European Seaport Systems in the early modern age
- a comparative approach

INTERNATIONAL WORKSHOP
PORTO - 21/22 OCTOBER 2005

proceedings

INSTITUTO DE HISTÓRIA MODERNA - UNIVERSIDADE DO PORTO

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Instituto de História Moderna – Universidade do Porto

Coord.: Amélia Polónia; Helena Osswald

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# Table of Contents

5... The Case for a Workshop on European Seaport Systems from a Comparative Approach

**Early Modern Seaports Research – Guidelines**

8... Early Modern European Seaport Studies: Highlights & Guidelines
*Gordon Jackson*

28... HISPORTOS – A research Project on Portuguese Seaports in the Early Modern Age
*Amélia Polónia*

**Sources, Problematics and Methodology in Seaports Studies**

42... Research Options and Archives Potentialities – The Hisportos Case
*Elisabete Jesus / Hugo Ribeiro da Silva / Sandra Brito*

49... Cartographic Sources – Research Problems, Exploitation Limits and Potentialities
*Miguel Nogueira*

56... The Hisportos Case – Scientific Options And Research Programme. The Possible Approach on NW Portuguese Seaport Studies
*Helena Osswald / Inês Amorim*

64... Hisportos Databases – Informatics Options, Virtualities and Limits
*Gabriel David*

69... Multidisciplinary Analysis of Historic Sources – the Geomorphological Approach for Territorial Planning and Management
*Filomena Cardoso Martins*

70... Multidisciplinary Analysis of Historic Sources – the Geomorphological Approach
*Helena Granja*

79... Climatic and Coastal Evolution During Little Ice Age: Some Considerations
*Marìa da Assunção Araújo*

89... Geo-morphologie du litoral et Hinterland: des relations difficiles a saisir. Hinterland des ports du Nord du Portugal et ressources forestières
*Nicole Devy Vareta*
...TABLE OF CONTENTS

Seaports Systems. A Comparative Approach

96... Portas para o mar: infraestruturas portuárias nos Países Baixos na Baixa Idade Média
Louis Sicking

107... Le port de Cadix: Innovation technique dans un contexte de construction d'un système portuaire
Juan Torréjon Chaves

115... Population Growth, Infrastructural Development And Economic Growth: Amsterdam And Lisbon in the 17th Century – A Comparison
Cátia Antunes

132... From a Natural Safe Haven to a Structured Seaport – Porto and the Atlantic System
Amândio Barros

148... Port Development and Technical Change C.1700-1900. Outline Summary
Gordon Jackson

Conclusion

Hisportos – Partial Results and Products. Programme for the Next Steps
Amélia Polónia
THE CASE FOR A WORKSHOP ON EUROPEAN SEAPORT SYSTEMS FROM A COMPARATIVE APPROACH

The coordination team of HISPORTOS has appealed, since the very first moment of its constitution, to national and international debate on seaport studies from a multidisciplinary approach, in individual and institutional as well as epistemological and methodological terms.

Several European researchers and teams currently develop seaport studies according to their own guidelines, frequently without establishing contact among each other.

Furthermore, the main debates today on the history of seaports are focused on the definition of seaport networks, seaport hierarchies and complementarities, and seaport systems. Therefore, research teams should be aware of each others' work. It is, thus, imperative to define work gridlines that could be applied to several case studies, in order to obtain comparative results.

Defining seaport models, another goal of seaport experts, also demands teamwork in international cooperation, which presumes institutional and individual contact between experts. But it also presumes, at a more modest level, the development of micro approaches to seaport infrastructures and seaport spaces so as to achieve more comprehensive models.

This is one of the clearest conclusions reached by the Hisportos project, which, after four years of collective work, reveals the urgent need for international discussion around concepts and methodology on seaport history within Europe.

For this reason, we invited, from among the international participants, one of the most prestigious and highly renowned experts on European seaport history, Professor Gordon Jackson, whose presence is a honor for us all, as well as three other researchers on seaport History: Cátia Antunes and Louis Sicking, both from the University of Leiden, Cátia Antunes being also a fellow countrywoman, and Juan Torrúen Chaves, professor at the University of Cadiz and an expert on Cadiz seaport history and construction, for whose presence we are also grateful. We further invited Agustín Guimera, a specialist on seaport systems, and Gérard le Bouedec, from France, whose work on French seaports on the Atlantic front is well-known, but their presence could not, unfortunately, be confirmed.

A considerable number of the speakers are members of the Hisportos team, since this workshop is, to some extent, a meeting point and an official closing event of the project's activities. It is our hope, however, that our joint work can be continued in the coming years. We are also exploring the possibility of presenting a Hisportos 2 Project, to give continuity to all the paths this project has opened, but could not conclude.
We thus welcome, beside the colleagues from the Department of Geography, João Carlos Garcia, Nicole Vareta and Assunção Araújo, Miguel Nogueira, responsible for the Cartography Office, Filomena Martins and Helena Granja, from the Universities of Aveiro and Minho respectively, and Amândio Barros, also from our University.

Finally, we are very pleased to announce the participation of two of our main young researchers: Sandra Brito and Elisabete Jesus, as well as for the presence of Sara Pinto and Patrícia Costa, two of our most recent yet valuable research assistants. I take the opportunity to mention Hugo Ribeiro da Silva, also a young team member, who could not, unfortunately, be present at this session.

This workshop was conceived so as to be able to, simultaneously:
1. increase contacts between European teams
2. update knowledge acquired by the several work teams
3. update and propose new research topics and investigation areas and, possibly,
4. prepare research work according to a joint program
5. create the basis for a research team network following European standards.

Whether these goals are too ambitious or, on the contrary, outdated, will comprise one of the topics for discussion in the round tables proposed.

So as to accomplish these goals, we have structured a program divided into four sessions, whose objectives are the following:

1. The goal of the first session is to present some research guidelines in Early Modern Seaports, from both the European and Portuguese viewpoints.
2. The goal of the second and third sessions is to discuss operative concepts, and also research problems involving sources, methodology, database construction and cartographic reconstructions, and, last but not least, provide an opportunity to cross-reference historical materials.
3. The last session aims to provide a comparative overview on European seaport systems, even through by means of a sample which we hope is representative.

The workshop seeks to boost wide-ranging discussions among the speakers and the public on central issues in seaport history, and we have thus proposed English or French as the “official languages”.

Finally, we wish to thank to the sponsors of this meeting, The Faculty of Arts of the University of Porto, through the Department of History, the Foundation for Science and Technology, and the Administration of the Ports of Douro and Leixões, whose financial support have made this event possible.
EARLY MODERN SEAPORTS RESEARCH

- GUIDELINES
EARLY MODERN EUROPEAN SEAPORT STUDIES:

HIGHLIGHTS & GUIDELINES

Gordon Jackson

When Ralph Davis, the leading British maritime historian of his generation, persuaded me, exactly 50 years ago, to write my PhD thesis on the Port of Hull in the Eighteenth Century, there was, so far as we could discover, not a single academic history of a British port. There were plenty of eighteenth and nineteenth century antiquarian histories ‘from the earliest times’, full of romance and great names — Hansards from the Baltic, home-grown smugglers, pirates, press-gangs and ‘great merchants’ who, like William Wilberforce of Hull, played a well-remembered rôle in national politics. They were full of facts illustrating the supposed greatness of the British: the Romance of Ports; the Romance of Commerce; and the worship of warships. But Ralph Davis was adamant that facts are meaningful only in context, and I was sent off to London to ransack national archives for anything I could find on British trade and British ports in general — before I began serious work in Hull itself.

Since there were no published works to provide guidelines I had to make them up as I went along, and these have been expanded and changed over the last forty years. But the central theme was easily developed over time. Clearly the history of ports is of necessity complicated, and the easiest way to understand the complexities is to regard port history as a leading constituent of economic history. So: three texts above your bed or on your desk:

- Favourable factor endowments
- Factors of Production: Land (Resources), Labour, Capital
- Knowledge and Connections

And a warning:
- There is rarely long-term permanence in the life of ports

1. University of Strathclyde, Glasgow, Scotland
'Early' Ports: A Romance? Nineteenth Century invention of a mythical past?

Ports have existed since 'Ancient times' and were celebrated as part of the nineteenth century fixation with the archaeology of lost worlds and dead languages. The Egyptians, Greeks, Romans, Phoenicians — and Vikings — all had ships and ports, and poets to write about them. They were useful for trade & Odysseys, but since it took Odysseus 10 years to get from Troy to Ithaca it is just as well that the Maritime world moved from Greece to the West and North where Vikings — according to their Sagas — did things much quicker. But ports supported conquests and incipient imperialism. Romans in the Mediterranean secured corn from Africa; and in the North conquered Britain in search of corn, wool and tin, to be followed by the Angles, Saxons and Vikings in search of booty or living space. For Britain and France ports were, from 1066, the means of extracting value from Saxon peasants and providing luxuries for new rulers; and later for the incessant warfare between the two monarchies. However, the real purpose of trade which developed after invasions was the exchange of favourable factor endowments. Some regions lacked materials, others food; and trade was commonly determined by climatic zones: wood and tar do not mix with wine, or coal and salt with herring. Port People use their knowledge to shift things round and even things up. Port Historians use records to understand the nature of production and consumption and the methods adopted by Port People for balancing them.

So far as the evolving physical structure of ports is concerned it is useful to start with the earliest and to consider the spatial development model published by a British geographer, James Bird, in 1963. This is more appropriate for major than for minor ports, and for Britain’s flat-land ports rather than Porto with its hills, but two of his concepts are part of any port: Water site and Water situation, both of which can determine a port’s success.

The water site is, quite simply, the physical structure such as depth of water, waterfront land and staithes (or quays) of the port itself, and its relationship with its close surroundings and wider hinterland. Some early ports were simply shore lines in sheltered bays; small vessels beaching on the pebbles, sand or mud. Landing places might be built if foundations were suitable: wooden staithes required piling, and stone quays required rock foundations. Many beaching places — they were hardly proper ports — were still used in the nineteenth and early twentieth centuries, especially for coastal coal deliveries, and in some shallow imperial ports where steamers used their own derricks to off-load into barges. Flat-bottomed steamers called ‘Puffers’ were built for over-side working in Glasgow to serve its extensive coastal distribution trades on the West coast of Scotland.

More usually ports were either near the mouth of tributaries or rivers entering the sea, sometimes both. Or they were up rivers at suitable bridging places. River ports were well integrated with the hinterland transport & trade routes, and their rivers avoided poor roads to and from the coast. They were usually market and/or fair towns, and

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often were – or became – religious, legal and political centres, especially on major rivers such as the Rhine, Maas, Scheldt, Danube, but also the Elbe, Weser, Clyde, Thames, Seine, Gironde, Loire, Rhone, Tagus, Duoro. Ports on these major rivers usually had very substantial up-river hinterlands, and we need to know how they interacted with the surrounding countryside.

In order to examine the port structure and its success it is essential to know whether they came under Royal, Aristocratic or Ecclesiastical domination, and how far this affected their operations through taxes and physical controls. When did they acquire independence? Glasgow, for instance, rebelled against its archbishop, and welcomed the ‘Glorious Revolution’ when the Stuart monarchy was expelled, and ‘William & Mary... declared the town free.’ It was controlled thereafter by the City Council which maintained the harbours and encouraged both trade and industry. On the other hand, Glasgow also suffered depredation several times by marauding armies, and it is important to note how far up-river ports, with their area’s chief or only bridges, suffered in this way, especially in the seventeenth and early eighteenth centuries.5

Port Facilities in upriver ports were obviously determined to a large degree by the width of the river and the condition of its bottom and banks, as well as the flow of water. Embankments depended on the foundations, and the best were obviously founded on rock. Generally there were wooden or stone quays on one side of rivers, with simple cranes or large Treadmill Cranes.6 Use of both banks of rivers was rare because they increased congestion in the river and hampered through traffic and the transfer of goods to up-river barges. More seriously, all early ports had city walls, and these were almost always practical on only one side of the river.

The way in which a port handled and stored goods is also important because of the time loss and labour involved, as well as the potential for dishonesty and theft, which in London led to massive warehouses and walls for the East India Trade, and the creation of the Police Force to protect sugar cargoes highly susceptible to pilfering. Early engravings of ports in Northern Europe (and in Portugal) show narrow quays and (wooden) staithes fronting onto the waterside to the front and merchants warehouses to the rear, with their houses above or behind the warehouses, and fronting onto the streets behind them which were used to disperse goods by road to the hinterland. Mediæval topography commonly survived into the eighteenth century, an increasing problem as trade expanded.

This leads to a further troublesome aspect of port life and development, namely the ownership of property in ports. Open quaysides might be owned by city authorities, with the warehouses some distance behind them, which was not always convenient when goods re-shipped up-river or abroad criss-crossed cargo-handling areas. Many ports had privately-owned quays, which made it difficult for merchant apprentices to establish new businesses, an increasing problem as old trades grew and new trades developed in the eighteenth century. Private property in the immediate vicinity of port operations was always a physical and human obstacle to the periodic development of new and necessary port facilities; it also tended to raise their cost!

5 For the problems hampering Glasgow, see G Jackson, ‘Glasgow in Transition’ in D M Devine & G Jackson, Glasgow Volume 1: Beginnings to 1830 (Manchester, 1995), chapter 2.

6 The only surviving port treadmill crane appears to be in Harwich, in East Anglia, England.
It is clear that up-river ports on small rivers were losing their advantages by the late Middle Ages. Big ports on big rivers were vulnerable to warfare & political upsets in the seventeenth and subsequent centuries. Ports on narrow rivers suffered as they changed course or lost depth through silt coming down river or sand washing in from the sea. In England the south coast Cinque Ports of mediaeval legend sank behind their sand bars; in East Anglia Wells-next-the-Sea was no longer next the sea! They all lacked space for building, repairing and wintering ships, and there were recurring difficulties as vessels changed shape and size. The northern Cog, for instance, was a sizeable and deep-draughted vessel, but not easily sailed in shallow meandering rivers.

The second aspect of ports, their Water Situation, covered their down-river or direct contact with deep, safe and suitable seaways for transacting overseas business. This determined the early development of German, British, French and Spanish ports. With some exceptions, and depending on internal communications, ports on Western coasts do not trade Eastwards and ports on Eastern coasts do not trade Westwards, and this was especially true for Britain with dangerous seas around the north of Scotland and down the east coast of England. Not until the end of the eighteenth century were ship canals cut from the Clyde to the Forth, and from Fort William to Inverness. In the meantime, by the fifteenth century British upriver ports were declining as ships got bigger and trade increased. York moved its port functions to Hull; Lincoln to Boston; Norwich to Yarmouth; Glasgow to Port Glasgow and Greenock, and so on. The future lay with ports at the mouths of tributaries or in sheltered bays and estuaries, except for ports on wide and navigable rivers.

For substantial and dramatic change – in any period – it is wise to turn from geography to the growth or decline of enterprise and initiative amongst Port People. Although hydraulic engineering was an art well known in the ancient and mediaeval world, the forces driving the move to ‘modern’ maritime experience – and therefore ports – were chiefly intellectual. The Renaissance and printing press brought freedom of thought and experimentation, killing off the flat earth and other aspects of Mediaeval ignorance, enabling long-distance navigation and exploration, from which maps, charts, compasses, small arms and ship’s cannons offered a reasonable chance of safe return. Charts and maps based on Mediterranean experience were copied and used by Spanish and Portuguese explorers, and Navigation schools were founded in Seville and Lisbon. In 1492 Columbus famously found America; da Gama went eastwards in 1498 to Mozambique and Calicut; Cabral claimed Brazil for Portugal in 1500; around 1510 Albuquerque reached Java and the Pacific; and, rather late in the day Francis Drake circumnavigated the globe in 1577-1580.

It is also important that port history is founded on a clear understanding of the activities of non-port people, especially rulers, governments and the political and military elites surrounding them, whose decision-making rarely took into account the effects on the economic and social life of ordinary subjects, and especially the well-being of seaports dependent on stable hinterlands and good international relations which have, for five centuries or more, been regularly disrupted by wars and rumours of war.

7 In England Grimsby moved down the coast with its river’s mouth; Wisbech, more remarkably, started on one river and ended up on another, admittedly owing partly to drainage schemes.
8 One of the best accounts of maps and charts in English is: Kees Zandliet, Mapping for Money (Batavian Lion, Amsterdam, 2002).
Obviously empire was created by violence and a fair measure of cruelty, seizing territory, enslaving labour, prepared to fight off any potential take-over from rival Europeans. In such circumstances South/Central American bullion and luxury goods on the 'Spanish Main' in the early days of development were the happy hunting ground for assorted thugs, venerated — at least by the British — as State-approved pirates, welcome in their home ports in the English South West, so long as they did not steal from local merchants.9

By comparison with Spain and Portugal, the Dutch and British appeared to gain little more than plunder in the first European penetration of the 'New World',10 though in Holland's case resident Portuguese Jews ensured that a third of all exports from Brazil were destined ultimately for Holland.11 Their gains elsewhere were potentially greater as Eastward voyages in the wake of Portuguese explorers secured trading stations and ultimately territories in South and East Asia that became the envy of the rest of Europe. However, although Catholic Spain was viewed with caution after the Dutch won their Independence and the British repelled various Spanish invasions, the two Protestant nations turned to fighting each other to secure their overseas territories. The Dutch expelled the British from Spitsbergen and the East Indies, and the British expelled the Dutch, (and subsequently the French) from North America, and in this area Britain had the best bargain. Serious occupation and exploitation of Jamaica began during the Republic, when the Protector sent an army there and subsequently a ship-load of London prostitutes to raise a self-perpetuating labour force to produce spices and sugar. When this failed, slave labour was imported because Africans supposedly endured the climate and 'Fever' which decimated white settlers. Ultimately more important for Britain's 'Commercial Revolution' was the occupation of New Amsterdam (renamed New York) and the gradual spread of immigrants through the Northern Colonies and down to the Chesapeake from the late seventeenth century. They became powerful consumers of British products, as well as producers of tobacco, flax seed, wood and eventually cotton shipped exclusively in British or colonial ships to British ports under the terms of the Navigation Acts designed to increase Britain's mercantile income and naval strength. Britain became an entrepôt for a much wider area than Northern Europe, especially after taking partial control over India in the 1740s, and despite the efforts of other European countries in establishing their own East India Companies. In this, London was by far the chief beneficiary.

This westwards movement of people and 'Settler Goods', the return movement of colonial goods, and the concurrent acquisition of trading stations and territories in South and East Asia, with the subsequent interlocking of colonial and European trade, is fundamental to the way in which British, Dutch and other European ports interacted

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9 The economic and social activities of Bristol in opening up transatlantic and Mediterranean trade, together with the dynamics of the port's move from a Mediaeval commercial economy to an early capitalist one, is discussed fully in D. H. Sacks, The Widening Gate: Bristol and the Atlantic Economy, 1450-1700 (University of California Press, Berkeley and Oxford, 1991.)


for much of the next two or three centuries. In the Netherlands, Hapsburg territory until 1556, Amsterdam remained the chief entrepot between the Iberian peninsula and the Baltic, encouraging its domination of Northern European Trade, while their East India Company – VOC – provided luxuries desired throughout Europe and their territories were the prime area for expanding Dutch factors of production: new land and labour producing new goods and increasing domestic capital. Moreover, Amsterdam was also the major port handling the vast herring trade, based on the virtual monopoly of the fisheries which were a serious obstacle to British-Dutch accord in the mid-C17th. Nevertheless, in peace-time Amsterdam remained the entrepôt between Britain and Baltic ports, and Dutch ships were commonly involved (as they were in Portuguese imperial trade), relieving the pressure on Britain’s inferior stock of ships and on mercantile capital that was soon needed elsewhere. Amsterdam was also the centre of international payments and credit, something which was at the heart of port development. In tracing the success of ports the inter-relationship of their trade and financial connections, and their ability to use Dutch shipping, suitably ‘coloured’, is always instructive.

In almost every country one or perhaps two ports were - and still are - outstanding. In exploring the reasons it is important to bear in mind that early dominance may owe more to primitive politics than to trading skills. In Britain benefits accruing from expanding transatlantic territories and from Indian and South East Asian trade, were not enjoyed directly by all ports, or even the leading ones. London, with its excellent water site and situation, had always been the leading port, catering for the needs of its own population, especially the monarchy, aristocracy, government, church and, of course, the country’s greatest merchants, who grew fat on servicing (and in some measure creating) by far the largest and richest city, with the most demanding market and a high productive capacity from craft industry, supplying miscellaneous luxuries to the elite.

London also benefited from sixteenth and early seventeenth century joint-stock monopoly companies which were seen as a way of enriching both Crown and courtiers while making rich merchants richer. The Levant (or Turkey) and Russia (or Muscovy), companies, and especially the East India Company, were not closed to new capital, but traded out of London and were controlled by cliques of London merchants and shipowners with little or no input from other ports, whose merchants were ‘interlopers’ if they tried to circumvent the London Company’s monopoly, and in the case of the Greenland monopoly of the Muscovy Company found themselves facing battleships in the Arctic, in sharp contrast with the Dutch situation where each of the provinces had its own East India Chamber and whose chief ports (Amsterdam, Enkhuizen, Hoorn, Middelburg and Rotterdam) had representatives on VOC’s ‘Heeren XVII’, the governing Chamber.12

Most of the busiest and wealthiest British (and cosmopolitan) merchants operated in London, where, in the case of the East India Company, caring for its grand East-Indian and its huge warehouses and walled estate provided maritime employment for both rich and poor far exceeding that in any other port.

However, the Commercial Revolution did not inhibit the growth of old-established

12 This reflects the amalgamation of earlier companies in 1602; Davids & Lucassen (eds.), A Miracle Mirrored (Cambridge University Press, Cambridge, 1995), p.72.
trades and the regional ports were beginning to make their name in old and new activities, whether in the direction or the commodity composition of trade, or both, according to the dictates of their geographical position and their hinterland’s needs. Bristol, the leading South-Western port was early into transatlantic ventures and had a flourishing interest in Newfoundland dried codfish which was exchanged in Spain and Portugal for oil, wine and fruit, and she was also well-placed for Mediterranean trade, initially at the Marseilles entrepôt, which offered Eastern and Southern Mediterranean goods as well as oil and wines from Provence. By contrast Liverpool was of minimal importance until the early eighteenth century, when its port was significantly improved and its transatlantic interests began their rapid growth in time with the industrialization of Lancashire and its demands for wood, whale oil, turpentine, and eventually cotton (first from the West Indies and then from the Southern colonies), as well as the sugar, tobacco, spices and other luxury items that were turning into necessities. Moreover, while Liverpool did not trade extensively with Europe in her own ships, contacts were maintained via an extensive coastal trade, also booming throughout the eighteenth century. Further north, Glasgow, with minimal foreign trade and shipping in 1670, also experienced vast and rapid growth in many aspects of mercantile and industrial experience in the early eighteenth century. Her merchants thrived on importing and refining sugar, and by advancing capital to Chesapeake tobacco farmers Glasgow was by the 1740s dominant in the trade, importing more tobacco than any other British port, much of it re-exported to Europe, especially France, where Glasgow had acquired the state tobacco monopoly. Glasgow is probably the best example of a direct relationship between foreign trade and hinterland development, though much of it was in or close by the city itself. Transatlantic trade also involved large shipments of ‘settler good’ for people who made little for themselves, including products of the distilleries, ‘gasseries’, potteries, tanneries, forges and foundries, and of printers, shoemakers, woollen and linen weavers, hosiery knitters and by, the 1740s, cotton spinners, weavers and printers. More surprisingly, perhaps, was the export of locally-mined coal to growing towns in the colder parts of America. Glasgow was on the way to becoming the ‘Workshop of the Empire’.

Bristol and Liverpool, as well as dealing with America, also took part in African trade, sending out manufactures and salt to exchange for slaves for the Plantations, and also dealt in ‘settler goods’ for the plantation owners and ‘slave irons’ and ‘slave cloth’. Even the smaller western ports such as Whitehaven and Dumfries dabbled in transatlantic trade, importing sugar and tobacco, wood and spices sometimes for transhipment coastwise. Whitehaven, like other ports adjacent to coalfields, shipped coal to the Northern colonies, a trade which often goes unnoticed. Ironically some of this plantation-oriented trade was with Portuguese and Spanish America, the latter under the ‘Asiento’ treaties of 1743-50, the main beneficiary being the English South Sea Company.

It would seem logical that developments in overseas trade and domestic industry

13 Glasgow city was the up-river commercial, warehousing and industrial centre; trade was transhipped in her two satellites – Port Glasgow and Greenock – some twenty miles down river where it entered the Firth of Clyde

14 The importance of the tobacco merchants in the rise of Glasgow is discussed in T.M. Devine, The Tobacco Lords, 1740-90 (Edinburgh, University Press, 1990).
associated with the westward ‘expansion of Europe’ would shift the emphasis from Eastern to Western ports, but this was only partly the case. The growing importance of Glasgow, Liverpool and Bristol certainly outclassed all but London, which remained the leading ports with interests in all directions, and at least some manufacturing capacity and the great advantage of the financial sector in the ‘City’. However, the Eastern Ports played an indispensable rôle in developing both trade and industry, the leading ones growing substantially in importance in during C18th.

We are back to Favourable Factor Endowments. Transatlantic connections provided new goods and outlets for surplus population, but Britain still lacked many of the essential ingredients of industrialization on which export trades to her colonies and Europe depended. Industries requiring heat certainly developed on the coalfields in the hinterlands of the most serious contributors to industrial development: Glasgow, Liverpool, Bristol, Leith, Newcastle and Hull. But coal underground was useless without cribwood to line shafts and pitprops to support galleries. Factories and forges demanded building timber, scaffolding poles, malleable iron, acid steel, copper and tin plate. Cotton came from America, but linen yarn, oils, chemicals and dyestuffs, came from Northern Europe. Nor could Britain build large ships without Baltic ‘Naval Stores’ (masts, spars, oars, cordage, oak knees, sails, treenails and tar). So Hull on the east coast imported goods from Europe for its huge hinterland stretching almost to Liverpool. Without these imports there could have been no industrial revolution, and at least until the middle of the eighteenth century the ordinary things of life also came from the Continent, usually from Holland. A British sugar merchant might count his English barrels, but the staves came from the Baltic, and his office wainscot, candlesticks, ledgers, paper, ink, sand-shaker, tape, sealing wax, maps and globe were all Dutch, as was his coach or sedan chair. His house was decorated with Dutch pantries and paint, and protected by his insurance company’s Dutch fire pump against accidents in his Dutch fireplace. His children played with the latest Dutch toys while his wife, having put aside her Dutch Spinning Wheel, made China tea from the Dutch tea-caddy, at the Dutch tea table, while admiring her Dutch prints and paintings, understanding, as she squirmed within her Dutch whalebones corset, why well-built Dutch artists models appeared so willing to take their clothes off. Perhaps she calmed her thoughts by reading (with her Dutch glasses) her Dutch bible (to the annoyance of English printers) or perhaps only Spin-oza. One could continue for far too long through the world of printing, fine cloth, clocks, machinery, tools, and the brass, copper and tin-plate utensils, taps, and stills used in brewing, distilling, oil manufacturing and a variety of similar trades.15

The change beginning around 1740 was immense as Britain began to export manufactures she previously imported from Europe, such as tin plates, linen, pottery and edge tools, mostly manufactured in the hinterland of Liverpool, shipping to America, and Hull, shipping to Europe. The towns on a map of Hull’s river communications with

its hinterland read like a checklist of industrialization. (Figure 1) It is worth bearing in mind the close relationships between developing overseas connections, ports, and hinterland connections, in assessing factors facilitating or obstructing port development during the eighteenth and nineteenth centuries.

Understanding our own country's port and hinterland development is best set against the experience of other countries with different characteristics. Considering their early lead in exploration and annexation it is appropriate to ask why Spain and Portugal, initially successful, subsequently fell so dramatically behind Britain and Holland
in maritime affairs. This leads to consideration of the nature of early transatlantic mainland colonies. Did the slave economies on which Spain and Portugal concentrated have inherently inferior potential to the mix of Slave Plantations and settlement colonies suitable for European emigrants. Were the tropical colonial factor endowments unfavourable rather than favourable for anything but slave production? Did West Indian and Brazilian production fail to match the demands of the metropolitan market, or to stimulate industrial development and encourage ports to explore and create an interlocking colony-port-homeland economy? So far as Spanish America is concerned, was trade development warped by the relatively easy access to bullion and the lack of demand for settlement colonies?

Trading colonies will always, at least to some extent, reflect the economic and social environment of the home country. Does the lack of an expanding colonial colony reflect the social and political backwardness to be found at home? Almost inevitably a mercantile or industrial society tends to spread wealth a little more than an atavistic, autocratic and parasitic one. It is also necessary to ask whether it is possible for a society to be too rural and too agricultural to set the mercantile ball rolling. To test this I examined in great detail the isolated region consisting of Argyll and the Hebrides which stretches over 8,000 square miles of the west of Scotland but had only one two very minor ports, chiefly engaged with fishing. There was widespread poverty and starvation caused by the wet climate, very poor land, and too many living off those who did the work. One would not expect to find too many happy peasants in a country famed as Scotland is for its many castles. Nor would one expect to find such an area, with no manufacturing industry, engaging in profitable foreign or colonial trade. Paradoxically, the region had a great, though indirect interest in colonial trade and development: there was widespread emigration of excess population to the American colonies throughout the eighteenth century, and many reports in the 1790s echoed two cries for help in changing both society and economy: 'We Need Industries' but 'We have no Coal'.

Was this perhaps also the problem of arrested development elsewhere? On the other hand it is evident that hinterlands of ports in the warm south have a ready supply of wine, fruit and oil so long as economical transport systems are available. We might adopt a different approach: did Northern European countries have to search beyond their Borders more widely to live decently – like the people of Argyll? Britain was still relatively backward socially and economically in the sixteenth and early seventeenth centuries because of its lack of important resources, and developed enormously when they became available. Ignoring political susceptibilities, we might also consider how far the ports in Portugal, Spain and France were helped or hampered by autocratic rulers? Were they subsidized by the state, if only to create facilities suitable for battleships? What sort of customs regulations assisted or hindered the growth of trades which might have emerged if merchants had been allowed to follow economic rather than political incentives? Finally, in considering the interaction of major ports and imperial expansion we need to examine how far, and why?, the Britain colonies differed from those of Spain and Portugal, in terms of encouraging new industries in their hinterlands.

Were these differences caused by the ports, the colonies or the hinterlands? Was it related to the landholding? What sort of port-based industry was possible? Were industries discouraged by lack of demand or the ease of obtaining goods in exchange for oil or wine? In particular, how far was it an advantage to Britain that colonies in North America were British in population and culture, whereas those (including the British) in the Southern States, Caribbean and South America had more-or-less monocultures employing slave populations — with little consumption of goods from home. Indeed, what there was in the Spanish colonies tended to be supplied by British merchants getting round any official ‘Mercantilism’. British Jamaica was made a free port [without rigorous Customs checks] for this purpose. How far were Spanish and Portuguese ports engaged in supplying the colonial ports with goods which they themselves have secured from Northern European ports serving the Northern Industrial Revolution?

Most of these are questions relating to the benefits derived from European ports exchanging the products of each others’ hinterlands, or with the ports of their colonies. In any event it was not as simple as it sounds. Straight exchange may have happened in the distant past, but at least by the seventeenth century trade and shipping was far more complex, and settling payments in uneven trades was far from easy. Trade did not develop because someone in Newfoundland caught a codfish and someone in Sweden cut down a tree. Trade was created by merchants, shipowners or adventurers in home ports, or their agents in colonial as well as European ports. Since everything in trade depends on human knowledge and connections, a port’s ability to arrange and maintain suitable relationships was as important as the changes in its domestic hinterland. How did Glasgow, Hull or London – or any other ports – find suppliers or markets in Europe or the Colonies? The Mediterranean trades relationships had been long established, and the Northern European ones were organized by Vikings and later by the Hansard League of ports. British ports relied on these agencies, and then on the great Dutch entrepôt with some of this trade initiated or organized by Dutch merchants whose ships were often seen in British ports.

British transatlantic trades, on the other hand, were chiefly established by emigrants from and representing Glasgow, Liverpool, Bristol and London. In the 1690s Glasgow city council employed a Captain experienced in the transatlantic trades to teach others how to find their way to American ports. Was the same true of Porto or Lisbon? Within the ports themselves, mercantile and shipping information was spread through the Exchanges and Coffee Houses where merchants assembled. But for intimate knowledge of conditions abroad merchants in British ports were beginning to send their own Factors to maintain or establish connections. By 1700 there was a Glasgow Factor in Stockholm, selling Clyde herring and buying brass and pin wire, iron barrel hoops, malleable iron, steel and wood. There was soon a sizeable contingent of Scots in Sweden, who played a part in the establishment of the Swedish East India Company. A stint in the Baltic was not always welcome. One Hull factor (Henworth) complained to friends enjoying the lively society of Hull that he was ‘tied and nailed down in this hole [Gothenburg] by the fate of a younger brother’. With this sort of direct interest, three Hull firms were exporting 40% of the iron leaving Gothenburg by 1730.17

In listing the important issues in port development overseas credits and payments must be ranked highly. How did merchants in western Europe pay for timber from ports, or obscure shipping place, in Sweden or Russia? They looked to London or Amsterdam where someone was sure to be owed money in those places. In the eighteenth century the more generalized Bills of Exchange increased in popularity, but these still needed intermediaries if money was the be transferred speedily. In most ports leading merchants with widespread debts and credits began acting for their less active neighbours. In Hull, for instance, this happened almost accidentally. Robert Pease, who fled to Holland in 1663 following the Restoration of the Stuart monarchy, entered the oil seed trade there with the help of Dutch friends and in 1708 established an international business with sons in Amsterdam, Limerick and Hull, where Joseph Pease, who always maintained his Dutch connections, opened Hull’s first bank involved extensively in overseas payments. Wilberforce & Smiths, one of Hull’s greatest Baltic traders, also opened a bank, named Smith & Thompson’s because it was run by Thomas Thompson, their chief clerk and confidant. An alternative to this was Thorley & Co.’s bank in Narva to cover Hull/East Baltic payments from the other end.

Hull was not one of the greatest ports. Glasgow, Liverpool and of course London were much superior in trade and finance, and their overseas payments may have been more easily made because of the volume of business involved. In fact we know very little about this, and it would be interesting and instructive to discover how Iberian ports tackle this problem in trade management when they were dealing largely with their own colonies and also had British and presumably other foreign merchants resident in their ports? Indeed, how far was their colonial trade dependent on the Portuguese Jews resident in Amsterdam?

The Shipping Side

The provision of an adequate supply of suitable vessels was another of the tasks of Port People in the late-seventeenth and eighteenth centuries. British shipping was backward compared with Holland, and well into the eighteenth century British ports were relying on Dutch shipping to bring goods from the Baltic as well as from Holland itself, and small Norwegian vessels often brought wood on master’s account to be sold down the coastline. Many ports built their own vessels, though some, especially on the North-east coast, specialized in shipbuilding, but because of the lack of ‘naval stores’, which had to be imported from the Baltic, British North America soon began building the largest sailing ships, whose maiden voyages brought wood to Britain.

The traditional division of vessels into sixty-four independent shares allowed for single merchant ownership, but simplified the raising of capital by permitting groups of share-owners assembled by ‘managing owners’, made easier because, apart from huge East Indiamen, ‘ships’ were still small. The 100-tonner was the ‘handy size’ for most purposes, good enough even for the transatlantic run! Many were not ships at all by the true definition of ‘ship’ which was not a vessel but a specific rig. Brigs, Barques,
Snows and Sloops were all involved, the smaller vessels chiefly in coastal trade. As a result, a vessel was suitable for various routes, with the managing owner switching between voyages to secure maximum employment and ensure she was not caught in Baltic ice which might cost several months’ earnings. Does a similar search for maximum deployment apply also in Portugal? A variant on this theme of maximum deployment was the growing tendency for merchants who owned ships to use masters as supercargoes to sell outward cargoes and purchase return ones, especially common in British voyages to the West Indies. This sort of record appears usually in private merchant-shipowner papers which are fairly scarce in Britain, or in Court Cases which may be full of detail but very difficult to find.

For Britain, rapid industrialization from the mid-eighteenth century demanded a corresponding increase in shipping to carry the resulting trade. Some of these vessels were trade-specific, such as Glasgow’s large ‘tobacco fleet’, the East India Company’s ships, and the Whaling fleet, which were subject to special regulations. For other vessels, which were not registered by the State before the Registration Act of 1786, information is less easily available. In consequence it is not easy to trace who was funding the new vessels in the eighteenth century and whether they coincided with the emergence of shipowning as a separate profession. In Britain the first specialist shipowners appear to have been those owning whalers, which were not involved in normal trade except between seasons. They were very expensive — as much as the insurance valuation of Arkwright’s first three cotton mills — and usually owned by small partnerships, some of which owned more than one whaler. Colliers, of which large numbers were engaged in fuelling London from the Northeast coalfields, were also usually trade-specific, and owned in fleets, especially in Whitby, with a bay suitable for wintering them.

