

The Yangtze and the Rhine, Two Major River Systems

*An Introduction*¹

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TSEG 21 (1): 5–20

DOI: 10.52024/tseg.18555

Abstract

This introduction to the articles about the Rhine and the Yangtze as well as transport on these rivers emphasizes how innovation plays a role throughout both subjects for this collection. In two articles here, this innovation took the form of the movement of a capitalist, business mentality from the coastal areas, where there was already plenty of seafaring and trade, to the interior via the river. In the eighteenth century, this was the case both along the Rhine and along the Yangtze as can be seen from the articles by Ralf Banken and Yao Chen. The articles by Blussé and Klemann, rather, focus on more concrete technical innovation. Blussé shows how similar circumstances, independently of each other, led to similar technical innovations in the Yangtze and Rhine deltas. Klemann looks at the consequences of nineteenth-century mechanization for Rhine navigation, especially for the small Rhine skippers.

Introduction

This special issue of *TSEG – The Low Countries Journal of Social and Economic History* is about the Rhine and the Yangtze along with the transport on these rivers, though especially about the modernization that resulted from this transport and about the modernization of that

¹ I would like to thank some colleagues who advised me on this paper and especially the anonymous reviewers of this journal. The articles presented here, along with a host of other articles, were presented at the conference River societies: Old problems, new solutions. A comparative reflection on the Rhine and the Yangtze Rivers, organized in May 2019 by Leiden University and Erasmus University Rotterdam, in collaboration with Fudan University Shanghai.

transport itself. Before the introduction of rail transport, in areas far from the coast, inland waterway transport was often the only inter-regional mode of transport on more than a marginal scale. Without rivers or other navigable inland waterways, inland transport of any size, even over relatively short distances, was often impossible. Just over a century and a half ago, 90 percent of all cross-border transport between Germany and the Netherlands still took place on inland vessels via the Rhine. There was no rail service, and the scale of water transportation on that river far exceeded that of the only alternative, horse-drawn carts. Rhine navigation was therefore many times cheaper.² That quality certainly did not mean that inland shipping was large-scale transport. Until the mid-nineteenth century, the largest Rhine barges, the colossi among inland vessels, had an average capacity of approximately 150-220 tons and, at that, only along the lower parts of the river.³ Further upstream, the vessels were smaller, often much smaller. Similarly, from the second half of the eighteenth century, transportation also grew enormously along the many tributaries in the middle part of the Yangtze River. In these tributaries no fewer than 125,000 barges were in service. However, on average they were very small. Many even had less than 20 tons of loading capacity.

There were practical reasons why inland vessels were often small. Not only were natural, non-channelized or normalized rivers often shallow in many places. Moreover, it was impossible for teams of horses or manpower to tow larger ships against the current. In such rivers, towing was necessary until a practical application of the steam engine in river navigation arose, as the current was often stronger than the wind. Despite the limitations that these conditions imposed on the size of ships, the scale of inland navigation far exceeded that of any other form of inland transport. Rivers and some other navigable waterways therefore often played an essential role in the economic life of the riparian areas. Trade activities and thus the market economy often spread via inland navigation from the coast to parts of the hinterland located along the banks of rivers.

In addition to economic contacts, river shipping was important for the dissemination of information. Cultural influences penetrated

2 See: Agnes Lewe, *'Invoer te lande verboden.'* Een verkenning van de handel over landwegen tussen Nederland en de Pruisische provincies Rijnland en Westfalen, 1836-1857 (Hilversum 1995) passim.

