

powered passenger vehicles began. However, initial numbers were very small, for there were only 210 vehicles registered at the end of March 1912. Not until the 1920s did the transportation business begin to use such vehicles on a wide scale.

As the railroad age began, the emphasis in road construction and improvement shifted to local roads. The proportion of expenditure for national highways as a percentage of total road expenditure was at the 18–30 per cent level up to 1889, but in 1890 it dropped to 15 per cent, and in 1897 it was 10 per cent (see table 5, chap. 2). Although bridge expenditures were declining – but not as quickly as highway funds – expenditures for bridges on national highways relative to total bridge funds dropped from 25 per cent in 1879 to 18 per cent in 1897. As usual, local government had to pay the largest share for these roads, and most expenditures for national highways and bridges were shifted over to local bodies. The railroad age, which started around 1890, resulted in, once again, the localization of national road transport, in this case as a means of transportation to and from railroad terminals. The traditional method of making local people pay for all roads in their locality continued unbroken from the Edo period.

Notes

1. From the *Chugai Bukka Shimpo* for 21 August 1889.
2. Nippon Tsuun Kabushiki Kaisha, *Shashi* (Company history) (Nippon Tsuun, 1962), chap. 3.

Coastal and River Transport

Hiromi Masuda

Coastal Shipping and the Establishment of a Coastal Shipping Industry

Through the formation of Nippon Yusen and Osaka Shosen, referred to as *shasen* (i.e. companies using their own ships), and other shipping corporations, or *shagaisen* (companies using outside ships), the base for Japan's maritime shipping industry was almost complete by the 1890s. However, these companies were involved in domestic shipping only. The only scheduled overseas shipping route was the one to Shanghai that the government-protected Mitsubishi Company had taken in 1875, and its development lagged far behind that of domestic routes. The major reason for this backwardness was that the shipping companies had not accumulated adequate capital to increase their number of ships. Nippon Yusen was the first to begin an overseas route, in March 1889, from Shanghai to Vladivostok. Osaka Shosen followed in July 1890 by putting ships on the route between Osaka and Pusan. In December, Nippon Yusen began its route

between Kobe and Manila. In March 1893, Osaka Shosen began shipping between Osaka and Inchon. Shipping companies thus gradually started overseas routes to neighbouring Korea and China. Also in 1893, Nippon Yusen began Japan's first long-distance overseas route, to Bombay.

Ship ownership in Japan in 1893 amounted to 680 steam vessels (110,205 tons) and 749 sailing-vessels (44,967 tons), but only 60 steam and 4 sailing-vessels were of 500 tons or more. From the size of these crafts, we can see that most were ships for inland and coastal shipping, with only a few suited to overseas routes.¹

Effects of the Sino-Japanese War

At the outbreak of the Sino-Japanese War in August 1894, the government commandeered almost all vessels registered by domestic shipowners for military and naval transport and purchased 14 steamships (40,000 tons) from abroad that it lent to Nippon Yusen. Nippon Yusen itself purchased 23 steamships (65,000 tons) from overseas that it used for military transport. The commandeering and procurement of 140 ships (227,000 tons) during the war impoverished merchant shipping and brought coastal shipping to a standstill.² It was this situation that forced Naikoku Tsun to send employees to Hokkaido and Tohoku in October 1894 to convince freight shippers to transfer their cargo from coastal to land transport. Owners of *shasen* and *shagaisen* companies tried to deal with the reduced numbers by purchasing and chartering foreign vessels or building new ships. Consequently the number of foreign-purchased ships rose rapidly from an annual 10 or fewer (8,000 ton level) at the end of 1893 to 38 (over 60,000 tons) in 1894, 35 (over 43,000 tons) in 1895, and 27 ships (over 22,000 tons) in 1896. There was also a dramatic increase in the number of shipbuilding sites, from 53 in 1894 to 82 in 1895, and a boom in the construction of steamships and sailing-ships in these years: 68 steamships (over 3,800 tons) built in 1894; 87 (over 8,400 tons) in 1895; 99 (over 6,700 tons) in 1896; and 86 sailing-ships (over 3,800 tons) in 1896; 66 (over 4,300 tons) in 1897; and 113 (over 9,700 tons) in 1898.³ This brought the number of Japanese ships registered to 1,032 (438,779 tons) steamships and 715 (48,130 tons) sailing-ships in 1897, 1.5 times the number for 1893, which also increased the registered tonnage by 400 per cent. Although the number of sailing-ships declined by 34, tonnage increased by 3,000 for an approximate 7 per cent increase overall.