It should be noted that both whalers and herring busses were subsidized in Britain because both were seen as a valuable source of sailors in war time, and whalers in particular were valuable as naval auxiliaries. Were vessels subsidized in Portugal?

Although Major ports undoubtedly played a great part in economic growth by importing raw materials and exported finished goods, we must remember that there was a great demand by the middle of the eighteenth century for new ports, especially for the coastal coal trade, but also for the distribution of things such as China clay, lead, tin, and of course the foodstuffs demanded by the growing industrial towns and London. Coal ports sprang up on the east and west coasts, wherever there was coal adjacent to the sea in Scotland, Wales and Northern England, some with direct rail connections between pit and quay. In the nineteenth century Cardiff became the leading British port in tonnage terms because of vessels carrying coal all over the world, and even the ‘commercial’ ports such as Glasgow and Hull tended to have a larger tonnage of shipping engaged in exporting coal than in general commerce. For this reason, if for no other, a

19 English Court of Admiralty records are in the Public [i.e. British] Record Office, Kew, while Scottish Customs and Court of Admiralty records are in the Scottish Record Office in Edinburgh, which also has a vast holding of Court of Session Records dealing with industry, merchants and trade. The burgh records of many but not all ports also contain much local information, especially about the harbour structures.

20 Jackson, Hull, Chap. VI, deals with the development of the shipping industry, and Jackson, The Trade & Shipping of Dundee, 1780-1830, Chap. V, examines Dundee ships and shipowners. The standard work on collier owners is S. P. Ville, English Shipowning during the Industrial Revolution, 1770-1830 (Manchester, 1987).
large number of ports were created to export large amount of coal and other minerals and were distinct from the commercial ports which grew in size rather than in number to serve the changing economy, new commercial ports being very largely nineteenth century creations by railway companies.

It is necessary, therefore, to examine the functions and performance of the Minor Ports, which were actually the majority, and many of them boasting a notable past, though some never handled foreign trade.\(^1\) Their hinterland connections were generally poor in size or transport, and their water sites unsuitable for the larger vessels of the eighteenth century. Nevertheless they provided a necessary and cheap contribution to the regional distribution network, particularly for foodstuffs and coal, the latter sometimes landed overside from beached vessels. They also shipped raw materials from primitive quays or piers that sea-going ships could not have used with safety. Moreover, minor ports also interacted with nearby major ones by distributing their foreign imports sent coastwise, and collecting goods for export by them. More directly they provided labour for shipping and other port work, sending boys for apprenticeships, and in some cases providing ships and masters to their bigger neighbours - as in the Glasgow tobacco fleet, with ships from the minor ports to the south of the Clyde. In these and other ways minor ports (often the leading town of their area) were essential to the smooth functioning of both coastal trade and some elements of foreign trade. They might have been small cogs, but even small cogs help the wheels of commerce to revolve!

The decline of the Merchant?

The eighteenth century witnessed the rise of the old-established major commercial ports to a position of great importance in the economic development of Britain, though trade was not the only factor contributing to that growth.\(^2\) In this movement the old-established Port People generally took the lead with their mercantile information, access to shipping, established overseas and inland connections, credit-worthiness and assured means of payment. However, towards the end of the century the rise of the shipowner appears to be related to the decline of the great merchant houses. Many leading British merchants retired to their English mansions or Scottish castles; Castle Toward, on the Clyde, sheltered Kirkman Finlay of Glasgow, M.P., whose flourishing trade and cotton manufacturing business is the only eighteenth century one known to be still in existence.\(^3\) Of the Hull house Wilberforce & Smiths, Wilberforce was in Parliament and Smith was a peer; and soon their chief clerk, Thomas Thompson, also entered Parliament. Hunting, Shooting and Fishing was – quite literally – taking over merchant inter-


\(^2\) This may not be what happened in other countries. It would, nevertheless, be instructive to know the relationship between trade and economic growth in Portugal.

\(^3\) James Finlay & Co shifted from Scottish manufacturing to Indian manufacturing and tea merchandising with 74,000 acres of plantations. Anon., *James Finlay & Co, Manufacturers and East India Merchants* (Glasgow, 1951), p.47.
Did it matter? Mercantile Information was now generally available through Newspapers, and in many ports merchants had their offices some distance from the riverfront and left the handling of goods there to a rising group of Agents and Brokers who acted for merchants and shippers. This was especially the case when the shipping side moved to deeper water and more land space; Greenock Agents began handling goods for Glasgow merchants, twenty miles up-river. Moreover, with Newspaper advertisements of ‘ships laid on’ inland manufacturers no longer needed to use merchants as intermediaries, but could use supposedly cheaper Agents instead. By the 1780s Customs ledgers were including Agents names along with the owner of the goods. With companies such as Boulton & Watt sending travellers with catalogues and samples to the Continent it may have been less necessary to employ an export merchant, but finding ever more raw materials abroad still kept the knowledgeable import merchants in business.

For the early nineteenth century the case of Thomas Wilson of Hull is instructive. Having been apprenticed to Hull’s leading iron importer he apparently inherited the business, becoming in turn one of Hull’s leading Swedish traders. Deciding to employ his own ship he bought a small sailing vessel (mortgaged with a Northern partner) and eventually expanded into steam having secured the Swedish Mail contract. Trade apparently ceased and Thomas Wilson & Sons ended with the largest steamer fleet in the world by number of ships in 1913, running shipping lines as far as America in the west and India in the east, but especially to Northern Europe.

The impact of timetabled regular liners was twofold. On the one hand they supplied ports – not necessarily their home ports – with an assured service. On the other hand they finally separated merchandising from shipowning. Much depended on their loyalty, and a port without its own shipping line might have difficulty attracting ships, whatever goods were being offered. The arrival of steam lines and railways made matters worse for traditional Port People because they allowed the development of new railway ports such as Grimsby, but did not provide the shipping. When Grimsby dock was opened a banner was tied to the Hydraulic Tower ironically announcing ‘Ships Wanted’. They never came, and here, as elsewhere, railway companies with new ports were forced to buy their own shipping line, with which they established ‘through traffic’, for example from Manchester to Berlin. The new port of Manchester is perhaps the best example of inexperienced port builders who failed to realise that ships do not appear automatically out of sea mists (or in their case canal mist). They had to buy a Manchester fleet.

Port Systems?

There have been many conferences on various aspects of Port Systems. The Association for the History of the Northern Seas conferences usually consist of comparative studies of specific themes. The eighth, in Bremerhaven in October 2005 was on Crisis and Transition in the North Sea Region. The International Maritime Economic History Association and International Commission for Maritime History hold regular meetings

24 Hunting was a safer pursuit. William Wilberforce, who was short sighted, very nearly shot his close friend, Prime Minister William Pitt.
at which the maritime experience of member nations around the world is explored. In October 1995 there was a similar conference in Madrid, *Puertos y Sistemas Portuarios* (Siglos XVI-XX) at which Jacob Price, examined *British ports & the Tobacco trade*, the late Frank Broze tackled *Ports and port systems in the Asian Seas* Maria Sirago spoke about *The Italian Port System* and Gordon Jackson about *The British Port System*. However, But I am still not clear how we should deal with the subject of Port Systems, and particularly international systems.

What is a ‘Port System’? Indeed, what is a ‘System’? The Standard *Oxford English Dictionary* offers three definitions: (a) “An organized or connected group of objects” which British ports were certainly not. Apart from a very brief period after WWII nobody has ever tried to organize British ports. (b) “A whole composed of parts in orderly arrangement according to a plan”, which again is laughable in the British context; and (c) “A set of things connected, or interdependent, so as to form a complex unity”, a definition which might just reflect reality. In the inter-war period a British economist wrote that “The British do not plan to plan; they plan to muddle”. It was not a joke!

My own studies of port development over time would certainly support only the last definition. I studied a series of individual ports while building up evidence about the ‘system’ as a whole: Aberdeen, Leith, Dundee, Montrose, Hull, Grimsby, Glasgow, Liverpool, London, Cardiff, and many other places in less detail, though my trade and shipping statistics cover all British ports. This material provided the basis for a context against which ports might be examined in *The History and Archaeology of Ports*. But for this it was essential to study individual ports in depth and to set them in context in a variety of ways:

1. **Their Hinterland:** How good is its economic potential and development, its production and consumption of trade goods; how did its population change; what transport developments occurred?

2. **Their Purpose:** What service do they offer to the hinterland?; what is unique about it? Did they fulfil that service? Or are they engaged principally in Coastal Trade? What part did ports play in feeding their hinterland?

3. **Their People:** Were the merchants enterprising and capable of initiatives in the hinterland. Did they establish adequate contacts with credit-worthy merchants abroad? Did they employ Factors abroad to search for new suppliers and consumers? How were they recruited and trained? Did the mercantile elite contain foreign merchants who raised the over-all trading ability of the port? What about the Workers: How were these employed? Did trade fluctuate during the year? What did Port Workers do when trade was slack?

4. **Their Shipping:** Were the merchants able to provide the required ships with, or without the assistance of other contributors. How were ships owned? Were they profitable? Were they built locally?

5. **Their Financial capability:** Had the port people established their credit-worthiness in international trade? Did they arrange finance for themselves or through

25 The lectures at this conference were published in A. Guimera y D. Romero (eds), *Puertos y Sistemas Portuarios Siglos CVI-XX*. (Madrid, 1996).
another port such as London or Amsterdam? Did they have Banks which facilitated the development of the port. Was there adequate insurance available for shipping and goods? How did they organize and pay for port improvements?

6. **Their port-based Industries:** Had the processing of imported raw materials such as sugar and tobacco and fibres added to the port's self-contained economy and employment patterns? Did it make goods for export? Did the port build and maintain its own ships?

7. **Their National Support:** Did they benefit from State imperialism using superior military and naval power to annex overseas factors of production? Did the State build or subsidise ports and interfere in their affairs for good or ill? Did the State develop its naval/military power to assist territorial acquisitions in the interests of trade and ports — as in the acquisition of Africa slave ports for supplying colonial plantations? And did the State, by engaging in warfare, assist or hamper port development? Did the State subsidize trades or port facilities?

8. **Their port facilities:** Topographical situation and physical structures are important to any port, and in any comparison they should be taken into account. What form did they take? Piers, Quays, Docks, or oversee working? Was the engineering good, and how was it adjusted (and paid for) in accordance with need? Who owned and managed the port facilities? Were they competent? Was there adequate space for the storage of goods? Was this publicly or privately owned? Was there a State interest in taxing shipping or trade. Was the Custom House adequate for the trade of the port, and conveniently situated? Did it have a bonding warehouse? Was it suited to the flow of trade? How did port facilities interact with the changed in shipping over time?

9. **Their Social life.** Although I don’t think this is mentioned in my *Ports Book*, it is important in individual port studies to survey the way in which port society differed from other towns and cities, and the way in which port societies worked at all levels.26

Adding all this together does not imply that ports were part of a system serving the national economy. They appear to be a collection of independent places interacting with each other according to their advantages which change regularly with the direction and composition of trade and the size of vessels. The national economy clearly influences these changes, but the major problem seems to be the accelerated changes which occur because of Government activity, particularly in waging war and achieving foreign trade agreements (such as the Methuen treaties, 1703 which facilitated trade between Britain and Portugal), and the imposition of taxes and restriction or prohibition of trades.

Obviously ports secure and dispense goods *appropriate to their hinterland* and this clearly differs from port to port. The country is not so arranged and the transport possibilities are not such that trade can be shared out between ports. So from that point of view there is no *system* in the sense of collaboration and parts of a whole. But the ports between them do cater for the whole business of the country. For this reason I find it difficult to talk of a port’s *Hegemony* or *leadership*. It may be at the top of a rank-

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ing by volume or value of trade, number of ships, and so on. But its trade is limited by its hinterland. Liverpool exported more cotton goods that Cardiff, and Cardiff exported more coal than Liverpool, but this was not a competition. Liverpool had a cotton hinterland and Cardiff had coal. Of course Liverpool interacted with its hinterland by importing raw cotton so may be said have facilitated or fostered the production of cotton, but Cardiff could not import raw coal, though presumably it had a flourishing trade in pit props. Many ports shipped coal without being in competition since they served different coalfields, or handled different sorts of coal, of which there were many.

Competition between ports in the same country came when the spread of railways allowed the cross-penetrations of hinterlands, the level of port charges might persuade inland customers or shipowners to use one port rather than another.— but only if the railways overcame the ‘private hinterland’ which port people hitherto enjoyed.27 Similarly, if we talk of Hegemony when reviewing ‘leading’ ports in ‘leading’ countries, are we actually considering their national or their international status? Are these ports engaged in international competition, and if so, how did it work? This might be true of modern ship operations where container or bulk carrier companies decide which countries’ biggest ports will be one of the five visited by their computer-operated giants. But again, I am not sure that it is meaningful for eighteenth and nineteenth centuries ports, except perhaps in phrases such as ‘Amsterdam was Europe’s leading port’, which it certainly was; but it was never Europe’s leading coal port, though it may lead the world trade in Dutch cheese.

In any case such statements might first be set against the National standing of ports, and this meant, for me, the detailed examination of National trade & shipping records, showing direction and composition of trade; Local Government records and statistics, which often contain details of what people were doing and thinking; and private mercantile papers (as available) which reveal things not to be found in ‘public’ papers.

Should ports be assessed by the value of their trade?

If we follow the usual course we encounter statements of value, because that is what interested the officials drawing up Customs statistics, and because that is a component of the ‘balance of payments’ which most concerns economists, governments, and many economic historians to the present day. The value of trade may well have a bearing on the wealth of a particular port, either directly through profits derived from valuable imports or exports, or indirectly through the value adding by processing imports, especially sugar and tobacco. From this standpoint some ports bring more wealth into the national pot than others, though this may appear more in the wealth accruing to the Treasury than in that enjoyed by the lower level of port and shipping workers. But does that: cover all aspects of a port’s contribution to industrial or general social well-being? Boxes of bullion may well stimulate demand, but cotton factories are perhaps less dependent on imported silver than on imported cotton, and you cannot make acid steel with imported silver.

Or by the volume and commodity composition of trade?

The interaction of ports and their trade with industrial and social demands is more easily learned from the far more complex statistics of commodity composition which show the vast range of imports that kept the British economy going, and without which the British people would have starved; indeed, Customs figures show that 1771 was the year in which Britain became a food importing country. The volume statistics show the impact on port structures of increasing trade flows, or, in reverse, how ports adapted or changed their physical structure to cater for increasing demand. These changes can be followed in evidence given to support the Acts of Parliament which were required for harbour works to take place.28

It is fairly obvious which are a country's major ports. Their hinterlands can be mapped, and the volume and commodity composition of their trade goods can be linked to the demands of industry, and compared with similar activities elsewhere, while the total volume of shipping entering and clearing is an important physical measure of their importance.29 But how are we to compare Cardiff with Bristol, not far away yet completely different in commodity composition of trade? It seemed best in the British case to group ports by their chief purpose and the sort of facilities required for their primary trades. Coal ports enjoy a far greater through-put of goods — and therefore shipping — because their handling methods were completely different from, say, those importing large amounts of wood requiring extensive handling and storage areas, and ports handling valuable and small parcel goods requiring huge or secure warehousing capacity. It is also possible to take into account the number of foreign trading connections. The number, tonnage, and type of shipping owned is also an important indicator of status, especially with the development of steamshipping with timetabled lines and dedicated berths which assured that trade would go via 'their' port.

So far as major ports are concerned it is necessary to bear in mind that they also had a leading role in the regional distribution trades and consequently had serious problems caused by the necessity of accommodating large numbers of coasters, which hindered the working of larger vessels.

Medium ports are less of a problem because they were much smaller and often trade-specific, shipping or importing coastwise coal and other minerals, grain, beer, live animals, salmon, lobsters and crabs; or London's dirty clothes, laundered in Perth! Some handled the Mail and passenger packets crossing the Channel and the Irish Sea. Many of them — such as Whitby — were important for owning or sheltering ships used by the Major ports and supplying seamen and apprentice merchants. Since these smaller ports played an essential role in regional distribution trades, they too were important to the national economy and should not be overlooked despite their lack of significant overseas business.

Comparing ports in different countries is a far more difficult exercise. Listing ton-

28 This means that we have details of all the engineering works and of all the engineers from the eighteenth century. See D. Swann, 'The Engineers of English Port Improvements 1660-1830', in Transport History, Vol 1, No 2 and No 3, (1968).

nages of shipping and value of trade does not work so well if the ports are situated in differing economic, social and political structures. A port which is highly subsidized for political reasons may well have better facilities and cheaper rates than one which is not so favoured. If we regard ports as servants of specific economies it seems hardly just to compare ports in two or three different economies, especially when ports suffer from the mal-functioning of the international economy which may affect different countries in completely different ways. It might be more realistic to use their percentage of the total trade of their own countries, and make allowances for the relative size of those economies. What, in any case, do we mean by competition and ranking? ‘We are the biggest/best/fastest/and lots of other things port’ looks rather like Port Authority publicity. It is easier to understand it when real competition is possible. The best example of this is when two ports serve the same hinterland, and the best European example is the current ‘competition’ between Rotterdam and Antwerp, both of which have good access to the Central Europe. Rotterdam is immensely attractive as the European Gateway for global traders, largely because huge amounts of money and planning were lavished on it while Britain was busy shutting down ports and the industries for which some of them existed. Now various European countries are trying to establish their own ‘Gateways’ for transhipment to smaller vessels, from Glasgow in the North to Bilbao in the south, but the most determined is Antwerp. It is, however, interesting to read the literature from the aspiring companies. Ports used to be thought of in terms of their service to the economy. Now they are seen in terms of profit for their owners, and this is now largely derived from property development on their urban ‘land-sea’ interface while port business is conducted in deep-water down-river ‘terminals’ employing only a fraction of the former workforce and importing the goods produced by more active low-wage economies which now have the world’s most active ports: all save Rotterdam are in the Far East. The part which these played in South and East Asian developments in the twentieth century may well be instructive in a study of the rise and fall of European ports.

30 It may be unfair to argue in this way, but that is what I glean from publicity by Clydeport and Hull, and in the most substantial work on modern competition: R Loyen, E Buyst & G Devos, Struggling for leadership: Antwerp-Rotterdam Port Competition 1870-2000 (Heidelberg, 2003)

HISPORDOS – A RESEARCH PROJECT ON PORTUGUESE SEAPORTS IN THE EARLY MODERN AGE

Amélia Polónia

Abstract

The main goal of this paper is to present, briefly, the research Project HISPORDOS – A contribution for the history of NW Portuguese seaports in the Early Modern Age (POCTI/ HAR/ 36417/00), in which development this workshop is integrated, making part of the outcomes planed since the beginning of our research program. The project, submitted to financing of the Portuguese Foundation of Science and Technology, began in October 2001, and must be finished and evaluated in October 2005. This meeting is, in some way, a closing event.

We intend to discuss the pertinence of the scientific goals of the project, its accuracy in the global panorama of Portuguese and European historiography on seaports, the main guidelines which direct our research program; the constitution of its research team, and the nodal axes of its realisations.

This paper provides a brief presentation of the HISPORDOS Project – A contribution to the history of NW Portuguese seaports in the Early Modern Age. Holding this workshop is, in fact, part of the project, as it was planned as one of its outcomes from the very start.

The project has been funded by the Portuguese Foundation for Science and Technology and started in October 2001. It is due to be concluded and assessed in October 2005. Thus, this meeting is, to some extent, a closing event.

Some of the papers to be presented during the course of this workshop by project members are, in fact, reflections on specific issues of the research programme: sources, methodology and, naturally, obstacles and constraints arising or imposed during the course of our research. The main goal of this paper is to underline the opportunity of its emergence and the accuracy of its options in the European and Portuguese historiographical panorama.

* HISPORDOS, funded by FCT, POCTI/ HAR / 36417 / 2000

Ports have been centuries-old focal points of local, regional, national and international economic development and social change. Their major interactions with the hinterland, and, at the same time, with an extended vorland, have transformed seaport history into a major field of research, buttressing the understanding of historical transformations in economic, commercial, transport and technological networks, as well as industrial development and social and urban changes. Seaports are no longer viewed only as infrastructures, but as a complex system, resulting from economic, political, social and cultural forces; the gateways between land and sea, between the hinterland and the vorland, a nodal axis with reflections on territorial, economic, social and mental structures. They are also active agents in the process of modernisation and change, and have a role to play in the fields of technological innovation and in urbanisation processes. As a result of these dynamics, research on seaport history has achieved, in the last few decades, significant advancements all over Europe, even though it has focused particularly on economic and technological issues, and is mostly centred on the Modern period and recent History.

The discussion on the building of seaports during the Early Modern period is, therefore, a pertinent one. The important role played by ports in the early modern period (16th to 18th centuries) in Europe seems undeniable. They were essential in structuring political and economic spaces and comprised crucial junctions in supra-regional spaces. The mastery of new nautical techniques, the definition of a new network of routes, the increasing tonnage of seagoing vessels, all worked to increase the importance and prominence of maritime communication routes, from the coastal to the trans-oceanic.

In this historical period, the economic hegemonies were contested between cityports, such as Lisbon, Seville, Antwerp, Amsterdam and London. Connections between Europe and other continents were naturally based on ports, at the same time that the internal implications of those dynamics were, at the very outset, projected on maritime centres.

In fact, we firmly believe that the strategic centrality of the ports, especially seaports, in the Early Modern Age, has given rise to specific historic phenomena and dynamics that should be studied. The concentration of population, plus the centripetal nature of these maritime complexes, certainly generated demographic, social and mental phenomena that clearly set port zones apart from inland areas.2

Port movements themselves require complicated logistics, including supporting arsenals and warehouses. Royal control of commercial operations resulted in complicated taxation and supervision systems, consolidated in customs and excise structures and procedures. Larger vessels posed problems of access, which required the building of quays, the implementation of procedures to control entry to and departure from the harbour and even the use of specialised pilots, for instance. But in the 18th century it also became necessary to expand the artificial infrastructures to protect and guide the vessels.

2. On the concept of city-port, see FERNANDO MONGE, MARGARITA DEL OLMO – Un contexto de análisis para el concepto de ciudad portuaria: las ciudades americanas en el Atlántico, in “Puertos y Sistemas Portuarios (Siglos XVI-XX)”, Madrid, 1996, p.213 a 233. These historians state that “city-ports are precisely those in which the establishment of a port has concentrated a sufficient number of activities and people such that it develops the characteristic social fabric of an urban environment”. (Op. cit, p.221).
A context of growing shifts in “sea power”, due to the rise of the Anglo-Iberian and French conflicts, boosted military, political and economic power. The confluence of international fleets and lucrative trading traffic in key ports also motivated piracy and led to the need for defence and the construction of military facilities.

The dual exposure of these fronts, to land and sea, made them more vulnerable to epidemic outbreaks. Improvements in health protection facilities were also a feature of the internal dynamics of these spaces.

Along with this, advances were made in engineering, notably in the 18th century, at the same time that the royal authorities were awoken to the importance of investing in infrastructures - in bridges, ports and fortifications.

In fact, implementing an economic system centred on commercial changes, whether at a national, international or overseas level, processes in which seaports were central, led to significant investments by the central and local authorities in seaports.

Evidence of this impetus can be seen in the production of knowledge and representations regarding these matters. Navigation requirements and infrastructure interventions both led to the production of maps, especially in the 18th century, as well as intervention plans, accessibility studies and hydraulic engineering schemes. All these provided the historian of the early modern period with an increasingly more accurate picture of the situation at the time.

Both the cultural factors and the reforms resulting from the Enlightenment were responsible for a clearer understanding of the world and, thus, of the coast. This understanding was undoubtedly associated with the growing need for land planning, which consequently encouraged studies in Cartography and Statistics.

This was also a time when cities with seaports played a new role. Besides the economic issues, wars, piracy and military events, public hygiene and public health, also became a major concern, the reason and justification for a more effective intervention from the State in seaport affairs, which the local authorities were no longer able to deal with by themselves. Thus, individuals and local and central authorities concurrently proposed new forms of intervention, at the same time as engineering was offering new technologies in the building of harbours and infrastructures.

Different historiographical schools throughout Europe have developed studies on these and other issues, whereas there have not been a sufficient number of in-depth studies on the part of Portuguese historians to allow for the possibility of comparative studies with the Dutch, French, German, English, Italian or Spanish cases. Thus, a gap in this specific area of research had to be bridged so that international dialogue could take place.

Furthermore, in the last few decades, Early Modern European historiography has largely focused on the analysis of port systems and intercontinental seaport networks, paying particular attention to the overseas traffic system. This perspective is based on a theoretical conception of the existence of international seaport hierarchies and tends accordingly to be centred on a macroeconomic and international analysis. This type of

approach, which places emphasis on the analysis of macroeconomic spaces, underrates or even disregards the study of the internal dynamics and specific profiles of each seaport.

On the contrary, the Hisportos project, even though indebted to all this research, elected the micro level and the local and regional scales as its methodological starting point to study the seaports in NW Portugal, aiming to discuss the existence or not of seaport models. But models cannot be developed out of context, stripped of specific local realities, without resorting to the perception of possible diachronic evolutions in which, besides the general cyclical events and the policies of the central authority, local circumstances and specific conditions and features of each seaport interfere. If we accept that specific realities neither could nor should be subsumed in the general picture, simply because this is the outcome of those factors, then we should agree that the macro-analytical approaches are fraught with limitations that can only be corrected with a micro-analytical reading.

The theoretical premise of our research was, then, that a micro-analysis provides a crucial opportunity to review the levels of research and the thematic topics involved in seaport studies, facilitating the search for answers to questions that the macro approach is unable to give. It is our understanding that the micro-analysis provides researchers with a keener perception, since they can see, through this microscopic scrutiny, factors and issues that are diverse and heterogeneous.

Hand in hand with this, even though the geography of maritime scales insists on the international dimension of the European market, we must not forget the regional and interregional dimensions. This period, particularly from the 16th century, saw the consolidation of transport networks involving the coastline and the interior, some making use of the waterways as routes for shipping goods and supplying regional sub-areas. The organisation of roads accompanied this confluence of routes to the ports they served and connected with the vast rural hinterlands, and so the study of port zones is crucial to our understanding of the economic dynamics of far more extensive regions.

So it is important to examine other types of networks and complementarities, on a smaller scale and not simply that of the connections between the major ports, whether European or European and Eastern, or European and American. The historical protagonism of these great maritime centres often relied on local inter-port networks. In fact, from the point of view of logistics, shipbuilding, transport capacity, and the availability of navigation techniques, a cosmopolitan port in particular necessarily relies on other ports and on areas where agriculture and crafts were the predominant occupations, without which their dynamism would have been impossible to sustain. This is verifiable in the case of Lisbon during the period of overseas expansion. And hence it is important to study these local and regional interactions to better understand local situations, on the one hand, and international and intercontinental connections, on the other. It is also important to see a port in its complexity as a whole: human, social, urban, technical, administrative, and economic.

These are the goals and epistemological lines that guided the Hisportos project. Its aim was thus to study the ports of NW Portugal in the Early Modern Age (16th to 18th centuries), covering the areas of coastline shown on the map.
Some studies have in fact already been conducted on these seaports. In particular, Viana, Vila do Conde, Porto and Aveiro have already been object of academic studies, namely in the form of PhD theses. Their approach was, however, mostly directed at economic, demographic, urban and even social dynamics, without questioning or providing answers to four essential issues:

- in what way did geomorphological conditions interfere with the potentialities of each seaport;
- in what way did the crown, the local authorities and politics interfere with the construction of specific seaports and sea towns;
- in what way were the technological advances in Europe implemented in Northwest Portugal, through the mobility of engineers;
- how did the different seaports in these historical and geographical spaces work together and in what way were they part of a larger system – regional, national, European and intercontinental.

Based on these points of view, our team developed a research project in which the following aspects were central to the research plan carried out:

1. The geomorphological features and their interaction with historical dynamics;
2. The installation and subsequent changes in sea ports infrastructures;
3. The interaction between these port areas and the *hinterland* and *vorland*;
4. The organisation of the urban area;
5. The application of technological innovations, associated with hydraulic engineering;
6. The production of scientific knowledge on the territory (cartography, topography, hydrologic plans, ...)
These aims led to the constitution of a multidisciplinary team that includes historians, archaeologists, geographers, cartographers, engineers and architects. The team's purpose comprised in developing a research methodology and data gathering that would enable the area under study to be considered from a pluridisciplinary viewpoint, and consequently examine all of its geomorphological, historical and urban planning aspects.

The choice of the area, Northwest Portugal (see map), was validated based on geographical criteria – the characteristics of the coastline and port accessibility – and on historical criteria: it is common knowledge that the north-western ports played a specific and highly relevant role in the trading networks of the Early Modern Age. It has been clearly established that they interacted closely with the North and South of Spain and Northern Europe, as well as with an extended insular, African and South American Atlantic. These essentially commercial dynamics should not cease to produce implications for port infrastructures and for strategies of leadership and political and economic protagonism that need to be studied, case by case.....

Our standpoint, also stated by others, is not to assess the overwhelming importance of some ports over others, i.e., to try to establish a hierarchy of ports based on indices chosen in terms of the large ports, and which have therefore tended to underrate those that are on the fringes of such hierarchies.

What interests us here is to re-exam the role of small ports (defined in terms of concentration and distribution of goods, vessels, services, capital) and place them in a system. In fact, we have ignored their comparative rank and have appraised them for their intrinsic value, on their own terms. We are particularly interested in examining whether these ports became economically and socially essential (in the national, or even local, context), or whether they were built in response to circumstantial political opportunities and schemes.

This is a fundamental aspect which led us to re-ask many questions. With respect to this, besides the historical dynamics, we concentrated on studying the consolidation of port precincts, and port infrastructure, and their integration in the urban setting, assuming an active interaction between these variables. The methodology we proposed to follow consisted in taking each port separately and subjecting them to investigation using the same inquiry grid, so as to compile databases that would guide the questioning of the documentation and systematisation in a manner consistent with the information available.

The methodological grid devised aimed to answer the following points:

1. The geomorphological aspects of each port
   1.1. The geomorphological constraints and potentialities of the coastal zone
2. The territorial backdrop
   2.1. Topographical setting
   2.2. Factors influencing changes to the coastal rim
3. Construction of port infrastructures
   3.1. Building or improving quays, wharves, etc.
   3.2. Building breakwaters, groins, jetties, banks, dikes,...
3.3. Constructing sea marks (channel markers, stakes, lighthouses, sails, buoys, flags)
3.4. Improving accesses (harbour entrances and depths)
3.5. Improving and constructing defence and communication facilities (forts, bridges, channels, etc.)
3.6. Establishment of administrative and fiscal controls (authorities, legislation, technical staff, specialised buildings)
3.7. Construction and specialisation of facilities: warehouses, arsenals, shipyards.
4. The historical dynamics of each port
4.1. Connections to the hinterland and vorland (transport networks, costs, mobilities)
Royal and local polices relating to ports
5. Assessment of use of technological innovation
5.1. The technical and cultural sphere (agents and institutions for scientific and technical development)
5.2. The technological options in building each port in relation to advances in hydraulic engineering
5.3. The route between the production of scientific knowledge (hydrology, topography, cartography) on the territory and the options of those in charge of the ports
6. Urban construction of each port
6.1. The interaction between the port and the surrounding urban communities
6.2. The definition of the relations between the construction of the urban space and the historical and economic dynamics of each port.

Not all of these items were, however, object of research.

In light of these assumptions, the analytical perspective was to re-ask a series of questions, and to examine:

1. whether geomorphological conditions influenced specific interventions in the ports, in terms of infrastructure, or the historical dynamics of seaports;
2. whether the global historical contexts revealed to be decisive in the construction of ports, and whether their influence could likewise be detected in the various ports studied;
3. whether, over a long period of time (16th to 18th centuries), and in light of contextual restrictions and related technological factors, common lines can be found in the building of technical, military, urban and economic infrastructures in the various ports of Northwest Portugal;
4. whether this construction, especially of infrastructures, arose from a concerted policy emanating from the central authority, or whether other institutional entities, to be identified, were the protagonists;
5. whether, from a multi-secular perspective, there were any developments in this institutional policy in terms of construction and intervention in port infrastructures and urban planning;
6. whether international contexts interfered in the domestic decisions of each coun-
try, setting a synchronic European pace, or whether it was the opposite, that is, the tendencies identified at a national level were specific or even contradictory amongst themselves.

To sum up, what we aimed to underline was that the infrastructural construction of ports cannot be exempt from areas of questioning that considerably transcend the technological aspects. They involve issues related to geomorphological variables and historical evolution, in which the micro approach can be essential, even when research covers a long period of time and a vast territorial area.

Strict answers to the questions raised by this analytical structure were not found in the historiographical output, which actually contained considerable gaps with respect to the history of ports in the periods prior to the 18th-19th centuries. We were confronted with three main kinds of work on this topic: that produced by local researchers, more monographic in nature and inclined to be descriptive and greatly bound to documentary contents; that concerned with a particular plan from a particular engineer, generally without checking the geomorphological conditions and historical dynamics that motivated them; and those arising from academic research work. These ultimately aimed to tackle economic and social issues, although they still required a geomorphological and climatic contextualization, as well as having to reference buildings and infrastructural improvements, taken as reflecting or influencing historical dynamics.

From an historical point of view, moreover, works summarizing royal policies and the jurisdiction of central authority in relation to seaports, did not add much. They only explained which institutions were subsequently in charge of the public works carried out on these areas, but not really the tendencies and implications of their policies.

At the same time, although other disciplines have also focused on port precincts, making the coastal rim one of the most favored areas for geomorphological analysis, this approach is usually taken either on the basis of a long-term perspective, going back to the major geo-climatic eras and their impact on the design of the coastline (warm period, ice age), or concentrating on an environmentalist reading, focusing on the study of the occurrence of contemporary ecological assaults on the planet and how they have redefined coastlines.

Architecture and urbanism also favor urban seafronts, reflecting policies that aim to restore Riverside and coastal zones, but apart from that, leave in the most complete silence all the earlier contexts and factors that shaped the development of these areas.

This division of interests and paths, blocking interdisciplinary dialogues, has led us to a ‘core’ option: establishing a multidisciplinary team that includes historians, geographers, archaeologists, cartographers, engineers and architects. The intention was to develop a research program and a methodological framework that would enable a particular zone to be regarded from several angles, in its geomorphological, historical and urban aspects. Members of the team had different, yet complementary, training, and they tried to question and interpret the historical materials (maps, written documents) submitting them to an inquiry grid that had been previously defined, under the appraisal of various specialized scientific readings that could maximize information which the training of a historian does not permit him/her to decipher.

We believe, then, that the major challenge presented by the project was in bringing
together a scientific team with diverse, yet complementary, academic backgrounds, and in seeking to implement a multidisciplinary research framework, in which historical materials could be subject to diverse and specialised scientific interpretations, able to decode information that a mere historical analysis could not ascertain.

Finally, another of this project’s main aims was to include young researchers, through the attribution of initiation to research grants and, consequently, establish in the school community a research practice which would continue beyond the specific financing period. This is one of the reasons behind the project’s interaction with the postgraduate studies offered by the History Department (“Postgraduate and Masters Course in Local and Regional Studies”), namely its branch in “Seaport Studies”.

We think this goal has been successfully achieved, not on our own merit, but on that of the young researchers who have worked and are still working with us. Two have concluded their Masters, one is developing his PhD project in Florence; another is in the final stages of her Masters thesis and two others are currently Masters students.

So as to comply with the research goals proposed, the team followed a research program in the last four years, whose main steps were:

1. Research on sources found in private, local and central archives, in Portugal and abroad;
2. The holding of scientific meetings, whose main goals were the definition of concepts and methodological grids and the motivation of those with historical backgrounds to question not only the strictly historical, but also other aspects, especially the geomorphological.
3. The promotion of debates and work sessions to discuss database modeling so as to bolster data gathering and improve the potentialities of information research.
4. The presentation of essays on cartographic reconstructions of seaport spaces from a diachronic and comparative perspective, aiming to project and reconstitute geomorphological, infrastructural and urban phenomena.
5. Group participations in national and international meetings in order to present and submit our research program to discussion and feedback.
6. Also foreseen were contacts with international research teams that develop similar research projects, namely CEHOUUP (Centro de Estúdios Históricos de Obras Públicas e Urbanismo) and CRHMA (Centre de Recherche sur l’Histoire des Mondes Atlantiques), as well as contacts with the International Maritime Economic History Association.
7. In the same way that we have participated in an international research and all-inclusive team, members from French, British, Irish and Spanish universities got together to prepare a project to be submitted to Interreg III B – Atlantic Space, under the general theme: “West Atlantic landscapes and representations”, which was not unfortunately approved for Community funding.
8. Last but not least, we have planned the holding of this workshop since the project’s beginning, whose goals have already been presented in this session.