3 H.P.H. Nusteling, *De Rijnvaart in het tijdperk van stoom en steenkool 1831-1914. Een studie van het goederenvervoer en de verkeerspolitiek in de Rijndelta en het achterland, mede in verband met de opkomst van de spoorwegen en de concurrentie van vreemde zeehavens* (Amsterdam 1974) 242.

inland along rivers. Yet historians, including economic historians, have often ignored rivers and river navigation. In the historiography of trade and transport in the pre-railway period, the emphasis is almost always on overseas trade and maritime shipping. While some historians have analyzed the development and history of inland navigation on an individual river, little has been written about the history and importance of rivers in general to human society.⁴ Even maritime historians rarely mention these natural waterways. Lincoln Paine, one of the few river historians, writes that this lack of interest in rivers and river navigation in the historiography is

‘especially puzzling when we consider that rivers provided the most efficient means of transporting goods, people, and ideas between seaports and their hinterlands, and that many of the world’s most historically important gateways from and to the sea are as much river ports as seaports: Cairo, Yangzhou, Guangzhou, Palembang, Baghdad, Seville, Rouen, London, York, Dorestad, Cologne, Novgorod, Kiev, New York, New Orleans, St. Louis, Montreal, and Manaus.’⁵

We can easily add Rotterdam, Antwerp, Hamburg or Shanghai to this list.

Most large and many smaller cities around the world are located on riverbanks. Consequently, riverine areas are inhabited by a disproportionate share of the world’s population. In 2010, more than 50 percent of the world’s 6.9 billion people lived within three kilometers of fresh surface water (i.e. a lake or a river). Only 10 percent live further than 10 kilometers from such water basins. The population density is especially high near major rivers. For smaller rivers, and especially lakes, the population density is clearly less. Lucien Febvre wrote in the 1930s that the Rhine was the highway of Europe, connecting the main economic centers of the continent and thus creating an international community,

4 See for instance: Marten Boon, Hein A.M. Klemann and Ben Wubs (eds), *Transnational regions in historical perspective* (Abingdon 2020); Hein A.M. Klemann and Joep Schenk, ‘Competition in the Rhine Delta. Waterways, railways and ports, 1870-1913’, *The Economic History Review* 66:3 (2013) 826-847; J.Y. Li, T.E. Notteboom and W. Jacobs, ‘China in transition. Institutional change at work in inland waterway transport on the Yangtze River’, *Journal of Transport Geography* 40 (2014) 17-28; Nusteling, *De Rijnvaart in het tijdperk van stoom en steenkool*; Robert Mark Spaulding, ‘Revolutionary France and the transformation of the Rhine’, *Central European History* 44:2 (2011) 203-226; Idem, ‘Changing patterns of Rhine commerce in the era of French hegemony, 1793-1813’, *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte* 100:4 (2013) 413-431.

5 Lincoln Paine, ‘River cultures in world history. Rescuing a neglected resource’, *Fudan Journal of Humanities and Social Science* 12 (2019) 457-472, there 459.

despite national borders.⁶ Leonard Blussé evoked similar sentiments when he wrote that river systems ‘were and still are the arteries of our society. For centuries, rivers, lakes and the canals built to connect them [...] formed the main roads of transportation.’⁷ In this publication he quoted Wim Blockmans, who in his book about the *Metropolises along the North Sea* emphasized that ‘all major cities in the Netherlands emerged along well navigable waterways, making good connections possible.’⁸ Blussé and Blockmans emphasize that population density is especially high along large rivers, while Blussé explains this situation further by linking urbanization and the function of rivers as transport networks.⁹

This special issue focuses on modernization. One of the most important conclusions is that rivers were often the catalysts of modernization in the interior. Contacts made through river navigation often resulted in trade with the commercialized coastal areas and thus in the spread of the trading mentality and associated culture from those more developed regions. Especially from the eighteenth century onward, trade relations along the rivers developed, spreading tradable goods as well as a capitalist, business mentality from the coasts to the interior. Moreover, as this market system became viable and the need for it was felt, river transport itself was modernized and adapted to the larger scale required by increasingly modern, large-scale transport. Contacts established through river navigation often resulted in the spread of the trading mentality and associated culture from the more developed coastal areas.