Two reasons for this dramatic increase in ship numbers were the 1894–1895 Sino-Japanese War and the 1896 government grants-in-aid to develop maritime companies. The grants-in-aid were based on the stipulations of one law on ocean navigation and another to encourage shipbuilding.⁴ The two laws were concerned primarily with ocean-going steamships of 700–1,000 tons or more; inland shipping was not under their purview. However, inland shipping was subject to a shipping inspection law enacted in amendment to these two laws that required the inspection of Japanese-type sailing-ships of 200 *koku* (1 *koku* = 180 litres) capacity or greater. In order to get

Table 4. Number of inland steamships and sailing-vessels (1888–1909)

Year	Steamships		Sailing-vessels	
	Number	Tons	Number	Tons
1888	524	81,066	896	63,128
1889	564	88,816	843	52,328
1890	586	93,812	865	51,880
1891	607	95,588	835	50,137
1892	642	102,301	779	46,031
1893	680	110,205	749	44,967
1894	745	169,419	722	43,511
1895	827	341,369	702	44,794
1896	899	373,588	644	44,055
1897	1,032	438,779	715	48,130
1898	1,130	477,430	1,914	170,894
1899	1,221	510,007	3,322	286,923
1900	1,329	543,366	3,850	320,572
1901	1,395	583,067	4,026	334,904
1902	1,441	609,951	3,977	334,507
1903	1,570	662,462	3,934	327,150
1904	1,815	797,366	3,940	327,329
1905	1,988	938,783	4,132	334,684
1906	2,103	1,041,268	4,547	352,244
1907	2,223	1,116,945	4,811	365,013
1908	2,304	1,160,440	5,379	384,481
1909	2,366	1,198,194	5,937	404,089

Source: *Nihon keizai tōkei sōkan* (Complete statistics on the Japanese economy), Asahi Shimbun Sha, 1930, "Table of Tonnage of Inland Steamships," p. 835, and "Table of Tonnage of Inland Sailing-vessels," p. 836.

around the inspection law, however, the capacity ratings for Japanese-type sailing-vessels were converted to tons, which thus gave these so-called hybrid ships (*ainokosen*) the advantage possessed by Western-type sailing-ships. The result was an increase in sailing-ships from 715 (over 48,000 tons) in 1897 to 1,914 (about 17,900 tons) in 1898. This brings into clear relief the number of sailing-ships operating as a part of inland shipping. The 1898 increase was due not only to converting ship capacities to tons; there were 113 (9,754 tons) ships constructed in that year, making this the largest increase in number of ships in the post-Sino-Japanese-War period. Clearly, conditions for inland shipping were favourable during this period.

Favoured by the Sino-Japanese War and the law to encourage ocean navigation and shipping, both the inland and high-seas shipping industries progressed dramatically during this period, opening routes to Europe, America, and Australia. The post-Sino-Japanese-War excess in shipping capacity and the recession of 1898–1899 put ocean shipping in difficult straits. The Boxer Rebellion of 1900 and the War for Philippine Insurrec-

Table 5. Number of ships newly constructed and imported (1888-1909)