We sincerely hope that our overall discussion may provide the Hisportos Project
with constructive criticism and, if possible, further suggestions for the next steps to be followed. And it is also our desire that the Hisportos research plan may unpretentiously contribute to the studies on European seaports in the Early Modern Age, having set standards we believe are appropriate and rigorous:

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SOURCES, PROBLEMATICs AND
METHODOLOGY IN SEAPORTS STUDIES
RESEARCH OPTIONS AND ARCHIVES POTENTIALITIES

- THE HISPORTOS CASE*

Elisabete Jesus / Hugo Ribeiro da Silva / Sandra Brito

Abstract

One of the most vital steps of the project HISPORTOS was the gathering of data related to NW Portuguese ports. This process was based on research options and on the available public information available in archives and libraries. It is now possible to try to make some observations about the potentialities of these archives.

Introdução

Enquanto colaboradores do HISPORTOS – uma contribuição para a História da construção dos portos do Noroeste Português nos séculos XVI a XIX- tivemos a nosso cargo a tarefa de percorrer arquivos e bibliotecas com o objectivo de reunir informação, arquivística e bibliográfica, de base para o projecto, mediante a orientação e supervisão dos seus responsáveis, nomeadamente da Prof.ª Dra. Amélia Polónia.

Por conseguinte, esta comunicação pretende ser uma reflexão crítica de todo esse trabalho de três anos, procurando mostrar opções metodológicas de investigação em arquivos, bibliotecas e centros de documentação, bem como as potencialidades dos materiais encontrados.

Assim, começaremos por abordar as instituições detentoras da documentação; descobriremos os percursos de investigação que a elas nos conduziram; observaremos os instrumentos de pesquisa que possuíam e em que condições ocorreu o acesso à informação e, por fim, faremos um balanço entre o caminho percorrido e os resultados obtidos, ou seja, a quantidade e relevância da informação coligida.

1. As instituições detentoras da documentação

Procurar nos arquivos informação sobre os portos portugueses é uma tarefa que requer alguma imaginação. Na verdade, a documentação nem sempre seguiu um percurso que obedecesse a uma qualquer lógica. Por conseguinte, a sua identificação não

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foi fácil, uma vez que tivemos de recriar o seu trajecto institucional. Conhecidas as entidades produtoras da documentação que procurávamos, assim como as mudanças de denominação das mesmas ao longo do tempo ou mesmo a transferência de funções entre entidades, acompanhada da transferência de toda a produção documental associada, surgiu o problema da localização da documentação produzida, por exemplo, pelas Direcções das Obras das Barras, pelas Junta Administrativas das mesmas, pelas Circunscrições Hidráulicas e outras entidades com responsabilidade directa nas intervenções ocorridas nos espaços portuários em análise.

De uma forma geral, podemos afirmar que a documentação se encontra dispersa por dois grandes tipos de arquivos: nacionais e locais. A nível central foram considerados, por exemplo, além da Torre do Tombo, o Arquivo do Ministério das Obras Públicas, o Arquivo Histórico Militar e o Arquivo Central da Marinha. Se uma pesquisa no primeiro é obrigatória pela multiplicidade, tipológica e geográfica, de documentação que detêm, já nos outros três procurou-se a documentação produzida, directa ou indirectamente, pelos órgãos centrais de governo, como a Companhia Geral do Alto Douro, ou por entidades militares, responsáveis pela defesa da costa e pela manutenção e melhoria de infra-estruturas nos principais portos do Reino.

A nível local enquadram-se, desde logo, os arquivos distritais que, se por um lado têm como documentação de incorporação obrigatória, entre outras, a proveniente dos arquivos dos organismos da administração central periférica extintos e serviços cesantes (ex.: documentação das Provedorias/Comarcas), para além da documentação de organismos representantes da administração central – Alfândegas –; por outro recebem também a produzida pelos antigos conventos e órgãos de administração das dioceses – Cabido e Mitra. Nalguns casos, como em Viana do Castelo, encontrámos mesmo documentação produzida por organismos criados especificamente para intervirem na melhoria dos portos – a Superintendência da Barra.

A nível local destacam-se ainda os arquivos municipais, visto abrigo às Câmaras a manutenção de algumas infra-estruturas, como os cais, e os arquivos das actuais administrações portuárias, como a APDL (Administração do Porto do Douro e Leixões) ou a APA (Administração do Porto de Aveiro), que por vezes receberam documentação de instituições que as antecederam. Para além dos arquivos, há a destacar, também a nível local, as bibliotecas, já que algumas delas, como a BPMP (Biblioteca Pública Municipal do Porto), guardam documentação manuscrita, ou até mesmo impressa, de interesse para os estudos portuários.
2. Percursos de investigação

No ponto anterior, ao descrevermos algumas das entidades detentoras da documentação, referimo-nos apenas àquelas que, logo à partida, pelas competências que lhe estão adstritas, potencialmente guardariam documentação com interesse para as questões propostas pelo projecto. No entanto, as leituras de bibliografia, portuguesa e estrangeira, sobre o tema (obras científicas e artigos em publicações periódicas e monografias de história local), foram revelando a (provável) existência de fundos documentais noutros arquivos, bibliotecas ou outras instituições. Por outro lado, também nos ajudaram a traçar o possível percurso da documentação, desde que foi produzida (Antigo Regime) até ser depositada em arquivo. Tornou-se, pois, necessário, como atrás deixamos antever, conhecer a história institucional das diversas entidades (centrais, municipais ou até particulares) que tiveram responsabilidades na construção de infraestruturas portuárias no litoral Noroeste português. Só assim seria possível reconstruir com rigor o processo de produção e transferência da documentação histórica portuária e aspirar à sua localização e posterior análise.

Desta forma, conseguiu-se perceber, por exemplo, a necessidade de uma pesquisa nos fundos do Arquivo da Real Companhia Velha, herdeira do arquivo da entidade que, no século XVIII/XIX, superintendeu a navegação no Rio Douro, ou em instituições como a Sociedade de Geografia de Lisboa, Gabinete de Engenharia e Arqueologia Militar ou Instituto Geográfico, que teriam cartografia histórica de interesse para o projecto. Contudo, nem sempre as pistas seguidas se revelaram frutíferas, de que são exemplos a Academia da Marinha ou o Instituto Marítimo-Portuário, onde não se encontrou qualquer informação relevante.

3. Instrumentos de pesquisa disponíveis e o acesso à documentação

Muitos dos arquivos portugueses não possuem bons instrumentos de pesquisa nem estão informatizados. Além do mais, como não possuem guias ou inventários publicados, toda a pesquisa e selecção da documentação a consultar tem de ser feita in loco. Ou seja, todo o processo se torna difícil e moroso. A estes problemas, somam-se outros, como a errónea catalogação de fundos ou séries documentais, a que por vezes se junta a pouca ajuda prestada por técnicos/funcionários. As maiores dificuldades foram sentidas em alguns arquivos centrais, como o Arquivo Histórico Ultramarino e o Arquivo Histórico Militar, onde apenas são disponibilizadas listagens manuscritas de documentação, que se encontram em caixas, obrigando à consulta de todos os documentos para se verificar se há algum com interesse. Já nos arquivos Municipal e Distrital de Viana do Castelo, por exemplo, ainda que não disponham de eficazes e rápidos instrumentos de pesquisa, os técnicos mostraram-se sempre disponíveis para auxiliar o investigador.

2 As designações atribuídas à documentação de cada caixa são por vezes incompletas e induzem em erro.
4. Fundos arquivísticos versus informações relevantes – alguns exemplos

Pelo que já ficou exposto, rapidamente se conclui que arquivos à partida promissores, pelo tipo de documentação que guardariam, se revelaram parcos em informação (ex.: Academia da Marinha e Instituto Marítimo-Portuário). Por outro lado, algumas fontes revelaram dados importantes, nomeadamente para períodos recuados (séc. XVI), mas exigiram muito tempo na sua recolha, de que são exemplo os livros de despesas dos municípios. A sua tipologia foi variando ao longo do tempo e, como incluíam todo o tipo de despesas municipais, foi necessário vê-las todas para se detectar as que estavam relacionadas com as infra-estruturas portuárias.

Uma dificuldade particular surgiu com alguns projectos de obras, cujas memórias descritivas nos remetiam para material cartográfico que nem sempre foi possível encontrar, do mesmo modo que se desconhece o paradeiro da cartografia que estaria apensa a alguns processos de intervenção.

4.1- Arquivos Nacionais

O Arquivo Histórico Militar revelou possuir alguma informação, mas remetendo-nos apenas para os finais do séc. XVIII/ínicios do séc. XIX. Note-se ainda que, como seria de esperar, a documentação aí existente, com interesse para o Hisportos, aborda sobretudo aspectos relacionados com a defesa da costa, nomeadamente construção ou obras de melhoramento em fortes ou fortalezas. Mesmo assim, de particular importância para o estudo das barras (em especial Aveiro) parece ser o designado fundo do Conde de Lippe. Sobre a abertura da barra de Aveiro, existe também documentação no Arquivo Histórico Ultramarino.

O Gabinete de Estudos Arqueológicos de Engenharia Militar, o Instituto Geográfico, a Sociedade de Geografia de Lisboa, a Torre do Tombo e a Biblioteca Nacional forneceram-nos cartografia histórica relacionada com o âmbito cronológico e espacial em estudo. Mesmo assim, a maioria dos mapas retratam o Porto e Aveiro no século XVIII ou em períodos posteriores. Já no Arquivo Histórico do Ministério das Obras Públicas, se a cartografia não tinha especial interesse, encontrámos documentos sobre as obras na Barra de Aveiro, as condições de navegabilidade no Rio Douro (Porto) e o encanamento do Rio Cávado (Esporões).

No Arquivo Central da Marinha e no Instituto Marítimo-Portuário, a documentação existente extrapolou o limite cronológico do projecto, tratando-se majoritariamente de material produzido a partir da segunda metade do século XIX.

4.2- Arquivos Locais (distritais, municipais e privados)

Aveiro

Na Administração do Porto de Aveiro foi recolhida documentação cartográfica e documental. No entanto, os fundos documentais referem-se, na sua maioria, ao século XIX. Deu-se particular atenção ao livro do Registo Geral da Superintendência da Barra (com registos a partir de 1756) e ao livro das Despesas das obras da barra (de cobertura cronológica muito limitada - 29 de Março de 1802 a 20 de Setembro de 1802 - mas deveras importante pela sua raridade e riqueza informativa, nomeadamente no que toca a trabalhadores, salários, técnicas e materiais de construção).
Porto

No Arquivo Distrital do Porto foi realizada uma extensa pesquisa em diversos fundos: Real Casa Pia - Inspeção de Estradas; Provedoria da Comarca do Porto; Contadoria da Comarca; Almândega de Vila do Conde; Intendência da Marinha; Arsenal do Exército do Porto; Governo Civil do Porto e Cabido da Sé do Porto. Contudo, estes fundos revelaram poucos dados para o projecto.

No Arquivo Histórico Municipal do Porto e na Biblioteca Pública Municipal do Porto as pesquisas realizadas prenderam-se, num primeiro momento, com a identificação de cartografia histórica relativa ao porto local. No entanto, o resultado da pesquisa contemplou-nos com representação cartográfica não apenas da barra do Douro, mas também de outros espaços portuários.

Na primeira instituição, uma “série” de livros de obras públicas, bem como vários livros do cofre das fortificações forneceram importantes contributos para o estudo do porto desta cidade, desde o séc. XVII ao séc. XIX. No entanto, num segundo momento a pesquisa direcionou-se para um outro núcleo documental relacionado com as receitas e despesas municipais e sua aplicação, de que são exemplo os livros do cofre dos sobejos das sisas. No que toca à relevância destes livros municipais enquanto fonte histórica de interesse para a reconstituição de intervenções em espaços portuários, tomemos como exemplo o livro 827, cujas datas extremas são 1590 a 1600. Nele se descrevem as receitas, arrecadadas pelo cofre dos cobejos, provenientes das várias sisas e das avenças (contributo pecuniário directo dos moradores do Porto até 1603) e, por vezes, nas margens dos registos de receitas, vêm anotações de despesas que são pagas com parte das quantias devidas ao cofre pelos arrendamentos das sisas (canalização directa das receitas para despesas). A leitura dos 100 folios que compõem este livro, revelou as despesas relacionadas com a defesa militar, o castelo de São João da Foz e a obra do Cais da Ribeira. Esta fonte, que à partida não seria prioritária para qualquer investigador que se debruçe sobre o estudo de espaços portuários, mostrou-se, pois, de considerável importância.

Além destes, foram ainda visitados os arquivos históricos de instituições privadas, como a APDL e a Real Companhia Velha. Neste, dadas as limitações impostas – inexistência de um horário de abertura ao público e a necessidade de pagamento para consultar a documentação – procedeu-se a uma recolha parcelar da informação existente, em particular num fundo que reúne documentação relativa às obras da barra e das estradas do Douro, e no fundo de correspondência trocada com a Companhia, onde se encontram algumas cartas sobre as obras da barra, como as enviadas pelo engenheiro Reinaldo Oudinot. Contudo, assinal-se-as potencialidades deste arquivo e o interesse em realizar aí pesquisas mais exaustivas.

Já no que se refere à APDL, cujo acervo documental não foi ainda contemplado com a devida organização arquivística, não dispenso, portanto, de instrumentos de pesquisa, o acesso à documentação e a sua reprodução foi-nos completamente facilitada. Contudo, o núcleo documental refere-se, majoritariamente, ao século XIX, não se encontrando documentação portuária que à partida nele deveria estar localizada, já que

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a APDL é a herdeira de outras entidades que em séculos anteriores tiveram responsabilidades na edificação/manutenção das infra-estruturas portuárias.

Vila do Conde e Viana do Castelo

No Arquivo Distrital de Viana do Castelo, pudemos completar um pouco mais o puzzle das informações sobre o encanamento do Rio Lima, que haviam sido obtidas através do **Livro do Encanamento do Lima**, depositado no Arquivo Municipal da mesma cidade.

As pesquisas nos Arquivos Municipais de Viana do Castelo e de Vila do Conde revelaram-se profícuas, visto que nos arquivos centrais pouco se encontrou sobre estes espaços. Foram vistos os livros de despesas destes concelhos que, pela sua natureza, apresentam informação diversa, relacionada com os diversos gastos dos municípios, incluindo as motivações subjacentes a esses dispêndios. Os dados relativos a infra-estruturas portuárias são escassos, mas, na ausência de outras fontes, a consulta deste tipo de documentação constituiu a única via para uma aproximação ao conhecimento dos portos destas duas localidades.

Conclusão

Um projecto dedicado ao estudo de um espaço geográfico, confinado aos principais portos marítimos do Noroeste português, entre Caminha e Aveiro, pode sugerir que estamos perante uma investigação de nível regional, para não dizer mesmo local, ou melhor, perante um somatório de estudos de caso. Por conseguinte, poderia pensar-se que o trabalho de recolha de informação se circunscreveria, na sua maioria, às instituições arquivísticas localizadas no espaço em estudo. Contudo, como pudemos observar no presente relatório, foi necessário percorrer arquivos sedeados em Lisboa, para além dos arquivos distritais, municipais e, até, instituições privadas.

O elevado número de questões que o projecto inicialmente pretendia abordar ficou restringido aos aspectos relacionados com as infra-estruturas, as políticas régias associadas e os condicionalismos geomorfológicos da costa, já que são aquelas que, entre os estudos portuários em Portugal, mais carecem de resposta. No entanto, para determinados intervalos temporais, a documentação mostrou-se lacuna no cumprimento de tais objectivos. Alguns dos arquivos, como o Central da Marinha e o das Obras Públicas, mostraram-se parcos em informação, ao contrário do que seria de esperar. Nos arquivos municipais foi possível identificar, para várias cronologias, investimentos na conservação e melhoria de algumas infra-estruturas, em particular os cais. Todavia, raramente foi possível identificar técnicas utilizadas e mão-de-obra empregue. As exceções referem-se a Aveiro, Viana e Porto (finais do século XVIII e primeira metade do século XIX). Contudo, de todos os portos do Noroeste em análise, para o século XVIII, distingue-se, pela quantidade de informação que foi possível recolher (sobretudo nos arquivos centrais), Aveiro. Já para o século XVI, o lugar cimeiro é ocupado por Vila do Conde.

Em suma, o percurso realizado durante estes três anos permitiu reunir a informação existente, graças à união de esforços e ao trabalho de equipa, diagnosticando-se ao mesmo tempo problemas/entraves à investigação:
• Dispersão da documentação por numerosos arquivos, fundos e, até, tipologias documentais - daí a importância do trabalho em equipa;
• Inexistência de instrumentos de pesquisa informatizados na generalidade das instituições consultadas;
• Inexistência de Guias de Fundos Documentais que identifiquem o percurso da documentação desde a entidade produtora até à entidade detentora da mesma;
• Excesso de burocracia no acesso à documentação e sua reprodução para fins meramente científicos;
• Dificuldades de uma análise comparativa na longa duração, ainda que não impossível, visto nem sempre existir informação para vários portos num mesmo momento histórico ou nem sempre existir o mesmo tipo de informação que dê resposta às mesmas questões.

No entanto, os problemas/entraves à investigação atrás enumerados não se tornaram impeditivos do andamento do projecto:

• Perante a dispersão da documentação por arquivos vários, conseguimos identificar e localizar fontes relacionadas do ponto de vista histórico (ex. Plantas e respectivas memórias, alvarás e avisos régios associados);
• Perante a inexistência de instrumentos de pesquisa informatizados que agilizassem a nossa investigação, conseguimos, neste momento, dispor em base de dados de um roteiro de fontes portuárias (impressas e manuscritas) localizadas nas diferentes instituições citadas;
• Perante a inexistência de guias que identificassem o percurso da documentação desde a entidade produtora até à entidade detentora da mesma, não só traçámos sumariamente a história institucional das entidades produtoras, como identificámos o percurso efectuado ao longo dos séculos por muitos desses fundos documentais.

Perante este cenário, temos maiores certezas da importância do projecto, uma vez que as informações reunidas, por mais parcelares ou lacunas que possam ser, merecem dos próprios percursos da documentação ao longo do tempo, permitirão, como já têmos permitido, um melhor conhecimento dos portos do Noroeste na Época Moderna...
CARTOGRAPHIC SOURCES

- RESEARCH PROBLEMS AND EXPLOITATION LIMITS

Miguel Nogueira

A.
Research problems and exploitation limits
- The “geographical reality” which is in on any map, is and will be what the cartographer wants it to be, or what he was asked to do.
- Technical/methodological approaches in thematic map construction

Reading / interpreting

*Historical map*

- filter—

  - distinguished types of quantitative and qualitative geographical information according to:
    - who ordered
    - the purpose
    - cultural context and scientific (geographic) knowledge
    - who drew the map
    - technological facilities and cartographic knowledge
    - {...}

- filter —

  What we retrieve from historical maps

* HISPORTOS, funded by FCT, POCTI / HAR / 36417 / 2000

B.

Technical/methodological approaches in thematic map construction
- Reading and interpretation of cartographic sources
- Different paths/methodologies based on exploitation limits

Different approaches / methodologies

A

historical map

base map

actual / present map

historical data

draw and / or project into

thematic map

A

upon original historical map

B

upon redrawed (computer assisted) historical map

C

upon georeferenced historical map
B.1. Approach / methodology A

historical map
\[\downarrow\]
draw and / or project into
\[\downarrow\]

\text{thematic map upon original historical map}

\text{Process:}
\[\downarrow\]
\text{Digital historical map}
\[\downarrow\]
\text{Analysis and management of historical data}
\[\downarrow\]
\text{Project historical data upon a historical map}

\text{Pro:}
- Important portraits of spatial morphologies, features and elements (natural and human) at the time
- Base map chronologically balanced with the theme represented
- Esthetically appealing map
- (...) 

\text{Against:}
- Base map with a primary theme with information that may obscure or compete (graphically) with our theme
- Imprecisions concerning absolute and relative distances and consequent spatial distortions
- (...)
B.2. Approach / methodology B

Pro:
- Important portraits of spatial morphologies and elements (natural and human)
- Base map contemporaneous to the theme represented
- Clear spatial image after “washing up” all the accessory information
- (...)  

Against:
- Imprecisions concerning absolute and relative distances and consequent spatial distortions
- (...)  

Process:
- Digital historical map
- Analysis and evaluation and selection of geographical data on the historical map (reading and interpreting)
- Computer assisted redrawing of the selected geographic data
- Creation of a “clean” historical base map
- Analysis and management of historical data
- Project historical data upon a historical map
B.3. Approach / methodology C

Process:
- Digital historical map
- Analysis and evaluation and selection of geographical data on the historical map (reading and interpreting)
- Identification of "anchor points"
- WARP and other GIS functions (like georeferencing)
- Reproduce the geographical aspects (both human and natural) into a georeferenced map
- Analysis and management of historical data
- Project historical data upon a historical map

Identification of "anchor points"
Geographical "displacements"

Georeferencing historical map
Approach / methodology C

Pro:
- Preservations of important morphologies and elements (natural and human)
- Clear spatial image after "washing up" all the accessory information
- Georeferenced historical features/elements
- Ability to exchange/compare/mix different maps and geographical information
- Recover lost locations of features
- (…)

Against:
- Difficulty of GIS environment
- (…)

Overlaying historical and present maps
THE HISPORTOS CASE – SCIENTIFIC OPTIONS AND RESEARCH PROGRAMME. THE POSSIBLE APPROACH TO NW PORTUGUESE SEAPORT STUDIES

Helena Osswald / Inês Amorim

Abstract

The basic goals of this paper are twofold: to review the concepts used in the definition of the project and to explain the methodological approach to an object linked to a vast number of features of a temporal and social context.

Hisportos was based on preliminary results of the work of two co-workers of the project, Amorim and Polónia, who dealt with questions arisen from the characteristics of the cities they focused in their research, PhD dissertations. Both studied phenomena centred in towns that were also ports. Both recognised some problems and tried to arrive at satisfactory answers for their questions. And both concluded that simple questions like: how, when, where and why were pre-existent harbours and ports dimensioned into new ones, needed to be answered. Harbours seemed to have been there for ever. But these simple questions implied some more complex ones:

1. How fit these ports, small and medium ones, in a port system designed by links to a vast foreland mostly Atlantic: South America, especially Brazil; Africa (West-Coast); the Islands (in first line Madeira, Açores, Cabo Verde, but also Castilian Indies); North- Europe. And links to a hinterland marked near the coastline by the production of salt and fish in small quantities, and in a range that is not easy to define, by poor or medium farming production, where the most interesting issue was to be: wine and, in a smaller degree, textile materials. A foreland and a hinterland marked by consumption varying from luxury to elementary levels, from exotic and surplus to common goods.

2. Which role did these ports play in a port system? Which degree of efficiency did they have as central platforms of a mercantile network? And as simple forward cargo

* HISPORTOS, funded by FCT, POCTI / HAR / 36417 / 2000

1 Universidade do Porto, Faculdade de Letras, Departamento de História, Instituto de História Moderna da Universidade do Porto (IHM-UP), researchers of HISPORTOS.

suppliers of goods needed elsewhere and transported easier and cheaper by ship?

3. Was there any place for these ports, which we know to have played changing roles and with different weights all along the early modern age, in a country dominated by Lisbon? Was their major role at an international or an intercontinental level? Or was the coastal trade the essential feature of them? And how did they survive to the pressure of the international system around them, supported by Lisbon?

4. Coastline shifts along the period are at the level of harbours and port cities significant. One had to deal with replacements, with shores that were washed away, with sea withdraws that left port infrastructures lying in wet margins but not in water as it was expected, with infilling caused by silting and sanding menacing the continuity of port operations. These and other effects of geomorphologic and climatic conditions forced communities to action. Were they the causes of difficulties thought by contemporaries to endanger their wealth or well being?

That kind of questions led to the discussion of concepts that seemed to enable the construction of a research frame to carry on Hisportos.

First of all: system, port system.

The suggestion read in Guimera¹ and others seemed attractive: it is a concept that should help us to define the essence of ports. As an object a port is difficult to be analysed. It seems not to show auto sufficiency. It exists as the result of complex relations. Relations between distinct elements of various natures: economic, cultural, social, political and geographical. The intensity and level of enchained causes and effects, of sub relations and main relations, never determined in a one way sense, the very essence of ports that are dominated by one commodity or by many commodities, independent of their value, by long trade ships or by coastal traffic, by fishers or by passengers, all these characteristics lead to unsatisfactory results when studies treat only one of the variables, ignoring the complex relationship between the above indicated types. It is a singular element hiding plural realities. The port is the most visible part of a complex. Traffic (volume of cargo, number of ships), naval industries (from shipbuilding to fisheries), maritime services (from transport to insurance) are they the determinant indexes to the definition of a port role? And, if yes, how may they be used in a comparative look? The use of the system concept can help to overcome such problems. The main aim is to recognise the rules of an object made of complementary parts. The nature of the object is readable in the most important elements that make up the system, but also in the features of these elements and in the relationships between them. Determinant for the whole results of the study is the definition of the system. If at the departure the port functions are elected as the reference, then all ports of a region, independent of their most important functions can be approach as elements of a system.

NW Portugal geography of the rivers and of the morphological aspects of the coastline shaped a potential aptitude for ports and impelled communicating along the coast and in the mouth of rivers as a sustained activity and imposed this reality as an inter-

pretative tool in Portuguese historiography. The dimension, type, etc. of NW Portuguese ports vary between very small harbours and small and medium ports.

Comparison is the second concept that seemed to be important at the level of the scientific options. And the use of a system allows comparing elements independent of the intrinsic significance of any of them, as long as they present relationships between them. A comparative approach may reveal the role of a small port, handling minor tonnage of goods, and for that reason depreciated by contemporaries and by researchers looking for tonnage capacity as the most important indicator of trade, in the sense that it may be the only mean to allocate external commodities to the hinterland of that port. The very existence of that opportunity to distribute goods would never be recognisable by the evaluation of tonnage indicators alone. But the comparative approach inside the system defined before will bring other results forward.

Another array of questions dealing with the problem lead to a third concept: frontier:

Were ports the result of geographical, technical, political, economic pressures and conditions or were they, their reality and survival/improvement a result of their own dynamics and were they the authors of the development around them? In terms of port infrastructures to deal with these questions is to try understand what factor was responsible for the plans, works and projects that stirred up in the early modern age in NW Portugal: the main identity of these transformations lied in the development of the traffic (volume and frequency and value); or in the new way of consumption (commodities, number of consumers, prices); or in the new definition of a power culture; or in the outbreak of the global idea of a new authority which implies rational territorial planning executed by engineers all over Europe and their knowledge reaching out to local affairs; or in the impact of diseases and the slow recognising of the importance of hygienic and healthy contexts; or in the powerful pressures of the geomorphologic transformations.

To answer these questions is to recognise that ports are active but also passive objects. And this leads to the concept of frontier. Frontier between land and the oceans, between a hinterland and a foreland, between forces that act on them and forces they engender, and in the early modern age, specially, between inland and external trade balance, between customs and duties pending on trade and liberty of duties. Most of them are the result of casuistic definitions. That is they exist as long as they are useful for


those who determined them or as long as their own lifespan make them useful or at least not a nuisance.

For this and others reasons there are a lot of reasons to study ports, even when, at a first look, they seem unimportant ports. "What were (relatively) unimportant ports?" asked Gordon Jackson. "Those with a poor or backward hinterland and few external connections; with a small or no share of national imports and exports and, contrary to expectations, a small share of coastal trade, which was also dominated by major ports; with exceptions they owned and built few ships; they had inadequate facilities for larger ships; few warehouses; no comprehensive mercantile community or direct foreign linkages; few industries and small populations; in sum, they had no opportunity for self-generated trade. What, then, is to be said in favour of "unimportant ports"? "We should perhaps forget about their comparative status and study them for what they did on their own terms and within the overall port system", and thus the research would "redress the balance a little by reasserting the contribution of smaller ports to the grand scheme of things". Indeed, "depending on the specialist nature of their products, some ports played a part far greater than their share of tonnage or value". Besides, as defended Gordon Jackson "the most interesting side of this was not what the small ports received so much as what they offered".

These proposals justify to work on a methodology that allows to integrate a port, any port, in a referential space, and the study of its strategic contribution to the progressive construction of an economic space (local, national or international). It is clear that such a perspective implies a huge amount of information data, but there are significant reasons for testing this path. At the level of micro-analysis the heterogeneous elements tend to impose themselves. And as seen before one of the vitalities of the system concept is to override these many clues that a heterogeneous reality as that of a port offers. It is important to work at a micro level because in variety and diversity some questions may reveal themselves not only as a process but it may also happen that factors that make up the processes turn out to be apprehensible. And by focusing on micro contexts some elements tied to individual paths may come forward at the analysis and allow the researcher to use the theoretical frames of the model without imposing the model on the reality. This has implications at the level of data collecting. Qualitative data turns out to be of great significance, if treated in a serial manner. That implies that data needs to be reconstructed.

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The next step in the research was to create a list of tasks designed in the frame of


the above concepts and according to the main guidelines of the history of NW Portugal. At first the research object included aspects like ship equipment, seamen, dock workers, merchant offices, etc. But it had to be reassessed because of the limited financial funds the IHM-UP disposed of.

The actual plan is centred on 3 main issues: geomorphologic phenomena, explored as heavy circumstances; plans and politics in view of the phenomena or independent of them (produced and conducted by single or multiple authorities as their affair); and interventions, that is, initiatives regarding the construction, reconstruction of harbours, the equipment and accesses.

These 3 main issues controlled the questions, the searching for historical data fit to answer these questions and the relationships that this data should support.

The first issue implied clearly a multidisciplinary research group or at least inter-disciplinary. Not only was it important to begin to think about problems learning from the point of view of those who deal with these questions and to benefit from their knowledge and expertise to be able to design the queries needed to select information from the documents, but also to analyse the information. The evaluation of technical and scientific problems regarding the engineering implied another way of looking and understanding than that of the historians. The project memberships illustrate this option (4 geographers, 1 cartographer, 1 engineer, 1 architect, 5 historians, 2 archaeologists).

To put up an inquiry relating these main aims of the project implied a selection of the questions to be made and the way to formulate them. The result is summarised in the following points:

1. Geomorphologic aspects of the coastline and of every seaport in NW Portugal and the set of phenomena responsible for the transformations that happened along the period\(^{10}\).

2. The construction and reconstruction of seaport infrastructures: projects and their fulfilling and implementation; knowledge, available technology and techniques used; materials used and their origin; initiatives and investment; technicians\(^{11}\).

3. Main functions of the seaports and their changing along the period; the position of the port (in or nearby the city) and the implications of an administration by local or central authorities.

These questions implied the knowledge about the kind of information that is available, and so the list of questions had to be enough plastic so that at each moment questions could be improved. Dealing with historical data for the early modern age may be sometimes a surprise. And not always a nice surprise! Polónia and Amorim had recognised in their earlier works that to disclose information in archives related to seaport questions not only enquiry tools are important but also it is of utmost necessity to be

\(^{10}\) GRANJA Helena; ARAÚJO, M. Assunção; DEVY-VARETA, Nicole - “Os aspectos geo-morfológicos e as dinâmicas históricas dos portos do NW português” in XXIII Encontro da APHES (Coimbra, 6 e 7 de Novembro de 2003) (CD-ROM)

aware of the history of those in charge of ports along early modern age. The forefathers of the actual port authorities were created in the 19th century. Their shape had been tried out in the centuries before. As this history was not available it was necessary to disclosed paths to lead to institutions responsible for the production of information about ports. This means in Portugal to deal with a number of fragments, as if the common wrecksages of the early modern period, not only occurred at sea but also in the production of information.

As the very nature of seaports implied institutional and private investments often linked to privileges, the fate of documentation, produced by those interested, depended a lot on the acuity of these interests. Thus searching for data in archives is a process where one has to be prepared for all kind of surprises. Central government, that is, crown, treasury, custom houses are expected to have produced information on duties paid by commodities, on monopoly rights toward shipping or commodities, on companies recognised to pursue interests identified with those of the crown or the other way round. But central government may also have produced information on port regulations, construction licences, investment and financial support of work in port equipment. Issues like regulation of buoys, pilots, markets, and cargo handling equipment, breakwaters and quays among many others were problems of city councils and local authorities in first line. But for a lot of reasons central authorities tried or were driven by local petitions to interfere in these affairs. And a lot of times both local and central authorities had not enough money or capacity to deal with problems arisen at this very level. So they had to count on private investments or private initiative. Public, private and institutional records have had differentiated fates. Some had by law determination to be stored in files and cared for. Others were of such an importance for individuals or groups that they spent money assembling them. But others seemed to be unnecessary.

One case should be representative of the multiple fragments of information that a specific situation may have produced: All along the early modern period the mouth of Douro River was a challenge to seamen. Low and ebb-tides, ocean and river streams, rocks and winds were responsible for collisions, groundings and difficult moorings. From the 16th to the 18th century the problem persists in the documentation and sometimes local and central authorities only take notice of it because some private institution or person makes experiments to solve the problem. In these circumstances initiative and investment are in the hands of the private sphere. Records on rocks demolition have to be looked upon in central archives, in local archives and in private institutions if available. And in various types of information: in letters exchange between


13 As pointed out in the paper presented at this workshop by BRITO, Sandra; SILVA, Hugo Ribeiro; JESUS, Elísabete - Research options and archives potentialities.


central and local authorities, in requests addressed to the authorities, in accountancies, in bills, in reports of every one involved. Sometimes there are only clues to the whole process.

As central government tended to organise powers in a clear self oriented way it regulated processes but inputted local authorities the tasks. The construction and repairs, but also the service in light-houses and other devices of the same kind were performed by local authorities, which obliged men living nearby to that service. To chart the number and locals of these elements is of high interest when dealing with these matters. The availability of records is compromised if there was only an obligation by common people without the need to spend money on it and therefore to control the performance. And if this duty of common people was sensed as a traditional tool of a community to survive, when in danger by attacks from the sea, or by difficulties to recognise the way back when on sea fishing or trading, than there is a minor chance that regular records have been kept about this service and its circumstances. In the second half of the 18th century, when the conscription reused regulations of the 16th century in a new atmosphere and with new aims, the military districts draw a listing of those sites that used to be of common sense for the populations as guides and signals of survival. This list was then made because the new spirit imposed that they had to be recognised, not for the sake of information, but to build a strategic planning upon them. They were understand as important military elements which should be identified. When designing tasks in the project at the level where to search for information this would be no priority! But in the end it turned out to be a fine source.

These two examples should be enough to show the low accuracy of a record and sources guide sketched at the very beginning of the project. The possibilities offered by statistical tools produced by governments are those of a later period. For the early modern age one has to deal with the difficult task of trying to find files and records.

But, in spite of this, it turned out to be a qualitative important positive feature: to have 15 references after searching in central and local archives about one and the same event is perhaps a time consuming experience, but it may be useful for the interpretation: it may built and join, for a sole event, different perspectives and so enable the researcher to draw conclusions otherwise not possible.

The critical approach to the information sources has to have the above specified features in mind. Every process of information production has to be analysed to fulfil the tests of validity of the information. The fact that as information sources the project has established such a wide range implies a thoroughly process of critic. The potentialities of such a variety of sources and records, permitting cross regards on the research object are also a potential problem. Understanding the aims and objectives of those who produced the information doesn’t always help to evaluate which is the most accurate one.