Rivers and the spread of capitalism

When Ralf Banken in his article for this journal quotes from the fairy tale ‘The Heart of Stone’ (*Das kalte Herz*, 1827) by Wilhelm Hauff, Banken shows the contrast between the hard, business mentality of a Dutch merchant and the simple, honest attitude of the rural inhabitants of the Black Forest. This example reflects the confrontation of a traditional society in the interior of Europe with the capitalist business mentality of the modern market economy in the Dutch coastal

6 Lucien Febvre, *Le Rhin: histoire, mythes et réalités* (Paris 1997) 236-237.

7 Leonard Blussé, *Aan de oevers van de grote rivieren. De Rijn en Yangzi delta's 1350-1850* (Leiden 2011) 6.

8 Blussé, *Aan de oevers van de grote rivieren*, 9; W. Blockmans, *Metropolen aan de Noordzee 1100-1560, de geschiedenis van Nederland, 1100-1560* (Amsterdam 2010) 17.

9 Blussé, *Aan de oevers van de grote rivieren*, 12.

area. Banken makes it clear that the Rhine has played an important role in the penetration of capitalist, market-oriented trade and thus of a new mentality deep into Germany. He also shows implicitly that this penetration and the emergence of a new mentality only took place from the eighteenth century onward, and that capitalism and its mentality reached the internal parts of Europe much later than the coastal areas. In his article he shows how the timber trade from the Black Forest to the Dutch ports, especially Dordrecht, developed into big business. The developed, capitalist coastal areas needed raw materials and started to extract them from their hinterland, thus incorporating that hinterland, which had not yet been influenced by their trading practices, into their trade and thus into a capitalist society. Wood from those areas became indispensable in the Dutch ports. It was sawn there by windmills and then used to build ships.

Banken describes the timber trade in the eighteenth and early nineteenth centuries. His article is mainly about the large-scale trade of some German timber traders and trading companies, who not only traded over great distances, but also traded huge quantities of this commodity. Large timber rafts from the Black Forest, but also from the Neckar region, floated downstream to be auctioned in the port city of Dordrecht. This trade involved large sums of money. The German capitalist timber trade was able to develop because a great demand for wood had arisen in the Dutch commercialized economy. Thanks to river transport, large timber rafts could be brought in from the hinterland. The capitalist market practices, business mentality, and impersonal trade relations of the coastal areas of the Netherlands thus penetrated into the German hinterland, far from the coast in the Black Forest and the Neckar basin. Likewise, during the Ming (1550-1644) and Qing (1644-1911) dynasties, the Huizhou timber traders along the Yangtze River also became major businessmen, as did such German traders along the Rhine. Their activities also resulted in large-scale trade and thus the spread of a capitalist mentality in the central part of the Yangtze region. These Chinese timber traders were also blamed for changing standards. They lived luxurious lives and were envied for their wealth, but like their European counterparts, they were also hated for their harsh, capitalist mentality.¹⁰ In China, the timber merchants were viewed with similar eyes as the Dutch merchant in Hauff's fairy tale.

10 Wang Zhenzhong, 'Huizhou merchants and timber trade in the Yangtze River Valley in the late imperial period', Paper presented at the conference, the Yangtze and the Rhine: A historical conference, Rotterdam, Leiden 22 to 25 May 2019.

Yao Chen's article shows that similar developments to those along the Rhine took place along the Yangtze River. During the Ming dynasty, the flow of goods along the many branches of the Yangtze were mainly confined to the lower coastal areas of this vast river system. Only during the Qing dynasty, when transportation along the Yangtze and its tributaries, including those further from the coast, increased dramatically, did the more inland provinces develop. According to Yao Chen's calculations, between the eighteenth and mid-nineteenth centuries, no fewer than 125,000 wooden boats provided transportation on an increasingly large scale along the middle branches of the colossal Yangtze River. Together, these barges had almost half a million crew members, who often lived on these boats. Together these had a carrying capacity of approximately 2.45 million tons. However, even more so than along the Rhine, the transport capacity of each individual inland vessel was small, on average even less than 20 tons. Nevertheless, it was much more than any alternative form of land transport, which in China often also involved porters and handcarts. According to Yao Chen, because of the transportation options provided by the fleet of ships on the central Yangtze River, something like a national Chinese market developed during the Qing dynasty and spread even to the middle and upper reaches of this river system.