Year	Number of shipyards	New construction				Imports	
		Steamships		Sailing-vessels		Steamships	
		Number	Tonnage	Number	Tonnage	Number	Tonnage
1888	—	26	2,696	18	1,348	11	8,582
1889	—	26	2,269	18	1,300	8	5,451
1890	53	59	6,939	37	1,488	10	8,324
1891	57	55	4,592	12	860	4	4,125
1892	52	44	3,436	7	752	7	4,930
1893	58	55	3,425	22	969	10	8,064
1894	53	68	3,868	24	1,277	38	60,180
1895	82	87	8,474	22	1,545	35	43,117
1896	86	99	6,738	86	3,853	27	22,059
1897	91	112	12,431	66	4,391	22	41,818
1898	120	81	14,627	113	9,754	10	44,110
1899	148	52	15,421	60	4,954	7	24,486
1900	153	77	12,828	58	4,257	13	28,492
1901	169	77	32,385	62	5,118	12	19,344
1902	186	73	15,541	165	13,013	10	20,684
1903	200	128	37,314	151	10,181	17	33,440
1904	205	200	23,264	143	12,171	72	77,298
1905	216	122	33,039	308	16,457	100	138,706
1906	214	119	32,300	440	25,633	22	30,142
1907	224	76	28,838	220	16,841	34	32,009
1908	236	93	72,757	197	14,958	21	19,178
1909	239	58	63,475	205	15,616	8	8,032

Source: *Nihon keizai iōkei sōkan* (Complete statistics on the Japanese economy), "Table of Newly Constructed and Imported Ships," p. 837.

tion (1899–1902) temporarily restored the demand for shipping, but the subsequent decline brought on another industry recession. No real recovery came until the Russo-Japanese War in 1904.

Effects of the Russo-Japanese War

The Russo-Japanese War covered a much broader theatre of operations than the Sino-Japanese War, and scale itself was a major factor in the increase in armed forces demand for transportation. The army and navy commandeered all Japanese steamships, the largest number at one time being 266 (670,000 tons). To overcome the extreme shortage in ships, every shipping company purchased or chartered foreign ships.⁵ In 1904, 72 ships (77,000 tons) were brought in and in 1905, 100 (138,700 tons) were imported, for a two-year total of 172 ships (215,700 tons). Shipyards constructed and launched more than 200 new ships during the period. In 1904, 200 steamships (23,000+ tons) were constructed, and in 1905, 122 (33,000+ tons), for a total of 322 ships (56,000+ tons). The number of sailing-ships built increased dramatically, with 143 (12,000+ tons) constructed in 1904 and 308 (16,400+ tons) in 1905, for a total of 451 ships (28,400+ tons). This brought the total number of ships registered in Japan at the end of 1905 to 1,988 steam (938,700+ tons) and 4,132 sailing-ships (334,600+ tons).

Since most of the increase in ships during the Russo-Japanese War was in medium and large-sized ships suited for long-range sea voyages, all companies began new overseas routes, foremost among them Toyo Kisen, which opened a route to the west coast of South America at the end of 1905. These overseas routes were then closely connected with all inland port routes. However, the post-war excess in capacity eventually resulted in a recession and an extremely sharp drop in coastal shipping at the end of 1906. The *shagaisen* cut back on the number of ships operating in the following year, and even Nippon Yusen kept several ships docked at the port of Kobe. Inland shipping was no exception; the cost of shipping rice between Fushiki and Tokyo dropped from the normal ¥70 per 100 *koku* (1 *koku* = 180 litres) to ¥37. Although the minimum (break-even) cost for transporting coal between Moji and Yokohama was one yen per ton, it dropped to half, or 50 sen. That put almost all ships over 10,000 tons out of service from March 1907 to January 1908.⁶

Regulations and the Improvement of Port and Harbour Facilities

The recession in merchant shipping bottomed out in the latter half of 1908, and the economy began a slow road to recovery. A decrease in the number of ships in moorage began around May 1909, and by February 1910 almost all ships were in service. Companies began operation of ships on distant routes as well as in neighbouring waters.

