Afterthoughts

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The great technological breakthrough in the design and construction of sailing ships in the years around 1400 opened a range of new possibilities for European travellers and traders; options not open to other peoples in the world. The continued improvements shipwrights made in the sixteenth century created more possible windfall profits through connecting distant markets. Investors jumped on board, as did governments, the latter subsidizing exploration to unknown waters in hopes of creating even more possibilities for political, religious and commercial advantage. The windfall profits came with increased risk and so increased potential for massive losses. Through the sixteenth, seventeenth and eighteenth centuries all parties involved searched for ways to decrease the threats to financial success, but with an eye to retaining the potential for profit. Over the course of time ships became more reliable, navigational methods improved, and new institutions emerged, along with new relationships, which all together made exchanges over the high seas more predictable.

The sailing ship, and more specifically the full-rigged ship with a hull built frame first and a rig that combined square sails and at least one triangular lateen sail, was the vehicle for exchange between Europe and the rest of the world and so a necessary part of globalization in what proved to be its seaborne first phase. Europeans, seeking to expand their reach and their returns, expended extensive effort figuring out how to improve the technology of long distance trade across the world’s oceans in all its aspects. That included attacking the constant problem of maintaining an adequate supply of ships in proper condition in the right places, at the right time. The nine essays here explore one avenue Europeans followed to address that problem. The varied enterprises they established to build and maintain ships overseas is a topic rarely discussed. The contributors correct that failure by delving into the difficulties and complications that turned up in Asia, Africa and the Americas when Europeans brought their practices to unfamiliar shores. Many of those efforts failed. Most did not live up to expectations. A few were successful. In all cases the

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shipyards, no matter how small or short-lived, were important to the commercial, military, naval and political success of Europeans around the world from 1500 to 1800.

States in Europe tended to imitate each other so there were features of the efforts to build ships outside Europe that proved similar. In fact, it is surprising how similar were the organization, practices and problems of the different European states. The natural tendency among historians is to concentrate on differences among those involved rather than on similarities. That may be wrongheaded but the urge is hard to beat back. Europeans in far flung places often built ships just as they did at home. Their purpose was to bring the new technology to other parts of the world where they could exploit the advantage their reliable and versatile ships gave them. That alone assured some similarity among the participants in what they did overseas. There were differences, of course, and isolating those variations is something the authors do by simply laying out the facts. Concentration here is on the Dutch with the first five essays on specific aspects of Dutch shipbuilding in different locations around the world. The next four essays explore Portuguese, Spanish, English – which became British after union with Scotland in 1707 – and finally French practices. The essays largely follow a pattern of dealing with the same topics, an indication of wise and extremely helpful editorial direction. Matthias van Rossum offers guidance on what the common topics and issues are for each writer, ones which illustrate best the areas for comparison and the differences among the states.

The roots of deviations from some norm and especially from Dutch practices, the benchmark for this collection of essays, came from some obvious sources. There were vexing and complex problems of getting adequate supplies of necessary raw materials, of getting adequate supplies of the right kind of labour which were part of a larger issue of relations with local populations, of geography including climate and local topography and, perhaps more obviously, there were the differences in political practices in the different states back in Europe. Superiors in mother countries chose policies and the institutional structures of the enterprises that constrained the scope and scale of what shipbuilders could do in those outposts around the world. The builders had as their principal function the transfer of technology from Europe to the varied sites and that in turn meant producing vessels of European design and in the process bringing new ship types to seas and oceans in all parts of the globe. That, in turn, raised problems of which ship designs were the best choices and what the concept of ship type might mean when a European shipwright, overseeing a collection of workers of varied skills and training using local supplies mixed with some materials imported from near and distant sites, produced a vessel which imitated what he knew in Europe.