16 OSSWALD, Helena; BRITO, Sandra – “A barca do Porto, as experiências, os engenheiros e os poderes” in XXIII Encontro da APHES (Coimbra, 6 e 7 de Novembro de 2003) (CD-ROM)

17 AMORIM, Inês; NOGUEIRA, Miguel – “Da cartografia histórica à reconstrução cartográfica. O caso de Aveiro”, XXIII Encontro da APHES (Coimbra, 6 e 7 de Novembro de 2003).(CD_ROM)
The next step was the construction of a database to gather all the partial information distributed on so many sources. The fields of each table in the database match the questions put above. The main idea is that the result of queries made upon this data may answer the segment studies on ports in NW Portugal. As long as the purpose of these partial researches is related to the concepts and approaches discussed before. But obviously this database is also the result of data gathering that may be used in itself. The data about geomorphology of the Portuguese NW coastline is of interest for historians but also a possibility for geographers and others to evaluate long term phenomena and understand from other points of view problems of the very present day. The guessing about the effects of some phenomena or of the solutions planned to minor these same phenomena may have in the long term experience a model to improve results.
HISPONTOS DATABASES

- INFORMATICS OPTIONS, VIRTUALITIES AND LIMITS

Gabriel David

Presentation
• Goal
• Functional requirements
• Non-functional requirements
• Data model
• Two misunderstandings
• Update interface
• Querying models
• Improvements foreseen

Goal
• Organize in a database the data collected by historians in archives and in the bibliography so that it:
  – Becomes the project repository
  – Supports researchers in further analysis and interpretation under several perspectives
  – Can be made available to a wider community
• Characteristics
  – Subject unity
  – Extensive previous work of concept clarification and categorization
  – Including maps

Functional requirements
• Record collected data and its relationships
• Preserve the main concepts and categories
• Enable easy retrieval of complex data along arbitrary approaches
• Enable hypothesis test through correlation
• Differentiate users for updating, complex querying or simple browsing
• Support evolution towards multimedia product

Non-functional requirements
• In order to maximize portability, a cheap and common DBMS should be used, namely MS Access

1 University of Porto. Faculty of Engineering
Data model – main concepts

Data model – with place

Data model – complete main
Data model – sources and references

Two misunderstandings – Effects
The struggle between structured data and free-text
Two misunderstandings – References

Operations

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References to parameter tables: must be previously updated
Except for references and sources, which may be locally updated

Update interface - master-detail
Master-(multiple) detail approach
Systematic
Complex master-detail - Operations

Querying models
- Form based
  - Mimic the update interface, not updateable, with filtering options
  - Canned queries, more complex queries
- SQL based
  - Full querying power
  - Requires programming knowledge
- Navigation
  - Web-like
  - Browsing, multiple links
  - General public
- Full text indexing
  - Blind search
  - Must be combined with navigation

Improvements foreseen
- Develop a multimedia product around the database
  - Nice design
  - Both forms, navigation, and full text search
  - SQL for knowledgeable users (with metadata)
- Further define significant canned queries
- Prepare a Web version to ensure easy dissemination
- Offer the DB to groups conducting similar studies

Conclusion
- The project could have benefited itself from the DB
  - Planning the data repository should have gone along with the first tasks instead of being seen as a last step deliverable...
MULTIDISCIPLINARY ANALYSIS OF HISTORIAL SOURCES – THE GEOMORPHOLOGICAL APPROACH FOR TERRITORIAL PLANNING AND MANAGEMENT

Filomena Cardoso Martins

Territorial Planning and Management

a methodological need! ...

- contemporary options versus inherited decisions
- lessons learned from past experience
- basis to shape future scenarios

a new emerging approach! ...

- sustainable development paradigm
- global changes

"há trinta e cinco anos se haviam feito no rio da dita vila as azenhas da Retorta e que logo que se começou a fazer o açude sentiu-se os danos na barra de Vila do Conde, uma vez que as águas das marés e cheias quebravam no dito açude não tendo força para levar areia ao mar".


1. dAO / CESAM – Universidade de Aveiro
MULTIDISCIPLINARY ANALYSIS OF HISTORICAL SOURCES – THE GEO-MORPHOLOGICAL APPROACH

Helena Granja

Abstract

The progress of science, including the improvement and development of very specialised fields, has not made the multidisciplinary approach obsolete. On the contrary, it is fundamental for the understanding of a wide range of interconnected issues. Understanding the changes of the European seaports in early Modern Age, is certainly one of these issues. Here, historical research gains from the application of other sciences, like geomorphology. And the contrary is also true. The reconstruction of [palaeo]environments through a geomorphological approach, can help historical research to understand the reasons why changes in seaport development took place, changes, that most of the times, had dramatic socio-economic consequences. The increase or decrease of seaport activities not only depends on economical constraints, but also on other complex natural or human-induced causes. The main natural forcing factors are related to climate, sea level, and sedimentary budget. The main human factors are related to the artificial changes of fluvial systems and drainage basins. The world-wide character of some natural factors helps to understand the identical behaviour of European seaports during specific time periods. Through some examples, the importance of the geomorphological approach for the understanding of Northwest Portuguese seaports will be highlighted.

Geomorphology:

- The science that treats the general configuration of Earth’s surface
- The study of the classification, description, nature, origin and development of present landforms and their relationships to underlying structures, and of the history of geologic changes as recorded by these surface features
- Strictly, any study that deals with the form of the Earth (including geodesy, and structural and dynamic geology)
- Science of the Earth

– Glossary of Geology (Bates and Jackson, 1987)

* HISPOROS, funded by FCT, POCTI / HAR / 36417 / 2000

1. Universidade do Minho
Let's look at some historical cases...
Looking at the charts, concerning the Ria de Aveiro (in fact a lagoon system), from Amorim Girão (1941). The lagoon evolution would be like this? Or not? (fig. 1)
If so, how can the presence of this geo-indicator be explained? This lagoon environment was protected by a barrier placed, elsewhere, westwards of the present coastline.

Fig. 1
Where is the truth? Or is something missing on the whole story? And if so, what? (fig 2, 3, 4)

Figure 5 shows a chart of 1623 (?). Rivers mouths are wide and spits do not close them. Why? The silting up of river mouths was not yet important? Inaccuracy of the chart? Or both? Or other reasons?

Looking now at Cávado estuary and the Apúlia residual lagoon: a story that crosses historical data with (geo)morphological indicators, and seems to fit quite well.

- Progressive silting up of Cávado estuary from 16th century onwards
- Cávado mouth would be located southwards – Fão inlet – before the end of the 15th century

- The Apúlia lagoon (today completely silted up) would receive boats, with oil and wine, during the 1st millennium (fig. 6, 7)
Fig. 5

Fig. 6

Fig. 7
But, along the coast, more lagoons were present. These lagoons were active between cal BC 3253 and cal AD 1511, when they dried up and a new event happened. (fig. 8, 9, 10)

And today’s very small brooks were rivers, sided by large trees. And today’s agricultural fields were bogs and wetlands. The landscape was very different from today... so the human activities too. (fig. 11, 12)

Another historical event is also corroborated by geomorphological evidences. The Medieval salt pans were abundant during the 11 and 12th centuries (Medieval Optimum). Their decline seems to correspond to a period of worsening of the weather conditions, corresponding to the Little Ice Age. Stratospheric volcanic dust (1752-1840) would have been one of the forcing factors? (fig. 13, 14)

The Little Ice Age is dominated by strong winds, transporting sands onshore, and by the increase of storminess. Both historical and geomorphological data point out a general sand cover and dune formation on low coastal areas. (fig. 15, 16, 17)
Fig. 15
Foredune Parabolic Dunes

Fig. 16

Fig. 17

Fig. 18

Fig. 19
And looking to the historical data collected during this project, we can observe that most of the events are due to morphological changes, some clearly induced by overall climatic changes. The evolution of the seaports is closely related to those changes. Let us look at some examples.

- Vila do Conde inlet
  - the silting up in 1540
    Indeed, dating from roots in a peaty layer at Vila do Conde paleoestuary points an age of 450±60 years BP (16th century), what confirms the historical record
  - Silting was probably due to a change of weather.
  - 1500-1550: the weather was warmer than during the 15th century (frequent anticyclones?)

- Aveiro
  - < 12th century: salt pans at Ovar and the inlet at N of Torreira?
  - 12th century: dunes along the coast were formed and inlet migrated S; 1052-1160; wetter and warmer years than during the 900’s (fig. 18, 19)
  - 13th century: at the beginning of the century, Murtosa spit would be already built and the Gafanha spit would grow at Mira sands in N direction. At this time, would an overall inversion of the littoral drift have taken place? And if so, why? Looking at some old maps it does not fit. But there are many references to the location change of the inlet. This is a common situation on lagoon systems.
    - 15th century: strong currents and big floods move the inlet to the S; very wet century
      - 1585: floods
      - 1570-1720: frequent surges due to big storms
      - 1755-1757: floods
      - 1751-1760: very wet summers

- Caminha
  - 1541: sea brings sands, closing the inlet
  - 1575 and 1582: the Insua island attached the mainland; Times of severe winters and big storms and floods. The tombolo forms when there is enough sediment available (compare with the recent high rainy winter of 2000-2001)

Even a tsunami is inferred from the historical records of Póvoa de Varzim. And this means that the impact of the 1755 earthquake of Lisbon was felt, as a tsunami wave, on the North coast, which is a very important issue.

"Não padeceu esta villa ruina no terramoto do 1º de novembro de 1755- fez nêla ainda maior horror que o tremor da terra que aqui se sentiu na mesma hora em que geralmente tremeu, o que se observou no mar; porque estando este num brando suessuro, quietas as ondas, porque assim o permitia a tranquilidade
do ares, das onze para o meio dia principiou primeiro por uma contensão
d'aguas descobrindo com ella pedras e area, que nunca se viram descobertas,
e logo sem alterar o tranquilo se estendia em lingoetas de maré impetuosíssimas,
passando os limites a que chegam ainda na maior braveza levando consigo os
barcos, catraias e bateis que achou na area da praia, em que causou damno
arrombando-os nos encontros que lhes fez dar nas paredes dos quintaes das
cazas contiguas ao mar.
Assim continuou d'onda a onda quazi até à noute (...) [que] por castigo de Deus
inundava a todos, submergindo no mar os barcos da pescaria, que se achavam
nesse dia n'elle por necessidade de colher as suas redes, os quaes chegando a
terra ao mesmo passo em que os que estavam dez ou doze legoas ao mar con-
fessaram nada sentir, e os de tres até quatro legoas, que só conheceram um
movimento extranatural nos barcos.
Todos se assombraram do que viam obrar as lingoetas da maré e desampara-
ram os barcos ...”

— Barbosa, 1958 (p 339)::

References:

GRANJA H. M., 2002. Reconstituição paleoambiental da zona costeira, a
norte da laguna de Aveiro, desde a Idade Média até à Actualidade. O litoral em
Perspectiva Histórica (séc. XVI a XVIII). Instituto de História Moderna, Porto,
93-109.

London.
CLIMATIC AND COASTAL EVOLUTION DURING LITTLE ICE AGE: SOME CONSIDERATIONS

Maria da Assunção Araújo

Abstract

Modern Age (1453-1789) coincides approximately with a time of low temperatures through most of the world, a period called Little Ice Age (LIA). So, much of the ports history during this time must be understood inside a framework of a cold period, with river discharges, sea level, possible coastal advance and estuaries evolution that may be, in some sense, the opposite of the situations that we face today. Our main objective is to emphasise this idea because we believe that it may be a clue for the understanding of seaports evolution during that time.

Natural circumstances are interrelated with the man's influence modifying them (agricultural practices, forest exploitation, river embankment and dam's construction). For these reasons the correct investigation must not rely merely on a deductive model approach. However, the utilisation of this inferential approach may be helpful, awakening new ideas and hypothesis that may guide the necessary historical investigation.

1. Introduction – About Little Ice Age

The Little Ice Age (LIA) was a period of cooling lasting approximately from the 14th to the mid 19th centuries.

The beginning of LIA is still object of discussion and its limits are quite variable according to different sources. This happens partially because of the difficulty in reconstructing past temperatures. Instrumentally measured temperatures were widely used only since 1850, so they didn't exist in the beginning of LIA. Because of that, all the limits that we established are somehow artificial and prone to revision.

In addition, climate can vary continuously in time and space (Jones & Briffa, 2001). For instance, Barlow (2001) points out a significant discrepancy of LIA onset between Greenland and Europe. In Greenland LIA began earlier, around 1350.

It seems that LIA had its deepest temperatures in Europe during the 17th century while in North America the coldest period seems to be during the 19th century (Grove,

* HISPORTOS, funded by FCT, POCTI / HAR / 36417 / 2000
1 University of Porto. Faculty of Arts. Department of Geography (M.a.araugo@netcabo.pt)
2 http://en.wikipedia.org/wiki/Little_Ice_Age
3 http://en.wikipedia.org/wiki/Historical_temperature_record#The_quasi-global_period_from_1850
Fig. 1: Fluctuations in the length of the Grosser Aletsch glacier (the Alps, Switzerland) in the last 2000 years. Source: Brázdil et al., 2005

2001). Besides that, the same episode may have meaningful climatic differences in different areas. It is the case of MWP in the south and North of Europe: it seems that Doñana Park had a drier climate during MWP and a wetter climate during LIA and this precipitation characteristics were more important than temperature issues in LIA climate definition (Sousa & García-Murillo, 2003).

Therefore, it is not a simple task to define the boundaries of his period, as temperature variation was rather complex with several highs and lows. In fact, it is easier to define LIA in opposition to the surrounding periods: MWP and modern warm period. However, though the variation is quite complex, it is possible to find a meaningful contrast between the average temperatures during Medieval Warm Period (MWP) and LIA (Grove, 2001).

We can define MWP “as the period between the 10th and 14th centuries when global temperatures were about 1.0°C warmer than present” 4. According to the first International Panel for Climate Change (IPCC) report, medieval temperatures were considerably higher than recent temperatures. This seems to be true also for the NW Iberian Peninsula (Martinez-Cortizas et al., 1999).

After Medieval Warm Period, began a period of cooling. That period is designed as Little Ice Age (LIA) and can be characterised by several advances (including minor retreats) of the glaciers (Brázdil et al., 2005).

Little Ice Age can be defined as a time interval of about 330 years (c. AD 1570–1900) when Northern Hemisphere summer temperatures fell significantly below the AD 1961–1990 mean. This episode was also characterised by a stronger snowfall in winter and both facts are responsible for a general advance of alpine glaciers (Matthews & Briffa, 2005).

The beginning of LIA was not very well defined. However, its end is quite clear: after 1850, temperatures began climbing arriving to the actual warm period.

Even considering that the correlation between different proxies is sometimes haz-

4 http://www.co2science.org
ardous and the fact that MWP and LIA evidences are not contemporaneous world-wide it seems that both the Little Ice Age and Medieval Warm Period “have been climatic anomalies with world-wide imprints” (Soon & Baliunas, 2003).

2. Possible causes of climate change during the last millennia

According to Mörner (1993) most of climate and sea level changes “represent the redistribution of heat and water masses via the ocean current system”. However, “solar effects are not ruled out, especially during the periods of sunspot minima”.

In fact, there are striking similarities between climate evolution during LIA and a very meaningful drop in the sunspot number (fig 2). Two periods can be distinguished easily: the Maunder Minimum is the name given to the period roughly from 1645 to 1715 A.D., when sunspot became very rare, as noted by solar observers of the time. The Dalton Minimum was a period of low solar activity, lasting from about 1790 to 1820.

Besides orbital parameters pointed out by Milankovitch since 1941, many scientists believe in the influence of solar irradiance, at several timescales. One of the most discussed is the 11-year cycle (Schwabe cycle, Oldfield, 2005). The solar irradiance variation is quite small (about 0.08% within the 11 years sunspot cycle, Oldfield, 2005). The principal question remains in how a small amount of radiation variation can induce all these consequences. However, as the biggest augmentation due to sunspots stays in the ultraviolet range, its absorption at the stratosphere can produce important modifications on global circulation at troposphere level.

Svensmark and Friis-Christensen (1997) demonstrated a high degree of correlation between total cloud cover and cosmic ray flux between 1984 and 1991. The mechanism is quite complex but can be described in a simple way: when the Sun is more active (more sunspots), the magnetic field that is carried by the solar wind intensifies, pro-
Fig. 3: Changes in 14C production over the past 1000 years relative to 1950. The negative 14C anomalies correspond to high solar activity periods. The positive anomalies correspond to low solar activity periods. The Medieval Warm Period and the Little Ice Age are clearly discernible. (Source: Svensmark, 2000).

Providing more shielding of the earth from low-energy galactic cosmic rays. This effect may lead to a decrease in ion production in the lower atmosphere, possibly resulting in the creation of fewer cloud condensation nuclei and less low-level cloud cover.

This phenomenon also influences 14C production: the interaction of cosmic ray particles upon the atmospheric gases produces 14C. Solar wind intercepts cosmic rays; thus, variability in 14C production is mainly a result of changes in solar activity. High solar activity leads to stronger shielding from the solar wind and thus a reduction in the 14C production rate. Confirming the correlation between these different processes, at fig. 3, we can see that 14C anomalies have a negative correlation with temperatures.

Solar forcing is no doubt a large field of possibilities to be explored: even the scientists who think that solar forcing is not a dominant cause of 20th century Northern Hemisphere warming and insist on an anthropogenic causes agree that it could produce a very significant forcing of pre-industrial climate (Damon & Peristykh, 2005).

Because of all the obvious implications in politics, climate change is a delicate field of work. Much of it is still controversial science. Within a controversial science framework, the opinions are sometimes clearly divergent. The most important is to keep an open mind on these subjects trying to listen to both side arguments.

Therefore, even if the conclusions are still uncertain it is important to open the discussion to discuss the scientific mainstream on these subjects. The subject clearly deserves to be pointed out beyond the scientific discussion and controversies, because the misinformation and the catastrophic views are impregnating much of the discussion on these themes.

5 http://www2.sunysuffolk.edu/mandias/ilia/little_ice_age.html
3. Climate characteristics and Geomorphologic consequences of LIA

During the LIA cooling of the climate, glaciers in many parts of Europe began to advance (fig. 1). Glaciers negatively influenced almost every aspect of life for the people living in their path. Glacial advances throughout Europe destroyed farmland and caused massive flooding. There was a high frequency of storms. As the cooler air began to move southward, the polar jet stream strengthened and followed, which directed a higher number of storms into Central Europe. Large hailstorms occurred over much of Europe due to the very cold air aloft during the warmer months.

For our purposes, it is most important to notice that the LIA was accompanied by a greater frequency of floods. It seems that the same situation was happening at the Mediterranean areas. Grove (2001) refers the existence of great floods in places so far away as Setúbal, Bordeaux and Rome during the winter 1694-95. This situation should be responsible for a greater discharge on rivers and that could lead to a greater transportion of sediments until the coastline. The augmentation of snow or rain during winter could increase floods and the rivers would carry more sediment. Some of it should be deposited inside intramountain basins or piedmont plains. After LIA, the transition to a less resistatic climate (Ehrardt, 1956) would imply the down cutting of previous deposited sediments transforming these old sediments into fluvial terraces. This sediments are generally designed as the “younger fill” (Grove, 2001) and they are a typical occurrence of circum-alpine areas.

Deltas were also advancing and during 1604 Venetian authorities tried to alter the Po River valley, dragging its mouth to the south to prevent a further siting of Venice lagoon (Grove 2001).

Due to strong winds, great sand storms acted upon coastal land regions, redistributing through the coastal areas the increased sediments brought to the littoral by the rivers. This increase in dune construction can be traced also in Portugal. In the northern coast, near Espoende, a medieval cemetery is covered by sand dunes. This shows an advance of coastal dunes after MWP (Granja, 1990).

Rodrigo et al. (1998) analysed climatic information in private correspondence of the Jesuit order in Castille (Spain) for 1634–1648. They showed prevalence of intense rainfall and cold waves in that period. Doñana Park also had a wetter climate during LIA (Sousa & García-Murillo, 2003), contrasting with a drier one, actually.

In Portugal, according to Alcoforado (1999), during Mauder minimum (1675-1715), the climate was not too different from today: there were a little more anticyclone conditions in winter and spring, producing a dryer climate.

This seems to be true also for other areas of Mediterranean Europe. According to Grove (2001), during Mauder minimum (1675-1715), the winters were mostly cold and dry, with the exception of 1690 that was quite snowy.

Still according to Grove (2001), the intensification of fluvial activity happened from 1250 to 1550 and from 1750 to 1900 in northern, western and central Europe.

Martins et al., (2006) showed the occurrence of muddy events from 2200-1200 years BP and after 500 Cal BP at Vigo’s Ria in the NW coast of Iberian peninsula, about 30 km from Portuguese border: they conclude that these muddy events are a sign of contrasting climatic conditions. The last period corresponds to LIA and so, it seems that
also in Iberian Peninsula, LIA was characterised by increased erosion on the inland and the transportation of sediments to the coastline.

In fact, Grove (2001) comparing the historical evolution of population density and the erosion features concludes that forest clearance issue is only a part of reasons to explain the increased sedimentation during LIA and according to him, the “younger fill” could have mostly a climatic origin.

4. Climate variation and sea level changes

Actually, we are in a period of slowly rising sea level. This happens because of thermal expansion of seawater and because of glaciers retreat after Little Ice Age. Mörner's curve (1973) shows precisely a rising sea level departing from a low around 1830, which coincides with Dalton minimum and one of the last cold advances of LIA.

This curve, constructed after the comparison of tide gauges from Stockholm, Amsterdam, Warnmünd (near Rostock, Germany) and Swinemünde (Polish coast, North of Stettin) proves the close relationship between climatic cooling, glacier advance and eustatic lowering, which can be recorded throughout the last 20,000 years (Mörner, 1973). It seems clear that LIA was a period of relatively low sea level.

According to this principle, as MWP was a warm period sea level must have been higher in MWP than during the subsequent LIA.

Van de Plassche et. al. (1998) studied the sea level in the last 1400 years for Hammock River marsh, Clinton, Connecticut. They conclude that it “correlates positively with large-scale regional variations in sea-surface and summer-air temperature, indicating a link between sea-level and the climate-ocean system”. According to this research, “real sea level oscillated centimetres to decimetres on a century time scale over the past 1400 years”. It was “25±25 cm higher ca A.D. 1050 (Medieval Warm Period) than ca A.D. 1650 (Little Ice Age)”. This clearly agrees with Mörner's curve and it seems to be quite well established since the results are obtained from two continents: Europe and North America.

5. Coastal evolution: LIA versus modern situation

It seem quite probable that during LIA:

1 – Due to increased storminess, intense rain/snow could be responsible for an increased sedimentation along river valleys, creating the so-called “younger fill”(Grove, 2001). Downstream and inside the estuaries, a sea level drop will allow the sediments to migrate towards the sea, contributing to beach nourishment. The same reason should allow the rivers to cut its own deposits: close to river mouth, the river channels may be narrower and incised upon the abundant sediments that characterise that climate situation, forming river terraces, a reverse
of upstream situation, where “younger fill” sedimentation should be the norm.

2 – The sediment transported to the coastline should be deposited in the coastal areas where they should construct wide beaches that strong winds could use as sources for building extended coastal dunes.

3 – Sea level should be a little lower than present. This could result into a sea retreat, abandoning older beach ridges, and reinforcing the sandy supply for dune building.

On the contrary, during MWP and the recent warm period:

1 – The rivers carry less sediment than during LIA. Consequently, having less sediment charge they will have the strength to cut older sedimentation areas, transforming them into river terraces, at least in the intermediate part of river channel.

2 – A sea level rise produces some infilling of estuaries because the rivers have not enough strength to carry their sediments into the sea. This also contributes to a coastal retreat because of lack in sediments available to littoral drift.

3 – The sea level rise produces a retreat of the coastline end the erosion of previous beaches and dunes.

The history of Aveiro lagoon shows a very fast (fig. 5) advance of the sand spit that encloses the lagoon. At 922 Ovar was still a sea harbour. At the end of XV century the sand spit was located at the latitude of Aveiro. At 1756 the sand spit stayed at Mira latitude and Aveiro port entrance was ca 28 km to the south of the city. Aveiro was dying because of a precarious connection to the sea and the lagoon, filled with non-renewed waters had serious sanity problems. The new port entrance was finally opened in 1808.
A: At the end of Flandrian transgression (ca. 5000 BP): the sea invaded lower Vouga valley, transforming it into a “Ria”.

B: At the end of XIV century: the spit was near Aveiro latitude.

C: Nowadays: the cutting of advancing spit was made by man action in 1808.

Fig. 5: The sand spit progression and Aveiro lagoon evolution. Adapted from Martins, 1949.

This means that from ca 1500 to 1756 (about 250 years) the sand spit moved about 28 km: a little more than 1 km each decade. It is important to underline that the sand spit fast movement happened during Little Ice Age when the increased storminess and rainfall could have brought a greater amount of sediments to the coastline. These sediments contributed to a rectification of the coastline that was presumably more irregular during high sea level periods (around 5000-6000 BP, Dias et. al, 1997), and also during MWP.
6. Some conclusions:

The more we move towards the past, the more difficult are the reconstructions of physical environment, and the more information and team work is necessary.

More than the deductions we presented it is important to know if the model really apply to the reality. The use of Hisportos database, with its rich cartographic fund can be a very important issue in order to analyse the real situations and finding out the possible connections between climate change, sea level change, coastal and port evolution.

That's one of the more important issues about Hisportos: the possibility of working together exchanging information and methodology between earth sciences and history sciences.

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GEO-MORPHOLOGIE DU LITORAL ET HINTERLAND:
DES RELATIONS DIFFICILES A SAISIR.
HINTERLAND DES PORTS DU NORD DU PORTUGAL ET
RESSOURCES FORESTIÈRES*

Nicole Devy Vareta¹

Abstract

Si l'on a déjà reconnu dans les relations commerciales entre les villes portuaires et leur hinterland l'un des piliers de la richesse des centres urbains du littoral, il est par contre assez difficile de reconstituer l'évolution de ces rapports en ce qui concerne les dynamiques géomorphologiques, du moins dans la région du Nord du Portugal. Comment interpréter les rapports entre les variations du niveau de la mer, l'ensablement croissant et l'évolution de l'utilisation du sol dans les régions intérieures, pendant l'Époque Moderne? S'agit-il de dynamiques essentiellement naturelles, ou surtout orientées par les impacts anthropiques? Il sera fait une mention spéciale sur les difficultés d'interprétation des dynamiques forestières: la forêt représente une ressource fondamentale pour la construction navale, mais le déboisement et l'ampleur des incendies sont documentés dès le Moyen-Âge. Sur les marges de l'approche géo-morphologique du littoral, il faut certainement élargir la place accordée aux dynamiques de l'hinterland.

Si l'on a déjà reconnu dans les relations commerciales entre les villes portuaires du Nord du Portugal et leur hinterland l'un des piliers de la richesse des centres urbains du littoral, il reste malgré tout assez difficile de reconstituer l'évolution de ces rapports à la lumière des dynamiques géo-morphologiques. Comment interpréter, pendant les Temps Modernes, les relations entre les variations du niveau de la mer, l'ensablement des ports et l'évolution de l'utilisation du sol dans les régions intérieures? S'agit-il de dynamiques essentiellement naturelles, ou surtout orientées par les impacts anthropiques? Notre brève intervention fera une mention spéciale sur la situation forestière, qui représente une ressource fondamentale pour toute activité de l'économie et de la vie quotidienne de l'Ancien Régime, de la construction navale au bois de feu domestique.

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1. University of Porto. Faculty of Arts. Department of Geography
1. L’interface du naturel et de l’anthropique : les principaux enjeux de l’hinterland des ports

Envisager cet interface pendant les Temps modernes, c’est obligatoirement se confronter à l’imbriication des dynamiques naturelles et anthropiques. Surtout dans les régions littorales du Nord du Portugal, les plus anciennement aménagées du pays. La nature représente ici l’ensemble des ressources, qui se trouvent au cœur de l’histoire de l’organisation du territoire depuis des millénaires. Le potentiel écologique, l’exploration biologique et les interventions humaines dans l’environnement interfèrent les uns avec les autres de manière irréversible (N. Devy-Vareta, 2002).

Tout d’abord, le relief dévoile deux principales caractéristiques. Cette région a été affectée par une tectonique complexe, avec plusieurs paroxyssymes depuis 350 millions d’années. Les mouvements de fracturation ont permis la création d’une mosaïque géomorphologique, constituée par un ensemble de petits blocs de différentes hauteurs, entre 800 m et 150 m, séparés par un réseau hydrographique, dense et orienté par les fractures. Dépressions plus ou moins vastes près du littoral, séparées par des collines aux versants parfois abrupts, avec de larges vallées devenant soudain étroites au contact de la montagne plus à l’Est : c’est dans ce cadre que ce sont développés les processus érosifs des sols et l’ensablement des ports, liés à la forte pluviosité et à la désestabilisation des milieux très tôt modifiés par les interventions humaines.

En fait, on constate une notable asymétrie dans la distribution des précipitations, avec une abondance exceptionnelle, avec plus de 3000 mm par an, sur les reliefs orientaux, qui passe à moins de 1000 mm dans la région de Porto. Le passage du Little Ice Age (1550-1850) pendant l’Époque moderne a eu certainement des impacts significatifs sur l’évolution de l’environnement et les conditions de la vie portuaire. Pendant cette période plus froide et pluvieuse, la couverture végétale aurait souffert une dynamique progressive naturelle, encore mal connue, en articulation avec le renforcement des impacts anthropiques, qui provoquent des phénomènes complexes de rétroaction dans les systèmes naturels régionaux.

Selon la typologie de la végétation de la Carta Biogeográfica de Portugal (1998), le Nord-Ouest portugais intègre le sud de la Région Eurosibérienne ou Atlantique, qui inclut tout l’océan de l’Europe. L’unité phytogéographique Cantabro-atlantique, du Rio Minho à la Ria de Aveiro, constitue la parcelle méridionale de la Région Eurosibérienne, en transition avec les milieux méditerranéens. Au Portugal, on individualise le Secteur Miniense, où se mélangent les éléments floristiques atlantiques dominants, et d’autres méditerranéens. Le géographe Orlando Ribeiro remarquait déjà dans les années 1950 « l’entrelacement des influences méditerranéennes et atlantiques », encore bien visible dans les régions les plus atlantiques du pays (moins de deux mois de sécheresse). Selon le modèle de la Carta, la végétation naturelle était essentiellement formée par des bois de feuilles caduques, avec des chênes (Quercus robur), mais aussi des bouleaux (Betula ssp), noisetiers (Corylus ssp), frênes (Fraxinus ssp) et sycomores (Acer ssp). La position de transition bioclimatique du Minho favorise l’intégration d’un cortège floristique méditerranéen, avec le chêne-liège (Quercus suber) et le pin pignon (Pinus pinea) dans la strate arborée. Dans le Trás-os-Montes, biogéographiquement situé dans la Région méditerranéenne, ce sont les chênes-liège et le tauliz (Quercus pyrenaica), qui dominent la végétation naturelle.
Quoique cette végétation ait été largement modifiée par les sociétés humaines depuis le troisième millénaire A.C., les documents descriptifs de l'époque montrent que le NO était alors l'une des régions les plus boisées du pays, même si les massifs forestiers avaient subi une contraction généralisée pendant la période des défrichements du Moyen Âge. L'occupation des sols est totale dans la région des collines et plaines, conduisant à l'intégration de la forêt dans les agrosystèmes, avec surveillance contre les pillages de bois et des plantations régulières, notamment dans les propriétés des monastères. Il s'agit donc d'une forêt fortement anthropisée, essentiellement constituée par des chênaies et châtaigneraies (soutos), et gérée en fonction des nombreux produits et services qu'elle fournit. Sur les versants ou les plateaux plus éloignés des concentrations de population, persistaient des massifs semi-naturels, plus ou moins exploités selon leur accessibilité.

La demande de produits forestiers va subitement augmenter à partir de la fin du Moyen-Âge, à un moment où se définissent les contours de l'Expansion portugaise, et se confirme une augmentation de la population. De plus, il y a quelques changements dans les systèmes de cultures, par exemple l'expansion de la vigne et, plus tard, l'introduction du maïs, qui viennent transformer l'équilibre médiéval des agrosystèmes. Les besoins en bois s'accroissent et la concurrence entre produits forestiers se fait plus pressante.

2. La question des ressources forestières

C'est la grande question que se posent les chercheurs quand ils abordent les dynamiques portuaires, inséparables de la construction navale et donc de l'existence ou non de massifs boisés à exploiter dans les régions environnantes, de facile accès par voie terrestre et fluviale. Certains pays, comme la Hollande, pauvres en forêts, ont dû importer de grandes quantités de bois pour approvisionner leurs arsenaux et chantiers navals. Qu'en est-il au Portugal?

Bien que la situation de l'histoire de la forêt portugaise ne permette pas encore une bonne systématisation des résultats en ce qui concerne le Moyen Âge et l'Époque Moderne, quelques travaux récents lancent une nouvelle lumière sur cette question (voir par exemple, L. Costa, 1993 c et 1997; A. Polónia, 1999 et A. Barros, 2004). Elles viennent pondérer, ou même démentir, les thèses classiques développées par F. Mauro (1960) et C. Boxer (1966), selon lesquelles le manque de bois de marine se serait fait sentir au Portugal dès le début du XVIe siècle. Pour ces auteurs, le bois nécessaire à la construction de la flotte commerciale n'existait déjà plus suffisamment sur le sol national, obligeant à l'importation de matériel, principalement d'origine allemande et baltique.

En Europe occidentale, la fin du Moyen Âge et le début de l'Époque moderne est une période de déboisement, et la pénurie de bois d'œuvre est flagrante à partir de la deuxième moitié du XVIe siècle. Au Portugal, et ceci malgré les carences de la recherche, il est reconnu que la forêt, pour des raisons diverses, avait déjà connu une nouvelle phase de recul, avant le virage du XVIIe. Les défrichements et les mises en culture de la seconde moitié du XVIe siècle, la croissance démographique, avec les besoins croissants des villes, tant pour la construction que pour la consommation énergétique, et l'augmentation des besoins pour la construction navale en sont les principaux facteurs. A cela
s'ajoutent des processus naturels de régénération forestière très perturbés par l'amplitude des feux qui balayaient régulièrement les reliefs et les régions à l'agriculture et à l'élevage extensifs.

Le fait est que le Portugal importe du bois pour la construction navale dès le Moyen Âge et que ces importations pouvaient se faire à l'abri d'exemptions d'impôts qui bénéficiaient commerce et négociants. Est-ce là le signe d'une véritable pénurie, ou le reflet des intérêts commerciaux établis de longue date par les compagnies portugaises, entre la Méditerranée et les Pays Nordiques? S'il y a eu pénurie de bois pour les arsenaux et les chantiers navals, les importations, dûment documentées, sont là pour le prouver. D'un autre côté, les exonérations de taxes bénéficiant ce type de matériel rendent l'information plus opaque, par le manque de documents où se trouverait consignée l'entrée de bois dans les ports.

Il faut aussi tenir compte de la pluralité des situations locales en ce qui concerne la protection, l'aménagement de la forêt, et l'évolution des usages de la forêt par la population. Car, à la fin du Moyen Âge, la forêt constituait encore un espace nourricier pour les communautés paysannes, qui y récoltaient aussi le bois d'œuvre et le bois de feu. Dans les coutadas royales, c'est-à-dire dans les réserves de chasse et de forêts qui se trouvaient dans l'aire d'influence directe des chantiers navals de Lisbonne, les conflits entre usages et protection pour la production de bois s'accroissent, au détriment des usages, et en faveur de la production du bois de marine. Selon L. Costa (1993 et 1997), le chêne-liège et le pin pignon, espèces privilégiées pour la coque des navires, resteront abondants jusqu'au troisième quart du XVIIe siècle. Cependant, les importations de bois et de mâts se poursuivent depuis le Moyen Âge, par l'intermédiaire des relations hanseatiques.


Jusqu'à la fin de l'Ancien Régime, l'histoire des ressources forestières au Portugal est celle d'une véritable obsession de l'approvisionnement en bois, comme dans la plupart des pays européens. Le pouvoir royal a stimulé le reboisement à l'échelle nationale par des édits publiés dès la fin du XVIIe siècle. La loi de D. Manuel de 1498, dont on ne sait à vrai dire pas grand-chose, se solde par un échec reconnu quelques années plus tard. La Loi des Arbres de 1565 qui encourage le reboisement des communautés et des propriétés privées par le biais des municipalités, répond aussi au désir d'augmenter les
ressources en bois des arsenaux. Mais il reste à savoir si elle a eu vraiment les effets escomptés.

Les incertitudes se maintiennent en ce qui concerne l’aménagement forestier, dont il n’existe aucune réglementation globale, mais dont on connaît les pratiques reconnues dans quelques documents du pouvoir central, ou dans les contrats publiés à l’échelle locale dès le Moyen Âge. C’est justement à ce niveau là que semble se situer la situation privilégiée de l’approvisionnement en bois des ports du nord du pays, dans l’état actuel de la recherche: un hinterland qui bénéficie d’un aménagement forestier dans le maillage serré de propriétés privées, ecclésiastiques et seigneuriales, qui ont joué un rôle important dans la gestion locale des pratiques forestières.

