e.g. shipments of raw clay and specialized fire-clay manufactures could be committed to the extractive products category adopted here.

In practice, objective or even comparative valuation figures for these exports are near impossible to obtain due to uncertainties of price, measure and quantification,[68] and neither can the expansionary trends of coal and chemicals be applied to, for example, glass and pottery.[69] Baltic demand for glass appeared static, with the 45 tons and 5,000 pieces of 1861 apparently close in volume to the 96 tons of 1880. Meanwhile, pottery saw an apparent decline, with a mere five hundredweights exported in 1880 as against 250,000 pieces in 1861. Naturally, some comparisons of this kind may result from the vagaries of demand in these particular years, and may not reflect underlying trends. For example, American civil war embargoes halted Newcastle's normal transshipments of raw cotton to Russia in July of 1861, but by 1880 this business had returned and over 300 tons of cotton were despatched. Conversely, miscellaneous exports related to major Tyneside bulk products appear to have enjoyed similar, steady long term growth rates to them.[70]

Viewed in a broader perspective, the majority of these miscellaneous exports were local in origin with individual consignments frequently driven by very specific market demands, often non-recurring in nature. Consequently, it is as useful to examine them in relation to destination, and end use, rather than by strict product category alone.

Subsidiary Commodities: Destinations

Separation of miscellaneous exports by product and port of destination provides qualitative evidence of dedicated trades and helps demonstrate the import profiles of the principal ports of entry. However, quantitative aggregation by nation is not particularly meaningful owing to the disparate nature of the products and the uncertainty of contemporary valuations.

The most striking miscellaneous Baltic-bound exports of 1861 were the fourteen Tyneside-built locomotives shipped to Riga for the newly opened Riga to Dünanberg railway (connecting St. Petersburg through to Warsaw), a system that,

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[68] For instance, the *NBESL*, 1861, usually records miscellaneous goods by number (e.g. earthenware pieces), whereas that for 1880 consistently quantifies them by weight.

[69] C. Ross, 'The Development of the Glass Industry on the Rivers Tyne and Wear, 1700-1900' (Unpublished Ph.D. thesis, University of Newcastle, 1982).

[70] For example, Baltic exports of special-purpose fireclay goods (pipes; cupola bricks; arch bricks; retorts; tiles etc) totalled over 800 tons in 1880, indicating steady expansion.

locally, captured much of Riga's formerly river-borne traffic.[71] Indeed, Russian ports received all of Tyneside's machinery exports to the Baltic in 1861, including: two small steamers (carried entire), 20 items of agricultural machinery for St. Petersburg and Cronstadt, textile machines and equipment for Narva, and a few reaping and 'washing machines' for the provincial port of Libau (in Kurland). With no repeat of the exceptional locomotive order of 1861, exports of 'machinery and millwork' to Russia in 1880 were less than 60 tons, mostly destined for Russia's textile factories in the Upper Gulf, as was the 1,000 gallons of sperm oil for Narva.

Amongst other Tyneside manufactures, glass and earthenware were largely directed to Russia whose capital, St. Petersburg, took two-thirds (c. 30 tons) of all Baltic glass imports in 1861, together with nearly 100,000 out of 250,000 'pieces' of earthenware pottery. St. Petersburg's urban domestic needs of the 1860s are also indicated by exports of: more than 100 tons of 'freestone', regular consignments of special fireclay products, and 43 tons of Tyneside-produced 'patent size paste'. Although, in 1880, the ultimate destination of much Tyneside glass exported to Russia was probably still St. Petersburg, imports were now concentrated through Reval or, to lesser extent, Cronstadt; these two ports absorbed well over half the Baltic's glass imports.[72]

Exports of fireclay products, other than firebricks, had shifted their direction by 1880 as well. The emphasis was upon shipments – of up to 100 tons each – of sanitary pipes to the major urban centres around the Baltic, in particular to the towns of the German Lower Baltic. Danzig alone absorbed well over 300 tons, whilst Königsberg, Stettin, Helsingfors and Riga each took nearly half that. Similarly, Riga, Viborg and Narva imported quantities of retort pieces (for gas making) and furnace cupola bricks. These high levels of imports clearly helped to meet the demands of urban improvement schemes in the large Baltic port cities: the populations of Danzig, Königsberg and Riga all passed 100,000 during this period.[73]

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[71] M.R. Bailey, 'Decision Making Processes in the Manufacturing Sector: The Independent Locomotive Manufacturing Industry in the Nineteenth Century' (Unpublished PhD thesis, University of York, 1999); M.R. Bailey, personal communication.

[72] By 1880 the carriage of glass had become the preserve of steamers, militating against direct imports to St. Petersburg – it received a mere three tons. Imports of building materials had also collapsed, reduced to a single, Dutch-carried (ballast) cargo of brick.

[73] Kirby, *Baltic World*, pp. 142-143.

Three kinds of extracted raw material exports also merit mention: clay; barytes; and, 'crude mineral'. In 1861, the shipments of local clay, fireclay and 'pothouse clay' were mainly destined for Viborg (fourteen tons), albeit there was a five-ton parcel of transshipped china clay for St. Petersburg. Barytes, a by-product of the lead mines in Tyneside's southern hinterland played only a minor role in 1861;[74] Stettin took just 50 tons, but by 1880 this had risen to 650 tons. Similarly, although no crude mineral exports had been recorded in1861 those to Stettin alone exceeded 700 tons in 1880.[75]

Coal tar, a Tyneside coal derivative, was shipped principally to Riga, which received over 300 barrels and 100 casks (some 60 tons) in 1861. Lesser quantities were directed to half-a-dozen more ports along the Baltic's southern shore, a pattern and volume unchanged by 1880. However, exports in 1861 such as telegraph cable (22 tons) to St. Petersburg and Cronstadt and 20 tons of gas fittings to Helsingfors, seem to have been singular orders – these products were not recorded in 1880. Exports of salt herring (a staple Baltic foodstuff) occurred in both years, however, with a small quantity of Scottish-caught 'Loch Fyne' herring in 1861 superseded by 180 tons of North East coast caught herring in 1880.[76] Generally, however, foodstuff exports were negligible.

The Tyne's location meant that it was not favoured as an entrepot port for commodities sourced outside the North East; it played a limited role in transshipment. Only two significant Baltic-bound products were transshipped in 1861: American cotton for St. Petersburg, and, presumably Welsh, tinplate. The boxed tinplate was dispatched primarily to Russian ports, with lesser amounts to secondary Prussian and German ports. Both transshipped commodities were present in 1880, although cotton shipments (which had declined overall in volume) were made by steam to Cronstadt rather than direct to St. Petersburg.

On a comparative basis, St. Petersburg showed itself to be the largest and most catholic marketplace for miscellaneous imports in 1861, taking the widest range of manufactures and raw materials. These were demands that might well be expected of

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[74] Barium sulphate, a gangue (waste) mineral associated with lead ore. Its chief use was a filler for paper, white paint and cheap cloth, hence the demand in industrial Stettin.

[75] The term 'crude mineral' probably indicates raw lead ores.

[76] Riga took 130 tons of this local herring and Stettin 50 tons.

what was becoming by far the Baltic's largest city (population, 900,000). Riga, whose Tyne-originated imports were commonplace ones in 1861, appeared as no more than a weak reflection of St. Petersburg in 1861. But by 1880 it had developed a distinct import profile of it own, albeit one dependent upon rail links to the Russian capital. However, tariffs and government support had eroded Tyneside's potential export market there, especially through government subsidies for the home manufacture of locomotives and rails, a policy that hit rail-related British imports. And, to a lesser extent, the same was also true of Reval. Meanwhile, since it was incapable of receiving the new generation of cargo steamers, St. Petersburg's role as a reception port for miscellaneous imports had declined drastically.

In the Prussian territories, Stettin and (to a lesser extent) Danzig received a limited range and quantity of miscellaneous exports in 1861. However, by 1880, the industrial growth of Stettin, together with the improving urban status of Danzig, ensured considerable growth in the volume of such exports. By comparison, the Prussian capital city (and port) of Königsberg, and the port town of Memel, did not import a great deal either in 1861 or 1880. Königsberg, previously a large-scale exporter of Russian (Polish)-harvested wheat,[77] suffered following Russia's redirection – by means of lowered rail charges – of that commodity to the more distant, but Russian, port of Libau.[78] Arguably though, the city's outport of Pillau compensated for the capital's declining port status through increases in its own steamer trade. By 1880 the situation in Memel, Germany's most northerly Baltic port, was one of severe economic stress, the root cause of which was the impact of nationally imposed tariffs (especially on locomotives and machinery) that depressed the intake of non-coal goods. In the then German regions of the lower Baltic in 1861 the premier position of Rostock within Mecklenburg was marked by demands for Tyneside-produced glass, earthenware, and painters' materials. But, as part of the new Germany, even this small trade had disappeared by 1880, whilst earlier modest intakes of Tyneside goods for local use at Lübeck, Kiel, Wolgast and Stralsund had almost disappeared.

[77] BPP, *Reports by H.M. Consuls on British Trade Abroad, Part I*, 1873, pp. 222-224.

[78] BPP, *Second Report, Depression of Trade, Part II*, pp. 179-183; consular reports from Stettin and Swinemunde, Königsberg, Memel, and Breslau.

Conclusions

Three characteristics marked out the Tyne's export regime for non-coal products, 1861-1880. Firstly, Tyneside manufactured chemicals (especially alkalis) formed the most important component, their relatively high price ensuring that the aggregate value returned by non-coal exports to the local economy was comparatively large. Secondly, non-coal exports were sourced from the immediate industrial or extractive hinterland and, although often limited in global appeal, they were not especially vulnerable to fluctuations in Baltic consumption alone. Thirdly, the Tyne's overall volume and range of re-exported goods was remarkably low compared to other large British ports.

The examination of non-coal exports also conclusively (if unexpectedly) demonstrates some wider aspects of the relationship between the Tyne and the Baltic, in particular attitudes towards free trade. Since non-coal goods faced greater difficulties of entry and increasingly harsh protectionist measures, alterations in their flow often reflected shifts in political boundaries and regulatory attitudes more strongly than did coal's. And, although the underlying robustness of Baltic demand for them was confirmed by growth overall, protectionism (and competition from subsidised indigenous producers) clearly depressed export potential.

In this respect, trends in the export and carriage of chemicals are particularly instructive of carriers' responses to changed circumstances and capabilities. There was a radical shift away from chemical conveyance *via* a fleet of many small North European sailing craft, to conveyance by a relatively small number of large (predominantly British-owned) steamers. Other non-coal producers had similar needs – promptness of shipment and stowage care – marking out their requirements for more sophisticated shipping provisions than those that satisfied exporters of coal. And, in the steamship era, coal's leading consignors frequently extended their interests by providing transaction services for non-coal goods too. But inconsistency of long term demand, relative lack of volume, and downward trends in freight rates deterred even major manufacturers from direct engagement in product consignment or shipowning. Altogether though, the shipment of non-coal goods to the Baltic added a dimension to the port of Tyne's traffic that – although hinted at by Elliot – has lain largely unrecognized,[79] offering a sustained and worthwhile marketplace for producers in its hinterland.

Finally, it is argued that this detailed review of the origin, nature, volume and destination of non-coal goods exported from the Tyne to the Baltic acts as an indicator of the very different geographic, technological and social environments enjoyed by that port's limited regional hinterland and its far more extensive international foreland in the Baltic – providing specific substance to Elliot's broader observations on the subject.[80] Given the opportunities grasped when developing the resultant successful outward trade to the Baltic foreland, it is pertinent to inquire whether this was balanced by a reciprocal inflow. That is, was there a substantial measure of inward trade accompanied by a local response that provided the backhaul tonnage needed for imports?

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[79] Elliot, 'Tyneside, a Study', pp. 265-66.

[80] Elliot, 'Tyneside, a Study', pp. 269-72.

CHAPTER 5: THE TYNE'S BALTIC IMPORTS, 1861-1880

Compared to the export trade in coal, the Tyne's imports have been regarded by contemporaries and modern historians alike as rather unimportant. As a single sector within the port of Tyne's (admittedly limited) role for global imports the intake of Baltic products has not excited previous research. Even secondary sources confine mention to generic comments on those timbers and fibres imported from the Baltic for shipbuilding purposes,[1] or to the controversies associated with late-nineteenth century plans to build a dock that might stimulate imports.[2] And, as Rennison concludes, even the laggardly provision of this dock (Albert Edward Dock, 1884) was ambiguous of intent and uncertain in outcome.[3] As a consequence the carrying regimes that supported the Tyne's own limited Baltic imports are best viewed in a wider context, that of east coast trade as a whole, where these regimes contributed much to the inward trade of its premier import centres, Hull and London.

The Baltic Imports of the Tyne, 1861 and 1880

Through a qualitative appraisal alone, Newcastle's Customs records for the period 1861-1880 suggests that the volume of imports reaching the Tyne lay far below that of its exports. Such a conclusion is fully supported by contemporary published statistics. This marked disparity in favour of exports over imports immediately sets the port of Tyne apart from its major northern counterparts of Hull, Liverpool, and Leith, where the situation was far more balanced or where imports were ascendant.[4]

Measured by ship numbers and aggregate tonnage, Newcastle's global imports in the early 1860s were just under 20 percent those of exports, although this figure did rise to almost 30 percent in the early 1870s.[5] Meanwhile, the imbalance in the Baltic

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[1] J.F. Clarke, *Building Ships on the North East Coast, Part 1. c.1640-1914* (Newcastle, 1997), pp. 50-53.

[2] Johnson, *Making of the Tyne*; J. Guthrie, *The River Tyne: Its History and Resources* (Newcastle, 1880).

[3] Rennison, thesis, 449.

[4] J.M. Bellamy, *The Trade and Shipping of Nineteenth-Century Hull* (York, 1971); F.E. Hyde, *Liverpool and the Mersey* (Newton Abbott, 1971); S. Mowat, *The Port of Leith* (Edinburgh, 1994).

[5] Plummer, *Newcastle-upon-Tyne*, p. 40; Plummer's statistics (1863, 1873) were supplied by the 'Custom House'.

trade itself was generally much greater again, for imports ran at only some ten percent (or even less) of the port's corresponding volume of exports.[6] These relatively low volumes of imports were constrained in variety too, for the most part consisting of little more than cereals (wheat, oats and rye) or peas, together with primary wood products (sawn and unsawn).

However, accurate aggregations can rarely be made of the quantities of goods imported into the Tyne for, unlike common Customs procedures elsewhere, Newcastle's officials often simply categorized – rather than quantified – imported goods; furthermore, their recording practices varied from year to year.[7] In consideration of these and allied problems, the only realistic measure of comparison is through aggregating the shipping tonnage engaged in carrying the more significant categories of Baltic imports, and delineating whether they were ordinarily carried alone or constituted mixed cargo.

The greater part of the shipping carrying imports in 1861 was divided equally between the carriage of grain (especially wheat) and wood. But by 1880 this balance had changed, for imports of grain had fallen markedly and wood's tonnage had correspondingly risen. Calculation suggests that imports of Baltic wheat in 1861 amounted to approximately 13,000 tons, suggesting that Newcastle relied upon the Baltic for up to 40 percent of its foreign wheat supplies at that time.[8] However, its

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[6] The changing format of the Customs returns makes exact comparison impossible, but the following indicates the proportion of Baltic imports as against exports when measured by tonnage employed:

1861, All Baltic to Newcastle (compiled from *NBESL*, 1861):	10% of exports
1871, 'Russia: Northern Ports' to Tyne Ports (*ASNS*, 1871) :	6% of exports
1880, All Baltic to Tyne Ports (compiled from *NBESL*, 1880):	6% of exports

[7] Of the two principal Baltic imports in 1861, only one-in-four consignments of wheat were reported by weight. Listings of wood employed over twenty product descriptions, various volumetric measures, and simple enumeration ; all defying reduction to the accepted contemporary measure, the 'load'. Quantifying wood goods was always difficult, see for example: H.C. Johansen, 'Baltic Timber Exports in the Late Eighteenth Century', in Y. Kaukiainen, ed., *The Baltic as a Trade Road*, VII Baltic Seminar at Kotka 1989 (Kotka, 1989), pp. 18-22; Stevens, *On Stowage* (5th), pp. 609-13.

[8] Ten full cargoes of wheat recorded by measure, *NEBSL*, 1861, totalled 8,212 quarters (1,833 tons). *Pro rata* (by tonnage), the other 50 full cargoes of wheat would have totalled c. 9,000 tons, with a further 49 ships delivering unmeasured part-cargoes of at least a third as much again. According to, *ASTN*, 1861, Table 32, Newcastle's total imports of foreign wheat amounted to 155,255 quarters (34,655 tons).

imports of Baltic wheat declined drastically over the next twenty years – to merely 1,300 tons in 1880. And, since the port's global wheat imports remained static, the Baltic now represented barely four percent of its foreign intake. Whereas at least 7,000 tons of shipping tonnage had been engaged for wheat in 1861, just under 1,000 tons was employed in 1880 (see Table 5.1). And, although the ports in the Lower Baltic retained their primacy, there were marked changes in the source of these supplies. Initially, Prussian ports had dominated the trade, handling three-quarters of the tonnage that carried wheat to Newcastle in 1861, with Danzig and Stettin clearing a little above and below a third each. However, 1880 saw no Newcastle-bound wheat emerge from Stettin and, although about one-third continued to clear from Danzig, a good half of the (now meagre) total issued from the previously insignificant German port of Rostock. Russia's ports no longer featured.

In 1861, the 33 entire cargoes of wood that arrived in Newcastle required nearly 7,000 tons of shipping, whilst about half as many again contained wood goods combined with wheat, peas or (occasionally) other products. Altogether, some 9,000 tons of shipping carried wood goods. As with wheat, wood was largely loaded in Prussian ports. Danzig and Memel were by far the largest contributors (42% and 28% respectively), and together with Stettin they handled just over 80 percent of the tonnage carrying entire cargoes of Baltic wood to Newcastle. Russian exports, through Riga and Cronstadt (plus one small cargo from Libau) contributed the remainder.[9] Before 1880 though, the situation changed radically. Imports of Baltic wood trebled to around 100 cargoes, needing 20,000 tons of capacity, and there were major shifts of origin. Although Danzig retained its premier position, by 1880 it was closely challenged by the Russian ports of Riga and Kotka (demoting Memel to fourth-ranked provider). Riga and Kotka's rise, combined with the opening up of more loading points on the Gulf of Finland's north shore, thrust Russia ahead of Germany as the principal employer of tonnage for carrying Baltic timber to Newcastle (Russia, 57%; Germany, 43%). Whether from Russian or German ports, however, the carriage of wood had become a much more specialised business. Whereas a high

[9] Where shipments of wood were mixed with other commodities the supply pattern remained much the same, suggesting wood was always the leading component.

proportion of shippers to Newcastle had mixed subsidiary products with their wood in 1861, only five out of 100 did so in 1880.[10]

Despite the fact that the aggregate tonnage required for Baltic wheat and wood to Newcastle remained much the same between 1861 and 1880 (c. 20,000 tons) there was a significant, 75 percent, growth in the overall tonnage engaged for Baltic imports (see Table 5.1). This largely arose from a few new demands, in particular for the carriage of bagged flour from Kiel which provided for 40 % of this growth alone by 1880 (21 cargoes employing 7,000 tons of shipping, mostly steam).

Table 5.1 Principal Baltic Import Cargoes, 1861 and 1880

(number; tonnage)

	1861		1880	
	Entries (No.)	Tonnage (tons)	Entries (No.)	Tonnage (tons)
Wheat only	50	5361	8	906
Wheat + Other Goods/Wood	49	6414	0	0
Wood only	37	7288	101	21175
Hemp and/or Flax	7	1217	7	955
Specific or Mixed Goods	18	2118	55	16304
Totals	161	22398	171	39340

Compiled from *NBESL*, 1861, 1880

There was also a convenient new 'ballast' trade from Cronstadt, the importation of heavy chrome ore in individual shipments of 30 to 300 tons.[11] And some growth also occurred in a pre-existing mundane trade, the import of baled rags (nine shipments from Libau and Königsberg in 1880). However, the take up of tonnage for Russian linseed and hemp to Newcastle remained at a very low level in

[10] Four of these were casual consignments – kegs of spruce beer from Stettin – the other a shipment of steel rails from Cronstadt 'for [re-]exportation' and ballast.

[11] Although five of the eleven vessels that arrived with chrome had already discharged cargo (probably wood) en route at Berwick, Hull, Lynn, or Dover.

1880, requiring less than 500 tons for linseed and a barely 1,000 tons for hemp. Altogether, the trade in flour, chrome, rags, hemp and linseed, accounted for 80 percent of the tonnage required for the import of Baltic non-wood products into Newcastle in 1880. And it was the carriage of flour, chrome and rags that helped drive what limited growth there was in Newcastle's Baltic import tonnage between 1861 and 1880.

Carriers of Imports, 1861 and 1880

Shortcomings in the original recording procedures mean that it is not possible to assign places of origin to all the vessels that carried Baltic imports to Newcastle. Nevertheless, 60 percent can be accounted for by port and country in 1861, and 75 percent can be accounted for by country (only) in 1880, providing an adequate basis for consideration of the carriers engaged.[12] Correspondingly, these records can also be used to determine the proportion of ships engaged in reciprocal voyaging direct.[13]

Ships engaged to carry cargoes into Britain from the Baltic in 1861 were primarily those of participating trading nations. Prussia provided approximately 40 percent of the tonnage engaged, the German Confederation's Baltic provinces together with England supplied around 20 percent each, whilst the Scots, Danes and Dutch took up much of the remainder – Russia's contribution was very modest. Stettin was the only major originator of imports that housed a large carrying fleet (1,832 tons). As the largest single supplier of import tonnage its contribution was closely followed by that of neighbouring Wolgast (1,675 tons), which supplied much the same capacity as the recipient Tyne (i.e. Newcastle/Shields, 1,714 tons).

The West Prussian littoral around the mouths of the rivers Oder and Peene formed the most concentrated area of tonnage supply, with Stettin, Wolgast, Stralsund, Greifswald, Uckermunde and Swinemunde providing approximately 5,500 tons of shipping between them. Collectively, they contributed a third (or more) of all the ships that entered the Tyne with Baltic imports in 1861. Stettin's export trade was

[12] Newcastle's Collector of Customs did not record the origin of vessels entering from abroad, but consistently did so for those departing (another indicator of the importance afforded locally to exports). Consequently, a homeport or nationality can be readily assigned only to ships that made a Baltic export, as well as an import, trip.

[13] Some 60% made direct reciprocal trips in 1861, and 75% in 1880. Presumably the remainder departed the Tyne coastwise or towards non-Baltic ports overseas.

carried largely in Prussian ships and, remarkably, Stettin-registered ships were found on no other Baltic-to-Tyne export route. This specialisation seemed to result (in the Newcastle context) from Stettin's owners concentrating on their port's early season grain shipments.[14] Despite the fact that Prussian shipping also serviced much of the needs of Danzig (ten clearances, 1,867 tons),[15] Danzig's providers were far more mixed in terms of North European participation, and included a prominent Scottish contingent (six clearances, 656 tons). This carrier mix probably resulted from the fact that its exports were delivered over a lengthy season – lasting well into high summer – with a wider variety of cargoes available than at Stettin.

Elsewhere in the Lower Baltic's wheat exporting regions, cargoes for Newcastle were commonly loaded into local ships: Wolgast and Stralsund loaded almost exclusively into vessels owned there, while Neustadt employed ships from nearby Fehmern. Conversely, Memel's low level of wood exports relied upon its long held German connections, using shipping from Rostock. But in Russia three of the four export cargoes shipped from Riga in 1861 found English carriers – two from Newcastle and one from Hull.

Despite the fact that shipping from the new German nation (founded 1871) carried around half of all Newcastle's Baltic imports in 1880, the impressive tonnage involved (16,131 tons) had actually fallen slightly as compared with 1861 – when Prussia together with the German Confederation had supplied some 60 percent. Nevertheless, Germany's tonnage in 1880 was still twice that of its nearest rival, Britain (25%),[16] with Denmark, Russia and Norway – in that order – providing much of the remainder (25%). (see Table 5.2)

Changes had also occurred in the nationality of the ships servicing the exports of the Baltic ports, and their tonnage also serviced new entrants (chiefly Kiel, and the Gulf of Finland's northern shore timber ports). Amongst the prominent exporters to Newcastle, Danzig had lost its former mix of shipping providers in favour of German carriers. German shipping had also picked up the re-invigorated trade of Memel, but its new domination of Riga's exports (where Britain was now barely represented) marked an even more striking advance. In burgeoning Kotka across the Gulf, Russian-

[14] Two-thirds of Stettin's Newcastle-bound tonnage in 1861 was Prussian: ten out of fifteen cargoes were April and May arrivals of wheat.

[15] Vessels from Wolgast, Greifswald and Stralsund again played a prominent part.

[16] Britain's competing fleet was composed of English and Scots ships alone.

registered vessels held sway, and only at Cronstadt did British ships maintain their lead as the carriers of choice for Russian shipments to Newcastle. At the Baltic's western extremity, in the sensitive border town of Kiel, the carriage of that port's new flour trade to Newcastle was almost exclusively in German hands. Kiel's situation in 1880 also highlighted another emerging factor, as nearly all Kiel-to-Newcastle shipments were carried in steamers (mostly German-owned).

Table 5.2 Principal Carriers of Newcastle's Baltic Imports, 1861 and 1880: by Nationality [17]

(number; tonnage; percentage of tonnage [%])

1861			1880		
	Entries (No.)	Tonnage (tons; [%])		Entries (No.)	Tonnage (tons; [%])
Prussia	33	5696 [42]	Germany	74	16131 [52]
England	15	2894 [22]	Britain	14	7219 [23]
German Conf.	27	2747 [19]	Denmark	12	2811 [9]
Scotland	7	754 [6]	Russia	12	2458 [8]
Others	12	1234 [11]	Others	15	2647 [8]
Totals	94	13325	Totals	127	31266

Compiled from *NBESL*, 1861, 1880

Other than Kiel, it was only Cronstadt that espoused steam to any extent for its Newcastle-bound trade, and even there it was barely half the tonnage used.[18] Although by 1880 steam's aggregate tonnage approached two-thirds that of sail in the Baltic-to-Newcastle import trades (13,000 and 19,000 tons respectively), steam's apparent advance was heavily skewed by Kiel's usage alone. Overall, steam was still a minor (or even non-existent) provider from the point of view of the majority of

[17] Excludes carriers of unknown nationality: 1861, 64 entries, 8,524 tons; 1880, 44 entries, 8,074 tons.

[18] Kiel despatched 6,687 tons of steam shipping to Newcastle in 1880 and Cronstadt 3,770 tons; Danzig (the next highest) only 763 tons.

Baltic ports shipping exports to Newcastle.[19] And the large number of Tyne-registered steamships that now carried coal outwards to the Baltic did not figure amongst the arrivals with Baltic goods in their own home port – although many were to be found re-entering British ports elsewhere.

The Tyne's 'Import Docks' – Hull and London?

Unexpectedly perhaps, locally registered ships did not dominate the British tonnage that carried Baltic goods into the port of Newcastle in 1861. Just half of the 22 known entries made by British vessels in that year were definitely made by Tyne-registered ships, representing two-thirds of the tonnage involved.[20] Scottish owned vessels formed the next largest British contingent (seven entries, 745 tons).[21]

Given that Tyne-registered ships made 188 departures from Newcastle for the Baltic in 1861, then the proportion that returned with imports direct to their home river was remarkably low (6%), leaving nearly 180 vessels whose return cannot be immediately accounted for. However, consideration of the arrival lists of the East Coast's two other leading ports, Hull and London, resolves the question of their inward destinations. During the Baltic trading season of 1861 a little over 200 Tyne-registered ships totalling c. 48,000 tons entered Hull and London from the Baltic. These inward figures, with Newcastle's added in, bear close resemblance to the corresponding departures from the Tyne towards the Baltic, 188 departures totalling 47,000 tons.[22] (see Table 5.3)

As the most favoured port of re-entry for Tyne-registered ships, London's intake well exceeded that of Hull. Nevertheless, Hull attracted 22 percent (10,764 tons) of the Tyne-registered group of returnees, and its draw was such that 78 percent of this Humber-bound shipping had commenced its Baltic round trip from the Tyne.[23]

[19] For example, Newcastle recorded no steamer entries from Kotka and Memel.

[20] Allowing for two ready identifications (*Gloriana*, *Breeze*) that probably sailed outward from their homeports of Amble and Blyth, only about half of this British tonnage was actually owned on the Tyne.

[21] Banff-registered vessels accounted for five of these.

[22] That the inward figures appear slightly in excess of those for departures is explained by the number of ships that, although registered at Newcastle or Shields, had loaded coals outward from their owners' sub-ports, Amble or Blyth.

[23] In addition, at least half of the remainder had owners in Amble or Blyth, probably loading outwards from those ports.

The bulk of the Tyne-registered ships returning in this way to Hull carried deals, battens and other sawn wood products from either Cronstadt – the favourite outward destination with coal – or the nearest large Russian timber port to it, Wyburg (at the very head of the Gulf of Finland).[24] Generally, cargoes from Cronstadt were carried in vessels of the largest class, those that could accommodate shipments of bar iron, or linseed, in addition to bulk wood goods. Less than one-third of all comparable entrances into Hull were made from ports elsewhere in the Baltic and, except for a few minor shipments of wheat, seeds or peas (from Stettin and Königsberg), the main constituent was always wood. After discharge, Tyne-registered ships almost invariably left Hull coastwise for home in ballast or (in two-thirds of cases) with a nominal freight of Cheshire salt serving the same purpose.[25]

Table 5.3 Tyne-registered Shipping entering Newcastle, Hull and London with Baltic Imports, 1861
(number; tonnage)

	Newcastle		Hull		London	
	[26]Entries (No.)	Tonnage (tons)	Entries (No.)	Tonnage (tons)	Entries (No.)	Tonnage (tons)
Departed Tyne	9	1714	32	8405	83	20649
Departed Other Ports	2	384	11	2359	79	16429
Totals	11	2098	43	10764	162	37078

Compiled from: *NBESL*, 1861; *Hull Bills of Entry* [*HBE*], 1861; *London 'A' Bills of Entry* [*LABE*], 1861.

[24] However, the voyage patterns of sub-port ships differed from those owned on the river Tyne itself. Sub-port ships placed greater reliance upon return freights from the Lower Baltic, for example the *Isabellas* discharged wheat from Königsberg at Hull and then departed coastwise, in ballast, direct for her owners' homeport, 'Warkworth' (Amble).

[25] Unlike Newcastle's, the *Hull Bills of Entry* [*HBE*] list departures and entries 'Coastwise'. Salt was the basic feedstock of Tyneside's chemical industry.

[26] Includes one ship that arrived via London.

Not only was the volume of Tyne-registered shipping entering London from the Baltic much greater than Hull's, but it differed in character. The proportion of entries made by Tyne-registered ships that had actually left the Tyne outward was much less, 55 percent. Of the remainder, the greatest number was made by ships owned in – and most likely despatched outward from – the Tyne's sub-ports. Of 162 Tyne-registered arrivals in sail at London, 67 percent (108 entries) were by ships whose owners resided on the Tyne,[27] whilst 33 percent (53 entries) were made by vessels belonging to owners in its sub-ports: Blyth, Amble and Alnmouth.[28]

Because of the wider spread of ownership of its incoming Tyne-registered shipping, London's return voyage patterns from the Baltic differed from Hull's. Although Cronstadt and Wyburg similarly provided cargoes for the highest proportion of tonnage engaged (56%),[29] the Lower Baltic ports were markedly more prominent than in Hull. Danzig alone dispatched nineteen percent of the Tyne-registered tonnage that entered the port of London from the Baltic, whilst Memel and Stettin played proportionately large parts as well. Once again though, ships operating directly out of the Tyne showed a preference for lifting cargoes from the Russian ports of the Upper Baltic, whilst those from its sub-ports had a higher frequency of return from the Lower Baltic.[30]

Altogether, these Baltic cargoes discharged in the port of London reflected that city's extraordinary appetite for wood, nearly 90 percent of the Tyne-registered tonnage which entered from the Baltic was involved in carrying wood. Less than a quarter discharged any cereals or legumes, and half of those that did had been loaded primarily with wood. More explicitly, while over 130 arrivals were made with entire cargoes of wood, there were only eighteen comparable entries with cereals and legumes. The differential between tonnages employed was even sharper, over eight-to-one. Cronstadt (with Wyburg), Danzig, and, to a lesser extent, Riga and Memel,

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[27] That is, owners who operated from Newcastle, North Shields, or South Shields – and occasionally from points between.

[28] Blyth ships were by far the most prominent of these sub-port ships, effecting 44 out of the 53 entries recorded.

[29] Cronstadt's domination over Wyburg in the London returns may simply reflect a recording convention, i.e. the commonplace ballast trip from Cronstadt to Wyburg to load wood was ignored.

[30] Two-thirds of the tonnage that arrived from Cronstadt had commenced its voyaging from the Tyne, but a good deal less than half of Danzig's had done so.

were the major sources of these dedicated wood cargoes, whilst Cronstadt and Stettin were the main providers of entire ladings of cereals and legumes (each port shipped around 1,000 tons). Cronstadt also provided regular, if chance, opportunities for freighting a few other staples to London. All except one of the two dozen cargoes of tallow and/or hemp brought into London by Tyne-registered ships had been despatched from Cronstadt.[31]

In the early 1860s, Hull and London obviously exercised great attraction for Tyne-registered shipping returning from the Baltic, but by 1880 the situation had changed dramatically. At Hull the number of entries made by Tyne-registered ships was only one-quarter of the previous level, and London's had halved: a consequence of the introduction of steamers (much larger units than sail). Hull's volume (by tonnage) actually halved between 1861 and 1880, and even London's fell by nearly one-fifth.[32] The decline at Hull itself was even more severe than this suggests for, although Tyne-registered ships from the Baltic made ten entries into the Humber in 1880, six of these were bound for its competitor port, Grimsby.[33] Two factors seem to have produced this adverse effect on the volume of Tyne-registered carriers trading into Hull from the Baltic by 1880: one general, and the other specific.

Firstly, the late 1870s saw a nationwide downturn in demand for Hull's principal import, wood.[34] The volumes handled at Hull fell by half and that degree of decline alone must have created enough surplus capacity to face the Tyne's owners with a major decision: whether to remain and compete, or deploy elsewhere. Secondly, the same period saw a massive rise in the steam cargo tonnage owned in Hull, with two of the port's leading, privately-owned steamer companies (Wilson Line; Bailey and Leetham) pursuing expansionary policies that provided a significant presence in the Baltic.[35] Wilson's in particular integrated Newcastle sailings – where

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[31] The exception was a Tyne-registered, London-based steamer from St. Petersburg.

[32] These, and subsequent figures for 1880, are based on full season totals for Hull, but a part-season sample only for London (comprising five months: April-July inclusive, plus October).

[33] Of the four arrivals in Hull, three came from Cronstadt with wood; five out of the six discharging at Grimsby brought wood loaded in Riga.

[34] Bellamy, *Trade and Shipping*, p. 45.

[35] D.J. Starkey, 'Ownership Structures in the British Shipping Industry: The Case of Hull, 1820-1916', *International Journal of Maritime History*, VII, No.2 (1996), pp. 83-84; A. Credland and R. Greenwood, *Bailey and Leetham* (Preston, 2002).

they already provided a coastal service and possessed historic commercial links – into the company's triangular voyage routines for Baltic general cargo (and passengers), running schedules based on, for example: Hull/Tyne/Stettin, or other Baltic port/Hull. Their success was such that they eventually ousted their Hull-based competitors from these Baltic liner routes and, in the process, this energetic approach seems likely to have deterred Tyne-owned (tramp) steamers from seeking more than an occasional freight on the increasingly well covered Baltic-to-Humber inward leg (see Table 5.4). This narrowing of opportunity abroad, compounded by the Wilson brothers' influence within the commercial community of the port of Hull, probably stifled potential deployments by outsiders.[36]

Table 5.4 Tyne-registered Shipping entering Newcastle, Hull, Grimsby, and London with Baltic Imports, 1880
(number; tonnage)

	Newcastle		Hull & Grimsby		London (5 months)	
	Entries (No.)	Tonnage (tons)	Entries (No.)	Tonnage (tons)	Entries (No.)	Tonnage (tons)
Departed Tyne	7	2743	8	4806	11	6630
Departed Other Ports	0	0	2	921	16	7190
Totals	7	2743	10	5727	27	13820

Compiled from: *NBESL*, 1880; *HBE*, 1880; *LABE*, 1880 (April-July, & October)

Britain's premier port, London, also felt the effects of the 'disastrous slump' in the national wood trades that occurred in 1875, also suffering the subsequent years of depressed demand for imported wood.[37] The tonnage of Tyne-registered shipping entering London from the Baltic during the first half of the 1880 season was actually

[36] Starkey, 'Ownership Structures', p. 86.

[37] B. Latham, *Timber its Development and Distribution: a Historical Survey* (London, 1957), p. 56.

below that recorded for 1861: some 14,000 as against 17,000 tons.[38] From a strictly Baltic viewpoint, the general downturn in the British wood trades was partly offset by the increased market share realised by the introduction of cheap Russian softwoods (deals). Indeed, from 1875 onwards, the remarkably low cost of these sawn wood products from Russia saw the main focus of these particular imports shift from the existing supplier, Sweden, to Baltic Russia.[39] This change was reflected in the patterns of entry displayed by Tyne-registered ships reaching London, with over 80 percent of their Baltic wood cargoes having been picked up from the Russian ports of Riga, Windau, and Cronstadt; only three small ladings originated in the Lower Baltic (Memel and Danzig). As in 1861 though, wood carrying still preoccupied Tyne-registered shipping, comprising 22 out of the 27 cargoes carried; only Russian oats (5 entire cargoes) provided any alternative.

Although wood was still pre-eminent in 1880, there had been significant changes in the nature of its London-bound carriers. Steamers dominated the Tyne-registered tonnage, outstripping sailing vessels by a (tonnage) factor of four-to-one, but despite this sail's continuing presence was demonstrated by its ten entries to steam's seventeen (see Table 5.5). Steam, however, already commanded most of the inward trade from the Gulf of Finland, whilst sail's role was restricted largely to the Lower Baltic. Noticeably, the remaining Tyne-registered sailing ships were owned mainly in the constituent sub-ports (especially Blyth) rather than on the river itself. And, largely as a consequence of this changed distribution, the proportion of Tyne-registered vessels commencing their voyages from the river had fallen, from around half in 1861 to under one-third by 1880. Indeed, all of these Tyne-registered departures in 1880 were made by steamers, nearly all of which were registered in Newcastle. This trend towards steam by Baltic importers was also exhibited by Tyne-owned arrivals at Hull,[40] and it was only amongst shipping returning to Newcastle itself that sailing ships – conservatively engaged in the long-established trade with Cronstadt – held any kind of balance with steam.

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[38] Compiled from: *LABE*, 1861, 1880. Sampling also suggests that the rate of entry into Hull by such Tyne-registered ships in 1880 was only around half that of London's.

[39] Latham, *Timber*, p. 57; indicates that Russian deals were barely half the f.o.b. cost of those obtained from Sweden.

[40] The only Tyne-registered sailing ship that discharged from the Baltic (*Elliots*, 376 tons) was immediately sold foreign upon arrival back in the Tyne.

Table 5.5 Tyne-registered Shipping entering Newcastle, Hull, and London with Baltic Imports, 1880: Nature of Carriers
(number; tonnage; sail to steam ratio)

	Newcastle		Hull		London (5 months)	
	Entries (No.)	Tonnage (tons)	Entries (No.)	Tonnage (tons)	Entries (No.)	Tonnage (tons)
Sail	5	1333	1	376	10	2705
Steam	2	1410	9	5351	17	11115
Sail:Steam		1:1		1:14		1:4

Compiled from: *NBESL*, 1880; *HBE*, 1880; *LABE*, 1880 (April-July, & October)

Conclusions

Analysis reveals that there was exceptional asymmetry between Newcastle's imports from the Baltic as against its exports. Despite advances in carrier technology and the opening up of new supply areas around the Baltic this imbalance changed little, for the import weakness was structural in nature. Moreover, neighbouring ports competed for all the import trades,[41] and the Baltic was increasingly unable to contribute to one of the hinterland's major import needs – foodstuffs. The Tyne's own shipowners placed little emphasis on carrying imports, leaving much of that business to external providers, amplifying Rennison's argument that the port's policies were directed firmly towards exports.[42] As a result there was only a sluggish expansion of a reciprocal requirement for imports, and there was little opportunity for carriers in the Baltic-to-Tyne (return) trade to introduce new volume or responses.

As the port's sailing shipowners participated so little, the question arises as to how their vessels were deployed subsequent to the discharge of coals in the Baltic. Through analysis of re-entries it is conclusively demonstrated that they were overwhelmingly stemmed to Hull or London, although close examination reveals differentiation and subdivision of carrier deployments within this apparently uniform

[41] Milne, *North East England*, Chapters 3, 5.

[42] Rennison, thesis, 229-261.

pattern. Since no technical reasons for such small-scale specialisation can be evinced, the conclusion is that it resulted from long-standing commercial practices (and networks) allied to localism. For example, Tyne-owned ships fixed back to Hull rather than London in order to pick up salt for Tyneside's chemical manufactories. And the identification of such subtle responses supports Milne's opinion that distinctions between coastal and short sea voyaging in northern waters are often artificial – they were often contiguous parts of a pan-European 'coasting' whole.[43]

These sail-originated patterns for Baltic imports were interrupted both by the radical change towards steam and a concurrent (nationwide) downturn in the demand for wood. However, these factors only partly explain the significant decreases in import tonnage that occurred during the 1870s, and it is tentatively concluded that Hull's severe decline was occasioned largely by local influences, while London's simply followed adverse national trends. Paradoxically, although many of the Tyne's recently introduced Baltic-going steamers were attracted to London, it also became a destination of choice for sailing vessels still owned in Newcastle's sub-ports.

Overall, there are some outstanding and previously unrecognized aspects to the port's Baltic import trade. Although limited in scope and growth, it was valuable for attracting a class of Baltic-owned ships that provided a ready reservoir of (low cost) tonnage for carrying exports and imports to and from the Baltic's secondary destinations. This guaranteed supply of foreign-owned shipping in turn opened up opportunities for Tyne-based vessels to respond by seeking out higher freighted (and more certain) Baltic return cargoes to Britain's other east coast ports, and the resultant deployment patterns indicate a degree of interdependence amongst the ports of Newcastle, Hull and London that is worthy of further study.

However, a more complete understanding of such deployment responses may be gained by evaluating the nature and movements of the entire carrier force employed in lifting the Tyne's huge volume of Baltic exports, commencing with the 'mature' sailing ship era, the early 1860s.

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[43] G.J. Milne, 'Port Cities and Maritime Urban Systems: The North East of England and Europe's northern seas, 1850-1914' (unpublished report, AHRB Centre for North East England History, Newcastle University, 2001), 9-10.

CHAPTER 6: THE 'MATURE' SAILING TRADE, 1861

In 1861, the Tyne's trade with the Baltic was conducted almost entirely in sailing vessels belonging to a mix of nations. Although the events leading up to the repeal of Britain's Navigation Laws have been well explored, most notably by Palmer,[1] the subsequent effects (or otherwise) of this legislation on domestic fleets have been little examined. The Tyne's Baltic trade, replete with its North European interests, provides an unusual opportunity to make such investigation. Indeed, even the character of the Tyne-owned fleet employed in the Baltic trade has been uncertain, but recently published listings provide the substance for a comprehensive, quantitative analysis of this local fleet – revealing its true composition and status.[2]

Similarly, the received views on the financial returns accruing to shipping in the Baltic trade were formerly predicated on the profitable carriage of Baltic imports (principally wood),[3] assumptions that were revised by Fischer who argued for a significant earnings potential in the outward carriage of coal.[4] As indicated by Fischer this particular argument could be tested at a micro rather than macro level, an approach that is adopted here through the aggregation and analysis of statistics contained in Newcastle's uniquely detailed *Bill of Entry and Shipping List*. Alongside this 'bottom up' micro analysis, a local appreciation of the Tyne's Baltic trading regime under sail – as described in contemporary secondary sources – also allows rectification of misunderstandings that may arise through a nationally oriented, 'top down', approach.[5]

Some Influential Factors and the Evolving Pattern, 1848-1861

Three areas of commercial policy pursued by British governments in the 1840s and 1850s were influential in shaping the shipping resources that were to carry Newcastle's Baltic trade in 1861.

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[1] S. Palmer, *Politics, Shipping, and the Repeal of the Navigation Laws* (Manchester, 1990).

[2] Keys, *Dictionary*; *Clayton's Annual Register of Shipping and Port Charges* etc. (Hull, 1865; Liverpool, 2002, reprint).

[3] Fischer and Nordvik, 'Myth and Reality', 99-116.

[4] Fischer, 'Flotilla of Wood ', pp. 53-56.

[5] For example, Harley, 'Coal Exports', 311-38; with regard to Baltic coal freights, Harley fails to appreciate important effects arising from local factors.

Firstly, the reductions in coal export duty applied from 1831 onwards stimulated Newcastle's nascent coal exports and when, in the early 1840s, the (nationally-applied) preferential duty on coals shipped in British-owned vessels was abolished, competition between British and foreign carriers became even keener.[6] Secondly, the gradual harmonisation of import duties meant that the long-established discriminatory tariffs on non-colonial timber were successively reduced and, although the equalisation of timber duties proved a very protracted affair, after 1851 the trends increasingly favoured Baltic imports. Thirdly, and most significantly, for it affected the British shipping interest as a whole, there was the controversial proposal to repeal the Navigation Laws that had shielded British shipping from foreign competition for two centuries.

When repeal was finally enacted in 1849 it opened up, in theory at least, the carriage of the major part of Britain's extensive imports – a privilege previously reserved for British ships alone – to foreign owners. In reality, this privilege had already been eroded from the early 1820s onwards through the diplomatic agreements made in reciprocity treaties or by the accordance of favoured (trading) nation status. States on the Baltic littoral had been to the forefront in making such agreements and, even before 1844, there were with reciprocity treaties in place with Lübeck and Prussia (1824), Mecklenburg (1825), Prussia together with states of the German Zollverein (1841) and, finally, Russia itself (1843).[7] Concessions to Prussia and the German States stretched the strictly bilateral conditions of these agreements further still, to the point where their ships might act as indirect carriers into Britain from any Baltic port, that is, they were no longer restricted to imports originating in their own national ports.

Whether arising directly from these relaxations or not, during the early 1840s there was a marked expansion in the amount of shipping arriving at Newcastle with foreign imports.[8] By 1847 the situation was such that a Tyne shipowner was led to remark that, in the North European context at least, British shipping had already been

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[6] Some inequalities still existed through the application of local charges (e.g. several British ports applied higher harbour dues to foreign vessels).

[7] Palmer, *Politics, Shipping, and Repeal*, p. 52, 55.

[8] NCL, *Bell Collection*, Vol. V, 1849, f. 134: entries with foreign imports rose from 612 in 1842, to 908 in 1845.

'left virtually unprotected',[9] and if this was really so, then the repeal of the Navigation Laws in 1849 simply marked the formal recognition of an already accomplished fact.

Since the Navigation Laws were largely concerned with protecting the carriage of imports, the effects of repeal should be demonstrable through a subsequent shift in the proportions of foreign and British shipping. Taking as a baseline the Baltic-to-Tyne trade in the year preceding repeal, 1848, there was relative equilibrium between the tonnages employed by foreign and British carriers.[10] However, by 1861 the shift to foreign carriers predicted by the opponents of repeal seemed to have become a reality, for some 80 percent of shipping – both by arrivals and tonnage – was foreign owned.[11] (see Table 6.1)

Two caveats though must be raised over this apparent effect. Firstly, as a consequence of a drop of a quarter in total carrier numbers between 1848 and 1861, the increased foreign share did not actually result from an overall expansion in foreign carrier numbers (or volumes). Secondly, British shipowners in the post-repeal era may well have turned their own attentions to the bigger import centres of London and Hull. That is, rather than relinquishing the Baltic import market as a whole, they had responded by re-directing their inward bound vessels away from the Tyne.

Meanwhile, the Tyne's – already unprotected – export trade to the Baltic exhibited far worse effects. Although its exports of coal expanded more than threefold between 1849 and 1861, British carriers lost a great deal of their share. Whereas they had outperformed their foreign counterparts by providing 75 percent of tonnage in 1848, by 1861 foreign carriers had actually overtaken the British, providing 60 percent of tonnage. In a vastly expanded market, British shipping had not even doubled its export capacity over the preceding twenty years whilst, correspondingly, foreign capacity increased nearly eightfold (see Table 6.2).

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[9] G.F. Young (M.P., Tynemouth) shipbuilder and shipowner, cited in: Palmer, *Politics, Shipping, and Repeal*, p. 52.

[10] Slightly greater numbers of arrivals by foreigners were probably counter-balanced by the larger average size of British ships.

[11] These, and succeeding, analyses are based upon samples comprising all shipping movements in April, July and October 1861. These months were generally the heaviest for exports (aggregating 47% of annual tonnage) and had average levels of imports (31% of annual tonnage).

Table 6.1 British and Foreign Ships Entering the Tyne from the Baltic: Comparative samples, 1848 and 1861[12]

(number; percentage; tons)

	1848			1861		
	Entries	Entries (%)	Tonnage (tons)	Entries	Entries (%)	Tonnage (tons)
Foreign	33	56	unrecorded	37	82	5385
British	26	44	unrecorded	8	18	1094
Total	59			45		6479

Compiled from *Newcastle Courant* [*NC*], 1848; and, *NBESL*, 1861

Table 6.2 Coal Exports to the Baltic by British and Foreign Ships: Comparative samples, 1848 and 1861[13]

(tons; percentage)

	1848		1861	
	Coal Exports (tons)	Coal Exports (%)	Coal Exports (tons)	Coal Exports (%)
Foreign	11304	25	89500	60
British	34100	75	59215	40
Total	45404		148715	

Compiled from *NC*, 1848; and, *NBESL*, 1861

Close examination, however, dispels the conclusion that it was repeal (1849) that marked the point of advance for such foreign carriers. Indeed, in respect of the port's global trade, the trend towards foreign carriage was already a well confirmed fact. In the five years preceding repeal, 1843-1848, foreign tonnage had increased its share of Newcastle's expanding import market by some fifteen percent, whilst in the

[12] Samples comprise April, July and October.

[13] Samples comprise April, July and October.

burgeoning export business it acquired an extra six percent. The five years following repeal actually saw a marked slowdown in this rate of increase by foreign carriers: they gained less than two percent of imports, and four percent of exports.[14] In this context the Russian (Crimean) War, 1854-6, temporarily distorted northern Europe's shipping patterns, prohibiting strict evolutionary appraisal. Despite this hiatus, however, some significant sectoral changes can be discerned in the post-war period, 1856-c.1861.

Immediately the hostilities ended Newcastle's import activities were (quite literally) re-doubled with respect to Russian supplies. Inward tonnage approached 10,000 tons in 1857, and British ships provided nearly 80 percent of this. By comparison, immediate exports to Russia were more in line with pre-war volumes, with British carriers still supplying some 70 percent of tonnage. This position was maintained from 1857 to1861, during which time export volumes increased by some 20 percent. However, the post-war boom in Russian imports had proved short-lived, with inward tonnages dropping back towards pre-war levels. This decline was accompanied once more by a shift towards foreign carriers: their share advanced from 20 to 34 percent.[15] As a consequence of these shifts, the British and foreign carriers' shares of inward and outward tonnages moved closer together – slightly more favourably so for British carriers of exports.[16]

It is instructive to contrast the Russian trade with that of (non-combatant) Prussia over the period concerned. Whereas seaborne trade between Newcastle and the Russian Baltic ports collapsed at the outbreak of war, 1854, that with Prussia was relatively unaffected. If anything, import volumes increased over those projected for the wartime and immediate post-war period, whilst exports from the Tyne made a solid gain over the entire period, 1854-1861. British carriers benefited in the immediate post-war period but, by 1861, the shares enjoyed by British and foreign shipping had returned to pre-war proportions, with foreign vessels providing 79 percent of import tonnage and 77 percent of that for exports (see Table 6.3).

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[14] J.F. Clarke, personal communication (2000), datasets prepared for unpublished paper, 'Newcastle's Industrial and Commercial Development, c.1840-1914', Newcastle, 1999; calculated from entry and departure statistics for the Port of Newcastle: *ASNS*, 1843, 1844, 1848, and 1853.

[15] Compiled from: *ASTN*, 1861, Table 41.

[16] By 1865, the carriage of both Newcastle's imports and its exports had reached the same ratio: two-thirds to British carriers, and one-third to foreigners.

Table 6.3 Newcastle's Trade with Prussia, 1854, 1857 and 1861: Proportions of British and Foreign Carriage
(tons; percentage)

	Inward from Prussia			Outward to Prussia		
	Total (tonnage)	British (%)	Foreign (%)	Total (tonnage)	British (%)	Foreign (%)
1854	19096	20	80	76511	25	75
1857	19882	36	64	106687	41	59
1861	16588	21	79	95335	23	77

Compiled from *ASTN*, 1861, Table 41

These Prussian provisions of 1861 were much in line with Newcastle's overall Baltic pattern of that date (see Tables 6.1 and 6.2). Just as significantly, they were congruent with the national pattern of supply, for even in the pre-repeal era (pre-1849) this pattern had been characterised by the fact that 'Ships belonging to all other Baltic powers [i.e. except for Russia] were the dominant carriers in their trade with Britain, although their share varied', and indeed, the positive capabilities of these other powers was in stark contrast to Russia's own 'exceptional maritime incapacity'.[17] This domestic deficiency opened up the carriage of Russia's much needed exports to British shipowners, and promised yet further opportunities for response.

British and Foreign Supplies of Sailing Tonnage, 1861

In 1861 the tonnage employed in the Tyne's Baltic trade was supplied by vessels belonging to a dozen nations, and these may be divided into three groups in order of importance (see Table 6.4).

In the first group were ships of three of the Tyne-to-Baltic trade's participating powers: England, Prussia, and the German Confederation. These three provided some 80 percent of all the tonnage engaged. The greater part of the remaining 20 percent

[17] Palmer, *Politics, Shipping, and Repeal,* pp. 54 -55; in 1846, foreign shipping already commanded 81% of the tonnage entering UK ports from Prussia, but only 13% of that from Russia.

was supplied by a second group of four providers: Scotland, the Dutch Republic, Denmark, and Russia, with all but the last-named acting as indirect carriers. A third group, of five further nations, made very minor contributions.