The most essential, as well as most important, raw material for shipbuilders was wood. In almost all cases the local supplies were not like anything available in Europe. British North America and New France were the exceptions. Where the wood species at hand were different that could prove an advantage. As Karwan Fatah-Black points out, Dutch builders found in Surinam that some tropical woods were more resistant to shipworm. Woods in southeast Asia, such as teak, proved to be very hard and therefore more durable, if more difficult to work with. In many places, builders faced problems of adequate supplies of the wood they needed. In Cochin and the Philippines there were shortages and it was not just a matter of availability but also of the prices shipyards needed to pay to get the wood they wanted. A big, perhaps even bigger, problem was supplies of
nails and, for that matter, metal fittings in general. Traditionally local builders in India and around the Arabian Sea made their vessels without nails, using other varied fastening techniques. Presumably their practices were driven by a shortage of nails. Even when Europeans could get nails in India the quality of the metal was questionable. Erik Odegard reports complaints from Dutch builders in Cochin about the nails they could get. The solution for many sites, and for a number of different necessary supplies, especially those manufactured, was to import them from Europe. Reliance on the metropole did mean shipbuilders could work with familiar materials but at considerable increases in cost and also increases in the time needed to get the items to them.

At least for ropes there were often ways to make them without having to resort to Europe. Hemp had the advantage of being an adaptable plant and so Europeans could promote production in far away places. Making the ropes out of hemp took space and some skill and equipment, typically beyond the capabilities of smaller installations. If hemp was not easily accessible then alternatives might do such as coir from the outer husk of coconuts. In the tropics, and especially in south and southeast Asia, that was an option for builders. It was a rare case where a different local product provided an effective substitute for what Europeans knew from home. Indian coir, on the other hand, had shortcomings. For sails matters were more rife with complications. Supplies of flax for producing canvas that could become sails was something of a problem in Europe, and it was even more so in other parts of the world. Efforts to promote production of flax in European states had effects but only slowly, so the shortages overseas were to be expected. Imports from other, often European, sources was the answer in many instances for overseas yards. One option, and one often the last resort, was to cannibalise existing vessels that were near the end of their useful lives or were temporarily in such poor condition that they could not sail. Recycling sails or ropes or metal work from other ships, however, was not a reliable way to supply shipyards. For shipyards in or near larger ports the chances of getting supplies through salvage were considerably greater than in smaller centres. The practice was a stopgap, though, and only useful when there happened to be a vessel at hand that fit the specific requirements of the moment.

In general, success of the different European shipbuilding yards depended on the presence of adequate and suitable existing supplies in the region. That depended on geography and on existing supply chains, which, in turn, meant existing social and economic structures shaped the character of operations. Building in Africa and the Americas faced different conditions and a steeper climb to success than in India, the Philippines and Indonesia. One significant change over time was the development of systematic exploitation of potential supplies of raw materials in North American colonies, which closed the gap and made possible the emergence of a viable and thriving shipbuilding industry, especially in New England, as Edmond Smith shows.

The differences in local conditions that circumscribed the problems of raw material supplies, the variation from south and southeast Asia compared to Africa and the Americas, prevailed in the labour market. On shipbuilding wharves there were very small numbers of highly skilled designers who oversaw all work, a larger number of less skilled men with extensive carpentry skills, and even larger numbers of unskilled labourers there to move wood and other materials around the yards as needed. There could also be, on the wharves or at separate sites, sawyers who prepared wood for use in building.
Unskilled workers were often easy to recruit since physical strength was the most important qualification. The work was both hard and sporadic so there was often disinterest in continuing once recruited or even resistance to staying on, especially when European authorities resorted to coercion to guarantee a supply of labourers. Semi-skilled workers often had to be created through some on-site training. The greatest problem was finding and keeping highly skilled European shipwrights with a knowledge of a range of designs of ships that were needed overseas. Typically those were the chief builders and they almost invariably had to come from Europe.

Convincing men to leave home and travel to some distant unknown place proved difficult and certainly for the Portuguese in the sixteenth century, as Amélia Polónia and Liliana Oliviera found. On the other hand, David Plouviez reported that France had considerable success in the eighteenth century in signing on men to go to work in Senegal on three-year contracts. That was the better choice it seems since, in general, training local shipwrights in European methods presented a daunting task for the small number of possible instructors. High wages for shipwrights, such as those in New Netherland described by Martin Heijink, reflected the generally excellent pay for skilled artisans along the North American seaboard, but also suggested that the supply of such people was limited despite the potential for an excellent income. In Europe, to control wages and the supply of trained ship carpenters, guilds were established by the late Middle Ages. They continued to fulfill those functions through the eighteenth and even into the nineteenth century. No guilds emerged overseas. The numbers of builders were too small and the tradition did not map easily onto local practice.