What becomes clear from these examples is that from the trade-oriented port cities at the estuaries of major rivers, a capitalist mentality that had developed there in previous centuries could move to the hinterland. This development will happen when the need for raw materials or food from the hinterland in those coastal areas becomes such that it results in such a demand for those products that a large-scale trade in such products is established in that hinterland. A raw material such as wood was an excellent product to serve as a catalyst. The Rhine and the Yangtze have been navigable since ancient times, but commercial capitalism along the banks of these rivers developed only slowly. Only when the ports at the mouth of these rivers needed food and raw materials from the hinterland on an increasingly large scale did this change arise.

Obstacles

Residents of areas along a river, canal, or lake use the water for fishing, as sewage, as drinking water, for cooling, for recreation, as an energy source, or for irrigation. Nonetheless, riverbanks are much more

densely populated than those of lakes or canals. The reason for this demographics must lie in the transport options that a river provides, and which a lake hardly offers. Rivers are natural waterways along which markets, trade relations, and economic integration develop. Such waterways connect different parts of a country or even a continent to the coast, where a port city has often developed at the mouth of the river. Contacts along a river can therefore not only lead to trade with the coastal region, but also to import from and export to the rest of the world via such a port city.

Ralf Banken emphasizes that the money earned from the timber trade was used not only to invest in the economies of the German states along the Rhine, further developing capitalist economic practices in these regions, but also to finance imports. Money earned in exports to the port cities on the North Sea paid for West German imports of products brought to the Dutch ports, such as coffee and sugar from the Dutch colonies. Such products were exported to the German hinterland in increasing quantities. Imports from overseas became so common in the German Rhine region that even the lowest classes drank Javanese coffee and used sugar imported from Asia. Before the railways opened up all corners of the continents, inland shipping was the only form of more or less large-scale transport far from the coast. River navigation not only ensured the transport of products from coastal areas to the hinterland and vice versa, but also incorporated the hinterland areas into the seaborne trade of the coastal areas.

Historians paid little attention to riverine trade relations, not even as an offshoot of overseas trade relations. The reason for this lack is probably that this trade was not the most spectacular in terms of size or value. Shipping to and opening of new continents seemed more important and, in any case, produced more spectacular stories. Nevertheless, the contributions in this journal show that river trade was of great importance to the hinterland and resulted in the transition from traditional, relatively isolated agricultural, landlocked economies to modern, capitalist market economies. A contempt for the Netherlands developed in Germany in the eighteenth century and lasted in nationalist circles at least until the end of the early twentieth century. It was directed against the *Fluch des Mammons* – the curse of money – which poisoned the Dutch mentality. It made them forget that they were a Germanic people, and that Germanic heroism was deeply rooted in their minds, or, to use the phraseology of such nationalists,

in their blood.¹¹ In Germany, this transition to a new, commercial society, which came with all the positive and negative consequences of such a transition, was hated by a conservative, nationalist part of society. It could not prevent that river transport opened up the German economy and allowed overseas products to reach further inland areas. Especially in this case, it is of paramount importance to emphasize how the economic dynamism of the coastal areas spread inland along the rivers, integrating local economic activity into regional, national, or even transnational economies.