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SEAPORTS SYSTEMS.
A COMPARATIVE APPROACH
PORTAS PARA O MAR:
INFRAESTRUTURAS PORTUÁRIAS NOS PAÍSES BAIXOS
NA BAIXA IDADE MÉDIA

Louis Sicking

Abstract

In several European countries, the rising interest in medieval ports has stimulated the comparative study of port development and infrastructure. This can be considered as a stimulus for the study of ports in the Low Countries in the late Middle Ages. Research into the maritime history of Flanders and Zealand has yielded several studies on individual ports. The late medieval port infrastructure in Holland, however, has not been studied as thoroughly. For this reason the author organised a research seminar on port cities and their infrastructure in late medieval Holland. Because of the great diversity and varying availability of primary sources concerning ports, it has proved difficult to find meaningful grounds of comparison. Nevertheless, studying ports from different angles will enhance our understanding of port development. The article summarizes the results of three case-studies: on the deepening of the harbour of Dordrecht, the conflict between the town government of Amsterdam and the inhabitants of the harbour area known as Lastage over its infrastructure, and the city of Leiden’s ambition to create a direct connection with the sea. Finally, a number of issues related to three different geographical levels – port, harbour area, and the link between a town and the open sea – are explored.

*University of Leiden

A maioria das cidades dos Países Baixos que cresceram a um ritmo acelerado e às quais foram atribuídos direitos e privilégios, situavam-se junto a zonas marítimas ou fluviais.

A acessibilidade destas cidades por via marítima ou fluvial faz com que actividades económicas ligadas ao comércio e à pesca se tenham tornado essenciais para o desenvolvimento e manutenção das áreas urbanas.

Não é, pois, com surpresa que vemos representantes do poder político a vários níveis chamarem a si o desenvolvimento portuário.

Os condés da Flandres, em especial Diederik (1128-1168) e Filipe da Alsácia (1168-1191), assumiram um papel de relevo no desenvolvimento das zonas portuárias sob a sua administração.2

Este interesse do poder político pelo crescimento portuário tem duas explicações distintas. Por um lado, o desenvolvimento de infraestruturas portuárias servia como polo de atracção para as actividades comerciais que, por sua vez, contribuíram para o desenvolvimento de cidades e seus termos. Por outro lado, o poder político podia tirar proveito da criação de impostos alfandegários3 e angariar capital privado para investir na prestação de serviços ligados às actividades portuárias ou no alargamento das áreas portuárias.

A história dos portos, cidades portuárias e infraestruturas portuárias, em especial durante a Idade Média e o período Moderno, tem-se tornado uma área de grande interesse científico para os historiadores. Este interesse tem-se estendido a países na Escandinávia4, Inglaterra5, Alemanha6, França7, Espanha8 e Portugal9, locais onde recentemente o interesse por estas temáticas se revelou maior do que em países como a Holanda ou a Bélgica, onde a literatura sobre portos se tornou, nos últimos anos, um tanto ou quanto desactualizada.10

Esta situação é algo surpreendente, pois tanto a Holanda, como a Bélgica, localizam-se junto ao mar e daí se esperasse um maior empenho na realização de trabalhos


9 Um exemplo deste empenho é a presente publicação, fruto da sessão de trabalhos que a precedeu.
relacionados com temáticas portuárias e marítimas.

Dado que o desenvolvimento portuário está intimamente ligado com o trabalho feito ao nível infraestrutural e de defesa dos cursos de água junto aos quais os portos se encontravam, também a investigação neste terreno se encontra estreitamente ligada com temáticas relacionadas com a história urbana e áreas envolventes\textsuperscript{11}, assuntos pelos quais existe grande interesse na Holanda\textsuperscript{12} e Bélgica\textsuperscript{13}.

No contexto mais geral ligado à historiografia nos Países Baixos é legítimo utilizar as problemáticas relacionadas com as infraestruturas marítimas e defesa das frentes ribeirinhas, num esforço de resposta a questões centrais, tais como, o significado das zonas urbanas para o desenvolvimento dos Países Baixos, os quais conheceram um processo de integração económica e de formação de entidades políticas, desde o fim da Idade Média.

A tese de Peter Sigmond, Nederlandse zeehavens tussen 1500 en 1800, pode servir de ponto de partida para o estudo dos portos e infraestruturas portuárias nos Países Baixos durante a Baixa Idade Média.

A particularidade da obra de Sigmond reside no facto de o seu estudo ser conduzido não de uma forma individualista, monográfica e isolada de cada porto, mas sim tratar-se de uma análise comparativa e integrada de diferentes portos marítimos.

O livro de Sigmond apresenta, no entanto, alguns problemas. O autor concentra a sua atenção no território hoje localizado na Holanda, deixando de fora grande parte da província da Flandres e do Brabante. Por outro lado, o livro retrata somente o período moderno\textsuperscript{14}.

Para o estudo do desenvolvimento portuário no fim da Idade Média é importante compreender que tanto a Flandres, como o Brabante, sempre estiveram na vanguarda deste fenómeno. Esse foi também o caso da expansão urbana e económica consequência da criação, estabelecimento e recuperação de vários portos.

As questões levantadas por Sigmond poderão, no entanto, ser utilizadas como ponto de partida para uma análise comparativa do desenvolvimento de infraestruturas portuárias e portos durante a Baixa Idade Média. Quais as razões que levaram à cria-


\textsuperscript{12} Por exemplo, R. Rutte, Stedenpolitiek en stadsplanning in de Lage Landen (12de-13de eeuw) (Zutphen 2002).

\textsuperscript{13} Fei o caso do colóquio Groupes sociaux et territoires urbains (Moyen Age – 16e siècle), organizado pelo IUAP em Bruxelas, de 2 a 4 de Dezembro de 2004.

\textsuperscript{14} J.P. Sigmond, Nederlandse zeehavens tussen 1500 en 1800 (Amsterdão 1989)
ção de portos inexistentes ou à ampliação de portos antigos? Qual a razão segundo a qual portos com as mesmas características acabaram por ter destinos diferentes, tornando-se, uns, portos de envergadura internacional, e outros, nunca ultrapassaram o seu estatuto regional?

Estas perguntas pretendem resolver uma série de problemas do foro historiográfico, a saber, qual a origem dos portos, as razões que levaram à sua criação, e a forma como funcionavam.

Na Idade Média, a distinção entre porto marítimo e porto fluvial é muito importante. Se a definição de porto marítimo assenta no facto de nela só serem incluídos os portos aos quais barcos de grande porte tinham acesso, nesse caso, cidades como Tiel, Utreque, Deventer e Colónia teriam de ser consideradas como portos marítimos.

No entanto, com o aumento da profundidade dos cascos dos navios, a definição de porto marítimo deslocou-se para cidades mais a juzante dos principais rios. Exemplo desta deslocação foi o crescimento de Dordrecht, no Reno, e de Kampen, no IJssel.

Para utilizar uma perspectiva comparativa, o historiador tem sempre de se socorrer de monografias sobre os diferentes portos ou infraestruturas portuárias. Para a Flandres, a bibliografia é bastante rica e abundantemente. Por exemplo, existem estudos significativos sobre Bruges, os seus portos de mar e o rio Zwin15, assim como proliferam trabalhos sobre portos marítimos na zona costeira desta mesma província16.

Muitos dos artigos sobre os portos marítimos da Flandres foram publicados no *Handelingen van het Genootschap voor Geschiedenis*, inaugurado sob o nome 'Société d'Émulation' te Brugge: driemaandelijkse tijdschrift voor de studie van geschiedenis en oudheden van Vlaanderen.

O estudo mais importante sobre estas problemáticas foi publicado por A. Verhulst que para além de artigos17 da especialidade, publicou ainda sínteses18 bastante significativas sobre estas temáticas.

Ao trabalho de Verhulst, teremos de acrescentar ainda as investigações de R. Degryse, que contribuiu também de uma forma inequívoca para um melhor conhecimento dos portos da Flandres, através da pesquisa exaustiva de fontes primárias19.

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No que respeita à província da Zelândia, o resultado dos estudos mais antigos sobre os seus portos foram publicados no Archief. Mededelingen van het Koninklijk Zeeuwse Genootschap der Wetenschappen, dos quais se destacam os artigos de P. A. Henderikx.20

Para a província de Holanda, a literatura é menos abundante. A historiografia tem privilegiado os estudos monográficos relativos a cada cidade, e tem prestado menos atenção aos estudos de índole comparativa.

Presentemente, esta tendência parece manter-se, até porque as novas ‘histórias de cidades’ ignoram ostensivamente todas as questões que se relacionam com portos e infraestruturas portuárias. Uma das poucas exceções a esta regra é a nova Geschiedenis van Amsterdam, que, no seu primeiro volume, dedica duas páginas ao porto propriamente dito.21 Como se pode constatar, ainda há muito a fazer.

Foi neste contexto que se decidiu criar um grupo de discussão para estudantes do terceiro e quarto anos, no sentido de se promoverem estudos sobre os portos dos Países Baixos na Idade Média.22

Não querendo ser exaustivo, é importante sublinhar alguns resultados deste projeto.

A situação das fontes nos diversos arquivos é dispare, o que torna difícil a tarefa do historiador no sentido de encontrar fontes semelhantes para se efectuarem estudos comparativos sobre portos diferentes.23

Porém, uma nova perspectiva de investigação sobre portos e estruturas portuárias parece ser bem vinda, não obstante os obstáculos postos pelas fontes primárias.

O tipo de fontes mais comum encontrado nos arquivos locais permitem uma análise mais ou menos detalhada sobre os vários aspectos característicos de um porto, assim como a relação estabelecida entre as infraestruturas portuárias e a área urbana do porto e seu termo.

Neste artigo apresentaremos três exemplos de problemáticas essenciais para um estudo comparativo dos portos holandeses: 1) o desenraizamento do porto de uma antiga cidade holandesa, como foi o caso de Dordrecht; 2) o bairro portuário de Amsterdã, conhecido como o Lastage; 3) o plano de abertura das dunas na frente marítima de Katwijk, com o objectivo de ligar a Rijnland directamente ao mar, o que pode ser interpretado como uma tentativa, por parte da cidade de Leiden, de ligar o centro da cidade, por via fluvial, directamente ao mar.

Os três temas acima enunciados podem ser considerados como um todo, uma vez

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22 Trata-se de um bachelor seminar, Sleutels tot de zee. Havens, handel en infrastructuur in de Neder- landen en Europa in de middeleeuwen, leccionado no segundo semestre do ano lectivo de 2004-2005, no Instituto de História da Universidade de Leiden.

que podem ser vistos como diferentes círculos concêntricos de influência. O primeiro círculo inclui uma temática directamente relacionada com a área urbana propriamente dita. O segundo círculo contém um bairro no interior da zona urbana. O terceiro círculo engloba a ligação entre o porto (zona urbana) e o bairro, por um lado, e o mar, por outro (vide esquema).

A investigação sobre o desaçoreamento do porto de Dordrecht baseia-se no registo das despesas feitas durante as obras. Tal fonte parece ser bastante sui generis, uma vez que mais nenhum registo documental desta natureza sobreviveu nos arquivos de outros portos.

O projecto de desaçoreamento do porto de Dordrecht parece ter sido muito importante e ter durado vários meses. Devido à duração do projecto, vários especialistas, entre eles administradores e mesteirais, receberam generosos contratos para efectuarem as ditas modificações.

O processo de desaçoreamento do porto de Dordrecht parece ter obedecido a um plano. Em primeiro lugar, o porto foi encerrado e a água foi bombeada para fora para que se pudesse trabalhar no porto seco. Quando o porto ficou completamente seco, a área foi dividida em lotes iguais e cada lote foi escavado individualmente. O solo foi retirado dos lotes com a ajuda de cestos e elevações, e, depois, transportado por carroças para fora da área circundante.

A administração municipal decidiu iniciar este projecto por pressão das confrarias, também elas representadas nos conselhos municipais.

O financiamento do projecto foi conseguido através da venda, por uma vida, das rendas municipais. Os mesteirais do termo de Dordrecht viram-se obrigados a contribuir para o projecto com trabalho, uma vez que também eles tirarião proveito do projecto de melhoramento do porto. Os proprietários de edifícios junto ao porto foram vemente aconselhados a escorarem as paredes dos seus imóveis, a repararem as brechas de prédios urbanos e estruturas anexas, entre outras obras de beneficência. Os proprietários das oficinas situadas nas docas anexas ao porto, parte integrante do complexo portuário, foram, também eles, chamados a participar do projecto, nomeadamente através do desaçoreamento das docas por iniciativa privada.

Durante o tempo que durou os trabalhos, todas as actividades portuárias foram sus-
pensas. Os maiores prejudicados foram aqueles que dependiam directa ou indirectamente das mesmas actividades portuárias, mas que num futuro próximo poderiam vir a tirar algum proveito das obras. Para além deste grupo, também os restantes habitantes da cidade foram muito penalizados, uma vez que todo o entulho e maquinaria que eram transportados do porto para a cidade, ou vice-versa, tinha obrigatoriamente de passar por dentro de propriedades privadas, danificando frequentemente terras, culturas e edifícios.

Não há dúvida que este projecto foi concebido para defender e expandir os poderes da cidade, seus habitantes e seu termo. Por isso, o desacoreamento do porto de Dordrecht em 1452 e 1461 tem de ser visto como uma obra de cariz infraestrutural, que surgiu como uma reação a uma crise económica relacionada com os direitos e privilégiros atribuídos à cidade, que há muito se encontrava em declínio.24

A cooperação entre a administração local e os interesses privados que assinalamos em Dordrecht não existiu no caso de Amesterdão. Nesta cidade ocorreu a situação inversa. O conflito entre os habitantes do Lastage, bairro anexo ao porto, mas situado fora das muralhas, e a administração municipal foi constante.

Devido ao perigo de fogo nas áreas residenciais da cidade, a administração municipal de Amesterdão foi proibindo, aos poucos, o abandono de materiais relacionados com as actividades portuárias, tais como cordas e pedaços de madeira, por toda a cidade. A primeira consequência desta medida foi a deslocação das actividades adjacentes à vida portuária para um bairro fora das muralhas, o Lastage.

A relação entre os habitantes do Lastage e a administração urbana foi sempre conflituosa, mas os diferendos aumentaram significativamente aquando das guerras de Gelre durante o século XVI, em que Amsterdão era vista como uma cidade de fronteira.

Durante as guerras do início de Quinhentos, os interesses da cidade e da sua elite governante resumiam-se à defesa da integridade física do espaço urbano e à protecção eficaz dos seus habitantes, ao passo que os moradores do Lastage estavam mais interessados em defender as suas casas e negócios e manter as actividades portuárias a funcionar, o que exigia uma atitude política oposta à defendida pela cidade.

O perigo de incêndio e o agravamento da situação militar fez com que Amsterdão e o bairro do Lastage se vissem confrontados com diversos dilemas. Devido à existência de materiais voláteis um pouco por todo o Lastage, esta zona era o calcanhar de Aquiles na defesa da cidade de Amsterdão. Esta fragilidade foi confirmada quando, em 1512, as tropas de Gelre invadiram o Lastage e incendiaram muitos dos barcos que se encontravam ancorados no Oude Waal.

Para evitar uma catástrofe semelhante à de 1512, a administração municipal optou por construir uma muralha em torno do Lastage e obrigar todas as estruturas de madeira, inclusive, as habitações, a serem reforçadas com exteriores de pedra.

A fortificação do Lastage teve duas consequências negativas. Por um lado, a importância da área como motor de desenvolvimento económico diminuiu, ao mesmo tempo que um maior número de estruturas ilegais de madeira continuaram a crescer fora de muros.

Um dos problemas imediatos após o reforço dos edifícios com tijolos e pedras foi o afundamento das estruturas primárias dos imóveis, isto é, o facto de o solo ser cons-

tituído por lençóis de água fez com que o peso acrescentado às estruturas primárias se tornasse de tal forma insuportável, que os solos cederam e, com eles, os edifícios. Por outro lado, o reforço com pedra e tijolo de estruturas de madeira atribuíu a estas um caráter mais permanente e definitivo. Isto quer dizer que em caso de ataque militar, seria impossível desmontá-las temporariamente e voltar a montar em tempo de paz.

O caráter definitivo dos edifícios do Lastage, assim como a fragilidade dos solos sobre os quais esses mesmos edifícios foram construídos, fez com que os habitantes deste bairro aproveitassem o que parecia, à primeira vista, uma situação desvantajosa, como um incentivo à alteração das fundações dos edifícios. Isto significa que por todo o bairro vários edifícios foram elevados das suas fundações, de acordo com um sistema de palissadas.

Após a assinatura do tratado de paz com Gelre em 1543, que terminou com a absorção deste condado na unidade provincial dos Países Baixos, Amsterdã deixou de ser uma cidade de fronteira face às possíveis investidas militares vindas do Zuiderzee.25 Porém, esta nova situação não significou o fim dos conflitos entre administração municipal e habitantes do Lastage.

Os conflitos entre bairro periférico e a administração urbana continuaram a ter o mesmo caráter, nomeadamente, no que respeita à destruição ou manutenção da fortificação em torno do Lastage, bem como à construção ilegal e à elevação desordenada de edifícios particulares que continuou a bom ritmo.

Para além destas questões já existentes durante o período da guerra, surgiram ainda diferendos sobre a possível construção de um dique e de um canal, os quais melhorariam significativamente a acessibilidade do Lastage.

Os conflitos entre habitantes e administração municipal foram apresentados às instâncias políticas e jurídicas competentes, entre elas a administração central em Bruxelas e ao Grande Conselho de Malines.

É possível que parte dos antagonismos entre administração local e habitantes tivesse uma natureza mais complexa do que atrás se sugere. De facto, estas alterações parecem ter tido uma origem socio-política, de acordo com a qual o poder estava a ser disputado por duas elites que tentavam criar espaços de intervenção autônomos. A situação melhorou apenas com a Alteração de 1578, a qual deu a nova elite numa posição de vantagem em relação à antiga elite política, defensora do status quo ante.26

Para uma visão mais clara e elucidativa do conflito socio-político em Amsterdã durante o século XVI é necessária mais e melhor investigação dos arquivos do Grande Conselho de Malines27, pois só eles nos poderão dar pistas e compreensão da posição dos magistrados da administração central neste diferendo de natureza local, e nos dar mais informações sobre as alterações estruturais feitas no Lastage, assim como os perigos que as mesmas representavam para habitantes e administração.

Na lógica que tem orientado este artigo, em que partimos das alterações feitas dentro da área urbana do porto de Dordrecht, passando depois para a relação, nem sem-


27 Estes arquivos encontram-se no Arquivo Real de Bruxelas.
pre fácil, entre o *Lastage* e Amsterdão, torna-se um pouco estranho falar da abertura
de uma ligação entre o porto e o mar e escolher como exemplo a cidade de Leiden.

No caso de Leiden, a questão que se levanta é saber se os trabalhos de ligação da
*Rijnland*, isto é, do termo de Leiden ao Mar do Norte terão sido uma simples obra de
melhoramento, ou se este empreendimento resultou de uma ambição da cidade de Lei-
den em adquirir uma ligação e, portanto, um porto directamente na margem do Mar
do Norte.

Não existem provas efectivas de que Leiden ambicionava ter um porto de mar.
Porém, Tim Bisschops, com base em algumas evidências circunstanciais e alguma argu-
mentação contrafactual, defende que a possível ambição de Leiden em adquirir um
acesso a um porto marítimo em Katwijk, parece ser mais do que uma discussão aca-
démica.28

De facto, o dispendioso processo de abertura de dunas parece ter coincidido com
períodos de crise económica, o que indica um objectivo mais vasto e abrangedor do que
uma simples intervenção para o controle das águas no termo da cidade. Não podemos
deixar de estabelecer aqui um paralelo com o desaçoreamento do porto de Dordrecht,
também ele levado a cabo durante uma conjuntura económica desfavorável. Podemos,
por isso, argumentar que esta tendência para efectuar investimentos e obras de grande
envergadura pode ser vista como uma forma de superar períodos de crise por parte das
cidades tardó-medievais.

Se os investimentos e obras de grande envergadura eram vistas como benéficos para
as cidades, eles podem também ser encarados como uma forma de contrariar possíveis
focos de competição.

Em 1659, Pieter de la Court, fabricante de têxteis em Leiden e famoso jurista, defen-
dia a posição de Leiden em relação a Katwijk, afirmando a necessidade por parte de
Leiden de evitar a abertura e construção de um porto de mar em Katwijk, pois esta
pequena aldeia tornar-se-ia uma cidade e daí viria, com toda a certeza, bastante mal a
Leiden. Pieter de la Court dá algumas sugestões para que Leiden mantivesse a sua posi-
ção dominante, nomeadamente a manutenção de Katwijk sob jurisdição e administra-
ção de Leiden.

Cidades como Bruges, Middelburg e Delft fizeram sempre os possíveis e impossí-
veis para retardarem o estabelecimento, crescimento e autonomização dos seus portos
de mar, respectivamente, Sluis, Arnemuiden e Delfshaven.29

A maior preocupação das cidades que tinham um porto de mar na sua dependên-
cia era a possível deslocação das actividades económicas das cidades para os portos. Por
isso, tanto actividades económicas como a vivência diária dos cidadãos e habitantes des-
tes portos eram estritamente regulamentadas pelas cidades. Seguem-se exemplos des-
tes regulamentos.

O primeiro exemplo diz respeito à prática de profissões mecânicas. Estas activida-

28 T. Bisschops, 'Een uitwatering voor Rijnland, of de onvervulde Leidse wens van een toegang tot de
Noordoostpolder? De vroegste doorgrotingen bij Katwijk herbekeken (1404 – 1572)', *Tijdschrift voor zeegezich-

29 Para uma comparação entre Bruges-Sluis, Middelburg-Arnemuiden e Delft-Delfshaven: L. Sickling,
'Le paradoxe de l'accès. Le rôle des avant-ports dans les anciens Pays-Bas au bas Moyen Âge et au début de
l'époque moderne : une approche comparative génératrice' in : M. Bochaca ed., *Ports, transformations et amé-
nagements des littoraux de l'Europe atlantique (XIIe-XVIe siècles)* (Rennes 2007, em impressão).
des tinham de ser autorizadas pelas cidades e um sistema de *numerus clausus* regulamentava o número de mesteirais permitido dentro de cada porto.

O segundo exemplo reflecte a dependência económica em que estes portos viviam em relação às cidades principais. Assim, todos os produtos que dessem entrada no porto de mar teriam de ser transportados para a cidade principal e aí armazenados. Só depois é que estes produtos eram distribuídos, de acordo com as decisões urbanas internas.

As problemáticas impostas por esta relação cidade-porto estão intimamente ligadas com as questões em torno das tentativas de controle, por parte das cidades, de termos e áreas de influência, frequentemente determinadas por fórmulas jurídicas, com um objectivo único: a manutenção da prosperidade urbana. A relação estabelecida entre Amsterdã e o *lastage* é disto um bom exemplo.

É importante assinalar o facto de que para estudar de uma forma concreta e competente a formação de portos e infraestruturas portuárias é importante compreender o processo de decisão, incluindo a forma como as opiniões de diferentes instituições e grupos de interesse foram essenciais para a tomada de decisões ou resolução de conflitos. Como atrás se constatou, se os grupos de interesse e instituições parecem ter cooperado no caso do desacreamento de Dordrecht, o mesmo não aconteceu em Amsterdã, onde instituições municipais e grupos de interesse no *lastage* tiveram de levar os seus diferendos a instituições da administração central para resolver os seus conflitos.

Uma situação semelhante à que foi retratada para Amsterdã foi detectada nos casos das relações entre as administrações municipais de Bruges, Middelburg e Delft e os habitantes dos seus portos, a saber, Sluis, Arnemuiden en Delfshaven.

A angústia das cidades medievais de serem ultrapassadas pelos seus portos de mar fez com que a memória coletiva, através das palavras de Pieter de la Court, ainda durante o século XVII, evidenciasse o medo da construção de um porto de mar em Katwijk, em detrimento da centralidade de Leiden.

É, por isso, vital o estudo histórico de projectos que nunca passaram do papel, pois também esses planos mal sucedidos poderão trazer novas informações sobre as ambições dos vários actores históricos.

Mas se as ambições de Leiden poderão ser classificadas como megalómanas, o que dizer dos planos de Florença para abrir um porto de mar a cerca de 80 km da costa? Este plano foi, nem mais, nem menos, arquitectado por Leonardo da Vinci, o qual, no fim do século XV, engendrou um plano para optimizar a navegabilidade do rio Arno, com o objectivo último de tornar Florença um porto de mar.

No princípio do século XVI é Niccolò Machiavelli que, por sua vez, utiliza as ideias base de Da Vinci para transformar Pisa, rival de Florença, num porto de mar, evitando assim o crescimento e hegemonia da primeira.

Uma análise sistemática dos planos infrutíferos de Da Vinci e Machiavelli é complicada devido à falta de fontes, o que poderá ser explicado pelo nível de secretismo que rodeava estes projectos, assim como o risco para a respeitabilidade de cada um dos seus arquitectos.30

O argumento que utilizamos para a dificuldade de análise no caso de Florença e

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30 Ver R.D. Masters, *Fortune is a river. Leonardo da Vinci and Niccolò Macchiavelli’s magnificent dream to change the course of Florentine history* (New York etc 1998).
Pisa, poderá ser utilizado também no caso de Leiden e assim justificar o silêncio das fontes.

No que respeita a Leiden podemos afirmar que não se tratou de um projecto cujo objectivo seria somente a construção ou melhoria de infraestruturas, mas também a manutenção de uma posição de concorrência vantajosa em relação ao termo e futuro porto.

O mesmo mecanismo pode ser na actualidade, tema de discussão, a propósito da concorrência entre Roterdão e Vlissingen *vis-à-vis* Antuérpia.\(^{31}\)

Embora não pretenda ter a última palavra nesta discussão, podemos constatar neste artigo uma nova forma de utilização e análise de novas perspetivas que possam ser úteis para a elaboração de outros estudos de carácter local, ao nível do estabelecimento e desenvolvimento de portos e estruturas portuárias.

Os três casos aqui apresentados reflectiram esta nova perspetiva comparativa e multifuncional, não ocultando, no entanto, as dificuldades impostas pelas fontes para a realização destas comparações. Porém, esperamos que este artigo possa ser um primeiro passo para um maior interesse na história de infraestruturas portuárias, portos e seus termos.:::

\(^{31}\) Sobre a concorrência entre Roterdão e Antuérpia vêr F. de Goey, *Comparative port history of Rotterdam and Antwerp* (1880-2000). *Competition, cargo and costs* (Amsterdam 2002).
LE PORT DE CADIX:

INNOVATION TECHNIQUE DANS UN CONTEXTE DE
CONSTRUCTION D’UN SYSTEME PORTUAIRE

Juan Torréjon Chaves

Abstract

1.- Cádix, le premier port commercial et militaire de l’Espagne au XVIIIème siècle.
3.-Infrastructure portuaire et réalisations techniques hydrauliques. Les formes (Calle Sèche) de l’Arsenal de “La Carraca”.
4.- Innovations technologiques associées à la construction navale. L’introduction de la machine à vapeur (pompe à feu) des types “Newcomen” et “Double Effet”.

1. Cadix, le premier port commercial et militaire de l’Espagne au XVIIIème siècle.

En 1700 a lieu l’accession des Bourbon sur le trône d’Espagne. Après la fin de la Guerre de Succession -une guerre international, mais aussi un conflit civil-, les Bourbons vont refonder la Marine Royale qui, partie de rien, comprendra 76 vaisseaux de ligne et 50 frégates à la fin du siècle: tous dédiés à la protection du trafic vital avec les Indes Occidentales.

Dans le plan visant à faire renaitre la Marine de Guerre, Cadix jouera un rôle principal par sa triple condition de grand marché, grande place forte et grand arsenal naval, en devenant le plus important port de l’Empire Espagnol.

1.1. Les caractéristiques du port.

Quand Bélidor, dans la seconde partie de L’Architecture Hydraulique fait une ”Description historique des Ports les plus célèbres, établis par les anciens, pour juger des progress de l’Architecture Hydraulique, relativement à la Marine”, considère la baie de Cadix comme la plus remarquable de toutes les baies des côtes atlantiques espagnoles et portugaises.

1 University of Cádis
Cadix présente des conditions idéales pour un port à l'époque de la Marine à voile:
1.- Une situation très favorable, à quelques milles du Détroit de Gibraltar, la situation est la caractéristique fondamentale d'un port —
2.- L'heureuse disposition naturelle de la baie, grande et profonde —en réalité deux baies—, permet de bien protéger les navires.
3.- La possibilité d'entrer et sortir de la baie avec tout type de vent.
4.- La capacité que les bateaux soient toujours à flots dans la vaste rade, même par les marées les plus basses.
5.- Un territoire environnant fertile, bien peuplée, permettant une facile communication et avec de bonnes capacités d'approvisionnements.
6.- Un climat favorable.

Toutes ces circonstances valorisent Cadix durant l'Époque Moderne.
Suite à la Découverte de l'Amérique, Séville était l'unique port habilité au commerce avec les Indes espagnoles, où fut fondé, en 1501, la “Casa de Contratación” (Chambre de Commerce) ou organisme de la Couronne chargé de contrôler toutes les affaires commerciales concernant les colonies. Le port de Cadix constituait alors un avant-port subordonné à celui de Séville. Mais commence un très long “bras de fer” entre Cadix et Séville afin d'être le siège des organismes administratifs contrôlant le commerce avec l'Amérique espagnole et, peu à peu, Cadix gagna la partie. Au cours de la deuxième moitié du XVIIe siècle, bien que les organismes administratifs restent à Séville, la plus grande partie du commerce d'outremer s'effectue depuis Cadix.

La prédominance « de fait » de Cadix fut corroborée légalement le 28 janvier 1717, quand fut décrété le transfert de la “Casa de Contratación” et du “Consulado de Comercio” (Consulat de Commerce), ou corps qui rassemblait tous les grands commerçants dédiés aux affaires des Indes. Avec cette décision fondamentale, le port de Cadix obtint la maîtrise du monopole. Dès 1717, jusqu'en 1778 Cadix resta l'unique port habilité au commerce avec l'Amérique.

Le XVIIIe siècle d'or pour Cadix. Dans la cité et sa baie s'installa la plus grande et dynamique bourgeoisie marchande espagnole : un groupe hétérogène de négociants commandé par les grands commerçants “de gros”, représentants une authentique « aristocratie de l'argent ». A côté d'eux, existait une très importante colonie de commerçants étrangers (français —les plus nombreux—, génois, irlandais, anglais, flamands, vénitiens, arméniens, hambourgeois, suédois, etc.). Tous arrivèrent à l'appel de l'argent, car Cadix était la ville incontournable où arrivaient les richesses minières du Nouveau Monde, qui furent le fondement de l'Empire espagnol.

Dans le même décret de 1717, qui ordonne le transfert de la Casa de Contratación de Séville à Cadix, fut signé la création du poste de premier « Intendente General de la Marina de España » (Intendant Général de la Marine d'Espagne). Le français Philippe V, premier roi espagnol de la famille des Bourbons, déclare son intention de rétablir la Marine de guerre et ordonne que toute l'attention à cet effet, se concentre sur le port de Cadix, où étaient apprêttées et dépêchées les flottes, galions et escouades. Ainsi, le développement économique fondé sur le commerce colonial se lia donc au développement maritime militaire. Le monarque, pour rendre patent l'intime dépendance de ces deux réalités complémentaires, confia à une même personne la direction opérationnelle —non militaire— de la naissante Marine Royale et la Présidence de l'organe dirigeant le
commerce des Indes. Les intentions étaient absolument claires: seule une armée puis-
sante pouvait assurer la protection de l'activité commerciale périodique et constante
avec les lointaines contrées de l'empire espagnol, au bénéfice du monopole exclusif éta-
blie par l'Etat. Soixante-dix ans plus tard, le roi Charles III, dans l'Instruction qu'il envoie
à la "Junta Suprema de Estado" spécifie le caractère fondamental de l'Espagne comme
puissance maritime et signale: "[...] rien n'est aussi important et en rien on ne doit
mettre plus d'attention, qu'à faire progresser et améliorer notre Marine (militaire)".

La formation d'une flotte moderne et puissante fut une des grandes réalisations de
l'Espagne du XVIIIème siècle, et le rôle joué par Cadix fut fondamental, en installant
le premier des Départements Maritimes de l'Espagne bourbonique. En son sein furent
crées la Compagnie Royale des Chevaliers Gardes-Marines et le premier Observatoire
Astronomique d'Espagne.

2. Développement du capital humain et processus de globalisation scientifique:
La compagnie royale des chevaliers gardes-marines, le corps des ingénieurs du
génie militaire, et le corps des ingénieurs du génie maritime.

2.1. La Compagnie Royale des Chevaliers Gardes-Marines.
La première décision adoptée pour faire renaître la Marine, fut la création de sa
"pierre angulaire": la Compagnie Royale des Chevaliers Gardes-Marines, qui fut créée
à Cadix en 1717, pour la formation des jeunes qui aspiraient à devenir des cadres de
la Marine Royale. Lorsque l'on établit le profil de formation de l'officier de Marine, il
sembla nécessaire de conjuguer les aspects propres de l'homme de mer, destiné à la navi-
gation militaire, avec les aspects de l'homme de science. Par conséquent, la formation
reçue à l'Académie de la Compagnie Royale sera ample et diverse. Elle comprendra tous
les aspects de la navigation, mathématiques, astronomie nautique, langues modernes,
etc. Le blason est représenté par les armes royales de l'Espagne flanquées par Neptune
—le Dieu de la Mer— et Minerve —la Déesse de l'Intelligence et du Savoir—.

Sous la protection de la Compagnie Royale des Chevaliers Gardes-Marines est
fondé à Cadix, en l'an 1754, le premier Observatoire d'Astronomie d'Espagne. Et en
1783, on institua les études de "Mathématiques Sujlmes", pour les officiers de travaux
et de talents distingués.

La Compagnie Royale et l'Observatoire furent deux des moyens qui permirent l'ar-
rivée en Espagne de l'Illustration, de la pensée et la science moderne.

2.2. Le Corps des Ingénieurs du Génie Militaire.
Cadix, au XVIIIème siècle, il se joignit à sa splendeur économique la vitale fonction
de sa défense, affirmant son caractère de grande place forte. Dans la ville et sa baie, se
développèrent d'importants projets d'intervention territoriale et de travaux publics.
Durant ce siècle Cadix devint la plus importante position fortifiée de tout l'Empire Espa-
gnol, en tant que partie intégrante d'un système articulé autour de la protection de l'ac-
tivité commerciale entre l'Espagne et ses territoires d'outre-mer : avec la mer comme
moyen et le vent comme conditionnant, tout ce système étant dédié à la réception en
Europe de la vitale nourriture économique : le métal américain.

C'est au cours du XVIIIème siècle que Cadix complétera ses fortifications; le rôle

2.3. Les Ingénieurs du Génie Maritime

Le Corps des Ingénieurs du Génie Maritime fut établi en 1770 avec des missions propres à la construction navale des vaisseaux de la Marine Royale, des travaux civils et hydrauliques dans les Départements et les chantiers navals d’Europe et d’Amérique; ainsi que la supervision de l’approvisionnement en bois. Afin de faire carrière dans le Corps, il fut établi comme principes généraux ceux de mérite et de compétence. L’objectif essentiel à atteindre était que les ingénieurs du Génie Maritime intègrent le formalisme scientifique-mathématique comme langage propre et fondamental de leur domaine technologique. Ceci était ce qui devait différencier fondamentalement ces techniciens supérieurs des charpentiers de marine ou des constructeurs d’embarcations dont le savoir était seulement empirique.

3. Infrastructure portuaire et réalisations techniques hydrauliques. Les formes (calle sèche) de l’arsenal de “la carraca”.

Dans la baie de Cadix, l’Arsenal Royal de “La Carraca” fut construit au cours du XVIIIème siècle et devint, avec les deux autres arsenaux péninsulaires du Ferrol en Galice et de Cartagena en Méditerranée et l’arsenal de la Havane en l’Amérique espagnole, l’une des installations industrielles la plus complexe d’Espagne. Pour se faire une idée des activités de production et de l’organisation de la force de travail, signalons uniquement que, à l’arsenal de La Carraca travaillaient, en 1787, 3.230 ouvriers et 1.349 forçats.

La nature du terrain fut un des défis majeurs qu’il fallut surmonter durant la construction de La Carraca, par sa caractéristique fangeuse. Ceci représentait un grave et permanent problème pour construire les différents édifices et autres infrastructures destinées à la construction navale. Le dépassement d’un tel obstacle démontre clairement le génie et la persévérance de ses constructeurs, tout comme la force irrésistible de la nécessité.

Durant de nombreuses années la construction des calles sèches était considérée comme une œuvre impossible, jusqu’à l’an 1785 où se développait une technique qui, grâce à une grande structure formée de piliers en bois, permettait de former une chape de ciment dans un terrain fangeux. Ainsi purent être construits les trois plus anciennes calles sèches appelées « San Carlos », « San Luis » et « San Antonio ».
4. Innovations technologiques associées à la construction navale. L’introduction de la machine à vapeur (pompe à feu) des types "Newcomen" et "double effet".