In Asia, there were local builders trained in traditional ways. Apparently a number of them in southeast Asia came from China. The methods and the tools they used were different from those of Europeans. They did, however, have extensive experience working with wood. They also had local knowledge, so could prove helpful to European bosses on the wharves. In Africa and the Americas, there were local builders as well, but their skills and knowledge extended only to vessels of modest scale. Working on inland and small coastal vessels they could contribute and continued to do so. There, and in Asia as well, local builders often carried on as before, operating independently, producing on their own and selling craft on contract to any buyers. Local traditional knowledge proved suitable in many locations such as Surinam, though perhaps less so in west Africa, as Filipa Ribeiro da Silva found. All authors report that the skills for building small vessels, either of European or local design, do not seem to have been too difficult to acquire. It was very rare that work on shipbuilding wharves was full time and lasted throughout the year. Workers on the wharves of all levels of skill and income had to have other pursuits to maintain an income stream. Many found themselves involved in other aspects of wood trades. They would build ships or take part in ship construction as carpenters, and at other times build houses or make barrels or take on any type of work similar to their shipbuilding work. In smaller centres, the likelihood of fluid careers for shipyard workers was even greater.

Governments picking the right sort of location for ship carpenters to ply their trade could prove an important factor in any success the industry might enjoy. The choices Europeans made for sites of shipbuilding wharves were dictated by many factors not related in any way to the availability of raw materials or a good supply of labour.
International politics, the locations of their rivals or potential rivals, relations with local governments and peoples, and the expected extent and character of military and naval operations counted more than the yard having access to what was needed for success as a place to build ships. Even though commercial interests were typically more important than naval and military concerns, all were intertwined in the thinking of officials back in Europe when choosing when and where to set up shipyards. Matters of geography came into play only as they related to trade and the defence of trading relations. Local topography got little consideration with the men in charge. They typically had only limited knowledge of the lie of the land in some distant place. It is therefore unsurprising that a number of shipyards were in places less than ideal for performing their function.

Shipbuilders could work under primitive conditions, just taking up a piece of shoreline and using it for the duration of any specific work that needed to be done. That was the Dutch practice in New Netherland in the earliest days of the colony. It followed a long tradition from the Middle Ages, which was common practice in much of Europe. By the thirteenth century, in northern Europe, and even earlier in towns in the Mediterranean, civic governments set aside land for shipbuilding. Centralizing the activity of specific trades was a practice in many medieval cities. With work on ships, not only did that increase efficiency because related trades like rope-making could be set up nearby, but also because dangers associated with practising the trade, such as fire, might be contained. Amsterdam got such a city-sponsored district, a Lastage, set aside for shipyards in the late fifteenth century and it seems no coincidence then that in the Dutch colonies of Surinam and New Netherland there were designated sites for work on ships. Even before those were thought of, Portuguese officials in India had set up a state-sponsored and managed wharf in imitation of practice at home in Lisbon.

The geography of the region, and the prevailing winds that might bring trading vessels to the ports which were home to European shipyards, had a considerable influence on what supplies might be available. In parts of the globe where there was a healthy and well established trade in raw materials, as in the lands around the South China Sea, builders had an easier time of it than in, for example, West Africa. Topography was of more immediate concern, since, once committed to a specific site, it was difficult to move. The specific conditions dictated the ability to build and launch ships. Locations along rivers and streams were almost invariably subject to changes in the depth of water and the strength of currents, so in some cases, for reasons of changing environment, shipbuilders had to pick up and transfer to a different location. Builders had to choose sites not for the benefits they offered for their craft, but because they were the optimal ones under the political and economic circumstances. In West Africa, good sites proved hard to find. A number of yards failed or existed for only a limited time, which suggests the choices of sites reflected poor commercial decisions. The survival of competing sites not chosen, or supported, by governments, but rather devoted to doing contract work – in many cases small operations of local shipwrights – underlines the suspicion that the state’s choice was not always the right one.

One thing true of almost all overseas shipbuilding operations was that smaller vessels dominated in terms of the numbers of vessels produced. The settlements of Europeans, and the economies they created, needed to maintain internal communication and trade among themselves to support not only their own survival but also to marshal goods for
export to the mother country. Staying in touch with people and places close by were of immediate importance to the settlers. Cabotage was the function fulfilled by most of the boats built and maintained in the overseas settlements. That became more true as trading posts and colonies grew in number and size. In Europe, there was considerably less interest in such local connections than in long distance exchange, a fact reflected in the locations and character of both government- and company-sponsored shipbuilding sites and operations. In choosing where to build ships, there was an air of trial and error, of uncertainty often because of inadequate information for those making the decisions and also lack of experience with making such decisions. Setting shipbuilding sites was uncharted territory through the sixteenth and seventeenth centuries.