Naturally, residents of settlements along the rivers tried to take advantage of the activity along these transport routes. They did so by collecting tolls, setting up staple markets, or by establishing monopolies for skippers or merchants from the guilds of their own city or state. Although such regulations and the many taxes and tolls maximized their own benefits from river navigation in the short term, in the long term they undermined the river's relevance as a transport route and therefore as a cash cow. In the seventeenth and especially the eighteenth centuries, the costs of local taxes, tolls, regulations, and monopolies for the guilds from the river towns along the Rhine made the use of horse-drawn carts on certain routes 15 to 35 percent cheaper than navigating the river. By land there were so many roads that it was impossible to charge tolls everywhere, but a river is relatively easy to control. A riverbed is more or less stable. To restore the Rhine's position as Europe's most important transport route, the riparian states – including the Republic of the United Netherlands – met at a large-scale conference in Cologne in 1699 to discuss limiting obstacles for transport along this European highway. However, local interests were strong, and a broad vision was a rare exception.¹² Such levies and regulations thus not only undermined the competitiveness of inland navigation, but also increased transport costs in the riverbank regions of the Rhine and thereby undermined the competitiveness of Rhineland products. To give one example: in the eighteenth century, French wine pushed Rhine

11 K. Pabst, 'Der übermächtige Nachbar. Belgische, niederländische und luxemburgische Urteile über das Deutsche Reich', in: K. Hildebrand (ed.), *Das Deutsche Reich im Urteil der großen Mächte und europäischen Nachbarn 1871-1945* (Munich 1995) 27-47, there 32.

12 L. Elix, *Echte stukken betreffende de vrije vaart op den Rijn* (Amsterdam 1826) xi-xiii; Eberhard Gothein, 'Rheinische Zollkongresse und Handelsprojekte am Ende des 17. Jahrhunderts', in: *Beiträge zur Geschichte vornehmlich Kölns und der Rheinlande zum achtzigsten Geburtstag von Mevissen* (Cologne 1895) 361-400

wine to a marginal position in the Dutch trade because of the enormous transport costs of that Rhineland product.¹³

River transport could easily be taxed, monopolized, or otherwise used and thus undermined by the numerous states, cities, or other political entities along its shores. As there were roads everywhere, land transport could often find a detour, but the track of the river was God-given. Only in the second half of the nineteenth century, the actual river – that is, the Rhine – and its exact track were adapted to the needs of modern navigation by enormous hydraulic building activities along the entire river. These construction activities only became possible within a completely new political constellation, which was the result of the formation process of the German Empire. Before that, the Rhine and its use was often a source of conflict. Since the Peace of Westphalia (1648), the autonomy of German princes and city-states increased. Such princes always needed money, while cities claimed preferences for their traders. As a result, taxation, regulation, discrimination, and corruption of tax collectors and favorites of princes exploiting toll contracts broke up Rhine transport.¹⁴ In particular, the staple markets of Cologne and Mainz, where it was mandatory to sell all freight and use ships and tow-horses of the local guilds on the next leg at rates set by the local government, undermined the river's competitiveness. Often the legal basis for such traffic regulation was questionable, but the German Empire was too weak to effectively ban it.

In addition to natural barriers, local or regional governments created barriers by taxing inland shipping, collecting tolls, and establishing regulations that usually benefited themselves or local skippers, liner riders (the horsemen towing the ships), or their own markets. At first glance, a major difference between the Yangtze and the Rhine was that the Chinese river was entirely Chinese, while the banks of the Rhine, especially in the pre-Napoleonic era, were owned by a significant number of states, cities, or other political entities. Rulers or administrators, merchants, and skippers of such more or less sovereign areas all had their own interests, which they often pursued

13 Gothein, 'Rheinische Zollkongresse', 361-400 there 372-373.

14 Jürgen Heinz Schawacht, *Schifffahrt und Güterverkehr zwischen den Häfen des deutschen Niederrheins (insbesondere Köln) und Rotterdam vom Ende des 18. bis zur Mitte des 19. Jahrhunderts (1794-1850/51)* (Cologne 1973) 25-26; Spaulding, 'Revolutionary France and the transformation of the Rhine', 203, 213; 4 Oktroivertrag, 25 Augustus 1804, *Rheinurkunden, Sammlung zwischenstaatlicher Vereinbarungen, landesrechtlicher Ausführungsverordnungen und sonstiger wichtiger Urkunden über die Rheinschifffahrt seit 1803*, Erster Teil 1803-1860 (The Hague 1918) 6; Gothein 'Rheinisch Zollkongresse', 362.