De la même manière, les arsenaux furent les lieux d’introduction des machines à vapeurs de seconde génération, nommées de « Double effet » : celles qui servirent pour l’activité industrielle, grâce aux innovations qu’introduit James Watt. La première machine à vapeur de « double effet » qui ne fut pas dessinée en Angleterre, le fut à l’Arsenal de La Carraca en 1788, afin de scier le bois. La plus puissante machine à vapeur (90 CV) qui fut vendue par les fabricants de Birmingham, Boulton & Watt, au continent européen, arriva en Espagne par le port de Cadix en 1791. Elle était destinée à cet arsenal.

Documents


Pp. 62-63

Origine de l’établissement de Cadix.

660. Les côtes d’Espagne & de Portugal sur l’Ocean, ne sont pas moins favorisées de magnifique Bayes que celles de la Méditerranée. La plus remarquable est celle de Cádiz, répondant à la Province d’Andalousie, soit par la singularité de sa figure, soit par les avantages qui lui sont propres. Soli, Auteur Latin, qui a écrit dans le gout de Pline sous le regne de Vespasien, prétend qu’une Colonnie Tyrienne qui s’embarqua sur la Mer Rouge, ayant fait le Tour de l’Afrique, vint surgir dans l’isle de Cadix, où elle fonda la Ville de ce nom, qui a été longtemps le dernier terme de la navigation des anciens, dans la pensee qu’on ne pouvait aller plus loin.

Situation de l’Isle de Cadix.

661. La nature a si heureusement disposée la Baye de Cádiz, qu’elle n’auroit rien laissée à d’esier, si son entrée étoit moins grande & moins dangereuse par les ‘ecueils qui s’y trouvent, mais que l’on ‘evite aisément, pour peu qu’on la connoisse. L’Isle qui couvre cette Baye a six lieues
de longueur du N.O. au S.O. &c deux dans sa plus grande largeur; elle n’est séparée du continent vers le Sud-Est, que par un petit canal où est le Port Suizo; de sorte que les Vaisseaux sont obligées pour arriver dans le port, de passer au N.O. de l’Isle, où est située la Ville qui a cela de particulier, par rapport à la Rade, que pour aborder cette seconde il faut passer sous le canon de la première, & près le port qui leur est intermédiaire, située dans le coude que forme la Ville sur la tête de l’Isle, en s’avancant dans la Baye, au lieu que c’est tout le contraire dans les autres où la Rade précède ordinairement le Port.

Description du Port & de la Rade de Cadix.

662. Quoiqu’il soit assez difficile d’expliquer une disposition aussi singulière sans le secours de la Carte qui la représente, mais que l’on aura aisément, parce qu’elle se vend gravée, on saurait que cette Baye couverte de la sorte, est divisée par une langue de terre partant du continent, & qui s’étend du N. E. au S. O. Sur la longueur de deux lieues; de manière qu’elle forme deux Bayes au lieu d’une. Il faut passer par la première, répondant à la Ville &c au Port pour aborder à la seconde, qui tient lieu de Rade, dont l’entrée comprise entre la pointe de cette langue &c l’Isle, n’est que d’environ 1.000 roises de largeur.


Observation sur la différence des Ports de la Méditerranée avec ceux de l’Océan.

663. L’on sait que le Port de Cadix est le rendez-vous ordinaire des Galions d’Espagne, par conséquent des Flottes venant des Indes occidentalechargées des thrésors du Perou. Les plus Vaisseaux y sont toujours à flot dans le temps des plus basses Marées, avantage assez rare le long des côtes occidentales & septentrionales de l’Europe, principalement dans la Manche dont les Ports n’ont alors que pu ou point d’eau, ce qui oblige les gros Navires de se tenir à l’ancre à une certaine distance du Port, où ils ne peuvent dans la plupart entrer même à Marée haute, d’où il résulte que c’est la bonté de la Rade qui décide du mérite de ces Ports; mais la plupart de ces Rades ont la défaut d’être forestes, nom qu’on donne à celles dont les bords n’ont point d’élévation pour abriter les Vaisseaux des vents du large; au lieu que dans la Méditerranée les Ports & leur Rade, ne sont presque partout qu’une même chose, renseignée dans une seule Baye bien abriée où ils ont toujours autant d’eau qu’ils en ont besoin.

Chapitre Quatrième. Des qualités propres aux Ports de Mer pour être sensées accomplir, d’ou l’on déduit des Maximes tendant à perfectionner ceux qui n’ont pas le même avantage.

Pp. 73-74

L’importance d’un Port dépend essentiellement de sa situation.

683. Il est très-rare de rencontrer des Ports dont la situation & la figure comprennent tous
Conscéquence d'un Port situé sur une côte fréquentée par le plus grand nombre des nations commerçantes.

686. Quand sur une côte fréquentée il se trouve un Port capable d'attirer les étrangers par la facilité de son entrée & de sa sortie, la fertilité de ses environs & l’abondance de son Commerce, comme est le Port de Cadix, près du Détroit de Gibraltar, point de partage des Mers du Levant & du Couchant, il est certain qu’une position aussi favorable, est une source de richesses pour un Etat, & que ce seroit ne pas connoître ses vrais intérêts que de la négliger [...]


Don Felipe, por la Gracia de Dios, etc. Habiendo tenido por conveniente restablecer la Marina de España y Comercio de Indias, por ser de tanta importancia y bien público, y regular las armadas, flotas y escuadras que más convengan á los referidos fines y á mí Real Servicio, como al resguardo de mis dilatadas costas marítimas en el Océano y Mediterráneo, y que una de las providencias que para su logro hayan de darse sea la de crear un Ministro que, con el nombre de Intendente General de Marina, fomente la ejecución y cumplimiento de las que considerare ser conducentes en conformidad de mis Reales Órdenes y sucesivas determinaciones que tomare y se le dirigieren en todo lo que mira á la fábrica de bajeles, su carena y composición, provisión de víveres, compra de pertrechos, razón del consumo, cuenta y razón de la distribución de los caudales que se emplean en estos fines, y en la paga de gente de mar y guerra, así de armadas y escuadras, como de navíos sueltos, haciendo llevar asimismo razón y asiento de los oficiales de todas clases, soldados y marinería que hubiere en los pueblos y costas de cada provincia, para saber su número y calidad, y el que de uno y otro se podrá juntar cuando sea menester para mi Servicio, y los que se emplearen en los armamentos que se hicieren, de los que en desarmándose los navíos quedaren en ellos para su guarda y custodia, y de los que se despidieren para ir á sus casas, y que consiguientemente vele sobre el buen régimen y adelantamiento de las fábricas que yo mandare establecer en los parajes que fueren más á propósito, así de bajeles como de jarcia, Iona y lo demás concerniente á su construcción y armamento, en el cuidado de los almacenes, y de lo que cualquier género que sea, embarque en los navíos, y quede existente en ellos y en el de que, arregloándose á la forma que quedare establecida, preveña lo conveniente á efecto de que en cualquiera parte que lleguen mis Reales armadas, escuadras y navíos sueltos, encuentren lo necesario para el curso de su navegación, correspondiendo, en su consecuencia, con todos los demás ministros subalternos empleados en diferentes partes y puertos en dependencia de Marina, los cuales deberán dar todas las relaciones y noticias que á este fin les pidiere, debiendo también
el referido Ministro atender á que se lleven con toda exactitud los asientos que se le preveinieren en las expresadas fábricas de bajeles, artillería, cordaje, velamen, vivieres y demás necesario para el avío y surtimiento de dichas mis Reales armadas y escuadras, ya corran por administración ó ya por asiento,como en el cumplimiento de los que se hicieren, y al mayor interés y beneficio de mi Real Hacienda, consultándome todo lo que á este fin y al adelantamiento de la Marina tuviere por conveniente, para cuyos encargos deberá residir en la parte que fuere más á propósito para su ejecución, y la expedición y curso que pide esta tan importante dependencia, siendo igualmente a su cuidado la conservación de los montes y plantios cercanos á las costas, destinados hasta ahora á este servicio, y la plantificación de los árboles para que cuando sea menester se corten, ó ya sea para construcción de bajeles, ó ya para carenas, en cuya consecuencia deberá pedir y tomar desde luego individual noticia de todos los que se hallaren capaces de servir á estos fines, con distinción de los que hubiere en mis montes reales o de particulares, y sus distancias á los astilleros donde yo mandare construir las fábricas, con todo lo demás que mira á la mayor comodidad y beneficio en su conducción. Y teniendo cumplida satisfacción y confianza de vos, don Josef Patiño, de mi Consejo de las Órdenes, por los particulares servicios que habéis hecho en los empleos que hasta ahora habéis servido, y de vuestro celo y experiencia, he resuelto elegiros y nombraros por Intendente General de mi Marina de España, poniendo á vuestro cargo, en virtud de la facultad que os concedo, el fomentar y velar sobre todo lo referido, por ser de vuestro instituto y ministerio, como el celar en todo lo que mira á la economía, policía y servicio de mi Marina, en conformidad con mis Reales órdenes, que se os comunicarán y dirigirán por mi Secretario del Despacho universal. Y respecto de que en este principio en que es menester establecer las reglas y práctica de lo que yo determinare y mandare arreglar para la referida planta que quiero formar de mi Marina, y se habrá de observar en mis reinos, se hace preciso que toda la atención y cuidado se haya de poner en el puerto de Cádiz, de donde se han de aprestar y despañar las flotas, galeones y escuadras, según convenga á mi Real servicio, he resuelto que paséis á residir y ejercer vuestro empleo en dicha ciudad de Cádiz, y que asimismo corra á vuestro cargo la Superintendencia del Reino de Sevilla, según las reglas e instrucciones dadas á los superintendentes particulares de las tropas que se hallaren en él, de las rentas, derechos y reales intereses que en los avíos de venidas de flotas me pertenecen, ó en cualquiera otra forma me pudieren pertenecer, arreglandoos á las órdenes particulares ó generales que se os fueren dando, y que asimismo presídáis en el Tribunal de la Contratación, el cual deberéis establecer en el número y forma que se os prescribiere en la ciudad de Cádiz, como asimismo deberéis velar sobre el Comercio, no sólo para proponerme lo que fuere de mayor aumento de él, sino es también para deterrar los abusos que se hubieren introducido á impedir el que se introduzcan de nuevo en perjuicio del público y de mis reales intereses, á cuyo fin los Diputados del Consulado deberán asimismo pasar á residir en Cádiz, para que así éste como el Tribunal de la Contratación puedan ocurrir con más facilidad y prontitud á las providencias de los que, arribando á Cádiz, deberán seguir sus dependencias ante el juzgado de ellos. Para todo lo cual os doy toda la facultad y autoridad que conviene para la ejecución de todo lo referido, y la de poder nombrar subdelegados, aprobados por mí, señalándooos 12.000 escudos de vellón de sueldo al año para la decencia de vuestro empleo y carácter [...] Para lo cual mando despachar este vuestro título, firmado de mi Real mano, sellado con mi sello secreto y refrendado de mi infrascrito Secretario del Despacho Universal de la Guerra en Madrid á 28 de Enero de 1717.- Yo, el Rey,- Miguel Fernández Durán...:
POPULATION GROWTH, INFRASTRUCTURAL DEVELOPMENT AND ECONOMIC GROWTH:
AMSTERDAM AND LISBON IN THE 17TH CENTURY
- A COMPARISON

Cátia Antunes

Abstract

Population growth in Early Modern times often triggered urban expansion. This urban expansion was mainly due to the increase of the housing areas for the segments of the population arriving in the city. However, dwellings were not enough to answer the needs of overcrowding cities. Infrastructural developments such as streets, markets and ports had to adapt to the new reality presented by explosive or sustained demographic growth. The presentation will particularly focus on the issues arising from urban expansion. To what extent infrastructural developments in Amsterdam and Lisbon during the seventeenth century supported or hindered economic development. My argument will show that the same type of expansion and growth may often lead to different outcomes on what concerns economic development. There are external factors to urban expansion and infrastructural improvement that played a significant role. That was the case of particular jurisdictional disputes, taxation rights and laws, environmental change, links between the city and the hinterland and the development and sustainability of urban consumption markets.

1. Introduction

Population growth in Early Modern times often triggered urban expansion. This urban expansion was mainly due to the increase of the housing areas for the segments of the population arriving in the city. However, dwellings were not enough to answer the needs of overcrowding cities. Infrastructural developments such as streets, markets and ports had to adapt to the new reality presented by explosive or sustained demographic growth.

This article will particularly focus on the issues arising from urban expansion. For example, to what extent infrastructural developments in Amsterdam and Lisbon dur-

1 University of Leiden.
ing the seventeenth century supported or hindered economic development. My argument will show that expansion and growth may often lead to different economic developments. There are external factors to urban expansion and infrastructural improvement that played a significant role. That was the case of the links between the city and the hinterland, particular jurisdictional disputes, taxation rights and laws and the development and sustainability of urban consumption markets. All these factors together revealed the more or less economic success of Amsterdam and Lisbon during the seventeenth century.

2. Population growth and infrastructural solutions

Graph 1 – Population growth in Lisbon and Amsterdam from the 16th to the 18th


Amsterdam and Lisbon were two growing Early Modern ports. By analysing the data gathered by Nusteling and Rodrigues and summarized in graph 1, we can argue that Amsterdam was growing fast in the first half of the seventeenth century. Commercial success, economic prosperity and inter-European migration meant population growth. On the other side of Europe, Lisbon’s economic expansion decreased, after a sixteenth century of growth. This did not necessarily imply that population growth stagnated. Lisbon’s population grew steadily since the fifteenth century despite the effect of plagues, wars, and political turmoil.

Amsterdam and Lisbon were growing during the seventeenth century against all odds. Amsterdam was prospering during the first half of the century, though by the second half population growth had slowed down significantly. Lisbon had been a prosperous growing city in the sixteenth century, but her growth decreased by the beginning of the seventeenth century. In the end, we can argue that both cities grew throughout the Early Modern period in a more or less sustainable cycle. They seem to have been immune to the general economic crisis and political turmoil that was devastating Europe during the ‘long sixteenth century’.

At the beginning of the seventeenth century, Amsterdam’s commercial and industrial capacity increased. This growth was the consequence of three main factors. First,
the inner growth and development of the urban economic activities. Second, the general expansion of the Republic overseas. And third, the decline of Antwerp after the closing of the river Schelde.²

Amsterdam’s expansion continued during the seventeenth century. Of a total of 1790 acres that Amsterdam had in the beginning of the eighteenth century, 1334 were added during the preceding century. Amsterdam’s expansion was well studied and often planned. The famous ‘plan of the three canals’, developed by Council Architect Frans Hendrickszoon Oetgens, Council Surveyor Lucas Sinck and Council Master-Builder Hendrik Jz. Staetz., was a clear attempt to establish a systematic and regular division of urban plots.³

The original plan encompassed the development of three main concentric canals (Herengracht, Keizersgracht and Prinsengracht) to surround the centre of the city.⁴ These canals would be prolonged from the Brouwersgracht to the river Amstel, and by so doing, several radial canals and streets were created. The new area was used to build new housing, local churches, market places and a park, the Plantage.

The new canals became the residence of the elite.⁵ The area of the Jordaan became the neighbourhood for the less prosperous, including French refugees and Jewish immigrants. The Jordaan became, therefore, the industrial and poorer area of seventeenth-century Amsterdam.⁶

The development of the ‘ring of canals’ was an attempt to promote the building of a new residential area. In fact, the political, economic and religious centre of the city was kept between the old city boundaries: the Dam Square and surrounding area harboured the new Town Hall, built after the Peace of Munster, in 1648, the Stock Exchange, built in 1608, and the Nieuwkerk.⁷

Expanding the city meant renewing the infrastructure. Large warehouses were built around the harbours to store all the goods arriving to the city. The construction of these warehouses was extended to the Brouwersgracht. On the other hand, the old medieval centre was rebuilt under the supervision of Council Architect Daniel Stalpaert (1615-1676) and a new line of fortifications was created to protect the city. Stalpaert was also the man who fulfilled the ‘plan of the three canals’. His aim was to provide the city with business houses, living quarters for merchants and residential areas for the middle class. However, the effective development of the city was mainly achieved by private enterprise, either by individuals or housing societies, such as the Noortsche Bosch.⁸

The expansion plans of Amsterdam went beyond the inner urban area. New plots

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² W. Montague, The delights of Holland; or, three months travel about that and the other Provinces. With observations and reflections on their trade, wealth, strength, beauty, policy, etc. Together with a catalogue of rarities in the Anatomical School of Leyden (London 1696), 120, argues that Amsterdam controls now what used to be the commerce of Antwerp, Seville and Lisbon.
³ E. A. Gutkind, Urban development in Western Europe: the Netherlands and Great Britain, vol. 6 (New York & London 1971), 63-64.
⁵ Ib. 39.
⁶ Ib. 39.
⁷ Ib. 40.
were being developed for industrial purposes. The general expansion of the Republic during the first half of the seventeenth century had brought the VOC (Dutch East India Company) to a prominent position in the economic life of most Dutch cities at the time. Amsterdam was no exception. The VOC Kamer Amsterdam had a high demand for a specific area in the city where to build new ships and repair old ones. The VOC was then given the island of Oostenburg to build on. Later on the complex was known as Oostenburg, although in reality next to Oostenburg, the island of Wittenburg was also being built on by private entrepreneurs. The whole complex expanded further in 1657 to the island of Funen, also called Keerweer, where the company decided to install all the wood works. The Admiralty also joined the general VOC expansion by building a depot on the north western part of the newly developed plots of the inner city, on the island of Katungen.

On the other side of Europe, Lisbon witnessed the political and commercial centre move from the hill of the Moor castle to the lower part of the city, near the river: Baixa, Terreiro do Paço and Rossio. The expansion overseas brought wealth to the city and the first sign of that wealth was the planning and execution of several squares in residential quarters and the upgrading of private and public buildings. The new squares outside Rossio and Terreiro do Paço (main squares until then) and the opening of the city to the waterway gave Lisbon her well-known shape. Lisbon was now mainly a shipping port. And therefore the dock area also developed, especially the warehouses to store goods and allow for the collection of taxes and fees. That was the case of Casa da India particularly destined to store overseas products.

Next to the warehouses, which were meant for the overseas goods, there was also the Alfândega das Sete Casas, storage point of the city’s provisions. The permanent shortage of wheat in the city was also a reason why the Alfândega do Trigo, used to control precisely the amount of wheat arriving and distributed, was created. Hundreds of ships arrived and departed per year, full of luxury products and new visitors. But life went on beyond the waterfront. Rossio became the place where the city met the hinterland. The area had become a place of supply and demand and soon became a real market, surrounded by different streets where all sorts of professional activities took place. The new axis Rossio-harbour was then the centre of commercial, administrative and political life.

The Spanish period (1580-1640) did not bring about any major changes to the city;

8 lb. 34 & 38.


14 lb. 15. J. Cortesão, Páginas Olisiponenses (Lisbon 1975), 132-133.

still Lisbon was the biggest Atlantic port of the Habsburg Empire. And that was the reason why Philip II thought of making the river Tagus navigable to Aranjuez, in an attempt to connect the Atlantic to the centre of Iberia. But natural difficulties and political criticism put an end to the project. However, the new king was still aware of the privileged position of Lisbon. And that seems to have been the reason to allow the Armada to depart from this harbour.  

The Portuguese became independent from the Habsburg Empire on December 1, 1640, with the recognition of John, Duke of Braganza, as the new king of Portugal, John IV. Lisbon was the stage of all the political movements that brought the new king to the throne. The new dynasty adopted Lisbon as its capital and built up its power structure and ideology on the urban space, which had been promoted to be the head of the Empire and the world during the rule of Manuel I. Once again, the royal power allowed Lisbon to become the largest receptacle of economic prosperity and one of the most important European cities.

One of the first acts of the new king was to order the construction of several forts on the coastline between the city and Cascais, in order to protect it from any possible attack by enemies of the new royal house, especially the Habsburgs. John IV also recognised the need to build a new wall around Alcântara (where he ordered the construction of a royal palace) and by doing so, he defined a whole new area of urban growth, greatly needed because the population was, for a long time now, scattered beyond the medieval walls. However, the centre of the kingdom’s administration was still located in the corridors of the Paço da Ribeira, which became much admired by foreigners.

John IV’s project to defend the city and the kingdom started around 1650. The king hired foreign engineers amongst whom Jean Gilot, Charles Legarte and Jean Cosmander. But the dream of building defences along the river and protecting Alcântara would take too much time. The king accepted the advice of Marshall Schomberg, who, in 1656, suggested the construction of the same defence lines, but on a smaller scale. The size of the project and the signature of the peace treaty with Spain in 1668 made the whole enterprise useless. The primary project was re-initiated at the beginning of the eighteenth century, this time headed by Portuguese military engineers, who thought a fortified defence line based on the modern models presented by the French was better for the city than the, now out-of-date, Dutch style.

The new political institutions were very fragile. Counter-power groups still connected to the Spanish House seriously threatened John IV’s take-over and his succes-

17 A. Crespo, Lisboa mítica e literária (Lisbon 1987), 79. The Invincible Armada left Lisbon on May 1588. The Armada was composed by 125 ships, under the direct command of the Duke of Medina Sidonia. The goal of the enterprise was to invade England. The Spanish fleet was later in that year heavily defeated by the English.
20 Ib. 29.
21 Schomberg was a German military advisor of king John IV.
sion became a problem after the death of his first child. Therefore, the appearances and displays of power inside and outside the court were the main key to the success of the new dynasty. On the one hand, the huge processions and receptions organised after the arrival of foreign ambassadors, and on the other hand, the public presentation of the king’s children as main candidates to marry into important European royal houses, gave the Braganza dynasty the European dimension John IV had dreamed of.23

The capital of the Portuguese kingdom was still suffering from two major problems related to under investment. First, the beginning of the war of Restoration against Spain and the wars overseas to defend the territories outside Europe consumed an enormous part of the financial resources. Second, the decrease of the amount of urban plots used for new buildings and housing showed a lack of private initiative to invest in urban dwellings. In fact, the radical policies against the Jews in the second half of the sixteenth and the first half of the seventeenth century drove many out of the kingdom, and with them the opportunity for sources of investment. Other social groups were now focusing more on how to gain the favour of the new dynasty than trying to assert their economic prosperity.24

Population growth and urban expansion resulted in the traditional problems facing Early Modern Cities. The smell in the streets and the lack of a proper sewage system made part of the urban spaces very unpleasant. There was no public illumination during the night. The narrow streets made circulation dangerous and almost impossible due to the increasing numbers of coaches used by private owners. These daily problems often provoked public arguments and even severe fights between the inhabitants.25 Of the few improvements promoted by the urban authorities, one can mention the enlargement of some major streets. In 1665, Rua Nova do Almada was enlarged to allow a better access to Santa Catarina. In 1681, the same happened in Rua dos Ourives da Prata. Although these two changes were most appreciated by the citizens, the development of other areas of the city was not planned at all. Even though, five new parishes were created in the new developing areas: S. Sebastião da Pedreira and Nossa Senhora das Mercês, in 1652, Santíssimo Sacramento, in 1671, and Nossa Senhora da Encarnação and Nossa Senhora da Conceição, in 1698.26

To sum up, it is important to stress that during the second half of the seventeenth century Amsterdam and Lisbon were two of the largest ports in Europe. Amsterdam witnessed a prosperous growth in the first half of the seventeenth century as a result of general economic development and expansion. This period of prosperity was the immediate consequence of the fall of Antwerp as the largest international market at the time, and of Amsterdam’s stronghold in the Baltic trade and its leading role in the overseas

25 lb. 248.
26 lb. 249.
expansion of the Republic.

Lisbon showed a slow pace of growth since the end of the sixteenth century. Due to growing European competition overseas, the city had suffered a severe blow on maintaining her grip on international trade. However, the capital of the Portuguese empire was far from declining, although its growth was, by the second half of the seventeenth century, put under pressure as a result of the wars of Restoration against Spain and the overseas wars against the European powers that had been preying on the Portuguese controlled areas in Africa, South America, and Asia.

In general, Amsterdam and Lisbon were growing throughout the Early Modern period. However, the nature of this growth was different. The former had moments of explosive growth while the latter was able to sustain a gradual growth. From this difference, two separate plans for the development of the urban structure ensued: Amsterdam was carefully planned, not only because it grew amazingly fast, but also because it was a city of recent formation. On the other hand, Lisbon depended heavily on royal support and it grew more or less spontaneously. This had two main reasons: first, Lisbon knew a sustained and not an explosive growth, and second, the whole infrastructure was centuries old.

3. Hinterlands

We have just seen how population growth influenced urban development in Amsterdam and Lisbon. We will now shift our focus to the reasons and consequences of this population growth. In order to do that, we will have to consider the different levels of the hinterland and their relationship with both cities.

The concept of 'hinterland' is that of a rural environment that immediately surrounds a city. There is some debate over this definition, though. The development of urban history and the increasing discussion centred on urban themes have forced historians to revive primary concepts such as 'hinterland'. Specialists on Medieval urban history state that hinterlands were the spaces surrounding the city, but they were also part of the urban structure because the city had jurisdictional rights over them. In practice, that meant that an urban system was composed both of an urban element – city – and of a rural element – the hinterland.27

Early Modern urban historians have gone even further. They agree with the medievalists that hinterlands were often within the jurisdiction of the city, as was the case of the termos in Iberia, but they stress the idea of the growth of the informal hinterlands during the Early Modern period. By informal hinterlands they mean not only the clearly jurisdictional definition given by Medievalists, but also the extent to which cities influenced their surrounding space and the extent to which that space influenced the cities.

For the Early Modern period one has to look at the immediate rural hinterland (jurisdictionally dependent on the city), but also at a larger space, that one could call

27 Schulze calls this area the Umland. Schulze argues that this area was demographically and economically connected to the city. For further insight on this 'umbilical cord' concept see H. K. Schulze, Städtisches Um- und Hinterland in vorindustrieller Zeit (Stuttgart 1985).
region, which may include areas of migration and long-distance trade. Some argue, going even further, that hinterlands can also have a trans-continental character, especially during a time in which European cities were venturing into overseas enterprises.

The concept of informal hinterlands (trans-regional and trans-continental) poses a contradiction with the arguments presented by medievalists. According to the latter, hinterlands are, by definition, rural. What Early Modernists propose is an inclusion of all the spaces surrounding the cities that may be in contact with the urban centre, therefore, including surrounding spaces such as other (usually smaller) cities and towns.

The balance between one hinterland system and the cities and hinterlands in that system was precarious during the Early Modern period. Jurisdictional conflicts, socio-economic unrest, and political turmoil occurred, but usually large cities were able to co-exist peacefully with all the members of their hinterland system. That is not to say, however, that uncomfortable competitive situations between the smaller cities and the larger city or between the smaller cities themselves did not exist.

So, we may argue that Early Modern hinterlands had both a jurisdictional and an extra-judicial nature. They included smaller cities with their own hinterlands. Moreover, competition between the elements of the system and the main city were not uncommon. However, socio-economic dynamics (trade, capital transactions, migration, immigration, and so on) were able to keep these complex relationships running at a reasonably peaceful level.

In general, we can say that the Dutch and Portuguese hinterlands provided Amsterdam and Lisbon with daily supplies of foodstuffs. The first difference we find in the way in which the Dutch and the Portuguese hinterlands related to their ports is the kind of foodstuffs they sent to the urban markets. In the Dutch Republic, the levels of specialisation in the agricultural sector meant that only some foodstuffs could be found in the urban hinterlands. That was the case of some vegetables, meat and dairy products. Fish was provided by the Dutch fishing fleets stationed in the different ports and grain, wine, fruit and salt were imported from the Baltic, the Mediterranean and the Iberian ports.

Contrary to the Dutch case, the Portuguese rural hinterlands were the main providers of all kinds of foodstuffs. In Portugal, the hinterlands produced plenty of fruit,


vegetables, meat, dairy products, wine and salt. The grain was obtained, as we will see next, from the trans-regional hinterlands surrounding Lisbon. The fact that the Portuguese agriculture was still organised on a traditional subsistence level, meant that long-distance imports of foodstuffs were not needed. The only exception was the import of cereals, which will be discussed when we mention the contribution of the trans-regional hinterlands to the survival of both Amsterdam and Lisbon.\textsuperscript{32}

Ports provided the rural hinterlands with different products coming from their pre-industrial urban activities. Textiles, ceramics and beer were common urban products exported by ports to the rural hinterlands. Amsterdam also had to provide the rural hinterland with grain. The specialisation of the Dutch agricultural system and the adverse natural conditions for producing grain in the Northern Netherlands forced the rural, urban and trans-regional hinterlands to acquire imported grain via the Dutch main port system. Therefore, the rural hinterlands functioned as consumption markets for urban pre-industrial products and agricultural imports from the European networks.\textsuperscript{33}

In Portugal, the rural hinterlands were also used as consumption markets for pre-industrial products and grain produced and imported by the main ports. The difference between Amsterdam and Lisbon is that the demographic pressure in the rural hinterland was higher in the Dutch case than in the Portuguese, which means that the amount of goods required by the Dutch rural hinterlands was far higher than the one required by the Portuguese rural hinterlands.\textsuperscript{34}

Contrary to what happened with Amsterdam, the Portuguese hinterlands were deprived of urban elements in their hinterlands. There are no studies that explain this, but one may argue that there are four main reasons why that was the case. In the first place, there was the jurisdictional status of most of the Portuguese cities. The urban jurisdictions were officially recognised by the Portuguese kings during the Middle Ages (\textit{Carta de Foral}), and reconfirmed in the sixteenth century with few alterations to the original texts. The rights and obligations of most cities were then written and they remained the basis for urban administration, on the one hand, and the guideline for the relationship between each city and other cities, and between the city and higher authorities (Nobility, Church and the King). The \textit{Carta de Foral} often mentioned the jurisdictional boundaries of the city by determining the \textit{termo}, that is to say, the physical extension of the rural hinterland. In practice that meant that the boundaries to the rural hinterlands had been clearly set by law and informal relations occurred, but in case of disagreement or conflict, the statements of the \textit{Carta de Foral} were still the norm. There-


\textsuperscript{33} M. van Tielhof, De Hollandse graanhandel, 1470-1570. Koren op de Amsterdamse molen (Leiden 1985).

fore, we may argue that clear jurisdici
tional boundaries acted as an obstacle against the
integration of diferent urban units in a major hinterland system surrounding Lisbon.35

The second reason for the lack of urbanisation of the Lisbon direct hinterland was
the general system of communication. Dutch cities invested large amounts of public
income in the construction of communication systems. That was the case in the develop-
ment of a network of canals, the surveillance of the main international and regional
waterways and for the maintenance of roads.36 This example was not followed by the
Portuguese cities. The Tagus river was not navigable for long distances, which hindered
a direct connection between the capital and the cities located along the river. There is
little work on the road system, but historians agree that few were constructed during the
Early Modern period, nor were maintained or expanded. That left a large Por-
tuguese port such as Lisbon and its rural hinterland largely separated from the rest of
the urban system. We will not argue that separation meant isolation, but it certainly
meant significant difficulties in ascertaining the economic or political relationship
between smaller Portuguese cities and towns and the capital.37

Thirdly, there were taxes placed upon the communication infrastructure. Since the
Middle Ages, Portuguese kings heavily taxed the use of roads, bridges and river-cross-
ings in the kingdom. The difficulties the royal bureaucracy encountered in enforcing
these taxation laws forced the king to delegate his rights to the local lords (nobility and
Church) and urban authorities. Conflicts over the jurisdiction and tax collection of cer-
tain roads, river-crossings and bridges were frequent.38

Last, but not least, there is the problem of deining certain Portuguese urban set-
tlements as cities. Generally, Portuguese historians define as cities coastal and inland
cities, whose size and historical importance in the Portuguese context cannot be denied.
However, when compared to other European cities, the so-called cities in Portugal have
to be classified as small towns or villages. Therefore, an awareness of demographic and
urban sizes is paramount in order to keep the Portuguese urban world in perspective.39

There is perhaps one exception we should mention. Some cities bordering the rural
hinterlands of Lisbon were able to place some textiles in the urban market. These tex-
tiles were not particularly cheap or of good quality, but they were an alternative to the
import of foreign textiles, which were usually more expensive, but of better quality.

35 Carta de Foral was a letter given by the Portuguese kings to the cities. In this letter all the rights, obli-
gations and privileges of the cities were settled. These rules were used as guidelines for the relationship be-
tween the cities and their citizens, on the one hand, and between the cities and higher authorities (king, nobles
and Church).

Ligtendag, Van Ijzer tot Jade. Een reconstructie van de zuidelijke Noordzeekust in de jaren 1600 en 1750
(The Hague 1990).

37 H. Baquero Moreno, A acção dos almonreves no desenvolvimento das comunicações inter-regionais

38 V. Rau, Feiras Medievais portuguesas. Subsídios para o seu estudo (Lisbon 1981). I. Goncalves, ‘Rela-
ção entre os concelhos e o espaço, segundo o Corpus legislativo de produção local na Idade Média’, R. Araujo
& W. Rossa & H. Carita (coord.), Actas do Colóquio Internacional Universo Urbanístico Português 1415-
1822 (Lisbon 2001), 51-36. L. Krus, ‘Producir e mercancía’, R. Carneiro & A T. de Matos (coord.), Memó-
ria de Portugal. O milénio português, (Lisbon 2001), 141.

39 For a good conceptual assessment and comparison of levels and rates of urbanisation in different
European regions see: J. de Vries, European urbanization. See also: P. Bairoch et al, La population des villes
européennes.
However, it seems improbable that this one product could provide the same amount of interdependency that was the term between the urban settings of the Republic and Amsterdam. The same can be said about some wood and rope that was sent to Lisbon (where the royal shipyards were located) during the sixteenth century, though by mid-seventeenth century the quantity, quality and competitive price of foreign supplies finished off these regional contacts. 40

The medieval taxing system prevailed well into the nineteenth century and, with it, the local tolls on regional imports and exports (alfândegas and portos secos). 41 In fact, and contrary to what happened with Amsterdam and other Dutch ports, Lisbon could not rely on any kind of regional integration due to the obstacles raise by jurisdictional disputes, the bad state of the infrastructures, an overall system of taxes and tolls to be paid by the use of the infrastructures and the regional imports and exports, and a comparatively small urbanised world.

If the rural hinterlands functioned as a consumption market for cheap urban preindustrial products and rural imports, the urban hinterlands were far more demanding. They did not need the manufactured products because they could produce similar products in their own right. 42 At the same time, they were as dependent on grain imports as the rural or the trans-regional hinterlands. However, the urban hinterlands were of vital importance to Amsterdam and Lisbon. They were the privileged environment for the consumption of luxury and exotic products imported from other continents. Smaller cities and towns had a political, judicial and intellectual elite, who possessed enough disposable income to buy exotic foodstuffs (spices, sugar, tea, coffee, cacao), rare raw materials (exotic woods, silk) or expensive objects (porcelain, books, paintings) almost all of them imported from overseas. 43

At this point, it seems that urban and hinterland elites, as well as grain markets and distribution were two essential elements in the relationship between a growing city and its rural and urban hinterland.

The high wage levels and the reasonable living standards of the Dutch urban population after the Revolt allowed large groups of citizens to acquire all sorts of luxury goods that, in earlier centuries, had been the privilege of a small elite. That is to say, that more important than ports serving the hinterland’s urban elites, Amsterdam was supplying different social groups in numerous small cities and towns in its hinterland sys-

40 A. M. P. Ferreira, A importação e o comércio têxtil em Portugal no século XV (1385-1481) (Lisbon 1983). The price of the imported grain in Lisbon was cheaper than the output of the hinterland. See: C. Antunes, Globalisation in the Early Modern period. The economic relationship between Amsterdam and Lisbon, 1640-1705 (Amsterdam 2004), 100.


tem. This growing demand drove prices of luxury and high-value products down, which in turn helped to spread these products further down the social ladder. The larger the demand from the urban hinterlands, the higher the willingness of ports to increase imports. Therefore, the good relationship between Amsterdam and its Dutch urban hinterlands was only possible because there was an urban elite able to pay for what was offered, on the one hand, and, on the other hand because a large and well-kept transportation network was in place.

The same situation cannot be accounted for in Portugal. The urban elites were basically the same as in the Middle Ages. The higher ranks of the clergy, the higher ranks of the nobility and a few merchants were able to gather enough disposable income to buy high value or luxury goods. The problem is that this elite was concentrated in the larger urban centres, usually the largest ports. That is not to say that cities in the interior like Coimbra, Évora, Lamego or Braga were not important. The problem was that citizens did not have the same amount of disposable income as the patrician, mercantile or pre-industrial elites of the Dutch cities. A significant portion of Portuguese citizens belonged to the elite not so much because they had an economic activity that improved their social status, but because they had been born into such a status. Often, that status had little economic meaning. On the other hand, the presence of the higher ranks of the elite in the cities in the interior was reduced to the number of clergy and nobles.