There were differences in the sources of decisions, differences in the institutions in Europe to which the colonial authorities, and so ultimately the workers in shipbuilding yards, answered. The people thousands of kilometres away from the metropole, with at best infrequent communication with their superiors, did enjoy a great deal of freedom of action. Still, ultimately, they did receive directives from the centre and often needed the support of the authorities back home in order to function and even survive. The institutions in Europe that set up and dictated practices in the overseas shipyards were different in form and practice from one country to the next. The interests of those institutions, the criteria for decision-making and how they went about making choices, varied as well. It is true that costs mattered to all participants, transcending the character of administering institutions. The Dutch West India Company was almost invariably in financial difficulties and that meant limited concern for, or investment in, shipbuilding in, for example, New Netherland. Even though the colony had access to good timber, that was not enough to compensate for the condition of the responsible institution back home.

It is not surprising that there were differences in practices and outcomes among shipbuilding operations despite there being similar goals shared by virtually all the institutions that oversaw overseas shipbuilding. The structure of the European governments involved, the history of establishing colonies and the economics of the parts of the empires guaranteed differences. England and the Dutch Republic opted for joint-stock companies to handle overseas settlement, trade and shipbuilding. Portugal and Spain started earlier with direct involvement of the Crown in enterprises. There, the governments and the navies were in charge, making the central decisions. France, on the other hand, arrived late enough for it to combine the two forms, with companies, firmly in the control of the royal government, taking responsibility for overseas commerce and ship construction. No matter the type of organization, all states faced the question of how much of their shipbuilding they should do at home on familiar ground with known problems, and how much they should have done at overseas stations.

The English East India Company did set up its own shipyard at Blackwall, London, in the 1610s, but by the 1650s it was clear that, despite considerable investment, the wharf was a commercial failure. The Company abandoned the idea of building its own ships in England, but could and did contract out necessary work to the thriving shipbuilding industry along the Thames and beyond in the country. The Dutch East India Company, on the other hand, had its own shipbuilding yards spread around the Republic at sites corresponding to the six administrative chambers. By the eighteenth century, the yard in Amsterdam was probably the largest industrial complex in Europe. The Dutch opted for
building on their own wharves, not just at home, but overseas as well. They had the most extensive range of sites, varying in size, mostly in the East Indies but also in Cochin on the Malabar coast after they took control of the town from Portugal in 1663. The Dutch West India Company followed the example of the older trading company when it tried to establish shipbuilding establishments overseas, though with little success. The financial problems of the Company proved too difficult to overcome. Spain was closer to her overseas settlements in the New World than the Dutch or, for that matter, the Portuguese were to their trading footholds in Asia, and so it was possible for the Spanish crown to build the ships needed to connect with the Americas or more often simply buy them from yards in the northern part of the country. That is not to say there were no shipbuilding yards in Spanish America. Interest in construction there emerged before the end of the sixteenth century, both for naval and commercial vessels. The Spanish Asian colony in the Philippines, on the other hand, presented a more serious problem. The Spanish had to set up a system for building ships to cross the Pacific to Mexico, as Ivan Valdez-Babnov explains. The Portuguese built ships in Asia, especially in India to overcome the same difficulty of distance from home that implied problems of supply and management. It was the Crown that had responsibility for establishing and maintaining those overseas installations. The French tried to develop shipbuilding in their own yards in the Americas, especially in New France because of the plentiful supplies of wood. Commerce centred in the West Indies so having wharves there made more commercial sense. Ultimately the problems of supply and the location of demand for shipbuilding services were too great to overcome. There was also a larger issue deriving from the overarching strategy of the French government, which, as David Plouviez points out, did not think in terms of protecting trade, but in terms of fortresses that could be held against attack by competing powers. Developing shipping and shipbuilding services was relegated to a lesser role with long-term negative results.