Through the advantages it gained from the wars against China and Russia, Japanese merchant shipping made astonishing progress in the two

decades between 1890 and 1910. The opening of routes to all parts of Asia, Europe, the Americas, and Australia was supported by government policies for protection and development that took legal form in the two 1896 laws promoting navigation and shipbuilding, the Navigation Promotion Law of 1909 that replaced the 1896 laws, and in the Law to Aid Distant Ocean Navigation that came into effect in 1910.⁷ Progress in merchant shipping required a wide assortment of pertinent laws and regulations. Most important among them were the 1896 Law on Shipping Inspections and the revised 1899 Navigation Promotion Law, which replaced the 1884 Regulations on Inspection of Western-type Ships, and, further, set forth rules related to ships, crews, and cleaning, and improved the protection, supervision, and control of Japanese shipping and crews.⁸ Regarding port and harbour facilities, in 1896 the construction of a new port in Yokohama was completed and the improvement of Nagoya and Niigata ports had started. In 1897, improvement work had begun on the ports of Osaka, Nagasaki, and Otaru. Thus Otaru, together with Muroran, became the first port able to load coal on to ships by chutes. Miike Port was improved in 1902, and the first pneumatic caisson for pier construction in Japan was used at Yokohama. At the port of Nagoya, the Nakagawa Canal was opened and the fourth reclamation project completed in 1901. In 1906, the new pier was completed at the port of Yokohama, and improvement projects were begun at the ports of Kobe and Tokyo. In June 1907, the Home Ministry set up a group to survey ports and harbours. In October, the government decided to adopt a Policy on Important Ports and Harbours and Facilities, which designated 14 ports as major and, of these, selected Yokohama, Kobe, Shimonoseki, and Moji as top priority ports to be managed by the national government (see fig. 4, chap. 5).⁹

Merchant shipping made astonishing progress in the period from 1890 to 1910, particularly in overseas routes, but the overseas business was much less than inland shipping. Of the cargo-passenger ships entering the nation's ports in 1910, 9,400 were steamships on overseas routes (20,022,000 tons); 1,700 were sailing-ships on overseas routes (100,000 tons); 442,200 were steamships on domestic routes (134,526,000 tons); 235,700 were sailing-ships on domestic routes (with d.w.t. registered in tons) (16,407,000 tons); and 699,200 ships (with d.w.t. registered in *koku*) (12,673,000 tons, with 10 *koku* = 1 ton). That is 124 times as many ships and 53 times the tonnage on domestic as on overseas routes. That means that 99.2 per cent of cargo-passenger ships and 89 per cent of tonnage making port entries were of domestic shipping. Obviously, the proportion occupied by ships on foreign routes was much smaller.¹⁰

Competition between River Transport and the Railways

Progress in railroad construction during this period was rapid, but this was an initial period, and the impact of railroads on other means of land and water transport such as river boats was still small. Conversely, the effect

that inland water transport had on railroad construction was actually much larger. One example is the 1883 opening of service by Japan Railway on its railroad between Ueno and Kumagaya. The company reduced its freight rates so that it could compete with Tonegawa Shu'un, and this continued until 1889, when Japan Railway's volume of freight increased.¹¹ Another example is the Lake Biwa Canal project, on which construction began in 1890, and the Kamogawa Canal, built in 1894, which connected the Lake Biwa Canal with the Yodo River. Both ran parallel to the railroad routes between Tsuruga, Otsu, Kyoto, and Osaka. But as more and more railroads were constructed during this period, the railroads slowly began to overwhelm the river boats and other inland shipping.

In 1890, the Tone Canal was completed to provide a direct connection between the middle reaches of the Edo River and the lower reaches of the Tone. The canal was designed by A.T.L. Rouwenhorst-Mulder, a Dutch engineer employed by the government, and was a trench-type canal 8.2 km long, 18.2 m wide at bottom, and 1.6 m deep. The canal's completion made the route between Tokyo and Choshi 52 km and six hours shorter than what it had been. It was an excellent contribution to transport along the lower reaches of the Tone and Kinu rivers.¹²