*Illustration 1 Towing along the Rhine, eighteenth century
(source: Painting by Karl Marquard, Rheinmuseum Emmerich.)*

unscrupulously. However, in her article, Yao Chen shows that, during the Qing dynasty, in the eighteenth and early nineteenth centuries, direct central government supervision of river navigation and boatmen in the central parts of the Yangtze region was too difficult to organize, explaining why such supervision hardly existed. Instead, boatmen's gangs and clans arose more or less spontaneously, which, in competition or cooperation with merchant communities or local authorities, regulated navigation on parts or in certain tributaries of the Yangtze. It is clear that within these organizations, in addition to social and religious regulations, drawing up and enforcing safety rules and ensuring the cargo was paramount, but economic goals were also pursued, if only by limiting the number of skippers. Local skippers also promoted their interests along the Yangtze, by forming guilds and excluding outsiders, for example, just as happened on the Rhine.

Along the Rhine, the Conference of 1699 was not a unique event. In fact, every few years the representatives of the electors of the Rhine Valley, the most important princes along the German Rhine, discussed the problems of Rhine navigation and its obstacles in the *Zollkapitel* (tax chapter). However, attempts to liberalize inland shipping failed, if only because these electors were just as greedy as their lower-ranking colleagues. Because Rhine traffic fluctuated with Dutch trade, some Germans of the time blamed Hamburg and Bremen for the decline of Rhine traffic, as these German port cities attempted to undermine

the position of the Dutch ports.¹⁵ In fact, Rhine transport had become too expensive due to all the tolls and regulations. Indeed, it was often cheaper to land goods at the port of Bremen and then send the cargo across the Weser and from there by horse-drawn carts to Cologne, rather than take the route via the Dutch ports and further along the Rhine to this central market town. Transport by horse and cart from Le Havre or Antwerp also became more common. Even from the Dutch ports, road transport to Frankfurt was often cheaper than transport on the Rhine.¹⁶

Only in the nineteenth century, after the Napoleonic period broke up the old regulations, were these problems gradually resolved by the oldest supranational European organization, the Central Commission for the Navigation of the Rhine (CCNR) (1815).¹⁷ Only the Act of Mainz of 1830 would result in the first steps towards the goal of this organization. This treaty between the Rhine states was intended as a step toward the liberalization of Rhine navigation, in order to give concrete form to the provisions of the Congress of Vienna. Now, transport on the Rhine was exempt from all monopolies for local skippers' guilds and other remnants of the old staple markets. The levying of taxes and tolls by the various governments of the Rhine states was also limited. As a result, Rhine skippers only now had to deal with competition for the first time. With the introduction of the railways in the decades following the Act of Mainz, this competition was no longer limited to competition between skippers or between traditional skippers and the first steamships. With the rise of the railways, and especially the Antwerp-Cologne railway from 1843, Rhine navigation had to find a way to increase its competitiveness. If that didn't work, Rhine navigation was doomed to disappear. In this struggle, shipping on the Rhine, like shipping on virtually all other natural waterways, was seriously endangered. It was widely believed that the railways would eventually wipe out navigation, as happened on many other rivers around the world. The fact that Rhine navigation managed to survive was the result of the modernization of river navigation, along with the adaptation of the river to the needs of much larger-scale Rhine navigation.

15 Gothein, 'Rheinisch Zollkongresse', 363.

16 Ibid., 372-373.

17 Hein A.M. Klemann, 'The central commission for the navigation on the Rhine, 1815-1914. Nineteenth century European integration', in: Ralf Banken and Ben Wubs, *The Rhine. A transnational economic history* (Baden-Baden 2017) 33-68.