Despite the presence of government- or company-owned and operated shipbuilding yards, private concerns always built more ships. The greater the role of the Crown the less the interest in private investment in facilities for building ships either at home or at overseas sites. Setting up and operating a shipyard involved considerable investment by the standards of the seventeenth and eighteenth centuries. Actions of royal governments could be, and often were, subject to the caprice of the monarch. They were not driven exclusively or even primarily by a desire to maximize return on investment. The potential for destruction of any possible profit by an unpredictable king or his ministers diminished interest in sinking capital in shipbuilding enterprises. In England, such fears were comparatively less than in France or Iberia. In the Dutch Republic, there was no king to generate sudden changes in policy or practice. The well-to-do merchants of the thriving commercial cities of Holland dominated government decisions. They acted in more predictable ways, and so did not deter the development of a thriving domestic shipbuilding industry, which continued to function, even if in some decline in the eighteenth century, alongside the yards of the East India Company.

In all cases in all the states involved in overseas shipbuilding operations the foremost goal was to benefit the home country, either the Crown and government officials, or shareholders, or the entire domestic population. One argument made for setting up colonies and promoting trade with various parts of the world was that those long-distance connections
would promote shipbuilding at home, as in the case identified by Karwan Fatah-Black. If the home country was always the most important in planning, investment and regulation, local interests overseas were inevitably secondary in any decision made by any of the varied institutions that oversaw the global reach of the European states. Legislation on shipping, designed for the home country, could be contrary to overseas needs as the case of the Philippines illustrates most graphically. In the beginning, the Portuguese government limited Brazilian shipbuilding because the rulers in Lisbon did not want to lose control of trade across the Atlantic. As it turned out, though, in time the state had to drop the restriction to maintain supplies of shipping. It appears that local shipbuilding beyond Europe tended to fare better with less control from the centre. It proved difficult for rulers sitting in European capitals to control what went on at such considerable distances. They had to rely on local officials. Some transmission of directions took so much time, it was often the people on the ground in the Far East or the Americas who had to make the decisions on their own. Local officials and people involved in commerce then found they had considerable latitude frequently with little tangible or intangible support. In many cases, those people were ahead of governments in the mother countries in identifying troubles and in finding optimal solutions.

Despite the institutions, and despite the campaigns to assure supplies of ships overseas, the operatives of European states did buy ships from other imperial states. Relationships were not simply those of the centres in Europe with their colonies or outposts. Local officials and merchants had contact and connections with people in other European enclaves. They were less tied up in matters of trade policy than their nominal masters and so could, for example, buy ships and supplies needed to build and repair, not just from the residents around them, but also from people from other imperial states. Considerations beyond loyalty to the mother country could take precedence. There was a solidarity of sailors, of men who knew the dangers of the sea and the threats that sailing entailed. A ship in distress, a crew in need of assistance, could count on help from fellow Europeans even to the point of providing supplies to make necessary repairs to their vessels. There was a willingness to help out those in need that may not be so obvious since such assistance to competitors may not have been part of reports that went back to officials in mother countries.

The policy institutions in Europe may have had limited impact on daily operations, but over the long-term, and in general, their actions had considerable impact on how overseas operations functioned. Over time, the initial phase of trial and error in new circumstances with new problems gave way to consistent practice and some notable successes. In Indonesia, the Dutch East India Company continued its presence, enjoying considerable achievements in commerce both globally and within Asia. The enduring shipyards were clear signs of what the Company accomplished into the nineteenth century. In New England, the presence of abundant supplies of familiar woods, thriving fisheries and a lack of other well-paid work that might divert labour to other activities, something which proved a problem in Virginia, a booming shipbuilding industry emerged in the eighteenth century, providing not just vessels for trade along the Atlantic seaboard, but also competing effectively with the production of ships in the mother country.