Table 6.4 Shipping by Territory of Origin, 1861 [18]

(tons; percentage; number)

	Tonnage		Sailings	
	(tons)	(%)	Number	(%)
England	76930	36	308	24
Prussia	51467	24	276	22
German Confederation	44485	21	313	25
First Group, Totals	172882	81	897	71
Scotland	11260	5	85	7
Dutch Republic	10830	5	101	8
Denmark	8024	4	81	6
Russian Empire	4661	2	26	2
Second Group, Totals	34775	16	293	23
Norway	2108	1	14	1
Sweden	1172	1	12	1
Ireland	929	0	2	0
France	243	0	2	0
Canada	145	0	1	0
Unknown	2107	1	37	3
Third Group, Totals	6704	3	68	5
Aggregate Totals	214361		1258	

Compiled from, *NBESL*, 1861

[18] Includes repeated voyages.

Considered in broad fractional terms, England supplied one-third of all aggregate tonnage, Prussia one-quarter, and the German Confederation one-fifth. And these three dominant nations each provided a balanced contribution to the shipping stock, contributing almost 700 ships between them – 70 percent of the vessels deployed. Altogether, some 1,000 individual vessels with an aggregate tonnage of nearly 175,000 tons were employed during 1861. (see Table 6.5).

Table 6.5 Individual Ships by Territory of Origin, 1861[19]
(number; percentage; tons)

	Ships		Tonnage	
	Number	(%)	(tons)	(%)
England	237	24	59,014	34
Prussia	207	21	40,422	23
German Confederation	254	25	37656	22

	Ships		Tonnage	
	Number	(%)	(tons)	(%)
First Group	698	70	137,092	78
Second & Third Group	305	30	37,687	22
Totals: Overall	1003		174779	

Compiled from *NBESL*, 1861

Disaggregation on a regional rather than on a purely national basis indicates that just ten out of a potential two dozen European and Russian maritime regions provided 90 percent of all the tonnage (and ships) engaged – the top ranking six supplied 80 percent alone. Prussia topped the regional rankings,[20] followed closely by the North East coal ports of England. The overall pattern, in which the major regions

[19] Vessels of known tonnage only.

[20] Prussia was a notoriously heterogeneous state and, in this context, there seems little virtue in maintaining the provincial distinctions of East Prussia, West Prussia, and Pomerania.

of shipping supply lay in the nations directly involved as trading partners, exhibits only one significant contra-trend, that in favour of a couple of 'third party' (indirect) carriers: the Northern Provinces of the Dutch Republic, and the North East coast of Scotland.[21] (see Table 6.6)

Table 6.6 Shipping Ranked by Region of Origin, 1861: Top Ten Regions [22]
(tons; percentage; number)

Country	Region	Tonnage		Ships	
		(tons)	(%)	Number	(%)
Prussia	East and West	40422	23	207	21
England	North East Coal Ports	37076	21	146	15
German Con.	Baltic-shore	29946	17	179	18
Dutch Rep.	Northern Provinces	8367	5	79	8
Scotland	North East Coast	8059	5	60	6
German Con.	North Sea Coast	7710	4	75	7
England	East Yorkshire	7660	4	34	3
England	Humber	5972	3	19	2
Denmark	Archipelago	4464	3	42	4
England	London	3869	2	13	1

Compiled from *NBESL*, 1861

Further subdivision of the areas of supply by port of registry reveals intra-regional foci of ship ownership. For example, the leading place of registration was Newcastle's own sub-port of Shields (i.e. North Shields, England), and this was closely followed by Rostock in the German state of Mecklenburg (see Table 6.7). These two ports provided 69 and 80 ships respectively, and each boasted nearly ten percent (over 15,000 tons) of the capacity engaged.

[21] These regions' position can be best be explained as the continuation of long-held cultural and trading ties, allied in the Dutch case to transition from a former far eastern dependency.

[22] Vessels of known tonnage only.

The concentration of shipping stock was such that just ten ports out of some 180 participants mustered 50 percent of the shipping engaged (by tonnage and numbers),[23] and the top ranked 40 ports – approximating the top quartile – supplied over 80 percent of tonnage and nearly 75 percent of numbers.[24] (see Table 6.7). As a general rule, lesser ports supplied a few ships of small size, and larger ports the reverse. Consequently, although the 90 ports in the lowest rank supplied ten percent of all individual vessels, their total capacity was less than five percent of that deployed.

Table 6.7 Ships by Port of Origin, 1861: Top Ten Ports
(tons; percentage; number)

Homeport	Region (territory)	Tonnage		Ships
		(tons)	(%)	(No.)
North Shields	North East Coal Ports (England)	17490	10	69
Rostock	Baltic-shore (German Confederation)	15897	9	80
Stettin	East and West Prussia (Prussia)	10646	6	54
Stralsund	East and West Prussia (Prussia)	9478	5	57
South Shields	North East Coal Ports (England)	9320	5	35
Barth	Baltic-shore (German Confederation)	7634	4	42
Newcastle	North East Coal Ports (England)	7241	4	31
Whitby	East Yorkshire (England)	6656	4	30
Hull	Humber (England)	5296	3	16
Wolgast	East and West Prussia (Prussia)	4025	2	21
Totals		93683	54	435

Compiled from *NBESL*, 1861

[23] Omissions and obvious typographic errors in the published *NBESL* do not allow for a more exact figure.

[24] Significantly, even the least prominent of these upper-ranked ports, Neustadt, entered ships whose aggregate tonnage reached some 850 tons, 0.5 % of the total.

Ships: Size, Aggregate Capacity, and Numbers

Although the segregation of this Tyne-to-Baltic shipping into arbitrarily defined tonnage bands is somewhat artificial, it does provide a useful indicator of fleet structures, showing that the fleets of the top six nations determined the patterns of size distribution within the shipping stock as a whole.[25] The only appreciable departure from this was in the sub-150 ton range, where the minor nations contributed a slightly higher proportion of the stock. Overall, sailing vessels in the 150- to 300-ton range were solidly in the majority, making up well over half of the tonnage entered outwards (127,500 tons out of 223,442 tons). A sizable minority of sailing craft below 150 tons provided a further quarter of all tonnage, whilst vessels in excess of 300 tons made up only one-sixth. (see Table 6.8)

Table 6.8 Ship Size: Carrying Provision by Size Band [26]

(tons; percentage)

	Tonnage Entered Out		Top Six Fleets	All Other Fleets
	(tons)	(%)	(%)	(%)
under 100 tons	24343	10.9	8.5	2.4
100-149 tons	34603	16.5	13.2	2.3
150-199 tons	43710	19.6	18.6	1.0
200-249 tons	46619	20.9	20.7	0.2
250-299 tons	37110	16.6	16.6	
300-349 tons	16406	7.3	6.9	0.4
350-399 tons	7411	3.3	3.2	0.1
over 400 tons	13240	6.9	6.5	0.4
Totals	223442		93.2	6.8

Compiled from *NBESL*, 1861

[25] These top six nations, which supplied over 90% of all tonnage, equate (with the exception of Russia) to the first and second ranked groups; Russia's small fleet was a very mixed one.

[26] Includes repeated voyages.

Table 6.9 Ship Size: Top Six National Carriers by Size Band [27]
(percentage)

	Percentage of Tonnage Entered Outwards					
	England	Prussia	German Confed'n.	Dutch Republic	Scotland	Russian Empire
	(%)	(%)	(%)	(%)	(%)	(%)
<100 tons	0.3	1.1	3.9	1.8	1.1	0.3
100-149 tons	1.2	3.5	3.8	2.7	1.9	0.2
150-199 tons	3.5	7.3	6.5	0.4	1.3	0.6
200-249 tons	10.7	4.0	4.8		0.4	0.8
250-299 tons	10.6	3.8	1.4	0.1	0.5	0.2
300-349 tons	3.8	1.9	0.9		0.1	0.3
350-399 tons	1.8	0.8	0.3	0.2		
>400 tons	4.0	1.5				

Compiled from *NBESL*, 1861

If the various national fleets were differentiated in terms of their absolute carrying capacity they were also differentiated according to the shipping stock employed (compare Table 6.9 and Table 6.10; see Chart 6.1). English shipping's strength lay in ships of medium and large size: 60 percent of its tonnage came from ships of 200 to 300 tons, and 25 percent from those of over 300 tons. Prussia's strength was focused at slightly lower size levels and the German Confederation's pattern was similar, although with more emphasis upon very small ships of less than 100 tons. The shipping stocks of Denmark, the Dutch Republic, and (to a lesser extent) Scotland were each concentrated in small, sub-150 ton vessels, a dependence shown at its most extreme in the Danish fleet.[28] (see Table 6.11)

[27] Includes repeated voyages.

[28] M. Hahn-Pedersen, 'Rise-Decline-Fall: The Shipping Trade of Fanø – a comparative analysis of the period of reorganization and final collapse, 1860-1920', in P. Holm and J. Edwards, eds., *North Sea Ports and Harbours, Adaptations to Change* (Esbjerg, 1992), pp. 73-86.

Table 6.10 Ship Size: Total Shipping Stock [29]

(percentage)

Tons	<100	100-149	150-199	200-249	250-299	300-349	350-399	>400
Ships (%)	22	22	19	17	12	4	2	2
Tons (%)	11	15	19	21	18	7	4	6

Compiled from *NBESL*, 1861

Table 6.11 Shipping Stock, Tonnages by Nationality: Top Six Ranked Fleets only [30]

(percentage)

Register tons	<100	100-149	150-199	200-249	250-299	300-349	350-399	>400
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)
England	1	3	10	29	30	10	6	10
Prussia	5	13	26	18	17	9	5	8
German Con.	16	19	26	24	9	5	1	
Scotland	22	30	25	9	11	3		
Dutch Repub.	34	50	9		3		4	
Denmark	49	37	13					

Compiled from *NBESL*, 1861

Germany was by far the largest supplier of ships of the smallest size, and the Dutch Republic provided more than half as many. Germany also led in the 100 to 150-ton size band, although the Danes, Prussians, Dutch and Scots competed strongly there, and even the English were well represented. The English clearly commanded the greatest number of ships of medium size, 150 to 300 tons.[31] And ships of the

[29] Vessels of known tonnage only.

[30] Vessels of known tonnage only.

[31] Significantly, German and Prussian ships outnumbered them at the range's lower end.

largest size (over 300 tons) were almost exclusively English and Prussian, particularly English. (see Table 6.12; Chart 6.2)

Table 6.12 Shipping Stock: Ship Numbers by Nationality (Top-ranked Six only) [32]

(numbers)

Register Tons	<100	100-149	150-199	200-249	250-299	300-349	350-399	>400
England	8	15	32	75	66	19	10	12
Prussia	25	41	59	32	25	12	5	8
Germ. Con.	80	57	57	41	13	6	1	
Denmark	25	21	5					
Dutch Rep.	43	44	6		1		1	
Scotland	24	24	14	4	4	1		
Total ships	208	206	181	158	111	39	17	20

Compiled from *NBESL*, 1861

Ships: Sail and Steam

For non-English vessels there is little immediate indication in local records of the typologies and technologies of most of the sailing craft involved, their rigs, hull-forms, and age profiles. A broad impression, though, may be obtained through the descriptions in contemporary and modern published sources of craft characteristic of the various North European nations in the mid-nineteenth century.[33] However, for the sailing vessels originating from the North East 'coal ports', most particularly those

[32] Vessels of known tonnage only.

[33] See principally: F.R. Chapman, *Architectura Navalis Mercatoria* (Stockholm, 1768; facsimile reprint, London, 1971); R. Finch, *Coals from Newcastle* (Lavenham, 1973); J. Harland, *Ships & Seamanship, the Maritime Prints of J.J. Baugean* (London, 2000); I. Hustwick, *Moray Firth Ships and Trade* (Aberdeen, 1994); and, D. McGregor, *Merchant Sailing Ships 1850-1875, the Heyday of Sail* (London, 1984).

from the Tyne, recent compilations allow much clearer analysis to be made of the typology and technology of the ships then in use.[34]

The vast majority of the thousand or so ships employed in the Tyne-to-Baltic trade in 1861 were sail-propelled, for only a mere dozen can be confirmed as steamships. In terms of their absolute volume these steamer sailings from the Tyne to the Baltic certainly need to be seen in perspective, for the capacity offered during the year amounted to just 7,500 tons, only 3.5% of the total tonnage engaged. And at least half of the fifteen or so sailings carried out were single events – not scheduled or repeat voyages – and they were made by vessels based out-with the port, most particularly from Hull.[35] By comparison, total British steamer visits to Cronstadt or St. Petersburg during the previous five years had reached the significant total of 150-200 per year, with 173 visits in 1861.[36] So, quantitatively (by number of sailings), Tyneside's contribution to the Cronstadt/St. Petersburg trade in steam was a very small one, amounting at best to five percent of arrivals, whereas its corresponding share of carriage under sail was over 25 percent.

The small group of steamers deployed from the Tyne contained at least a couple of vessels that dated from the Russian (Crimean) War period but, altogether, it contained a surprisingly high proportion of recently completed ships: seven were less than two years old, and another had recently been re-built and lengthened (the Wilson Line's, *Humber*). All measured in excess of 400 register tons and were iron-built screw steamers with 'simple' engines, nominally developing 70 to 90 horsepower, and all came from the pioneering iron-shipbuilding yards of the Humber, Tyne, Wear, Clyde and Waterford in Ireland.[37] (see Table 6.13) These last, the Waterford vessels, comprised new-buildings from an owner/builder group, the Malcolmsons, who had been early arrivals in the London to St. Petersburg steamer trade – taking over pre-existing Irish interests in the Baltic in 1847.[38]

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[34] Keys, *Dictionary*; R.E. Keys, *The Sailing Ships of Aln and Coquet, 1830-1896* (Newcastle, 1993).

[35] Pearsall, 'British Steamships', pp. 139-166. This emphasises that Hull had already developed regular packet steamer services to and from the Baltic's major ports.

[36] Pearsall, 'British Steamships', p. 149, Table II (from, Consular Commercial Reports in BPP annual volumes; and PRO, FO 184/1-7).

[37] J. Harrower, *Wilson Line* (Gravesend, 1998); *Lloyd's Register* 1861 (London, 1861).

[38] McRae and Waine, *Steam Collier Fleets*, p. 12; Pearsall, 'British Steamships', p. 154.

Despite similarities in size and construction, the most modern of these steamers exhibited differing functional designs. The Humber-owned vessels were fitted out for carrying a sizeable numbers of passengers as well as merchandise and the two ships originating from the Wear (Sunderland) were likewise oriented towards the goods liner trade. But the two newly-completed Tyne-built steamers were designed solely for the bulk shipment of coal. Since these last, the *Sir James Duke* and *Tom John Taylor*, represented the most up-to-date (and largest) generation of home-trade steam colliers, so their single-voyage deployments to the Baltic by Tyne-backed owners may indicate something in the nature of a trial trip each.[39]

Table 6.13 Shipping Stock: Steamships
(tons; number [voyages])

	Port	Owner	Tons	Voy.	Type	Built	Builder, Place
Humber	Hull	Wilson	465	1	liner	1854	Denny, Dumbarton
Gertrude	Hull	Pearson	526	1	liner	1855	unknown, Hull
Pacific	Hull	Wilson	574	1	liner	1860	unknown, Hull
Deptford	Sunderland	Gray	469	3	liner	1860	Laing, Sunderland
Oder	Hull	Wilson	556	1	liner	1861	Earle, Hull
Tom John Taylor	London	Taylor	602	1	collier	1861	Smith, Shields
Sir James Duke	London	Fenwick	570	1	collier	1861	Palmer, Jarrow
City of Exeter	Newcastle		190	1			unknown
Archimedes	Stettin		350	1			unknown
Southwick	Sunderland	Gray	468	4	liner	1861	Laing, Sunderland
Era	Waterford	Malcolmson	437	1		1861	Malc'n, Waterford
Ida	Waterford	Malcolmson	583	1		1861	Malc'n, Waterford

Source: *NBESL*, 1861; Harrower, *Wilson Line*; *Lloyd's Register*, 1861; McRae and Waine, *Steam Collier Fleets*; C.V. Waine, personal communication.

As far as can be ascertained, 1861 was the first year in which steamships were placed in the Tyne-to-Baltic trade on a scheduled service, although steamers had often been employed on a casual basis well before that time.[40] This new (fortnightly) liner service by the 'Diamond Screw Steam Shipping Co.', employed two, new, 750- ton

[39] McRae and Waine, *Steam Collier*, p. 48. These Baltic trips had precedents, the steam collier *George Hawkins* was sent out and lost in 1856, and *Earsdon* (a sister ship) was lost shortly afterwards.

[40] Pearsall, 'British Steamships', pp. 139-55.

(gross), A1-classed, Sunderland-built steamers, *Deptford* and *Southwick*. These were managed/owned by Wm. Gray of Sunderland (their nominal home port), but freighted from the Tyne by one of Newcastle Quayside's leading agents and shipowners, William Dickinson.[41] The company's seven trips in 1861 do not seem to have been a success though, for the levels of non-coal goods carried (*NBESL*, 1861) were relatively low, and the service was not renewed or pursued in the following year.[42] Nevertheless, local commercial reports on Tyneside were already emphasising that steamers could obtain late season freight premiums and were much in demand owing to their ability to get cargoes out of the Baltic before winter ice set in.[43]

This relative lack of engagement by Tyne-based steamship owners with the Baltic in 1861 may be contrasted with Tyneside's iron shipbuilders, for they had begun to make significant sales to Russia *via* the Baltic.[44] For example, Charles Mitchell's Low Walker shipyard had sent out no less than ten river steamers for the west Russian waterways in the previous two years,[45] and earlier buildings (1856) by the yard included the eponymous, 190-ton screw steamers *Oder* and *Vistula*, specifically designed for the North of Europe Company's shallow water trade in the Lower Baltic.[46] These early contacts led the way to even more substantial and beneficial contracts later in the century, with Mitchell helping set up the St. Petersburg naval shipyard and Leslie building major units of the Russian Volunteer Fleet. Mitchell's successor company, Armstrong Mitchell and Co. (1881), went on to build specialised vessels for Russia's internal waterways and pioneered its commercially important fleet of seagoing icebreakers.

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[41] 8 April, *NBESL*, 1861.

[42] As a pointer to the future, *Southwick*'s final inward trip from Cronstadt in December was routed back to Hull where her cargo (primarily wheat) was consigned *via* Bailey and Leetham, and, Thomas Wilson: 29 November, 1861, *HBE*.

[43] 29 October 1860, 14 October 1861, *NDC*.

[44] In particular the shipyards operated by: Charles Mitchell (Low Walker), J. Wigham Richardson (Wallsend), and, Andrew Leslie (Hebburn).

[45] Plans of several survive, e.g., the paddle tugs *Looga*, *Luban* and *Neva*, 1859-1860, in TWAS, Mitchell Collection (1852-1910): G7438, G7439, G7440.

[46] R.E. Keys, *Low Walker Yard List, 1853-1947* (Newcastle, 1997), p. 6.

Characteristics of the Tyne's 'Baltic Fleet'

Tyne-registered ships formed the principal constituent of what was the second largest regional sailing fleet (that of the North East 'coal ports') employed in the Tyne-to-Baltic trade and, in turn, they comprised around half of all English ships dispatched. Taking this into consideration, together with the fact that these ships effectively formed a homeport fleet, a detailed descriptive analysis is warranted.

The existence of a body of shipping at Newcastle and its sub-ports in the third quarter of the nineteenth century which, if not actually dedicated to Baltic trading, was heavily disposed towards it, has been a fact recognized by contemporaries and modern researchers alike.[47] Ships thus employed are commonly referred to as 'Baltic Traders', in the same way that those primarily engaged with the ports of southern Spain and Portugal were given the sobriquet 'sou' Spainers'. Though useful, the appellation 'Baltic Trader' remained subjective, for it is evident that ships of this 'handy' size traditionally fulfilled a multi-purpose role. And the nature of that role altered from season to season, either as part of the vessel's long-term career cycle or through changes in ownership and management policy.[48] Similarly, the concept of a Tyne-based 'Baltic Fleet' can at best be no more than a shifting one, and, for the purposes of this examination it is restricted to those Tyne-registered vessels which made at least one outward voyage to the Baltic in 1861.[49]

Quantitative analysis of entries in the *NBESL*, 1861, largely confirms the suggestions offered by Runciman and others that the Baltic-bound ships of the Tyne, and of Blyth, were somewhat confined in typology and size. Indeed, their concentration in the 200 to 349 tons range is quite remarkable, as is the near-unanimity of rig observed by local artists and described in local treatises, i.e. they

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[47] W. Runciman, *Collier Brigs and Their Sailors* (London, 1926); W. Runciman, *Before the Mast ~ and After* (London, 1924); Keys, *Dictionary*, pp. 46-50.

[48] In principle, this kind of flexibility had altered little since the end of the previous century. See, for example, T. Barrow, 'The Account Books of the *Disko Bay* of Newcastle, 1784-1802', *The Mariner's Mirror*, Vol. 81, No.2 (1995) 171, 180.

[49] Confusingly, even the definition 'Tyne-registered' is disputable since Blyth-owned ships were then generally registered in the Tyne Ports, usually at North Shields; Blyth itself did not become a port of registry until 1894. Analysis here is thus confined to ships principally under Tyne-based ownership, and whose careers are readily traced (principally in: Keys, *Dictionary*, supplemented by *Lloyd's Register*). This provides data for approximately 120 ships out of a potential 140 despatched.

were two-masters, rigged either as brigs or snows (see Table 6.14).[50] Since Tyne-owned ships made up half of the English vessels involved in the Tyne-to-Baltic trade they strongly influenced the composition (by ship size) of the English fleet nationally. But even so, there was some divergence at the extremity of the size range, for Tyne-registered ships were less prominent in the smallest and largest size bands.

However, in the important size range of 200 to 349 tons the Tyne's capacity was significantly above the national norm: 87 percent as against 69 percent (by tonnage).[51] There was close conformity in the Tyne-registered ships of this range since registered lengths varied by only six feet (91-97ft), breadths by less than a foot (24.5-25.25ft) and hold depths by under two feet (c.15ft-16.75ft). Length/breadth ratios remained almost constant throughout, and it was decreasing breadth/depth ratios (giving proportionately deeper hulls) allied to enhanced length that provided for progressive increases in capacity. The few recorded draughts (loaded flotation depths) available for such ships indicate that they were generally around one foot less in draught than their registered hold depth,[52] so even 350-tonners did not exceed sixteen feet draught. Undoubtedly this limitation reflected not only the depths of the main port entrances they used, including those in the Baltic, but also that of the Tyne where the bar was not yet fully deepened.[53] This element of size concentration carried through to rig selection, for two-masted, square-rigged vessels (brigs and snows) of 200 to 349 tons formed 66 percent of the Tyne's Baltic-going shipping stock, whilst the predominantly fore-and-aft sail plans of the schooner and brigantine – best applied

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[50] A. Gregg, *John Wilson Carmichael 1799-1868: Painter of Life on Sea and Land* (Newcastle, 1999). A. Osler and A. Barrow, *Tall Ships Two Rivers* (Newcastle, 1993), pp. 46-60. R. Kipping, *The Elements of Sailmaking* (London, 1851); Kipping worked on Tyneside and figured local ship types.

[51] Compiled and calculated from *NBESL*, 1861.

[52] As for instance *Forsyth*, 239 tons: depth in hold 15.4 ft, draft 14.5 ft.

[53] For example, J. Imray, *The British and Foreign Coaster's Guide Containing Complete Sailing Directions* etc. (London, 1852), indicated: Swinemunde 17 ft, and Stettin 11 ft; Pillau 11 ft; Riga 14 ft (± 2 ft); Memel 15 ft; Libau 10-14 ft; and, Cronstadt 25 ft; on 27 August 1860, the *NDC* advised of ten feet or less in the Königsberg approach channel. Correspondingly, outward bound vessels often bumped detrimentally over the Tyne bar during unfavourable conditions, with vessels of just sixteen feet draught regularly suffering delay awaiting spring tides.

to sailing craft of lower tonnage – were poorly represented (see Table 6.14).[54] Accurate categorization by rig is, however, beset with uncertainty.[55]

Although a ship's tonnage might appear more certain in its measurement than draught or rig,[56] it is interesting to note that in a quarter of cases the figures cited in the *NBESL* lie significantly (6%-15%) below those entered formally in Newcastle's customs shipping registers.[57] This is suggestive of attempts by some Tyne-based masters to misrepresent their ships' official tonnages and thereby making savings on dues.[58]

Table 6.14 The Tyne's Baltic Fleet: by Size and Rig
(numbers)

	Schooner	Brigantine	Brig	Snow	Barque	Ship	All rigs
<100 tons	1						1
100-149 tons	2	1	1	1			5
150-199 tons			5	2			7
200-249 tons			14	14	4		32
250-299 tons			14	23	9		46
300-349 tons			5	8	10		23
350-399 tons					3		3
>400 tons					1	1	2
Totals	3	1	39	48	27	1	119

Compiled from: *NBESL*, 1861; Keys, *Dictionary*; and, *Lloyd's*, 1861

[54] This contrasted with England's west coast regions where fore-and-aft rig came to dominate coastal and short sea sail. See, for instance: Starkey, 'South Devon, 1786-1914'; B. Greenhill, *The Merchant Schooners* (2nd edition, London, 1988); D. Bennett, *Schooner Sunset* (Rochester, Kent, 2000); and B. Greenhill, personal communication (2002).

[55] Within limits, a vessel's rig might be changed during its career. At best, 119 vessels can be distinguished here by rig, largely using the (often imprecise) descriptions given at registration.

[56] Taking into account the fact that the determination of tonnage was subject to several shifts of parameters during the early nineteenth century.

[57] Keys, *Dictionary*; TWAS, EX/NC, 1786-1891.

[58] If so, this leads to under representation of aggregate tonnage. However, since its extent is uncertain it has been ignored for calculation purposes; perhaps foreign ships did the same.

Comparison with Tyne-registered vessels active in other trades (both coastal and foreign) illustrates the dedicated capacities and dimensions of Baltic-going vessels. (see Tables 6.15 and 6.16)

Table 6.15 Tyne Vessels in Baltic and Other Employments: by Size (percentage)

	Baltic-going (%)	[59]Other Trades (%)
under 100 tons	1	6
100-149 tons	4	7
150-199 tons	6	9
200-249 tons	27	17
250-299 tons	38	21
300-349 tons	19	13
350-399 tons	3	10
over 400 tons	2	18

Compiled from: *NBESL*, 1861; Keys, *Dictionary*

Table 6.16 Tyne Vessels in Baltic and Other Employments: by Rig (percentage)

	Sloop (%)	Schooner (%)	Brigantine (%)	Brig/Snow (%)	Barque (%)	Ship (%)
1861 Baltic-going	0	3	1	74	22	1
1861 Other Trades	2	7	2	48	35	6
1830-1930 All Trades[60]	2	10	3	50	27	8

Compiled from: *NBESL*, 1861; Keys, *Dictionary*

[59] 'Other Trades' compiled from a representative sample of 240 vessels.

[60] Calculated from, Keys, *Dictionary*, p. xiii.

Whereas more than 80 percent of Baltic-bound vessels were of 200 to 350 tons, such vessels appeared much less frequently in other trades. Similarly, as a consequence of distant-water needs, the proportion of large vessels engaged in the non-Baltic trades was far higher, whilst the coastal sector's requirements meant that small vessels featured less prominently in the Baltic trade. However, the dominance of brig and snow rig in the Baltic trade probably possessed a temporal element, for their appeal in the early 1860s was markedly above the long-term norm.

Composition of the Tyne's 'Baltic Fleet'

Since negative inferences have been drawn by contemporary observers and later researchers as to the age and quality of ships employed by North East shipowners in the coastal and short sea coal trades,[61] it is instructive to consider the build-dates and longevity demonstrated by Baltic-bound, Tyne-registered ships in 1861. Building-date analysis certainly indicates an aging Baltic-going fleet, for almost 25 percent of tonnage was 21 to 25 years old whilst, cumulatively, some 60 percent of its strength was older still (i.e. of pre-1842 build). Critically, the newer ships – those of ten years and under – formed only eight percent of the tonnage deployed, although around 30 percent of this fleet lay in a mature sector of eleven to 20 years in age.[62] (see Table 6.17).

This fleet's aging profile is underlined by comparing it with a broad spectrum of Tyne-owned vessels then active in other (non-Baltic) foreign-going and domestic employments. In a representative sample of these the proportion of new ships is far higher, 44 percent of tonnage, over four times its Baltic equivalent. Correspondingly, and despite the inclusion of coastal coal traders, the tally provided by old ships (i.e. ships over 21 years of age) is much less, barely 30 percent, only half that employed in the Baltic fleet. Finally, sampling suggests that the age profile exhibited by the entire Tyne-owned sailing fleet of 1,400 vessels necessarily mirrors that displayed by the

[61] Amongst them: G. Patterson, 'Life and Death at Sea', in R.W. Sturgess, ed., *The Great Age of Industry in the North East* (Durham, 1981), pp. 139-46; J.H. Ridley, *Losses at Sea; their causes and means of prevention* (Edinburgh, 1854), pp. 46, 87-90.

[62] These older ships had averaged over twice the span assigned by their original insurance surveys.

vessels employed in 'other trades' since only one in eight were deployed to the Baltic in any year (see Table 6.17).[63]

Table 6.17 Age Profiles of Tyne-owned Vessels, 1861: By Trading Area [64]
(build-date period; years; percentage tonnage by trade)

Build-date	Age (years)	Baltic Trade (%)	Other Trades (%)	Entire Fleet (%)
1861-1857	under 5	3	19	17
1856-1852	6-10	5	25	23
1851-1847	11-15	19	17	17
1846-1842	16-20	13	7	8
1841-1837	21-26	23	9	11
1836-1832	26-30	12	4	5
1831-1802	31-60	19	14	15
pre-1802	over 60	5	4	5

Compiled from: *NBESL*, 1861; Keys, *Dictionary*

Given that the entry of new, Tyne-owned, ships into the Baltic trades was at a low level it is germane to investigate the depletion rates of the stock engaged in 1861. Depletion can chiefly be assigned to one of two causes: accidental loss, or, sale. The former accounted for 85 percent of the whole. Strong correlation might therefore be expected between the age of ships and the frequency of loss, but there is no clear cut relationship. (see Table 6.18) For example, amongst accidental losses the newest ships (aged ten years or under) averaged nine years survival after 1861, whilst rather older

[63] Sample from Keys, *Dictionary*, ship-names commencing A, F, M, and R. The approximate total of 1,400 is derived from *Clayton's* 1865, whose cumulative entries total 1,380 (North Shields, South Shields and Newcastle); Armstrong *et al* eds., *Industrial Resources*, pp. (3)-(4), indicated 1,406.

[64] Compiled on the basis of: 'Baltic Trade', 119 ships recorded as Tyne owned in Keys, *Dictionary*, that made one or more Baltic voyages in 1861; 'Other Trades', random sample of 237 ships extant in 1861 in Keys, *Dictionary*; 'Entire Fleet', assumes that 12% of all Tyne-owned vessels were deployed to the Baltic in 1861.

ones (eleven to 20 years) survived only marginally less well, for eight years. Even the most elderly vessels (aged 21 years and over) averaged five years. Age certainly increased the risk of accidental loss, but not dramatically so.

Table 6.18 Depletion of Tyne-owned, Baltic-going Vessels Extant in 1861: by Age, Cause and Trading Area [65]

(years; percentage)

Age (years)	Cause	Depletion of Ships (%)		Post-1861 Survival (years)		Age at Depletion (years)		Date of Depletion	
		Baltic	Other	Baltic	Other	Baltic	Other	Baltic	Other
1-10	Loss	5	17	9	6	14	11	1870	1867
	Sale	5	20	7	7	11	11	1868	1868
11-20	Loss	30	17	8	7	22	21	1869	1868
	Sale	3	9	7	8	19	22	1868	1869
21-30	Loss	32	13	5	5	28	28	1866	1866
	Sale	3	4	13	6	38	30	1874	1867
>30	Loss	18	17	5	4	53	45	1866	1865
	Sale	5	4	5	5	56	51	1868	1871
All	Loss	85	63						
	Sale	15	37						

Compiled from: *NBESL*, 1861; Keys, *Dictionary*

Although depletion through sale (15%) was far less important than accidental loss, the ratio of sales to losses is revealing. The number of vessels which were 'sold out' of the eleven- to 30-year age range (almost 70% of fleet numbers) amounted to

[65] Based on same datasets as Table 6.17.

only a tenth of those lost, but sales of newer vessels (aged 10 years and under) were on a par with corresponding losses. Old vessels (aged 30 years and over) also had a comparatively high depletion rate through sale, more than one in four were disposed of in this way, generally sold foreign or as hulks.[66] (see Table 6.18; Chart 6.3)

The overall pattern of depletion in the 1860s suggests a willingness by owners to realize capital assets through the opportunistic sale of younger ships, meanwhile accepting the fact that their numerous mid-aged units had limited appeal for outright buyers, whilst the forced disposal (or loss) of their very oldest vessels was a matter of acceptance. Anecdotal evidence supports this last problem, that of disposing of older, poorer quality ships. For instance, the failure of a 43-year old, 216-tonner to find a buyer at auction prompted a local newspaper to comment that 'persons having second or third class ships have no alternative but to struggle on with them and it is difficult to find, even at a low price, a purchaser now for such property.'[67] Collectively, the sales of those Baltic-going vessels which had been extant in 1861 peaked in 1869, and for those in 'other trades' sales climaxed only a couple of years later (see Table 6.19).

As regards accidental losses, the annual rates for Baltic-going ships differed little from those of the Tyne-owned vessels employed in other foreign trades – if anything Baltic-bound vessels enjoyed slightly better life expectancy. However, depletion through sale was markedly higher in vessels engaged in the non-Baltic trades and, as a consequence, the proportion of accidental losses in non-Baltic trades is skewed downward, even though – as noted previously – their objective loss rates were marginally higher (see Table 6.18).

Altogether, the original Tyne-owned shipping stock of 1861 displays a severe, almost straight-line decline (see Table 6.19). Within three years it was reduced to barely 70 percent of its original strength, after just six years it slid to 50 percent, and at the end of ten years (by 1871) it was reduced to little more than a, non-viable, 23 percent. As to replenishment, sampling suggests that the entry rate of new-built sailing ships into Tyne ownership in the mid-1860s was extremely low, and that even this rate was declining. In 1863 and 1864 only 44 new-built ships were added to the Tyne-register of around 1,400 vessels, providing for less than two percent per annum

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[66] No more than three to four percent ever became decrepit enough to force their owners into breaking them up.

[67] 5 July 1867, *NDC*; auction of *Penelope* (built 1818).

(in numbers or tonnage) by way of replacement as against eight percent attrition. Furthermore, no more than a dozen of these entrants could be characterised as the 'handy-sized brigs' favoured for Baltic trading, and half of them were acquired for sub-ports rather than the river Tyne itself.[68] Consequently, the renewals of Tyne-registered tonnage that did take place were largely dependent upon the acquisition of older, pre-owned vessels.

Table 6.19 Attrition Rates, 1861-1875, of Tyne-owned Vessels extant in 1861[69]
(percentage; percentage p.a.)

	Ships Remaining (% original)		Attrition Rate (% p.a.)		Accidental Losses (% p.a.)		Sold Away (% p.a.)	
	Baltic	Other	Baltic	Other	Baltic	Other	Baltic	Other
1861	100	100	10	18	10	14	0	5
1862	90	82	8	9	6	7	2	2
1863	83	74	15	12	14	5	1	5
1864	70	65	6	5	5	5	1	3
1865	66	61	10	11	9	6	1	6
1866	59	54	13	13	12	10	1	3
1867	51	47	18	22	17	14	2	8
1868	42	36	16	12	14	7	2	5
1869	35	32	27	13	20	8	7	5
1870	26	28	10	18	7	14	3	5
1871	23	23	11	24	11	13	0	11
1872	21	17	21	15	21	10	0	5
1873	16	15	16	11	11	9	5	3
1874	14	13	6	10	6	7	0	7
1875	13	12	13	14	13	7	0	7

Compiled from: *NBESL*, 1861; Keys, *Dictionary*

[68] Derived and compiled from entries in *Clayton's*, 1865.

[69] Based on same datasets as Table 6.17.

With regard to outlay, the lack of strictly comparative documentary material makes it difficult to generalise on the capital costs incurred by owners wishing to renew their wooden tonnage for Baltic (and allied) voyaging in the early 1860s. But the indications are that they were in the region, per ton, of: £10-12 for a new, Sunderland-built ship (8-9 year survey); £8 for a comparable two-year old vessel; £6 for one of around ten years age in average condition; and, at the bottom end of the market, just over £4 for either a 20-year old British ship or a foreign-built one of uncertain age.[70]

Although the proportionate causes of depletion, i.e. the ratio of losses to sales, varied between Baltic-going vessels and those engaged in other trades, the inexorable decline in both groups was closely matched, though Baltic-going vessels were slightly the more favoured (see Table 6.19; Chart 6.4). Annual fluctuations in accidental losses – good and bad years – cannot hide the disturbing upward trend in losses of Tyne-owned Baltic shipping from 1865 onwards. Peak attrition rates reached 20 percent of surviving stock.

Superficially, these losses of the late 1860s and early 1870s seem to indicate either a rapid deterioration in the quality of men and materiel, or, a more liberal attitude to risk-taking amongst owners. However, that Baltic-bound shipping was just one strand within a broader fabric of operational decline is suggested by the fact that its loss rates simply mirrored those of Tyne-owned shipping engaged elsewhere – though these (as with sales) peaked some two years later, in1870-71.

Deploying British and Foreign Sail

Nearly two-thirds of all direct sailings from the Tyne to the Baltic were made by ships that carried out only one Baltic trip during the year.[71] For them, it is obvious that a Tyne-to-Baltic voyage was a single element within a wider pattern of deployment. However, these 'single-voyage' ships were vital carriers in the Baltic trade, they accounted for 79 percent of outward tonnage (see Table 6.20). Amongst the English, German, Prussian and Scottish fleets the proportion of ships carrying out

[70] Clarke, *Building Ships, Pt.1*, p. 100; 13 August, 3 September, 1 October, *NDC*, 1860.

[71] Regrettably, examination of the *NBESL* alone cannot identify ships leaving the Tyne which traded indirectly with the Baltic, e.g. those which first discharged coal in Denmark or Sweden.

single voyages was close to 75 percent, whilst two-voyage ships made up most of the remainder (see Table 6.21).[72]

Table 6.20 Frequency of Direct Outward Sailings, 1861: All Fleets
(number; percentage; tons)

	Ships (No.)	Sailings (No.)	Annual Sailings (%)	Tonnage (tons)	Annual Tonnage (%)
Single Sailing	793	793	63	138537	79
Two Sailings	176	352	28	30609	18
Three or More	35	113	9	5747	3
Totals	1004	1258		174893	

Compiled from *NBESL*, 1861

Table 6.21 Voyage Frequency of Individual Ships: Major National Participants
(number; percentage)

	Ships	Sailings	Single Voyage (% Ships)	Two Voyages (% Ships)
German Confederation	257	313	81	16
England	237	308	74	23
Prussia	208	276	75	19
Dutch Republic	95	101	94	6
Scotland	71	85	80	20
Denmark	71	81	86	14
Russian Empire	24	26	92	8
Totals	963	1190		

Compiled from *NBESL*, 1861

[72] Tables 6.20 and 6.21, vessels of known tonnage only.

The Dutch, Russian and – less so – the Danish fleets, exhibited the strongest single voyage bias: c. 90 percent. Such emphasis may well have resulted from the Dutch and Russian concentration on Russian routes (these involved long passages and a short season). And, also indicative of a casual role, ships of the minority nations were also confined to single voyages. Owing to the diverse composition of the shipping within the various national fleets though, it can be inferred that a single Tyne-to-Baltic voyage fulfilled similar economic (or routeing) roles for each. Considering seasonal limitations, ships making two outward voyages might be considered as dedicated Baltic traders and, as such, they made a quarter of all direct sailings, and supplied eighteen percent of tonnage. Constant traders (including steamers) making three or more direct trips were few in number, making up less than one-in-ten sailings, merely three percent of tonnage. (see Table 6.20)

A distinctive operational feature of shipping on the Tyne-to-Baltic route was its national allegiance to the ports serviced. Generally, the trend was for a home nation's own fleet to service its domestic ports, but some extra-national allegiances also existed – particularly in the case of Russia with its extremely weak national fleet. Cronstadt's enormous appetite for coal was satisfied largely (81%) by English carriers, while carriage to the adjacent capital, St. Petersburg, was far more in the hands of the Dutch (42%) and those other European fleets that operated smaller, shallow-draught vessels. Russia's only other significant Baltic port, Riga, had a more varied profile, 36 percent of Tyne-shipped cargoes arrived in German bottoms, reflecting the city's Germanic past,[73] with the English, Scots and Dutch carrying much of the rest. In the old Hanse and Mecklenburg ports of Rostock and Lübeck, German shipping's domination was near absolute (92% and 82%), but the contested border town of Kiel was split between German and Danish interests (41% and 45%) with little penetration by other nations.[74] (see Table 6.22)

Overall, the Prussian fleet acted as the major carrier for its home territories, but individual Prussian ports were characterised by diversity of supply. The Prussian capital, Königsberg, received 27 percent of its Tyne-originated cargoes in German ships, but a further two-thirds arrived in vessels drawn from five different nations.[75]

[73] Kirby, *Baltic World*, pp. 117-179; members of the German landowning aristocracy had moved into banking, industry, railways and shipping.

[74] Kirby, *Baltic World*, pp. 107-11.

[75] Königsberg, like St. Petersburg, was a shallow-water port.

Conversely, Prussia's rapidly industrialising city of Stettin together with its outport, Swinemunde, received over half of their cargoes in home-fleet ships, though they were much served by foreign carriers as well. Danzig in East Prussia saw a singular, 51 percent, intake of Scottish shipping – likely a result of an earlier influx of Scots immigrants into its hinterland.[76] Even the Prussian fleet's carriage of coal to its northernmost border, at Memel, was fully shared with German shipping (38% to each). Only the smaller ports of West Prussia, especially Wolgast and Stralsund, were served primarily by Prussian shipping. (see Table 6.22)

Table 6.22 Cargoes to Principal Destinations by Carrier Nationality [77]
(number; percentage of ships, by nationality)

	Cargo (Nu.)	England (%)	Prussia (%)	Germany (%)	Scotland (%)	Dutch R. (%)	Denmark (%)	Others (%)
Cronstadt	260	81	1	7	4	0	2	5
St. Petersburg	103	5	0	9	4	42	18	22
Stettin	155	9	59	19	6	0	0	7
Swinemunde	106	25	50	15	8	0	0	2
Kiel	76	5	0	41	0	5	45	4
Königsberg	73	11	10	27	10	19	16	7
Riga	69	17	4	36	10	19	0	14
Danzig	57	7	11	14	51	7	0	10
Rostock	36	0	0	92	3	3	0	2
Lübeck	50	2	8	82	0	2	0	6
Wolgast	44	0	84	11	0	0	0	5
Stralsund	39	0	82	10	0	3	3	2
Memel	26	4	38	38	8	8	0	4

Compiled and calculated from *NBESL*, 1861

[76] M. North, 'Scottish Immigrants in the Southern Baltic Area: 16th - 18th centuries', unpublished paper, Britain and the Baltic Conference, University of Durham (1999).

[77] Vessels of known tonnage only, to destinations receiving at least 25 sailings.

Deploying Tyne-owned Sail

Within that considerable sector of Newcastle's foreign-going trade carried in British sailing vessels the port's own shipping held a prominent position. Tyne-registered ships took up 49 percent of all such sailings, representing 60% percent of the tonnage cleared.[78] The deployment, in 1861, of around 140 ships to the Baltic therefore needs to be seen in a global context, for Tyne-owned, foreign-going shipping was destined for nine distinct trading zones in that year. Altogether 1,818 such foreign-going clearances were made in 1861, with Baltic-bound sailings comprising exactly ten percent – by number and by tonnage – of these (see Table 6.23).

Table 6.23 Primary Foreign-going Destinations by Trade Zone, 1861 [79]
(number; tons; percentage)

	Destination (sailings)	Destination (%)	Tonnage	Tonnage (%)
Elbe to Brest[80]	1,060	58	229,639	49
South Spain and Mediterranean	314	17	115,353	25
Baltic	188	10	47,209	10
Biscayan and Atlantic Europe	85	5	20,287	4
Black Sea	47	3	16,285	4
Western Sweden and Denmark	68	4	15,725	3
North Atlantic routes	30	2	10,307	2
Various Oceanic routes	21	1	9,001	2
Norway	5	0	968	0
Total	1,818		464,774	

Compiled from *NBESL, Vol. 1*

[78] Source: summary, 'Trade of the Port of Newcastle', in *Newcastle Bill of Entry and Shipping List*, Vol. I, February, 1862.

[79] Based on twelve month cycle, March 1861-February 1862 (inclusive). Relatively few outward declarations, especially Baltic ones, cited a second port of call.

[80] 'Elbe to Brest', the foreign-going sector of the Home Trade limits (i.e. excludes British coastal routes).

However, a proper understanding of foreign going deployment patterns requires an understanding of timing as well as geography. The movements of shipping stock towards the major trading zones exhibited strong (often complementary) seasonal characteristics. Most conspicuously, for around three quarters of the year the gross monthly tonnage totals were tracked at a lower level by those of the largest zonal component, Elbe to Brest, whose seasonal cycle rose to peaks (c. 28,000 tons) in July and September/October. After that zone's demand collapsed in November the monthly totals actually rose again, from December through to February, as a consequence of movements into the South European and Mediterranean trades. So it was this southern zone, and not Elbe to Brest, which tracked the wintertime totals. By comparison shipping engaged in the Black Sea trade enjoyed a rather more equable seasonal regime, though at lower levels. (see Chart 6.5)

Viewed in this global context, the drawbacks of deploying ships to the Baltic are apparent. The greatest disadvantage was that – of all potential voyaging zones – the Baltic's active season was the most predetermined one, for wintertime closure by ice meant that ships could not (sensibly) be deployed from the Tyne to the Baltic for more than eight months in every twelve. Although the northern sector of the Elbe to Brest zone suffered similar seasonal constraints, its grouping of ice-free ports – in the Netherlands and northern France –continued to absorb some tonnage (6,000 -10,000 tons monthly) throughout the whole winter period.

A further disadvantage suffered by Tyneside owners deploying ships to the Baltic was the effect of cyclical, seasonal demand. Outward demand for Tyne-registered Baltic tonnage peaked sharply in April and again in July (approximately 10,000 and 12,000 tons respectively). This necessitated much elasticity in tonnage supply, as these upswings almost doubled monthly norms. By comparison, trading zones such as the Black Sea required little in the way of elasticity, for rates of change were slower and seasonal demands were more balanced. (see Table 6.24; Chart 6.5)

These overlapping seasonal and zonal demands gave responsive Tyne-based shipowners who engaged in the nearer (non-oceanic) foreign trades relatively high, almost year-round, potential opportunities for deploying their ships. During eight months of the year, including the oft-assumed dead one of January, the supply of outward-bound tonnage never fell below 40,000 tons, whilst in another, July – when demand peaked in four separate trades – it soared to c. 59,000 tons. Consequently, for three-quarters of the year monthly deployments fell close to, or above, the statistical monthly average of 42,053 tons. Only November's figure fell to what might be regarded as a bench-mark low, i.e., half the monthly average.[81]

Table 6.24 Foreign-going Destinations Ranked by Consolidated Trade Zone, 1861-1862 [82]

(thousand tons)

	Elbe to Brest (000)	S. Euro. & Medit. (000)	Black Sea (000)	Baltic (000)	Oceanic Routes (000)	Scandi-navia (000)	Monthly Total (000)
Mar.	17.9	9.5	1.2	4.2	4.3	1.3	38.4
Apr.	19.7	12.0	1.4	10.4	1.9	2.1	47.5
May	26.7	7.2	3.8	4.5	3.2	2.5	47.9
June	26.3	7.2	4.2	3.5	2.1	2.1	46.4
July	28.3	9.8	6.4	11.8	2.1	1.4	58.8
Aug.	20.6	6.8	2.7	6.4	2.5	3.1	41.1
Sept.	28.7	11.1	2.8	3.7	0.6	1.8	48.7
Oct.	28.5	9.8	3.6	1.7	0.7	0.3	44.6
Nov.	9.5	4.8	4.9		1.1		20.3
Dec.	6.0	16.0	7.3		0.3		28.6
Jan.	6.5	29.8	7.5		3.9		47.7
Feb.	10.9	16.3	3.8	0.9	2.5	2.0	36.4

Compiled from *NBESL, Vol. 1*

In fact the nine trading zones (see Table 6.23) into which Tyne-registered shipping was deployed may, more conveniently, be reduced to six 'consolidated trade zones' (see Table 6.24), comprising: Elbe to Brest (the Home Trade, i.e. excluding

[81] A result of several factors, including: reduced access and demand in the Home Trade; onset of winter sailing conditions in the northern hemisphere; commitment of vessels to the Southern-going trades; and, in small part, to still absent (late-season) tonnage returning from the Baltic.

[82] Based on twelve month cycle, March 1861-February 1862 (inclusive).

British coastal); southern Europe and Mediterranean (Portugal, Southern Spain, and the entire Mediterranean); the Black Sea; the Baltic; Scandinavia; and the various Oceanic routes – including transatlantic crossings to North America.

Given that the Tyne's shipowners had a variety of foreign-going options, it is important in the context of the Baltic trade to determine what voyage regimes Baltic-going vessels actually practiced. In all, 140 Tyne-registered ships ran out to the Baltic in 1861, clearing on 184 separate trips. The relative brevity of the Baltic season curtailed the number of trips that any ship might make, and only a quarter (37) of them made two Baltic trips, while ships making three or four trips were rare. A clear majority (100, or 71%) obviously regarded a single seasonal trip as the norm. (see Table 6.25)

Table 6.25 Frequency of Baltic Voyages by Ships Engaged to the Baltic, 1861 [83]
(number of ships; percentage of ship total; number of voyages)

	Ships	Ships (%)	Voyages
Single voyage	100	71	100
Two voyages	37	26	74
Three voyages	2	1	6
Four voyages	1	1	4
Totals	140		184

Compiled from *NBESL, Vol. 1*

These Baltic-going figures stand in contrast to the entire foreign-going records of the same ships over the entire year. It is apparent that approximately half of them (67) carried out three or more foreign voyages during that time, whilst only for a minority of them (27) was a Baltic trip the sole foreign-going voyage entertained (compare Tables 6.26 and 6.27).

[83] Based on twelve month cycle, March 1861-February 1862 (inclusive).

Table 6.26 Frequency of all Foreign Voyages by Ships Engaged to the Baltic, 1861 (number; percentage)

	Ships (No.)	Ships (%)	Voyages (No.)
Single voyage	27	19	27
Two voyages	46	33	92
Three voyages	34	24	102
Four or more voyages	33	24	142
Totals	140		363

Compiled from *NBESL, Vol. 1*

Table 6.27 Foreign-going Destinations of Ships Engaged to the Baltic, 1861 [84] (number; percentage)

	All Voyages		Single Voyages		Double Voyages	
	Sailings	(%)	Sailings	(%)	Sailings	(%)
Baltic	186	51	100	40	76	72
Elbe to Brest	113	31	94	37	18	17
South Spain and Mediterranean	23	6	19	8	4	4
Biscayan and Atlantic coasts	23	6	18	7	2	5
Western Sweden and Denmark	21	6	18	7		
Transatlantic	1	0	1			
Black Sea	1	0	1			
Totals	368		251		105	

Compiled from *NBESL, Vol. 1*

Though Baltic trips constituted 51 percent of the 368 foreign-going voyages made by the 140 Tyne-registered ships involved, the second most important trading region to them was clearly Elbe to Brest, which absorbed a further 31 percent. The

[84] Based on twelve month cycle, March 1861-February 1862 (inclusive).

engagement of these Baltic-going ships in trades involving voyages to the south or west of Brest was slight, less than 12 percent (c. 50 voyages). They were extraordinarily orientated towards Northern Europe, destined for ports there on nearly 90 percent of occasions.[85]

But within this overall North European pattern there were distinctions. Though ships which carried out single Baltic trips made a similar number of trips into the Elbe to Brest zone, those which made two seasonal Baltic voyages carried out only a quarter as many. For these latter, the Baltic was the main component (72%) of their foreign-going regimes. Conversely, for single trip ships it represented a solid minority element (40%), and these were the vessels most likely to venture into the southern trades. (see Table 6.27)

Seasonally, these Baltic-bound voyages by Tyne-registered ships peaked in spring (March-April), and again in summer (July-August). Sailings then approximated 66 percent and 80 percent of their foreign-going totals respectively. Even in the comparatively slack periods of early summer (May-June) and autumn (September-October) the Baltic component remained high: at approximately 66 percent and 33 percent of seasonal totals. Correspondingly, during the spring and early summer deployments into the Elbe to Brest zone remained relatively low (around 25% in each period). But, seen against the overall decline in foreign sailings during the autumn and 'forewinter' (November-December), Elbe to Brest gained in significance – its share increasing to some 60 percent. Winter proper (January-February), then saw it subside in importance, to less than one-third of the season's foreign-going total. This downward trend, however, was offset by rising deployment into the southern-going trades. These last, in turn, provided at least 50 percent of all winter engagements.[86] (see Table 6.24)

The Carriers: Measures of Efficiency

Although objective measurement of the economic efficiency of Baltic-bound sailing ships remains problematic,[87] there are two factors, stowage and manning, that can be

[85] Three ships that made multiple Baltic trips showed an exclusive dedication to North European ports.

[86] Nevertheless, newspaper reports and surviving voyage accounts indicate that many Baltic-going ships were routinely transferred into the coastal coal trade for the winter.

[87] Fischer, 'Flotilla of Wood ', pp. 53-56.

evaluated quantitatively through the *NBESL*. For stowage, evaluations are based on the fact that a high proportion of loadings were made up of a single homogenous deadweight cargo ('large coals'). Thus, the amount of coal carried on a given register tonnage can be used to give a factorial number, the 'stowage factor', which directly compares the stowage efficiency of individual ships.[88] Nineteenth-century sources indicate the use of similar estimates of stowage efficiency, although these related to the standard volumetric measure of coal then in use, the keel: equivalent to 21.2 tons by weight.[89] The standard authority on stowage, R.B. Stevens (1863 onwards), adopted a stowage rate of 14 net register tons per keel loaded,[90] although adding the rider that ships of below 100 net register tons would stow slightly more, and those above 300 tons, slightly less (see Table 6.28).

Table 6.28 Stowage Factors
(keels; tons; tons per keel; stowage factor)

	Stevens on Stowage			Sunderland Colliers		
	Register tons	Tons per Keel	Factor	Register tons	Tons per Keel	Factor
7 Keels	98	13.1	1.62			
12 Keels	168	14.0	1.51	184	16.3	1.38
14 Keels	196	14.0	1.51	195	13.9	1.52
16 Keels	224	14.0	1.51	214	13.8	1.58
20 Keels	280	14.0	1.51	262	13.2	1.62
24 Keels	336	14.3	1.48	315	13.3	1.62

Compiled from: Stevens, *On Stowage* (5th); and, Sunderland Mutual Insurance Club, 1841-42.