The number of the local and regional elites in Portugal was far lower than in the Republic. However, the highest concentration of elites was in Lisbon. Nobility, clergy and merchants lived in the city in the hope that their presence in the capital, where the king also lived, would further their social and economic position.

As we have seen, the largest concentration of urban elites (lower nobility), merchants, bureaucrats, nobles and clergymen was in the largest ports. However, we cannot state that even the urban elites living in Lisbon could afford to buy what their disposable income allowed. The impoverishment of certain groups inside the traditional elite was obvious but the largest problem was posed by the king. In an attempt to keep up appearances and only allow the ones born with status to show this status, different
Portuguese kings at the time issued sets of pragmatic laws (*leis pragmáticas*). This legislation forbade the use of external signs of wealth or the consumption of luxury or high value products, which might be unfit to someone's social status.48

The pragmatic laws had three goals and several consequences. The first goal was to stimulate the consumption of goods produced locally. The second goal was to protect the social position of nobles and clergymen born into a certain social status from being compared to the merchant elite that was able to buy that status with money. Exterior signs that the traditional social hierarchies were changing were not welcome. The third goal was to keep the high value and luxury goods, often of colonial origin, away from the Portuguese consumption markets. Portugal was heavily dependent on imports of grain, warfare and shipbuilding materials, and the only way to balance these needs in the international market was by holding on to luxury colonial goods for a fair exchange.

The consequences of the pragmatic laws were very serious. On the one hand, illegal trade flourished. And illegal trade meant that the royal treasury lost large amounts of income because it did not collect taxes. On the other hand, the laws are perceived to have been a serious obstacle to the formation of urban consumption markets in Portugal. That means that the lack of consumption of luxury and high value goods hindered the generalisation of patterns of consumption and postponed a possible consumption revolution in Portuguese cities *sine die*.

As mentioned earlier, one of the reasons to approve the pragmatic laws was to keep the royal control over valuable products that could be easily used in the foreign markets in order to stabilise the balance of payments.

One of the products in high demand in Lisbon besides warfare and shipbuilding materials was grain. All Portuguese ports needed grain, but not all of them had equal access to the grain producing areas. Beira, in the centre of the kingdom, and Alentejo, in the south, were the two provinces that produced most of the grain in Portugal. The ports of Porto, Aveiro, Lisbon, Setubal and Algarve were the ones closest to the grain producing areas, but that never stopped the Portuguese ports, in general, from being dependent on the importation of grain. This dependency on imported grain had three causes. The first cause was the first juridical claim on the Beira and Alentejo grain came from the local urban counsels, who tried to exercise the rights recognised by the *Cartas de Foral* to get as much grain as possible to their local markets.

The second cause was that Portugal, like the rest of Europe, suffered the consequence of the periods of drought in the Sicilian and North African grain producing areas, which damaged the balance between grain production and consumption in Southern and Atlantic Europe. As happened with other Portuguese ports, Lisbon was highly dependant on grain imports dating way back to the Middle Ages.

The third cause for Portugal's dependency on grain imports can be illustrated by the specific case of the capital. Lisbon had no other option but to rely on foreign imports. The foreign imports arrived from the North, mainly from or via Amsterdam. But even with foreign imports, Lisbon had a difficult task in controlling grain supplies, as there were several demand markets in the city, all of them relying on what came from Alentejo, on the one hand, and from abroad, on the other hand. The first was the urban mar-

ket. The urban market had to provide for three different groups: the population of the city, the royal house and the court, and the rural hinterland. The second set of demands came from the overseas markets, especially during the second half of the seventeenth century. The overseas markets had two sources of demand. The first was the need to supply the fleets. The Asian, Brazilian and European war fleets needed enough bread for their crews and captains. Moreover, the number of the crews on board and the fighting personnel on those ships had increased during the seventeenth century and, therefore, demands for bread were also higher. The Asian and Brazilian fleets represented another consumer group as they were often loaded with grain as cargo. The third drain of Lisbon’s grain supplies was the army. During the period of war between 1640-68 and 1702-13, both the Portuguese and foreign armies had to be fed. The problem was not only the amount of grain required by the different regiments, but also the transport and distribution logistics of the supplies between the port and the front line. If we add to this the fact that both Beira and Alentejo were border provinces and, therefore, victims of the war that devastated their fields, we understand that the supplies of grain to and from the trans-regional hinterland to Lisbon were difficult to sustain and imports were the only answer. Similar situations happened in other Portuguese ports to a smaller or larger extent.

We can argue, then that Lisbon’s trans-regional hinterland was of less importance than its rural and urban hinterlands. If the link between Lisbon and the urban hinterland was hindered by the poor navigability of the Tagus river, the same can be said of the trans-regional hinterland. The physical connection between the Portuguese Atlantic coast and the rest of the country was difficult enough, as we have seen in the case of the imports, transportation and distribution of grain. This difficulty was compounded beyond the political borders of the kingdom. Communication was made difficult not only by the natural situation of the international rivers, but also by the lack of a comprehensive road network that would connect the capital with the distant Spanish provinces, as well as a complex system of local and national taxation. All of these greatly hindered the access, transport and distribution of goods to the consumption markets.

In the case of Amsterdam, the natural trans-regional hinterland followed the course of the international rivers deep into the German states, northwards, via the North Sea, to Scandinavia, and towards the South of the Republic, to the Spanish Netherlands. Both the German states and Scandinavia provided Amsterdam with its work force. This work force, mainly responsible for the explosive demographic growth of the city, was driven away from their homes by war or the expectation of earning a better living.

The migration flows from Amsterdam’s trans-regional hinterland can be characterised as follows. The Thirty Years War drove large numbers of German youngsters to the coast. Hamburg, as a free city, profited as much from this movement as did the Dutch maritime cities. The German migrants were clearly divided in groups. The first group included urban migrants, who left towns and cities throughout the German states to escape war and look for better opportunities in the north. These urban migrants were mainly craftsmen and their work experience was much appreciated in places like Amsterdam. The second group included rural migrants, who driven by the fortunes of war, fled first to the German towns and cities, and, afterwards, to the Republic. This second group formed a massive unschooled work force, willing to work, but unable to offer
special skills or knowledge. These were the ones destined to become low-ranking sailors for the large Dutch commercial companies or in the private fleets. This presence can be seen through the information provided by the Amsterdam's marriage registers. These registers show that in the years 1661-1665, 18.5% of the seamen married in the city were German.

The Scandinavian trans-regional hinterland provided a skilled labour force. Scandinavian migrants were specialists in different commercial activities. That was the case of ships' captains, ships' pilots, and war engineers. They left Sweden, Norway and Denmark during times of war or else were attracted by the high salaries in cities like Amsterdam or Middleburg. Some were even hired to work on the Dutch war and commercial fleets.

The main difference between the German and the Scandinavian hinterlands is that they provided different segments of the Dutch labour market. The German migration originated from an endemic state of warfare that pushed different groups of German society into the Netherlands. Those groups included skilled urban labourers, but also a large number of unskilled workers. In the Scandinavian case, migration was a result of economic longing for a higher standard of living, and, therefore, the migrant groups were mainly skilled workers looking for better wages in the large Dutch ports.

The Southern Netherlands provided a whole different kind of migrants. Movement of groups between the Southern and the Northern Netherlands dates back to the Middle Ages, and the political border instituted after the Dutch Revolt at the end of the sixteenth century was hardly a physical barrier for the movement of people, goods and capital. In fact, large numbers of migrants left the Southern cities heading North, after the closing of the Schelde by the insurgents in the North. Protestant and Jewish merchants and craftsmen left cities like Antwerp and Bruges and moved northwards, first to the neighbouring cities of Zealand, and, later on, to Amsterdam. Again, this trans-regional migration flow was radically different from the German or Scandinavian flows. The migration from the Southern Netherlands was neither mixed (as the German), nor individual (as the Scandinavian), but clearly devised as an entrepreneurial choice by certain individuals, all of them linked with the same activity (commerce), who decided to


leave their place of origin because the traditional networks in which they operated were falling apart due to the blockade of the Scheldt. The actions of the rebels in the North had practically closed all the access to the Antwerp market, causing great and grave loss of life and income.

In the case of Lisbon, the difficulties encountered for the transportation and distribution of goods throughout all levels of the hinterland, constituted the same reason why migration flows may have been disrupted and not at all comprehensive. We have few information about migratory flows inside the Portuguese kingdom during the Early Modern period, but we believe that Lisbon and other major ports could not have survived as such if they would not be the receptacle of important migratory dynamics. However, we believe that these migrants did not come from the trans-regional hinterland, but from the urban and rural hinterland surrounding Lisbon. Those areas were the only ones close enough to be able to allow people to move with some efficiency from the hinterlands into the capital.

Migration flows appear to have dominated the relationship between Amsterdam and its trans-regional hinterlands, but there were other factors influencing this relationship. It was the case of the trans-regional elites and imports. Contrary to what happened with Lisbon, Amsterdam still profited from the consumption market formed by the Scandinavian and Baltic elites for luxury and manufactured goods produced in Amsterdam and throughout its urban hinterland, or otherwise imported from the colonies. The commercial balance between the Scandinavian and Baltic regions and Amsterdam was achieved by supplying the latter with grain and raw materials for the shipbuilding industry and warfare materials. These imports were stockpiled in the city’s warehouses and later on sent to European partners, as was the case of Lisbon and other Portuguese ports.

4. Conclusion

We were able to see that the transactions between Amsterdam and its hinterland system was far more integrated and based on an interdependent relationship than the one between Lisbon and its hinterland system. The main difference between the two was the situation of the transportation networks that could serve as an incentive or an obstacle to the integration of both ports and their hinterlands, the existence or absence of strong or weak consumption markets, and the level of balance in the trade exchange between both cities and their trans-regional hinterlands. In fact, Amsterdam could rely on the strength of its inter-regional markets to survive, while Lisbon had difficulties in balancing international trade and regional markets.

The strength of the hinterland system was, however, not enough to keep a port as centre of the European economy. Although Amsterdam was surrounded by an efficient and extensive hinterland system, when English competition reached the inter-European and continental routes, Amsterdam lost out. This decline was not to be expected if we look at the situation Amsterdam’s hinterland system was in. Simultaneously, Lisbon had always had a deficient hinterland system, but the city’s ability to keep partners and maintain its integration in the European urban system overruled the weaknesses of its hinterland.
It is therefore important to keep in mind that hinterland systems helped ports at two very important moments. The first moment was the take-off moment that took the economy of ports to another dimension. That was what happened with Amsterdam after the fall of Antwerp and with Lisbon after the beginning of the Portuguese expansion overseas. The second moment was the moment ports declined as international economic centres into regional economic centres. At both moments, hinterlands played a crucial role on the way different ports developed and declined. Nonetheless, hinterland systems could do little to fight external competition based on the overwhelming takeover of commercial relationships alien to the hinterland systems themselves.
FROM A NATURAL SAFE HAVEN TO A STRUCTURED SEAPORT – PORTO AND THE ATLANTIC SYSTEM*

Amândio Jorge Morais Barros

Abstract

During the 16th century, while, from Lisbon, the Portuguese Crown was concentrating its best efforts in exploring the Cape sea route ("The Indian Run") as well as the East and Far East circuits, commercial shipping agents of other Portuguese seaports led their undertakings seeking for alternative ways. It’s mainly due to this fact, that is to say, to the existence of seaports like Porto, Viana do Castelo and Vila do Conde, classified for a long time as minor ones that the Portuguese Kingdom definitely participate in the creation of the first Atlantic system. Which means that I affiliate this paper to the studies produced by the so-call “new Atlantic History”, a historiography school that bring to the “grand history” the role performed by certain European maritime regions in the organisation of a widespread economic structure that shaped future achievements such as the articulated, international, and global economy.

Influenced by this modern historiography, I’ll try to discuss and analyse a particular case: that one of the evolution of the city of Porto, mainly the building and organisation of its seaport. Structures such as ports carried out a key role in the process, and thus worth the study of their evolution. Here we have a port that started to be no more than a natural safe haven for ships in the Early Middle Ages, and became a structured equipped artificial harbour between Late Middle Ages and Early Modern Times. In addition to the most important material changes meant to its transformation, I’ll also pay attention to its inclusion on a pervasive international port system, the mobility of its merchants within vast and articulated markets, fleet features up to the extent of their enterprises which projected themselves into the Atlantic world and helped increasing the European trade.

Foreword

Knowledge about historical port infrastructures still is insufficient among scholars and researchers. Key subjects such as space organisation, engineering and hydraulic projects, construction techniques, and resources available to improve them are yet unknown. Often, we don’t even know for sure where the ancient structures were placed

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1. Instituto de História Moderna-Faculdade de Letras da Universidade do Porto.
and located, and the shape of most of the port facilities. In addition, once they're often in the heart of the city's urban system, they were subjected to the effects of continuous and profound interventions on the urban frame. Traffic evolution and shipping, as well as relentless works of renewal of the waterfronts and extensive city areas, thwart the efforts to reconstruct the port's daily routine. To overtake these serious constraints, we must seek out an assertive interdisciplinary commitment between Archaeology and historical archive research, to compare results and to reflect upon them.

Research on archive manuscript records provides privileged information about the kind, size, and cost of major port works and their patronage, and also helps us to understand its function. We have to keep in mind that the organisation of trade – especially maritime trade – it's intimately connected to the seaports structure planning. If you take care of the development of a harbour, increase its volume of transactions, and draw to your marketplace well-heeled foreign traders, hosting conditions both for ships and merchants must be improve. Evidence about the establishment of landing spots for vessels, ramparts, storehouses, cellars, and other foremost port facilities, as well as hosting rules and trade privileges, can be traced in Porto since the Middle Ages. Such material and political initiatives are matched by similar ones approved and applied in some European maritime regions for centuries. They suggest interesting custumal practices, that can't be ignored.

In this paper, I'll pay attention to the first set of priorities: the building of the port.

The focus of this paper is a case study; a local history viewpoint that, of course, by its nature has some limitations. Nevertheless this micro-analytic perspective could be useful for the comprehension of a widespread analysis. Especially when you contextualize, searching for pertinent conclusions to understand the general evolution. And I believe this is the most valid methodological option. In the history of Porto maritime action you'll find early developments of port's activity, dated from the Middle Ages, responding to the challenging demands of international navigation along the Portuguese coast, and specifically, involving the Northwest Portuguese harbours. Some kind of services – bar piloting service, sanitary inspections, shipwright organisation, etc. – not being invented here, were, however, quickly adopted and incited, becoming a powerful manner of development.

However, I must point out serious limitations on this research due to the almost non-existing useful archive documentation and the reduced knowledge we still have about port settlements and its physical evolution. These remarks done I'll carry on presenting the paper's structure.

On the first section I'll introduce the Porto's social frame: who were the agents involved and somehow their motivations. Second and third sections will be dedicated to the evolution of the medieval port structures; as we will see that's a time of outmost importance because it represents a process of internationalisation of the city's maritime

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2. And give us fine clues about the level of early international maritime and economic contacts. (I'll mention a paper by Neil Middleton where tax and regulations in Early Middle Ages are mentioned.)

3. Although extremely important, in this text I'll not pay attention to the different meanings of words such as port, seaport, or harbour; I'll use them as synonym referring a place where maritime economic operations between land and water occur. Nevertheless I must point that we can observe all the acceptations of the word: we have a transhipment port, a port of destination, a port of call, a fishing harbour and a port of clearance with structures related to each one of them.
economy. After a brief approach of the dynamics displayed during the transition period, roughly between 1400 and mid-1500s, the last part of this essay focus the theme of the evolution of the port in close relation with the new Atlantic economy.

1.

Writers and novelists from the late 19th century on describe Porto as a prosperous town of merchants. Richness resulted from the Douro wine commerce, improved during the 18th century, and the Brazilian trade business in sugar and tobacco produced a thriving society of successful businessmen. Men of the world tidily related to the flourishing London trade and finance, to the brokers of the Royal Exchange and its extension of the effervescent Exchange Alley, and of course to their powerful trade companies that prevail over the world commerce. Back then Porto mattered: as recent studies prove, it was one of the most significant maritime centres for English merchantmen. In the same line of thought scholars included the township in the category of “hegemonic seaports”, like Bordeaux.

Of course merchants prevailed; they were the elite, and showed political skill to rule the city and to determine its economic evolution. Besides, trade, in every form we can think of it, succeeded over the remaining activities. Nevertheless both opulent businessmen and modest brokers were not alone in the field. For centuries we come across a numerous maritime community, a satisfactory merchant fleet and a shipwright activity allowing alluring enterprises. This social, economical and logistic assemblage begun in the late Middle Ages and continued to the 16th and 17th centuries. Here’s a novelty to keep in mind: thanks to that kind of resources Porto immediately integrated an extensive group of ports responsible for the growth of the Atlantic economy.

If one can’t do commerce – especially of long-distance range – without ships and sailors, one cannot do it either without a seaport. Not surprisingly there were traders, big and small, rich and not very wealthy, but each one of them fully interested in shipping: owning ships or parts of vessels in countless shipping societies, foreseeing good profits when connected with seamen, having them on their own pay roll, and organising major commercial projects on an international level, discussing dependable improve-


6. We must put together the process of port’s transformation to another one that occurred in sequence, concerning the social and urban evolution of the city: the transfer of the best-heeled families from the seedy heart of the town to well off suburban neighbourhoods. From the old city centre to the new urban surroundings where they proudly displayed lavish residences, side by side with the households of their foreign neighbours and business associates. Besides, there’s a little more we can say about it: as recent studies such as the aforementioned prove, despite the noticeable decadence of the Portuguese economy, and its subordination to external interests, some of these men still remain in business, even if they can only survive within the sphere of English interests. By then – we’re still moving in the 18th and 19th centuries – the word “bourgeois” was definitely the one that in reality defines this social group. So here we have a scant inventory of consistent facts that justify that widespread interpretation of the city’s main feature: as I said, on the social, as well as economical basis, Porto has been regarded since then as a city of merchants rather than one of sailors. One of the intentions of this paper is to show that this was not always likewise; at least not with this kind of depth between the 14th and 17th centuries.
ments to be made in the port, in fact consistently shaping is own prosperity.

For those intents, in next to no time locals become conscious they needed an organised nautical room. The building/organisation of the seaport sounded like a very wise decision: after all, that basic equipment signified a reliable guarantee of prosperity, and, conceivably, of the city’s wealth. That picture was entirely understood by the authorities: the city’s economy depended on it. And they acted accordingly. At first, working over the fairly natural conditions existing, trying to organise the space. Quickly, they transformed this “natural” haven into a modern seaport. As I stated previously, this process went underway in the Middle Ages up to an extent that resulted in the total identification between the port and the city7. I here like to point out the foremost features of such a procedure.

2.

We know for a fact that the history of the seaport goes together with the history of the city. Economic, social and cultural progress as well as innovation and information exchange resulted and depended a great deal of port’s dynamics. As far as we can figure out, the harbour had carried out since the 14th century an important role over both local and national economic dynamics, and (even) in the evolutional process of Europe’s trade and economy due to the fact that massive contacts and operations were performed by Porto’s merchants and businessmen wherever they could. For what it’s worth this paper addresses the following question: the role fulfilled by small Atlantic seaports in the process of creation of a consistent international market, offering a fresh perspective about the Medieval and Early Modern foundations of the European maritime trade.

One important fact, already mentioned here, must be kept in mind: the integration of the Portuguese coast in a context of maritime internationalisation; the significance of the scale, of the ports of call, in the medieval route between the Mediterranean and the Northern seas. For seaports such as Porto that meant opportunity and challenge: for once, the city cope with the requirements of the European expansion process contributing with is own modern fleet for the growth of maritime trade and benefiting from it; then, the market integration resulting from this context demanded new port facilities.

Heading their attention and dispatching their ships and merchandise to northern European regions, such as Brittany, Normandy, Flanders, Brabant, and British ports such as Bristol, Plymouth, Tenby, Cardiff, Galway, and, of course, the nearest harbours of Galicia and the Cantabrian Coast, Porto integrated, then, a “port system” in formation, with some interesting extensions to a few traditional Mediterranean cities.

That’s why geographic, political and economic options adopted by local authorities and entrepreneurs must be take in consideration because, as Jacob Price state for the 17th and 18th centuries, they “influenced or controlled decisions about where a particular commodity should be imported or exported”8. Back in the medieval times, Porto’s merchant community had to make such decisions. After all they knew the market and its needs. And that explains all the measures took to build up port conveniences

7. In fact, the name “Porto” says it all.

and, complementary, the approval of a legal jurisdictional board of trade.

The port appears, subsequently, as a public enterprise (since it demanded vigorous involvement of local rulers as well as the king’s interference over a wide range of matters of general interest) organised on behalf of the whole community.

In the early days Porto was probably a satisfactory port of scale. We always have that for granted, somehow influenced by classic scientific literature about the “discovery of the sea” and the initial role performed by the Iberian Peninsula ports, which functioned as support points for the ships involved by the Italy/Flanders route. I wrote “probably” because I think we can, or should, argue that some features – shared by many Portuguese ports – such as risky bar entries, shallow waters and narrow canals could be very dangerous for all of those who were unfamiliar with it, preventing that function. Anyway, been a scale or not, (in addition) Porto developed an interesting maritime activity of their own, and rapidly became a busiest harbour. From now on, facilities had to be expanded as a guarantee of good service and management.

We can easily figure out from the title of this article, and for what it’s been written so far, that in the beginning we have just a roughly whole natural haven with minimum coherence. This is hardly an entire novelty; comparable developments took place in multiple places, and it’ll be enough to bear in mind the ancient wicks in Britain that took advantage of good natural conditions to become firstly mere settlements, and later interesting regulated commercial spots. Here in Porto things went alike. And this is a good theme to reflect on. Look at the Douro River nowadays and you’ll probably miss the fact that you are observing an entirely different reality vis-à-vis olden times. In the past it used to have widespread sand beaches, rocky shores, bends and meanders; you just barely catch a glimpse of those today. The only similarity is the regime of the waters; Douro was, and still is a river of tidal movements. But again with a foremost distinction to make: back in historical times the tidal system was much more contrasting. In the summer it was not very different from today (except for the amount of water which was scarcer), but quite the opposite in the wintertime, when the stream became fast, furious and enlarged, bringing river navigation to a temporary close, and causing severe flooding, damaging the close by communities’ property. Let alone this constraints, the river offered good conditions for the development of a maritime way of life, especially when you notice that it was easy to find places for shipbuilding, satisfactory accesses to the watercourse from the city and nearby neighbourhoods, and, from it, with no trouble reaching the open sea.

Just about the same can be said about the town. Although people soon approach the riverside and took advantage of the manifest potential of both river and maritime activities, there still remain a lot to go through until we see a consistent settlement by the river. The key area primary chosen for commercial purposes was the square that spreads just in front the “Ribeira” beach. But throughout the final stage of the Douro line, we could find places alike. Especially by the right shore, whenever you find a sand

9. One cannot forget Portugal’s political frame in which the King prevail over every jurisdiction; is authority was never challenged by any city, institution or social group.
11. The river-level had been entirely change by the growth of modern dams throughout his course.
beach, a small bay, or some kind of indentations, you certainly stumble on modest clusters full with individuals that made up their life thanks to the river or dealing with the sea. Many had a small boat tied to the familiar river pillars and bollards; some dedicated themselves to cross people, while others became involved in fisheries, enlisted in the merchant navy, made small commerce on their own, hired their services, or get involved in smuggling.

Let’s return to Ribeira and stay there for a little while longer. That’s where the primitive seaport was organised, where the city approached the river, where the pressure on space was higher, as we can notice by observing the nearby quarters divided in narrow plots. On the beach the shipbuilding activity took place – the medieval arsenal –, which generally is immediately related to the existence of a port. In the beginning dominated the fabrication of galleys but later, when the shipyard was dislocated a little further down the river shore, the introduction of new technological solutions resulted in the emergence of modern ships like the “sea barge” (barca), the caravel (caravela) and cargo ships like the nau – at first further related to the well known big Mediterranean model rather than the future Portuguese naus that sail the seas throughout the 15th and 16th centuries, which, in every case, were about to be developed right here. These changes in the naval construction show a port very soon implicated in Atlantic dynamics; the old arsenal became out-of-date and their structures were used for other port purpose. The arsenals couldn’t respond to the needs of the new naval typologies and their stores, in the olden days used to build galleys and to keep them during the winter, served, from now-on as warehouses or commercial plants. That phenomenon occurs in Porto in the 14th century when the galley lodges were transfer for the left shore. This was also the time when galley carpenters where replaced by the modern ribeira carpenters, a fact that have to be emphasise because some researches consider it the moment when the early modern times begin.

Alongside with the carpenters labour, there’s a lively activity going on: ships waiting for cargo, unloading operations, carts and stowers coming and going, in and out of the vessels through the planks furnished by the municipality, merchants looking after their merchandises, boxes, barrels and piles of goods spread all over the sand, waiting for the tax collectors. Medieval regulations confirmed this commercial rise. Which means moreover that by that time the Porto way of life was increasingly attached to the maritime commerce. This was the primitive centre of maritime action. In here, we could come with the way things changed. Although the beach remains for a long time, planks were placed, jetties were built, timber quays were hoisted, and other anchorage solutions were found.

By then, the urban policy – responding both to Crown’s requirements and local needs – was directed to the welfare and protection of the growing population. And a

12. And the one that existed in the right shore was transform in the “weigh house”. In the 16th century the “houses of arches where in the old days galleys were kept” were reconverting in slaughter houses where the “meat for the armadas [of the Indian Run] were made”. This is what’s been written in the memoirs of the king’s representative in the city in mid-1500s. DIAS, Francisco – Memórias quinhentistas dum procurador del-rei no Porto, (edição de Artur de Magalhães Basto). Porto: Câmara Municipal do Porto/Gabinete de História da Cidade, 1937.

new wall was built. The riverain part of the gothic wall was concluded before 1348. Building the wall had a profound effect over the seaport. It made clear the definition of economical spots: for the resting of fishermen boats, the docking of commercial ships, especially those “that carry out commerce with France”, according to contemporary records even if we know that they more and more took out successful operations in different zones such as the Flanders, Brabant, the British Isles, Northern Spain, Spanish Levant and the Mediterranean Sea. Same as other parts of Europe, “archaeological investigations have shown that basic port facilities were built when settlements begun to acquire urban features”16. If this movement towards the riverside had already been clearly perceptible before the existence of the walls, the process was particularly enhanced when they were completed.

The importance of this structure can in addition be evaluated by the amount of stores, cellars and warehouses in the new streets that, from the beginning, became commercial paths. These buildings meant a lot for the port organisation; letting aside the fact that a great amount of individual city households had (private) accommodation for goods on the ground floor (discovering the very nature of the city's activity, founded on trade), the demand produced by the rapid extension of the commercial bonds, especially from the second half of the 16th century on, encouraged the construction of warehouses for storing salt, sugar, cotton, and brazil wood, cellars to keep the wine, and granaries to stock up cereal. Some merchants add to their own commercial trade activity profits, the revenues of storehouse rental. The municipality did pretty much the same.

Concentrating the commercial activity next to the wall revealed as well the need of infrastructures projected for traffic control. Here's another important development in port facilities. By the central years of the 13th century the Church, back then the landlord of the city, placed a toll collector next to a small chapel near the river, the mondomo of S. Nicolau (Saint Nicolas's taxman), putted in charge to hoard the taxes payable by the ship-owners and merchants. After a period of jurisdictional dispute between the King and the Bishop, regarding the rights over these tax revenues, an agreement was reached and from now on (mid 13th century) they were shared between both of them. That's the time when King's interference over the maritime activity of Porto became manifest and, on is initiative, a customhouse was built in 1325; it contain quarters for the crowns superintendent and a vast stow where the goods be kept until they were clear out. The king's warehouse became the key-point of the whole harbour: it's one of the most well-know buildings of the historical centre of Porto: the so-called “Casa do Infante” (House of Henri the Navigator)18, and, somehow, its existence expresses the desire of concentration of some port functions necessary to keep the port

14. The ow people always name muralha Fernandina because it supposed to be finished during the reign of Fernando I (1367-1383).
15. This is confirm by an inscription that stayed on the wall and was removed for the city's museum (which no longer exists and because of it we lost trace of that epigraphic piece). That inscription was very important because it registered the place where ships used to be tied to an iron chain.
17. The city was a Church domain (belonging to the Bishop's) until 1406.
18. A popular tradition – still not fully proved – says that the Infant was born there, in 1394. Today it is the City's Historical Archive.
working properly. Since that date complex custom regulations – precious elements to understand the port’s evolution, especially in terms of jurisdictional manner – were approved and implemented. The Crown’s interest visibly proves that maritime trade had become the key economic element. From now on, the port and the town emerged as centripetal over a vast region around them; an articulated economic market was definitely enacted.

3.

Planning the city’s circuits in view of the port’s development; arranging the riverside ways to easier the traffic; building up lines of storehouses and commercial plots; organising the shipyards; establishing a tollhouse; that is to say, creating effective and functional links between different port economic segments. All of those appear to be the initial initiatives to get a structured seaport: not a very impressive one, presenting at first only rudimentary piers (some of them timber landing stages with mooring posts), and basic dock equipment such as stone pillars to moor ships, stairs, planks, and cranes, but still a planned compound. As I pointed earlier, it was organised just outside the city walls in order to profit from the existence of this defensive stone structure which, of course, will provide more firmness to the quay section. Everyone is familiar to the importance of the walls in city’s organisation, about the way men took advantage of those bulky structures, arranging new commerce paths, streets, and boroughs, and inspiring new areas of activity from it. The main gates and the riverside sally-ports became decisive points in the organisational process of the seaport. We must again evoke differences between the old river and the one we are familiar with: in olden days Douro flowed more or less seven feet down in comparison to what he does now. Access to the river and moored boats was through the alleys that linked the principal streets to the wall doors, allowing goods transportation. And so, from these gates one got a direct access to the sand, to the crossing rowboats, to the ships.

Facing the increasingly maritime action, the men in charge struggle for efficiency. Piers and ramps, together with stone pillars, were built just outer the wall; when possible they were placed directly outside the gates, to ease the anchorage and the load and unloading of all different kinds of cargo. Some passageways, such as the so-called “Charcoal Gate” (Postigo do Carvão), “Stowage Gate” (Postigo da Arrecadação), and the “Timber Gate” (Postigo das Tábua) reminds us the purpose they were intended for, and almost certainly the manner the cargo operations had been organised.

The first real quay, in solid rock material, was built in 1449 near the Custom House. Next to it there were other timber quays and jetties. It took a long time to expand the berthing line; the stone quay was only concluded in the late 16th century, when a long pier was put through alongside the wall and almost definitively delineates the shape

19. For instance, in the late 14th century a new and wide street, made on the English way was open; she runs parallel the river (it still exists with the name of Infante D. Henrique Street) and close to the Royal Custom House. In 1558 the western end of the street, near the city wall, where a small stone quayside have been raised to ease cargo operations, was jammed with stockpile cooperers woods and materials. In face of the insistent complaints, the city’s authorities order the removal of the wood and barrels and started, then, a process of organization of the activity in there, for instance, defining the workshops place. AHMP (Porto’s Historical Archive) – Vereações (City’s regulations), liv. 16, flos. 51v-52

of the one we can observe today\textsuperscript{21}.

As I said before, the wall marked a major contribution to the seaport "zoning"\textsuperscript{22}. I've already mentioned the doors, but in general we can say that areas for merchant ships and fish boats were clearly assigned; stations for passengers and posts for the barges\textsuperscript{23} and ships were erected; the naval construction, no longer advisable or even possible in the heart of this active commercial site, was moved away to a more suitable location.

This last statement ought to be underlined. Checking the scientific literature about European historic seaports we realise that for the most part the shipbuilding industry remain side by side with the commercial doings for a long period. As we can witness in Porto that intentional and functional separation occurs as early as the 14\textsuperscript{th} and 15\textsuperscript{th} centuries. This chronological framework suggests precocious care about accurate organisation on a seaport enjoying a context of expansion induced by a global request of sea transport.

If one considers plan and organizes a harbour, one should be aware of the size of their own fleet, the capacity and tonnage of the ships calling the port, and the volume of trade expected enter the harbour. We must not jump into conclusions that could be out of place, out of context; we cannot expect rational thought yet; however, and confirming the concept that ports are places of innovation, very soon people had to think seriously about those questions; for example, about the impact of different types of vessels arriving, or the kind of commerce performed in there. The merchant ships of the 14\textsuperscript{th} and 15\textsuperscript{th} centuries displayed a considerable tonnage. For what its worth, land reclamation was carried out with the construction of piers and docks further into the water, in order to offer safe mooring and handling berths for vessels with greater draughts. That solution required brawny wharves, usually rock-solid ones, and more complex and expensive (engineering) works, which were made at some stages between the 15\textsuperscript{th} and 17\textsuperscript{th} centuries. Once more we must not forget the technical difficulties to perform hydraulic works. That's why some ships anchored in the canal and rowing boats had to be used for disembark, cargo and unloading operations or else, using the tidal movements to get the ships closer to land. Both new dockyards and handling solutions were related to the development of maritime trade and shipping industry in Porto. In fact, the increasing figures of ships entering the city's port compelled the local authorities to act in order to define a safe way from the bar entry up to the city\textsuperscript{24}.

Bar crossing was a serious problem since the access presented more than a few rocky points, shallow places, and sandbanks. Shipwrecks happened in many occasions and are documented. To avert distressing troubles, marks were positioned in strategic places meant to sign the entry way and point out a safe canal across the river. Keeping

\textsuperscript{21} Renewed in the 17\textsuperscript{th} century and totally modernized in the next one. The actual shape is the one he had on the 18\textsuperscript{th} century.

\textsuperscript{22} For a classic view of this subject see MUMFORD, Lewis – The city in History – Its origins, its transformations and its prospects (Portuguese Language Edition), S. Paulo: Martins Fontes, 1982

\textsuperscript{23} That incessantly crossed people and good between the two margins.

\textsuperscript{24} An eloquent case is the Brazil route (that I studied in my PhD thesis): between mid-16\textsuperscript{th} century and 1600 more than 200 voyages are documented. This figure must be worked for better explanation because we don't only have these vessels; we must also count the ones expecting them, prepared to receive the cargo they bring for distribution abroad; so, we have to add movement to movement.
up navigability was a permanent and most important concern for all of those implicated in trade; municipal rulers, merchants, and sailors actively involved themselves whenever problems came out, discussing and negotiating what they thought were the best solutions to be implemented. That's the reason why the City Council held a meeting with tradesmen and “men of the sea” by the riverbank, to see if it was possible to build two towers holding iron chains crossing the river to avoid pirate invasions in the middle of the 14th century; that's why the municipal chamber had to deal with the sailors complaints about the fishery traps (pesqueiras) that obstacle the maritime transit in the 15th and 16th centuries; and yet again, in the beginning of the 16th century, sailors and shipmasters were asked the best way of replacing the old pine tree used for fixing the route on the bar access.

4.

Late Middle Ages were crucial times in commerce history. The hub of the maritime trade transactions somehow shifted from the Mediterranean to the Atlantic ports. The traffic increase required other sort of port facilities. For once, more room for ships in the docks, and more sets of stores for cargo keeping; then, hospitals to host sailors in need of a place to stay on shore or convalescent from illness got on board; at last, chapels where they could express their spiritual feelings and pious practices, and shipyard services to repair damaged vessels passing through.

Together with the waterfront improvement, the reorganisation of the Porto's shipyard seem to be the biggest project going on. After a first transfer from Ribeira to the western neighbourhoods inside the wall, by the second half of the 15th century it was finally relocated outside the city limits, again on a river beach, just next to the Miragaia borough, where ships of all kind and size could be built and repaired. This process ended in a curious contract: the one signed by the municipality, owner of the ground, and the men of the sea confraternity (of Saint Peter); the terms of the agreement were plain: the City Hall agreed to yield half of the revenues from the taxes (assentos) paid by everyone who wanted to use the shipyard on behalf of that institution, in exchange of the wax their affiliates spent in the Corpus Christi’s feast. That was the best solution authorities came up to both to clear the commercial area and suitably place such a structure. One could figure out how it looked like: ramparts to hold ships and to get better access to them, possibly a wet-dock or, at least a water-dike to hold the ships, a suitable ground to keep ships ashore, warehouses for materials and tools, woodyards filled with piles of different kinds of wood waiting for the carpenters, small furnaces for the

25. For example, requiring the king's financial support, a very well known scenario that happened more than once in this period.


29. More exactly a tidal-dike, profiting from the river movement; the river tidal is still used today by the remaining shipyard in activity when a ship must be putted ashore to be repaired.
tar (pitch) and iron works; and an endless motion around the naval constructions. It's important to say that the shipyard transference went simultaneously with the cooperage's change to the same place\(^{30}\); this transfer could be explain by the fact that cooperage was intimately connected with maritime trade and also because of the interesting role performed by cooperers in tonnage measures, very helpful for the sake of the shipbuilding industry and general trade\(^{31}\).