Modernization of navigation

Because natural rivers were wide but shallow, they were usually not suitable for the use of keeled vessels. That is why sailboats with a flat bottom were often used. Such ships were extremely sensitive to crosswinds. In his article, Leonard Blussé explains how the problem of wind-sensitive small sailing ships without a keel in the shallow waters of the Dutch Rhine and Meuse delta and the China's Yangtze delta was solved by the use of leeboards. Although these regions were half a world apart, the problems of navigating the waters in these deltas were similar, and similar flat-bottomed ships were developed to circumvent those problems. Therefore, it is understandable that the problem of crosswind sensitivity with such ships in these two regions was also solved independently in a similar manner. In both the Dutch river delta and the Yangtze delta, skippers started using leeboards. China came first, but as Blussé shows, the Dutch could not have adopted this idea from the Chinese. They had no contacts with China yet when they started using leeboards themselves.

Rivers, especially large rivers, were important transportation routes, although river navigation is not as simple as it seems, either. When navigating a river, a skipper has to deal with a complex natural system that changes in character in many respects between the source and the estuary. Therefore, navigation in different parts of this natural system must meet different conditions. Navigating a non-canalized or non-normalized natural river entails all kinds of technical and organizational problems and many limitations, which also differ per section of the river. Natural problems include shallow areas, rapids, drifting and floating ice, sandbanks, gravel, and especially the current, which is almost always so strong that it makes upstream sailing impossible. Rarely is the wind stronger than that current. The fact that the force of the current generally makes it hardly possible to use wind energy for upstream propulsion, means that only the invention of an effective steam engine ended the use of muscle power in navigation. Everywhere along rivers, there was rowing and towing by people or animals to get the ship upstream. On the Rhine, the use of horses to tow ships upstream was dominant. As late as 1850, when steam navigation had long since been introduced, there were still 3,000 draft horses in use along the river. In the higher parts of the Rhine, where the condition of the river required smaller ships, groups of people also did this terribly hard work. In fact, manpower was usually deployed for this purpose

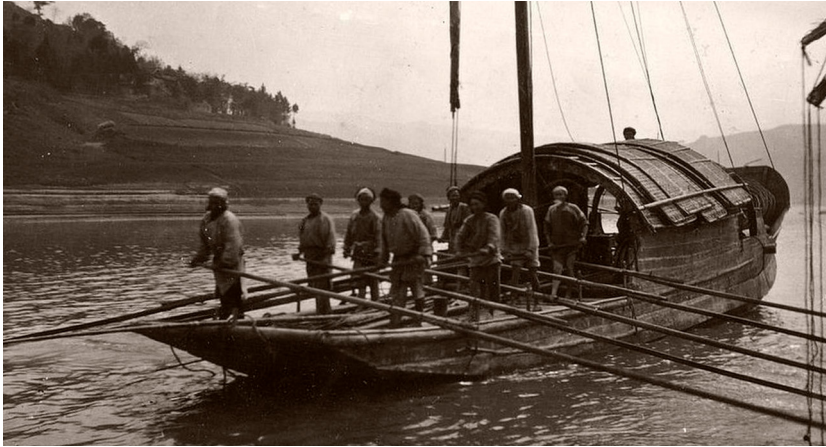


Illustration 2 Everyday life around the Yangtze River, China (1910s)

along the Yangtze. Men had to tow or row. Because the use of muscle power limited the size of the ships, but also because rivers were often wide but rarely deep, the ships were small and shallow.