[88] The higher this factor the more efficient the stowage, where: Stowage factor = Tons coal loaded ÷ Net registered tonnage (New Measurement).

[89] Stevens, *On Stowage* (5th), p 34, Table V; Salisbury, 'Early Tonnage Measurement', 69-76.

[90] Stevens, *On Stowage* (5th), p. 34, table V. This same rate was given some ten years earlier by the putative 'Seaman's Association of the Tyne', see: G.B. Hodgson, *The Borough of South Shields from the Earliest Period to the Close of the Nineteenth Century* (Newcastle, 1903), p. 307.

Stevens' norm indicates that English ships anticipated stowing around 1½ tons of coal per net register ton, equivalent to a modern stowage factor of 1.514 (the tons/keel rate is the stowage factor's reciprocal). In practice, commonplace north east colliers of 200 to 350 tons may have achieved more advantageous (higher) stowage factors than this: 1.52-1.62 (see Table 6.28).[91] Nevertheless, amongst England's competitors the Dutch and Scots showed the highest stowage efficiencies (1.65, or 12.9 tons per keel). English ships lay close behind (1.62, or 13.2 tons per keel), with German and Prussian vessels lower still (factors 1.59 and 1.55 respectively, over 14 tons per Keel). However, the Dutch and Scottish lead was rather artificial, arising from the advantage that Stevens' method accorded their many vessels of under 100 tons.

Manning efficiency is a more complex issue. First, the manning figures in the *NBESL* are nowhere defined; although it seems that the recorded figures indicate crew numbers exclusive of the master[92]. However, manning levels were a crucial economic element in British mid-nineteenth century ship operations, with owners constantly seeking overt (or covert) savings through manning reductions.[93] Tonnage employed per man would seem to be an indicator of such levels and, in essence, it was used by seamen's organisations in pursuit of agreed manning scales.[94] Although the *NBESL* yields gross manning levels – and (by calculation) tonnage per man figures – these aggregates cannot be turned into measures of absolute, rather than comparative, efficiency. At best, they are a guide to technological rather than economic efficiency, for one cannot realistically cost the individual units of labour involved – neither British nor foreign. For instance, a generation earlier (in 1833) a South Shields shipowner, Robert Anderson, suggested that on a typical Baltic voyage a foreign ship's wage costs were only 45 percent those of its English counterpart – his

[91] Sunderland Library, Local Collections, record book of the Sunderland Mutual Insurance Club, 1841-1842; this quotes the registry tonnage and the capacity in keels of many such colliers.

[92] Since they are completely undifferentiated with respect to age and position, only a detailed examination of the official crew-registers of the various nations (where such survive) could help resolve and quantify crew member categories. Such a task is out-with current scope.

[93] D.M. Williams, 'The Quality, Skill and Supply of Maritime Labour: Causes of Concern in Britain, 1850-1914', in *Merchants and Mariners: Selected Maritime Writings of David M. Williams*, Lars U. Scholl compiler (St. John's , Newfoundland, 2000).

[94] Hodgson, *Borough of South Shields*, p. 307.

comparison however was probably biased, for the English ship he cites appears over-manned.[95] Nevertheless, Anderson's figures indicate only slight difference between English wage levels of 1833 and 1861.

Manning levels and ship size show clear correlation though, highlighting economies of scale. There is an almost 'straight line' progression between 15 tons per man for 100-ton ships to 25 tons per man for 300-tonners. Below 150 tons, the manning levels of all nations are similar, no fleet deviating far from the mean. However, above 150 tons there are distinct national trends, with the English always displaying an advantage of a few tons per man. English superiority over Prussian and German shipping is most evident in the 150-199 ton range, the largest ships where there was full international competition. At this size, English ships held a seventeen percent advantage, arguing the achievement of optimal size/manning ratios. (see Table 6.29).

Table 6.29 Manning Efficiencies, Tons per Man: Ranked by Nationality (tons per man)

Ship Size (tons)	<100	100-149	150-199	200-249	250-299	300-349	>349
England	13.0	17.7	22.3	23.5	26.5	27.3	31.2
Prussia	12.8	16.0	18.9	21.6	24.2	26.0	29.4
German Confed.	13.1	16.3	18.9	20.0	24.2	26.2	
Scotland	13.3	16.6	20.4	23.4	24.3		
Russian Empire	13.8	16.9	20.5	22.2			
Dutch Republic	13.8	16.8	19.6				
Denmark	12.8	17.0	19.7				
Mean (tons/man)	13.2	16.6	20.0	22.2	24.6	26.2	30.3

Compiled from *NBESL*, 1861

[95] Anderson's evidence before a Select Committee, 1833, cited in Hodgson, *Borough of South Shields*, p. 310; this compares the costs of a voyage to Memel by a British and a foreign ship (British provisioning costs look suspiciously high, equivalent to 44 % of wage costs).

No nation's owners were able to reduce the minimum complements of the smallest ships. For the largest range of vessels though, from 150 through 350 tons, manning rose at the closely uniform rate of one extra crew member for each additional 50 tons: from nine men (150-200 tons) to twelve men (300-350 tons). Detailed analysis shows that for ships of above 149 tons, the English fleet's efficiencies were translated into a national manning advantage equivalent to a 'half' or full man per ship.[96]

Understandably, an English ship's crew for a Baltic trip was usually larger than when engaged in coastal or near-European voyaging. For example, around 1861 the manning levels of the Blyth brigs *Gleaner* (14 keels, 196 tons) and *Peace* (16 keels, 224 tons) accorded closely with published listings for North East ships engaged in the coastal trade.[97] Their crews then comprised: *Gleaner*, master and mate, three seamen (including cook/AB and carpenter), and two apprentices; *Peace*, master and mate, four seamen (including full-time cook and carpenter) and two apprentices. But for Baltic voyages their complements were regularly, if economically, increased by a 'half' man – usually by carrying an extra apprentice (see Table 6.30).[98] Both *Gleaner* and *Peace* always carried a ship's carpenter on a Baltic voyage, a position that was not always filled when 'on the coast'. The smaller ship, *Gleaner*, always carried a man who acted as combined 'Cook and AB' – a position characteristic of a coastal collier – whilst her slightly larger partner, *Peace*, first supported a full-time cook before resorting to the cheaper collier practice of 'Cook and AB'. The employment of ABs was kept to a minimum. *Gleaner* generally carried just one in later years and the larger *Peace* no more than two.

Different payment and victualling methods make direct comparison of wages in Baltic and coastal voyaging problematic. Wages for Baltic trips were paid *pro rata*, by the month and day, on the basis of the elapsed voyage time. The latter were paid as

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[96] In contemporary terms one able seaman was reckoned equivalent to two apprentices.

[97] Stevens, *On Stowage* (5th), p. 146; Hodgson, *Borough of South Shields*, p. 307. Stevens probably drew his (outdated) 'North of England' manning levels from the same source as Hodgson.

[98] Author's collection: *Gleaner*, transcript by R. Balmer (c.1970) of original ship's accounts, 1854-1872; *Peace*, transcript by R. Balmer (c.1970) of original ship's accounts, 1857-1867.

fixed sums by the 'run', a stated port-to-port voyage irrespective of voyage time;[99] characteristically, a nominal month for the regular 'London voyage' or round trip to a northern French port. In fact, an owner's manipulation of his crew levels seems to have kept any voyage's wage costs, Baltic or coastal, within prescribed cash limits. In consequence of this the monthly wage costs in the Baltic trade were little, if anything, above those paid for an equivalent period 'on the coast' (see Table 6.30).

Since common practice meant that the shipowner also underwrote the full victualling costs for a crew's Baltic trip, but only part of those for a coastal trip, crew members engaged for the Baltic were receiving an additional payment 'in kind'. But unfortunately, the nature of the two brigs' (*Peace* and *Gleaner*) accounts make it impossible to ascertain the real added value – a common problem when attempting to determine the nineteenth-century seaman's full level of remuneration.[100]

Naturally, any temporary shortage or surplus of seamen affected wage rates accordingly. For example, early in May 1861 it was reported that 'seamen [are] in excess of demand' on the Tyne. Consequently, 'union men' were accepting a lowered wage of £4-10s (£4.50p) for 'the [rate-setting] London Voyage',[101] even though charters coming on hand for Cronstadt were soon expected to 'relieve the [oversupply] pressure'. At this time, *Gleaner*'s new AB (John Dixon) took £3-10s (£3.50p) per month for two Cronstadt trips.

But the fact that throughout 1860 and 1861 her managing owner, John Herron, held to the unvaryingly low rate of £4-10s (£4.50p) for the 'London Voyage', suggests that short-term wage shifts were not necessarily translated into individual owner-to-crew agreements. Similarly, Herron never paid out the Baltic voyage's increase to £4 per month, an increase reported as having been 'given' (autumn, 1860) to seamen by the owners.[102]

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[99] D.M. Williams, ' "Advance Notes" and the Recruitment of Maritime Labour in Britain in the Nineteenth Century', in *Merchants and Mariners: Selected Maritime Writings of David M. Williams*, Lars U. Scholl compiler (St. John's , Newfoundland, 2000), p. 253.

[100] S. Palmer and D.M. Williams, 'British Sailors, 1775-1870', in P. van Royen *et al*, eds., *"Those Emblems of Hell"? European Sailors and the Maritime Labour Market, 1570-1870* (St. John's, Newfoundland, 1997), p. 102.

[101] 1 May 1861, *NDC*.

[102] 24 September 1861, *NDC*.

Table 6.30 *Gleaner* and *Peace*, Wage Rates: Baltic and Coastal Voyages, 1860-61 (pounds sterling)

	Cronstadt, monthly range (£)	Cronstadt, monthly average (£)	London, voyage range (£)	London, voyage average (£)
Master	8.50 – 9.00	8.67	8.50 – 8.50	8.50
Mate	5.00 – 5.50	5.17	5.50 – 5.50	5.50
Carpenter	5.00 – 5.50	5.17	5.50 – 5.50	5.50
Cook/AB	3.75 – 4.13	3.92	4.75 – 4.88	4.75
AB	3.50 – 3.75	3.58	4.50 – 4.50	4.50
AB			4.50 – 4.50	
OS	0.50 – 0.50	0.50		
Apprentice 1	2.15 – 3.40	2.90	3.15 – 3.40	3.28
Apprentice 2	2.65 – 2.90	2.82	2.15 – 3.40	2.78
Apprentice 3	2.40 – 2.65	2.57		
Total		35.3		34.81

Compiled from voyage accounts of the *Gleaner* and *Peace*, 1860-1861[103]

In the national context there is no evidence to suggest that Baltic-going seamen of the North East were under-remunerated. The wage levels exampled (see Table 6.30) compare favourably with national indices compiled for the period where, for example, Fischer's mean monthly rate, 1863-1865, for a foreign-going English AB (all found) is only £3.16.[104] North East owners in the Baltic trade were clearly responding to the wage market by matching, or improving upon, the remuneration offered to seamen employed in lengthier foreign-going voyages.

[103] *Gleaner*, ship's accounts; *Peace*, ship's accounts.

[104] L.R. Fischer, 'Seamen in a Space Economy: International Regional Patterns of Maritime Wages on Sailing Vessels, 1863-1900', in S. Fisher, ed., *Lisbon as a Port Town, the British Seaman and Other Maritime Themes* (Exeter, 1988), pp. 61-63.

The Carriers: Earning Opportunities

Collectively, freight incomes over a specified period were the product of the prevailing freight rate(s) and volumes carried. Consequently, it is possible to estimate aggregate freight earnings on coal by multiplying the individual loadings recorded in the *NBESL* by the prevailing freight rates for select destinations – daily tables of which were published locally.[105] Gross freight earnings are far more difficult to estimate since the rates for non-coal exports, including chemicals and metals, were rarely published, whilst reports of inward bound rates for imports, including forest products and grain, were irregular.

Even the resultant figures for coal exports must be used with caution for there were two important variables. Firstly, differences between the tabular published rates and those actually fixed by shippers (these might, for example, include a discount). Secondly, the exact rates for the lesser, non-quoted Baltic ports which, between them, received 30 percent of the Tyne's coal. Guidance to, but not a time series of, these variables can be found in two sources: local newspapers' irregular reports of vessels actually 'fixed', and rare surviving owner's records.

It has often been assumed that rates held a linear, or at least a direct, relationship to individual route mileages.[106] But, as Fischer indicates, this was not the case.[107] For instance, the rate per keel for the 750 miles to Swinemunde was around £9.20 whilst that for Memel, some 200 miles further east, was only £6.40 (30% less). Some differentials are clearly explicable though, in particular that between the sea-port of Swinemunde and the city of Stettin – 35 miles of approach along the Stettiner Haaf and up the river Oder inevitably caused delay.[108]

Paradoxically, the highest rates were offered for ports at the eastern and western extremities of the Baltic, that is, those that occasioned the longest and shortest mileages respectively. Amongst the last, Kiel's relatively high rate probably reflected the difficulties of its approaches (via the Danish archipelago), together with restrictions on draught and paucity of return cargo. Excepting for Stettin and

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[105] Newcastle Daily Journal [*NDJ*], 1861; 'Shipping News', destinations include nine Baltic ports.

[106] Harley, 'Coal Exports', pp. 311-38.

[107] Fischer, 'Flotilla of Wood ', pp. 48-49.

[108] Imray, *Coaster's Guide*, p. 256.

Swinemunde, the bulk of the ports in the Low Baltic – the southern Baltic's long central section – offered uniformly low freight rates. (see Table 6.31)

The attractiveness of the rate to a particular port was largely a compound of the rate itself and the route's distance, or (more properly) the anticipated passage time.[109] Objectively, the result can be expressed as money earned per unit distance, or, reciprocally, as route miles covered per unit of money earned. On this basis alone, the three most attractive ports were Cronstadt, Stettin with Swinemunde, and Kiel. Surprisingly perhaps, Riga, as well as Danzig with Newfairwater, and Memel, appeared much less attractive to carriers of coal exports.[110] (see Table 6.31)

Table 6.31 Quoted Ports: Coal Freight Rates (ranked) and Predicted Earnings (nautical miles; pounds sterling; nautical miles)

	Tyne-to-Baltic Port (nM)	Freight per Keel (£)	[111]Freight per 100 miles (£)	Distance for one pound (£) (nM)
Cronstadt	1284	13.360	1.04	96
Stettin	765	10.688	1.40	72
Kiel	679	10.250	1.51	66
Helsingfors	1156	10.063	0.87	115
Swinemunde	735	9.203	1.25	80
Riga	1075	7.188	0.67	150
Danzig	872	6.750	0.77	129
Memel	923	6.469	0.70	143
Newfairwater	870	6.219	0.71	140

Compiled and calculated from: *NBESL*, 1861; *NDJ*, 1861, 'Shipping News'.

[109] For sail, the additional loading/unloading times may be considered a common factor throughout.

[110] Danzig, upon which Harley, 'Coal Exports', predicated his Baltic results actually provided for only 4% of the freights earned. This highlights the fact that, despite its mid-geographic position, Danzig is entirely unsuitable as a reference port for Baltic freight rates.

[111] Calculated from an average of the initial rate quoted for each month of the shipping season (March to October inclusive).

These theoretical predictions as to attractiveness are supported by the shipment records for the nine most frequently quoted ports, with Cronstadt, Stettin with Swinemunde, and Kiel accounting for nearly 90 percent of the freights earned in supplying the nine quoted ports (see Table 6.32). Indeed, the 11,000 keels (235,000 tons) of coal products shipped to the nine quoted ports represented 73 percent of the entire Tyne-to-Baltic export total. Thus there is clear coincidence between the ports which were theoretically attractive to shippers and those which, in practice, received the largest volumes of coal (compare Tables 6.31 and 6.32).

Table 6.32 Quoted Ports: Quantities Shipped and Total Freights Earned (number; percentage; pounds sterling)

	Keels Shipped (No.)	Proportion of Keels Shipped (%)	[112]Aggregate Freights Earned (£)	Proportion of Freights Earned (%)
Cronstadt	4837	44	63585	52
Stettin & Swinemunde	3865	35	38573	32
Kiel	591	5	6070	5
Riga	705	6	5122	4
Danzig & Newfairwater	680	6	4454	4
Helsingfors	197	2	1966	2
Memel	224	2	1451	1
Total	11097		121222	

Compiled and calculated from: *NBESL*, 1861; *NDJ*, 1861, 'Shipping News'.

Freight rates for coal varied seasonally as well as geographically. They generally weakened during mid-summer and strengthened towards the beginning and the end of the shipping year (March to October) when demand, and voyage risks, were at their greatest. Late shipments always commanded a premium. This was

[112] Calculated from an average of the initial rate quoted for each month of the shipping season (March to October inclusive).

particularly so for Cronstadt where, for a typical 16-keel (224-ton) ship, the differential between a mid-summer and a late autumn voyage was £34 (16%), a sum equivalent to one-third of the round trip's wage bill. Stettin's seasonal profile was less exaggerated, giving more emphasis to the spring period of re-supply, and the variation there was proportionately less, £16 (10%). (see Table 6.33)

Table 6.33 Seasonal Variations in Freight Rates for Coal: Cronstadt and Stettin (pounds sterling; percentage deviation)

	Cronstadt			Stettin		
	Monthly Rate (£/keel)	Earnings [16-Keel ship] (£)	Deviation from Mean (%)	Monthly Rate (£/keel)	Earnings [16-keel ship] (£)	Deviation from Mean (%)
March	13.5	216	+1.	11.25	180	+6.3
April	13.5	216	+1.1	11.25	180	+6.3
May	13	208	-2.7	10.25	164	-4.1
June	13	208	-2.7	10.25	164	-4.1
July	13	208	-2.7	10.25	164	-4.1
August	12.4	198	-7.4	10.25	164	-4.1
September	14	224	+4.8	11	176	+2.9
October	14.5	232	+8.5	11	176	+2.9
Mean	13.36	214		10.69	171	

Compiled and calculated from *NDJ*, 1861, 'Shipping News'.

However, seasonal rate shifts did not necessarily drive corresponding changes in aggregate earnings, for increased rates generally implied lower volumes. At Cronstadt, the amount of coals shipped in any one month always closely matched that same month's share of the total annual freight earnings. For example, in the peak month of July the 23 percent of annual volume was matched by 22 percent of annual earnings. Elsewhere, however, the seasonal shifts were generally less clear, with two of the lesser-frequented (quoted) ports, Helsingfors and Danzig, cited as unvarying rates the year round.[113]

Regardless of regular seasonal rate shifts, two further factors helped determine the daily rates offered: the shipping stock available ('ready ships'), and the general demand to-or-from a particular destination. For instance, the importance of continuity of shipping supply was exemplified when, in mid-September 1861, the *Newcastle Daily Journal* reported a strong rate rise consequent upon a temporary shortage of tonnage, but predicted an ensuing fall: 'When the vessels now detained in the Baltic [by westerly winds] come to hand there will be a temporary briskness, and the abnormal rates to which freights have in some instances run up to [£15-10s] will speedily give way'. Demand side fluidity was illustrated less than a month later when, as the outlook for profitable return cargoes (of grain) was poor, the same newspaper's commercial columnist highlighted one of sail's new vulnerabilities 'The season is fast drawing to a close, and steamers are now chiefly in demand...the chief orders from the lower Baltic ports are for wood, and scarcely anything for [the more profitable] grain cargoes.' However, he anticipated that earlier arrivals would still stand to benefit, since 'those ships that are [already] out there seeking [at Cronstadt] will probably fall well in'; for the shipowner, forward positioning was everything.

The existence of the Fischer-defined 'joint production' regime for English shipping in the Baltic is confirmed, in part, by this susceptibility of outward rates to predicated changes in inward rates (a feature common to genuine reciprocal trades).[114] Thus, an anticipated rise of inward rates – consequent, say, upon shortfalls in grain imports – encouraged coal shippers to hold down the rates for outward cargoes. Sentiments expressed in 1860 were obviously a commonplace of Tyneside's commercial community: 'large homeward rates [when] anticipated...tend to keep down outward rates' and, in similar vein, 'owing to the improvement in homeward rates, [outward] rates have been flat.'[115]

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[113] *NDJ*, 1861, Helsingfors, £10; and Danzig, £6-10s to £7. This suggests openness to casual negotiation and again underlines the fact that, through lack of volume and location, Danzig's freight rates were atypical

[114] Fischer, 'Flotilla of Wood ', p. 44. This predicates that in a 'joint production' situation deployment decisions were susceptible to rate changes that occurred in either, rather than just one, of the directions of carriage.

[115] 27 August, 3 September, *NDC*, 1860.

In the light of such seasonal rate shifts, irregular fluctuations, and the individuality of the various ports' import regimes, it could be argued that the notion of an average, annual pan-Baltic freight rate for coal had little practical, contemporary meaning. However, as a historical concept it does have merit in defining trends and making port-by-port comparisons easier.

For example, the year-round (1861), arithmetical mean for the nine quoted ports can be determined at just over £9 per keel, equivalent to 8s 7¼d (8.6s) per ton. When weighted, by factoring in each port's received volume as well as its actual rate, the mean price increases to 10s 5d (10.4s) per ton (see Table 6.34). This figure, of 10.4s per ton for 1861, corresponds well as a precursor to Fischer's weighted pan-Baltic series for the succeeding years: 1863, 10.4s; 1864, 10.7s; 1865, 10.2s; and 1866, 9.7s. [116]

Table 6.34 Quoted Ports: Mean Freight Rates, 1861[117]
(tons shipped per hundred [i.e. percentage]; pounds sterling; shillings per ton)

	Tons per hundred (tons)	Mean Quoted Rate (£ per Keel)	Mean Rate (shillings/ton)	Weighted Earnings (shillings/ton)
Cronstadt	44	13.359	12.60	6.54
Stettin /Swinemunde	35	9.945	9.38	3.28
Kiel	5	10.250	9.66	0.48
Riga	6	7.188	6.78	0.41
Danzig/Newfairwater	6	6.484	6.12	0.37
Helsingfors	2	10.063	9.50	0.19
Memel	2	6.469	6.10	0.12
Mean		9.108	8.59	10.40

Compiled from, *NBESL*, 1861; and, *NDJ*, 1861, published freight tables.

[116] Fischer, 'Flotilla of Wood ', pp. 48-51.

[117] 'Mean Quoted Rate', cites the actual contemporary rate per keel, but for ease of comparison the 'Mean Rate' and 'Weighted Earnings' are expressed as decimal shillings per ton.

Earning Opportunities: Representative Vessels

Surviving shipowners' accounts for three characteristic British vessels engaged in the Tyne-to-Baltic and allied trades attest to the ways in which individual ships were freighted and most profitably deployed during the period under consideration. Two of these vessels were Tyne-registered brigs under one nominal owner, and the third was a Scottish-owned schooner registered in the Moray Firth port of Banff.

The brigs *Gleaner* (196 tons) and *Peace* (224 tons) represented a major class of British vessel trading to the Baltic and, similarly, the schooner-rigged *Orient* (103 tons) was characteristic of a class of Scots vessel that commonly worked in the Baltic and coastal trades.[118] In the years selected, all three vessels were engaged in a series of Baltic and Home Trade – including coastal – voyages,[119] and all three of them turned in respectable profits *ex* depreciation (see Table 6.35).

Table 6.35 *Gleaner*, *Peace* (1861), and *Orient* (1862): Freights Earned, Expenditure and Profits

	Brig, *Gleaner*	Brig, *Peace*	Schooner, *Orient*
Gross Freight Earned (£)	1225	1380	938
Annual Expenditures (£)	224	175	66
Voyage Disbursements (£)	818	801	625
Gross Profit (£)	183	404	247
Profit per Register Ton (£)	0.93	1.80	2.40
Profit/Freight Earned (%)	15	29	26

Compiled from: ship's Accounts, *Gleaner*; ship's Accounts, *Peace*; and, owner's ledger, *Orient*[120]

[118] One-third of all the Tyne-owned ships thus employed fell within *Peace* and *Gleaner*'s size range, 150-250 tons. Eighteen Banff-registered vessels of *Orient*'s type carried 24 cargoes of coal on the Tyne-to-Baltic run in 1861.

[119] In 1861 *Gleaner* made two trips to Cronstadt from the North East coal ports and four in the Home Trade; *Peace* was deployed on three round-trips to Cronstadt alone. In 1862 *Orient* took two outward cargoes to the Lower Baltic from the Tyne together with two from Scottish ports and picked up three coastal freights in addition.

[120] '*Money Engrossed by* Orient', voyage accounts ledger, 1855-1867.

Given that these vessels had a high usage rate and that, size-for-size, and allowing for depreciation they showed comparable levels of profitability, [121] the question arises as to which of their voyage destinations provided the greatest earnings and yield. Conventional wisdom suggests that such shipowners deployed their ships to the Baltic in preference to the Home Trades (including coastal) in expectation of higher returns and gains, but the voyage accounts of the two commonplace brigs provide no such tidy answer. Baltic voyages were generally four to five times longer than Home Trade ones, involved three or four 'legs' in total, together with the uncertainties over foreign dues, currency conversion, and 'bills of exchange'. The relatively high freight rates of the Baltic looked attractive, but the earnings equation was never a simple one, for an owner needed to maximise his returns – as measured by money earned per voyage day, or, per voyage mile – the full year round.[122]

Over a two-year period, 1860-1861, *Gleaner*'s nine Home Trade voyages provided freight earnings of £4.43p per voyage day, whilst four to the Baltic averaged less, at £4.04p. With just two Home Trade (London) voyages to *Peace*'s credit, as against six to the Baltic, her comparative earnings are less clear. But she made advantageous (if opportune) domestic earnings of £6.72 per voyage day compared with the Baltic's £4.71. *Orient*'s returns for 1861-1862 reflected much the same pattern,[123] with earnings of £0.15 per route mile in the coastal trade but only £0.12 for round-trip Baltic voyages. Thus all three vessels demonstrate a consistent bias in favour of coastal over Baltic earnings, amounting to: *Gleaner*, ten percent; *Peace*, eighteen percent; and *Orient*, 21 percent.

Part of the Baltic's failure to provide a higher rate of daily return undoubtedly lay in the structure of the round-trip voyage. If, as has often been assumed, a vessel's Baltic round-trip voyage actually ended at the inward port of discharge (characteristically London or Hull), then the earnings rate for a Baltic run shows up more favourably. But in practice, a Baltic voyage inward rarely ended at a centre for exports back to the Baltic. Tyne-based vessels frequently had to re-position

[121] A.G. Osler, 'Time Runs Out: a Case-Study in Baltic-going Sail, 1854-1872', *The Northern Mariner/Le Marin du Nord*, XII, No.4 (2002), pp. 26-27.

[122] Wherever the original accounts allow, both these ratios have been calculated. They show close correlation when averaged over successive trips.

[123] *Orient* was inactive for much of 1861 owing to a bad grounding.

themselves with a 300-mile trip in ballast north, and, conversely, London-based ships made a similar (initial) passage to load coals outwards. These east coast ballast legs, combined with the fact that the inward trip (that is, to London or Hull) was a materially longer one for a Tyne-based ship, considerably altered the Baltic voyage's economics.

Even though *Gleaner* and *Peace*'s outward legs (with coal) grossed them less overall than the inward ones (with grain, forest products or tallow), their freight earning rates per 100 nautical miles were significantly higher outward: *Gleaner* returning £14.08 outward, as against £13.44 inward; and *Peace* £18.39 outward, as against £16.08 inward. Only if the inevitable ballast passages are stripped out – something which could not be achieved in practice or disguised in the owners' annual accounts – do these brigs' rates for inward earnings exceed those outward. Conversely, *Orient*'s balance was marginally in the other direction. (see Table 6.36)

Table 6.36 Earnings on Baltic Voyages: *Gleaner*, *Peace* and *Orient*, Outward and Inward [124]

	Gleaner (1860-61)		*Peace* (1860-61)		*Orient* (1862-63)	
	Out	In	Out	In	Out	In
Total Baltic Voyages	4	4	6	6	8	8
Total Voyage Legs	5	8	6	12	8	9
Ballast Legs	1	4	0	6	0	1
Total Distance (nM)	4749	6347	6618	9024	6338	7284
Freights Grossed (£)	669	*853	1217	1361	698	859
Earnings (£/100nM)	14.08	13.44	18.39	16.08	11.02	11.79

Compiled from: ship's Accounts, *Gleaner*; ship's Accounts, *Peace*; and, owner's ledger, *Orient*

[124] *Gleaner*'s total of 'Freights Grossed In' contains two careful comparative estimates (*853) to provide for known cargoes at unrecorded freights. 'Total Distances' are given in nautical miles (nM) and include ballast as well as freighted passages. 'Earnings', are expressed as pounds sterling per 100 nautical miles.

Orient's more favourable inward earnings, however, did not arise from extra earning power on the Baltic leg, but from the economies that resulted from her ability to pick up (coastal) freights back to small Scottish ports after discharging inward – ballast passages were uncommon. But this was not the case for the two Blyth-owned brigs since the capacity that headed back to the North East coal ports (especially from London) always exceeded the cargo available, and what little cargo there was went in 'goods traders' or 'packets'.[125] Hence, the Baltic trips made by *Gleaner* and *Orient* in 1860 and 1861 were matched by the same number of ballast passages (see Table 6.36). There was no real prospect of a rewarding freight on the final leg from a British port of discharge to their homeport.

These very practical considerations explain the different deployment strategies followed by the Scots and the North East shipowners engaged in the Baltic trade. For the most part, the latter concerned themselves with a regular regime of voyaging, taking relatively large ladings of coal outward from their home rivers to the larger ports of the middle and upper Baltic. Here, they were fairly well assured of finding large quantities of bulk cargo awaiting shipment to London, Hull or other east coast English ports, and they were prepared to accept the fact that a round-trip, high volume, voyage would conclude with an unprofitable coastal passage in ballast.

Conversely, owners of the smaller, more versatile, Scottish schooners operated a regime of continuous, albeit low volume, freight earning. Dependent upon a vessel's position at the end of its wintertime coastal runs, coal would be loaded outward to the Baltic either from the Scottish coalfield itself or a North East coal port. The shallow water ports of the Middle and Lower Baltic were preferred (relatively short-haul) destinations, for there a wide range of small cargoes offered for British ports – anywhere from 'down Channel' to Orkney. After discharge, these schooners frequently secured modest cargoes that serviced the domestic needs of small ports in eastern Scotland.[126] Salted Scots herring then formed a regular and profitable outward cargo later in the season, supplemented by occasional shipments of pig iron from Grangemouth and Leith. Scottish schooners thus enjoyed a varied and opportunistic regime, exhibiting less regularity of voyage than did their square-rigged counterparts

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[125] T. Barrow, ed., *Walks around the Old Grain Ports of Northumberland: Alnmouth, Seahouses and Berwick* (Morpeth, 1995), p. 19; Keys, *Dictionary*, pp. 32-38.

[126] For example, barrel staves and manure from London for Morayshire's herring curers and farmers respectively.

from England's North East coast. In essence, this perhaps reflected the entrenched 'tramping' tradition of Scots shipowners in the Baltic, compared to the more mercantile attitudes – based around merchant shipowners – that had earlier typified Baltic operations from the North East coal ports.[127]

However, all three vessels: *Gleaner*, *Peace*, and *Orient*, seem to have satisfied their owners' expectations for profits in the Baltic and allied trades during the early 1860s. And there is reason to believe that the period was considered one of relative trading normality. But this period, 1860-1863, marked a turning point for them all. Even by the mid-1860s they had begun to show marked increases in their voyage 'expenditures', cost pressures that were exacerbated by falling incomes as freight rates declined both for coal outward and for (all but select) Baltic imports as well. What was not a factor, was direct competition from bulk-carrying steamers on the Baltic routes; very few were active there yet. However, the indirect effects of competition from the many bulk-carrying steamers already deployed in Britain's coastal coal trade – in which all three of these sailing ships found significant employment – adversely affected the year-round earning potential of the two North East-owned brigs.[128]

Conclusions

The repeal of the Navigation Laws (1849) appears likely to have produced a verifiable shift towards foreign, as against British, carriers in the Tyne's Baltic trade. Statistical evaluation, however, shows that there was no such sudden impact. Instead, repeal led to little more than a progression of existing trends. The causes of this shift are not investigated here, but it is likely that dedicated British tonnage proved insufficient to service increasing demand. It was logistics, rather than legislation, that probably determined the expansion of foreign carriers immediately prior to 1861.

Evaluation reveals that, by 1861, three of the territories directly involved in the Baltic's major reciprocal import and export trades: England, Prussia and the

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[127] T. Riis, 'Long Distance Trade or Tramping: Scottish Ships in the Baltic, Sixteenth and Seventeenth Centuries', in T.C. Smout, ed., *Scotland and the Sea* (Edinburgh, 1992); R. Davis, *The Rise of the English Shipping Industry in the 17th and 18th Centuries* (2nd edition, Leicester, 1971), pp. 214-15, 221, 226-27; A.W. Purdue, *Merchants and Gentry in North-East England 1650-1830: The Carrs and the Ellisons* (Sunderland, 1999), pp. 144-45.

[128] Osler, 'Time Runs Out', p. 15, pp. 25-7.

German states, also dominated its seaborne carriage. For the most part the Baltic's principal receiving centres imported coal in domestic (i.e. nationally-flagged) bottoms and, as posited by Palmer, it is evident that Russia's mercantile weakness alone allowed English shipping to break this mould.

Analysis shows a complex mix of sailing ships within the various national fleets with the major participants generally operating ships of larger size and *vice versa*. The few steamships capable of carrying bulk cargoes contributed little capacity. Prior suggestions that the Tyne's own 'Baltic fleet' comprised inferior vessels are not borne out by rigorous statistical appraisal, a finding entirely congruent with Fischer and Nordvik's revisionist thinking about English participation.[129] No nation showed significant superiority in ship efficiency and – other than in matters of ship size – none held a supply-side edge in technology or materiel. However, English shipowners demonstrably led the way in manning reductions through their realisation of economies of scale, an observation that similarly extends and confirms Fischer and Nordvik's views.[130]

Shipping flows indicate that three-quarters of annual (export) tonnage requirements were met by ships making a single Baltic voyage a year. Importantly, this reveals the (unexpectedly) casual nature of the trade's supply reservoir, indicating that Baltic trading was not an independent deployment activity – either for British or foreign shipowners. More specifically, it is clear that a Baltic voyage was generally but a single element within the wider employment patterns of a responsive Tyneside shipowner. Diverse overseas opportunities allowed such owners to shape their annual deployment strategies, maintaining a high level of association with intermediate foreign-going routes and integrating the Baltic (which demanded unusual elasticity of ship supply) into their North European commitments overall.

When the earning opportunities for the Baltic trade's outward leg with coal from the Tyne are comprehensively assessed, the coal shipment volumes actually achieved validate the deployment options that seem theoretically most attractive. Similar assessments and secondary evidences also conclusively support Fischer's later argument that the Tyne's Baltic trade was part of a genuine 'joint production' regime

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[129] Fischer and Nordvik, 'Myth and Reality', pp. 102-05.

[130] Fischer and Nordvik, 'Myth and Reality', p. 105.

for British carriers: with seasonally enhanced profits anticipated on the outward (export) leg as well as on the inward (import) one to Britain.

A new premise introduced into the earnings debate, however, is the failure of previous authors (including Fischer) to recognise the significance of the non-earning, ballast leg inherent in a Baltic round trip. This reduced the apparent returns on the higher-freighted import leg to a level where the degree of earnings on the outward coal-carrying leg were critical to profitability. Case-study evidence supports these generalised conclusions, and furthers the concept of a joint production regime in which prevailing outward (as well as inward) freight rates influenced shipowners' deployment decisions.

Contextually, it was the successful integration of various routes (both foreign and coastal), and not a reliance upon any one particular trading zone, that underlay the viability of the majority of the British sailing ships then engaged in the Tyne-to-Baltic trade. And, as a corollary to this, the loss of any one element amongst these routes threatened the integrity of the whole. Indeed, the situation was succinctly summed up by one of Newcastle's leading commercial correspondents of the day:

> So much are the various engagements of ships interwoven, it is surprising with what almost instantaneous effect a serious, especially an unexpected, depression in [any] one trade is felt, like an electric shock....[131]

Considering that the next shock to the Baltic trade's shipping system was to be a technologically induced one, it forms an apt closing simile.

[131] 17 December, 1860, *NDC.*

Chapter 6, Charts:

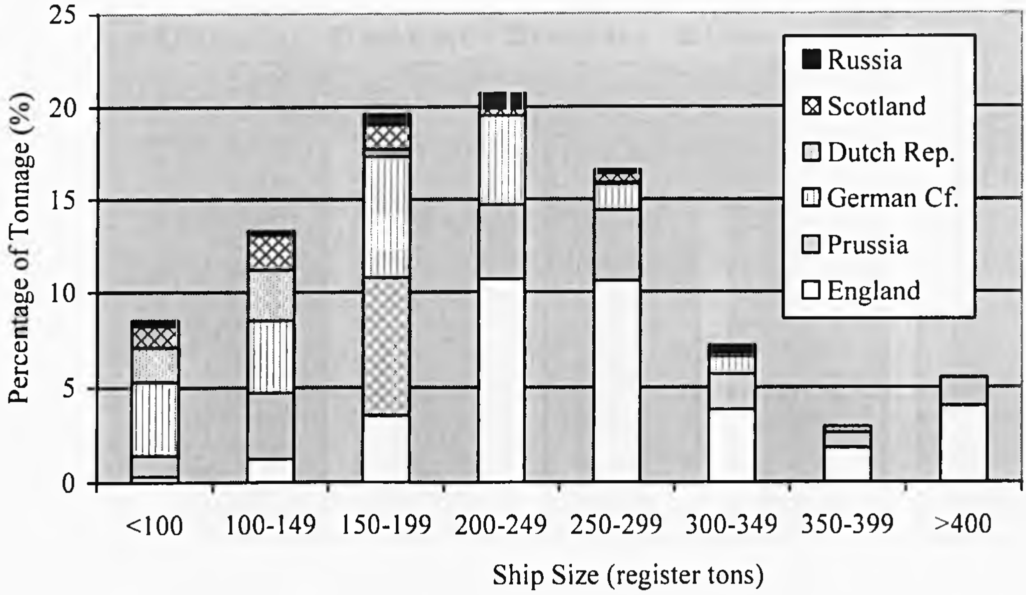

Chart 6.1 Ship Size: Top Six National Carriers by Size Band

(Source: see Table 6.9)

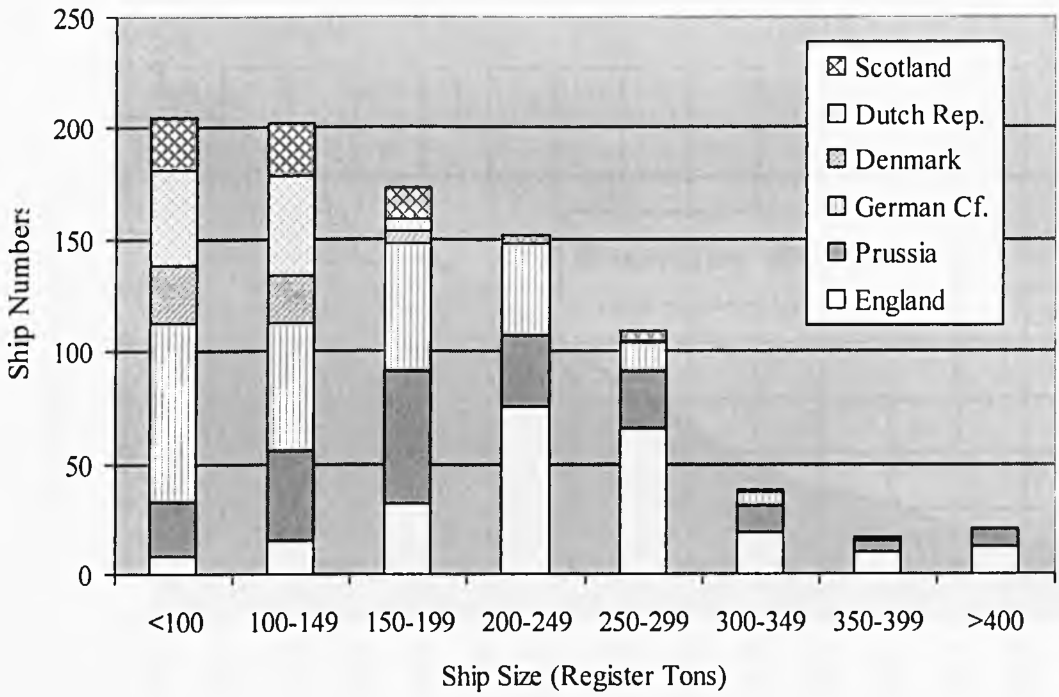

Chart 6.2 Shipping Stock: Ship Numbers by Nationality (Top Ranked Six only)

(Source: see, Table 6.12)

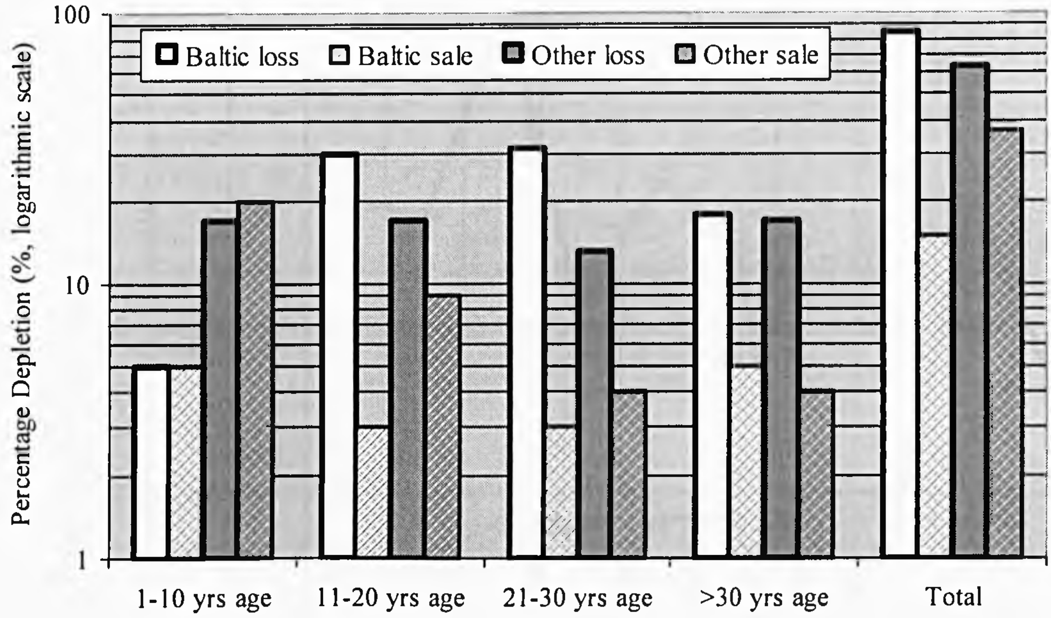

Chart 6.3 Depletion of Tyne-owned, Baltic-going Vessels Extant in 1861: by age, cause and trading area

(Source: see Table 6.18)

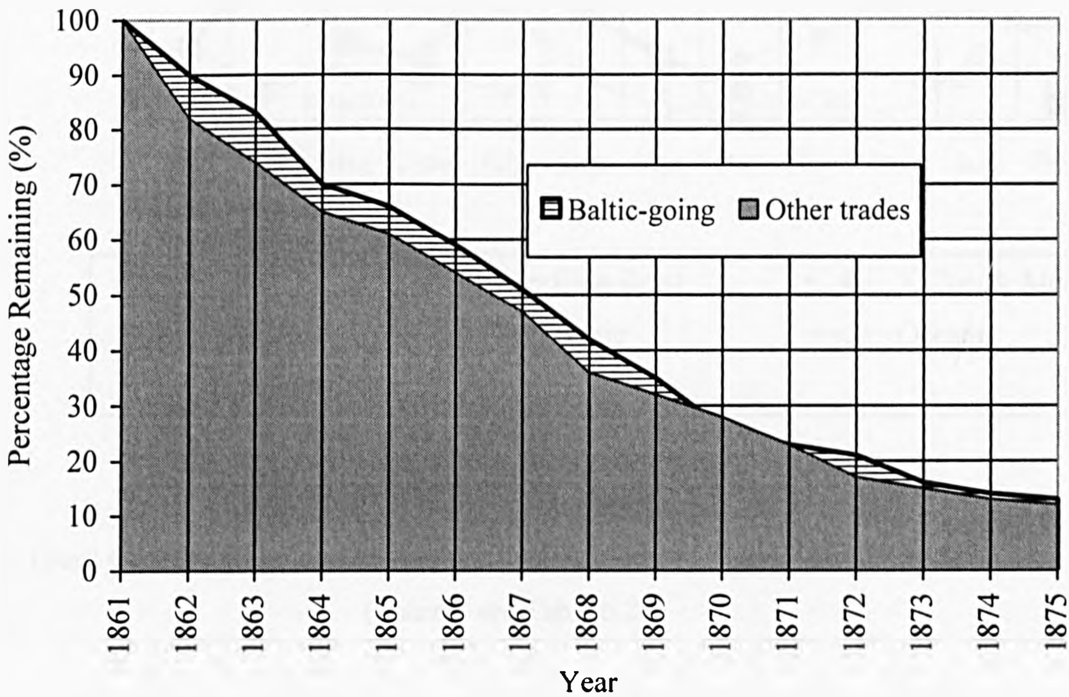

Chart 6.4 Attrition Rates, 1861-1875, of Tyne-owned Vessels extant in 1861

(Source: see Table 6.19)

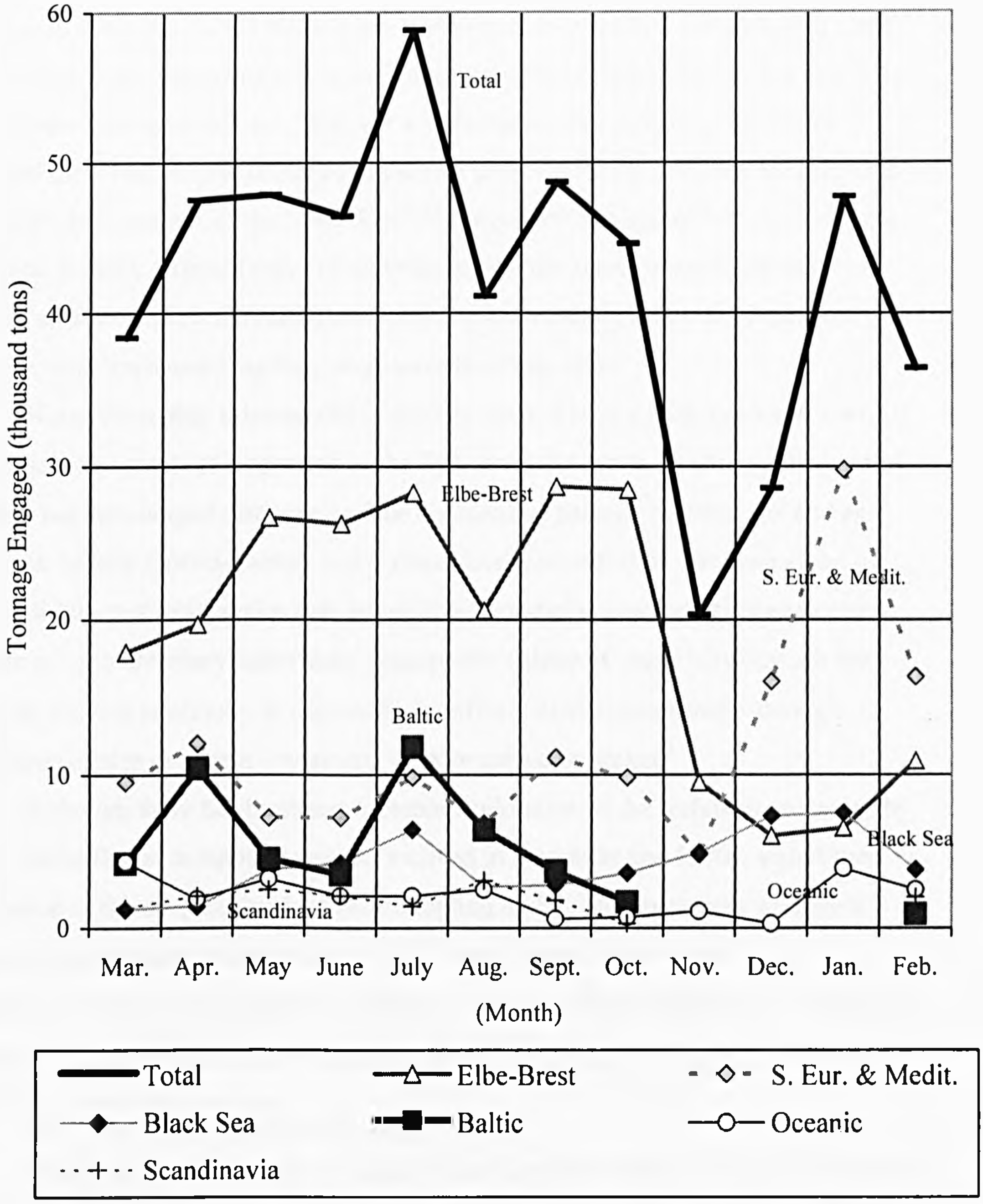

Chart 6.5 Foreign-going Destinations by Consolidated Trade Zone, 1861-1862

(Source: see Table 6.24)

CHAPTER 7: THE SHIPPING STOCK, 1880

Whereas in 1861 the Tyne's Baltic trade had been conveyed almost exclusively under sail, contemporary commercial comment and statistics for 1880 indicate that steam had become the major carrier.[1] This was a shift that might reasonably have been expected for it had already occurred in the east coast coal trade and, to a considerable extent, on the crossings of the North Sea.[2] However, the carriage of bulk cargoes into the Baltic posed a different order of technical challenge since its round trip routes entailed steaming a few thousand, rather than a few hundred, miles. Fuel-efficient steamers with improved seagoing range were therefore vital.

Notwithstanding this undoubted shift to steam a large (north European-owned) fleet of sailing vessels still operated in the Tyne-to-Baltic trade, producing the kind of mix that has encouraged discussion of the competitive balance between sail and an emergent, largely British-owned, steam fleet.[3] Less consideration has been given to the possibility that sail's major role during this period of technological change was to provide a complementary rather than a competitive element, especially through the ability to provide continuity in regionally significant market areas that – through constraints of size or access – were not initially served by steam.[4]

Although there has been considerable exploration of the technical processes by which fuel-efficient compound engines evolved in the 1860s and 1870s, and of their application in the deep-sea trades,[5] their adoption by British shipowners who were engaged in the shorter intermediate routes is not so intimately understood. Technology-led marine engineering studies, or plain descriptive histories of ships and shipowners (or ship- and engine-builders), rarely provide an overview of responses on

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[1] *NCL*, 1880, 'Commercial News'; *NBESL*, 1880.

[2] Smith, *Sea-Coal for London*; A. Pearsall, 'Steam enters the North Sea', in A. Bang-Andersen et al, eds., *The North Sea, A Highway of Economic and Cultural Exchange Character–History* (Oslo, 1985).

[3] Fischer, 'Flotilla of Wood '.

[4] A notable exception is Kaukaianen's exploration of the continuance and complementarity of sail between Finland and the Baltic's south west littoral: Y. Kaukiainen, 'Baltic Timber-Trade under Sail: An Example of the Persistence of Old Techniques', in L.U. Scholl and M-L. Hinkkanen, comp., *Sail and Steam: Selected Maritime Writings of Yrjö Kaukiainen* (St. John's, Newfoundland, 2004).

[5] Summarized, for example, in: R. Craig, *The Ship: Steam Tramps and Cargo Liners, 1850-1950* (London, 1980), pp. 11-14.

the economically vital intermediate routes, including the Baltic.[6] However, analysis of the British steam fleet employed on the Tyne-to-Baltic run (1880) provides opportunity to identify those processes by which dominance in the Baltic arena was achieved; in particular highlighting the input of the North East's shipbuilders and marine engineers.

Provision of Tonnage: Complement and Competition

By 1880, Britain commanded 61 percent of the aggregate tonnage employed on the Tyne-to-Baltic route, English-registered vessels forming by far the largest component, 53 percent of the tonnage engaged.[7] By comparison, despite the political and economic integration of Prussia with the states of the German Confederation (1871), Germany provided only 19 percent, whilst the Scandinavian countries, led by Denmark, mustered a similar share. (see Table 7.1; Chart 7.1) However, the contrast now lay in ship technology rather than in nationality.

Steam tonnage now exceeded sail by more than three-to-one (78%:22%), indicating that steam's penetration on the Tyne-to-Baltic route was well in advance of that even experienced in the Baltic wood import trade to Britain as a whole.[8] Overall, however, steam's provision was skewed by Britain's massive input, for 98 percent (421,168 tons) of the British tonnage that left the Tyne for the Baltic was powered by steam.[9] Germany provided just one-eighth the steam tonnage of Britain, for only 42 percent of its Baltic-going tonnage was steam. Denmark, the third-ranking steam provider, held a steam-to-sail ratio much closer to the three-to-one norm, whilst another Scandinavian country, Sweden, possessed the only other fleet whose steam tonnage surpassed sail's. Norway's rise though, was largely dependent on sail, whilst Russia and Holland were also predominantly providers of sail. (see Table 7.1)

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[6] F. Storr, 'Development of the Marine Compound Steam Engine' (unpublished PhD thesis, CNAA, 1982); Clarke, *Building Ships, Pt. 2,* pp. 1-11; P.N. Thomas, *British Ocean Tramps, Volume 2, Owners & Their Ships* (Wolverhampton, 1992); P.L. Hogg, '*Richies', 1832-1994* (Hartlepool, 1994).

[7] Scottish ships supplied about 7%, Irish involvement was minimal.

[8] Fischer and Nordvik, 'Myth and Reality', p. 105; steam's penetration of the total wood carrying trade from the Baltic to Britain was 30-55% (1878-1883).

[9] Fischer and Nordvik, 'Myth and Reality', Table 3, p. 105; also sets British-owned steam tonnage at 98%.

Table 7.1 Shipping Tonnage by Nation: Steam and Sail[10]

(registered tons; percentage)

	Tonnage		Steam		Sail	
	(tons)	(%)	(tons)	(%)	(tons)	(%)
Britain	431295	61	421244	98	10051	2
Germany	134765	19	56921	42	77844	48
Denmark	50936	7	37450	74	13486	26
Norway	33394	5	6873	21	26521	79
Russia	21194	3	5902	28	15292	72
Sweden	20714	3	14257	69	6457	31
Holland	12847	2	3936	31	8911	69
Finland	419	0	0	0	419	100
Totals	705564		546583	78	158981	22

Compiled and calculated from *NBESL*, 1880

Disaggregation of the shipping stock is particularly revealing. Superficially, Britain and Germany appeared to enjoy close parity, each deploying nearly one-third of the total number of ships engaged, but as a consequence of its larger unit size – through the wider adoption of steam – Britain's aggregate tonnage was more than twice that of Germany's (see Table 7.2). In ship numbers, sail still exceeded steam by a nominal 1.8 sailing vessels to every steamer in 1880, but the tonnage totals showed the exact opposite, with 1.8 tons of steam for every ton of sail. Further analysis indicates the degree to which nations had invested in steam or, alternatively, were still reliant upon sail in their pursuit of the Tyne-to-Baltic trade – and this technology shift, or lack of it, is readily measured.