An outstanding characteristic of this period was not only that the development of inland water transport created competition with the railroads, but that this development caused the railroad to actively use inland water transport. Japan Railway started operations on its route between Ueno and Kumagaya in 1883, and by 1891 had opened a complete route between Ueno and Aomori. During the interim, it concluded an agreement in 1886 to construct a railroad between Ueno and Akihabara, which was completed in 1890, at which time freight operations began at Akihabara Station. Built so that it could handle freight for Tokyo, the station was constructed along the Kanda River and, using the docks at Sakuma-cho between Shohei Bridge and Iizumi Bridge, it provided a juncture between river-boat and train transport. Roofed freight docks and rental warehouses were built at the station, and in 1891 a wharf running 120 m east and west and 50 m north and south was added. A canal was constructed to connect with the Kanda River, and the facilities were first used in 1893.¹³

In 1894, Japan Railway began the construction of three rail lines, the Tsuchiura, Sumidagawa, and Iwaki, so that it could transport by rail the Joban coal it had been carrying by sea. The railroad between Tabata and Sumidagawa was opened in 1896. Then, in 1905, a railroad was constructed between Nippori and Mikawashima to connect with this Tabata-Sumidagawa Line. This is the present Joban Line that now originates at Ueno. Akihabara Station was constructed as a freight depot for the Tohoku Line, and Sumidagawa Station was intended as a freight depot for the Joban Line. Sumidagawa is a station on the Sumida River – as its name indicates – in Senju-machi, Kita Toshima-gun, Tokyo-fu that Japan Railway built to handle the freight carried on the Sumida River. Thus construction at Sumidagawa Station included wharves, a canal giving access to the Sumi-

da River, roofed depots for loading and unloading freight and coal, freight warehouses, and a floating crane. The construction of more wharves in 1898 made this a freight station equipped to handle mostly barges.¹⁴ It was here that the railroads connected with inland shipping.

The examples of Akihabara and Sumidagawa stations show that the railroads had not yet assumed complete dominance over water transport. Soon, however, inland water transport was forced into a secondary position as the railway grew in importance, and the trend became quite evident when water transport was limited to barges moving goods within cities. Underlying the growth of the railroad was the expansion of cities under Japanese capitalism that had made dramatic progress through the opportunities given it by the Sino- and Russo-Japanese wars. The concentration of factories and workers in the cities increased the demand for iron, coal, and other industrial raw materials and for rice and consumer staples, and thus dramatically increased the volume of transportation. This created a new transport system with railroads at its centre and caused inland water transport to become subordinate to the railroads.

Notes

1. *Nihon keizai tōkei sōkan* (Complete statistics on the Japanese economy) (Asahi Shimbun Sha, 1930), "Table of Tonnage of Inland Steamships," p. 835; "Table of Tonnage of Inland Sailing-ships," p. 836.
2. *Ibid.*, p. 799.
3. *Ibid.*, "Table of Imported and Newly Constructed Ships," p. 837.
4. Navigation Promotion Law, Law No. 15, enacted 23 March, became effective 1 October. Law on Incentives for Shipbuilding, Law No. 16, enacted 23 March, became effective 1 October.
5. *Nihon keizai tōkei sōkan*, p. 799.
6. *Ibid.*
7. The Navigation Promotion Law was abolished when this law came into effect in January 1910.
8. The laws governing shipping became the basic regulations and supplanted the commercial shipping regulations enacted in February 1870.
9. *Naimushō shi* (History of the Home Ministry), vol. 3 (Taikakai, 1971), pp. 81-95.
10. *Nihon yusō shi* (History of Japanese transport) (Nihon Hyoron Sha, 1971), table 26, "Make-up of Freight Ships Entering Port," p. 407.
11. *Nihon Kokuyū Tetsudō hyaku-nen shi* (Hundred-year history of the Japan National Railways), vol. 2, pp. 463-464.
12. Kawana Haruo, *Tone Unga shi* (An account of Tone Canal) (Ronshobo, 1971).
13. *Nihon Kokuyū Tetsudō hyaku-nen shi*, vol. 2, pp. 449-451.
14. *Ibid.*, vol. 4, pp. 295-300.