Europeans brought new ways of building and new equipment and methods so it was to be expected that there would be some transfer of technology to local populations
through the varied overseas shipbuilding sites. The ship carpenters who left their European homelands to work at those sites met different practices among local craftsmen. Some of those practices had considerable advantages over their own, so the exchange of knowledge was not just in one direction. The most obvious intrusion of new ways of working was the different ship types that Europeans brought with them. Imposed originally by officials who had to describe vessels in books such as those recording toll collection, those categories are typically the basis for how historians describe ships. The precision of the concepts of types is in question. With limited information about any single vessel, and uncertainty about the essential features of any ship type, the words attached to vessels must be understood broadly. While many Europeans may have known what a carrack was in the sixteenth century, exactly what the term meant, if anything, to people in southeast Asia or South America is impossible to say. Designs shared common characteristics, but each ship was custom built to the specifications of the buyer, with specific features familiar to, and favoured by, the builder. There is a mass of names for the different types of ships Europeans built or operated overseas, but many of the names are unfamiliar or at least rarely appear outside of one region somewhere in the world. Local fleets were diverse, comprised of vessels of European design, and of local or regional design that could come out of different and long-standing traditions. Europeans in many cases realized the advantages of using local types, which had long proven themselves effective under prevailing conditions in the region. That was especially true of smaller vessels that colonists always needed. The builders who came from Europe brought their own types, but may well have imitated local designs. They certainly borrowed features from the vessels they saw. In the Philippines, for example, Spanish builders produced different types with names familiar in Europe, so perhaps their design and construction features were consistent with traditional practice. There were other names for products of those yards, as there were for vessels the Dutch East India Company used, the names often connecting to or deriving from the local language. It is unclear exactly what those vessels might have been like or how they were built. It is hard to establish the influence of one shipbuilding tradition on the others. The litany of names authors use for ship types, usually without explanation, creates more questions about technology transfer than answers.

The source of new technology was typically through the builders themselves. Embodied in them was the knowledge that was transferred to others in the shipyard. The sites became theatres for the exchange of technical knowledge, for cross-fertilization of methods that could then evolve into new forms. Skills were transmitted by learning-by-doing. Under the supervision of Europeans native builders found out how to build in the imported style and the shipwrights who went overseas learned from those they trained about types of ships and features of design not used at home. Education and information exchange was not formalized so there is little or no record of knowledge transfer. In the short run, the impact of the arrival of Europeans ship carpenters with their novel ideas appears to have been small, though information from the early years of overseas shipbuilding sites is very limited. In long run, that is through the sixteenth, seventeenth and eighteenth centuries, European practices swamped local ones and, more generally, the technology of building. Vessels of established designs did not disappear, practices in India, China and southeast Asia being the most resilient. Small vessel types were especially resistant to replacement
by imported designs. Even in 1800, certain designs, including, for example, sea-going junks from China continued to have a place in international trade, a role that carried on well into the twentieth century. Junks were good enough for Dutch traders to use them in place of vessels of European design in the eighteenth century, so they had some recognizably superior features. The shift to vessels of European type was not complete by 1800, but it was well underway in many parts of the globe.

The foreign ship carpenters over time took a more active role in pressing their own ways of doing things in shipbuilding yards. In 1738, local carpenters working on Spanish wharves in the Philippines got new tools, saws of Spanish design. The traditional axes of indigenous workers disappeared. There was a transfer of technology and, perhaps in other cases as well, even the imposition of European ways of doing things. Over time, whether by simple exposure, by trial and error, by learning-by-doing or by decisions imposed on craftsmen there was in shipbuilding a globalization of innovation.

Over time, shipbuilding by Europeans outside of Europe tended to settle down. Government regulation became more extensive and more effective, financing became more straightforward and easier to acquire and organization locally and at the centre in Europe became more established and reliable. What may have started out as being chaotic and uncertain at the start of the period was much less so at the end. There were some consistent patterns. All European overseas enterprises were more interested in maintenance and repair than in building new ships from raw timber. That is not to say they did not build new ships. They often tried, especially in Asia. At Cochin, for example, both the Portuguese and the Dutch built large new ships, and in the Philippines Spanish shipwrights built very large vessels for the transpacific trade. More pressing than supplying original vessels was working on ships sent from the metropole. The long voyages meant the vessels arrived worn and often in poor condition thanks to storms or simple wear and tear. The ships from Europe could then not function without extensive repairs and replacement of parts, work which often involved use of a wide range of raw materials. For naval vessels the need to perform necessary upkeep quickly was greater. The need to carry out those repairs meant that overseas wharves had to have spare parts in stock kept ready for use, as Amélia Polonia and Liliana Oliviera report for Portuguese shipyards. The need for repairs to keep European ships operating in distant waters was a primary concern for all shipbuilding at a distance from Europe. It was that need which ultimately drove the operation of overseas shipbuilding. There were frequent complaints about not having enough supplies and worries expressed about the flow of supplies to do repair work. A very useful document from New Netherland, discussed by Martin Heijink, gives an idea of what manufactures the New Amsterdam wharves needed that were only available from Europe. Both in what would become New York, and in the French settlements in the Americas, there were cases where it proved impossible to do necessary repairs because of a shortage of needed raw materials. How much were such complaints exaggerated by colonial builders and administrators is all but impossible to know, though certainly there would have been incentives to overstate the problem.