Britain led the steam-powered sector, supplying 71 percent of all steamers and 77 percent of aggregate steam tonnage. Germany was no better than a distant second, with only thirteen percent of steamer numbers comprising just ten percent of steam tonnage. Its great strength lay in the sheer numbers of its sailing fleet, forming 40 percent of sail's total strength. Furthermore, German sail made up nearly half of the

[10] Includes repeated voyages.

entire sailing tonnage employed on the Tyne-to-Baltic route. German sail's contributions reflected the fact that, although the tonnage based in its Baltic ports had been in absolute decline since 1870, these ports (including former Prussian ones) were still strongholds of sail.[11]

Table 7.2 Ships by Nation of Origin: Steam and Sail combined
(numbers; percentage; tons)

Country	Ships (No.)	Ships (%)	Tonnage (tons)	Tonnage (%)
Britain	304	29	196328	52
Germany	329	32	85150	22
Norway	112	11	28819	8
Denmark	119	11	28626	8
Russia	62	6	16761	4
Sweden	56	5	13156	3
Holland	55	5	9328	2
Finland	2	0	419	0
Totals	1039		378587	

Compiled and calculated from *NBESL*, 1880

Nevertheless, the growing commitment of Germany's shipowners to steam on the Tyne-to-Baltic route should not be underestimated, for they deployed 42 percent of steam tonnage there as against a national average (for all trades) of 23 percent, a figure which approached that in their own domestic (including Lower Baltic) coastal trade, 45 percent.[12] Norway's fleet was still strongly sail biased, supplying just over

[11] In 1880, approaching 90% of Germany's Baltic-based tonnage was still under sail. Sail and steam growth in its North Sea ports was directed more into trans-oceanic, not European, trades.

[12] W. Kresse, 'The Shipping Industry in Germany, 1850-1914', in L.R. Fischer and G.E. Panting, eds., *Change and Adaptation in Maritime History, the North Atlantic Fleets in the Nineteenth Century* (St. John's, Newfoundland, 1985), pp. 151-54; R. Knauerhause, 'The Compound Steam Engine and Productivity Changes in the German Merchant Marine Fleet, 1871-1887', *The Journal of Economic History*, XXVIII (1968), 398-99.

100 ships amounting to almost 20 percent of the entire Tyne-to-Baltic tonnage under sail; but, as yet, Norwegian owners deployed relatively few steamers there.[13] Beyond these German and Norwegian holdings more than one-third of the sailing tonnage was spread amongst a relatively long competitive tail of five nations: Russia (with Finland), Denmark, Britain, Holland, and Sweden. Meanwhile, the pattern of steamer tonnage was far more concentrated, 87 percent was under British and German ownership, whilst the remainder was spread amongst another five nations – they held only 56 of the 367 steamers employed. (see Table 7.3; Chart 7.2)

Table 7.3 Ships by Nation of Origin: Steam and Sail
(steam/sailing ship numbers; tonnage and percentage of total steam or sail tonnage)

	Steam			Sail		
	Ships (No.)	Tonnage (tons)	Tonnage (%)	Ships (No.)	Tonnage (tons)	Tonnage (%)
Britain	262	186277	77	42	10051	7
Germany	49	23783	10	280	61367	45
Denmark	24	15786	7	95	12840	9
Sweden	15	6983	3	41	6173	5
Norway	8	4537	2	104	24282	18
Russia	8	3619	1	54	13142	10
Holland	1	984	0	54	8344	6
Finland[14]	0	0	0	2	419	0
Totals	367	241969		672	136618	

Compiled and calculated from *NBESL*, 1880

[13] H.W. Nordvik, 'The Shipping Industries of the Scandinavian Countries, 1850-1914', in L.R. Fischer and G.E. Panting, eds., *Change and Adaptation in Maritime History, the North Atlantic Fleets in the Nineteenth Century* (St. John's, Newfoundland, 1985), pp. 137-42.

[14] Newcastle Customs House recorded ships of the Grand Duchy of Finland separately from those of Russia.

Regional Considerations: the British Fleet

The British shipping employed on the Tyne-to-Baltic route was predominantly English in origin, with English-registered shipping contributing nearly 90 percent of all British tonnage. Of the 300 or so ships involved, some 260 were of English registry, 44 Scottish, and very few Welsh.[15] Regionally subdivided, the North East coal ports provided a major part of the stock employed, although ships from two other east coast areas – the Humber and London – maintained a significant presence.[16] The coal ports of the North East coast supplied 40 percent of all the British steamers engaged, and a matching percentage of national steam tonnage. By comparison, the Humber ports supplied 22 percent of stock and 24 percent of tonnage, and, London 19 percent and 20 percent respectively.[17] (see Table 7.4)

Numerically, sail's contribution was now extremely small, little more than 40 vessels in all – barely one ship to six, and disparities in ship size rendered the tonnage comparison even more striking: there was only one ton under sail for every nineteen in steam. This British sailing fleet's geographical origins were, however, diverse. Although the North East coal ports still supplied Britain's largest quantities of sail – fourteen vessels (4,176 tons) – ports in north east Scotland, East Anglia and Yorkshire furnished respectable numbers of (generally smaller classes) vessels too. Only East Anglia though, showed total continuing reliance upon sail. (see Table 7.4)

Collectively, the North East coal ports still supplied the major part of the British steam shipping engaged in the Tyne-to-Baltic trade of 1880, but no port grouping dominated supply in the way that Tyneside's ports had done in 1861 (see Chapter 6). Indeed, shipping registered in Hull and London (with over 50 steamers each) now outranked that supplied by any individual North East coal port. And within the North East it was now (West) Hartlepool that was the leading port, supplying

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[15] Changes in recording practices at Newcastle's Customs House in the 1870s meant that foreign-owned vessels came to be designated by nationality only, precluding resolution of their exact provenance in 1880. British-owned vessels continued to be assigned a port of registry, allowing for ongoing regional analysis.

[16] Such regional subdivisions are arbitrary. Here, they are based upon congruent port groupings suggested by a survey of contemporary and later sources.

[17] Since steam dominated this British fleet the proportional distribution of all tonnage (steam and sail combined) closely followed steam's alone.

twice as much tonnage as Newcastle alone. Even the combined Tyne Ports (Newcastle, North Shields and South Shields) were merely second to Hartlepool, whilst Sunderland had achieved near parity with its long-term rival, Newcastle. (see Table 7.5) Elsewhere, few individual ports provided significant numbers of steamers for the Tyne-to-Baltic trade: Dundee reached ten ships (7,500 tons), whilst Aberdeen, Whitby, Leith and Grangemouth each contributed some half-a-dozen (2,000 to 4,000 tons per port); callers from west coast ports – Liverpool, Dublin and Cardiff – were infrequent. The most striking feature of steam tonnage provision overall, was its reliance upon shipping of strictly east coast provenance: English and Scottish alike.

Table 7.4 British Ships by Region of Origin: Steam and Sail
(number; tons; percentage)

	Steam			Sail		
	Ships (No.)	Tonnage (tons)	Tonnage (%)	Ships (No.)	Tonnage (tons)	Tonnage (%)
North East Ports	108	75058	39	14	4176	42
Humber	58	45351	24	1	134	1
London River	52	37535	20	1	214	2
Forth/Tay, Scotl.	21	13231	7	1	154	2
N.E. Scotland	11	6266	3	11	1669	17
East Yorkshire	5	4136	2	5	1327	13
N.W. England	4	3109	2	0	0	0
Wales	3	2028	1	1	149	1
Ireland	3	2092	1	0	0	0
East Anglia	0	0	0	7	1972	20
S.W. England	2	1371	1	1	256	3
Totals[18]	267	190177		42	10051	

Compiled and calculated from *NBESL*, 1880

[18] Re-registration of five steamships during 1880 causes slightly higher totals than in the comparable categories of Tables 7.2 and 7.3.

Table 7.5 Steamships by Individual Port of Registry: English East Coast Ports (registry port and region; ship numbers; total steam tonnage)

Port	Region	Steamships	Total Tonnage
		(Number)	(tons)
Hull	Humberside	54	42981
London	London River	52	37535
(West) Hartlepool	N.E. Coal Ports	45	33408
Newcastle	N.E. Coal Ports	25	16485
Sunderland	N.E. Coal Ports	24	14632
North Shields	N.E. Coal Ports	12	9056
Grimsby	Humberside	4	2370
South Shields	N.E. Coal Ports	1	835
Middlesborough	N.E. Coal Ports	1	642

Compiled from *NBESL*, 1880

Aggregate Capacity, Ship Size, and Numbers

Aggregate capacity on the Tyne-to-Baltic route in 1880 was concentrated not only in steam (78%), but on steamers within a relatively narrow size range. Steamships measuring from 400 to 1,000 tons comprised nearly two-thirds of all carrying capacity, with those in the mid-range, 600- to 800-tonners, supplying more than a quarter.[19] However, in practice the difference between the carrying capacities of sailing ships and steamers may have been greater than these plain tonnage aggregates suggest, for a steamship's stowage factor was normally higher than that of a sailing ship. This conferred a near ten percent loading advantage for shipowners using steamers.[20]

[19] As analysed from the *NBESL*, 1880. Direct competition between sail and steam in any particular size range was insignificant in terms of the total capacity engaged.

[20] Compiled and calculated from *NBESL*, 1880, the average stowage factor for sailing vessels loading coal to the Baltic was 1.53 (i.e. at sail's long-standing norm) whilst that for steamers was 1.68.

Since, for the most part, it was construction techniques and propulsion that determined the size of the ships employed, there was a marked division in size and numbers between the British- and foreign-owned fleets. As a whole, the foreign-owned sailing ship fleet continued to reflect the practices of a previous era, with some three-quarters of its numerical strength (two-thirds of its tonnage) comprised of relatively small ships of 100-300 tons. So, although there were only 42 British as against 630 foreign sailing vessels, the British fleet had a measurably higher size profile, 80 percent of its tonnage aggregate resulted from vessels of over 200 tons.[21] (see Table 7.6)

Table 7.6 Sailing Vessel Size: Foreign and British

(tons; number; tons; percentage)

	Foreign			British		
	Ships	Tonnage	Foreign Capacity	Ships	Tonnage	British Capacity
(tons)	(No.)	(tons)	(%)	(No.)	(tons)	(%)
under 100	69	5676	4	4	393	4
100-199	316	47274	37	11	1678	17
200-299	150	36740	29	20	5270	52
300-399	64	21996	17	4	1411	14
over 399	31	14881	12	3	1299	13
Totals	630	126567		42	10051	

Compiled and calculated from *NBESL*, 1880

Correspondingly, half the numerical strength of the foreign steamship fleet lay in ships of 400-800 register tons although, significantly, a quarter of its tonnage

[21] Fischer and Nordvik, 'Myth and Reality', Table 2, p. 104; shows much the same balance but, as a result of their nationally-based sample including ships carrying imports to west coast ports, especially Bristol and Liverpool, it indicates slightly larger (British- and foreign-owned) sailing vessels.

actually resulted from the ownership of larger vessels.[22] Britain's trend towards larger vessels was evident in steam as well as sail, for some 80 percent of its steam tonnage comprised 400- to 1,000-tonners. This again demonstrated a marked size advantage for Britain, since the strength of foreign owners' (numerically inferior) steamer holdings lay in 400- to 800-tonners. (see Table 7.7) This supports the observations of Fischer and Nordvik that, both for sail and steam, the British-owned tonnage deployed in the Baltic trade possessed a size advantage (per unit employed) over foreign-owned shipping during the period around 1880, although not to the extent that they suggest.[23]

Table 7.7 Steamship Size: Foreign and British

(tons range; number; tons; percentage)

	Foreign			British		
	Ships	Tonnage	Foreign Capacity	Ships	Tonnage	British Capacity
(tons)	(No.)	(tons)	(%)	(No.)	(tons)	(%)
under 400	36	10559	19	11	3487	2
400-599	31	14937	27	82	41340	22
600-799	23	16270	29	84	57804	30
800-999	13	11523	21	61	53529	28
1000-1199	1	1050	2	15	15903	8
over 1199	1	1353	2	14	18114	10
Totals	105	55692		267	190177	

Compiled and calculated from *NBESL*, 1880

[22] The only appreciable overlap between foreign steam and sail was in the 200-400 ton size range although, in a few extreme cases, steamers measured as little as 120-180 tons and sailing ships as much as 600-800 tons.

[23] Fischer and Nordvik, 'Myth and Reality', Table 2, p. 104. British-owned steamers leaving the Tyne for the Baltic averaged 100-200 tons less than Fischer and Nordvik's national samples indicate (i.e. 700 rather than 800-900 tons), but they were still almost 200 tons bigger than foreign-owned steamers.

As the principal owner of sailing tonnage, Germany supplied 45 percent of the whole, providing nearly twice as many vessels (258 ships) as any other foreign nation in the most significant size range, ships below 400 tons. For ships below 200 tons, Denmark – with vessels largely confined to that size – was Germany's nearest competitor, whilst Norway assumed a similarly competitive role for sailing vessels of 200-600 tons. For historical and geographical reasons, Holland's input was generally confined to vessels under 200 tons, whereas Russia showed strongly in the 200-400 ton range. Germany also dominated the foreign fleet's provision of steamships under 800 tons, supplying around one-half of all such steamers, beyond which only the Scandinavian countries provided any real input (see Table 7.8).

Table 7.8 Steamship Size, Foreign-registered Vessels

(tons range; number)

(tons)	Germany	Denmark	Sweden	Norway	Russia	Holland	Totals
<400	17	6	5	5	3	0	36
400-599	18	2	8	0	3	0	31
600-799	11	9	1	1	1	0	23
800-999	3	6	1	1	1	1	13
1000-1199	0	1	0	0	0	0	1
>1199	0	0	0	1	0	0	1

Compiled from *NBESL*, 1880

Examination of size differentiation in the British fleet is best concentrated upon steamships alone and, in particular, upon the shipping stocks contributed by the leading ports (see Table 7.9). Overall, owners preferred steamers in the 400-1,000 ton range, and within this leading group the accent was on 400- to 800-tonners; they constituted well over half the stock (166 of 267 ships) and the tonnage (52%). Large vessels, exceeding 1,000 tons, were relatively few in number (29 ships) but aggregated eighteen percent of tonnage (see Table 7.10); they came almost exclusively from Hull and London or, less often, Hartlepool.[24]

[24] These arbitrary tonnage divisions can be read as indicators of steamer type as well.

Table 7.9 Sizes of British Steamships by Port of Registry

(tons range; number)

Size in Tons	Hull	London	Hartle-pool	Tyne Ports[25]	Sunder-land	Others
<400	2	1	1	2	1	4
400-599	11	19	9	10	12	21
600-799	16	12	16	15	8	17
800-999	14	13	15	10	2	7
1000-1199	5	4	4	0	0	2
>1199	6	3	0	1	1	0
Totals	54	52	45	38	24	51

Compiled and calculated from *NBESL*, 1880

Table 7.10 Sizes of British Steamships

(number; tons; percentage)

(tons)	Steamships (No.)	Steam Tonnage (tons)	Share (%)
200-399	11	3487	2
400-599	82	41340	22
600-799	84	57804	30
800-999	61	53529	28
1000-1199	15	15903	8
over 1200	14	18114	10
Totals	267	190177	

Compiled and calculated from *NBESL*, 1880

[25] Newcastle, North Shields and South Shields.

In terms of regional ownership, all the major British east coast ports were well represented by steamers of 400-1,000 tons, with Hull and Hartlepool displaying near parity in these. The Tyne Ports were not far behind, and Sunderland showed particular strength in the range's lower end, supplying a dozen of 400-600 tons, whilst (surprisingly perhaps) London also demonstrated its greatest numerical strength there.

As steamships based on England's east coast played such a significant role in the Tyne's Baltic trade in 1880 and, furthermore, since they had largely been constructed in east coast shipyards, an understanding of their technology is important. Their separation out as a leading group also has implications for the relatively small numbers of foreign-owned steamers employed, since these mostly followed – with varying degrees of competence – British practices,[26] or had been acquired from British sources. In contrast, the sailing vessels employed had changed little over the period 1860-1880 and, in the coastal and short sea trades at least, had shown little (or no) real advances in technology.[27]

The British Steamer Fleet: Age and Provenance

A technological appraisal of the Baltic-going steamers under English east coast management in 1880 is best commenced by assessing the age profile of the vessels employed, for there had been notable advances in cargo steamship technology and specialisation over the preceding twenty years.[28] About 70 percent of the 200 or so east coast steamers under consideration had been built within the previous ten years, and a further 25 percent were just ten to twenty years old – barely five percent exceeded the twenty-year mark.[29] This amply confirms Fischer and Nordvik's observation that, contrary to earlier interpretations, British shipowners did employ their newest – not their oldest – steam shipping in the Baltic trade.[30]

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[26] For example, the Newcastle newspapers of the period comment upon the way in which Sweden's shipbuilders were finally beginning to match Tyne-built products. Knauerhause, 'Compound Steam', indicates that compound engines only appeared in the German merchant marine after 1873, well after their introduction in Britain.

[27] McGregor, *Merchant Sailing Ships 1850-1875*, pp. 72-108, 190-221.

[28] Craig, *Steam Tramps*, pp. 11-14; McRae and Waine, *Steam Collier Fleets*, pp. 9-20; C.V. Waine, *Coastal and Short Sea Liners* (Wolverhampton, 1999), pp. 16-28, 32-37.

[29] Compiled and calculated from: *NBESL*, 1880; *Lloyd's*, 1860-1880.

[30] Fischer and Nordvik, 'Myth and Reality', 103-05, 113.

East coast shipowners therefore deployed a relatively new fleet in 1880, although there were marked port-to-port differences. The leaders in the emerging cargo 'liner' trades to the Baltic, Hull and Grimsby, displayed by far the highest proportion of vintage vessels, possessing a significant number of mature, ten- to twenty-year old, steamers. Correspondingly, their ownership of the newest, under five year-old, classes of steamer were relatively low. The highest levels of ownership of these modern steamers were to be found in the North East coal ports, particularly at the Hartlepools and on the Tyne (with Sunderland not far behind). Hartlepool was the effective leader, for just over 90 percent of its 45-strong, Baltic-bound, steamer fleet had been constructed during the 1870s; only three of its steamers pre-dated 1869. The comparable modern shipping stock of the Tyne ports and Sunderland represented around 80 percent and 70 percent of their fleet strengths respectively, though they owned twice as many old (pre-1869) steamers as did Hartlepool. London's 46-strong group fell close to the east coast norm, with 26 percent less than five years old, 39 percent aged five to ten years, and 34 percent pre-dating 1869.[31] (see Table 7.11)

Table 7.11 Age of British Steamships: East Coast Ports
(number; percentage)

	Steamers (No.)	Pre-1860 (%)	1860-69 (%)	1870-74 (%)	1875-80 (%)
Hull and Grimsby	58	11	41	41	7
London	46	4	30	39	26
Hartlepools[32]	45	2	4	51	42
Tyne Ports	35	0	20	40	40
Sunderland	23	4	26	35	35
Total Percent (%)		5	25	43	27

Compiled from *NBESL*, 1880

[31] This analysis of London-registered steamers is a qualified one, for the ownership of several actually lay in the North East (a substantial section in *Turnbull's Shipping Register*, 1885, is entitled 'Shipping registered in London but principally owned in the Northern ports').

[32] Includes registrations in Old Hartlepool and West Hartlepool.

This east coast, Baltic-going, steamer fleet was thus a relatively young one, with its owners showing a clear preference for North East-built ships. Exactly 75 percent of their tonnage originated from the shipyards of the Tyne, Wear, Hartlepool and Teeside, with owners preferring to patronize yards within their immediate locality. The most extreme case was Sunderland, where 97 percent of the port's 13,287 tons was built on Wearside itself. (see Table 7.12)

Table 7.12 Place of Build of British Steamships: East Coast Ports (tons; percentage)

Port Area (approximate total tonnage)	Tyne-built (%)	Wear-built (%)	Hartlpl. & Tees-built (%)	Hull-built (%)	Other UK-built (%)
Humber[33] (45,000)	18	13	16	38	15
London (33,000)	33	32	5	7	23
Hartlepools[34] (33,000)	2	2	88	0	8
Tyne Ports (25,000)	56	38	3	0	3
Sunderland (13,000)	0	97	0	3	0
Total Percent (%)	22	27	26	13	12

Compiled and calculated from: *NBESL*, 1880; *Lloyd's*, 1880

West Hartlepool, a relatively new shipowning and industrial centre,[35] exhibited a similar alignment with 88 percent of its 33,408 tons domestically built. Owners in the Tyne ports drew 56 percent of their 24,714 tons from Tyneside's own shipyards, and 38 percent from neighbouring Wearside.[36] Humber-owned tonnage also reflected links with local suppliers (38% was Hull-built), and there was much

[33] Includes Hull and Grimsby.

[34] Includes vessels built in the Hartlepools and on the Tees (Stockton and Middlesborough).

[35] R. Wood, *West Hartlepool, the Rise and Development of a Victorian New Town* (3rd edition, Hartlepool, 1996), pp. 39-77; B. Spaldin, *Shipbuilders of the Hartlepools* (Hartlepool, 1986).

[36] This degree, and balance, of local allegiance in the North East ports is also indicated at a slightly later period: Milne, *North East England*, Chapter 6.

reliance on the North East shipyards too, they provided 47 percent of Hull and Grimsby's total of 45,531 tons. Reflecting the long-standing links of the coal trade, Tyneside and Wearside yards were also responsible for 70 percent of London's 33,299 tons. (see Table 7.12)

The British Steamer Fleet: Typology and Design

Confidence can be placed in the fact that all of the (200 or so) steamers employed in the Tyne-to-Baltic trade in 1880 were iron-built, screw-propelled vessels, and that the majority were powered by compound steam engines – of two-cylinder inverted configuration – rated at 90 to 130 registered nominal horsepower. Although the surviving evidence often lacks detail, and despite the fact that these steamers possessed various arrangements of machinery, superstructure and stowage (cargo-holds), definite trends in typology can be discerned. They may be divided into three broad categories.

Firstly, there were the survivors of an earlier, first generation, of cargo-carrying screw steamers built before the mid-1860s, most of which had been constructed as bulk-carriers for the coastal coal trade. Next, there were screw steamers that had been designed for, or adapted to, general cargo and/or passenger traffic – some at least of these were also first generation vessels pre-dating the mid-1860s. Lastly, there were steamers that had been built solely for bulk-carrying purposes from the mid-1860s onward. For convenience these last may be termed 'second generation steamers', and many of them had been outfitted with compound expansion engines when new, and often incorporated newly-introduced hull designs too.

There were 31 steamers of the first (pre-1865) generation, eighteen of which were apparently types purpose-designed for carrying coal in bulk. Of the thirteen steamers that loaded mixed cargoes, however, only six are identifiable as dedicated general cargo types.[37] Common to all of them was modernisation through re-engining and/or re-building; the latter usually involving lengthening to increase stowage capacity. Just half-a-dozen of these first generation steamers seem to have survived with their original 'simple' (i.e. common pressure) engines intact until 1880, whereas 24 had been 'compounded' by the retro-fitting of two- or four-cylinder compound expansion engines in order to achieve better fuel consumption and, consequently,

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[37] Based on loading records: *NBESL*, 1880; *Lloyd's*, 1860-1880.

increased range.[38] The shipowners of the North East ports and London led the way with compounding in the Tyne-to-Baltic trade in 1871-1872, although Hull's owners (notably Bailey and Leetham) swelled the trend with ten compoundings in 1873-1874. Nevertheless, this re-engining of the first generation of steamers was a protracted process, continuing throughout the entire decade.[39] And, as a process for increasing operating efficiency, it must be stressed that ship-lengthening actually preceded compounding.[40]

Numerically, these first generation vessels accounted for some fifteen percent of the east coast fleet's steamship stock, showing up strongly in the carriage of general cargo (over one-third of such steam clearances). Conversely, they contributed relatively little to the carriage of entire coal cargoes, shifting barely five percent (50,000 tons) of the coal products carried. A feature of their deployment with coal was a greater than normal emphasis on runs to Cronstadt,[41] and size apparently determined this since only ships whose original hold space (or subsequent lengthening) provided more than 800 tons capacity prosecuted the route.[42] These dedicated first generation coal carriers participated little in general cargo work.[43]

Of the first generation steamers employed more restrictively in the general cargo business, the greatest numbers were directed onto the shorter, 765-mile, Tyne-to-Stettin route; one serviced almost exclusively by Thos. Wilson and Sons of Hull. All eight ships ordinarily deployed on this route were relatively old, pre-dating 1870,

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[38] C.V. Waine, *Steam Coasters and Short Sea Traders* (2nd edition, Wolverhampton, 1980), pp. 36-37; Waine, *Coastal and Short Sea*, p. 21; Storr, thesis.

[39] In 1872, a renowned marine engineer, F.J. Bramwell, remarked on shipowners' indifference to 'the Economy of Fuel...no one seemed to care about the amount of fuel burnt' , cited in, Clarke, *Building Ships, Pt. 2,* p. 4.

[40] For example, Wilson's *Panther* (acquired in 1878) was lengthened in 1868, but not compounded until 1872. The *Black Swan* (Newcastle) saw nine years, 1870-1879, between lengthening and compounding, probably reflecting the continued availability of very cheap bunker coals on the Tyne. The 1864-built steamers *Black Swan* (Smith, Newcastle) and *Sappho* (Wilson, Hull), retained their common pressure engines until 1879 and 1881 respectively.

[41] A little surprising since it demanded the greatest range, c. 1,300 miles.

[42] The lengthened and re-engined (1870-71) 1,100-ton capacity *Busy Bee* of Newcastle made four trips, and the 1,900-ton capacity *Durham* of Hull (re-engined 1874) completed three.

[43] The London-registered, 1,000-ton capacity steamers *Neva* and *Nile* (built 1864, re-engined 1873) carried a few mixed cargoes of coal and metals, whilst Bailey and Leetham's *Durham* shipped a late season, part-cargo of goods in addition to coal.

and eleven out of these 33 Tyne-to-Stettin sailings were carried out by two, pre-1866 vintage, steamers: *Irwell* and *Pacific*. The latter had been deployed on the route since her inaugural year, 1860, although both had been modernised by compounding during the 1870s. Similarly, the company's pre-1866 steamer *Milo* appeared on the slightly longer (1,150-mile) Wilson dominated Tyne-to-Riga route, making three out of fourteen sailings there; the rest were made by Wilson steamers built before 1871.[44]

Indeed, *Milo*'s refurbishment incorporated all the technological refinements needed to continue competing for Baltic services of these kinds. Structurally, she was lengthened by the insertion of a 20-foot section (with additional hatch access) in front of the bridge, and other changes included a strengthened bridge together with a new, on-deck, galley aft. Her propulsion was upgraded by fitting a much more efficient 90hp (nominal) compound in place of the original 98hp common pressure engine, and this was accompanied by relinquishing the auxiliary rig's square-sail yards (reducing capital cost and adverse windage). With regard to carrying capacity, the poop- and bridge-deck were merged in order to gain a further 5,000 cubic feet of covered stowage, and this was matched by the installation of improved, steam-powered, cargo-handling gear. Altogether, this rebuild effectively turned an old-fashioned flush deck steamer into a modern raised quarter deck type whose far more fuel efficient engine was supported by around 150 tons of bunkerage.[45]

A few of the smaller re-engined first generation steamers found particular general cargo niches. For example, the Hull-owned *Czar* (324 tons, built 1857) made three trips to Königsberg, a shallow-water port also visited by *Harlequin* (342 tons, built 1854) of Sunderland, and *Forest Queen* (279 tons, built 1863) of Hull. Similarly, the somewhat longer route to the expanding deepwater port of Reval attracted general cargo sailings by four of Bailey and Leetham of Hull's re-engined steamers, including the company's very first ship, *St. Petersburg* (460 tons, built 1856).[46]

Whether modernised or not, these first generation ships formed a relatively minor component of the east coast's steamer fleet, for 85 percent of it lay in much

[44] Personal communication, D.J. Starkey; until the 1890s Thos. Wilson and Sons commonly deployed their older steamers onto the North European (emigrant) routes when, perhaps in response to adverse comment during Board of Trade inquiries, they began using newer ships.

[45] Waine, *Coastal and Short Sea Liners*, p. 36.

[46] Surprisingly, *Onega* (Norwood, Hull) seems to have made the same lengthy trip on her original, 1864-built, common pressure engines.

newer, second generation, ships (post-1865). These numbered 176 in all, and judging from their usage the vast majority had been purpose designed as bulk (rather than general cargo) vessels. Almost 150 of them shipped entire cargoes of coal products on their Tyne-to-Baltic runs during 1880 and over a half, 81, made two or more such outward trips – 45 made three or more. By comparison, only 20 second generation steamers at best were involved in the general cargo trades and, though clearly deployed on scheduled Tyne-to-Baltic services, they made few repeat trips. More than half seem to have been casual participants – making just one trip – and only five appear to have completed three trips or more, suggesting less than wholehearted commitment by the owners concerned.

This second generation steamer fleet was weighted heavily towards ships of newer build. Fully 25 percent were steamers less than four years old (built, 1877-1880), and a further 40 percent had been constructed only at the beginning of the decade (1870-1873); less than 20 percent comprised vessels built 1865-1870. Consequently, their technology included the best modern practices, for they were all iron-built, screw-propelled vessels, almost exclusively powered by compound steam engines working at pressures of 60-80 lbs. per square inch – this last implying willingness to adopt the recently introduced 'Scotch' boiler. Of those steamers engaged in bulk coal carriage, the most interesting construction trend was the widespread espousal of the 'well-deck' steamer of raised quarter-deck configuration.[47] This design, pioneered by shipbuilders on the North East coast in the late 1860s, helped accommodate the height of the now obligatory compound engines (with their concomitant, taller Scotch boilers), whilst ameliorating the longitudinal trim problems experienced by the older flush-decked steamers when they loaded homogenous cargoes – especially coal. Although the well-deck steamer's design benefits and its advantageous loading capabilities were little disputed, there was justifiable concern over the structural integrity of some early examples of the type, and controversy also arose over the designation of safe freeboard.[48]

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[47] Spaldin, *Shipbuilders of Hartlepools*, pp. 10-11, 76; *Lizzie English*, 1867, is generally cited as the first of the type.

[48] Clarke, *Building Ships, Pt.1*, pp. 152-153; Waine, *Steam Coasters*, p. 53, 75; McRae and Waine, *Steam Collier Fleets*, pp. 50-51 (re: *Gracie*); Peter Hogg, unpublished monograph, *The Well Deck Steamer* (Hartlepool, 1994).

Notwithstanding this, the well-deck steamer gained a particularly strong position in the Baltic trade, at least 40 percent of all the steamers in the entire second generation fleet of 1880 possessed some of the type's significant layout characteristics. And commonplace alongside these well-deck steamers was another new type too, a steamer whose engine (and accompanying raised bridge deck) was positioned amidships rather than, as in earlier colliers, being placed right aft. This 'engines amidships' layout was also initiated by North East shipbuilders during the late 1860s, this time with the aim of satisfying the demands of collier owners for steamers of greater length (chiefly in excess of 220 feet) that did not – as previously – compromise longitudinal trim. Furthermore, it was found that the engine amidships layout might be integrated into the raised quarter-deck design. The raised quarter-deck then providing a cargo-carrying space that nicely compensated for the dead space (at the bottom of the after hold) occupied by the lengthy propeller-shaft tunnel – it was a neat design solution.

In due course, two mainstay cargo steamer configurations emerged from these early innovations: the 'long raised quarter-decker', a design that was marked out by a distinct 'well-deck' forward and a discontinuity of deck levels aft; and, the succinctly-named 'three island tramp' with its separated superstructure elements of poop, bridge and forecastle. Compared to the popularity of these, cargo steamers with plain continuous decks were much in the minority in the Baltic trade, comprising a mere handful of somewhat older flush-decked steamers of 1866-68 vintage, accompanied by a few more advanced (two-decked or spar-decked) types of the 1870s.[49] These continuous deck steamers all needed considerable internal stiffening and were poorly suited to the bulk carriage of coal and grain since their hold spaces were obstructed by numerous deck beams and pillars. However, their naturally sub-divided hold areas possessed advantages when stowing mixed cargoes.

Although the evidences are incapable of supporting a detailed statistical analysis,[50] it is concluded that individual east coast ports did demonstrate preferences for particular types amongst the second generation steamers that were deployed into

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[49] P.N. Thomas, *British Ocean Tramps, Volume 1, Builders & Cargoes* (Wolverhampton, 1992), p. 30.

[50] Considerable uncertainties attend the conversion of the tonnage allowance designations listed in *Lloyd's Register* into actual configurations, especially where owners (e.g. the Wilson Line of Hull) had not sought classification at Lloyd's.

the Baltic. Shipowners in Hartlepool were closely identified with the well-deck type of vessel pioneered and constructed by that town's premier shipbuilders, Withy and Gray. Sunderland and Tyneside owners favoured the type too, although the latter seem to have retained a liking for continuous decked ships together with a disposition towards the emerging engines amidships ('three-island') type. The supposed aversion of London owners to the well-deck (raised quarter-deck) type does not seem to be borne out in respect of the Tyne-to-Baltic trade, and it is not exactly clear what London owners may then have understood by the term anyway.[51] It is apparent though, that Hull's owners – with their emphasis on the general cargo and passenger trades – generally had sound operational reasons for eschewing the true well-deck configuration, although some of their steamers (e.g. *Nero*, 1869, 841 tons) did sport long enclosed poop decks and enjoined bridges which, superficially at least, gave much the same 'well-deck' appearance. (see Table 7.13)

Table 7.13 Second Generation British Steamships by Configuration and Register Port (number)

	'Well-Decker'	'Three Island'	Continuous Decked	Non-designated	Total
The Hartlepools	36			5	41
Tyne Ports	13	9	6	1	29
Sunderland	13	3	1	1	18
Hull & Grimsby	3	18		18	39
London	11	7	5	5	28
Total	76	37	12	30	155
Percentage (%)	49	24	8	19	

Compiled from *Lloyd's*, 1880

An important secondary design feature of many bulk-carrying steamers deployed into the Baltic was the inclusion of a 'double bottom', a discreet space that

[51] Clarke, *Building Ships*, *Part 1*, p. 153.

could be filled and discharged at will with stability maintaining water ballast.[52] Facility to ballast down an unloaded bulk-carrying steamer was essential for reasons of safety and ease of handling – it provided lateral stability along with a degree of control over screw and rudder immersion. Despite these apparent benefits, discussion continued over the desirability of providing water ballast compartments in steamers primarily employed in the short-sea and intermediate trades. Even in the late 1870s Lloyd's surveyor on Tyneside, Benjamin Martell, felt the need to emphasise that in the Mediterranean trades owners could expect savings of five percent per annum on a steamer's first cost through the use of water ballast, and that long-term savings of this kind would be even higher on Baltic routes owing to the number of ballast legs inherent in that trade.[53]

Voyage records for steamers employed on the Tyne-to-Baltic route in 1880 confirm the veracity of Martell's remark.[54] There was near-certainty that the final leg from London back to the coal ports would be in ballast and, even for steamers engaged on the popular Cronstadt run, there was an increasing need to shift 'in ballast' between Cronstadt and an Upper Baltic wood loading port (usually Wyburg). Similarly, for those steamers sent out with coals to the lower Baltic ports there was regularly the prospect of voyaging onward (for several hundred miles) in light condition up into the Gulfs of Finland or Bothnia. Examination of the relatively few surviving builders' plans of regular Tyne-to-Baltic steamers of 1880 together with the sampling of entries in *Lloyd's Register*, suggest that a high proportion of these Baltic-bound vessels had been constructed with double bottoms.[55] This observation again suggests that British owners were not slow to deploy their best equipped tonnage in the Baltic trade.

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[52] The practical development of this in the earliest steamers employed in the coastal coal trade had determined their economic success. See, for example: MacRae and Waine, *Steam Collier Fleets*, p. 16; Clarke, *Building Ships, Part 1*, pp. 134-35.

[53] W.B. Martell, 'On Water Ballast', *Transactions of the Institute of Naval Architecture*, XVIII (1877), pp. 336-42.

[54] Select steamship voyage routines reconstructed from data in: *NBESL*, 1880; *HBE*, 1880; *LABE*, 1880.

[55] For example, plan of *Spero* (built, C. Mitchell, 1878), TWCMS, G7625C.

The British Steamer Fleet: Power and Performance

Although contemporary horsepower figures must be regarded as rather unreliable, the greater part of this second generation fleet featured installations of 80-100 horsepower (hp), with considerable emphasis on the 80-120 hp range. Only a dozen ships boasted engines of 150-170 hp, and merely three (from Hull and London) approximated 200 hp. Conversely, just a handful employed engines under 80 hp, but these ships were generally of such low tonnage that they still showed good power-to-weight ratios; all were capable of carrying out voyages to the upper Baltic.[56]

Table 7.14 Representative Baltic-going Steamers, 1880: Form and Propulsion[57]
(tons; feet; nominal horsepower)

	Date	Tons (net)	L.o.a. (feet)	Ratio, l / b[58]	Hull-type[59]	Engine-type	Power (nhp)
Milo (as built)	1865	638	212	7.26	Flush	Simple	98
Fenham (re-eng.)	1868		225	7.76	Flush	Compound	100
Chester	1871	696	230	7.42	R.Q.D.	Compound	110
Emma Trechmann	1871	489	195	6.84	R.Q.D.	Compound	90
Lady Clare	1874	760			R.Q.D.	Compound	110
Milo (re-built)	1874	683	241	8.25	R.Q.D.	Compound	90
Pelton	1876	516	218	7.52	Flush	Compound	98
Spero	1878	553	219	7.49	3-isl'nd	Compound	100
Presto	1879	637	221	7.11	3-isl'nd	Compound	130

Compiled from: *NBESL*, 1880; *Lloyd's*, 1880

[56] For instance, the 641-ton *Volga*, built in 1872 and re-engined with a 70 nhp compound engine, made four trips to Riga and Cronstadt in 1880.

[57] *Milo* (1865-74), a lengthened first generation general cargo steamer; *Fenham* (1868), a characteristic flush-decker; *Chester* (1871), *Emma Trechmann* (1871) and *Lady Clare* (1874), standard Hartlepool-built, well-deckers; *Pelton* (1876), *Spero* (1878) and *Presto* (1879), characteristic Tyne-built, bulk-carriers with engines amidships.

[58] Length (overall): beam (moulded).

[59] R.Q.D, indicates a raised quarter-deck, or well-deck, configuration.

Overall, steamers in the popular 80-140 nominal horsepower range averaged 760 register tons in size, rating their power requirements at around 7 register tons per horsepower (tons/hp). Indeed, linkage between ship size and power rating was apparent throughout, with: steamers of 400-600 tons at 6 tons/hp; 600-800 tons at 6¾ tons/hp; and, 800-1,000 tonners significantly higher, 7¾ tons/hp. Hull-owned steamers (e.g. *Milo*) had comparatively high such ratios. (see Table 7.14)

The fuel efficiency, and consequent steaming range, expected from vessels of this kind are exemplified by the performance figures assured by a Hartlepool shipbuilder, Henry Withy, for three raised quarter deck steamers with compound engines built by his yard in 1871: *Emma Trechmann* (489 net tons), 90 hp, to carry 1,100 tons deadweight averaging 8 knots @ 8 tons coal per day; and, *Chester* with sister vessel *E.S. Jobson* (696 net tons),110 hp, to carry 1,550 tons deadweight averaging 8½ knots @ 9½ tons coal per day.[60] Consumption when in ballast was rated at one knot of extra speed for the same expenditure of fuel (bunker coal). On the basis of these figures, the bunkerage for a loaded run to Cronstadt, 1,284 nautical miles, would have been 53½ tons for *Emma Trechmann*, and 60 tons for *Chester/E.S. Jobson*. These last two, larger, vessels consequently gained a 40 percent advantage in payload at the expense of only a twelve percent increase in fuel – an appreciable economy of scale.

The specific fuel consumptions for the two larger steamers, *Chester/E.S. Jobson*, were around 2.30 lbs/ihp.hr, and fractionally more, 2.37 lbs/ihp.hr, for the smaller *Emma Trechmann*.[61] All possessed a considerable (near 80%) advantage in fuel economy over their predecessors whose simple engines generally achieved only 4 to 4.5 lbs/ihp.hr. Correspondingly, the range of the new compound-engined steamers approximated 3,200 and 3,500 miles each (sixteen and nineteen days steaming) on a nominal 150 tons of bunkers, whilst a corresponding common pressure-engined steamer might have achieved only 1,800 miles (ten days steaming). That is, the latter would have been hard pressed to carry out the 1,700-mile round trip of, Tyne-Stettin-Hull-Tyne, on the same bunkerage.

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[60] Promotion brochure by Withy, 1873, cited in, Wood, *West Hartlepool* (3rd edn.), pp. 346-47.

[61] Pounds of fuel consumed per indicated horsepower hour (lbs/ihp.hr) calculated on the basis of the broadly accepted contemporary formula: ihp = nhp x 3.5.

Under favourable circumstances it seems likely that all three of these Withy-built, compound-engined steamers could have made the typical 3,000 mile Baltic round trip voyage, Tyne-Cronstadt-London-Tyne, on full bunkers of around 150 tons, with the Tyne-Cronstadt leg itself having a predicted passage time of six and-a-quarter days for *Chester/E.S. Jobson* and seven days for *Emma Trechmann.* And these retrospective estimations are amply supported by reports of these steamers' actual Baltic-going voyages during 1880.[62]

Conclusions

By 1880 two modes of sea transport, sail and steam, were employed to satisfy the demands of the rapidly growing Tyne-to-Baltic trade. Although sailing vessels were still present in great numbers, the growing contingent of steamers provided by far the greatest carrying capacity. This mix of provisions reflects the global conditions described by Harley, Palmer and others, in which the transition from sail to steam was marked by spatial and temporal diversity.[63] Indeed, what appertained in the Tyne's Baltic trade may be regarded as a paradigm of this wider process, a process that was

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[62] Compiled from: *NBESL*, 1880; *HBE*, 1880; *LABE*, 1880; *South Durham and Cleveland Mercury* [*SDCM*], 1880. *Chester* (Pyman and Bell, Newcastle) extended regular voyages on the Newcastle to Swinemunde run (five deliveries) with forays into the Gulfs of Finland and Bothnia to load timber for London; 2,600-mile round trips that fitted into a monthly 'schedule'. Though primarily engaged in the Iberian and Mediterranean trades, *E.S. Jobson* (Horsley, Hartlepool) was deployed into the Baltic during the mid-summer months, her voyages including an extended, 2,700-mile round trip: Tyne-Cronstadt-Gefle (Gulf of Bothnia)-London-Tyne. *Emma Trechmann* (Trechmann, Hartlepool) also worked largely in the southern trades, but in 1880 she routed outward to discharge coal at Cronstadt before proceeding in part-loaded condition, with iron and lead, for St. Petersburg (at 16 feet fully loaded, her draught was less than *E.S. Jobson*'s).

[63] C.K. Harley, 'On the Persistence of Old Techniques: The Case of North American Wooden Shipbuilding', *Journal of Economic History*, XXXII, No. 2 (1973); C.K. Harley, 'Aspects of the Economics of Shipping, 1850-1913', in L.R. Fischer and G.E. Panting, eds., *Change and Adaptation in Maritime History, the North Atlantic Fleets in the Nineteenth Century* (St. John's, Newfoundland, 1978); S. Palmer, 'Experience, Experiment and Economics: Factors in the Construction of Early Merchant Steamships' in K. Matthews and G. Panting eds., *Ships and Shipbuilding in the North Atlantic Region* (St. John's, Newfoundland, 1978).

of such complexity that (even today), 'a few relevant details can still be added to the larger picture.'[64]

Examination of national fleet capacities and the deployment patterns of the ships involved (see Chapter 8) demonstrate that the various national fleets were sharply orientated towards sail or steam. If, as has been asserted, sail held comparative advantages in the Baltic arena until the end of the 1860s then, by 1880, the truly competitive period when 'In real [non-liner trade] life, the competition was mainly a battle between steam and sail tramps' was already over.[65] In the Tyne-to-Baltic trade a clear separation of markets and carriers had occurred, and a new complementary phase had been entered into – a complement, in effect, of foreign sail and British steam.[66]

Whilst the technology and working practices of Baltic-going sailing ships changed little over the decades preceding 1880, the technologies of steamers capable of prosecuting the Baltic's bulk cargo trades progressed through a series of rapid engineering advances, yielding operators measurable economic returns. As demonstrated, this owed much to a conjunction of interest amongst three maritime constituencies on England's east coast: the consolidated coastal trade in coal; the singular regional iron shipbuilding industry; and, the concentration of Baltic imports into just two major centres, the Humber and Thames. Accordingly, the competitive market for steam bulk carriers in the Baltic attracted technological and capital investments that, collectively, produced a carrying fleet comprising relatively modern steamers. Meantime, those Baltic services in which steam had acted as the pioneer agency – for scheduled passenger and cargo carrying – tended to stultify.[67]

The bulk carrying fleet drove the Baltic trade forward for, by 1880, it largely comprised substantial numbers of recently built, purpose-designed, compound-engined intermediate vessels, supported by radically modernised vessels of (earlier) short sea type. Analysis amply confirms Fischer's contention that 'British owners

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[64] Y. Kaukiainen, 'Coal and Canvas: Aspects of Competition between Steam and Sail, c.1870-1914', L.U. Scholl and M-L. Hinkkanen, comp., *Sail and Steam: Selected Maritime Writings of Yrjö Kaukiainen* (St. John's, Newfoundland, 2004), p. 114.

[65] Kaukiainen, 'Coal and Canvas', p. 114, 119.

[66] Kaukiainen, 'Baltic Timber-Trade', pp. 101-111; describes its limited survival for another 40 years.

[67] Generally through the retention of what were old, if refurbished, steamers.

proved quite willing to deploy new technology in the [Baltic] trade', and carries with it the rider that they deployed it somewhat earlier than Fischer proposed.[68]

Within the global framework it has long been accepted that the introduction of compound marine steam engines on select oceanic routes 'proved an historic turning point in British maritime history', but it was their subsequent adoption into Britain's mainstream merchant marine which actually confirmed that 'Britain's superiority in the construction and operation of iron screw steamers [had been] made absolute.'[69] As evidenced here, there was no more characteristic example of this process than that demonstrated by the shipowners, shipbuilders and marine engineers of the east coast in pursuit of an effective tool with which to dominate the Baltic trade of the 1870s. Indeed, within its own context – the development of Britain's intermediate carrying trades – it is argued that the opening up of the Baltic to bulk carrying steamers was a collective pioneering act that ranks alongside Alfred Holt's original, if more individual, opening up of the Far East.

It is a clear reminder that the response of shipbuilders and shipowners to the needs of the Baltic and allied trades helps confirm the truth of Craig's assertion that the 'Perfection of the bulk cargo-carrying tramp demanded, and obtained, at least as much ingenuity and skill as was associated with the oft-considered passenger liner.'[70] Nevertheless, as chapter 8 next demonstrates, the achievements of this new technology must be tempered by an understanding that in the Baltic trade, as elsewhere, the 'diffusion of steam was gradual and that the pace was determined by mundane economic variables.'[71]

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[68] Fischer, 'Flotilla of Wood ', p. 39.

[69] Craig, *Steam Tramps*, p. 13.

[70] R.S. Craig, 'Aspects of Tramp Shipping and Ownership', in K Matthews and G. Panting eds., *Ships and Shipbuilding in the North Atlantic Region* (Newfoundland, 1978), p. 221.

[71] Kaukiainen, 'Coal and Canvas', p. 114.

Chapter 7, Charts:

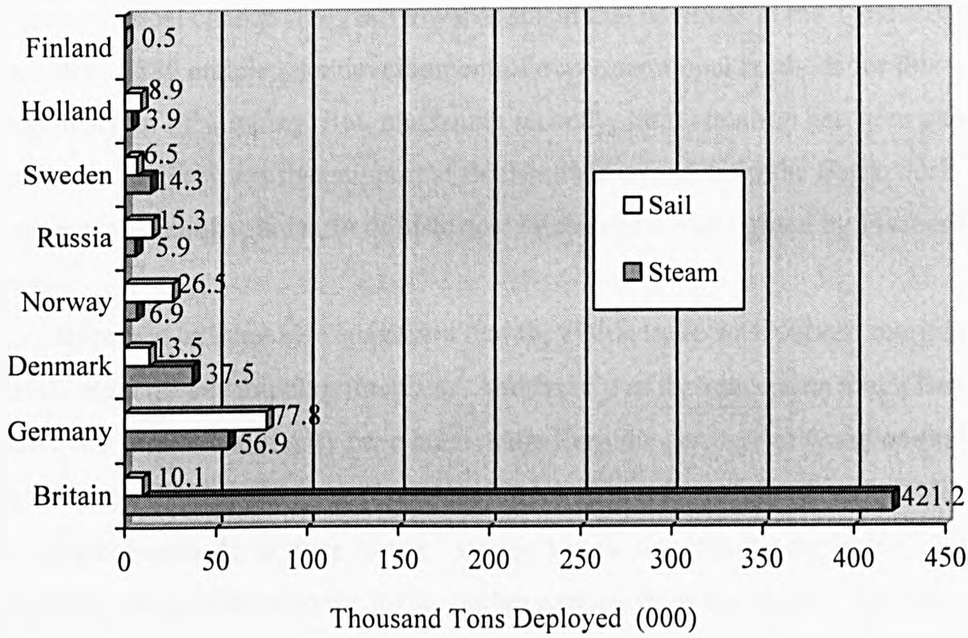

Chart 7.1 Shipping Tonnage Deployed (by Nation): Steam and Sail

(Source: see Table 7.1)

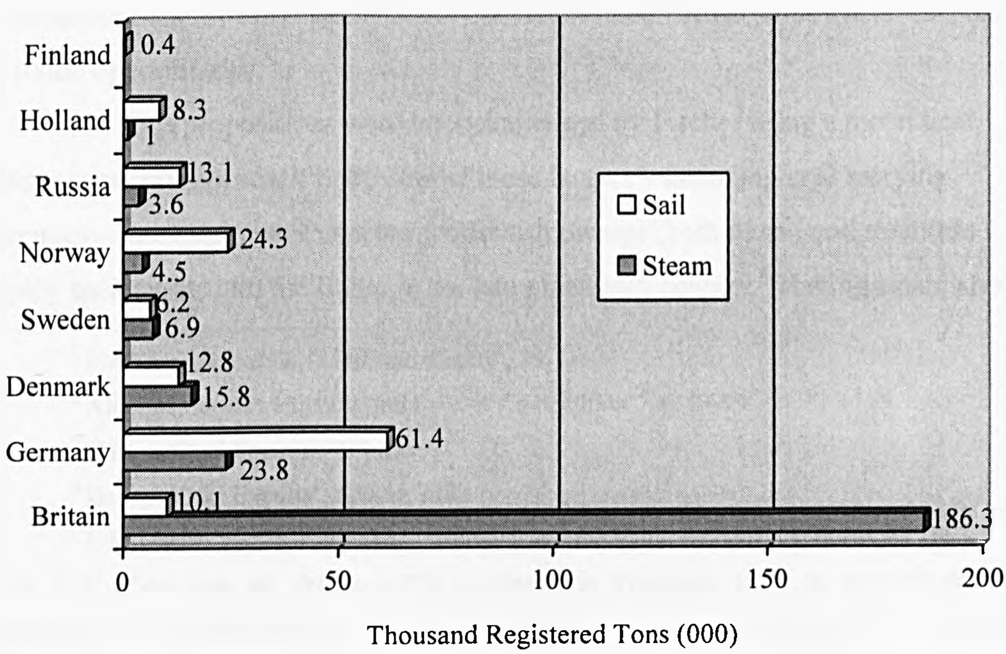

Chart 7.2 Shipping Stock (registered tonnage, by Nation): Sail and Steam

(Source: see Table 7.3)

CHAPTER 8: SHIP OPERATIONS, 1880

The technological change from sail towards steam that occurred in the Tyne's Baltic trade before 1880 entailed the development of new operational methods for this emergent sector of shipping. But, until quite recently, little attention has been paid to the ships and shipowners that supported British trade to and from the Baltic during the late nineteenth century, a dearth of historical interest first highlighted by Fischer and Nordvik.[1]

Received opinion also suggested that the Baltic trade was, at best, marginal to Britain's main global shipping interests.[2] And there was the perception that a British shipowner's profits could only have been made from the carriage of wood on the trade's homeward leg, since the (near-inevitable) outward carriage of coal yielded only marginal rewards, or even losses.[3] Harley's view was that 'In the Baltic, coal was a subsidiary cargo relative to the major timber exports from the region', and he assumed that coal freights would rarely have covered a British shipowner's marginal costs. Consequently these rates did not influence deployment decisions.[4] Additional emphasis to that effect was provided by various authors – based principally in the Baltic or Scandinavia – who focused attention upon Britain's consumption of Baltic timber, inadvertently heightening the perception that it was the freights (and profits) from the carriage of wood goods alone that determined British shipowners' responses to Baltic opportunities.[5]

All such propositions were later challenged by Fischer using a theoretical, macro-economic approach to determine those factors – including coal carrying revenues – that might have encouraged British owners (both of sail and steam) to deploy their assets into the Baltic in the late nineteenth century.[6] Having established

[1] Fischer and Nordvik, 'Myth and Reality', 99-116.

[2] Aldcroft, 'British Shipping and Foreign Competition', pp. 53-99.

[3] Harley, 'Coal Exports', 311-338.

[4] Harley, 'Coal Exports', 322-24, 330.

[5] L.R. Fischer and H.W. Nordvik, 'Shipping and the Baltic Wood Trade to Britain 1863-1908', in W. Minchinton, ed., *Britain and the Northern Seas* (Pontefract, 1988), pp. 171-179; W. Minchinton, 'The British Market for Timber from Northern Europe since the 1860s', in Y. Kaukiainen, ed., *The Baltic as a Trade Road*, VII Baltic Seminar at Kotka (Kotka, 1989), pp. 83-89; Kaukiainen, 'Coal and Canvas', p. 118.

[6] Fischer, 'Flotilla of Wood ', pp. 36-63.

to his own satisfaction that outward (coal export) freights were a significant component of the Baltic revenue structure, he investigated and affirmed the very real ‘importance of outward [coal] freights to the decision-making processes of shipowners’. However, in constructing an associated time-series of events, Fischer acknowledged the paucity of much of the primary evidence upon which his arguments were based, together with shortfalls in his (and others) detailed understanding of real life operating conditions.