After the Act of Mainz (1830), new competition was introduced on the Rhine. Shortly later, competition between traditional Rhine skippers and nineteenth century modern transport emerged. This situation is central to Klemann's article. It shows that the industrial development in the Ruhr region led to a Prussian initiated transformation of the river, organized by the Rhine states and controlled by the CCNR. The Rhine – in the mid-nineteenth century a mainly natural river – became a straight, narrow, deep, and almost dead channel. The aim of the Prussian authorities, which continued to exert great pressure on the progress of this process, was to prevent its main, but landlocked industrial region, the Ruhr region, from becoming dependent on private railway companies, which, following the collapse of inland navigation, could demand monopoly prices. Unlike almost anywhere else, inland navigation along the Rhine not only survived, but became even more important than ever before. However, this change was only possible after a radical modernization process, which resulted in the impoverishment of the small Rhine skippers.

The new, deep, narrow and straight, normalized river led not only to a huge increase in Rhine transport, but also into fierce competition between major German shipowners – often with close ties to the industrial conglomerates in the Ruhr region – and traditional, often Dutch skippers. From the 1880s onward, the major shipowners

associated with the Ruhr industry invested substantially in increasingly large steam tugboats and iron and steel barges. As a result of this increase in scale, freight prices fell drastically, giving the Rhine a new competitiveness in its struggle with the railways. This development also strengthened the position of the port of Rotterdam in the competition with the port of Antwerp. At the same time, it was disastrous for many small, independent Dutch skippers. They had no alternative but to more or less participate in this race toward ever-larger scale and ever-cheaper transportation or give up and find a job on shore. The need to buy larger ships resulted in rising costs for such skippers, while their incomes continued to decline. Most of them survived by giving up their coastal homes, taking their families on board as cheap labor, and accepting dramatic levels of impoverishment and pauperization. From a purely economic point of view, it may have resulted in enormous improvements, larger transport flows, and lower freight rates. However, this evolution was not felt as an improvement everywhere and by everyone.

The Rhine could not fully develop until the problems between the riparian states were resolved and they agreed to adapt the river to modern, large-scale transport. After the Rhine states agreed under heavy Prussian pressure to carry out major hydraulic engineering works on the river, transport on the Rhine could become competitive again. Only after these works were completed in the late nineteenth century, did transport rates drop by 80 percent. This modernization made the Rhine the European highway for bulk transport, connecting the main industrial center, the Ruhr region, to the sea. At the same time, Rotterdam came to dominate such transport and became the most important port in Europe and in the second half of the twentieth century even in the world. That position was lost in the twenty-first century to Shanghai, the main port at the mouth of the Yangtze River. Despite the emergence of all kinds of new modes of transport since the nineteenth century, these two ports at the mouths of the two economically most important rivers in the world still play an important role in regional economic development today. The Belgian port economist Theo Notteboom wrote about this:

“The gateway ports in the Yangtze River Delta and the Rhine–Scheldt Delta have embraced river transport. The development patterns of the river service networks in the Yangtze River and the Rhine basin, though not quite the same, show a remarkable level of similarity [...]. The Yangtze

barging network has the tendency to converge, in more than one aspect, with the (historical) development pattern of inland container services in the Rhine Basin.¹⁸

The fact that the Rhine-region has been the economically most important river region in Europe since the nineteenth century, and probably for much longer, and that the Yangtze River, after the problematic years of isolation, is now even the most important in the world, is a good reason to compare some aspects of their development. What is particularly important here is how trade and shipping along these two rivers in both regions brought market economics and commercial capitalism to the hinterland and how this water transport systems managed to survive in a period of rail and car traffic.

About the author

Hein Klemann (1957) studied history at the Free University Amsterdam (VU) as well as economics at this university and the University of Amsterdam and obtained his PhD from the VU. He then worked at various universities and institutes and published on economics and World War II, Dutch-German economic relations, Rhine navigation, and on Haarlem. Since 2005, Klemann has been professor of economic history at Erasmus University Rotterdam.

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18 Theo Notteboom, 'Container river services and gateway ports. Similarities between the Yangtze River and the Rhine River', *Asia Pacific Viewpoint* 48:3 (2007) 330-343, there 342