In matters to do with repairs, as in all aspects of imperial operations, there is a great deal to be learned about shipbuilding in all of its aspects and not just construction overseas. At the margin, far from the epicentre of the industry in Europe, the critical considerations, the most important issues which dominated the craft, are easier to identify. At
the end of long and uncertain lines of communication, the workers and administrators had to make choices which established what came first, what was of paramount importance to the industry. In the process, they showed the most critical factors that constrained the development of shipbuilding and determined the success of shipbuilding wharves. That imperial operations can be enlightening about all shipyards in the period is one of the most important reasons to pursue the neglected study of those institutions and their practices. The studies of European shipbuilding overseas offer few surprises. They reinforce what might well be expected. It is easy, of course, to uncover differences among the institutions of European states but it proves equally if not more productive to talk about what was similar. The latter is what the essays try to show, enough that they may raise a vexing question of whether the authors go too far and in the process lessen or understate the roles of local people, local practices and local topography and geography in shaping the enterprises around the globe.

One correction of what may be a longstanding misconception does come through in the essays. The dominance of European designs, methods and practices in shipbuilding yards was neither immediate nor complete nor uncontested. Transmission of technology was in two directions with varying levels of success in both. What proved most influential, it would appear, were practical considerations, of testing what might and might not work. By 1600, and even more so by 1700, there was a sense of the superiority of European ship designs, and guns, which led to a growing confidence among Europeans. Meanwhile there was also an undercurrent of interest in alternate options which went along with a willingness to accept and adopt local practices, most especially in relatively small scale work. In the early days of both Dutch and, later, French settlement in the Americas, that yards back in Europe sent along pre-fabricated boats is a sign of uncertainty about what might work overseas, about whether shipyards in far-flung places could produce the types of vessels Europeans knew and liked. The fact that the practice faded and disappeared indicates Europeans, once overseas, realized that for smaller vessels for regional use they could rely on local designs and builders to get what they needed. That was exactly what they did.

The early modern state extended its influence dramatically through the sixteenth, seventeenth and eighteenth centuries. The growth in overseas trade and in colonial establishments were signs of the extension of their power and of an ability to use that expansion to generate income necessary to expand their reach at home and overseas. The mixed success of overseas shipbuilding illustrates the general pattern of mixed success commercially and financially as it illustrates so many other aspects of developments in maritime history of the period. The differences among the colonial powers indicate that each government had its own characteristics. The differences also illustrate the limitations of their power and the consistently powerful impact of general prevailing conditions and constraints which forced them to act in similar ways. Whether the institutions responsible for overseas shipbuilding were joint-stock companies or the Crown or the navy, operations went through similar evolution. That indicates the role of the institutions was limited. Companies in general acted like the state, and states like the trading companies.

The studies give a special place to the Dutch, a logical choice since the Republic was an outlier in so many ways within Europe and especially in the seventeenth century. The Dutch carried on a great deal of trade within Asia, which kept the East India Company
profitable. The Company needed ships of many different types and sizes to carry on that commerce. They bought the vessels from private builders or had them built in their own yards. The Dutch prove to be the right example as the starting point for understanding and assessing shipbuilding by European states outside Europe in the period. The comparison with others indicates that the Dutch may have been outliers, but still not so unusual in organization, in using local skills and talents, in transferring technology, in dealing with decision-making, in contending with the physical conditions they faced and in leaving their mark on the sites and regions where they were active as traders. The authors, using Dutch practices and success as a starting point and through implied comparisons, illustrate the possibilities Europeans had to have an impact for better or worse on the maritime sector around the world.

Author biography
Richard W. Unger, trained in economic history, taught medieval and early modern history at the University of British Columbia until retirement in 2010. He is the author of a number of books and articles on ship design and the evolution of shipping from the fall of the Roman Empire to the age of steam, on medieval and Renaissance cartography, on the integration of commodity markets in early modern Europe, and on energy consumption in late medieval Europe and in Canada in the last two centuries.