To help resolve such issues an alternative, yet complementary, approach is adopted here. A detailed overview and analysis has been made of the trading situation during a single Baltic season, 1880, and within this frame of reference reconstructions have been made of the deployments, revenues, and likely rewards for representative units of British shipping (both steam and sail).

Outward Deployment: Voyage Frequency and Destination

Steamships and sailing vessels on the Tyne-to-Baltic route in 1880 showed significant contrast in deployment frequency and destination. Sail’s inherent limitations saw it used much as it had been over the previous twenty years, 1860-1880, whilst steamer owners had the opportunity – if circumstances warranted – of exploiting the potential for faster passage times and greater frequency of call. Despite this last advantage, over 40 percent of the individual steamers despatched to the Baltic were deployed for no more than a single outward voyage during the 1880 season. And there is no indication that sailing ship owners sought to counter steam’s facility for fast, frequent services. (see Tables 8.1 and 8.2).

Sailing ships making single seasonal trips provided the major part of the sailing tonnage employed (73%), and although two seasonal trips were not uncommon, three or more were rare (and generally made by relatively large vessels). Uniformity in sailing ship size led to a consonance between the number of clearances and aggregate tonnages overall. Conversely, in steam it was vessels that prosecuted three or more voyages that provided the larger part (59%) of the tonnage engaged, and although casually engaged steamships – making just one or two voyages – were present in far greater numbers (252:115), they provided significantly less aggregate tonnage (41%). (see Table 8.2).

Table 8.1 Frequency of Direct Sailings: Sailing Vessels

(number; percentage; tons)

	Ships	Clearances		Tonnage	
		Number	(%)	Tons	(%)
One sailing	576	576	74	116951	73
Two sailings	86	172	22	17251	22
Three or more	10	31	4	2416	5
Totals	672	779		136618	

Compiled and calculated from *NBESL*, 1880

Table 8.2 Frequency of Direct Sailings: Steamships

(number; tons; percentage)

	Ships	Size	Clearances		Tonnage	
		(average tons)	(No.)	(%)	(aggregate tons)	(%)
One clearance	159	628	159	19	99851	18
Two clearances	93	687	186	23	127700	23
Three clearances	44	708	132	16	93408	17
Four clearances	34	690	136	17	93856	17
Five clearances	21	686	105	13	72005	13
Six clearances	11	562	66	8	37086	7
Seven clearances	3	670	21	3	14077	3
Eight clearances[7]	2	538	16	2	8600	2
	367	659	821		546583	

Compiled and calculated from *NBESL*, 1880

[7] Includes *Metz*, routed solely to Kiel.

Outward Deployment: Ship Origins, Types and Destinations

As the dominant national carrier, British shipping serviced some 60 percent of the Russian and the German market alike, although Russia's demands absorbed over 100,000 tons more British shipping than did Germany's. Russia's own ships were despatched principally to Russia itself, and they, together with Scandinavian and Dutch vessels, satisfied almost a quarter of Russia's massive needs. Germany's own fleet was also primarily a domestic supplier, servicing a full quarter of this new state's needs, but it also commanded second place in supplying Russia. Overall, German demand was much less reliant than Russia upon the minor national carriers, using just 28,000 as against 110,000 tons. (see Table 8.3).

Table 8.3 Carriers and their Destinations (by Nationality)

(tons; percentage)

	Total Tonnage		Tonnage to Russia		Tonnage to Germany	
	(tons)	(%)	(tons)	(%)	(tons)	(%)
Britain	431295	61	270620	61	160675	62
Germany	134765	19	63711	14	71054	27
Denmark	50936	7	34671	8	16265	6
Norway	33394	5	31443	7	1951	1
Russia	21194	3	18975	4	2219	1
Sweden	20714	3	15573	3	5141	2
Holland	12847	2	10412	2	2435	1
Finland	419		419			0
Totals	705564		445824	63	259740	37

Compiled and calculated from *NBESL*, 1880

The ports of two Baltic regions dominated outward deployments from the Tyne: Russian ports in the Upper Baltic; and, German (*ex* Prussian) ports in the Lower Baltic. In the Upper Baltic, Cronstadt together with St. Petersburg comprised the major destination, absorbing some 45 percent of all Baltic-bound tonnage. In the Lower Baltic, the upriver town of Stettin together with its outport at Swinemunde, absorbed almost another 20 percent.[8] Riga, Danzig/Newfairwater, and Reval were the only other individual ports that received as much as five percent. Beyond these, and Königsberg/Pillau, a handful of lesser ports (Libau, Kiel, Lübeck) totalled six percent in all, while twenty minor and casual recipients took another seven percent between them. (see Table 8.4).

Table 8.4 Tonnage Deployed to Principal Destinations (by Port)
(rank; tons; percentage)

	Rank	Tonnage	
		(tons)	(%)
Cronstadt/St. Petersburg	1	314527	45
Stettin/Swinemunde	2	135105	19
Riga, Muhlgraben and Bolderaa	3	58061	8
Danzig/Newfairwater	4	54889	8
Reval	5	37262	5
Königsberg/Pillau	6	17997	3
Lesser Ports (three of)	7-9	each <15000	6
Minor Ports (eleven of)	10-20	each <10000	6
Casual Ports (nine of)	21-29	each <1000	1

Compiled and calculated from *NBESL*, 1880

Nevertheless, such simple rankings obscure greater complexity. Few of the highly ranked or developing ports (e.g. the outports of Swinemunde and Pillau) received anything but steam tonnage. Meanwhile, the traffic of the middle ranking ports (e.g. Riga's port complex) was predicated on steam and sail, whilst a number of the lower ranked but regionally significant ports (including Memel and Helsingfors) handled little but sail alone. The division between the receipt of steam or sail was at its most extreme in the linked ports of Cronstadt/St. Petersburg – they took 90 percent

[8] Swinemunde, the Baltic's 2nd ranked coal receiving port, took only a quarter as much as Cronstadt.

(by tonnage) of steam and of sail respectively.[9] The paired ports of Pillau/Königsberg, together with Muhlgraben/Riga (town), showed similar if less exaggerated effects, with the outer port of each most receptive to steam. However, the complementary ports of Swinemunde/Stettin, together with Newfairwater/ Danzig, showed higher levels of steam throughout. (see Table 8.5)

Table 8.5 Sail and Steam Tonnage Despatched to Main Destinations (rank; percentage; ratio)

Outer Port	Rank	Tonnage (%)	Steam: Sail (ratio)	Inner Port	Rank	Tonnage (%)	Steam: Sail (ratio)
Cronstadt	1	42	9:1	St. Petersb'g	7	2	1:9
Swinemunde	2	11	1:0	Stettin	3	8	9:1
Riga	4	7	1:1	Muhlgraben	13	1	6:4
Newfairw'r	5	6	7:3	Danzig	10	2	7:3
Reval	6	5	9:1				
Libau	8	2	9:1				
Kiel	9	2	4:1				
Pillau	11	1	1:0	Königsberg	15	1	2:3
Memel	12	1	0:1				

Compiled and calculated from *NBESL*, 1880

These divisions reflected the nature of the leading national carriers. For example, British tonnage – principally in steam – serviced nearly 70 percent of Cronstadt's needs, whilst its consort, St. Petersburg, was equally well served by smaller, largely sail-powered, vessels from Germany, Denmark and Holland. Other ports that depended greatly upon British shipping were Swinemunde, Stettin, and Pillau – each receiving 75 percent, or more, of their tonnage in British bottoms. Swinemunde and Pillau (88% and 93% respectively) could almost be considered 'British' ports, but that was not the case with Pillau's shallow-water partner,

[9] A consequence of St. Petersburg's restricted approach channel.

Königsberg, where the Germans, Dutch and Scandinavians relegated the British to just a third of its traffic. Indeed, Königsberg's and St. Petersburg's physical constraints saw them as the only ports that enjoyed significant Dutch tonnage (17% and 19% respectively). Elsewhere, Germany's share was understandably large wherever there were strong historic German ties, especially in the former Prussian ports of the Lower Baltic (Riga 33%, Danzig 55%, Newfairwater 31%).[10] It also held a near one-third share in the lesser ports of Libau, Kiel and Lübeck,[11] together with a half-share in several of that region's casual and minor ports. The supply of (steam-dominated) British tonnage to the smaller ports was very modest, ten to fifteen percent at most.

Although, for the most part, British-owned tonnage was directed to relatively few Baltic destinations, there were marked differences in the deployment of vessels from the main shipowning areas engaged, Hull, London, Hartlepool/Tees, and the Tyne ports. Cronstadt was the only port to attract ships from all of these areas. Of Hull's registered tonnage in the Tyne-to-Baltic trade 38 percent was sent to Cronstadt (Reval and Riga acted as subsidiary Russian destinations only), whilst 26 percent was directed to Stettin town. Similarly, 52 percent of all London-registered shipping went to Cronstadt, with relatively small tonnages directed to Swinemunde, Newfairwater or lesser ports. Tyne shipowners in particular maintained their long-standing association with Cronstadt, 61 percent of all Tyne-registered tonnage was directed there. By comparison, Hartlepool's owners divided their attentions between Cronstadt and Swinemunde (45% and 39%), and Hartlepool-based shipping was unusually dependent upon Swinemunde's demand. (see Table 8.6)

Indeed, Hartlepool-registered shipping was Swinemunde's leading British carrier, providing twice the tonnage (24,691 tons) of its nearest rival, London. But at Swinemunde's upriver partner, Stettin (town), Hull-registered shipping was predominant, contributing five times as much tonnage as either the Tyne or London, and Hull-owned shipping dominated the route to Riga as well. Hull also played the leading role in Reval, with Hartlepool a strong second. There was, however, little dispersion of east coast-registered tonnage into the smaller ports of the Baltic. (see Table 8.6)

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[10] Kirby, *Baltic World*, pp. 178-79.

[11] Kiel itself was understandably weighted towards Danish tonnage.

Table 8.6 British East Coast Tonnage Deployed to the Principal Baltic Ports (tons; percentage)

Destination	Hull-registered		London-registered		Hartlepool-registered		Tyne Ports-registered	
	(tons)	(%)	(tons)	(%)	(tons)	(%)	(tons)	(%)
Cronstadt[12]	40800	38	42500	52	28700	45	36400	61
Swinemunde	6500	6	12100	15	24700	39	6300	11
Stettin	27600	26	5800	7	500	1	5700	10
Riga	12000	11	2900	3	0		1200	
Newfairwater	4300	4	11600	14	900	1	2400	4
Reval	11600	11	0	0	6400	10	1600	3
Libau	0	0	0	0	600	1	1100	2
Other ports	4300	4	7100	9	1900	3	4600	9

Compiled and calculated from *NBESL*, 1880

Outward Deployment: Cargoes

In 1880, outward cargoes were dominated by the shipment of coal in bulk, and 1,165 entire cargoes of coals were despatched.[13] British shipping commanded 66 percent (578,823 tons) of the coals shipped in this way and, since British owners had adopted relatively large steamers, this was achieved through quite a low proportion of clearances (44%). German ships shifted just 17 percent, needing a high number of clearances by comparison. (see Table 8.7)

There were distinct national differences in the dispatch of entire cargoes of coal by sail and by steam. British-owned sailing ships carried just 29 such cargoes whilst German owners despatched 233, with British loadings averaging 1,100 tons overall and Germany's less than 500 tons. Danish and Swedish ships carried only a small proportion of the coal shipped in entire cargoes (8%), displaying a more

[12] St. Petersburg is included here amongst 'Other Ports'.

[13] Mixed coal and coke cargoes were infrequent (nineteen in all). Most were carried in small sailing vessels destined for various ports, although Newfairwater took five by steamer.

balanced usage of sail and steam. But, as in other sectors, the owners of Norwegian, Russian and Dutch vessels adhered firmly to small-scale sail. (see Table 8.7)

Table 8.7 Shipment of Coal Products as Entire Cargoes (by Nation)[14]

(number; percentage; tons)

	Clearances				Shipping Tonnage		Coal Products	
	Sail	Steam	All	All				
	(No.)	(No.)	(No.)	(%)	(tons)	(%)	(tons)	(%)
Britain	29	479	508	44	344722	64	578823	66
Germany	233	89	322	28	99218	18	152813	17
Denmark	69	34	103	9	36562	7	56090	6
Norway	84	8	92	8	23466	4	33842	4
Sweden	24	20	44	4	14377	3	21744	2
Russia	44	7	51	4	13427	2	20765	2
Holland	41	4	45	1	10255	2	15632	2
Totals	524	641	1165		543524		881487	

Compiled and calculated from *NBESL*, 1880

Although a 'general cargo' is not always easy to define, a workable definition in the context of the Tyne-to-Baltic trade is that it comprised, at the least, parcels of chemicals and metals.[15] Half of the general cargoes recorded in the *NBESL* also contained varying amounts of earth products and/or miscellaneous items, together with some coal and/or coke. Cargoes of this type were largely carried by steamers, only a handful were despatched under sail (mainly Scandinavian or Russian), generally bound for Finnish ports.

British steamers commanded the general cargo carrying trades to an even greater degree than they did that in bulk coal: 70 percent of tonnage deployed, carrying some 50,000 tons of the principal commodities (chemicals, metals, and

[14] An 'entire cargo' is defined as one that contained coals and/or coke only.

[15] This definition is supported locally by contemporary commercial descriptions which, almost invariably, described 'goods' cargoes as including both chemicals and metals.

associated coals). Germany supplied about 20 percent (9,053 tons), with the Danes picking up little more than half that. British and German shipping favoured the carriage of chemicals over metals, Russian vessels concentrated on metals, and the Scandinavians carried near-equal amounts of both. Dutch participation was negligible compared with what it had been in 1861 (Compare Tables 8.8 and 4.13).[16]

Table 8.8 Shipment of General Cargoes
(number; tons; percentage)

	Clear-ances	Tonnage		Chemicals	Metals	Coal Products	General Cargoes
	(No.)	(tons)	(%)	(tons)	(tons)	(tons)	(tons)
Britain	82	57561	71	21853	10634	18510	50998
Germany	20	7639	9	4898	2683	1472	9053
Denmark	15	6123	8	1364	1095	2704	5162
Russia	7	3445	4	586	1632	1666	3884
Sweden	9	3316	4	1628	1287	1139	4054
Norway	4	2387	3	482	959	2055	3496
Holland	3	352	0	263	17	104	384
Totals	140	80823		31074	18307	27650	77031

Compiled and calculated from *NBESL*, 1880

Surprisingly perhaps, vessels which made single trips to the Baltic provided slightly more general cargo tonnage (28,000 tons) than those which completed multiple runs (25,000 tons), and around one-in-three of the single trip vessels were sailing ships. The remaining capacity (27,000 tons) was supplied by steamers that ran to the Baltic just two or three times a year.

[16] Ships of the Dutch sailing fleet had then acted as the principal carriers of industrial chemicals from the Tyne to Baltic Russia.

Inward Deployment: The Tyne and Humber Ports

The voyage patterns of foreign sailing ships, and those few still deployed to the Baltic under British registry, remained much the same in 1880 as in the previous two decades.[17] However, analysis of the movements of British steamships – the trade's premier carriers – suggests that their owners had recently evolved new voyage regimes, in particular for the homeward leg. In addition to their fixing of return cargoes at (or close to) their initial ports of discharge in the Upper Baltic, these steamers now frequently made substantial shifts of position (in ballast) to seek cargoes from within the Gulf of Bothnia. Indeed, by 1880 the involvement of British steam shipping in the wood trades of the Gulfs of Finland and Bothnia was already reaching its apogee.[18]

However, only seven east coast-registered steamers clearing the Tyne for the Baltic returned directly to the Tyne from Baltic ports.[19] This was an extremely low rate of return for around 470 departures had been made in all, 83 of them by Tyne-registered steamers. Sampling suggests that the return rates to Hull and Grimsby were significantly higher. For example, fifteen such ships returned direct to Hull in April alone, a figure in accord with the major role ascribed to Hull in respect of Baltic imports; but there was minimal participation by east coast steamers registered outwith Hull. During the main trading season there were just eleven such entries by steamers registered in the North East coal ports, nine of them Tyne-registered. Considering that Tyne-registered steamers had made 83 departures to the Baltic this represented a very low reappearance rate at Hull, and it seems that the Humber's Baltic imports (especially those of Hull) were monopolised by its locally-registered steamers, many of which had started outward from ports other than the Tyne.

Two representative monthly samples support this conjecture, for Hull-registered ships returning from the Baltic carried mixed cargoes on 25 out of 27 occasions.[20] Conversely, throughout the season, the few Tyneside- and Hartlepool-registered ships involved were specialist carriers of wood and/or grain in bulk. This

[17] Though this British sail had largely disengaged from coastal collier work.

[18] Minchinton, 'British Market for Timber', pp. 88-89.

[19] Three Hull-registered steamers, and two each from the Tyne Ports and Hartlepool. Two Tyne-registered steamers that had not sailed outward from the Tyne also arrived.

[20] The contrasting months of: January (mid-winter); and, April (when the Baltic season got under way). Qualitatively sampled, the full year records indicate similar ladings.

signified a difference in the ports of lading as well, for Hull-registered ships returned twice as often from the Lower Baltic as they did from the Upper Baltic, whilst the opposite was true for the grain- and wood-carrying ships of Tyneside and Hartlepool. (see Table 8.9)

Table 8.9 Arrivals of Steamers (*ex* Tyne) at Hull and Grimsby: select periods (number)

Register Port	Period	Arrivals From			Cargo Components[21]		
		Lower Baltic (No.)	Upper Baltic (No.)	Up.+ Lw. Baltic (No.)	Wood (No.)	Grains (No.)	Other (No.)
Hull	Jan. & April	19	8	27	2	0	25
Tyne Ports	April-Dec.	2	7	9	8	1	3
Hartlepool	April-Dec		2	2	1	1	

Compiled from: *NBESL*, 1880; *HBE*, 1880

Inward Deployment: The Port of London

Their infrequent arrivals elsewhere, point to London as the likely destination for most of the inward bound, coal ports-registered ships that sailed out to the Baltic from the Tyne. [22] During a representative five months: April-July, and October 1880, there were 42 arrivals in the port of London by such steamers, meantime the Tyne received seven and the Humber five (see Table 8.10). Significantly, the number of coal ports' ships arriving in London from the Baltic proper,[23] was matched exactly by those that reappeared with cargoes from the Gulf of Bothnia (42). That is, half of all coal ports-registered steamers leaving the Tyne for a Baltic port had subsequently shifted their

[21] Note - a cargo might consist of more than one component, so cargo aggregations may exceed arrivals.

[22] This is confirmed by a qualitative appraisal of the relevant import records (*LABE*, 1880) as well as by quantitative sampling.

[23] That is, ports in the Baltic area under consideration: Kiel around to Turku.

position (after discharge) to fix inward for London in a Bothnian, not Baltic, port. This resulted in distinct cargo differentiation, for Bothnian loadings consisted almost exclusively of wood goods, whilst almost a third of those from the Baltic – especially from the Upper Baltic – contained substantial amounts of grain (see Table 8.10).

Table 8.10 Arrival of Coal Ports' Steamers in London by Region of Departure: five month sample, 1880
(number)

Departure Area	Arrivals in London		Cargo Components[24]		
	Ex All ports (No.)	*ex* Tyne (No.)	Wood (No.)	Grains (No.)	Other (No.)
Upper Baltic	46	36	30	12	4
Low Baltic	6	6	4	1	2
Gulf of Bothnia	46	42	41	3	5
Totals	98	84	75	16	11

Compiled from: *LABE*, 1880; *NBESL*, 1880

Irrespective of their ports of registration, 84 percent of east coast-registered steamers arriving in London from the Baltic had started outward from the Tyne (see Table 8.11).[25] There was considerable rationality in this. Coal was comparatively fast to load and discharge so its shipment occupied proportionally less of the – cost consuming – round trip voyage time. The Tyne had a particular reputation for speed of loading,[26] and the port's transaction systems were predicated on coal shipment (see Chapter 3, 'Consigning Coal'). Added to which, a steamer's stay there could also be used to take on cheap bunkers.

[24] See footnote [21]

[25] For instance, although Sunderland was the North East's second largest shipper of coal to the Baltic, 93% of Sunderland-registered steamers arriving in London from the Baltic (and Bothnia) had loaded outward from the Tyne, and 76% of Hull's incoming steamers had commenced in like manner.

[26] T. Powell, *Staith to Conveyor: an Illustrated History of Coal Shipping Machinery* (Houghton-le-Spring, 2000), pp. 66-75.

Table 8.11 Coal Ports- and Hull-Registered Steamers Arriving in London from the Baltic and Bothnia: five month sample, 1880

(number; percentage)

	Arrivals in London			Percentage of Arrivals	
	Departed All ports	Departed Tyne	Departed Other Port	Departed Tyne (%)	Departed Other Port (%)
Tyne Ports	24	20	4	83	17
Sunderland	14	13	1	93	7
Hartlepool(s)	60	51	9	85	15
Hull	21	16	5	76	24
Totals	119	100	19	84	16

Compiled from: *LABE*, 1880; *NBESL*, 1880

After it had discharged exported coal in the Baltic the onward deployment of a steamer depended much upon its immediate location. For instance, since two-thirds of all Tyne-registered steamers were destined for the Upper Baltic (especially to Cronstadt), they tended to load return cargoes from that region. The cargoes of fifteen out of twenty such London-bound steamers originated in the Upper Baltic, the remaining five in the Gulf of Bothnia. Similarly, although Sunderland-registered steamers ran to the Lower and Upper Baltic in equal measure from the Tyne, their return legs to London were twice as likely to be from the Upper Baltic (only one diverted to Bothnia).

Hartlepool-based steamers, however, responded very differently. Although Hartlepool was the weakest supplier of British tonnage for Cronstadt, it took the leading role in supplying (second-ranked) Swinemunde. Nevertheless, the Cronstadt trade was still so large that it absorbed slightly more of Hartlepool's tonnage than did Swinemunde. However, neither the ports of the Upper nor the Lower Baltic furnished Hartlepool's ships with their principal homeward cargoes for London. Instead, loading places on the Gulf of Bothnia's western shores provided for 70 percent of these shipments, 36 cargoes, whilst the Upper Baltic furnished another thirteen. The poor return rate, just two cargoes, from the Lower Baltic highlighting Swinemunde's own paucity of bulk exports. (see Table 8.12)

Table 8.12 Arrival in London of Coal Ports-Registered Steamers that Departed the Tyne for the Baltic: five month sample, 1880 (number)

	Arrivals in London From:				Cargo Components[27]		
	Baltic and Bothnia (No.)	Lower Baltic (No.)	Upper Baltic (No.)	Gulf of Bothnia (No.)	Wood (No.)	Grains (No.)	Other (No.)
Tyne Ports	20	0	15	5	17	3	3
Sunderland	13	4	8	1	8	5	3
Hartlepool	51	2	13	36	50	8	5
Totals	84	6	36	42	75	16	11

Compiled from: *LABE*, 1880; *NBESL*, 1880

Superficially, it would appear that Hartlepool-registered steamers discharging at Swinemunde would seek return cargoes at the upriver port of Stettin. But three things militated against this: ship technology, for the Hartlepool steamers were designed for bulk shipments rather than mixed parcels of cargo (or passengers); commercial competition, as Hull-owned liner vessels were already well-established there;[28] and seasonal limitations, since Hartlepool's steamers were not deployed to the Baltic the year round. In fact, Hull-registered steamers had acquired a near monopoly over Stettin's inward-bound trade to London and Hull.[29] Nevertheless, the majority of the London-bound general cargoes (hemp, flax, iron etc.) that were carried in Hull-registered vessels came from the Upper Baltic, particularly from Reval, Riga and St.

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[27] See footnote [21]

[28] Harrower, *Wilson Line*, pp. 10-13; A.G. Credland and M. Thompson, *The Wilson Line of Hull (1831-1931)* (Beverley, 1994), p. 7.

[29] For example, only one other (Sunderland-registered) steamer arrived in London from Stettin during the sample period. And, reinforcing these qualitative appraisals, April saw nine arrivals from Stettin into Hull, all by Hull-owned 'liner' vessels.

Petersburg. Steamers belonging to Hull's two biggest liner companies, Thomas Wilson, and, Bailey and Leetham, were the most prominent carriers, although a few lesser known Hull shipowners also engaged in the Low Baltic wood trades. (see Table 8.13)

Table 8.13 Arrival of Hull-registered Steamers in London: five month sample, 1880 (number)

	Arrivals in London		Cargo Components[30]		
	Departures from All Ports (No.)	Departures from Tyne (No.)	Wood (No.)	Grains (No.)	Other (No.)
Gulf of Bothnia	1	1	1	0	1
Lower Baltic	3	2	2	0	1
Upper Baltic	17	10	6	9	10
Totals	21	13	9	9	12

Compiled from: *LABE*, 1880; *NBESL*, 1880

Surprisingly, only 22 out of the 52 coal ports-registered steamers engaged on Baltic import voyages to London recorded two or more such trips in the sample period considered, and this despite the fact that most were capable of making a round-trip (*via* London) in just over four weeks. This casual level of engagement must, however, be considered against their full annual voyage patterns, and the extent to which these vessels might be diverted (temporarily) to the Baltic by their owners from their other, more regular, routes.

Annual Deployments: Hartlepool-owned Steamers

For the most part, steamers deployed to the Baltic could not make annual profits by operating to and from that region alone. Although their speed and independent power allowed them to extend their working season beyond that of sail, climatic restraints still dictated that owners had to construct voyage regimes in which their ships' Baltic

[30] See footnote [21]

engagements were complemented by, or subordinated to, other deployments.[31] Although no consistent voyage records have survived for any coal ports' steamers regularly deployed to the Baltic c.1880,[32] it is possible to reconstruct the foreign-going voyage patterns of select vessels engaged in the Baltic and other intermediate trades by correlating incidental evidence both from official publications and local newspapers.[33] And, given the frequency of their sailings from the Tyne to the Baltic the movements of Hartlepool-registered steamers, from October1879 to October1880, can also be examined in this way.[34]

Under the auspices of nineteen separate ownerships, 45 Hartlepool-registered steamers sailed from the Tyne for the Baltic during this period. The largest group comprised seven steamers owned by George Pyman (Hartlepool), augmented by three more, Hartlepool-registered, ships operated by the associated family company of Pyman, Bell (Newcastle). Six vessels belonging to Geo. Horsley's relatively newly-established fleet approached the Pyman group in size and character, followed by four in the hands of an old-established shipowning family, the Middletons; Cory, Lohden and Jackson were represented by four more (Jackson's involvement providing a London bias). Coverdale and Todd, a Hartlepool firm which had successfully made the transition from sail to steam, sent out three of their fleet of several steamers, and a dozen further owners fielded a ship or two each.

Diversity of ownership was reflected in a range of approaches to annual deployments, differences that are especially noteworthy in view of the consonant character and age of the ships involved. And, although simple voyage counts have limitations as measured indicators – since they take no account of voyage duration or mileage – they do provide a guide to an owner's particular spheres of interest. (see Table 8.14)

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[31] *Reed's Shipowners and Shipmasters Handy Book, 1905* (Sunderland, 1905), pp. 312, 322-325; in 1880 there were seven to eight months of open water in the Upper Baltic: Riga opened 15 April - closed 28 December, Cronstadt opened 5 May - closed 15 November.

[32] Even the few secondary (qualitative) accounts by shipowners who participated, deal lightly with their activities prior to 1890, by which time most were forsaking the Baltic anyway.

[33] The sheer volume of the Tyne's arrivals and departures defeats comprehensive coverage, but some select sampling is possible.

[34] Publication of the *NBESL* ceased in November 1880, hence the use of October 1879 to October 1880 (inclusive) rather than the calendar year.

Table 8.14 Foreign-going Deployments by the Principal Hartlepool Shipowners engaged in the Baltic Trade: October 1879 - October 1880
(number; percentage)

Shipowner	Foreign-Going Trips				Total Trips	
	Home[35]	Bothnia, Baltic[36]	Southern[37]	Oceanic[38]	All	'Baltic' share
	(No.)	(No.)	(No.)	(No.)	(No.)	(%)
Cory, Lohden	2	4	0	0	6	67
Coverdale...	0	8	10	1	19	42
William Gray	0	3	2	6	11	27
Geo. Horsley	1	14	14	8	37	38
Middleton	3	12	5	5	25	48
Geo. Pyman	1	28	7	0	36	78
Pyman, Bell	2	13	0	0	15	87
Totals	9	82	38	20	149	55

Compiled from: *LABE*, 1880; *NBESL*, 1880; *HBE*, 1880; *SDCM*, 1879-1880

The most prominent shipowners engaged were: George Pyman, and, Pyman, Bell Co., 28 and 13 Baltic trips respectively; Horsley, 14 trips; Middleton, 12 trips; and, Coverdale and Todd, 8 trips.[39] All told, the George Pyman steamers that made Baltic trips were singularly aligned to that foreign-going trade alone, they rarely went foreign elsewhere, probably spending the winter 'on the coast'. Pyman, Bell's three (Newcastle-based) ships showed an even greater Baltic orientation,[40] but Horsley and Middleton, and, Coverdale and Todd, showed greater balance between their

[35] Ports within Elbe to Brest (Home Trade) limits together with Norway and western Sweden.

[36] Ports in Baltic (as previously defined) and/or in the Gulf of Bothnia.

[37] Bay of Biscay, Spanish, Mediterranean and Black Sea ports.

[38] Ports of the Americas, and ports east-of-Suez.

[39] Few lesser-engaged owners deployed their steamers on more than three or four foreign-going trips altogether – many made just one or two.

[40] A result of their specialist runs, allied perhaps to their owners' merchanting activities.

deployments to the Baltic and those to the southern-going (or nearer oceanic) trades. Hartlepool's most prominent shipbuilder/owner, William Gray, even managed to insert Baltic trips into the routines of his two large, and heavily promoted, transatlantic steamers.

For at least seven of the smaller Hartlepool steamship owners though, the Baltic marked the full extent of their foreign-going deployments, a self-imposed limitation apparently resulting from strategic deployment decisions – most of their ships could have tackled other 'intermediate' trades. Only two of these owners (Otto Trechmann, Merryweather) made significant advances in any non-Baltic foreign trades, chiefly confining themselves to the nearer southern-going routes.[41]

Annual Deployments: Some Hartlepool Owners' Strategies

Comparison of the annual, foreign-going deployments of the two most dedicated Baltic-going 'Hartlepool' owners, the Pymans, with two who operated similar numbers and types of ships, Middleton, and, Horsley, reveals markedly different approaches. Their differing deployments resulted not so much from their attitudes to the Baltic itself, as to their intentions over the Black Sea (grain) and Mediterranean trades. For, in varying degree, it was their deployments into the Baltic that were critical to sustaining annual voyage routines which provided opportunity to engage in these two, potentially profitable, southern-going trades. The voyage strategies that resulted are designated here as 'asymmetric', and 'balanced', respectively.

In the asymmetric approach, as adopted by the Pymans, there was an extended Baltic season utilising the earliest part of the season – as soon as the Lower Baltic became ice free – and the riskier late season period as well. There was much use of triangular (rather than simple reciprocal) Baltic voyages, with reliance upon the Gulf of Bothnia as well as the Baltic for inward cargo. Foreign-going voyages beyond the Baltic were limited to a few select vessels, and were largely confined to occasional engagements in the Bay of Biscay and Mediterranean trades. Any steamer attempting more than one such southern-going trip jeopardised its ability to carry out a full schedule of five or six Baltic trips in that year. (see Table 8.15).

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[41] Functional inter-change is indicated only once: the West Hartlepool Steam Navigation Co. re-deployed its steamer *Norway* away from its intended (Gothenburg) liner run in order to make three bulk-cargo Baltic trips.

Table 8.15 Foreign-going Deployments of Select Hartlepool Shipowners: October 1879 - October 1880 (number)

Ships	Shipowner	Northern Trades		Southern Trades			East of Suez
		Baltic	Baltic & Bothnia	'Bay' & Spain	Mediterr-anean	Black Sea	India &/or Burma
(No.)		(No.)	(No.)	(No.)	(No.)	(No.)	(No.)
7	Geo. Pyman	22	6	2	4	1	0
3	Pyman, Bell	3	10	0	0	0	0
4	Middleton	6	6	3	2	4	4
6	Geo. Horsley	5	9	4	4	6	6

Compiled from: *LABE*, 1880; *NBESL*, 1880; *HBE*, 1880; *SDCM*, 1879-1880

The balanced approach, as adopted by Middleton and Horsley, saw owners running steamers to the Baltic over a somewhat shorter season, giving just sufficient time to average three trips. Even then, a ship's positioning at the beginning of the Upper Baltic season was critical to success. Commonly, a steamer's return from a Mediterranean, Black Sea or east of Suez voyage was scheduled for early May, when its arrival in 'Falmouth for orders' – or discharge at a continental port – then left sufficient time to make a short sea passage (in ballast) to the North East coast, fixing a Baltic-bound coal cargo and taking on bunkers there in mid- to late-May. After running consistently throughout the rest of the Baltic/Bothnian season, a favoured move towards its end was from the last British port of entry (often London) around to Cardiff or Newport. This positioned the steamer for entry into the southern-going trades (with steam coals), working a shifting pattern of Bay, Black Sea, Mediterranean, or east of Suez routes throughout the winter according to demand. Consequently, it was coal and contacts in South Wales as much as in the North East that shaped the balanced approach. (see Table 8.15)

Whether deployed in balanced or asymmetric pattern, these Baltic-going steamers rarely saw much of Hartlepool itself, few ever loaded or discharged there.

Only in mid-December did some make brief, deliberate visits – for convenience of owner's inspection and to take advantage of (cheaper) local re-fits.

Earning Opportunities: Coal Outward – rates and gross earnings

The absence of surviving voyage records for British ships engaged in the Baltic trade during the period under consideration has encouraged theoretical evaluation of their potential earning opportunities and profitability.[42] However, the acknowledged lack of definition of cargo volumes, destinations, and freight rates enjoyed, lends these evaluations an air of uncertainty.[43] Consequently, the investigation of earning opportunities that is undertaken here concentrates upon establishing a more definitive, quantitative framework.

Critical to an assessment of earning opportunities in the Baltic trade is a detailed, rather than generalised, understanding of its freight rates and the relationship that these rates displayed – especially in respect of geography and season. Unlike some oceanic routes, the Baltic's quoted rates did not necessarily demonstrate a simple relationship between rate and voyage distance. For sail, a particular Baltic destination's ease of approach was especially important, as difficulties might occasion loss of time or incur extra costs (especially towage). For steamers though, these factors were likely to count less than the facilities available upon entry, in particular the availability of stevedoring, lighterage and land transport (preferably rail) that promised rapid turnaround.[44] All-in-all, such influences made the enclosed Baltic Sea, with its physically and administratively heterogeneous collection of ports, a particularly complex place for the determination of rates. And this despite the fact that, by 1880, the cargo options were generally restricted to three bulk components: coal out, and wood goods or grain home.

Even as a homogenous cargo from a single point of origin (the Tyne), the quoted freight rate for coal to any destination within the Baltic appears to have

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[42] Especially the extensive, if contrasting, explorations: Harley, 'Coal Exports', 322-24; Fischer, 'Flotilla of Wood ', pp. 48-59.

[43] The limitations and uncertainties are clearly spelt out by Fischer, 'Flotilla of Wood ', pp. 51-55. The choice by Harley, 'Coal Exports', 331, 335-36, of Newcastle-Danzig as his representative Baltic route is unfortunate since Danzig's rate was definitely atypical (neither did it receive many steamers in 1880, although Newfairwater did).

[44] Kaukiainen, 'Coal and Canvas', p. 115.

factored in variables that included distance, location or access, port infrastructures, and inward cargo prospects. Furthermore, these individual rates were generally overlain by time-related (seasonal) shifts that rarely applied uniformly throughout the region. Therefore, although Kaukiainen's concept of calculating a freight rate as a compound of a (variable) distance element and a (fixed) 'port activities' element is certainly valid,[45] there seems no practicable way of identifying those separate elements within a particular Tyne-to-Baltic port rate. However the relative effects on the average, annual, freight rates outward for coal may be shown for each of the principal ports concerned by adopting Cronstadt, the largest recipient and the longest haul, as a standard for comparison, i.e. as Freight Factor = 1 (see Table 8.16).

Table 8.16 Comparative Rates, with Voyage Distances, to the Principal Baltic Destinations for Coal, 1880
(nautical miles [Nm]; factor)

	Distance from Tyne (nM)	Voyage: Distance Factor (Cronstadt = 1)	Steam: Freight Factor (Cronstadt = 1)	Sail: Freight Factor (Cronstadt = 1)
Cronstadt	1284	1	1	1
St. Petersburg	1299	1.01		1.31
Reval	1135	0.88	0.91	
Helsingfors	1156	0.90		0.94
Riga	1075	0.84	0.80	1
Muhlgraben	1070	0.83	0.85	0.79
Memel	923	0.72		0.76
Königsberg	907	0.71		1.05
Newfairwater	870	0.68	0.76	0.79
Lübeck	755	0.59		1.1
Swinemunde	735	0.57	0.83	

Compiled from: NBESL, 1880; *NDC*, 1880

[45] Kaukiainen, 'Coal and Canvas', p. 117.

Rates in the Upper Baltic, i.e. the Gulfs of Finland and Riga, were closely matched to distance, reflecting the relative ease of access to the ports there (Riga/Muhlgraben, Reval, and Helsingfors), together with their effective cargo handling and general availability of return cargo.[46] However, difficulties of access to what were primarily sailing ship ports (Königsberg, Lübeck) in the Lower Baltic, with slower handling facilities, pushed rates well above what voyage distances alone might suggest; the same trend was noticeable for the mixed steam and sail traffic into Newfairwater/Danzig. The Tyne's closest – and second busiest – Baltic steamer port, the modernised (rail-served) port of Swinemunde, displayed a rather high comparative rate for a different reason: its lack of return cargoes. (see Table 8.16)

Although the notion of an annual average freight rate for coal is historically useful, in contemporary practice it was the fluctuating daily rate that really counted. Considering Cronstadt and Swinemunde – the two largest steamer ports – by way of example, the main seasonal rate changes are easily identified. Commencing at advanced rates (Cronstadt c.£0.35 per ton, Swinemunde, c.£0.28 per ton) in March/April through May, rates then trended downward to reach a low point in August/September (c.£0.30, and c.£0.26 respectively), before recovering and advancing again in late season, mid-September through to mid-October (c.£0.38, and c.£0.30 respectively).[47] This seasonal rate pattern was also found in steamer ports elsewhere, particularly in respect of the autumn upturn. (see Table 8.17; Chart 8.1) But, if the prime determinant in fixing individual charters was the daily rate, then what also counted was the scale of opportunity offered, and this depended upon prevailing demand. Consequently, compounding the freight rate with the monthly tonnages loaded for any particular Baltic port provides a satisfactory guide to potential, aggregate, earning opportunities.[48]

Amongst the principal steamer ports Cronstadt's potential was outstanding, from May to October it provided 66-75 percent of all coal freight monies on offer. Although Swinemunde provided consistent earning opportunities, these amounted to no more than 10-20 percent of the Baltic's overall freight potential during those

[46] Owing to the 15 miles of waterway beyond Cronstadt, St. Petersburg's rate was higher.

[47] These figures ignore the spike that occurred in mid-October 1880 as a result of tonnage shortfall caused by an unprecedented transfer of ships into the Atlantic grain trade.

[48] Satisfactory rather than exact since, for example, there was a time lag between fixture and loading, whilst the extent of shippers' discounts (or imperfect market reporting) cannot be quantified.

months (May-October) when Cronstadt was active. Only early in the season with Cronstadt closed by ice (February-April) did Swinemunde become the largest contributor. Elsewhere the sums offered lay much lower. (see Table 8.18; Chart 8.2)

Table 8.17 Steamer Rates, Coal Outward (Principal Ports): Monthly Average, 1880 [49]
(decimal pounds sterling per ton)

	Feb. (£)	Mar. (£)	Apr. (£)	May (£)	Jun. (£)	Jul. (£)	Aug. (£)	Sept. (£)	Oct. (£)	Nov. (£)	Dec. (£)
Cronstadt	.350	.350	.351	.352	.334	.314	.302	.350	.405		
Reval		.300	.300	.303	.292	0.294	.309	.339	.388		
Muhlgraben	.313	.325	.296	.288	.288		.250				
Riga		.300	.300				.250	.250			
Newfairwater	.263	.238	.266	.271	.263	.269	.269	.263	.275		.381
Swinemunde		.282	.282	.268	.266	.275	.263	.263	.320	.360	

Compiled from *NDC*, 1880

Table 8.18 Steamer Freight Earnings, Coal Outwards (Principal Ports): Monthly, 1880
(thousand pounds sterling)

	Jan. (£K)	Feb. (£K)	Mar (£K)	Apr. (£K)	May (£K)	Jun. (£K)	Jul. (£K)	Aug. (£K)	Sept. (£K)	Oct. (£K)	Nov. (£K)	Dec. (£K)
Cronstadt				0.9	21.0	31.3	22.4	17.8	24.0	14.9		
Swinemunde		0.4	3.3	5.1	5.2	3.5	3.6	5.1	3.0	3.8	3.2	0.3
Reval		0.1	1.4	2.9	2.1	1.7	1.0	0.8	1.8	0.5	1.0	0.3
Newfairwater	0.4		0.6	3.0	2.0	1.7	1.4	1.9	0.5	0.2	0.2	0.4
Riga/Muhlgr'n				0.9	1.3	2.4	1.7	0.9	0.8	0.2		0.1
Totals[50]	0.4	0.5	5.3	12.8	31.6	40.7	30.1	26.5	30.0	19.6	4.4	1.1

Compiled from: *NBESL*, 1880; *NDC*, 1880

[49] From charters reported fixed in *NDC* ; months with only one or two fixtures omitted.

[50] Reduction to the nearest single decimal means that some totals are not exact aggregates.

The total freight earning opportunities for sailing ship owners were far more limited. The freight monies available for coals shipped to the six principal sailing ship ports amounted to barely 20 percent those paid to steam. However, sail's distribution was far more evenly spread, with three of the six principal sail receiving ports (Cronstadt, St. Petersburg, Riga/Muhlgraben) contributing up to a quarter of the total each, whilst the remaining three (Newfairwater, Memel, Helsingfors) made balanced contributions at a lower level – around ten percent each. So, although Cronstadt itself did not dominate the offers made under sail, it was still the Upper Baltic (i.e. Russian) ports that determined the whole: they provided for more than 75 percent of the freight money on offer to sail. Seasonally, the spread of sailing ship earnings did not differ from that of 1861, peaking during the early season deliveries despatched in April, before slackening until the succeeding rally of late summer: July-August/September.[51] (see Table 8.19)

Table 8.19 Sailing Ship Freight Earnings from Coal Outward (Principal Ports): Monthly, 1880
(thousand pounds sterling)

	Jan. (£K)	Feb. (£K)	Mar. (£K)	Apr. (£K)	May (£K)	Jun. (£K)	Jul. (£K)	Aug. (£K)	Sept. (£K)	Oct. (£K)	Nov. (£K)	Dec. £K
Cronstadt			0.4	2.3	2.1	1.9	1.2	1.5	0.5			
St. Petersburg				1.2	0.8	2.1	2.1	1.7	1.0			
Riga/Muhlgr.		0.3	1.3	3.0	0.5	1.0	0.8	1.1	0.8	0.1		
Newfairwater	0.5			0.5	0.5	0.4	0.4	0.2	1.0	0.9		0.2
Memel			0.2	0.6	0.2	0.8	0.9	0.7	0.3			0.1
Helsingfors				1.5	0.6	0.4	0.2	0.2	0.4		0.1	
Totals[52]	0.5	0.3	1.8	9.1	4.7	6.5	5.7	5.4	3.9	0.9	0.1	0.3

Compiled from: *NBESL*, 1880; *NDC*, 1880

[51] St. Petersburg was the only real exception, offering the bulk of its freights from June-August: a consequence of its location.

[52] As for Table 8.18

There was a general falling away of sailing vessel freight rates after the initial spring surge, but the situation was by no means clear cut. For example, Cronstadt's rate fell from £0.37 per ton in the spring to £0.315 at the season's end, and the rates for Riga/Muhlgraben likewise trended downward – but sail dependent Königsberg and St. Petersburg exhibited end of season recoveries (although volumes were low). Newfairwater's autumn rates also rose temporarily, whilst the unusual local winter conditions there – with light ice coverage – actually allowed sail quotations the year round (see Table 8.19).

The comparative annual figures for the principal ports demonstrate how rates and earnings varied between sail and steam. In particular they emphasise the separation between the two modes of carriage, for whilst gross annual earnings under sail barely reached £39,000, steam's amounted to more than £200,000. The shape of these annual returns also highlights the fact that Baltic ports rarely provided equal earning opportunities for the two shipowning constituencies, only Riga/Muhlgraben provided a real balance: £8,342 for steam, and £8,752 for sail. Even though the rates for both sail and steam to Cronstadt were widely quoted, more than 90 percent of real earnings there lay in steam, and, even at Danzig's outport of Newfairwater steam's earnings approached 75 percent ascendancy. (see Table 8.20)

By 1880 it seems that, since these two modes of carriage were largely dedicated to different regions or periods of delivery, there was but slight competition between the coal freight rates offered for them. So much so, that genuine comparisons are difficult to make. For example, although from a shipper's perspective steam might undercut sail by nearly five percent (on average) for the Cronstadt run, the balance might briefly shift in the opposite direction, particularly late in the season,[53] while at Newfairwater, where steam rates were generally lower than sail by around three percent, sail's rate might on occasion drop to undercut steam's by ten percent.

Generally then, it is inappropriate and unrewarding to seek for a fixed competitive advantage of the one mode of carriage over the other in shipping coal to the Baltic in 1880. Rather, each had its own select areas of operation and earnings

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[53] When, presumably, shipowners became reluctant to risk their expensive steam assets getting iced in.

within which rate competitions were internalized, so that rate competition was largely confined either to sail, or steam, alone.

Table 8.20 Annual Freight Returns from the Principal Ports, Steam and Sail: 1880 (decimal pounds sterling per ton; pounds sterling; percentage)

	Steam			Sail		
	Freight Rate (£/ton)	Freight Earned (£)	Percent Earned (%)	Freight Rate (£/ton)	Freight Earned (£)	Percent Earned (%)
Cronstadt	0.345	132186	65	0.342	9865	25
St. Petersb'g				0.449	8942	23
Reval	0.316	13696	7			
Helsingfors				0.321	3400	9
Riga	0.275			0.342		
&		8342	4		8752	22
Muhlgraben	0.293			0.269		
Newfairwater	0.264	12191	6	0.270	4461	11
Memel				0.259	3725	10
Swinemunde	0.287	36507	18			
Totals		202921			39146	

Compiled from: *NBESL*, 1880; *NDC*, 1880

Earning Opportunities: British Steam – coal out, Baltic products home

Although steamers were clearly ascendant in the Tyne's Baltic trade in 1880, the absence of surviving voyage accounts for such ships leaves the matter of their individual earnings open for discussion. However, some measure of earning capabilities – although not profitability – may be made by reconstructing the voyage routines and ladings of commonplace steamers (see Table 8.21), and applying to these the prevailing freight rates. In particular, such detailed reconstructions allow for realistic comparison of the earnings made through carrying coal outwards and the principal Baltic bulk commodities (wood and grain) home.

Table 8.21 Select Steamers making Round Trip Voyages, 1880
(register tons)

Steamship	Owner	Register	Built[54]	Tons	Trip	Destination(s)
Spero	Fenwick & Reay	Newcastle	1878	553	4	Stettin, N'fairwater
Pelton	Fenwick & Reay	Newcastle	1876	516	3	Stettin
Presto	Fenwick & Reay	Newcastle	1879	637	2	Stettin
Denham	Burradon Coal Co.	Newcastle	1878	561	2	Riga
Rose Middleton	Middleton & Co.	W. Hart'l	1874	512	2	Reval, Cronstadt
Nymphaea	Jos. Robinson	N. Shields	1871	737	2	Pillau, Cronstadt
Stephanotis	Jos. Robinson	N. Shields	1871/77	678	1	Cronstadt
Vernon	H. Wrightson	Newcastle	1878	669	1	Swinemunde
Black Swan	Smith, Luckley, S'n.	Newcastle	1864/79	412	1	Stettin
Tom Pyman	Geo. Pyman & Co.	W. Hart'l	1870/78	624	1	Cronstadt
Blue Cross	T.W. Smith	Newcastle	1869/77	694	1	Cronstadt
Spearman	W.J. Jobling	N. Shields	1878	850	1	Cronstadt
Tynemouth Castle	G. Cleugh & Co.	N. Shields	1870	873	1	Cronstadt

Compiled from: *LABE*, 1880; *NBESL*, 1880; *HBE*, 1880; *SDCM,* 1879-1880

Cross referencing of British-registered (principally coal ports) steamer departures from the Tyne with their corresponding arrivals at the major English east coast ports allows the reconstruction of typical round trip voyages. Using only the departure and arrival data immediately available,[55] the earnings of thirteen steamers making 22 voyages to-and-from the Baltic collectively, can be estimated. These steamers provide a representative sample of the 500-800 ton vessels then trading to

[54] Date of build and subsequent date (e.g. /77) if re-engined.

[55] Comprising: Newcastle, all departures and arrivals, 1880; Hull and Grimsby, all arrivals, 1880; London, five-month sample of arrivals, April to July (inclusive), and October, 1880.

the Upper and the Lower Baltic under the auspices of North East shipping companies with acknowledged Baltic interests.[56] (see Table 8.21)

Table 8.22 Select Steamers, Average Freight Earnings on Round Trip Voyages, 1880 (pounds sterling; percentage)

		Voyage	Freights Earned			Rates Earned		
Steamer	Reg. Tons	Round Trip (days)	Coal Out (£)	Cargoes Home (£)	Total Earned (£)	Coal Out Share (%)	Gross Week (£)	100-ton Week (£)
Spero	553	32¼	283	513	796	36	171	31
Pelton	516	32	273	543	816	34	182	35
Presto	637	25	332	857	1190	28	335	53
Denham	561	30½	292	676	967	31	221	39
Rose Middleton	512	33	263	555	818	32	174	34
Nymphaea	737	40	401	798	1199	33	210	28
Stephanotis	678	40	390	804	1194	33	209	31
Vernon	669	29	291	532	823	35	199	30
Black Swan	412	31	247	386	633	39	143	35
Tom Pyman	624	42	350	471	821	43	137	22
Blue Cross	694	35	414	253	667	62	133	19
Spearman	850	47	540	425	965	56	144	17
Tynemouth C'e	873	50	541	371	912	59	128	15

Compiled and calculated from: *LABE*, 1880; *NBESL*, 1880; *HBE*, 1880; *SDCM*, 1879-1880; *NDC*, 1880

Set against voyage durations, estimates of the total freights earned also allow the calculation of earning capacity per unit of tonnage.[57] This factor may be expressed

[56] Amongst them the: Pelton Steamship Co. (Fenwick and Reay, Newcastle); Stag Line (J. Robinson, North Shields); and, Pyman Steamship Co. (G. Pyman, West Hartlepool). The sample also includes vessels that carried coal on contract direct for Stettin (*Spero*, *Pelton* and *Presto*) as well as those engaged in general Baltic tramping.

comparatively as: freight earned in pounds (sterling) for each 100 (register) tons of steamer deployed per week. This, in turn, allows accurate comparison to be made of the earnings generated by carrying coal outward and Baltic products home (see Table 8.22).

Amongst the steamers that made two or more trips (totalling 15 voyages) the balance of earnings between coal out and Baltic produce home was remarkably consistent, 32 percent on average being earned through the carriage of coal – a figure unaffected by Upper or Lower Baltic routeing. The remaining single-trip steamers, however, gained a higher proportion of earnings through carrying coal, 33-62 percent, though detailed analysis suggests that this was not the result of extra efficiency in its carriage, but through failure to secure good freights home. The worst performers included the two largest ships, *Spearman* (850 tons) and *Tynemouth Castle* (873 tons), together with a relatively capacious old steamer, *Blue Cross* (694 tons). All had been despatched with coal to Cronstadt where they found that any return cargoes, let alone large ones, were hard to come by.[58] As a consequence they returned the lowest rate of round trip earnings for their size, less than £20 per 100-ton week. All but one of the other ten ships similarly engaged returned at least half as much again, averaging £35 per 100-ton week, in a range £28 to (exceptionally) £53. (see Table 8.22)

Cargoes carried on the homeward leg in 1880 indicate three main freighting opportunities back from the Baltic: softwood railway sleepers in various forms; grain (principally oats) and some linseed; and sawn wood goods (largely deals and battens). Analysis of the 76 bulk cargoes carried by the coal ports-registered steamers entering London from the Baltic during the (five-month) sample period reviewed, indicates that more than two-in-five cargoes consisted of sleepers, almost one in three were of grain or seeds, and only one-in-four was sawn wood.[59] The cargo compositions of the steamers selected (see Tables 8.22 and 8.23) serves to reinforce the fact that it was

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[57] For all practical purposes the duration of a Baltic round trip was the number of days that elapsed between a ship's 'entered out' date at Newcastle and the following such entry.

[58] 29 June 1880, *NDC*; the poor wood trade from Cronstadt was already persuading owners to carry coals to a Scandinavian 'bye port' (e.g. Copenhagen) before proceeding onward to load wood goods in the Gulf of Bothnia.

[59] Sleepers, 43%; grain or seeds, 32%; and, sawn wood, 24%. By comparison, the 50 cargoes carried from Swedish and Bothnian ports in the same period consisted almost exclusively (96%) of sawn wood goods.

sleepers together with grain, and not sawn wood goods, that composed the greater part of the cargoes offered.

Grain (largely oats from Cronstadt and Reval) was at the forefront of gross earnings, providing an earning potential of c. £700 on the inward leg. Cargoes of sleepers (mostly from Riga) returned slightly less, just under £600, but round trips carrying sleepers were a full week shorter than those for grain – a consequence of shorter passage distances and faster turnarounds. Earnings per elapsed voyage week on sleepers thus exceeded those of grain by some fifteen percent, and this despite the fact a steamer often had to shift (in ballast) from the Lower to the Upper Baltic in order to load sleepers – a passage of over 400 miles. By comparison, cargoes of grain were normally loaded direct in the port at which coal was discharged: usually Cronstadt, Riga or Reval. For both sleepers and grain the revenues earned on the inward leg were double those grossed with coal out, but the element of time helped offset this apparent imbalance, coal was loaded and discharged far more quickly.[60] Surprisingly, cargoes of sawn wood goods were the least remunerative of all freights, grossing barely half that of grain. Consequently, the returns on sawn wood goods under-performed those on sleepers by 50 percent, returning under £19 per 100-ton week on wood as against nearly £37 on sleepers. (see Table 8.23)

These analyses are important in furthering an understanding of the British shipowner's attitude towards ship deployment and likely earnings in the Baltic. Although Fischer and Harley arrived at very different conclusions in these matters, the arguments of both are prejudiced by their common belief that throughout the 1870s and 1880s earnings inward should be based (almost exclusively) on the actual, or projected, carriage of sawn wood goods – deals and battens – from Danzig and Cronstadt.[61] By 1880 this was obviously not the case for, as outlined by Latham, there had been a significant shift away from the main Baltic Russian and German sources to much cheaper supplies from Sweden and Bothnia.[62]

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[60] For example, in June 1880 the *NDC* reported that a 1,700 ton cargo of coal for Cronstadt had been loaded into a steamer (probably *Austin Friars*) in just twelve hours. Judging by later commercial accounts (e.g. *Myrher's Handbook*, 3rd edition, 1924) the discharge rates in Baltic ports varied from 100 to 300 tons of coal per hatch (or 'gang') employed per day and, in relative terms, a cargo of coal could be discharged in less than half the time allotted for loading one of sawn wood.