Finally, the modernisation of the shipyard could have been motivated by the good conditions offered: from the 1430s documentary data talks about the existence, in Miragaia, of a "ditch for fixing ships" (that we could, maybe, identify with the above-mentioned rudimentary wet-dock), and also a "mount" that, as it has often been mentioned, was used for careening\(^{32}\).

5.

The Iberian expansion and the establishment of Atlantic routes encouraged fresh investments in port facilities. We're now facing a whole new complex of social-economic phenomena "that lead to a fundamental change in European shipping"\(^{33}\).

As I pointed above, Porto contributed for this change. The city oriented its economy in order to recover from the stagnation caused by her overthrown from the Indian trade, and the losses suffered by their merchant fleet in result of the attacks by French interlopers.

From mid-16\(^{th}\) century, investments previously made in the Atlantic World (in order: Atlantic Islands, African gold and slave ports, Brazil, and the Spanish West Indies) begun to pay. Moreover, the rise of powerful Portuguese trade networks\(^{34}\), alerted European merchants for the role the city was then able to perform within this new context.

An excellent book by Nicholas Canny tell us about the "Europeans on the move"; that's precisely what we have in here; that's what's caused the global change in international shipping; that's the time we are allow to talk about trade networks, long-dis-

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\(^{30}\) We can still observe the long line of arches (some of them of the 16th century) that were in front of the barrel-making plants.

\(^{31}\) The wine barrels were always used in Porto to evaluate the capacity of ships' cargo. That's why we can say, for sure, that a ton, here, in late Medieval Era and Early Modern Times was equivalent to 1 000kg (2 barrels). See BARROS, Amâncio Jorge Morais – Porto: a construção de um espaço marítimo..., cit. Vol. I, p. 403 and Vol. II, p. 114, 147 (documents from 1568 and 1569).

\(^{32}\) For a long time Porto has been the most innovative shipbuilding centre in Portugal. By this time a Genoese careening master, Jacomo Lourenço, was in charge of that task, and was privileged both by the city and the king for that. In the 16th century (when Ribeira das Naus shipyard in Lisbon became the most important of the kingdom – although organized by carpenters and specialized workers from Porto and other North-west Portugal ports) another Genoese technician, Damião Brusio, received the careening monopoly from the king; this one brought a cheaper solution to do the job creating a floating wood platform that allow the job to be done in the water. See BARROS, Amâncio Jorge Morais – Porto: a construção de um espaço marítimo..., cit., vol. I, p. 387-8. About the careening works, and the problems they caused in the age of discovery, see BARKER, Richard – Careening: art & anecdote, in "Mare Liberum", n° 2. Lisboa: Comissão Nacional para as Comemorações dos Descobrimentos Portugueses, 1991, p. 177-207. Although considering it an ancient practice, this expert points the fact that it wasn't much documented until 1500, a fact that demonstrate the importance of Porto in the shipbuilding and naval logistics since an early period, cit., p. 179.

\(^{33}\) SMOLAREK, cit., p. 60.

\(^{34}\) Particularly the ones incorporated by wealthy New-Christian members, that were present in every important harbour and marketplace that by then mattered.
tance sea lanes, and perhaps economies of scale which overcome a great market: the one of the Northern Europe, mainly the Brabant region. A major part of this evolution was due to the existence, inside the city limits, of active trade firms that performed an important role within this global economy.35

At that point in time, ports of Northwest Portugal – along with some Galician ones – generate appealing economic dynamics. Concentrating a good deal of significant business – salt from Aveiro, wine, dye, and colorant plants from Douro Valley, slaves from West Africa, sugar from Brasil, etc. – they manage to uphold their on fleets and attracted other European ships and traders.

Perhaps it would not be very wise to think things went different from elsewhere in Porto and in the Northwest Portuguese ports, but it seems so; the pursuit for exclusive policies, a characteristic of the mercantilist programme, appear to be not very profound here. Actually it looks quite the opposite; merchants were aware of the need for co-operation with a multitude of agents.36 Maybe it's premature to consider economic systems or articulated economies. Or maybe not; looking at the extent of the contacts and exchange that had been settled between the Iberian northern ports and the northern Europe centres, along with the variety of the products exchanged, it's likely we have to reassess some theoretical economical ideas accepted by scholars. This Early Modern pattern in trade and commercial relationships brought small ports to the spotlight, once they were able to launch and lead important and profitable projects. From now one, we came across a vast maritime shoreline, elongate from the Baltic Sea to the Iberian Peninsula, where maritime centres stay in close touch, reorganising, reconverting, and redirecting their business in order of what we currently describe "globalisation."37 It's also a phenomenon that put things in perspective; that displace the traditional, and narrow image of an international trade roughly solely achieved from the imperial ports of Lisbon and Seville. This said the role of the small ports, for a long time considered in the periphery of the structure, ought to be taking in consideration since they were key elements in the formation of the "Atlantic System."38

Such a perception would have been reflected in the interest over port studies. Nevertheless again, tradition persisted; and research on infrastructures interested historians


36. Need of Antwerp and their wide-range market; trade associations with Spanish and Flemish business companies; "Flemish" ships charted to transport goods for north ports; "Flemish" ships (actually Dutch with Swedish flag) charted by Porto traders to go directly to Brazil before the end of the 16th century. Without the Northern agents, the city's trade could have not survived; this is a good proof that official politics and maritime practices many times don't – didn't – go together.

37. You could get salt, furniture, timber, fish – remember the cod fish industry – wool, metallurgic merchandise, sugar, cotton, exotic hood, slaves, etc., from the Iberian ports; and from the Northern European ports, ships came full of a wide range of merchandise from textiles to raw materials. These commercial relations where improved in time and have their own mechanisms and rhythms.

38. And even more accurate when we think of the overseas ports and territories explored, that should be included in this dynamic.

39. According to this point of view, modest harbours such as these ones should be put in the charts and maps of international trade, alongside the imperial ports that commanded the world economy and the world economic system, to use the expressions of Braudel and Wallerstein. We can look at a good example on PRIOTTI, Jean-Philippe Jean-Philippe – Bilbao et ses marchands au XVIe siècle. Genèse d'une croissance. Lille: Presses Universitaires du Septentrion, 2004.
and economists less than shipping and ships. That’s why I’d like to call the attention for an innovative project such as Hisportos, focused in the study of port facilities and the technical thought that goes along with it, keeping in mind, though, the importance of shipping dynamics and port regulations/jurisdiction\textsuperscript{40}.

On the second half of the 16\textsuperscript{th} century Porto needed to adapt its harbour conveniences. Improvements done by the City’s Council and merchants got underway all through the years resulted into a suitable haven for all type of ships, and an important transhipment point. Colonial and metropolitan products were very attractive for northern European merchants, and the level of business operations (of commercial and financial type) stimulated the influx of new customers and the strengthening of old bonds with key European entrepreneurial elements.

One can estimate the level of the port activity by looking after the ships registration; that’s a hard task to accomplish due to the non-existence of continuous series of records. Nevertheless some files from the sanitary department – in charge of the ships inspection –, some books from notary sources, and a few references collected from the municipal archives, are enough to enlighten us about the number, model/size, and origin of the ships. First of all we must be aware that the tonnage of the Portuguese merchant ships of the 16\textsuperscript{th} century diminished\textsuperscript{41} when compared with the ones of late Middle Ages; the large medieval European merchantmen of 250, 300 tons was replaced by to vessels dislocating 90 to 180 tons\textsuperscript{42}; more than nauis, the documentation makes reference now to “ships”. And where do they come from? Outside the Portuguese coast, they arrive from Galicia, Cantabrian Coast, Basque region, Britanny, Normandy, England, Scotland, Ireland, the provinces of Flanders, Brabant, and Holland, Germany, Sweden, Denmark, and from the Mediterranean ports such as Seville, Alicant, Valencia, Genoa, etc\textsuperscript{43}.

What’s the meaning of these changes, starting by the tonnage and especially the massive arrival of foreign vessels? First of all, that the dimension and type of the 16\textsuperscript{th} century local fleet had been irrelevant to the motivation lying behind the set-up of the port. Secondly, that these new arrangements had everything to do with the desire of internationalisation of the local business, creating a centre of commerce well enough to attract more and more foreign traffic. Thirdly, it has to do with port systems, their enlargement and progress. We must assess the meaning of the role performed by Porto during the early modern times in the rise of the Atlantic System. Brazil, the Spanish Indies, the Atlantic Isles and their high rotational economy were understood as meanings of fortune. Once again it would be easy to interpret this process in the context of

\textsuperscript{40} Visit this project in www.ihm-up.pt

\textsuperscript{41} Except, of course, for those which were involved in the Indian Run.

\textsuperscript{42} Of course there were big ships serving that exceeded, by far, that tonnage. Nevertheless they were used only in specific routes, such as the “Cape Run”. The Atlantic world, except for a few galleons, “was built” and was always pretty much dependable on smaller ships.

\textsuperscript{43} Notarial records of the 16th century mentioned ships from Galicia transporting fish and cooper’s wood, others from Andalusia and Valencia with salt, agriculture goods and natural fibre for the rope industry, Baltic and Scandinavian ships with cereals and staple products (mainly for the shipwright industry), French and British vessels with textiles, glass and metal products, Flemish and Brabant ships with textiles. Since the 1570s these last ones were the most noticeable and they used to stay in the port for some time, waiting the “sugar fleet” arriving from Brazil and also loading on board wine and dye products (sumagre) from the Douro valley. See BARROS, Amândio Jorge Morais – Porto: a construção de um espaço marítimo...cit.
a competition between ports. But for what the record data suggests us, I believe that we should talk about collaboration rather than rivalry or competition. First of all, the city integrated, from the beginning, a complex of ports of the Northwest Portuguese coast (from Viana to Aveiro) where functions were plainly assigned; for instance, Porto’s vessels returning from Brazil transfer their cargo to Vila do Conde ships – operation that was likely to occur in a Galician port, mainly Pontevedra or La Coruña – in charge of transporting it to Antwerp. In parallel, and with more expression by the end of the century and ahead, Portuguese ports receive northern Europe ships, especially merchantmen from “Flanders”, offering cheap and prompt shipping services. These bulk ships ("urcas") perfectly adapted to the low depths of the ports, quickly became valuable partners in this business and, in addition to colonial goods, they also carried merchandise produced both on the upland and the hinterland (dye and leather products, pottery and ceramic, wine and salt).

Sometime in the 16th and 17th centuries, colonies of foreign merchant were established in Porto. They were, of course, not so numerous as the ones settled in Lisbon, but even so noticeable and reason for other nature of new port structures: the host houses built by the riverside which the documentation refers as “estoa”.

The traffic expansion elucidates us how rulers faced retail facilities and port regulations. On the other hand, functional thought has evolved from the Middle Ages to Early Modern Times; from fishing, transport, regional and inter-regional traffic, to international commerce and, sometimes, even some sort of staple market. New, modern, suitable infrastructures for those purposes were needed, including the surveillance and defensive ones, by building fortifications such as a castle of the “modern way” (what specialists like Geoffrey Parker entitle trace italienne) right in front of the bar entry (in the 1530s), and a tower (built in 1589) close to the city wall, turned to the river. In addition, to the above mentioned changes in naval industry infrastructures, during the last third of the 16th century a new shipyard was organised next to the bar entry: the “Ouro (Gold) Shipyard”, a structure specialised in the construction of galleons for the Crown when a navy modernisation programme was introduced; we can furthermore point out the creation of an official and organised bar piloting service over an existent ad-hoc pilot corporation documented since the first half of the 15th century. And things went further; new investments were made in this area, amplifying and mod-

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44. Mainly due to tax policies, until 1573 Porto merchants order their ships to return to these ports.
46. Both extremely important to support sugar trade.
47. There were, of course, foreign traders in the city in the Middle Ages; however, their number was insignificant – on the contrary, their activity was much significant.
48. Especially when we check the massive imports of rough materials from the Basque region, Northern Europe, and Baltic Sea in the late 16th century, to fulfil the shipbuilding contracts (mainly for the construction of galleons) with the Crown.
50. And was extremely important for the recovering of the Iberian navy after 1588; for instance, in 1598 eight galleons were built in this shipyard. See BARROS, Amândio Jorge Morais – Porto: a construção de um espaço marítimo..., cit., vol. 1, p. 312.
ernising the existent port facilities, and introducing new ones: placing buoys in the canal, building up a lighthouse, organising specialised shipbuilding services, for example a crane to install masts on ships, or a new and modern shipyard, creating a planned and controlled service for ships quarantine and maritime health..., etc. We can figure out how important they were by checking the huge capital investments in order to build a new-fangled solid rock quay\textsuperscript{51} whose length and foundations were much more substantial than those of its predecessor (a task that took some years to be concluded in the late 16\textsuperscript{th} century\textsuperscript{52}), and the continuous boost of money and inventive solutions applied during the endless process geared up in order to remove the bar reefs\textsuperscript{53}.

Finally, another step up to rationalisation was done. Along with the new quay and a wide range of port services – for instance, translators were hired to deal with foreign merchants – the activity was regulated: authorities kept separated the sea traffic from the river bustle, assigning specific areas for each one, and reasonable entry and exit duties and storage fees for merchandise arriving from sea were rated, in order not to chase the traffic away from the city\textsuperscript{54}.

Conclusion

Talking about the progress of maritime regulations in the medieval Iberian Peninsula, Jennifer Green indicates the fact that “Southern Iberia became a stopover for ships travelling between the Mediterranean ports of Sicily, Catalonia, and North Africa, and the Atlantic ports of England and Gascony.”\textsuperscript{55} That’s exactly how many Portuguese seaports, such as Porto started: as a stopover, a port of call. As we approached the decline of the Middle Ages this process was improved. The trade lines were much more extensive and the west coast of the Peninsula was impelled to participate in the process; so its ports had to be adapted to respond the demand of new commercial dynamics.

The very nature of the city allows the development of local profitable activities direct or indirectly related to maritime traffic. During late Middle Ages and Early Modern Times there were a lot of schemes and ongoing business that correspond to a strong stimulation for the shipbuilding industry and the maritime trade. Of course we must analyse things in context: the opening of overall European maritime trade lines had profound effect in this region. That was the ideal period for port works. Roughly situated where nature allows it, where topographical suitability was favourable, the port was, until then, no more than a shelter protecting ships from the elements, nearby the city,

\textsuperscript{51} Filling the shore-line and conquering space over the river to get deeper berth places for ships.
\textsuperscript{52} See BARROS, Amândio Jorge Morais. \textit{Organização portuária da cidade do Porto nos séculos XV e XVI} (where the book of the accounts of the quay is analysed), Coimbra, 2003 (paper presented at the meeting of the Portuguese Economic and Social Association)
\textsuperscript{53} Not to mention the construction of the castle of the bar and its military equipment. Regarding the works over the reefs, the money spent and the solutions found during the 17th century, see H. Osswald.
\textsuperscript{54} For instance, the grain commerce was excuse to pay and the city council took care of every single charge regarding unloading and storage taxes. Only in exceptional years of good harvest things went otherwise.
where simple commercial operations could have been performed. The arrival of big
cargo ships and the building of some local ones, the integration on that extensive pic-
ture and the desire of big profits from the trade, presented a primary objective for all-
embracing changes on the infrastructures complex; and improvements were launched
and evolved; from local initiative, political argumentation was essential for the port con-
solidation, a fact that must be underline, and sometimes supported by the crown’s
approval – no more than that. Important and wholly new solutions were about to be
found and improved. A real seaport was built. A harbour was organised. Especially the
separation between shipbuilding and cargo operations – done as early as the 14th cen-
tury – appears to have constituted an effective means of arrange the nautical space; but
also the existence of a wet-dock; the bar piloting or the health politics, as well as evi-
dence of planning in the domestic organisation of roads and plots within the urban com-
 pound, connecting them with the port manners.

And then, the discovery of the Atlantic world and its richness; the brazilian wood,
the sugar, cotton, slaves, silver... elements that fast and sturdily bring generally ignored
small ports into the limelight. From the standpoint of those in charge, that was the time
for business upgrading: the new arrivals from the North, the financial support of Euro-
pean dealing companies, the profitable operations, the requirement of means of trans-
port, and the establishment of good port services. By this time the Porto’s harbour func-
tions fulfilled different needs of different agents; it reflected the economy of their imme-
diate umland and their nearby hinterland; it responds the requirements of a broader
commercial activity and, finally, the requests of the State.

From a safe haven to an artificial harbour, from a local small port to an interna-
tional organised waterfront, Porto authorities, merchants and seamen had to walk a
long road. The 16th and 17th centuries represented the commencement of a process
which resulted in housing consolidated merchant communities, and “nations”, that
were about to prepare the future: in next to no time the period when Porto started to
reveal itself as a city of merchants more than a city of sailors will begin.:

56. Crown’s financial support was difficult to get; from time to time the revenues of a tax rent or a tem-
porary exemption of payment were the most significant king’s contributions.
PORT DEVELOPMENT AND TECHNICAL CHANGE

C.1700-1900 – OUTLINE SUMMARY

Gordon Jackson

A number of modern dock engineers have been interested in the history of early harbour works since the Ancient Cretans and Egyptians built them c. 6,000-5,000 BC, and much is known of their construction, on river-banks (in Egypt, with the Nile) and seashores (on Crete, which had no serviceable rivers). For the first millennium A.D., economic life in Northern Europe was simple, and raiding and folk-migration was perhaps more common than trading. Medieval ports were still, on the whole, simple constructions on river-banks or bays. Their working areas were quays of wood or stone, with storage and living space behind the quays, the whole sheltered by walls to protect the valuable goods inside from marauders outside. Vessels were still small, and any increase in numbers was accommodated by extending quays, doubling or trebling vessels moored parallel to quays, or presenting them end-on. Mixed cargo was usually in bales or barrels – the ship ton was the space occupied by a ‘tun’ – and handling was a matter of simple cranes and strong muscles, often those of the crew. With few – and dangerous – roads, goods were best received and despatched by inland waterways, often the rivers on which ports were located.

Although some favoured ports expanded with pressure of business, it was not until international developments in oceanic trade and shipping in the sixteenth and seventeenth centuries that facilities in old ports were seriously stretched, and some new ones appeared, especially, in Britain, for the mineral trades. In the general commercial ports lengthening the water-site was often impossible. In Britain the solution was to expand the water area into the land area by building wet docks. Docks were not unknown. The alternative to shipbuilding and repairing on a tidal shore or riverside was a dry dock, which many ports had, especially London, with its congested river. However, constructing deep wet docks, requiring substantial walls and double lock gates (to accept tidal variations and avoid water loss), was more difficult, depended on the ability of engineers to enclose water. This probably owed more to naval than to mercantile demands. Naval dockyards grew in the seventeenth century as seaboard nations took their battles to sea, and several British docks were subsidized at various times if they

1. University of Strathclyde, Glasgow, Scotland
2. See, for instance, Sir C.R.S. Kirkpatrick ‘The Development of harbour and dock engineering’ and Sir L.H. Saville, ‘Presidential Address to the Institution of Civil Engineers 1925-6’, both reprinted in A Jarvis (ed.), Port and Harbour Engineering (Ashgate, Aldershot, 1998), numbers 1 (pp.1-44) & 2 (pp.45-74). Jarvis’ collection is the best source for a diversity of British, Continental and imperial port works in all periods.
could accommodate battleships. Another source of expertise was bridge-building for which the sinking of water-proof caissons was an essential art, while others came from various backgrounds: Swann lists eight 'engineers' known to be active in England between 1660 and 1700, including Sir Christopher Wren, better known for building St Paul's Cathedral. 3

The first recognizable dock in Britain appears to have been London's 'Howland Great Wet Dock', a landowner speculation designed and supervised by a local shipbuilder, John Wells, 4 possibly with Thomas Steers as assistant. Interestingly, it was built by the same noble family (Earls/Dukes of Bedford) who had employed the Dutchman Cornelius Vermuyden to drain the Bedford levels in the East Anglian fens, and was intended to shelter ships, not handle cargoes, which still passed over the city's river quays around the Custom House.

The first British commercial dock to handle both ships and cargo was built in Liverpool, a small creek on the Mersey estuary which was turned into a wet dock around 1715 when Thomas Steers designed a water-encroaching sea wall and lock. With the growth of Lancashire trade two more docks followed, and the gated dock appeared firmly established. All subsequent Liverpool docks were water-encroaching, but most harbour work elsewhere involved the construction of piers and quays in sheltered mineral ports, and when congestion hit Bristol the first (unsuccessful) reaction was to build an up-river dock for empty ships. The same thing was nearly true of Hull, when industrialization in its huge hinterland brought chaos to its Haven (the mouth of the river Hull) around 1750 and a dock for empty ships was envisaged, to protect the value of Haven-side quays. It was the British Treasury which forced the issue by offering to subsidize a dock containing Legal quays for Customs Business and able to shelter a battleship. 5

Hull's first commercial dock was the largest so far constructed in Britain. Its engineer, Henry Berry, trained by Steers and now Liverpool's dock engineer, used crushed Pozzellana stone in the mortar which produced unusually stable walls on relatively poor foundations. 6 Berry had no experience of its use, and obtained the recipe from John Smeaton, well known in Hull for building a steam-powered oil mill, and an interesting example of dock engineers passing information between themselves; indeed one could almost construct a genealogical table of engineers and knowledge was gained through apprenticeship and 'Resident Engineer' posts. However, the dock was still an up-river one, to the north of the Haven, and with the Industrial Revolution in full swing it was too small before it opened. Moreover, Hull soon found it had made a serious mistake which haunted the place for a century. The traditional control of the port by the City Council ended with the creation of a private monopoly company regarding its income as reward for building the dock and refusing to build any more. Private enterprise was not usually the best way of securing port interests. In fact the Hull company was again


4 Ibid, p.157. The name of Sorrocoold is associated with Howland, but no evidence supports this.

5 Hull was the only port exempt from a 1559 Act of Parliament (I Elizabeth, c.II) establishing Legal Quays.

6 Wooden Piles in Hull could not reach rock bottom.
subsidized to produce two more docks, but the problem remained: there was a struggle every time fresh works were required.  

There was one final problem to be solved before docks were the ready answer to British ports’ problems: how to overcome the silt or sand which besieged or invaded many of them. John Rennie was the first engineer known to solve the problem, firstly by introducing steam dredgers in Hull and Grimsby and secondly by building a ‘floating lock’ for the new dock in Grimsby in the 1790s. Based on deep mud this was anchored by very elaborate piling and the stone walls were hollow (part of the arcing is still visible!). Rennie later built a lock on the Humber at Hull, again on mud, and the way was now clear for the heavily silted ports to build sea-locks, though in truth there were few of them on the muddy east coast, and river ports such as Bristol and London were more easily served. South and West coast ports were more likely to find rocky foundations.

By 1830 most of the major ports had acquired docks of medium size with locks for the standard ship up to c. 400 tons. But already ports were discovering that advances in dock engineering had been overtaken by advances in mechanical engineering. Steam had been applied extensively to cotton factories and forges, and the result was accelerating trade and increasing shipping. The logical way forward was for mechanical engineers to adapt steam engines to shipping. This happened in both London and Glasgow, though Glasgow’s first attempt, which steamed down the Clyde in 1812, was rapidly followed by a fleet of coastal vessels increasing in size and power until by the 1840s the port was turning out transatlantic steamers for what became Cunard, and the Clyde-side steam-shipbuilding industry was already flourishing.

The advantages of paddle-steamships for traders were soon outweighed by their disadvantages for dock engineers: they were too wide for existing locks and for manoeuvring in docks full of sailing vessels. Valued for speed, owners demanded fast turn-round at wide quays with adjacent water and coal supplies. Coasters in Glasgow city harbour arrived every half-hour and expected to turn-round in the same time. Its new steamship harbour was soon followed elsewhere by steamship locks, then steamship docks in the 1830s and 1840s — just in time to be overtaken once more by mechanical engineers. Steam had revolutionized sea-born movements; now it was the turn of inland trade to be revolutionized by steam. Hinterlands were changed; new trades developed, especially in minerals which demanded bulk-loading facilities. Unwieldy goods could now be transported and required open quays. Worst of all was fitting railway lines round square docks, especially when transit sheds with rail access and upward movement to railway warehouses were preferred to old-fashioned warehousing. Railway docks and feeder systems of various size and complexity now appeared in almost

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8 For Grimsby lock, see Grimsby & the Haven Company, 1796-1846 (Grimsby, 1971), chap. 2.

9 Steamship owners in Aberdeen voted against a gated dock there because it took too long to get into and out of docks.

10 Glasgow had no gated docks: the Clyde had been canaled in the late C18th, so the chief problem was the separation of sail and steam in the city-centre harbour. See G. Jackson & C. Munn, ‘Trade, commerce and finance’ in W.H. Fraser & I. Mavor (eds), Glasgow, Volume II: 1830-1912 (Manchester, 1996), chapter 2.
every port, and new works increased the size of the ports’ water sites. In fact the work was partly wasted, since the early steamers were very quickly overtaken by larger iron square-section steamers which were not bothered by paddles but were too long and deep for many of the old locks. The next generation of docks were therefore deeper, wider (to permit manoeuvring of larger vessels), and equipped with much bigger locks. This in turn demanded not only more work for the docks engineers in providing deeper walls and bigger locks, but the involvement of mechanical engineers. Steam at sea and on land only worked with the medium of hydraulic power in the ports. Perfected by W.G. Armstrong in the 1840s, hydraulic power facilitated very large lock gates (and therefore deeper docks) and the first really effective heavy duty cranes, which enabled the export of further products of the mechanical engineers - steam tractors, locomotives, and even ‘tin tabernacles’- to the New World, and powered the coal hoists supplying coal to both the New and Old Worlds.

Although the developing railway network around mid-century served the established ports, rivalry between railway companies for inland traffic encouraged the latecomers to avoid ports already served by rivals and at the same time avoid the problems of inserting railways into established ports by building their own Railway Ports, especially for coal exports. However, one of the first, Grimsby, a decayed port, was built by the Manchester, Sheffield and Great Grimsby Junction Railway to divert goods from one of the great industrial areas away from the port of Hull and ensure greater activity for its own lines. Birkenhead, on the Mersey was also a railway creation, to divert trade from Liverpool.

This combination of ever larger steamers and docks, and the expanding railway network was also important for enabling the changing scale and nature of industry as the ‘Second Industrial Revolution’ introduced the ‘heavy industries’, dependent on coal and metals, which joined textiles as the foundation of the international trades of the British ports, and played an important part in the opening up of the new lands of the British empire and also the vast expanses of the USA and South America.

Inevitably, the growing pressure of trade growth and advances in nautical engineering such as the Froude Model Ship Tank, which, with elaborate mathematics, allowed him to predict the performance of full sized vessels from models, thus encouraging changes in the size and shape of steamships. With the emergence of very large steel vessels in the 1880s the ports were once again required to improve their facilities in terms of lock size and water depth. When Hull’s version was opened its triumphant telegraphic address was ‘Deep Dock Hull’. Ports now competed for the larger vessels – especially the Cunarders and other passenger liners – though in truth their chief cargo was usually coal. With the economic development of Australia, New Zealand, USA and Argentina the ports were now required to invest in refrigerated warehouses, vast granaries, and, for a time, special facilities for the handling of live animals before refrigerated vessels became widely available in the 1880s and 1890s. But above all, the major ports were forced to start work on yet another set of even bigger and deeper docks. Not only were they hugely expensive; they also took years to build, and most if not all of them enjoyed little active life before the Great War of 1914-18 undermined the inter-

11 The Denny version of this important tank is preserved (and operating) as a Museum in Dumbarton on the Clyde.
national trades for which they had been built, and the industries of their hinterlands began to decline. Many ports found themselves with very large debts to cover work which had failed to earn its keep. Most ports marked time until WWII introduced new and more economical working of vessels (copied from methods used to ship war supplies from the USA), with Ro/Ro, Containerization and Bulk carriers, vessels demanding a new set of very deep water quays and no docks, while globalization meant that computerized vessels would only call at a handful of select ports, which would then distribute or collect goods by smaller vessels calling at the once great ports which are busy converting their dock areas to ‘land-sea interfaces’ where the only trade is in ‘fast food’ and souvenirs.

For most of the history of European ports the chief worry was how to shelter relatively small vessels from a hostile coastal environment, and the chief skills required were the selection of suitable bays or harbours and the erection of simple quays and piers that did not fall off their rock foundation or sink into mud. Only rarely did the change in the structure of vessels cause much trouble for what would now be called civil or dock engineers. Despite changes in trade, tensions in Britain between the work of an assortment of engineers arose because of a wide range of advances around the middle of the eighteenth century. While the inventors and innovators in the textile, metals, chemicals and mineral extraction industries are generally remembered by economic historians, little attention has been paid to the impact of these innovations on the transport sector, and the interlocking reactions of nautical, dock, mechanical and railway engineering has generally been ignored. It is time that port historians redressed the balance a little, away from the easy veneration of well-known names to the work of engineers who more or less invented their wide-ranging professional skills without which the Industrial Revolution would have been a short-lived affair...
HISPORTOS – PARTIAL RESULTS AND PRODUCTS.

PROGRAMME FOR THE NEXT STEPS*

Amélia Polónia1

Having presented some of our research results, a pertinent question is put forth: what are the next steps, having decided that it is worthwhile to continue?

The problem is not to define the way, but rather how to maintain the necessary conditions to proceed with our team work. But we are optimistic, and hopefully we will be able to continue, with or without new public funding.

We are of the opinion that the next steps undoubtedley consist in further exploring the materials obtained by the different members and teams, and consequently conduct a detailed, comprehensive analysis of the data gathered, from the perspective of the geomorphologists, engineers, urbanists, climatologists and, naturally, the historians. Even though the databases will be made available to the scientific community as a whole and the public in general, namely on the Internet, it is still our responsibility to produce analytical overviews, capable of answering some of the questions raised:

- In what way did the geomorphological conditions interfere with the potentialities of each seaport;
- In what way did the crown, the local authorities and politics interfere with the construction of harbours and the development of individual seaports and sea towns;
- In what way were the technological advances in Europe implemented in each port in Northwest Portugal, and what were the local outcomes of these dynamics;
- How did the several seaports in these historical and geographical spaces interact with each other and in what way were they part of a larger hierarchy - regional, national, European and intercontinental.

And finally, it is imperative to answer the main question:

- Is there a Northwest Portuguese system in the Early Modern Age?

* HISPORTOS, funded by FCT, POCTI / HAR / 36417 / 2000
Concurrently, we have to broaden and deepen the studies on the cartographical reconstitution of seaport infrastructures and geomorphological dynamics from a diachronic perspective. This is one of the most productive ways to project and reveal the evolution of seaport spaces from a long-term perspective and to answer the questions raised above.

But it could also become a priority for us to truly explore the perspective we have subscribed since the beginning, to consider seaports not only in their geomorphological constraints and as infrastructural systems, but also as global historical complexes. We would then be able to proceed with an analysis of seaport history in its entire complexity: its demographic, social, economic, urban, administrative, cultural, religious and psychological aspects.

We can further propose some issues to be examined in future research. The first is governed by the need to find answers to three central questions:

1. How did the harbours under study develop over time? Was there a true seaport system in terms of infrastructures or were medium-sized and small ports in the Early Modern period, like those studied in NW Portugal, simply provided with quays and small slipways and, possibly, a dock? And does this apply to the entire period as a whole, or is there a moment in which we can identify the expansion of construction in harbour facilities? This issue is linked with another one:

2. Is there any policy regarding harbour and seaport development, either local or royal, and which are the main landmarks in these processes? Besides the public authorities, which agents, either individual or institutional, were central to the construction and development of harbours and seaports?

3. The third question is linked with a key issue: was harbour construction determined by the historical development of seaports, or, on the contrary, was there any interaction between harbour construction and seaport accessibilities and the internal development of seaport dynamics? Or further, were there any other variables which could explain seaport development, such as geomorphological constraints, intentional and strategic royal policies, or random opportunities? In global terms, what we aim to question is which were, over the times, the main factors behind the sustained development of seaport spaces.

The answer to this question depends on the study of the overall rates of historical dynamics, not only in terms of seaport movement or economic indicators, but also of seaport prominence or decline as a whole. Thus, studies should be conducted centred on:

**Demographic dynamics**, prospecting the centripetal forces exercised by the sea town over the surrounding countryside and a more or less extended hinterland, and its consequences on population movements, internal demographic structure, immigration and emigration rates, and so on...

**Economic dynamics**: definition of key sectors of the local seaport economy – fisheries, ship construction, transport and navigation, local, international or overseas trade, finances; industry, and the intersections between them, as well as their interaction with conjunctural and structural tendencies, and the definition of economic strategies over time.

**Political dynamics**: the study of internal political tendencies and the emergence of oligarchies and local elites and their interaction with maritime segments and
maritime and harbour dynamics. Interactions with the political and jurisdictional context. The resurgence of power elites.

Social dynamics. The social dynamics to be noted are related to the definition of a society with a maritime profile, correlated with some typical social phenomena. Here we can only indicate several complex processes, such as: the mobility of the male population, together with internal and overseas emigration, when applicable, responsible for large fringes of uprootedness and social instability and conflict; the breakdown of traditional safeguards and social control, failure to constrain social behaviour within acceptable boundaries. We can evaluate this from increasing rates of prostitution; phenomena of marginal behaviour, such as bigamy and polygamy, and cases, albeit exceptional, of homosexuality and sexual deviance; high rates of illegitimacy and abandonment of children; the integration of new communities, such as slaves and foreign groups with distinct social behaviours and ethnic and religious standards; the study of the emergence of new elites and new mobility criteria, as well as an analysis of social phenomena intersected with seaport movement and maritime experiences, mostly long-distance navigation and trade: the internal criminality, prostitution, illegitimacy; foundlings; implications on familial structure are, then, some of the topics to be treated, along with comparative studies on distinct profiles of fishing, trading and navigation societies, for instance.

Urbanization dynamics: the construction of an urban fabric; the evaluation of urbanization rates intersected with harbour structures and economic indicators; the construction of an urban profile involving or excluding the harbour, the seaside or the riverfronts; the construction of an architectural image intersected with wealth rates, financing capital and external patterns suggested by the seaport network connections.

Technological dynamics: the presence of foreign techniques, responsible for the import and application of foreign models of harbour construction; the application of new technological models and its implication on the local labour universe and on internal development rates; the involvement of a smaller or greater part of the population in technological plans and interventions,...

Religious dynamics: the study of religious fishermen and sailor corporations, the specific maritime spiritual demonstrations resulting from particular spiritual constraints and devotional profiles; the appearance of devotional and ritual phenomena exclusive to the maritime communities; the construction of a particular religious space, ...

This proposal undoubtedly configures an ambitious plan, which we think could nevertheless be accomplished in the long term, depending on several interdependent factors.

The micro-analysis is one of the main conditions in achieving the reconstitution of the overall historical dynamics of each seaport. But, even following a micro approach, these research projects should follow the same research plan in order to provide comparative approaches, especially with European sea towns and harbours in the Early Modern period.

The research that has already been accomplished on outcomes involving economic and social studies centred on some of these ports, namely Porto, Aveiro and Vila do
Conde, could be implemented in a comparative and wide-ranging way; and the Masters theses being prepared on these same spaces for different periods and from distinct perspectives, included in the branch in Seaports Studies, part of the Masters Course on Local and Regional Studies, taught at this Faculty of Arts, undoubtedly comprise factors that could make this goal possible.

The existence of a Research Unit, named IHM-UP, the Institute for Early Modern History – University of Porto, that is prepared to provide some logistic and financial support to these studies and goals, and the existence of an established team of academic and young researchers who are already highly familiar with the global features of each port, are furthermore other favourable factors.

At the same time, it is our aim to proceed with a comparative analysis of these dynamics with other spaces, particularly with those found along the Atlantic front all over Europe, which share historical and contextual experiences that are similar to the ones identified in Northwest Portugal, in order to deepen and broaden our investigative approach and to question the possible existence of models in the construction and reconstruction of historical seaport dynamics.

Finally, we think we should not remain closed in our own academic circuits. It is imperative that our research work be made available and useful in public initiatives that could, concurrently, raise the awareness of local public authorities and citizens to the importance of their harbour heritage and global historical memory, and even collaborate with tourism bodies and initiatives, thus further disseminating our knowledge on each seaport and sea town model.

Organizing an exhibition of cartographic representations of NW seaports from the 16th to 19th centuries, holding local conferences on seaport history, involving the entire community; and publishing CD-ROMS with historical tourist circuits, could be three, among others, of these initiatives.

These plans for the future do not however replace the future itself, so we will wait and see what the future holds for the Hisportos team...