[61] Fischer, 'Flotilla of Wood ', p. 54; Harley, 'Coal Exports', 331, 336-37.

[62] Latham, *Timber*, pp. 98-99.

In reality, it was the continuous demand for the carriage of sleepers from the Upper Baltic to England's east coast ports (especially London) that determined the earning opportunities on the Baltic's homeward leg in 1880, with sporadic supplies of grain offering occasional opportunistic rewards. From the British steamship owner's point of view the major Russian and German Baltic ports now offered relatively poor prospects for the carriage of sawn wood goods – the formerly ubiquitous deals and battens (see Table 8.23).

Table 8.23 Select Steamers, Average Earnings on Homeward Bound Cargoes, 1880

	Sleepers	Grain or Seed	Deals and/or Battens
Steamers Engaged	6	3	3
Average Register Tons	557	635	730
Number of Voyages	13	5	3
Length in Days	30	37	42
Despatched To	Lower Baltic	Upper Baltic	Upper Baltic
Returned From	Upper Baltic	Upper Baltic	Upper Baltic
Arrived At	London, Grimsby	London, Hull	London, Hull
Earnings Home (£)	£590	£702	£365
Share Earned Home	66%	67%	45%
Total Earnings per 100-ton Week (£)	£36.8	£31.1	£18.6

Compiled and calculated from: *LABE*, 1880; *NBESL*, 1880; *HBE*, 1880; *SDCM*, 1879-1880; *NDC*, 1880

Despite the fact that their earning levels may be estimated with considerable confidence, the lack of contemporary voyage records for any coal ports-registered steamers engaged in Baltic trading in 1880 prevents accurate assessment of profitability. Nevertheless, the voyage records of similar steamers deployed in the intermediate trades elsewhere gives an indication of the profits that owners anticipated. For example, although rather larger than the representative Baltic-going steamers selected here (see Tables 8.22 and 8.23), the 1,177 ton *Diadem* (Hall

Brothers, Newcastle) returned £8,542 of profits to her shareholders from nine Mediterranean and Black Sea voyages during 1879 and 1880.[63] Her surviving voyage records reveal that *Diadem*'s earnings averaged £39 per 100-ton week, of which £12.50p was distributed as shareholder profit.[64] Consequently, gross profits (*ex* depreciation) ran at 32 percent of total freight receipts, returning an average of £147 per week to the owners. Although *Diadem* earned more than many steamers carrying sleepers from the Baltic – they averaged £37 per 100-ton week – the difference was small considering the economies of scale offered by *Diadem*'s bigger capacity. However, *Diadem*'s earnings were well above those of any Baltic-going steamer that, like her, was involved in the carriage of grains and seeds inward, for they returned only £31 per 100-ton week.[65]

Given that owners and managers who deployed steamers to the Baltic would have sought returns comparable to those achieved on the Mediterranean/Black Sea run, then conjectural profits may be calculated for select Baltic-going steamers. Allowing for some loss of efficiency through smaller size, it seems likely that gross profits of £55-£65 per voyage week could be anticipated amongst the more successful Baltic steamers, i.e. those earning freights of more than £28 per 100-ton week.[66] Such an established level of profit for Baltic-bound steamers is also implied in an isolated court case of 1870-71 when Cory, Lohden and Co. (Hartlepool) were awarded compensation of £78 per week for nine weeks loss of profits resulting from a shipbuilder's contractual failure to deliver a new steamer, *Jane Cory*, in time 'for the best season for Baltic voyages [July to September]...making two or three voyages to Cronstadt with coals'.[67]

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[63] *Diadem*, built 1874, 1,177 net tons (1,842 gross), 140nhp compound engines, speed 9¼ knots on 13½ tons of bunkers per day, and range approximately 3,300 miles.

[64] TWA 1202/80: voyage ledgers of the *Diadem*, 1879 and 1880, voyages 14 to 22 inclusive.

[65] There was also a difference in the balance of earnings. Whereas the most successful Baltic-bound steamers accrued 33% of income from coal export freights, *Diadem* took 43% from hers. This differential seemingly remained thirty years later (1909), see, Harley, 'Coal Exports', 323-24.

[66] By slightly circular argument, Baltic steamers of *Diadem*'s size would have generated weekly profits of £126 as against £147, indicating that the Baltic and the Mediterranean/Black Sea routes probably produced similar profit levels.

[67] Hogg and Appleyard, *Pyman Story*, pp. 59-60. This perhaps was ungenerous, for the Franco-Prussian conflict of mid-1870 had pushed Baltic freight rates to almost double the levels of those experienced in 1880.

Instances like this, together with the reconstructed profit levels for selected Baltic-going steamers of 1880, contradict Fischer's theoretically based claim that 'British steamers… would not have become profitable [in the Baltic trade] until 1881', whilst the sheer numbers actually engaged by 1880 (see Table 7.3) belies the same author's assessment that 'there were few such [British steam] vessels in the Baltic trades until 1880'.[68] Fischer's rather negative view of the effectiveness of British steam in the Baltic before 1880 results from misconceptions in the 'four simplifying assumptions' that underlie his theoretical method.[69] Three of these four contain inaccuracies: Baltic steamers of the period 1870-80 averaged considerably less than his predicated 'one thousand net tons', but they were increasingly efficient, purpose built – rather than general purpose – vessels (e.g. *Spero*); neither, by 1880, was Cronstadt (Fischer's chosen port) 'the single most important wood exporting port to Britain', its sawn wood cargoes no longer provided the most readily available and rewarding of inward freights; lastly, steamers' fuel costs and consumption in the Baltic trade had moved sharply downward during the early 1870s – through the introduction of the compound engine – rather than showing (as Fischer assumes) a slow, linear reduction over a lengthy period.

Factoring in these generally favourable changes brings Fischer's predicted year of bare profitability for British steamers forward from 1881 to the mid-1870s at least, and the projected degree of profitability is advanced to a level rather greater than 'marginal'. His theoretical economic predictions are then seen to lie more closely alongside both the implied evidence of contemporary commercial reports, and the reconstruction of (select) coal ports steamers' earnings and profits exampled here.

Earning Opportunities: British Sail – two case studies

Although British sail provided barely a twentieth as much tonnage as steam did in the Tyne-to-Baltic trade of 1880, the North-East coal ports nevertheless supplied some 40 percent of British sailing tonnage (see Table 7.3 and Table 7.4). As a consequence, the earning capacity and profitability of this shipping is of particular interest, with the rare voyage accounts of two such vessels, *William and Catherine* (built 1861, 253

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[68] Fischer, 'Flotilla of Wood ', pp. 58-59.

[69] Fischer, 'Flotilla of Wood ', pp. 53-54, admits that such assumptions can 'often distort reality.'

tons) and *Silksworth* (built 1866, 255 tons), providing a guide to operating conditions in the 1870s.[70]

Owned by John Herron (and partners) of Blyth,[71] these two (snow-rigged) brigs were purchased secondhand in 1867 and 1873 as the replacements for *Peace* and *Gleaner* respectively (see, Chapter 6). Both newly acquired vessels were markedly larger than their predecessors, 20 keels in capacity. Significantly, each was sheathed with protective 'yellow metal', allowing them to operate in southern (teredo-bearing) waters. Indeed, the Mediterranean and Portugal quickly featured in their itineraries so, in contemporary parlance, they may have been regarded as 'South Spainers' rather than just as short sea, or Baltic, traders.[72]

William and Catherine was deployed exclusively to the Mediterranean and Black Sea during her first two years (1867-68), although subsequently a couple of Upper Baltic trips were introduced each season. *Silksworth* included the Baltic to a slightly lesser extent, partly because she was employed in her final years on the long, potentially risky, route to Archangel (White Sea). From the mid-1870s onward the deployment patterns of both brigs also featured an extended triangular Baltic voyage that was new to them: coal outward to an Iberian port (Atlantic or Mediterranean); a long intermediate leg back into the Baltic with salt; and, finally, a return trip to a British east coast port with Baltic wood. Although Blyth was always favoured for loading coal outward, both brigs (particularly *Silksworth*) began to take up coal from the Forth, Tyne, or even South Wales, as opportunity offered.

However, unlike their predecessors (*Peace* and *Gleaner*) they were not constrained to Baltic and Home waters trades, but were genuine intermediate sailing tramps that retained Baltic interests, and the proportion of the earnings and the operating profits that they made through Baltic voyaging remained remarkably constant. From 1867 to 1874, when she began to slip into deficit, *William and Catherine* made £2,366 in voyage profits through southern voyaging as against £2,645 in Baltic trading; although the Baltic involved nearly twice as many separate (if shorter) voyages than the former. In the nine-years 1873-1881, *Silksworth* made

[70] Author's collection: *William and Catherine*, transcript by R. Balmer (c.1970) of original ship's accounts, 1867-1882; *Silksworth*, transcript by R. Balmer (c.1970) of original ship's accounts, 1873-1881.

[71] But, characteristically, entered in this outport's nearest register: North Shields.

[72] R.E. Keys, *Dictionary of Tyne Sailing Ships, Supplement No.1* (Newcastle, 2004), pp. 3-5.

almost exactly the same voyage profits in southern trading as she did in the Baltic: £1,470 and £1,479 respectively, on a close balance of voyages. (see Table 8.24)

Table 8.24 Freight Earnings and Operating Profits of the Brigs *William and Catherine* and *Silksworth*, 1867-1881
(pounds sterling)

	William and Catherine[73]				*Silksworth*			
	Freights (£)		Voyage Profit (£)		Freights (£)		Voyage Profit (£)	
	Baltic	Other	Baltic	Other	Baltic	Other	Baltic	Other
1867	0	1093	0	465				
1868	0	1484	0	1167				
1869	967	581	457	0				
1870	1215	811	702	273				
1871	536	1081	231	315				
1872	1657	0	726	0				
1873	1268	0	276	0	1128	529	472	87
1874	1092	419	253	146	812	457	221	50
1875					967	334	272	134
1876					443	811	59	269
1877					938	573	223	128
1878					458	469	53	78
1879					324	960	96	234
1880					0	1276	0	386
1881					364	524	83	104
Totals (£)	6735	5469	2645	2366	5434	5933	1479	1470
Gross (£)	12204		5011		11367		2949	
Share (%)	55	45	53	47	48	52	50	50

Compiled and calculated from: *William and Catherine*, ship's accounts, 1867-1882; *Silksworth*, ship's accounts, 1873-1881.

[73] Detailed voyage statistics for *William and Catherine* post-1875 are lost. Voyage profits ascribed to 1868 (£1167) include an extended second voyage, October 1868 – March 1869.

Both brigs alike suffered a severe drop in earnings and voyage profits from the mid-1870s onwards.[74] For *Silksworth* this drop was so marked that during her nine year career (1873-1881) she grossed less in freights than *William and Catherine* had done over the previous eight: £11,367 as against £12,204, and her voyage profits showed an even greater contraction (near 40 percent): £2,949 as against £5,011. Despite these comparative financial shortfalls, *Silksworth* still managed to continue to turn in a slender operating profit during her career, averaging £128 p.a., whilst the previously profitable *William and Catherine* began to show an operating deficit of similar proportions – her losses averaging £93 p.a. from 1875 onwards (see Table 8.25).

In real investment terms, however, the situation was bleaker than these operating figures (Table 8.25) suggest. Purchased in 1867 for £2,064, *William and Catherine* was eventually sold late in 1880 for £475,[75] averaging close to 5½ percent (£113 p.a.) depreciation. The price realised for *Silksworth* at the end of the 1881 season is not recorded, but was unlikely to have been much above *William and Catherine*'s, say, £500.[76] Purchased for £2,050 in 1873, *Silksworth*'s depreciation rate was high, around 8½ percent (£172p.a.). Consequently, if the two brigs' annual operating returns are viewed against the respective straight-line depreciation figures, their investment returns on the capital employed were extremely poor.

Although, even allowing for depreciation, *William and Catherine* made annual profits of £127-£397 during the period 1867-1872, in every subsequent year (1873-1880) she sustained losses of £35 to £282. Her career-long profits amounted to just £595, averaging some £42 per year, providing a final return on the partners' original investment of marginally over two percent p.a. Allowing for depreciation in the same way, *Silksworth*'s returns, or lack of them, were more striking still. Real investment losses were made in all but her first year (1873), and in half of them exceeded £130 p.a. Her final deficit amounted to £998 over nine years, representing a loss on the original investment of nearly 5½ percent p.a. (see Table 8.25) Such low, or negative,

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[74] Had it not been for the perceived 'coal famine' of 1872-73 that stimulated demand for Baltic tonnage, this drop would probably have occurred even earlier.

[75] *NDC*, 2 October, 1880

[76] *NDJ*, 10 October 1879; indicates that ships of this type were 'not much sought after', and that three 10-year old barques (i.e. newer, larger vessels) had just been sold for £2-10s per register ton.

returns upon investments were not sustainable, not even for shipowners like Herron who had business interests elsewhere that might offset them.

Table 8.25 Accounts of *William and Catherine* and *Silksworth*, 1867-1881
(all profits and losses in pounds sterling)

	William and Catherine[77]		*Silksworth*	
	Profits and Losses (£)		Profits and Losses (£)	
	Distributed to Partners	Depreciated @ £113 p.a.	Distributed to Partners	Depreciated @ £172 p.a.
1867	240	127		
1868	520	407		
1869	510	397		
1870	486	373		
1871	276	163		
1872	412	299		
1873	54	-59	414	242
1874	65	-48	-80	-252
1875	78	-35	36	-136
1876	-25	-138	110	-62
1877	-109	-222	121	-51
1878			-258	-430
1879	-169	-282	126	-46
1880	-105	-218	124	-48
1881	-56	-169	-43	-215
Totals (£)	2177	595	1152	-998

Compiled and calculated from: *William and Catherine*, ship's accounts, 1867-1882; *Silksworth*, ship's accounts, 1873-1881.

[77] Distributed profits for 1868 accrued from the first voyage only, with the second (extended) voyage's profits carried over to 1869. Profit and loss figures for 1878 were not recorded.

The question remains as to whether these poor returns were typical of the place and period, or were they the result of poor individual management decisions? All the indications are that the former was the case. Writing retrospectively, but with intimate personal knowledge of the Blyth and coal ports' shipping scene in the 1870s and 1880s, Sir Walter Runciman confirmed the general and irreversible decline that had then occurred in local sail, giving – as he saw it – the reasons for the speed of that decline:

> It was not until the middle of the 'seventies' [1870s] that the smart-kept ships and men began to show signs of decay... All that strong and audacious courage and enterprise that had built up fleets of magnificent profit-earners became weaker and weaker, until they sank into hopeless lassitude... partly because a new order of commerce [the cargo steamer] which they refused to recognise had come to alter the system of which they had been pioneers... [and partly because] steamships took the best commanders and men gradually out of the best sailing ships which had to be re-manned by less competent masters and men, and this added greatly to the underwriter's risk, and naturally involved higher premiums, which made it impossible to run the sailing vessels that were left insured. [78]

His dating of the turning point for 'smart-kept ships', the mid-1870s, agrees closely with the change from operating profits to losses that the voyage ledgers for Herron's, rather more lowly-rated, brigs demonstrate. As to the quality of their 'commanders and men', well they may have fared better than some contemporaries since two committed masters were employed over the long term: George Ferrow, who had made good profits for Herron's previous brig *Peace* in the early 1860s; and, Aaron Dunn, a part-owner (6/64$^{\text{ths}}$) of *William and Catherine*. Another of Runciman's substantive points, one he reiterated elsewhere, was the punitive rise in sailing ship insurance – insurance which was still supplied through a mix of the region's 'mutual associations' (not through Lloyd's).

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[78] Runciman, *Collier Brigs*, pp. 269-70; Runciman's first command, in 1871, was the Blyth-owned barque, *F.E. Althausse*, but in 1876 he moved into steam.

Although Herron's accounts show that insurance costs did rise in the 1870s, that increase contributed no more than any other factor to making it 'impossible to run the sailing vessels that were left'. Rather, it was another additional cost that was combated by various means. For example, *Silksworth*'s insurance cover was progressively reduced (from £2,200 to £1,600) in order to lessen her 'averages', the yearly payments to which she was subject. In addition, there was a suspicious rise in the damage claims paid out to her,[79] together with increased refunds for the lengthier periods spent laid up (at a reduced insurance rate). Nor do *William and Catherine*'s accounts indicate any particular increase in insurance costs during the late 1860s and early 1870s, there was a fairly stable yearly mean of around £220.[80] *Silksworth*'s gross insurance costs were actually less, averaging £202 per year, although they fluctuated more. Consequently, in considering the insurance histories of these two vessels, it can be inferred that although the direct costs of insurance may not have been as punishing as Runciman made out, the general increase in local mutual insurance rates accompanied by a greater volatility in the market pressured owners into reducing their cover and managing costs by other means. Insurance costs could not be contained, let alone reduced, without accepting an increased level of uninsured risk.

Close examination of the two brigs' accounts reveals a significant factor that is not presented as such by Runciman – perhaps he considered it too obvious to mention – detrimental changes in freight rates for exported coal during the 1870s. Although Fischer's (weighted) rates for coal export to Cronstadt, and Harley's for Danzig, indicate only a marginal decline in such Baltic rates between 1867 and 1881,[81] the reality for sailing ship owners seems to have been much worse than these authors' aggregate figures suggest. Whereas in the period 1867-1873 Herron counted on chartering his brigs for £10-12s-6d to £12-10s per keel (of 21.2 tons) on the Baltic's benchmark run, Blyth/Tyne to Cronstadt, in 1874 this customary rate fell suddenly to a little over £8 per keel. It seems no coincidence that his recently-purchased

[79] The claims paid out to *Silksworth* amounted to nearly 30 % of the 'averages' paid in. *William and Catherine's* were less than 10%.

[80] Although the accounts are not explicit, Herron was probably reducing her cover as well. The post-1873 insurance figures appear lost.

[81] Fischer, 'Flotilla of Wood ', p. 49; Harley, 'Coal Exports', 332-33.

Silksworth was never despatched on the Cronstadt run again.[82] By 1881 the average annual rate for coals to Cronstadt had fallen yet further, to just £7-5s per keel.

Meanwhile, the rates for a similar regular southern-going run, with coal to Lisbon, showed greater stability, both brigs chartering for around £9 per keel throughout the 1870s. The problem here was the inward cargo, salt, whose rate back to Britain or Scandinavia almost halved from around 13s-16s per ton to only 8s per ton.[83] Herron's frequent adoption in the 1870s of an apparently lengthy, triangular round trip for his brigs of: coal to Iberia/salt to the Baltic/and timber or grain home, was actually a logical re-routing response. This definite change in Herron's established Baltic deployment pattern having been occasioned by the sudden fall in rates for coal shipment direct to the Baltic, combined with the maintenance of existing rates to Iberia (and the near-Mediterranean), all supported by the continuing demand for tonnage to ship grain, wood goods, and flax home from the Baltic. However, despite his attempts to make earnings throughout, the Iberia-to-Baltic leg effectively became a long ballast passage, and the overall profitability of these time-consuming trips appears marginal.

It would seem that Herron and partners stubborn adherence to their two brigs amply illustrates Runciman's sentiment that many such owners 'refused to recognise… [that] a new order of commerce…had come to alter the system of which they had been pioneers'. How far their poor investments resulted from cultural conservatism, and how much from a very real inability to liquidate failing assets, it is now impossible to say. But one thing is unmistakable, the routes on which they failed from the mid-1870s onwards were ones in which efficient steam, in the form of the compound-engined bulk cargo carrier, had most recently been introduced. Whereas for their immediate British predecessors in sail during the 1860s the competition from steam had been indirect, it was now very direct indeed.

Conclusions

In the 1870s the radical shift towards steam occasioned ownership and deployment adjustments throughout the entire Baltic trading regime. Shipowners in both sail and

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[82] A trip to Riga in 1879 yielded £6-2s per keel, although offset by a good rate for deals home.

[83] In 1879 the high outward rates for coals to Oporto (£12 per keel) saw *Silksworth* turning in a small operating profit even though she was twice forced to return to Britain in ballast.

steam responded rationally to change, the former by prolonging established strategies with existing assets, and the latter through the logistic and economic evaluation of a new tool – the bulk carrying steamer. Coal exports to the Baltic by steamer increasingly concentrated on two ports: Cronstadt, and Swinemunde/Stettin, exemplifying Kaukianen's observation that not only did shipping become divided into sail and steam constituencies, but that the latter's functional and economic needs determined which destinations became 'steamer ports'. [84]

During the 1870s the Baltic's ports as well as its carriers became increasingly segregated – as to sail, steam, and ship nationality – and British steam shipping was a prime determinant in this differentiation process. Nevertheless there was not a homogenous spread of British carrier interests, and deployments based upon mid-century precedent helped rationalise (English) inter-regional competition. However, the relatively stable pattern of coexistence that resulted depended upon a continuing upward trend in the Baltic's demand for coal, and the Tyne's retention of its position as the North East's 'port of choice' for coal exports.[85]

That coal occupied by far the greatest volume of tonnage outward from the Tyne, and that it attracted steamers owned in all other east coast ports, circumstantially supports the view that, contrary to Harley's assertions, coal carriage provided shipowners with significant revenues. The levels of engagement and dominance achieved by British shipping also belie Harley's stated conclusion that, in the global context, 'the coal trade …seems to have played only a modest part in the success of the British [steam] merchant marine'. Also to be challenged is his associated view that coal exports were least important in the non-oceanic trades, where 'Most of the coal exports went to European [including Baltic] ports and in these trades British shipping was significantly less successful than in the longer ocean trades'.[86] The Tyne-to-Baltic trade evidence points to a different conclusion. British, especially east coast, owners gained real success by deploying their most advanced steamers to these 'European' ports, and moreover they responded by introducing voyage routines which responded flexibly to the trade's inherent limitations.

[84] Kaukiainen, 'Coal and Canvas', p. 115.

[85] Rennison, thesis, 229-61; the port of Tyne's leading position now owed as much to its attractiveness to rail operators as to shipowners.

[86] Harley, 'Coal Exports', 330.

The outward route of a bulk carrying steamer usually determined its inward lading, a consistency of practice that once more argues strongly for Fischer's 'joint production' interpretation,[87] with shipowners pursuing round trip economies that purposefully linked outward and inward potential. Similarly, the specific decision-making strategies of shipowners can be revealed by analysis of their annual deployments. Sampling clearly reveals rational decision-making, showing that owners who were fully cognisant of the deployment options open to their ships chose to trade to the Baltic.

All Baltic deployments it is concluded were predicated upon the gross earning opportunities offered. Those open to sail were demonstrably lower than those for steam, although in some measure compensated for by sail's greater scope for geographic dispersion. In general, each mode of carriage internalised (rather than externalised) its rates and competition, promoting relative co-existence rather than absolute competition.

If, as asserted by Harley and others, coal carrying revenues provided only marginal profits at best, then it is extremely difficult to explain why the opportunity to ship coal outward was foregone only in exceptional circumstances; or, why steamers discharging in east coast ports (especially London) consistently routed out to the Baltic again *via* the Tyne. The surviving comparative evidence consistently leads to the conclusion that a British steamer's gross revenues resulted far more from a balance of earnings between the outward and inward Baltic legs than has been previously accepted – and that round trip profits approached those of the intermediate southern-going trades. Furthermore, this level of Baltic profitability had been achieved several years prior to the break-even point of 1881 (or later) postulated by Fischer.[88]

As for surviving sail, the returns of representative British sailing ships prosecuting the Baltic trade in the 1870s indicate that their long-established voyage regimes and alternative routeing expedients finally broke down, and an end point can be defined, 1874. For once the 'mundane economics' are transparent, for the emergence of large numbers of compound-engined steamers on these same routes had forced outward rates for coal down to the point of non-viability for sail. If apparently

[87] Fischer, 'Flotilla of Wood ', p. 44.

[88] Fischer, 'Flotilla of Wood ', pp. 57-60.

negative, such (sail) owners' responses were rational, choosing either to take immediate losses by disposing of now near worthless floating assets, or, minimising costs and sustaining deficits until their vessels failed physically.

This process is evidenced in individual as well as collective outcomes. For example, amongst the dozens of commonplace British steamers that left the Tyne for the Baltic in 1880, occasional regular departures stand out: 'Cronstadt, ss *Coanwood*, Runcieman [sic], 700t, 19 (crew)'.[89] The *Coanwood*'s master, Walter Runciman – enjoying his first command in steam – epitomised the one-time seaman under sail who intended to realise the ambition of becoming a steamship owner in his own right.[90] As such, he exemplified the changed role and circumstance of that class of individual whose small-scale capital and enterprise had underwritten the Tyne-to-Baltic carrying trade, 1860-1880: the coal ports' shipowner.

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[89] *NBESL*, 1880, June-September.

[90] Runciman, *Before the Mast ~ and After*.

Chapter 8, Charts:

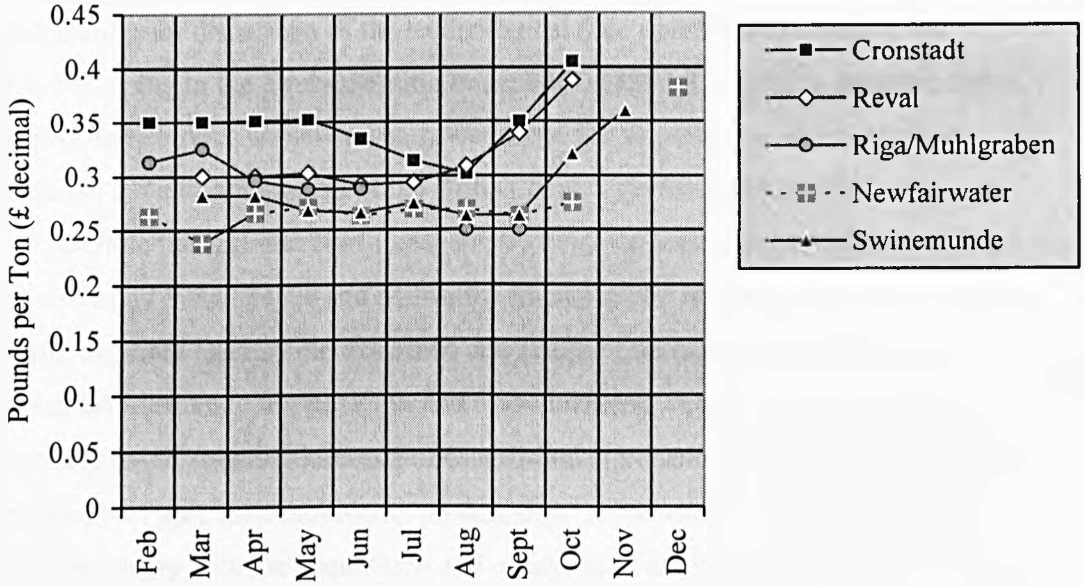

Chart 8.1 Steamship Freight Rates, Coal Outward: Monthly Average 1880
(Source: see, Table 8.17)

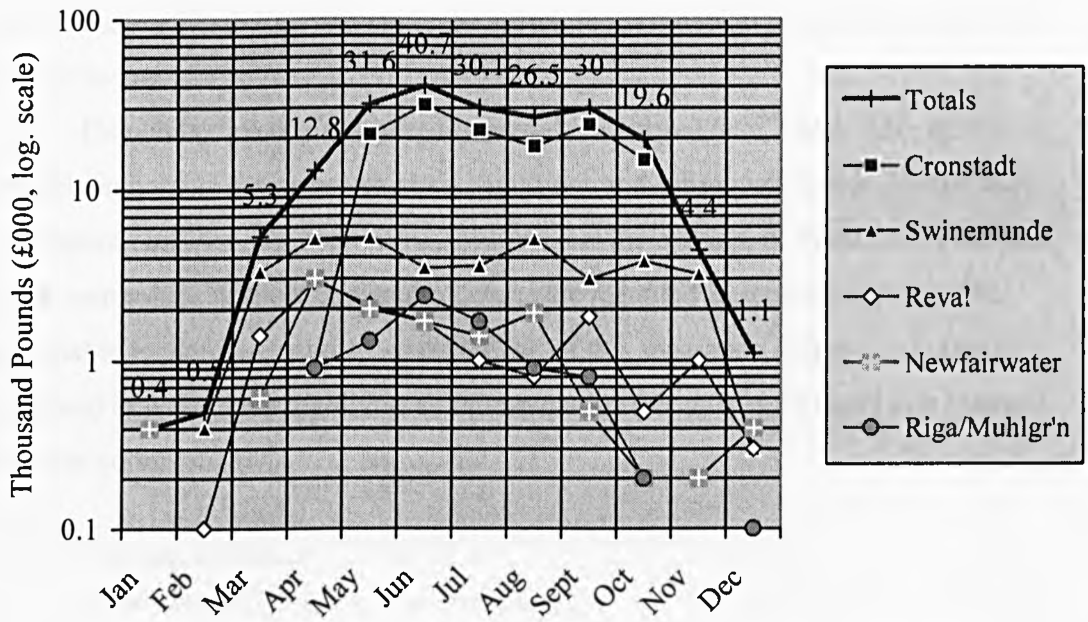

Chart 8.2 Steamship Freight Earnings from Coal Outward, Principal Baltic Ports:
Monthly 1880
(Source: see, Table 8.18)

CHAPTER 9: SHIPOWNING STRUCTURES, 1861-1880

Although presented separately here, considerations of shipowning obviously complement prior discussion of the technological (and operational) changes that affected shipping in the Tyne-to-Baltic trade, 1861-1880.[1] The need to maintain focus, however, determines a somewhat narrower scope for shipowning, and its study is confined to a major component of the British fleet: Tyne-owned shipping.

Despite the fact that North East shipowning has been discussed from varying perspectives by Ville, Boyce and Milne, the impact of the transition from sail to steam is a little-explored issue. Ville described and analysed the structural changes that occurred between the late eighteenth and mid-nineteenth century on the Tyne, when the broadly based shipping interests of established merchants and traders gave way to a new group of specialist providers, 'professional' shipowners. These latter involved themselves solely with the acquisition and operation of sailing ships.[2] In pursuit of later, large-scale ownership themes, Boyce investigated steamship owning in West Hartlepool during the late 1870s and early 1880s, providing a complex, in-depth study that concentrated upon the commercial and social networks that he saw as underpinning growth.[3] Milne's work focuses on the geographic extensions that were made by select North East owners in the search for new capital and markets during the late 1880s and 1890s.[4]

Though not exactly covering the period considered here, 1860-1880, all are valuable in helping define pre-existing conditions and subsequent trends. But there is an inherent omission, for none seriously considers the overlap, or interface, of sail and steam ownership. Without explanation, these are regarded as separate entities. The potential to explore the validity, or otherwise, of this separation is found in material contained in what Craig highlights as little-regarded (recently published) ship listings and fleet compilations.[5]

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[1] See chapters 7 and 8.

[2] Ville, 'Patterns of Shipping Investment', 205-221.

[3] G. Boyce, *Information, Mediation and Institutional Development: The Rise of Large-scale Enterprise in British Shipping, 1870-1919* (Manchester, 1995), pp. 44-54.

[4] Milne, *North East England*, Chapter 6.

[5] R. Craig, 'Introduction', in *British Tramp Shipping, 1750-1914* (St. John's, Newfoundland, 2003), p. 12.

Those that are particularly relevant in this context include works by Keys, Waine, MacRae, and Thomas, together with a few informative company and fleet histories – especially those of Hogg and Appleyard, and Robinson.[6] Enveloping all is Craig's own work describing the nature and growth of Britain's steam tramp companies in the late nineteenth century, and this despite the fact that, with a single exception (Gray's of West Hartlepool), he rarely illuminates the actual ownerships – as apart from the ships – of the North East.[7] Regionally, Craig's emphasis on those shipowners who have been regarded by historians as merely commonplace or lacking in success, rather than on the more prominent 'large-scale enterprises', is both relevant and significant. In essence, it is Tyneside's commonplace ventures in sail and steam of the former kind – and there were many of them – which provide substance for this chapter.

Ownership Patterns, 1861

Contemporary reports and statistics suggest that the level of sailing vessel ownership on the Tyne remained quite constant during the 1855-1865 period, with little variance from a figure of 1,400 vessels.[8] Consequent upon the Port of Shields having achieved independent customs status in 1848 there was also a tendency for the published sources of the period to give increasingly precise shipping details, thus providing for greater definition of ownership patterns along the Tyne.[9] By the mid-1850s, registrations at the port of Shields had already grown to equal those of the parent port of Newcastle, a down-river shift that continued over the following ten years. By 1860-

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[6] Keys, *Dictionary*; Waine, *Steam Coasters*; McRae and Waine, *Steam Collier Fleets*; Thomas, *British Ocean Tramps, Vol.2*; Hogg and Appleyard, *Pyman Story*; N.J. Robinson, *Stag Line and Joseph Robinson and Sons* (Kendal, 1984).

[7] Craig, 'William Gray and Company', in *British Tramp Shipping*, pp. 345-376.

[8] That is, craft of over 50 register tons.

[9] As was still being explained in *Marwood's Register* for 1854-55 (p. D3): 'Previous to 5th April 1848, North and South Shields were sub-ports of Newcastle; but as the majority of the Shipowners of the Tyne reside in North and South Shields, they were, by appointment of the Lords of the Treasury, made a separate and independent Port.' Since the customs house for this 'Port of Shields' had been located in North Shields, many shipowners in South Shields reluctantly commenced registering their ships there (rather than at Newcastle). Despite this common registration under 'The Port of Shields', contemporary listings generally separated out ships owned in South and North Shields. South Shields finally gained registration status in 1859.

1865, Newcastle's registrations had sunk to something under one-third of the whole, whilst those accredited to North Shields – the dominant partner in the Port of Shields – had risen to almost a half. Meanwhile, South Shields retained around one-fifth (see Table 9.1).[10]

Table 9.1 Numbers of Sailing Vessels Registered in the Tyne Ports, 1854-1865.[11]
(numbers, percentage)

	Marwood's Register, 1854-5		Hodgson, 1859		British Assoc. 1863-4		Clayton's Register, 1865	
	ships	%	ships	%	ships	%	ships	%
Newcastle	695	52	389	28	461	33	396	29
Port of Shields	763	48						
North Shields			739	54	631	45	673	49
South Shields			242	18	314	22	311	22
Total, Tyne Ports	1458		1370		1406		1380	

Compiled from: *Marwood's Annual Directory, Shipping Register and Commercial Advertiser, 1854-5* (Sunderland, 1855; Liverpool, 2003, reprint); Hodgson, *Borough of South Shields*, p. 317; Armstrong *et al* eds., *Industrial Resources*, pp. (3)-(5); *Clayton's*, 1865.

It is against this setting, one in which there was a steady shift of registration away from the port of Newcastle, that the ownership patterns of the 120 Tyne-registered vessels engaged in Baltic trading in 1861 may be examined. And, since they comprised just below ten percent of all sailing vessels registered in the ports of Newcastle and Shields, it should be borne in mind that – especially in size and character – they provide a representative sample (see Table 9.2).[12]

[10] This numerical dominance of North over South Shields resulted partly from the fact that ships owned in the sub-ports (Seaton Sluice, Warkworth/Amble, and Blyth) were frequently registered at North Shields.

[11] Craft of over 50 tons only.

[12] An 8.6% and 8.2% sample as regards ship numbers and tonnage respectively. However, when compared with the overall geographic distribution of ownership along the Tyne, this Baltic

Table 9.2 Comparative Sample of Tyne-registered, Baltic-bound Sailing Vessels, 1861
(number, percentage)

	Baltic-bound, Tyne-registered Sailing Ships, 1861		All Tyne-registered Sailing Ships, 1863	
	Ships	%	Ships	%
Newcastle	27	23	461	33
North Shields	57	48	631	45
South Shields	36	30	314	22
Totals	120		1406	

Compiled from: NBESL, 1861; and, Armstrong *et al* eds., *Industrial Resources*, pp. (3)-(5)

The Nature of Ownership, 1861

A range of sources indicate the nature of the ownership of this representative sample of 120 vessels.[13] Analysis reveals that all were owned through the well established fractional (i.e. sixty-fourth) system, with the shareholders in each ship relating to each other as 'tenants-in-common', all with perfect freedom to sell or acquire shares as they saw fit. Correspondingly, they accepted unlimited liability for a congruent proportion of any debts their ship incurred as well as any profits that it accrued. Only in one case is there any indication of ownership through a business partnership that had been formally designated as a 'company',[14] although there is no evidence of

sample shows an 11% bias towards the port of Shields at the expense of Newcastle – likely the result of a propensity for owning 'handy-sized' bulk-carriers of the type employed for the Baltic (Newcastle owners held a higher proportion of coastal packets and ocean-going merchantmen).

[13] The most important primary sources are the original customs Shipping Registers for the ports of Newcastle and Shields: TWAS, EX/NC; TWAS, EX/NS; and TWAS, EX/SS. However, the analyses presented here rely upon the comprehensive transcriptions in: Keys, *Dictionary*, pp. 105-743.

[14] *Gratitude*, 271-tons, was two-thirds owned by the Middle Dock Company (South Shields) whose principals were prominent, Newcastle-based, shipowners.

ownership by means of a limited liability joint-stock company.[15] It is also clear that in 1861 there was considerable variation both in the numbers of individuals investing in these Baltic-bound vessels and the ways in which the fractional shareholdings were structured.

This level of variability seems to reflect the fact that the shifts in ship investment practice that had begun in Britain in the late eighteenth century – away from merchanting towards specialist operation – were not comprehensive ones.[16] Correspondingly, a specific feature of this shift towards shipowning specialisation had been a reduction in the numbers of shareholders involved per ship, accompanied by a growing role for individuals who acquired a ship (or ships) as sole owners. According to Ville such trends occurred on the Tyne between 1750 and 1850, while Palmer identifies a similar pattern for the port of London during the first half of the nineteenth century.[17]

Although an analysis of the Baltic-going sample considered here is broadly supportive of the thesis that sole (i.e. specialist) owners had an important part to play in shipping investments on the Tyne, it suggests that they did not perform this role to quite the degree suggested by Ville.[18] Rather than investing in more than half (59%) of all ships as Ville indicates, sole ownership in the Baltic-going sample is substantially less (43%). In turn, whereas small-scale shareholders are preponderant in the 1861 Baltic-going sample, providing for 57 percent of all ships, Ville's comparable figure for Tyneside stands at only 42 percent in 1850 (see Table 9.3).

Disaggregation by district of the 1861 figures also indicates that small scale fractional shareholding was of greatest importance in Newcastle-registered ships, whilst sole ownership was rather more common in shipping registered at Shields; this provides statistical support for the contemporary view that 'the majority of the Shipowners of the Tyne reside in North and South Shields'.[19] Broadly speaking, the Tyne-registered sailing ship stock of 1860 was split more or less evenly between the river's sole owners and its lesser (i.e. fractional) investors. Furthermore, shipowning

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[15] S. Palmer, 'Investors in London Shipping, 1820-50', *Maritime History*, Vol.2 (1972), 51-52; this notes that joint-stock ownership of shipping was primarily a feature of early steamship operation.

[16] Davis, *Rise of English Shipping*, pp. 81-109.

[17] Ville, 'Patterns of Shipping Investment', 205-221; Palmer, 'Investors in Shipping', 52.

[18] Ville, 'Patterns of Shipping Investment', 213, 218

[19] *Marwood's*, 1854-55, p. D3.

as a specialist concern – rather than as a generalised investment activity – was concentrated to a greater extent in Shields than in Newcastle (see Table 9.3).

Table 9.3 Number of Shareholders per Tyne-registered Sailing Vessel: 1786-1788, 1850, and 1861[20]
(percentage; [ ] number of ships in sample, 1861)

	1786-88	1850	1861		
	All Tyne %	All Tyne %	All Tyne [ships] %	Newcastle %	Shields %
1, sole	21	59	[52] 43	33	46
2	14	26	[43] 36	33	37
3-5	27	14	[24] 20	30	17
6 or more	38	2	[1] 1	4	0

Compiled from: Ville, 'Patterns of Shipping Investment', Table 1; and, Keys, *Dictionary*

Although counts of owners per ship are a useful guide to the nature of investments overall, they reveal little of the shareholding structures that supported individual ships. To discover these it is necessary to examine each ship's registration records in turn, and such examination suggests that five types of investment were practiced:
a) 'Sole ownerships' – one investor holds all 64/64ths.
b) 'Equal holdings' – two or more investors have parity of holdings.
c) 'Principal holdings' – one investor holds at least twice as many shares as any other.
d) 'Majority holdings' – one investor (out of two or three) holds a simple majority.
e) 'Multiple holdings' – four or more investors, of which none holds more than 32/64ths.

The highest proportion of Baltic-going ships was held under sole ownership (43%), a category that considerably outweighed the next largest, principal holdings (26%). Equal holdings accounted for an even smaller proportion (20%), whilst the

[20] Based on: 1786-88 and 1850, Ville, 'Patterns of Shipping Investment'; 1861, Keys, *Dictionary*.

least common forms of ownership were majority and multiple holdings; these last two provided investments for little more than ten percent in all. (see Table 9.4) Vessels in which there was a single principal investor thus comprised over two-thirds of the Baltic-going fleet of 1861.[21] Beyond this substantial group, ownership appears to have rested largely with an agreed equality of investment, or, perhaps more uncertainly, upon a severalty of holdings in which the investment lead was unclear. As with the simple count of shareholders the propensity of Shields' investors for sole ownership was once again highlighted.[22]

Table 9.4 Investment Patterns in Tyne-registered, Baltic-bound Sailing Vessels, 1861 (number; percentage)

	All Tyne		Port of Newcastle		Port of Shields	
	ships	%	ships	%	ships	%
Sole ownership	52	43	9	33	43	46
Equal holdings	24	20	6	22	18	19
Principal holdings	31	26	9	33	22	24
Majority holdings	10	8	1	4	9	10
Multiple holdings	3	3	2	7	1	1
Total ships	120		27		93	

Compiled from: *NBESL*, 1861; and, Keys, *Dictionary*

Sole Ownership: Investment Levels, 1840-80

Since sole owners (64/64^{ths}) might have been expected to possess the greatest inclination to invest, it is appropriate to consider their investment profiles first. Analysis reveals that of the 45 men and women engaged in sole ownership in 1861, only three were the sole owners of more than one Baltic-bound ship.[23] And it was these three owners, together with just two others, who held further fractional shares in

[21] That is, they had either a sole owner or an investor who held a (potentially) principal share.

[22] This uptake by sole owners in Shields may well account for a lower level of principal investors there compared to Newcastle.

[23] Two Blyth-based ownerships ascribed to the Tyne in the *NBESL*, 1861, have been omitted.

any other such ships. Altogether, these five owners seem to have invested (in full or in part) in slightly under one-fifth of all the ships engaged to the Baltic that year. As might be anticipated, however, the shipping investments of the entire group of sole owners did not rest in ships that voyaged to the Baltic alone. Some, although by no means all of them, enjoined a much wider spread.

Just over a quarter (twelve) of these sole owners possessed three, or more, ships each in 1861, and outright investments of this kind were usually accompanied by fractional shareholdings in at least as many more. For example, the three largest investors – Peter Dale; James Young; and William Wright (all of South Shields) – owned fifteen, twelve, and six ships each, accompanied by significant shareholdings in another, eight, ten, and five respectively. At the lower end of the investment scale though, well over a half of all sole owners possessed no more than a single ship, or, a single ship supplemented by shares in just one or two more. Indeed, of the entire group of 45 sole owners, 36 percent (sixteen) were in the apparently risky position of owning just a single ship.[24]

Examination of sole owners' individual investment records over the four decade period 1840-1879, reveals that only five individuals – all of them 'large owners' – had a continuous record of investing in each of these decades.[25] Owners of similar status also participated throughout the three decades 1840-1860 and, as the largest single investing group (14 individuals), evidenced a clear commitment to placing capital in shipping. Those investors active over just two decades were only slightly less numerous, although relatively few invested in the 1840s and 1850s alone.[26] Clearly, those persons who achieved large ownerships tended to invest over longer periods of time, 30-40 years, whilst those with small or modest holdings figured more commonly as investors over a shorter term of 20 years or less. Correspondingly, the investment capacity of individuals in the latter group rose little

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[24] The sole ownership of two ships with, perhaps, shares in a couple more was not common – there were only seven such owners.

[25] All had interests (as shareholders or sole owners) in ten or more vessels during the period; the majority of lesser investors held interests in under six ships.

[26] Of seven investors whose activities were restricted to the 1840s and 1850s, two died in the early 1860s. Thomas Young, who acquired sole ownership of *Elizabeth Young* upon the decease of kin in 1860, died in 1863 – confining his investments to a single decade.

beyond taking interests in two or three ships per decade, whilst the larger, longer term, investors achieved rates in excess of five or even six (see Table 9.5).[27]

From the viewpoint of exclusive sole ownership, that is, excluding all fractional shareholdings, the investment activities of the 45 sole owners were more constrained. Only the two largest, William Wright and James Young, invested in new sole acquisitions in all four decades – each averaging seven per decade. Beyond this, just a half-a-dozen individuals provided for sole acquisitions over three decades, from the 1840s through the 1860s. Three of these were also large owners and another was nearly so, whilst two were apparently shipbrokers.[28] Of the first three owners, none averaged more than four sole acquisitions per decade.

Table 9.5 New Investments made by Sole Owners over Four Decades, 1840-1879 (number, percentage)

	Fractional Shareholdings and/or Sole Ownerships			
	Investors (i.e. Owners)		New investments	Average investments by owner per decade
	Number	%		
2 Decades: 40s/50s	7	16	36	2.6
2 Decades: 50s/60s	11	24	47	2.1
3 Decades: 40s/50s/60s	14	31	207	4.9
4 Decades: 40s/50s/60s/70s	5	11	131	6.6
Other periods	8	18	13	
Totals	45		434	

Compiled from Keys, *Dictionary*

When considered as a decennial (four decade) sequence the nature of the investments made by the 45 sole owners is particularly instructive, especially if shareholding investments are separated out from those which gained sole ownership.

[27] Investor numbers in Tables 9.5 and 9.6 include individuals who were mainly shipbrokers.

[28] Thomas Motley and Marshall Tweddell (North and South Shields respectively) had a history of making short-lived, speculative acquisitions of ships of dubious quality.

And this despite the fact that the number of fractional shareholding investments closely matched those made by gaining sole ownership.[29] The substantial levels of new investment that were made in the 1840s were heavily oriented towards acquisition through fractional shareholding rather than through sole ownership. The 1850s saw a further surge in investment overall, but there was a turnaround of investor sentiment, for decisions became evenly balanced between shareholding and sole ownership. However, the 1860s saw the new investment rate through sole ownership rise to nearly twice that of fractional shareholding – although volumes overall declined. Then, in the 1870s, the split between the two types of investment became balanced again, albeit at much reduced levels (see Table 9.6).

As the decennial shifts between these two modes of investment seem rather large, it is necessary to seek the underlying causes. The 1840s were certainly years of concern for putative investors in shipping, for there was a widely acknowledged cyclical slump in Britain's shipping business during the early 1840s when 'freights and values fell and orders for new vessels faded',[30] and the recovery late in the decade was accompanied by uncertainties surrounding the proposed repeal of the Navigation Act. It seems highly likely that shipping investors responded to these situations by resorting to the time-honoured tactic of spreading their risks, preferring to own 'one-eighth of eight ships rather than eight-eighths of one'.[31]

This interpretation of the situation seems to be borne out by the fact that new fractional shareholding deals in the 1840s considerably exceeded the number of investments by sole acquisition. However, in the succeeding decade, the 1850s, with the expectation of good freight markets during (and in the aftermath) of the Russian War, there was the incentive not only to invest more actively in shipping,[32] but also for existing investors to enhance their holdings by concluding sole acquisitions. The

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[29] The former necessarily implied a lower absolute level of financial investment than the latter. In theory it would be possible (although laborious) to calculate the proportions of each, but since factors such as: build quality; state of repair; and market demand, for individual ships remain largely unknown, it would still not give an accurate indication of monetary values.

[30] Palmer, *Politics, Shipping, and Repeal,* p. 3; for the severe effects on North East shipbuilding also see, Clarke, *Building Ships, Pt.1*, pp. 83-84.

[31] Davis, *Rise of English Shipping*, p. 87.

[32] Osler, 'Time Runs Out', 24; Palmer, *Politics, Shipping, and Repeal,* p. 186, notes the 'variety of short-term upward influences on freight rates in the early 1850s'.

more balanced split of investments to be observed in this decade was probably a collective response to such thinking.

Subsequently, during the 1860s, as the prospects for returns to investors in coastal and short sea sail deteriorated and the market values of the ships employed there fell,[33] the proportion of sole ownership amongst small owners rose markedly. Whether this rise was a result of their being lured into purchasing cheap tonnage, or, simply through being left with ships largely unwanted by others, it is now impossible to tell. By comparison, large owners generally preserved a much closer match between shareholding and sole ownership during the 1860s. Following which, in what proved sail's period of absolute decline (the 1870s) the minimal investments that were made followed a balanced pattern – the likely result of the fact that it was only a few of the largest owners who still survived in sail alone.

Table 9.6 New Investments made by Sole Owners over Four Decades, 1840-1879: Disaggregated by Investment Type
(number; percentage)

	All New Investments		New Fractional Shareholdings		New Sole Ownerships	
	No.	(%)	No.	(%)	No.	(%)
1840s	120	28	77	36	43	19
1850s	173	40	84	40	89	40
1860s	120	28	41	19	79	36
1870s	21	5	10	5	11	5
Totals	434		212		222	

Compiled from Keys, *Dictionary*

Sole Ownership: Fleets and Values, 1861

At a more particular level, consideration can be given to the investment and fleet growth experienced by individual owners, with three representative owners selected by way of demonstration. These give some hint as to ownership diversity: WDC Balls

[33] Osler, 'Time Runs Out', 24-27.

(North Shields), a relatively small owner; Shallett Hewson (North Shields), a medium-sized merchant owner; and James Young (South Shields), the sample's largest shipowner. (see Table 9.7)

Table 9.7 Holdings in Sail of Three Representative Shipowners: Quinquennial intervals, 1841-81
(number; tons total)

	1841	1846	1851	1856	1861	1866	1871	1876	1881
WDC Balls:									
Ships, interests in	1	1	2	2	3	4	4	4	
Ships, sole ownership	0	0	1	1	2	3	2	2	
Total tonnage	36	36	285	285	528	971	935	870	
Shallett Hewson:									
Ships, interests in	4	7	9	10	8	5	4		
Ships, sole ownership	0	2	7	7	5	3	2		
Total tonnage	363	1203	2260	2567	2078	1462	957		
James Young:									
Ships, interests in	14	26	27	26	22	15	17	15	11
Ships, sole ownership	5	10	11	13	12	9	13	11	10
Total tonnage	1766	4053	4728	5342	5244	4144	4597	4029	3778

Compiled from Keys, *Dictionary*

William Balls commenced shipowning on the Tyne whilst still a master mariner of Lowestoft, acquiring an eighth share (8/64ths) of the five-year old, 286-ton, brig *Scio* in 1846.[34] In the following year he purchased the newly-built, 249-ton, snow *Brierly Hill* from Sunderland,[35] maintaining his shipping interests at this level until the 1860s when he doubled, and then quadrupled, his investment in tonnage, reaching

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[34] Keys, *Dictionary*, p. 636; Balls' one-eighth share was equivalent to only 36 share/tons.

[35] Shipbuilding and shipping was in a depressed state in the mid-1840s, so Balls probably bought cheaply, near to £8 per ton, an outlay of £2-2,500. His source of capital is unclear, perhaps he risked obtaining a mortgage in anticipation of future demand.

some 1,000 tons. Ship losses in the late 1870s, followed by an advantageous foreign sale, finally saw Balls transfer his interests out of sail.[36]

Shallett Hewson similarly appears to have commenced as a master mariner, commanding family-owned ships in the 1830s and continuing as an active master during his initial period of ownership in the 1840s when he described himself as a merchant or shipowner.[37] His interests reached their apogee in the favourable 1850s when he held over 2,500 tons of shipping, but despite adding new-built ships as fleet replacements in the late 1860s his ownership steadily declined – just under 1,000 tons at his death in 1871. There seems to have been no family successor.

James Young, along with South Shields' second largest sailing shipowner, William Wright, started out with a rather different background and resource. Each of these men belonged to families that already had established records as agents and managers at local shipbuilding/repair docks, and who also acted as shipbuilders and shipowners in their own right.[38] Young succeeded early to the family business through the deaths of his elder brother and his wealthy father, Cuthbert. He then rapidly developed the shipowning side of the business, expanding its holdings from 1,700 tons at the beginning of the 1840s to 4,700 tons ten years later, reaching a peak of over 5,000 tons in the late 1850s. Young's locally famed 'frying pan fleet' rarely contained less than ten ships under his sole ownership at any one time, and, until the mid-1860s, he generally held fractional interests in as many ships again.[39] Unlike other large owners, however, he concentrated upon sole ownership ventures in his later years rather than upon an increased spread of investments through fractional shareholding. Without a direct heir, he finally sold out his major shipyard interests in 1878, dying eight years later at an advanced age in Harrogate.[40] The fleet's three surviving ships were then cheaply sold and, in the adverse climate that then prevailed for sail, quickly broken up.

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[36] The *William Balls*, 243 tons, sold in Riga in 1879 for some £1,190 (£4.90 per ton).

[37] Ventures often shared with another noted North Shields owner of the period, Thomas Reed.

[38] A. C. Flagg, *Notes on the History of Shipbuilding in South Shields, 1746-1946* (South Tyneside, 1979), pp. 98-99.

[39] Flagg, *Notes on Shipbuilding*, p. 98. The 'frying pan fleet', colloquially named for the disk-like wind vanes borne at the foremast truck of all Young's ships.

[40] Purdue, *Merchants and Gentry*; the author emphasises the point that success in business is often as much a matter of an individual's health and longevity as anything else.

Viewed in a wider context, it seems that size and capitalisation did not necessarily lead to the longevity of a successful sailing shipowning business. For example, despite acquiring considerable wealth, James Young's businesses did not survive him, largely because he resolutely adhered to the operation, building and refurbishment of wooden sailing vessels.[41] However, there was indirect continuity through the sale of his shipbuilding interests to another builder and owner, John Redhead, who soon commenced to build and invest in iron steamers.[42] Although Shallet Hewson's affairs were not so large as Young's, his shipowning would appear to have succumbed for similar reasons, with perhaps the added pressures of having acquired (costly) new tonnage at a time of falling freights. Surprisingly, it was the smallest and apparently least well capitalised of the three owners, William Balls, who was able to bridge the generation and technological gap for, together with a master mariner son, he carried his family interests forward into the successful ownership of intermediate steamers.[43]

Owing to the paucity of primary evidences and reliable contemporary comment, it is notoriously difficult to estimate the actual amounts of capital that such shipowners were able to tie up in their assets. Even for the well documented coastal and Baltic trading firm Henley (of London), 1783-1830, Ville was obliged to compute the fleet's value using notional first cost and depreciation figures.[44] There is somewhat firmer, and broader, guidance to the situation in 1861 though in the regional valuations prepared for the British Association's report on the industries of 'the three northern rivers' (1863-64).[45] By inference this ascribes a value of £6 per ton

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[41] An attitude exemplified by his repair and continued operation of some very old vessels for sentimental reasons: Flagg, *Notes on Shipbuilding*, pp. 98-99; and, Hodgson, *Borough of South Shields*, pp. 308-09.

[42] James Young retired to the fashionable inland town of Harrogate, one that also housed a small group of shareholders in Tyne-owned steamers.

[43] Thomas, *British Ocean Tramps, Vol.2,* p. 123; by 1884 Balls managed six such steamers.

[44] S. Ville, *English Shipowning during the industrial revolution: Michael Henley and Son, London shipowners, 1770-1830* (Manchester, 1987), pp. 22-23, 28-29. Ville's computed values for the company's elderly and declining ships during the 1820s is £3 to £6 per ton.

[45] Armstrong *et al* eds., *Industrial Resources*, pp. (3)-(5). Valuations were prepared by George Luckley, then Lloyd's agent in Newcastle and a major investor (alongside T.E. Smith and W. Southern) in high class sail.

to the shipping of the Tyne ports as a whole,[46] although indicating that there was differentiation according to locality – North Shields achieving the highest rating, £6.46 per ton (see Table 9.8). The shipping considered here appears to have been near to this £6 per ton average level, for a sample of seven Baltic-going ships for which reliable sale or insurance valuations survive gives an average value of £6.16 per ton.[47]

Table 9.8 Valuation of Tyne Ports' Shipping, c. 1863
(pounds sterling)

	Total Value (£ 000)	Pounds per register ton (£/ton)	250-ton Ship, nominal value (£)	1/64th Share, nominal value (£)
Newcastle	680	6.33	1583	24.73
North Shields	1120	6.46	1615	25.23
South Shields	530	5.85	1463	22.86

Compiled from Armstrong *et al* eds., *Industrial Resources*, pp. (3)-(5)

On the basis of such valuations it is possible to estimate the capital investment levels of sole shipowners in the early 1860s. For example, taking the three owners cited above (see Table 9.7), it would seem that their commitments in 1861 must have approximated to: WDC Balls, £3,500; Shallet Hewson, £13,500; and James Young, £30,700. Owners on this scale might also be anticipated to have had supporting capital tied up in associated assets ashore (stores, buildings etc.) although, except for Young,

[46] Luckley's published statistics are used here, but he appears to have manipulated his cumulative tonnages to achieve the precise £6 per ton; re-calculation of the various port totals suggests £6.27 per ton.

[47] Keys, *Dictionary,* entries for: *Deerfoot* (1862); *Twenty Ninth of May* (1839); *Ann & Elizabeth* (1855); *Assiduous* (1811, re-built 1830); *Eglantine* (1859); *William Reed* (1832); and, *Cumberland* (1795, re-built 1801). Their values range from £11.50 per ton (a recently built 350-ton barque) to £3.50 per ton (a 25-year old 230-ton brig). Further such occasional records reinforce the figure of £5-£6 per ton for the well-used ships largely employed in the Home and Baltic trades.

it is unlikely to have reached the level calculated for Henley – half the owner's fleet value again.[48]

To put these figures and their corresponding share valuations in some kind of context, it should be noted that even Balls' modest investment represented over 30 year's pay for a master in the coastal or Baltic trades. And, a master's achievement of a characteristic quarter (16/64th) share in a ship meant an investment equivalent to his entire cash earnings over four years: £400. Similarly, an able seaman would have needed to set aside more than a quarter of his pay for two years (totalling c. £90) in order to acquire just a single sixty-fourth share in a 250-ton ship.[49] Viewed in this light, the entry level for shipowning in sail was a relatively high one, and it would seem that few active seafarers could have accrued the equity with which to participate from their regular earnings alone.

Fractional Ownerships, 1861

Since the majority of fractional ownerships in the 1861 sample of 120 ships comprised partnerships that involved equal or principal holdings, it is convenient to examine these two kinds of partnership together. Indeed, the total number of ships (55) held by such owners slightly outnumbered those under sole ownership (52), so fractional ownership was just as significant in terms of gross investment.

Consequently, it is not surprising to find that the long term investment strategies of fractional owners mirrored those of sole owners. A ten-ship sample indicates that investment was at its highest in the 1850s (44% of the total) but ran correspondingly lower in the 1840s (20%), 1860s (30%), and 1870s (6%). The sample also provides insight into the kinds of partnerships concerned.[50] Four out of five ownerships of equality involved just two individuals each, whilst the other comprised three family members. Where ships were clearly owned by a principal partner, then three out of five were held by just two individuals, another by a short-lived grouping of three, and the last was effectively confined to a group defined by kinship. In all, 137 persons participated in their ownership of the 55 ships held on the basis of equal

[48] Ville, *English Shipowning*, p. 28.

[49] Calculated at Baltic voyage rates of approximately £3.60 per month (all found).

[50] Partnerships of equality comprise: *Celeste* (1846); *Empress* (1836); *Hoppet* (1847); *Morrises* (1861); and, *Wandering Shepherd* (1833). Those with principal partners comprise: *Agnes* (1811); *Croxdale* (1842); *Garland* (1849); *Perceval* (1811); and *William* (1839).

or principal partnerships. That is, each ship was 'owned' by an average of 2.5 people.[51] There was an obvious preference for restricted partnerships, those that placed a ship in the hands of just two – or at most three – significant individuals, and where partnerships did embrace three or more they usually exploited immediate family ties.[52] Scrutiny of the long term investment records of the investors in this ten-ship sample reveals that three factors in particular underlay these ownerships: continuity of partners; kinship; and residential proximity. Two out of three of these factors were combined in each of these ownerships and, quite commonly, they involved all three.

Of itself, continuity might simply follow from an established commercial relationship. For example, commerce and kinship were already combined in the shipbuilding business of the brothers David and John Morris. Their professional skills and facilities allowed them to acquire, and to operate, a succession of cheap, poor quality ships in the 1860s and 1870s (including the eponymous *Morrises*).[53] Similarly, amongst the manifold commercial interests of the South Shields shipowner James Young, there was his principal partnership in a series of vessels (including the *Agnes*) that were co-owned with another local resident, Emery Richardson, who was described as an 'accountant' or 'shipowner'.[54] The shipowning fraternity of North Shields exhibited many such strictly commercial partnerships as well. For instance, Thomas Day (shipowner) and James Turpie (master mariner) were equal partners in the purchase of the 411-ton, Russian-built *Hoppet*, just one of a series of ships in which the two men invested during the 1850s and 1860s. Turpie commanded at least two of these vessels (including *Hoppet*) and, in time, he became a 'shipowner' in his own right.[55]

In contrast, familial, as well as professional ties, seem to have been at the heart of the long term investments in shipping made by the Morrisons and Foremans of South Shields. In the early 1830s, master mariner George Morrison was the principal

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[51] Only six individuals held shares in more than just one of these 55 vessels.

[52] These conclusions are borne out by qualitative observations of similar ownerships.

[53] For example, the 50-year old *Adelphi* sank whilst loading coals near their shipyard. Bought and raised for just £200, the brothers got nine years use out of her before she finally foundered.

[54] He was probably a professional employee or associate.

[55] In the 1870s, Turpie also took shares in the large, cheap 'softwood' ships used for importing lead and esparto – then a profitable Tyneside practice.

shareholder and master of a 209-ton snow along with Phillis Morrison, a 'spinster' (probably his sister), and a lesser partner, John Foreman, 'shipwright/shipowner'. These three also held another 200-ton vessel in similar fashion. By 1840 George Morrison had begun to style himself a 'shipowner', and his partnership's original snow was now commanded by George Foreman (probably John's son), and George was also investing both in association with the Morrisons and in his own right.[56] Over the next twenty years, a tight South Shields grouping, comprising George and Phillis Morrison, John, George, and Mark Foreman (butcher), and Robert Stoker (master mariner/sailmaker), invested in at least half a dozen ships for the Home and European trades through various combinations of holdings. Phillis, the 'spinster', seems to have been a significant participant in all these ventures. In 1861, she was not only the principal partner in the Baltic-going *William*, but was also a major shareholder in *George and Mary* and *Caroline*,[57] as well as holding a quarter share in *Alliance*. That she was respected by her peers is indicated by the fact that in 1865, the year after she died, her surviving erstwhile partners (Mark Foreman and Robert Stoker) were moved to name their newly-built, 347-ton barque, *Phillis*.

A comparable, if even more exclusive, pattern was exhibited by yet another South Shields family, the Pearsons. The son of a Tyne pilot, master mariner Robert Pearson jnr. came into part ownership (24/64$^{\text{ths}}$) of his father's snow *Pilot* in 1845.[58] Between then and the mid-1860s the Pearsons acquired a series of seven – largely ageing – ships (including *Wandering Shepherd*) which, with rare exceptions, were financed entirely and evenly by five family shareholders: Robert snr., Robert jnr., Mary Jane, Margaret, and James. The last-named, as with Robert jnr., also appears to have been a master mariner,[59] whilst Mary and Margaret were both spinsters – and seemingly adequately provided for ones at that. But, by the mid-1860s, a combination of losses at sea and ageing family members ashore saw the Pearsons' activities decline. Finally, the wreck of *Emily* (owner, Mary Jane) in the Baltic, 1868, followed by the death of Robert jnr., 1871, ended the Pearson's shipowning interests.

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[56] From the mid-1840s until his death in 1861 he always held a ship outright.

[57] After his death in 1861, Geo. Foreman's shares in *Caroline* were added to Phillis' holdings.

[58] The *Pilot* had just been re-built, enlarging her from 247 tons to 307 tons.

[59] For example, in 1850 James was master of the family's ancient snow *Success* (built 1783), and in 1853 of their very elderly 342-ton barque *Endymion* (built 1815).

As with sole ownership, any estimates of the capital invested by such dedicated fractional shareholders must be treated with caution. However, close examination of a nine-ship sub-sample of 1861 indicates that they were financed by just fifteen significant investors who committed some £20,000 between them. [60] Of these fifteen investors, seven acquired interests valued at £800 to £1,200, whilst the holdings of just two fell below £500. Meanwhile, at the upper end of the investment range the holdings of three individuals' significantly exceeded £2,000 each, and those of two more lay at £1,500 and £1,800. Generally, it may be concluded that fractional investors were often willing and able to commit up to £1,000 of equity at any one time, whilst a minority (one-in-five) was prepared to risk more than twice that sum.

Considered in a broader investment context, it seems that a substantial number of these fifteen fractional shareholders supplied the same levels of capital as those provided by sole owners. Furthermore, the long term investment records of the more active fractional shareholders show that, on occasion, they also acquired sole ownership of a vessel or two – although rarely owning more than one at a time. Indeed, there was no certain boundary between those participants in shipping ventures who were active fractional investors and those who were sole owners. Rather, there was a core population of investors who shifted their emphasis between one and the other as their personal situations and the shipping trades allowed. On the other hand, there was also a residue of serial (and serious) investors who, whether through circumstance and/or choice, did not aspire to becoming sole owners.[61] Nevertheless, many of these last built up substantial portfolios of fractional holdings, and Phillis Morrison was amongst them.

Kinship, Occupation and Location

Despite the fact that little more than immediate, i.e., same surname, relationships can be determined from the Customs register entries alone,[62] even a cursory inspection of ownership records reveals how significant kinship ties were in the formation of sailing ship partnerships. Amongst the equal and principal ownership categories, 34 percent (19:55) show overt family relationships, and, when the two other categories of

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[60] *Agnes*, owned by James Young and Emery Richardson, is excluded from this sub-sample; Young's interests were so diverse that her inclusion results in undue bias.

[61] Sole ownership was occasionally thrust upon them, usually after a close relative's death.

[62] Ville, 'Patterns of Shipping Investment', 215.

fractional investment are taken into account, the proportion rises to fully 40 percent (27:68). This parallels Ville's kinship findings for the Port of Newcastle's shipping in 1850, suggesting that there had been little – if any – change in attitudes towards 'family' partnerships over the intervening decade; it was evidently a stable long term trait.[63] Furthermore, even when sole ownership is added into the reckoning, kinship still features in nearly 25 percent of all the Tyne's ownerships.[64] And, these same kinship levels were to be found throughout all its districts, although marginally more so in South Shields than elsewhere.[65]

It is also clear that the majority of investors in the Tyne's Baltic-going shipping of 1861 were drawn from the region's maritime commercial environment and, in varying degrees, that this resembled the situation in other east coast, and regional Scottish, ports (albeit subtly modified in those with agrarian hinterlands).[66] Those Tyneside investors who regularly described themselves as 'shipowners' – a loose, if increasingly common, appellation – held almost exactly half of the Tyne-owned tonnage engaged to the Baltic in 1861.[67] But in broader occupational terms 70 percent of the tonnage was in the hands of individuals describing themselves as shipowners, master mariners, or, in various other manners, as maritime traders or tradesmen (from sailmakers and wharfingers to pilots).

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[63] Ville, 'Patterns of Shipping Investment', 216, Table 4. This gives 43% for 1850 (and 45% for 1786-88) as against 40% in the sample for 1861considered here.

[64] If the kinship connections of the six – mostly large – sole owners who held part interests in other Baltic-going vessels are also added in, then it reaches 28%.

[65] A bias probably caused by the two very large family ownerships in South Shields: Young, and Wright.

[66] Ville, 'Patterns of Shipping Investment', 212-14; Palmer, 'Investors in Shipping', 53-54; S. Jones, 'Shipowning in Boston, Lincolnshire, 1836-88', *The Mariner's Mirror*, Vol. 65, No. 4 (1979), 341-346; M. Stammers, 'The Handmaiden and Victim of Agriculture, the Port of Wells-Next-The-Sea, Norfolk, in the Eighteenth and Nineteenth Centuries', *The Mariner's Mirror*, Vol.86, No.1 (2000), 62-63; Starkey, 'Ownership Structures', 78-80; C. Hill, 'Resources and Infrastructures in the Maritime Economy of Southwest Scotland, 1750-1850', in G. Boyce and R. Gorski, eds., *Resources and Infrastructures in the Maritime Economy, 1500-2000* (St. John's, Newfoundland, 2002), pp. 96-100.

[67] Individuals who recorded themselves as 'shipowners' were (understandably) most common amongst sole owners, about two-thirds adopted that title. However, irrespective of their degree of real participation, one-third of all fractional investors did so as well. Many of the individuals recorded as 'shipowners' had additional occupations or incomes.

The tonnage that remained outside these defined maritime groups was evenly divided between individuals who were in non-maritime trades or occupations (16%), and those of professional status or independent means (14%).[68] (see Table 9.9)

Table 9.9 Shareholding by Occupational Categories, 1861
(tons; percentage)

	Share/tons (tons)	Percentage share/tons, (%)
Shipowners	15386	51
Master Mariners	2542	8
Traders & Trades: Maritime	3315	11
Traders: Retail	3564	12
Traders & Trades: Various	1324	4
Professionals	883	3
Non-occupied persons	3286	11
Total	30299	

Compiled from Keys, *Dictionary*

However, one cannot be prescriptive in assigning occupational divisions. For example, investors who were butchers – largely a retail occupation today – held almost ten percent of the tonnage under sole ownership in 1861. But, since many butchers in the port of Shields were then dedicated to meeting the victualling demands for beef, butchering might well be categorised as a trade within the maritime community.[69] Combining the bulk supply of meat with shipowning was a natural business synergy. Conversely, amongst the occupations apparently unrelated to shipowning, Ville's comment that it 'is difficult to imagine the [shipowning] business overlap with an … watchmaker',[70] is amply contradicted by the active shipowning

[68] Independent means encompasses widows and spinsters here.

[69] Geordie seamen were renowned for their ability to consume large quantities of beef.

[70] Ville, 'Patterns of Shipping Investment', 212.

career of at least one prosperous clock- and watch-maker, John Herron of Blyth.[71] Indeed, it appears that successful individuals who came from unrelated trades such as Herron's, might deliberately seek to buy themselves a stake in a maritime milieu that was otherwise closed to them. In this way they promoted their personal standing in local society by becoming a 'shipowner' – one of the port community's elite – whilst also helping to spread their business risks. Elsewhere, where it appears difficult to link an individual's unrelated occupation to investments in shipping, family ties and antecedents often hold the key. For example, two local 'chemists', R. Day jnr. and J.C. Robinson, held substantial shares in vessels acquired by the North Shields shipowner Thomas Day, an arrangement explained by the fact that Thomas Day was himself a 'druggist' (or 'merchant') in his younger days.

Overall, the evidences suggest that at least one-third of the Tyne-registered, Baltic-bound sailing tonnage of 1861 had been capitalised by individuals for whom kinship had played a significant role in determining their investments and/or their investing partners. There is also good reason to suppose that – if it could be traced via the extended family – the true proportion affected by kinship was significantly higher still, reaching perhaps 50 percent or more. Occupationally, the reservoir of investors was yet more concentrated again, for at least 70 percent of tonnage had been capitalised by individuals who considered themselves as engaged in recognised maritime trades or occupations. In addition, there is a strong impression that several of those directly involved in maritime occupations spawned extended links (via kinship or business contacts) that may have provided up to ten percent more holdings through quasi-maritime sources, that is, through individuals who were intermittently engaged in maritime services.[72]

Partnerships that were so constrained by the limitations of kinship and occupation must necessarily have resulted in rather small-scale business networks. As a consequence, it comes as no surprise to find that the geographic spread of investors was circumscribed. An overwhelming 90 percent of all tonnage was taken up by persons who resided in one of the three Tyneside port towns: in South Shields, North Shields, or Newcastle.[73] And more than half of the remaining ten percent lay with

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[71] Balmer, ' Life of John Herron'; Osler, 'Time Runs Out', 19.

[72] Some tradesmen, e.g. plumbers, coopers, and victuallers, fell into this category.

[73] Few even resided in adjacent urban areas such as Gateshead or Tynemouth.

investors who lived in the Tyne's nearby coal port towns (especially Blyth), or in its largest trading partner, London. Curiously, participants from the hinterland counties of Northumberland and Durham – and their coalfields – were extremely rare. In numerical terms, South Shields was by far the most concentrated base for Tyneside shipping investors, supplying over twice as many as did Newcastle, whilst North Shields' strength showed up once more in the proportionately large amount of tonnage held by each investor – a result of the high level of sole ownership enjoyed there (see Table 9.10).

Table 9.10 Geographical Origins and Holdings of Investors, 1861

	Investors		Share-tonnage owned		Tons per Investor
	(Number)	(%)	(tons)	(%)	(av. tons)
South Shields	93	46	15342	51	165
North Shields	35	17	6702	22	191
Newcastle (& Gatesh'd.)	46	23	5386	18	117
Other Coal Ports	9	4	911	3	101
London	7	3	744	2	106
All Other Areas	12	6	1215	4	101
Totals	202		30300		

Compiled from Keys, *Dictionary*

Barely one-in-ten investors originated from outside the immediate North East region, and those that did so had invested only at the lowest levels, only 100 tons per investor as against 160-190 tons in the port of Shields. This demonstrates the continuing fact that in the era of sail, shipping was still a 'very private enterprise',[74] and that 'localism was an important aspect of the "private" nature of shipping ...

[74] E. Green, 'Very private enterprise: Ownership and finance in British shipping, 1825-1940', in T. Yui and K. Nakagawa, eds., *Business history of shipping: Strategy and structure* (Tokyo, 1985), pp. 219-48.

firms that wanted to limit ownership to a close family or occupational group would almost inevitably be raising their capital within a close geographical range.'[75]

Consequent upon this localism, a minimal supply of extraneous capital was absorbed by the region's shipping industry. What little outside capital there was seems largely to have been provided by individuals on the 'London river' who had interests in the Newcastle-to-London trade, or from a small number of east-Yorkshiremen who seem to have had existing ties on the Tyne.[76] Similarly, in Cumbria at least one sizeable fractional investment seems to have been brought in through family connections.[77]

Steamships: Ownership Patterns c.1880

In the three decades after 1860, Tyneside's shipping tonnage shifted from over 95 percent in sail to over 90 percent in steam, with the 1880s marking the first full decade in which steam ownership outstripped that of sail.[78] However, the rate of transfer from the one to the other was at its greatest during the 1870s, when steam tonnage increased six-fold, from a little below ten percent to just over 60 percent.[79] (see Table 9.11; Chart 9.1)

Not only did this shift from sail towards steam have major implications for productivity, but on the need for capital as well. For, although the conversion to steam increased carrying capacity (per ton) by a factor of three or even four,[80] this gain had to be set against the fact that steam tonnage was much more costly to acquire than

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[75] Milne, *North East England*, Chapter 6.

[76] Several prominent South Shields' families descended from (eighteenth century) in-migrants from Whitby.

[77] Edward Godsall of Carlisle's half-share (via his brother-in-law) in *Honor* of South Shields.

[78] This local changeover occurred in the late 1870s, earlier than the national average: 1883.

[79] Again, the local rate of transfer exceeded that of the national average, for this increased less than three-fold: from the slightly higher base of 17% in 1869 to just 41% in 1879 (source, Mitchell and Deane, *Abstract of British Historical Statistics*, p. 218).

[80] *The North of England Steam Shipowners' Association Eighth Annual Report* (Newcastle, 1879), p. 3; *The North of England Steam Shipowners' Association Twelfth Annual Report* (Newcastle, 1883), pp. 37-40. The 1879 *Report* gives the commonly quoted factor of three. But the 1883 *Report* indicates that a one-to-four ratio might also be applied, and that this degree of advantage was 'most marked in short voyages' (i.e. the Home and Baltic trades).

sail.[81] Nevertheless, by the beginning of 1880 just over 300 steamships (of over 50 tons) were registered on the Tyne, 67 percent in Newcastle itself and 27 percent at North Shields,[82] with the river's aggregate steam tonnage exceeding 250,000 tons.

Table 9.11 Growth in Tyne-owned Steam Tonnage: Decennial, 1859 -1879 (000 tons)

	1859		1869		1879		1889	
	Sail	Steam	Sail	Steam	Sail	Steam	Sail	Steam
Newcastle	116	8	103	29	50	137	15	250
North Shields	207	1	149	6	60	73	8	91
South Shields	64	0	83	0	37	17	6	24
Total (000 tons)	387	9	335	35	147	227	29	365
Percentage (%)	98	2	91	9	39	61	7	93

Compiled from Hodgson, *Borough of South Shields*, p. 317 [83]

Although these number and tonnage figures (Table 9.11) imply an average vessel size of 750 tons overall, there was local divergence. North Shields-owned steamers averaged almost 900 tons, whilst Newcastle-registered vessels were smaller, at some 675 tons. This differential resulted from the fact that there were a large number of coastal colliers amongst the many Newcastle ownerships, whilst the marked growth of oceangoing tramp interests amongst the (admittedly smaller) cluster

[81] The cost comparison contains several variables and so is difficult to quantify. For example, in 1871 Joseph Robinson of North Shields paid £15,940 for a new 739-ton steamer, *Nymphaea*, i.e. £21.57p per ton. A Sunderland-built iron barque of similar size and class cost around £15 per ton, say £11,085. The real comparison though lay in the steamer's cost against his existing, 300- to 330-ton, sailing ships which were insured (at best) for £3,000 each, i.e. £9-50p per ton.

[82] South Shields did not acquire register status till 1859, and waited until 1865 to become an independent customs port.

[83] Hodgson's decennial Tyneside statistics (1849-1899) were in turn abstracted from 'the Board of Trade...official returns' (presumably, indicating the various *Annual Statements*); these statistics include vessels of 50 tons and above only. Milne, *North East England*, Chapter 6, Table 6.1; this provides closely comparable decennial figures, quoting the opening years of each decade as taken from, *Annual Statements*.

of steamship owners in North Shields was vested in relatively larger vessels.[84] (see Table 9.12)

Table 9.12 Distribution of Tyne-owned Steam Tonnage: by District, 1869 and 1879 (number; tons)

	1869		1879	
	Steamships (No.)	Tonnage (tons)	Steamships (No.)	Tonnage (tons)
Newcastle	65	28844	203	136864
North Shields	13	5949	82	73480
South Shields	2	142	19	16657
Totals	80	34935	304	227001

Compiled from Hodgson, *Borough of South Shields*, p. 317 [85]

Steamships: The Nature of Ownership

Considered against the Tyne's total holdings of 304 steamers in 1879, the 41 steamers despatched to the Baltic during the 1880 season can be regarded as a significant fraction of the whole. Fortunately, the ownership details of 36 of these Baltic-going steamers can also be readily ascertained from contemporary printed sources,[86] and this is a sufficient number to provide a representative sample of the Tyne's bulk carrying steamship holdings of the time.[87]

[84] For example, the Robinson family's Stag Line; see, Robinson, *Stag Line*.

[85] Statistics include vessels of 50 tons and above only.

[86] By use of the north of England's then most popular annual list: *Turnbull's Shipping Register*, North Shields. Use of *Turnbull's* shortcuts the time intensive business of locating and transcribing the original Customs Register entries for individual steamers. Regrettably, the only issues so far located are for: 1865 (partial), 1871 (partial), 1875, 1876, 1885, 1891, 1895 and 1897. Since the issue for 1880 does not survive, the bridging issues of 1875 and 1885 are generally used here.

[87] The incomplete nature of the *Turnbull's* series means that only those steamers extant in either the year 1875 or 1885, or both, can be used here, i.e., the subsequent analyses are generally constrained to 36 out of a potential 41 vessels. However, these 36 Baltic-going ships of 1880 still represent 12% of Tyne-registered steamers by number, and around 11% (25,000 tons) of its total steam tonnage.

The three dozen steamers in this sample were overwhelming owned – as in sailing ship practice – by means of the long established system of sixty-fourths. Only one vessel was owned through the medium of a limited company.[88] Amongst these so-called 'sixty-fourthers' there was a striking level of multiple ownership with, on average, seventeen to twenty-one shareholders per ship, a far higher level of individual shareholding than in sailing vessels of the preceding era. Moreover, some fairly distinct patterns of steamship shareholding emerge. Over half of all the steamers were owned by groups of 20 or more individual investors, whilst those that were owned by less than ten made up almost another third. Although sole ownership of a steamer, or ownership by two equal partners, was not uncommon, these restricted forms of holdings provided for less than a fifth of all ships. More infrequent still were ownerships composed of ten to 20 investors (see Table 9.13).

Table 9.13 Size of Shareholdings in Baltic-going Tyne steamers: 1875 and/or 1885 (number; percentage)

	1875		1885	
	Steamships (No.)	Steamships (%)	Steamships (No.)	Steamships (%)
Sole owner	1	6	3	14
Two partners	1	6	2	9
3-5 shareholders	2	13	1	4
6-9 shareholders	1	6	1	4
10-19 shareholders	1	6	3	14
20-29 shareholders	9	56	7	32
>29 shareholders	1	6	5	23
Totals	16		22	

Compiled from *Turnbull's*, 1875 and 1885

[88] *Busy Bee*, an old 600-tonner formerly owned by W.D. Stephens. He astutely sold her to a limited company (Tyne, Tees S.S. Co. Ltd.) of which he was a director.

Altogether, it would seem that the bulk of steamship investment was provided by two sorts of subscribers. Firstly, there were those from amongst a numerically large investor base who purchased single shares or (at best) small parcels of shares. Secondly, there were a few individuals who were prepared to – and could afford to – invest in sufficient sixty-fourth shares to enable them to purchase a quarter (16/64$^{\text{ths}}$) or more holding in an entire ship(s). This seems to have resulted in two kinds of ownership structure.

In the majority of cases a steamer was regarded as a collective investment vehicle that was subscribed to by a large number of small-scale passive investors. Its day-to-day operations were controlled by (one or more) paid professional managers who, for the most part, invested only a nominal amount in that particular ship themselves. But in a minority of cases a very few investors put up the entire capital for a ship in the belief that they possessed – collectively or individually – all the skill sets and contacts that were necessary to actively, and profitably, direct its operations. Day-to-day oversight might be achieved directly by one of these investors, or, through a nominated and trusted professional ships' manager.

A conspicuous feature of Tyneside steamer owning was the multiplicity – rather than the concentration – of ownerships, and this is reflected in the Baltic-going sample under consideration here.[89] Of the sixteen steamers afloat in 1875, twelve definitely lay in the hands of separate ownerships. Only a couple can be considered to have shared the same owners, although a further two shared principals in common with them as well.[90] Similarly, of the 22 steamers extant in 1885, no less than eighteen were recognised as being under separate owners, with the four remaining vessels being held by just two more.[91]

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[89] That is, there were no especially dominant 'fleets' as there were, for example, in Hull.

[90] In 1875, *Black Swan* was owned in joint, equal, shares by the partnership of T.E. Smith, G. Luckley (both of Newcastle), and J. Southern (London). *Iduna* had the same principals together with J.M. Johansson (Newcastle) and W. Hunter (London), and these five partners held 22/64$^{\text{ths}}$ in all, with a further 8/64$^{\text{ths}}$ in the hands of the nominated managers: Elliot, Lowery and Dunford (Newcastle). The remaining sixty-fourths were held in ones or twos by various Newcastle-based investors. G. Luckley was also one of three principal partners in the *Lindisfarne*, whilst T.E. Smith held the early compound-engined steamer *Blue Cross* outright.

[91] T.E. Smith now held the *Black Swan* as well as the *Blue Cross* outright, whilst Stephens, Mawson Co. were cited as owner-managers of the *Regulus* and the *Rowland.*

In effect, eight out of every ten of the Tyneside steamers employed on a Baltic voyage in 1880 was likely to have had a different owner. This situation was the characteristic result of an era in which the Tyne had spawned a multiplicity of small tramp shipping ventures – over 30 had been established between 1866 and 1880 alone. And, as failure rates during this initial period appear low, most of these early tramp owners had survived until the sample year considered here, 1880 (see Table 9.14). Beyond these recognised tramp steamer operators, whose shipping was oriented towards the medium or distant water trades, lay a sizeable group whose steamers were chiefly designed for the Home and short sea trades in coal. These, the established Tyneside collier owners *per se*, amounted to another twelve or fifteen, although there was no absolute dividing line between the collier and tramp sectors at that time.[92] Consequently, it would seem that over forty Tyne-based owners were positioned to deploy some (or all) of their bulk-carrying steamers onto the Baltic route in 1880, and around half of them did so.

Table 9.14 Growth of Tyne-based Tramp Companies: Quinquennial intervals, 1866-1890

(number)

	1866-70	1871-75	1876-80	1881-85	1886-90
Number Founded	6	10	17	17	5
Cumulative Number	6	16	33	50	55
Surviving	4	17	32	44	48

Compiled from: Thomas, *British Ocean Tramps, Vol.2*; N. Middlemiss, *Travels of the Tramps* (Newcastle, 1989-1993); and, *Turnbull's*, 1871, 1875, 1885.

The most prominent ownership amongst the Baltic-going sample of 1880 was that which operated under the title of T.E. Smith, G. Luckley, and J. Southern. These

92 Thomas, *British Ocean Tramps, Vol.2,* p. 10; McRae and Waine, *Steam Collier*, pp. 25-30, 124-44. Thomas cites 35 Newcastle-based tramp operators owning 233 ships in 1880, but it is impossible to be that exact owing to uncertainties of ship design, function and investor/owner location.

partners had originally operated oceangoing sailing ships,[93] but had subsequently advanced the Tyne's ownership of coastal steam colliers in the early 1860s. Later still, they led the way in the development of the Tyne's medium tramping trades – especially on the Mediterranean and Indian Ocean routes.[94] T.E. Smith M.P., president of the North Shields and Tynemouth Chamber of Commerce, was heir to his family's long established shipbuilding and shipowning company, T.W. Smith Co. Up until the mid-century this company was renowned for its construction and operation of high class merchant sailing ships, but after this time its shipbuilding activities extended to the production of merchant steamers.[95]

Of Smith's regular partners, George Luckley was a prominent (Newcastle) 'quaysider' with widespread shipping interests, whilst James Southern was a London shipbroker. Southern's presence reflected the fact that Smith's sailing ship operations had entailed the maintenance of coal hulks and warehouses (for foreign merchandise) on the Thames. Not only was a leading figure like Smith an owner in his own right but, with his dual role as shipowner and shipbuilder, his influence extended to the retention of minor holdings in steamers that his yards contracted to build for other, chiefly local, owners.

Prospective purchasers at Smith's shipyard were thus provided with a form of discount and, perhaps more importantly, there was tacit acknowledgment of Smith's recognition of that individual's soundness and reputation – a valuable asset in promoting the new ship to subscribers.[96] Correspondingly, Smith's involvement drew in his other regular partners, for Luckley and Southern also took up shares in Smith-built vessels promoted by local owners such as William Johnson, George Reid, and Edward Eccles (see Table 9.15).

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[93] In the1860s and early 1870s the partners variously owned the famous Smith-built *Hotspur* and *Bucephalus* together with several other large East Indiamen. Southern died in 1876, and the two remaining partners absorbed his interests.

[94] The *Blue Cross*, built and owned by T.W. Smith, was one of the first steamers to pass through the Suez Canal. Shortly afterwards, Smith and partners sold out of sail.

[95] Clarke, *Building Ships, Pt.1*, pp. 78, 115-18; B. Lubbock, *The Blackwall Frigates* (Glasgow, 1924), pp. 88-90.

[96] Boyce, *Information, Mediation,* p. 3; this emphasises the importance of 'reputation' amongst those involved in business networks.

Table 9.15 T.E. Smith's Holdings in Steamers built by T.W. Smith & Co.: 1875 and 1885

(number of sixty-fourth shares)

	Built	Named Ownership	T.E. Smith, 64ths	
			1875	1885
Blue Cross	1869	T.W. Smith Co.	22	64
Black Swan	1864	T.E. Smith, G. Luckley, and J. Southern	44	64
Dunstanborough	1871	W. Johnson	2	4
Faraday	1873	G. Reid	3	8
Iduna	1868	Smith, Luckley, Southern, and others	4	-
King Coal	1871	E. Eccles	3	-
Lindisfarne	1870	W. Johnson, G. Luckley, and R.C. Carr	1	32

Compiled from: *Turnbull's*, 1875, 1885; and, *Lloyd's*, 1880.

Although builder-to-owner links were as commonplace on the Tyne as elsewhere,[97] the steamers in the Baltic-going sample of 1880 reveals little of them – Charles Mitchell's 4/64ths stake in his Low Walker Yard-built *Tynemouth Castle* of 1870 is an exception.[98] Interestingly, her owner, George Cleugh (North Shields) was one of those rare individuals who sought to reverse the accepted builder-to-owner relationship. He became a founding partner – alongside three fellow shipowners – in the successful Tyne Iron Shipbuilding Company (1876).[99]

Beyond a few large investors such as T.E. Smith and his partners, there is little evidence in the sample of cross-linkage amongst the major Tyne-based principals concerned, nor amongst any of the smaller investors involved. The general impression is that of individual steamers organised as quite separate investment vehicles. As a

[97] Milne, *North East England*, Chapters 6, 7; R. Craig, 'William Gray and Company', in *British Tramp Shipping, 1750-1914* (St. John's, Newfoundland, 2003), pp. 356-57, pp. 364-66; Boyce, *Information, Mediation*, pp. 45-48.

[98] These shares were acquired (post-1875) from his chief designer, and brother-in-law, Henry F. Swan. *Tynemouth Castle* was Cleugh's first steamer, so Swan's subscription may have acted as an inducement to build at Low Walker. Mitchell and Swan regularly took stakes in ships they built.

[99] Clarke, *Building Ships, Pt.1*, p. 131.

consequence, despite the rather large number of modest ownerships involved, there are few indications of cross-holdings, and even then they appear to represent little more than minor reciprocities.[100]

Commerce, however, was to the fore in the case of the London-based Lambert brothers. As active members of London's Coal Factors Society and its Coal Exchange they also possessed significant colliery assets on Tyneside.[101] In addition, their interests were served by investments in Tyne-registered shipping, a fact that is amply demonstrated by their increased holdings in this Baltic-going sample's steamers alone.[102] (see Table 9.16).

Table 9.16 The Lambert Family's Holdings in Newcastle-registered Steamers, 1885 (number of sixty-fourth shares)

	64ths held by Individual Family Members[103]													Tot.
[104]	AF	E/M	FD	HC	J	KJ	MD	MH	MW	NG	RJ	RT	TD	
De.			8						8	10	2	2	2	32
Pr.									17					17
Ty.			1									1		2
Ve.	5	3		5	6	5	5	5	14					48
Tot.	5	3	9	5	6	5	5	5	39	10	2	3	2	99

Compiled from *Turnbull's*, 1885

[100] Outside North Shields even such minor linkage is rare, and even those may indicate the presence of social, rather than purely commercial, liaisons.

[101] Lambert and Byass were the principals of the Burradon and Coxlodge Coal Co. for whom Mark Lambert (Newcastle) was nominated owner and fitter; the collieries lay north of Newcastle. The Byass family also invested in the shipping side, for example holding 17/64ths of *Denham*.

[102] Runciman, *Collier Brigs*, pp. 256-57; the Lamberts already had long-standing interests in north east sailing colliers and an ex-Blyth master became their marine superintendent in steam.

[103] MW., E., N.G. and M.H. Lambert resided on Tyneside, the rest in London /Home Counties.

[104] *De.*, *Denham*, Burradon and Coxlodge Coal Co. (560 tons, 1878); *Pr.*, *Prudhoe Castle*, J. Walton (553 tons, 1866); *Ty.*, *Tynemouth Castle*, G. Cleugh (873 tons, 1870); *Ve.*, *Vernon*, H. Wrightson (668 tons, 1878).

Between 1875 and 1885 the Lamberts' holdings expanded from 24 (sixty-fourth) shares in two of these steamers to 99 in four of them; correspondingly, participation spread from just three family members to at least a dozen. *Denham* (1878), newly-built for their colliery company, partly accounted for this increase, but the direction of their investments into another two (Newcastle-registered) steamers, formally owned by J. Walton and H. Wrightson, was also significant. In reality, Walton, a minor 'Commission Agent' of Newcastle Quayside, held at best 10/64$^{\text{ths}}$ in *Prudhoe Castle*, whilst Wrightson, the fitter for their Widdrington pit, apparently held none in the recently-built *Vernon* (1878).[105] All three steamers were effectively part of the collier fleet that the Lamberts had determined to set up in 1879. Indeed, *Vernon* remained in that fleet until their coastal shipping business was disposed of to Cory's in the 1890s.[106]

With the notable exception of the Robinsons of North Shields,[107] there is scant indication in this Baltic-going sample of extensive family involvement in steamer ownership on Tyneside itself, or in the surrounding districts.[108] Indeed, the most significant family investments seem to have come from outside the region. For example, the Clarke family of Hull held a dozen or so shares in steamers operated both by Wilkie, Turnbull Co. (North Shields) and by Stephens, Mawson Co. (Newcastle). The Mawsons are of especial note, for family members resident in Harrogate and Leeds provided the bulk of the family's investments in the two Stephens, Mawson Co. ships sampled here: *Regulus* and *Rowland.*[109] More generally however, family clusters of this kind – or significant investments from outside the region – were the exception rather than the norm.

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[105] Steam coal from the Lamberts' Widdrington pit was marketed as 'Vernon's West Hartley'.

[106] McRae and Waine, *Steam Collier*, p. 57. The eventual Lambert-to-Cory sale is presaged in this Baltic-going sample by R. Cory's 10/64$^{\text{ths}}$ holding in *Prudhoe Castle*.

[107] Robinson, *Stag Line*, pp. 5-6; A. McBurnie, *Fleet Ownership in the British Shipping Industry: A Case Study of Joseph Robinson & Sons of North Shields, 1885-1914* (Unpublished MA dissertation, University of Newcastle, 2002).

[108] However, *Dunstanborough* and *Lindisfarne* (W. Johnson, North Shields) were well subscribed by the landowning Barass's of south Northumberland. Matthew Barras (farmer) was also joint mortgagee of the pioneering petroleum carrier *Atlantic* (1863), and Barrass Bros. were recognised Newcastle shipbrokers.

[109] The capitalisation of these two steamers had an investor base of unusual geographic spread.

Steamship Investors: The Small Capitalists

Although very small scale subscribers made up a high proportion of investor numbers, this fact alone may give a mistaken impression as to their financial importance. Though by far the largest group numerically, comprising at least two-thirds of all those investing, they financed barely a quarter of all shares purchased. Conversely, although the upper tiers of investors comprised little more than one-tenth of investor numbers, their commitment levels were such – at more than six shares each – that they provided over half the capital invested, and the bulk of this came from the very top investor tier alone (approximately one out of every sixteen subscribers).[110] It seems that this select top tier contained the critical mass of providers for steamship capital. (see Table 9.17; Chart 9.2).

Table 9.17 Investment provided by the Various Levels of Shareholder: 1875 and 1885 (percentage)

	1875		1885	
Sixty-fourth Shareholdings	Shareholders (%)	64th shares (%)	Shareholders (%)	64th shares (%)
1 or less (½)	28	6	45	11
2	38	18	29	15
3 to 5	23	21	14	14
6 to10	5	9	5	10
more than 10	7	46	6	49

Compiled from *Turnbull's*, 1875, 1885.

Considered another way, the investment capital employed in a characteristic Baltic-going steamer was as follows: 50-60 percent from two or three leading investors, 15-20 percent from three modest investors, and around 25 percent from ten to twenty small investors. This theoretical (or average) model of capital disposition is

[110] The quoted samples analysed in Table 9.17 comprise: 1875, 242 investors in sixteen steamers; and, 1885, 496 investors in 22 steamers.

observed in around one-third of the steamers reviewed.[111] And these, in turn, were matched (or slightly exceeded) by those showing a more balanced provision of capital. Here, the volumes of large and small investors were broadly equal,[112] with the large investors who subscribed 50-60 percent of capital corresponding to the theoretical model, and small investors providing around 25-30 percent. Intermediate level investors were relatively few in number.

Given that approximately two-thirds of all the steamers in the Baltic-going sample were capitalised in one or other of the 'model' or 'balanced' ways, what of the remaining third? Most seem to have been financed by recognised partnerships consisting of a few individuals – generally two to four in number. Even though the vessels financed in this manner were relatively small in number – less than a quarter of the total – the partnership structures varied a good deal.[113] Sole ownership was even less common again. Indeed, barely one in ten steamers were under sole ownership, and those in the hands of public limited companies lay at much the same level.

Assessment of the long term allegiance of owners and individual shareholders to particular ships (or companies) is beyond the aims of this study but it is, nevertheless, possible to make some general observations – albeit based upon a limited sample of twelve steamers, 1875-1885.[114] The sample's three vessels which commenced under recognised partnerships evidence complex later histories,[115] whilst by comparison vessels financed upon the model, or balanced, patterns show far more stability of ownership. In these latter, 63 percent of individual shareholders retained their original complement of shares over the ten year period 1875-1885, whilst a further eleven percent even increased their holdings. This suggests that three-quarters of the earlier (i.e. 1875) shareholders in these ships were satisfied with their

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[111] That is, a sample of 26 individual Baltic-going steamers of 1880. This comprises sixteen listed in *Turnbull's*, 1875, and another ten from 1885 (eleven vessels listed in 1875 also remained in service in 1885, together with one direct replacement: *Kepler* II).

[112] Generally, some eight to fifteen of each.

[113] Ranging from partnerships of equality to those with a single, clear majority shareholder.

[114] That is, the twelve Baltic-going steamers that survived from 1875, through 1880, till 1885.

[115] Based on the ownership histories of: *Busy Bee* (sole ownership to limited company); *Blue Cross* (co-partnership to sole owner); and *Lindisfarne* (sale, by three nominal partners and numerous small shareholders, to Newcastle coalowner, J.O. Scott).

investments over the long term, leaving only a quarter of the original subscribers to be replaced by new ones.[116]

In summary, it would seem that common sixty-fourths steamers – financed along the lines of the model, or balanced, shareholding patterns – often suffered no more than minor internal changes to their ownership structures within ten years. Accordingly, they provided subscribers with a relatively stable and satisfactory investment environment in which to seek returns from shipping. By contrast, ventures whose promotion relied upon individuals, partnerships, or limited companies, often proved more volatile and susceptible to change – beneficial or otherwise. But in such cases adverse exposure was usually more confined since these ventures involved small numbers of better informed (wealthier) individuals, and fewer ships.

Although amongst this last, rather select, group of major investors there were extra-regional investors – including James Southern and the Lamberts – most of these ships' shares lay with Tyneside residents. The fact that the steamers concerned were registered and formally owned on the Tyne carried the clear, if superficial, corollary that (for the most part) they had been financed from within Tyneside. Of the vessels extant in 1875, then 86 percent of aggregate tonnage lay in the hands of Tyneside shareholders and, furthermore, half the remainder came from individuals resident in the immediate North East region.[117] By comparison, investors from outside this region were responsible for less than seven percent in all, the bulk of which (5.1%) came from investors in greater London. (see Table 9.18) Thus the procurement of capital was still a very local affair in 1875 although, as highlighted above, investors from outside the region might still have an important role to play in the financing of particular ships or companies.[118] However, this balance between local and outside investors was not a static one, there was a definite trend towards recruitment of a higher proportion of the latter (see Table 9.19). For example, Milne calculates that by 1895 no less than 39 percent of Newcastle's comparable (sixty-fourth owned) steamer tonnage lay in the hands of outside investors – over five times as much as in 1875.[119]

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[116] In exceptional cases, as with the well-managed Stag Line's *Stephanotis*, the need to find new subscribers fell below 10%.

[117] Here encompassing the Northumberland coalfield together with the rest of the coal ports (including Sunderland) on the coasts of Northumberland and Durham.

[118] As was the case with the Lambert family, see Table 9.16.

[119] Milne, *North East England*, Chapter 6, Table 6.3.

Table 9.18 Geographical Spread of Shareholdings in Twelve Steamers: 1875 (register tons; percentage register tons; number; percentage)

	Share/tons (tons)	Share/tons (%)	Shares (64^{ths})	Shares (%)
Tyneside: North Shields	4056	47	317	41
Tyneside: Newcastle	3251	38	345	45
Tyneside: South Shields	79	1	6	1
Northumberland & Durham	556	7	48	6
London	434	5	41	5
Other Localities	158	2	13	2
Totals	8532		770	

Compiled from *Turnbull's*, 1875

This analysis (Table 9.18) also demonstrates the intra-regional trends in patterns of investment. For example, it is noticeable that South Shields' former shipowning constituency had collapsed. This borough, whose shareholders had held some 30 percent of Tyneside's Baltic-bound tonnage under sail in 1861 (see Table 9.2), was reduced to holding only one percent of steam in 1875. Across river though, North Shields' shipping investors had been far more successful in maintaining actual and relative position – North Shields still ranked ahead of Newcastle in tonnage owned (see Table 9.18).[120] Such direct comparisons must, however, be treated with a note of caution. As pointed out by Milne,[121] share/tonnage comparisons alone do not necessarily equate with capital value, for value-influencing elements such as the age, condition, and build quality of the steamers concerned can no longer be (realistically) factored in. And these factors, together with intangibles including the reputation of a

[120] This despite the fact that Newcastle's investors actually held a higher number of shares overall, once again indicating that North Shields' owners were operating steamers of larger average size.

[121] Milne, *North East England*, Chapter 6.

ship's manager, or the 'state of trade', had real influence on the value of a block of steamer shares.[122]

Comparison of the geographic composition of steamers' shareholdings in 1875 and 1885 also provides opportunity to determine whether there was a contraction in, or a diffusion of, investor participation. The trends appear surprisingly clear cut. There was a distinct diminution (-20%) in the tonnage held by subscribers at Tyneside's early stronghold of steam, North Shields. And this tonnage was now redistributed elsewhere in Britain through a shift containing balanced intra- and extra-regional components: Newcastle and the Great Northern coalfield (12%), and other non-metropolitan localities (10%) (see Table 9.19).[123]

The intra-regional shift probably resulted from the transfer of specific managerial and administrative functions to the growing commercial centre of Newcastle Quayside – with resultant investor clustering – together with the greater integration of colliery interests into those steamship businesses that served the coalfield.[124] The extra-regional shift is more difficult to explain, but even superficial observation reveals many instances there of direct family, commercial (especially coal trade), and shipowning links between the extra-regional participants and Tyneside. It should also be borne in mind that although some Tyneside industrial entrepreneurs had already departed with their accrued capital to 'the south', they still made backward investments into the region, including investments in shipping. So, although these kinds of shareholdings might appear to be extra-regional investments, some represented re-circulated capital of Tyneside origin.[125]

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[122] The variations in level of publicly advertised offer (and auction) prices for sixty-fourth shares testifies to the fact that a vessel's tonnage was only one of the factors that dictated its gross market value.

[123] The apparent decline in the 'London' share between 1875 and 1885 (see Table 9.19) may result in part from *Turnbull's* reporting conventions. The 1875 edition gives less precise geographic information, so some London entries of 1875 are translated into specific (Home Counties) locations by 1885, these latter appearing under 'Other Localities' (Table 9.19). Location assumptions of 1875 may also lead to underestimation of the early extra-regional component.

[124] For example, in the case of *Lindisfarne* (see footnote [115]) whose sale eliminated 26/64ths of the existing investment by North Shields' residents, including the holdings of the two principals.

[125] The shipbuilder Charles Mitchell retired prematurely to London, where he continued to invest in ships built at his former yard. A cluster of Harrogate- and Leeds-based subscribers appear linked to re-location of members of Newcastle's (commercially prominent) Mawson family.

Qualitatively, an apparent feature of the geographical shift between 1875 and 1885 was the opening up of a number of new English regions to shareholder participation, in particular West Yorkshire, Humberside, and the North West ('Other Localities' in Table 9.19).[126] In addition, there was a smattering of small foreign shareholders – mostly shipping agents – from Mediterranean and Black Sea ports, but none from Baltic Russia or Germany.

Table 9.19 Geographical Spread of Shareholdings in Twelve Steamers: 1875 and 1885
(percentage register tons; percentage)

	1875	1885	Change: 1875 to 1885	
	Share/tons (%)	Share/tons (%)	Gain (+ %)	Loss (- %)
Tyneside: North Shields	47	27		20
Tyneside: Newcastle	38	45	7	
Tyneside: South Shields	1	2		
Northumberland & Durham	7	11	5	
London	5	3		2
Other Localities	2	12	10	

Compiled from *Turnbull's*, 1875, 1885

Steamship Investors: Occupations and Capital

Although largely outside the scope of this study, investigation of the occupational and social backgrounds of investors in the Tyne's Baltic-going steamers might well reveal features that parallel Boyce's findings about contemporary subscribers to West Hartlepool steamers.[127] Indeed, two of the major principals involved there, Thomas Bell and George Pyman, transferred their attentions from Hartlepool to the Tyne at

[126] The degree of this shift may be accidentally weighted (see footnote [121]). It is unlikely that this North West involvement was a precursor of the Tyne-to-Manchester shipowning links noted for the 1890s in Milne, *North East England*, Chapter 6.

[127] Boyce, *Information, Mediation*, pp. 50-54.

this time, so it seems quite likely that their business networks and investor bases – and those of shipowners like them – would have reflected much the same character. Limited random sampling certainly suggests this to be the case.[128]

For instance, the shareholder list for Robinson and Sons (Stag Line, North Shields) Baltic-going tramp steamer *Nymphaea* (1871) shows that 42 percent of her shares were taken up by individuals who cited their occupation as shipowning.[129] Characteristically, the Robinson family – both 'shipowners' and others – held a major stake (45%), the next largest grouping comprising eighteen individuals engaged in manufacturing and retailing (28%). And there was a distinct affinity network: six 'Chemists' from North Shields and Newcastle, including three members of the Williamson family,[130] plus a significant extra-regional investor related to a prominent Newcastle chemist.[131] Altogether, this network subscribed nearly a quarter of the *Nymphaea*'s capital. Other local trades-people who invested included two grocers, a bonded stores dealer, and a ship-chandler, all probably anticipating reciprocity – in addition to dividends – from the ship's operation. Members of the clergy and gentry, together with spinsters and widows, completed the ship's shareholding complement (17%).[132] Geographically, the shareholder distribution conformed to the norm, with some 80 percent resident on Tyneside (particularly in North Shields), and there was a remarkable investor allegiance throughout the ship's ten-year career.

Perhaps few promotions could match the dedicated occupational and geographic clustering exhibited by *Nymphaea*'s subscribers (or by Robinson-owned ships in general). For example, *Dunstanborough*, listed as owned by shipbroker W. Johnson of North Shields, had a far more diverse and fluid list.[133] Despite George Luckley's support, subscribers who classified themselves as shipowners or

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[128] Occupational disaggregation is based largely on the matching of shareholder names (and locations) to directory entries c.1880.

[129] TWAS, 628/11. Built in 1871, *Nymphaea*, 737-tons, made six voyages from the Tyne to the Baltic in 1880; she was lost by wreck the following year.

[130] McBurnie, dissertation, 5, 9. The manufacturing Williamsons' regularly invested in Robinson-owned ships.

[131] H.T. Mawson of Southport, with four shares.

[132] 13% of *Nymphaea*'s shareholders remain occupationally non-ascribed. The probability is that most were 'Gentry' class, lifting this group to much the same level as retailers.

[133] The 760-ton collier *Dunstanborough*, built by T.W. Smith, Co. (1871). She made five Tyne-Cronstadt trips in 1880.

shipbrokers held only 20 percent during the ship's early career (others in maritime occupations barely five percent more). Local retailers and trades-folk, including a pawnbroker and a 'Traveller' (i.e. salesman) accounted for another twelve percent. Except for the Barrass family the local 'Gentry' were not well represented,[134] although the ship gained a few London and southern counties subscribers from this social class later in her career.[135] A small disparate group of professionals from south Northumberland were also attracted, including a schoolteacher, a registrar, and the manager of Bebside Colliery (Blyth). But professionals contributed little more than ten percent of the steamer's capital. A later, unexplained, addition to this Smith-built steamer's shareholding list was the prominent Tyneside ship- and engine-builder Andrew Leslie (4/64ths). Perhaps his purchase was linked to a pre-existing holding by the Rowell family – H.B. Rowell was Leslie's general manager – or to the yard's upgrading *Dunstanborough* with compound engines (1878). Such speculation only serves to highlight the heterogeneous nature of the shareholders concerned, and the near impossibility of defining all the social, commercial, and personal nuances that bound, or separated, them.

There are few indications of the amounts of capital actually invested by individual investors in the shares of this Baltic-going sample of three dozen steamers, 1880.[136] Broadly, it would seem that a sixty-fourth share in a steamer of modest size and capability would have required at least £100 by way of investment and, for any degree of confidence and return, up to £300. For example, 32 shares in fifteen steamers were auctioned on Tyneside in October 1879, with their reserves set in rather a wide band: £70 to £350. The subsequent bid spread was from £50 to £155, and individual purchasers actually secured shares at £72 to £155 each.[137] In 1880, a single share in Wilkie and Turnbull's 1200-ton *Kepler* was auctioned for £375, whilst another in their (smaller) *Lucretia* was 'bought in' at £350.[138] Similarly, shares in the Robinsons nine-year old, 737-ton, *Nymphaea* (1871) were valued at around £250 in

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[134] Including J. Barrass, partner in Barrass Bros. (shipowners and brokers, Newcastle Quay).

[135] Some probably stemmed from the, socially disgraced, T.E. Smith's move to Hampshire.

[136] And this despite the reports, and advertisements, about the sale and auction of steamship shares carried by the national shipping press and North East newspapers.

[137] *NDC,* 1 October, 1879.

[138] *Kepler*, built 1878, 1,205 tons, made one trip to the Baltic (Swinemunde) in 1880; *Lucretia*, built 1878, approximately 990 tons.

1880, much the same as their issue price of 1871, and, based on the same company's purchase costs, their three new, 880-ton, sister-ships of 1878: *Camellia*, *Eglantine*, and *Coronilla*, designed for the intermediate tramp trades would have enjoyed issue prices near to £325 per share.[139]

From these, and allied, evidences it is possible to suggest a range of prices per sixty-fourth share for recently built (90, or100 A1-class) ships of Baltic-going type in the late 1870s and early 1880s: 550 tons (e.g. *Denham*), £170; 700 tons (e.g. *Vernon*), £210; 900 tons (e.g. *Regulus*), £285; and, 1,200 tons (e.g. *Kepler*), £375. If valued by the share/ton, investors were generally paying from £19 to £23 per ton dependent upon a ship's age and size. Older ships naturally offered the cheapest options whilst, perhaps surprisingly, large new bulk carriers might also offer good value per ton as a result of economies of (shipbuilding) scale. However, it must be remembered that relatively few investors subscribed to a single share in a single ship. Less than a quarter (26) of all the investors in Robinson-owned ships held a single sixty-fourth share amongst the company's seventeen-strong fleet in 1885; the majority of subscribers (70) held between two and ten shares each. This suggests that, even taking a representative five share holding at a conservative price, the majority of investors committed sums of £1,500 to £2,000, and some may have expended additional such amounts through other shipowners.[140]

Steamship Companies: Origins, Character and Principals

Of over 40 Tyneside steam tramp and collier companies in 1880, nearly two dozen had ships amongst the (full) Baltic-going, Tyne-registered sample of 38 ships considered here. This fact alone suggests how important the Baltic trade was to the Tyne's steamship constituency of the period. By any standard, over 40 owners is a remarkable number of operators for one port, with examination revealing much disparity in the companies and the principals behind them. Thirteen Baltic-going ownerships fell into the broad category of tramp steamer operators, whilst nine or ten

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[139] Robinson, *Stag Line*, pp. 18-20; *Nymphaea*'s retained value shows the relative increase in steamers' capital values in the 1870s.

[140] Calculation based at £20 per register ton on the Robinson's average steamer size of 1,200 tons; fleet tonnage after, McBurnie, dissertation, 3, 4, Table 1.

were oriented more towards the operation of coastal and short sea colliers.[141] Given this diversity, consideration is given to establishing features that might have been common to most – especially in relation to the Baltic trade. Key elements are company origins, the subsequent growth rate (if any), together with the propensity for long term success as measured by longevity and fleet size.

The tramp companies were products of the expansionary 1870s, for all had been founded (as dedicated steamship companies anyway) in that decade – their establishment split equally between its early and late years. The collier companies for the most part fitted the same chronology, although two of them commenced acquiring steamers somewhat earlier.[142] If it is anticipated that these companies would have had antecedents in sail, inquiry reveals a division between those whose principals held an active interest in sail and those, necessarily newer, companies founded solely for steamer operations. However, the coal trade's long-standing nature meant that there was a considerable degree of experience of sail ownership amongst the company principals themselves – if slightly more so in the collier rather than the tramp sector. It is instructive to examine a few of these sail-to-steam ownerships in greater detail, for they demonstrate that – on Tyneside at least – there was no single route to making the investment transition from sail to steam.

William Johnson of North Shields began his shipowning career as a shipbroker in sail during the early 1860's, with his interests in sail continuing at a reduced level throughout the 1870s alongside his new investments in steam: as nominal owner of the two steam colliers *Dunstanborough* and *Lindisfarne*. The construction of a network of significant contacts and associates can be discerned during Johnson's early period in sail and, in financing his ventures into steam, he relied upon some of these individuals as well as the capital raised from new (local) subscribers.[143] Also amongst Johnson's early business associates in sail was George Cleugh (North Shields),[144] an owner who made the successful transition from sail to steam as well, acquiring

[141] Thomas, *British Ocean Tramps, Vol.2,* p. 10; MacRae and Waine, *Steam Collier*, pp. 25-30, 124-44.

[142] W.D. Stephens, and, T.E. Smith and partners in the mid-1860s.

[143] George Luckley (of T.W. Smith and Co.), the coal fitter George Rowell, and members of the Barrass family played significant roles in Johnson's sail and steam ventures.

[144] In the mid-1860s, whilst also having independent interests in several other sailing vessels, Cleugh shared 8/64th holdings in at least two barques alongside Johnson.

management of the Mitchell-built *Tynemouth Castle* and three more tramp steamers in the early 1870s.[145]

Although Harry S. Edwards was the designated owner of only one steamer in the Baltic sample of 1880, the *John Straker*, aspects of his career are of especial interest in examining ownership transitions from sail to steam. Heir to one of the Tyne's largest shipbuilding, repairing and shipowning businesses, Edwards invested heavily in large secondhand sailing ships in the 1870s, combining their operation with the acquisition of steam. Comparison of his ownership interests in the two classes of vessel is particularly instructive. He was always the controlling and dominant shareholder in sail, selling small parcels of shares to a select group of associates, thus limiting a ship's shareholdings to six or a dozen people at most.[146] By contrast, the subscription list for the steamer *John Straker* ran to 25 individuals, with Edwards' personal holding amounting to only 7/64^{ths}, and this pattern of shareholding characterised the six steamers in which he was involved.[147] There was only a limited crossover of shareholding partners from sail into steam though, and, despite markedly reducing the number of shares they took up, these transferees from sail all became company principals in steam.[148] In consequence, and by example, over 70 percent of the subscribers in the *John Straker* were new participants, individuals who had not been investors with Edwards in sail.[149]

This pattern of reinvestment from sail into steam was not, however, followed by T.E. Smith, another heir to a major shipbuilding, repairing and ownership business on Tyneside. The high-quality sailing ships he inherited outright in 1860 were subsequently transferred to a tripartite partnership: Smith, Luckley and Southern, and this partnership also acquired steamers built in Smith's own yard in the late 1860s. By

[145] Cleugh held 27/64^{ths} of *Tynemouth Castle* in 1875. Other subscribers included: the builders (designer H.F. Swan), the Lamberts, and South Shields shipowner, W. Wright.

[146] These close associates included his regular broker (C. Kaminsky), his two agents (J. Dixon, and C.H.T. Borries), and, more occasionally, the great nineteenth century 'coal baron', John Straker, a man who was only one generation removed from a Shields seafaring ancestry.

[147] Edwards' own holdings in these ranged from this 7/64^{ths} to 18/64^{ths}, with those of his regular co-principals (J. Straker, J.C. Stevenson, and J. Williamson) in much the same range. Their ship-naming policy reinforced their personal status.

[148] These transferees included: John Straker, and C.H.T. Borries (Edward's agent). Borries, Craig and Co. (Newcastle) later became one of Tyneside's premier coal exporters.

[149] Including the second largest shareholder, J. Williamson, 10/64^{ths}.

1875 they possessed a fleet of six colliers and intermediate steamers, together with minor (sometimes controlling) holdings in at least fifteen more Newcastle-registered steamers.[150] Nevertheless, a tightly controlled partnership like this was vulnerable to personal circumstance. Southern died in 1876 and, for whatever reasons, Smith soon (by 1885) took the partnership's surviving vessels into sole ownership.[151]

Amongst the other steam collier owners only Anthony Strong (North Shields) had a full – if undistinguished – pedigree in sail, but by then he was near the end of his career. Of the remainder, most commenced their shipowning directly in steam, chiefly through coal trade connections. Some, like the short-lived ownerships of Davidson, Charlton Co. (with the ancient *Garrison*) and Humble, Thompson Co. (*Dissington*), were restricted partnerships of brokers and merchants, or, as with George W. Reid (*Faraday*) and Edward Eccles (*Edward Eccles*, *King Coal*), the principals' main business was as coal fitters.[152] It seems no coincidence that ventures backed solely by brokers and merchants were frequently ephemeral, whilst those promoted by fitters were generally more enduring.[153]

Similar patterns of sail to steam transition were apparent in the tramp sector. There was also the distinction between owners with experience in sail, and those whose shipowning careers had commenced with steam – the latter mostly arriving from a background of brokerage, coal-fitting, or coalowning. For example, the seagoing Robinsons of North Shields first began to own sailing vessels in the early nineteenth-century, but a generation later they were quick to embrace steam.[154] Others amongst the Baltic sample who made the transition from an established position in sail to the ownership of steam tramps included: Adamson, Short Co.; George Cleugh; Arthur Dick; Dent, Hodgson Co.; and Daniel Stephens (of Stephens, Mawson Co.).[155] These were generally owners whose roots lay in the Tyne's last stronghold of sail,

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[150] Half of these steamers were managed by Elliot, Lowery, Dunford and Co. (Newcastle).

[151] Following a family scandal, Smith increasingly relinquished control. It should be remembered that Luckley – successful as he was – was a onetime junior employee.

[152] Reid was fitter for the Marquis of Londonderry's great collieries in county Durham, and Eccles for Hugh Taylor's important Backworth and Cramlington group in south Northumberland. Taylor had backed Mitchell's introduction of what was, in effect, a well-deck collier design, 1869.

[153] Eccles ran the same four, by then elderly, colliers into the early 1900s.

[154] Robinson, *Stag Line*, pp. 5, 15-20; McBurnie, dissertation, 3, 16.

[155] Also, indirectly, Pyman and Bell, for the company's Hartlepool founder, George Pyman, had been a master mariner and then owner in sail.

North Shields (with Blyth), and they were already inured to running ships in the Home and short sea trades with the exigencies – and ship losses – that this entailed.

Of these owners, the partnership of Adamson and Short (North Shields) stands well for the rest, even though its trajectory was more extreme than most. Commencing in the late 1850s as a shipbroker, H.E.P. Adamson built up substantial interests in a succession of 'handy' sailing ships during the next decade, moving into steam alongside sail in the early 1870s.[156] His new company, Adamson and Short, rapidly built up – and equally as rapidly dispersed – a substantial fleet of steamers.[157] The two principals, H.E.P. Adamson and W. Short, generally held a quarter and a half of each ship's shares jointly, with the remainder spread amongst a bevy of small subscribers, around 20 for each ship (never less than fifteen).

Such aggrandisment in the 1870s and early 1880s, together with the expansionary shareholding that accompanied it, seems to have come close to mimicking the nineteenth century's earlier 'railway mania'. And it could result in the kind of shareholding situation graphically described by Walter Runciman for Arthur Dick's *Coanwood*,[158] a steamer which Runciman was grateful to get the opportunity to command:

> Her shareholders were many, and composed mainly of men and women who lived in country and colliery districts, who had pinched themselves in order to acquire an interest in what they confidently anticipated would yield them an independency. The annual meetings of these shareholders were quite droll affairs: every criticism, suggestion, or inquiry was founded on the particular occupation followed by the critic or eager inquirer, and their manager being a Scot, and an elder of the Presbyterian Church, handled the proceedings with a profound solemnity more befitting a religious meeting than a business meeting.[159]

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[156] Though another family member, C.A. Adamson (solicitor) may have initiated the move.

[157] From sail alone in 1871 to a ten steamer fleet by 1875; this declined to three before 1895.

[158] Dick was a former (North Shields-based) master mariner in sail.

[159] Runciman, *Before the Mast ~ and After*, p. 222. Sunderland-built in 1872, the 'old macked tramp' *Coanwood* was his first steam command, she made three Tyne-Cronstadt trips in 1880.

That 'Her shareholders were many' was almost an understatement, since in 1885 *Turnbull's Register* indicated that *Coanwood* had 37 of them, no less than 30 of whom – including her master ' W. Runcieman' [sic] – possessed but a single share. His remembered geographic and occupational descriptions of the subscribers are borne out by this surviving evidence as well. Indeed, it was the extravagant expansion, promotion and collapse of locally-based, sixty fourther, ventures of this kind that led to the public concern that found expression both in the local press and the shipping periodicals of the time.[160] Nevertheless, at this juncture shipowners on Tyneside did not embrace moves towards the controversial 'single ship' companies that (as Cottrell demonstrated) many owners did on the Mersey.[161]

It must be stressed though, that whether the Tyneside tramp companies' origins lay indirectly in sail or directly in steam, for the most part they showed a genuine measure of vitality and viability. True, most of those in this Baltic-going sample (say, thirteen companies) showed a reduction in fleet numbers following the initial boom of the 1870s and early 1880s, but they traded on into the first decade of the next century without exception. Beyond that, more than a third survived into the difficult inter-war period, 1918-1939, and three continued uninterruptedly (via successor companies) as ocean tramping businesses until the 1960s.[162] This record of longevity in Tyneside's dedicated tramp shipowning constituency compares favourably with those who operated primarily in the Home and short sea collier sectors. There, in this sample at least, the more immediate failure rate neared one-third of all companies involved, with shipbroker or merchant led undertakings the most likely to succumb.

If the steamship owning businesses represented in this Baltic-going sample appear very diverse, then the principals who headed them might appear to have been

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[160] For example, the regular concerns expressed over 'sixty fourthers' in the letters column of the *South Durham and Cleveland Mercury*, 1880; and, in *Fairplay International*'s short cautionary tale (c.1880) 'Captain Hauxley', where a thrifty, collier brig, master's life savings are lost through an unscrupulous, Newcastle Quayside, steamship promoter.

[161] P.L. Cottrell, 'The Steamship on the Mersey, 1815-80', in P.L. Cottrell and D.H. Aldcroft, eds., *Shipping Trade and Commerce, Essays in Memory of Ralph Davis* (Leicester, 1981), pp. 152-53.

[162] Fenwick and Reay (Pelton Steamship Co.); J. Robinson and Sons (Stag Line); and, Stephens, Mawson Co. (later, Stephens, Sutton Ltd.).

equally disparate, ranging from Quakers to 'men-about-town'.[163] Close study of individual careers though, reveals that they often had characteristics in common, and always possessed an extensive range of – often interdependent – connections and skills. Broadly speaking, these principals came from one of four kinds of personal background: those with substantial capital and/or assets inherited through pre-existing maritime businesses; those with similar, or greater, levels of capital acquired through coalowning; self-made individuals in various branches of Tyneside's commerce and manufacture (including, but not necessarily, ship operations); and, within the maritime sector itself, relatively minor shipowners or brokers who made a successful entry, or transition, to steam. Often allied to personal background was the matter of their geographical, and resultant social, orientation. If, for example, an individual's business and residence lay in one of the old-established shipowning centres at the river-mouth then it likely carried provincial undertones. But, should it lie in one of the prosperous new industrial districts, like the mid-Tyne, then there was a greater prospect of social mobility via residence in Newcastle and engagement in the city's cultured society.[164]

To be regarded as a successful shipowning principal thus implied a good deal more than the simple ability to run a ship. Nevertheless, even a brief review of the activities of some more notable Tyneside shipowning principals, c.1875-1885, throws into relief Craig's salient truism that, in shipowning, as in much else, whilst 'Man proposes, God disposes'.[165] However rational the analysis of economic imperatives, networks, resources and the like, there are always apparently irrational human events and impacts to contend with. What, for instance, were the effects (if any) on 'Quaysiders' attitudes towards the formation of that controversial shipowning instrument, the joint-stock shipping company, when the Tyne's major proponent, W.D. Stephens, prematurely withdrew from active ship management? Albeit, it would

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[163] For example, the Quaker, Henry Clapham (b.1827, d.1883), and, the entrepreneurial, racehorse-owning, George Renwick M.P. (b.1850, d.1931).

[164] For instance, by 1880 the shipowners and shipbuilders: C. Adamson; H. Clapham; C.S. Hunting; G. Luckley; C. Mitchell; and H.F. Swan, were amongst the 21 'Private Residents' living in Newcastle's most desirable suburb (Jesmond), clustered around the home of Tyneside's foremost industrialist, Sir William Armstrong.

[165] Craig, 'Trade and Shipping in South Wales', in *British Tramp Shipping*, p. 210.

seem that Stephens' withdrawal was not a pragmatic commercial decision, but a personal choice resulting from moral re-direction.

Stephens, Smith, Straker, and Luckley all illustrate the status and influence which might arise from a successful, and wealthy, shipowner's role within the commercial and civic entity. A status that might be expressed through involvement in national or local politics, philanthropic or religious works, or the management of one (or more) of the trade associations and commissions that attended to the business of the port and, in particular, pursued the interests of Newcastle's premier business district, the Quayside.[166] For instance, Stephens, Luckley and Runciman were all committed Wesleyans, engaging in civic duties and radical local politics, with Stephens eventually exhausting his accumulated wealth through charitable works.[167] Both George Luckley (b.1825, d.1911) and W.D. Stephens (b.1827, d.1901) epitomized the concept of the self made shipowner. Luckley rose from office boy in T.W. Smith's establishment to full partnership and eventual recognition as the 'father of Newcastle Quayside'. Stephens had risen from a lowly position in the chemical industry to a partnership in a Tyne-to-London shipping business. He benefited from wartime opportunities (1854-1856) to enlarge his holdings in sail and then steam, before successfully promoting a joint-stock limited liability company: The Tyne Steam Shipping Co. (1864). A trenchant advocate of the shipping interest, he was also heavily involved in marine insurance, eventually becoming president of the UK Chamber of Shipping.

If men like Smith, Straker, Luckley and Stephens were figureheads on the local shipping scene, then there were numerous principals (and major shareholders) of lesser status who were in much the same mould, although differing in formative experience: Harry S. Edwards (shipbuilding and repairing), H.F. Swan (ship design and construction), R.B. Fenwick and J. Reay, J.O. Scott, and J. Straker (colliery owners). Generally though, those with coalowning interests – as with Straker and the Lamberts – involved themselves in steamship owning at one remove, channeling capital into shipowning through their fitters or agents.

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[166] By 1880, the Quayside played as important a role in Tyneside's commercial – although not manufacturing – life, as did the City of London there.

[167] E.I. Waitt, 'John Morley, Joseph Cowen, and Robert Spence Watson' (Unpublished PhD thesis, University of Manchester, 1972).

This separation, however, gave opportunity for well positioned agents to set up as shipowners, and there were also openings for others experienced in administering maritime commerce, especially shipbrokers. Consequently, smaller operatives sought to move into the ownership of steamers direct and, although a number of these prospective ventures (chiefly partnerships) were short-lived, where their Tyne-based promoters had more immediate ownership and operating experience they fared better.[168]

Indeed, this was the margin of shipowning on which the newly-formed steamship companies (and their non-shipowner principals) merged in character with those whose primary business had always been the ownership and operation of ships – shipowners *per se*. These long established companies were largely North Shields-based and possessed principals (and antecedents) who had long been engaged in ship ownership.

Conclusions

The most striking and persistent features of Tyneside shipowning during the period under consideration were diversity – rather than concentration – of ownership, allied to unbroken localism of investment and control. Although tempered by a degree of flexibility there was also a determined adherence – in the bulk carrying trades at least – to sixty-fourth ownership. These characteristics marked out the Tyne amongst other British ports of comparable size.[169]

Nonetheless, the Tyne's shipowning constituency responded to change by demonstrating geographic and commercial mobility. In particular, steam's need for increased capital and managerial control encouraged owners and brokers to re-cluster at Newcastle Quayside in the 1870s, a shift in location that was accompanied by a major disjunction of the investment base. Quantitative investigations reveal that the long-established financial pattern, whereby sail was financed through slow injections of relatively small sums of capital from localised investment networks, declined

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[168] For example, Daniel Stephens (Stephens, Mawson Co.) had been a highly regarded, experienced master mariner. Similarly, the entrepreneurial shipbroker George Renwick's partnership with the established Fishers' of Barrow brought him non-Tyneside subscribers.

[169] Cottrell, 'The Steamship', pp. 137-63; Starkey, 'Ownership Structures', pp. 83-85. The former outlines the development of a broadly-based pattern of joint stock ownership on the Mersey, and the latter the effects of concentrated family ownership in Hull.

noticeably. Instead, steam's needs for core capital were met by relatively large, and immediate, subventions from a limited number of key investors. Concomitantly, the extreme riparian localism displayed by artisanal investors in sail was largely dislocated, substituted for by a more regional investment spread. This shift did not act through enlargement of the existing investment base for Tyne-owned shipping, it re-formulated it.

Investor analysis for steam shipping reveals that the impact of extra-regional capital was, at best, selective during the period of maximum growth. Whilst nationwide the two principal entry routes into steam ownership were 'via the profession of seafaring or via the counting house' (or both),[170] low level entry was a far more open matter in the maritime industrial environment of the Tyne. There were distinct ownership opportunities for enterprising professionals or producers embedded in the local coal supply chain, and synergies also arose from shipbuilding/repairing links. It was, conclusively, intra-regional rather than extra-regional access to capital that supported the growth of steam shipowning during this period. Why that capital was deployed in companies that continued to be structured on sixty-fourths – rather than limited liability – is strictly beyond the bounds of this study. But, if sixty-fourths ownership 'was the glue which held the [North East steamship-owning] system together',[171] then the conclusion from the Baltic evidence is that this structure's backbone was stiffened by a small group of key investors – most of them experienced in sail – who rarely engaged in any other ownership form.

It has been suggested that the British-owned steam tramps of this period were working under conditions of near perfect market competition. If so, then the ownership patterns evolved on the Tyne may be seen as a matched response to the diverse opportunities offered. There was a well understood and flexible ownership structure in place that provided relatively easy entry paths for a variety of putative operators, rather than by wealthier specialists alone. And the region's expanding economy provided enough capital to support low level start ups. Nevertheless, Tyne-owned steam shipping still lost market share in the Baltic trade, a decline that appears

[170] Craig, 'Trade and Shipping', p. 189.

[171] Milne, *North East England*, Chapter 6.

to have resulted in part at least from the limited potential for growth inherent in this relatively closed capital-raising system.[172]

Paradoxically, the introduction of bulk-carrying steam shipping into the Tyne's Baltic trade of the 1870s can be regarded as having brought with it a return to the eighteenth century shipowning position, one in which the capitalisation and operation of ships was very much an extension – and not altogether a welcome aspect – of rather more generalised coalowning and merchanting interests. For all of his technological and commercial advances, the Tyne-based steamer owner of the early 1880s can, in many respects, be seen to have been something less of an independent specialist operator, a 'shipowner', than had been his immediate predecessor in sail. The ownership balance in steam shipping lay less with the practical skills of seafaring and more with the counting house techniques that were essential to the acquisition, and efficient management of, capital.

[172] See Chapter 6.

Chapter 9, Charts:

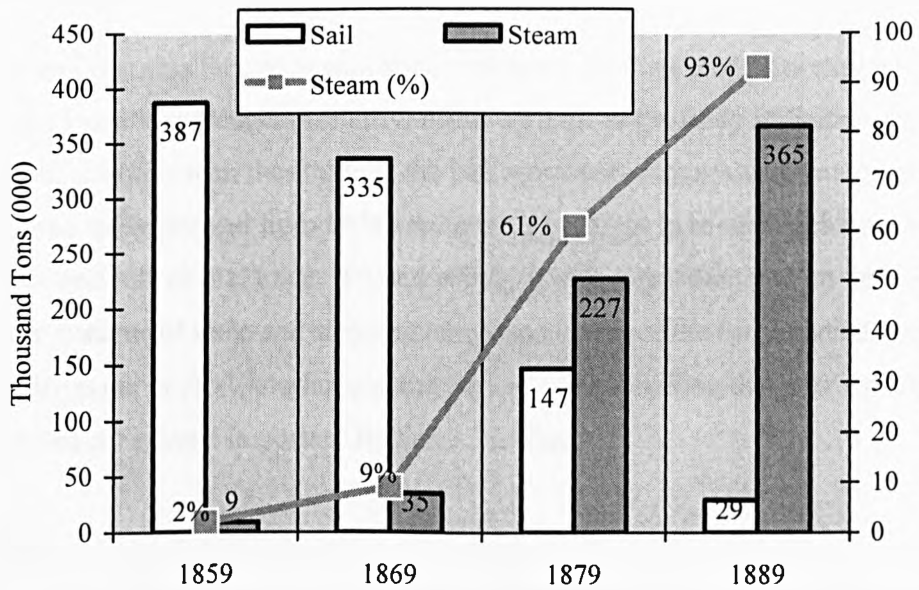

Chart 9.1 Growth in Tyne-owned Steam Tonnage: Decennial, 1859-1879
(Source: see, Table 9.11)

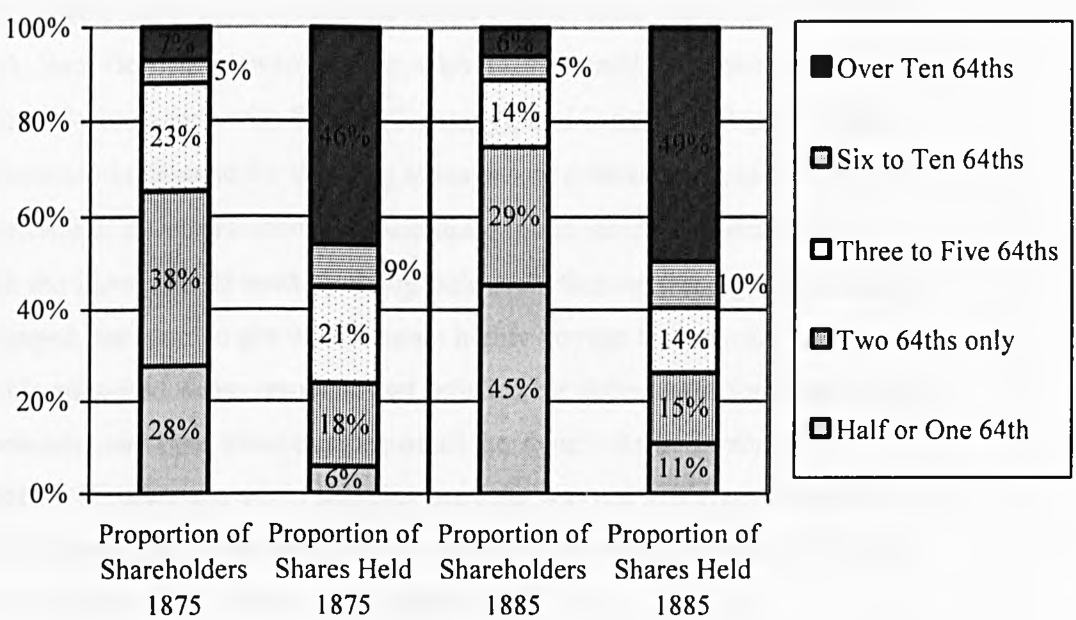

Chart 9.2 Steamship Investment Provided by Various Levels of Shareholder: 1875 and 1885
(Source: see, Table 9.17

CHAPTER 10: THE ESSENTIAL RATIONALE OF THE TYNE'S BALTIC TRADE AND SHIPPING

Through rigorous factual examination and discussion this study has explored several areas of new knowledge. Primarily, it fills a hiatus in the study of Britain's maritime trading relations with the Baltic in the late nineteenth century, using an original baseline study derived from little used primary sources to re-open debates over the nature and role of that trade. Beyond which, it adds significantly to an understanding of the systems of trade and shipping employed in one of the least studied major English ports of the Victorian era, the port of Tyne, detailing that port's relationship with one of its most important forelands, the Baltic.

Trade

The port of Tyne's position as the most significant and influential exporter of British coal to the Baltic is confirmed, and rapid expansion is seen as the key characteristic of this trade. The port's coal exports to the Baltic region under consideration tripled between 1860 and 1880, with the Baltic market's share of its worldwide exports growing throughout: from 15% to 21%. However, although continuing to supply coal products to some thirty ports around the Baltic littoral, there was a marked shift in emphasis, from Germany toward Russia, with traffic steadily polarising at the region's extremities: Swinemunde with Stettin (Germany); and Cronstadt (Russia). This secular increase in demand for shipping tonnage saw contrasting responses from the trade's (existing) operators under sail, and those in the (emergent) steam fleet. Although the former could react by doing little more than increasing the number of units engaged, the latter might invoke much higher voyage frequencies, and it was largely this enhanced steam response that satisfied escalating calls for capacity. By 1880, steamers conveyed three-quarters of all the Tyne's Baltic-bound coal. Nevertheless, absolute growth in shipping capacity was not sufficient of itself for, in order that shippers might effectively meet massively increased demand, the trade required changes in its practices and management.

Initially, the consignment of coal for export was subject to customary routines based around the long-standing 'spot market'. Coals were sold and conveyed by the single shipload, with a variety of 'middlemen' playing crucial roles in the complex, small-scale transaction chains that linked coal producers to Baltic end-users.

Increasingly, however, there were demands – especially from gas and railway concerns – for much larger scale exports, and it was the resultant introduction of contractual forward buying that provided new opportunities for shippers who could provide dedicated, rather than just casual, (tramp) tonnage. Allied to a coincidence of local factors, this demand-led pressure heralded major shifts in the port of Tyne's (Newcastle-based) coal exporting consignment community, a shift that owed much to greater commercial mobility in the North East region – particularly the entrepreneurship of select Hartlepool shipowners and county Durham coalowners. The practical outcome, by 1880, was a much more robust transaction system, one that was capable of meeting export growth by transporting ever greater quantities of coal to tighter deadlines. Commercial practices had, conclusively, kept pace with steam shipping's enhanced physical capacity to export coal to the Baltic.

Although coal's sheer volume dominated the port of Tyne's outward trade to the Baltic, the aggregate value afforded to the port's hinterland economy by non-coal exports – in particular chemicals – was comparatively high. Despite the fact that the export potential for non-coal goods in the Baltic foreland was increasingly restricted by German and Russian protectionist measures, the growth rates for non-coal exports continued to match, or even exceed, that of coal. Also, since non-coal goods required rather more sophisticated shipping provisions than did coal, they helped add width of response to the Tyne's outward traffic. Chemical carriage, for example, shifted completely away from an abundant fleet of small, casual (north European) sailing carriers to a limited contingent of relatively large, more scheduled (mostly British) steamers.

Given the port of Tyne's expansionary export trades to the Baltic, and that its carriers responded to growth and changed demand, it might be anticipated that there was a measured balance of imports resulting in a need for backhaul tonnage. But this was not so. There was an exceptional, structural imbalance between the Tyne's low-level of imports from the Baltic and its high volume of exports, and the barely discernible growth in imports that did occur (1860-1880) gave carriers little opportunity to initiate new responses. Nevertheless, the Tyne's Baltic import trade did attract a steady supply of small, north European-owned ships that, in their turn, acted as niche carriers for exports directed to the Baltic's lesser ports. This low-cost foreign tonnage also served to relieve the Tyne's own shipping from potentially unrewarding domestic import work. Consequently, after discharging their coals in the Baltic they were open to load more remunerative import cargoes stemmed, in particular, to London or Hull.

Shipping Supply and Response

The major carrying fleets of the Tyne's Baltic trade in the early 1860s originated in three of its reciprocal trading partners – England, Prussia and the German States; only Scottish and Dutch tonnage formed significant 'third party' elements. Coal was principally conveyed to Baltic Prussian and German ports in nationally-flagged vessels whilst, in large measure, English shipping responded by occupying the tonnage supply gap (for Cronstadt/St. Petersburg) occasioned by Russia's mercantile weakness. Sail was absolutely ascendant in bulk cargo carriage and, although the several national fleets evidenced distinct variations in ship size, none held a significant supply-side edge in materiel overall. Through economies of scale, though, English shipowners realised slight advantages in manning levels. The unusually casual and elastic nature of the trade's entire tonnage supply is exposed by the fact that three-quarters of all export demands were met by ships that made only one Baltic voyage annually. Ordinarily, for a Tyneside shipowner this single, seasonal, 'Baltic voyage' was an integral part of a diverse year-round deployment pattern, one much based on north European routes. And, it is concluded, owners definitely sought 'joint production' returns from their Baltic voyages, with earnings on the outward (coal carrying) leg critical to round-trip profitability. Consequently, the prevailing freight rates for coal, as well as those for (higher freighted) Baltic imports, influenced shipowners' deployment decisions. Although solidly rational in approach, these highly intensive deployment strategies of the 1860s – in which the Baltic formed a part – were vulnerable to unanticipated change. For, as is evidenced, the long-term failure of even a single routeing element could jeopardise the whole.

By 1880, although several hundred sailing ships still prosecuted the Tyne's Baltic trade, it was the growing array of much larger bulk-carrying steamers that afforded by far the greatest tonnage capacity (78%). And, whilst the practices and configurations of the sailing ships engaged had altered little, the technologies of steamships now capable of prosecuting the Tyne's Baltic trade had advanced with rapidity – they could now provide clear operational rewards. Indeed, the relationship of bulk carrying sail and steam had already passed through an overtly competitive phase into a more complementary one, with a distinct separation of the roles and markets enjoyed by (largely) north European sail and (predominantly) British steam. This latter's, successful, supply side response had resulted from an exceptional conjunction of maritime interests and technical expertise on England's east coast, where the competitive requirement for bulk carriers in the Baltic (and allied trades) attracted sufficient intellectual, and capital, investment to generate a fleet of relatively large, modern bulk-carrying steamers under east coast ownership. These purpose-designed, economically fuelled (i.e. compound-engined) steamers made demonstrable advances in the Baltic carrying trades – and on related intermediate routes – where they were initially supported by upgraded, short-seas, bulk carriers of earlier provenance. These deployments substantiate Fischer's (previously contested) theory that British steamship owners were responsive in deploying their 'new[est] technology', rather than their old, second-rate ships into the Baltic.[1] Furthermore, it focuses attention on the fact that the opening up of the Baltic to bulk carrying steam in the 1870s played an important, if previously unrecognised, role in the process by which 'Britain's superiority in the construction and operation of iron screw steamers [was] made absolute'.[2] Nonetheless, the introduction and diffusion of this innovative new technology into the Baltic arena was shaped by commonplace economic forces.

Generally, owners both in sail and steam responded rationally during this period of change. The former maintained long-established strategies with their remaining stocks of vessels, and the latter looked to evaluate and extend the operational potential of a new working tool, the bulk carrying steamer. The functional needs of this last, especially those under British ownership, also proved the determinant by which select Baltic destinations became 'steamer ports' – further concentrating coal exports towards Cronstadt and Swinemunde/Stettin. On the supply side, Harley's view that the carriage of such coal cargoes was unrewarding is contradicted by the fact that the Tyne attracted very large numbers of Baltic-bound steamers owned in other east coast ports. This observation also helps belie his stated conclusion that British steam's involvement in coal exports to northern Europe was a comparative failure.[3] On the contrary, voyage reconstructions and deployment evidences mark out the Baltic as a regular destination of choice. Owners made

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[1] Fischer, 'Flotilla of Wood ', p. 39.

[2] Craig, *Steam Tramps*, p. 13.

[3] Harley, 'Coal Exports', 330.

rational decisions between the various intermediate voyage options, and real earnings were made through deploying modern steam assets in ways that responded flexibly to the Baltic trade's inherent limitations. Furthermore, surviving evidences lead consistently to the conclusion that British steamers' profits in the Baltic trade resulted far more from a balance between outward and inward earnings (i.e. joint production) than was formerly believed, and that operational profitability was achieved several years earlier than previously proposed. Meanwhile, for rapidly dwindling British sail, the sudden drop in coal freight rates that occurred around 1874 proved insupportable. Owners faced the forced, if rational, choice of disposing of now near worthless holdings, or risked escalating loss until their ships or finances failed. The contrast between shipowning in sail and steam had become marked indeed – a matter for comment.

The port of Tyne's sail ownership of the early 1860s exhibited characteristics common to that displayed by nineteenth-century artisanal sail elsewhere in Britain. Its long-established, modest, investment patterns were underscored by extreme (riparian) localism based upon close familial ties or occupational networks and, generally speaking, those concerned invested only relatively small sums over quite long periods of time. The emergent bulk carrying steamships however had proportionately greater needs for capital finance. Commonly they came to be financed through more sizeable, more immediate, subventions by a limited number of significant, regionally-based individuals – ones whose core capital was supplemented by that obtained from large numbers of 'small capitalists' (disinterested minor investors). Except for the very top investment echelon, there was little direct transference of shipowning interests from sail into steam, resulting in a marked discontinuity between the two investment constituencies. Unlike major English shipowning centres elsewhere, however, the Tyne's bulk carrying steamer owners of the 1870s remained firmly – maybe conservatively – focussed on the earlier, sail-originated, 'sixty-fourths' shareholding system, only rarely espousing limited liability status (or its derivatives). Diversity, rather than aggrandisation, remained a characteristic feature of the tramp and collier steam ownerships that participated in the Tyne's Baltic business – allied to localism of investment and control. Although, as elsewhere, many of these new owners were drawn from a senior seagoing or accounting background, the fast expanding maritime-industrial environment of the Tyne encouraged a higher proportion of entries (albeit at low level) from those engaged in the coal supply chain or marine industries.

However, since the ownership balance in bulk carrying steam lay less with seafaring skills than with the management of capital, these new owners perhaps showed rather more in common with their eighteenth century counterparts, the merchant shipowners, than with many of their immediate nineteenth-century sailing 'shipowner' predecessors, the one-time masters under sail.

Key Findings

Contrary to received opinion it is shown that, rather than benefiting from Baltic import earnings alone, British carriers responded positively to the revenue opportunities offered by the expansion of coal exports to that region. By association, this also demonstrates that British deployments into the Baltic should no longer be considered – as previously – in isolation, but as interactions with, and essential components of, the deployment regimes that ensured British shipping's growing dominance of the Home and intermediate trades.

Fresh facets of the complex interactions which occurred between sail and steam operators in the Baltic during the third quarter are explored, providing new perspectives on the complementary, as well as the competitive, aspects of that relationship. Considered collectively, the rationality of shipowners – both sail and steam – is confirmed during this era of change. Furthermore, in detailing the manner in which steam shipping impacted directly and indirectly on sail, this work also maps the introduction of steam into the Tyne-to-Baltic (non-oceanic) bulk export trade in coal for the first time, correlating this process with freight rate shifts and earning potentials calculated from previously unexamined sources. And this reveals that the deployment of British-owned bulk carriers into the Baltic marked an important stage in the development of the nation's steam tramp shipping.

Correspondingly, the argument is also made that the supply side advantages afforded by the North East's marine engineering/shipbuilding expertise, growing productive capacity, and enhanced mining output, both facilitated and expedited the positive response of its steamer owners to the growth of the Baltic's bulk trades, 1860-1880. Rigorous scrutiny of the fleet of British steamers deployed to the Baltic from the Tyne further permits the identification and evaluation of performance discontinuities arising from innovations in their design and propulsion.

At a more discrete level the construction of financial case-studies for representative vessels, both sail and steam, helps confirm the existence of rational behaviour patterns amongst the British owners who deployed ships to the Baltic – a rationality that was evident in times of economic decline as well as of growth. Investigation is also made into the broader aspects of the ownership structures that supported both artisanal sail and emergent steam on the Tyne, giving detailed consideration to investment trends, participating communities, shareowning patterns and requirements for capital. As a result, some previously unrecognised areas of disjunction and overlap are shown to have existed between the two, while the Tyne's extraordinary diversity of steam ownership is highlighted as a unique signature amongst comparable British shipowning centres.

Lastly, since the difficult question of the differential rate of technological change is at the heart of much of this study, where it has not been addressed and answered in full, it might be contended that 'little harm [has been] done "so long as we can advance our understanding of the reasons for the actual historical pace of technological diffusion"'.[4]

Wider Horizons

In concluding this study, it should be noted that a number of issues remain partially explored. Exposed throughout is the fact that the shipping employed, both sail and steam, was enmeshed in a variety of trades that were rarely separate entities, each of which would require similar treatment in order to obtain a comprehensive overview of shipowners' motivations, responses and decision-making. This, in the local context at least, could be satisfied by further specific studies of data extracted from the *NBESL*, but equally importantly might be supplemented through linked work on sources abroad.

Similarly, this present study helps illuminate the interconnected nature of the shipping that serviced the overseas needs of all the major east coast ports during the period concerned, suggesting that a coordinated, carefully focussed study of their variously presented *Bills of Entry* might yield important insight into the east coast's wider maritime trading economy and its shipowning as a whole. Spatially, although the Baltic area originally defined is shown to have coherence, there is clearly need for closer examination of British steam's incursion into the Gulf of Bothnia late in the period. And this also raises questions of temporal extension, in particular the use of

[4] N.R. Rosenberg, cited in, Hornby and Nilsson, ' Transition from Sail to Steam', p. 112.

local sources to help map the decline of British shipping's interests in the Baltic in the 1890s. This process, although already subject to large scale economic modelling, would undoubtedly benefit from analysis of the source-based kind adopted here.

APPENDIX I

Database: Construction and Use

Objectives

The database was designed for two purposes: firstly, to produce a comprehensive analysis, for select periods, of all Baltic-bound shipping and cargoes as recorded in the *Newcastle-upon-Tyne Bill of Entry and Shipping List*, 1861-1880; secondly, to integrate quantifiable information extracted from reliable printed primary and secondary sources into this analysis.[1]

Method

In order to maximise the potential cross linkage of data presented in the formulaic listings of the *NBESL* it was necessary to employ a fully relational database. Both for convenience, and its proven ability in dealing with similar *Bill of Entry* oriented research elsewhere, a proprietary ('Windows'-based) relational database management system (RDBMS), '*Access '95*', was trialed and then adopted (1997).[2] The resultant database employed full referential integrity and, although not completely normalized, field duplication between tables was reduced to a low level. An essentially flat-file (1-1) arrangement of tables dealt with major cargo components and vessels, but these were then connected through fully relational links (1- ∞) (∞-1) to all other record-holding tables.[3] Two major sample years were selected for analysis, 1861 and 1880. The design, transcription and entry processes for 1861 were completed first, and only relatively minor design modifications were applied to that for 1881 (chiefly to simplify and facilitate use). Early recognition of the fact that relatively few datasets would need to be imported from one sample year to the other resulted in the entries for each of the two years being placed on separate databases.

For Newcastle's exports, sub-tables detailing every (dated) loading record, together with the constituent component(s) of each, were used to build up the profile

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[1] In particular: *Browne's Export List*; Keys, *Dictionary*; *Turnbull's*, 1875, 1885; and, *Lloyd's*, 1860-1880.

[2] Especially the *Liverpool Bill of Entry*, researched by Ashcroft, Milne and others. 'Windows 95' was the most advanced system then available to the author.

[3] A small group of non-relational flat files were constructed for quick visual reference only.

of all complete cargoes. A unique identifier, the 'cargo identity' (i.e. record of sailing), was then assigned to each. Fully relational links were subsequently established between each identifiable cargo and ancillary tables containing details of the carrier (the ship), the cargo provider (consignor), and intended destination (Baltic port). Similar, although implicitly more limited, tables were set up for imports – including samples from Hull and London – and these were also integrated into the two main relational databases.

Source, transcription, and entry

The *Newcastle-upon-Tyne Bill of Entry and Shipping List* was published on behalf of the Customs Benevolent Fund by the nautical supplier Septimus A. Cail, 42-43 Newcastle Quayside, from 9 March 1861 (Issue 1, Volume I) to 31 December 1880 (Issue 53, Volume XX) when, under revised regulations, publication ceased.[4] With slight variation it appeared three times weekly in a two-(later four-) page format and, until 1 April 1875 all published entries were referred to the port of Newcastle-upon-Tyne.

Subsequently, separate listings were made for North Shields and South Shields, although these entries generally suffered a day or two's (communications) delay before publication. Each issue of the *NBESL* carried comprehensive listings under the sub-heads: 'Imports', 'Exports', and '[Ships]Entered Outwards', together with several column inches of (paid) nautical advertisements that advised of ships 'now loading' or making scheduled sailings.

'Imports' were presented as individual, well itemised, cargoes by date of entry. 'Exports', however, were presented as sequential loadings (by date of notification) and, as a result, a particular ship's export cargo – especially a general cargo – might comprise various entries covering several days. 'Entered Outwards' listings posted official notice of ships' intentions to load for (stated) foreign destinations and normally, although not invariably, an entry there preceded a vessel's appearance in the 'Exports' list – usually by a few days. Data that was published consistently within these listings from early 1861 to the end of 1880 included:

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[4] Abbreviated throughout to: *Newcastle Bill of Entry and Shipping List* [NBESL]. Carson, *Maritime History*.

Imports – date, port of departure, ship, master, 'men', nature and sometimes volume of items discharged (arranged by consignee), consignee/'to order'.
Exports – date, destination, ship, master, nature and volume of items loaded (arranged by consignor), consignor.
Entered Outwards – date, destination, ship, home port/country, master, tonnage, men (i.e. crew numbers), ship's agent.

For the two sample years, the volume of data referring to Baltic-bound shipping and cargoes that required transcription from the *NBESL* amounted to:

Vessels Entered Outwards:	1,355 (1861);	1,600 (1880);	2,955 total.
Export Cargoes:	1,272 (1861);	1,577 (1880);	2,849 total.
Import Cargoes:	161 (1861);	171 (1880);	332 total.
Individual Vessels:	1,093 (1861);	1,039 (1880);	2,132 total.

Some 4,000 further records (*ex* case-study data) were also transcribed from other sources in the way of: shareholder/shipowner listings, ship careers/technical data, voyage schedules, Hull/London import samples, Baltic and north European port locations and characteristics.

Trials revealed that, although it was marginally slower in operation, a system involving manual transcription followed by separate electronic entry was more practical, flexible and considerably less prone to error than direct electronic entry on site.[5] Consequently, all data was transcribed manually onto purpose-designed pro-forma for subsequent 'keying in' to the database, either direct to a specific table's spreadsheet or *via* an associated electronic 'form', the latter allowing inclusion of 'expressions' (for automatic aggregation and/or the conversion of original units) where convenient. When completed, all tables within the relational framework were available for analysis by interrogation using a number of standardised queries set up under the 'Access SQL' (Structured Query Language) system. This provided a massive body of validated statistical evidence that formed the basis of the tables/charts presented in the main text of the thesis.

[5] Sample cross-checking suggested transcription/entry error levels of around one item per thousand data-cell entries (0.1%).

Source Limitations

Although an apparently accurate and comprehensive source, detailed examination of the *NBESL* reveals some problems of use. Names (especially north European ones) of ships, their masters, and destinations or home ports are often irregularly spelt or even misnamed. Con-joint names are frequently applied to ports,[6] whilst clerking or typographical errors occasionally result in omissions, duplication, or incorrect dating. However, cross-checks through use of the relational database itself and reliable secondary sources both reveals and resolves most such issues.[7] Even obvious omissions or inaccuracies may be decided by reference to appearances elsewhere, and where synonymous (or easily confused) vessel names appear, resolution into individual vessels can usually be achieved thorough cross-referencing *via* the database of tonnages, masters, and home ports – only rare cognitive decisions are required.[8] Consequently, although the *NBESL* rarely yields an absolutely comprehensive specific dataset it does provide relatively high levels of completeness overall, rarely falling short of its theoretical potential by more than 1 or 2 percent.

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[6] For example, Danzig's outer port, variously cited as: Newfairwater, Fairwater, or Neufahrwasser.

[7] This was particularly the case with a ship's tonnage which, for some database calculation purposes, needed to be assigned a 'fixed' (usually the most frequently quoted) value.

[8] In 1861 for example, there were eight separate vessels named *Maria*, each needing database separation by means of a numeric suffix (e.g. Maria3); similarly, *Margaret* appeared in several confusing variants.

APPENDIX II

Location and Status of Baltic Ports Receiving Coal from the Tyne

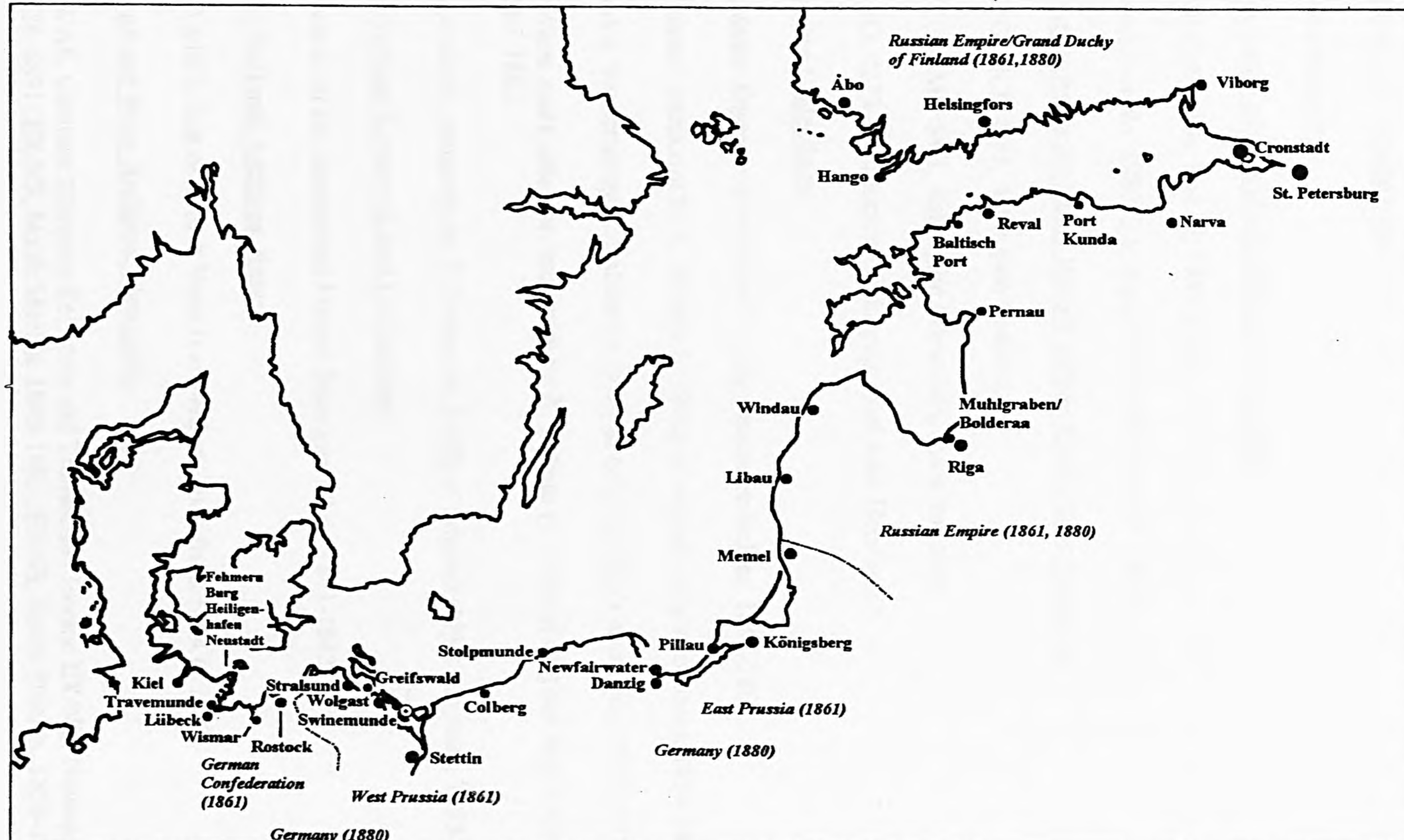
Common Nineteenth-century Name (where changed, *Modern Name* thus) [1]	[2] Distances (nM)	[3] Coal Import (nearest 000 tons) 1861	1880
Kiel	679	12	19
Fehmern (*Fehmarn*)		1	0
Burg		<1	<1
Heiligenhafen (*Heiligenhafen*)		1	<1
Neustadt (*Neustädt*)		1	1
Travemunde & Lübeck	775 (Lü)	14	14
Wismar		4	9
Rostock		7	6
Stralsund		7	4
Greifswald		1	1
Wolgast		12	4
Swinemunde & Stettin (*Świnoujście & Szczecin*)	735 & 765	81	185
Colberg (*Kolobrzeg*)		3	<1
Stolpmünde (*Ustka*)		<1	0
Newfairwater & Danzig (*Nowy Port & Gdańsk*)	870 & 875	14	72
Pillau (*Baltiysk*)	885	3	16
Königsberg (*Kaliningrad*)	907	10	7
Memel (*Klaipeda*)	923	5	15
Libau (*Liepāja*)		1	15
Windau (*Ventspils*)	959	<1	<1
Muhlgraben & Riga (*Rīga* port)	1070 & 1075	13	66
Bolderaa (part of *Rīga*)		0	<1
Pernau (*Pärnu*)		1	2
Baltisch Port (*Paldiski*)		<1	1
Reval (*Tallin*)	1135	1	49
Port Kunda (*Kunda*)		0	2
Narva (*Narva-Jõesuu*)		2	2
Cronstadt & St. Petersburg (*Kronshtadt*)	1284 & 1299	111	467
Viborg (*Vyborg*, *Wyburg*, or, *Viipuri*)	1265	2	2
Borga (*Porvoo*, or, *Borgå*)		<1	0
Helsingfors (or, *Helsinki*)	1156	4	11
Hango (*Hanko*, or, *Hangö*)	1091	0	1
Dahlsbruck (*Dahlsbruk*)		<1	0
Åbo (or, *Turku*)	1101	2	2

Note – Ports listed east-about (i.e. anti-clockwise starting from Kiel)

[1] *NBESL*; A. Hammick ed., *The Baltic Sea: RCC Pilotage Foundation* (2nd edition, St. Ives, 2003).

[2] Nautical miles, calculated (*via* The Skaw) from, *Reed's Nautical Companion*, 1993.

[3] Compiled from *NBESL*, 1861, 1880; in 'Coal Import' columns, '<1' indicates under 500 tons.



Baltic Ports Receiving Coal Exports
from the Port of Tyne: 1861, 1880

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