

Chap. 2 : transportation in transition
(1868-1891) : coastal and river transport

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3. Yamamoto Hirofumi, "Meiji zenki no dōro yusō to dōro kensetsu" (Road transportation and road construction in early Meiji), in *Kotsu Shi Kenkyu* (Research in transportation history), no. 5 (1980).
4. Various reports concerning the character and cost of internal transport in Japan.
5. See note 3 above.

Coastal and River Transport

Hiromi Masuda

Coastal Shipping and the Opening of the Country

Inland water transport, which included transport over lakes and marshes, as well as rivers, and linked overland horseback, pack oxen, or coolie transport, which terminated at upstream berths, to coastal shipping, which developed at the mouths of rivers, supplemented both land and deep-ocean transport and progressed in all parts of the country during the Edo period. But two events greatly affected the system and forced it to change. The first was the opening of Japan to other countries in 1854; the second was the Meiji Restoration and its subsequent political reforms.

The opening of ports increased the import-export volume and changed the face of traditional transportation; the Restoration's political reforms brought to an end the parallel rule by shogunate and local feudal lords. Both of these developments then led to the creation of a modern transport system, and of all traditional transport modes, coastal shipping was the first to change.

The transition from traditional to modern sea transport began with the acquisition of modern ocean-going cargo ships and navigation techniques. When Commodore Matthew C. Perry's Black Ships first arrived in 1853 to demand that Japan open itself to foreign trade, they provided the incentive for the shogunate to lift its Prohibition on the Construction of Large Ships in the same year and begin building a shipyard at Uraga. The ban had been in effect against the lords since 1635 as part of the closed-country policy. The shogunate itself began constructing Western-style sailing-ships. It gave orders for the Mito clan to build the Ishikawajima shipyard. Satsuma and other powerful clans also began building their own shipyards. The Netherlands's gift of the warship *Soembing* gave the shogunate an excellent tool for the training of navigational techniques. The shogunate established a naval officer training school in Nagasaki in 1855 to turn out professional seamen equipped with modern navigation techniques who, subsequently, would aid in the *Kanrin Maru's* 1860 crossing of the Pacific Ocean. In 1854, the shogunate abolished the special privileges afforded to guilds of Higaki Line agents, who handled ships on scheduled routes between Edo and Osaka. That opened cargo shipping up to competition from other groups. In 1861, the shogunate began trade with Shanghai using its ship, the *Chitose Maru*. To develop commercial shipping, the shogunate cancelled, in that

same year, the ban on commoners constructing large ships and on the purchase of ships from overseas and allowed the use of those ships on domestic routes. In 1867, the shogunate lent a steamship to a guild of runner-messenger agents to operate scheduled service between Edo and Osaka. The shogunate revised tariff agreements in 1866 with Great Britain, France, the United States, and the Netherlands partly to ensure safety on the sea lanes and built lighthouses at Kannonzaki on the Miura Peninsula and seven other places and set up lightships off Yokohama, Hommoku (near Yokohama), and Hakodate.

Shogunal policies on sea transport were directed towards building the kind of strength that could withstand any foreign naval threat and that could prevent the kind of foreign merchant incursion in coastal shipping that American Pacific Mail Steamship Company had been attempting on the route to and from Shanghai. That policy direction became even more important when the port cities of Hyogo, Niigata, Edo, and Osaka were opened in the 1850s and was further strengthened by the Restoration government. The new government of the Meiji period continued the shogunal policies on sea transport lock, stock, and barrel.

Coastal Shipping and the New Government's Shipping Policies

The Meiji government passed regulations in November 1869 that allowed anyone to own a Western-style ship but required that construction or purchase of such ships be reported. In February 1870, the government decreed new regulations on commercial shipping that emphasized the safety of the Western ship, that were based on the intention to convert all Japanese shipping to Western-style vessels and eliminate all traditional Japanese ships, and that provided special, favourable treatment for the owners of Western-type ships. Around the time this first set of regulations was handed down, the Foreign Office made an inquiry (in September 1869) that indicates that the intent of the policy was to keep foreign ships out of coastal shipping and to foster Japanese shipowning and coastal shipping companies. However, in the early years of Meiji, the government and the leading clans owned almost all Western ships and the only way coastal shipping companies could be developed in a hurry was for the government and the clans to lend or sell those ships. Several coastal shipping enterprises were created in this way. The Kimansen Line was formed by the Kishu clan lending six steamships to Kinokuniya Manzo and his associates in February 1869 to transport cargo between Kobe and Yokohama. In November 1870, Iwasaki Yataro took over Kaiseisha of Tosa, renaming the enterprise Tsukumo Shokai, and was lent three ships by the Tosa clan to cover the route between Tokyo, Osaka, and Kochi; this company later became Mitsubishi Kaisha. Under Trade Agency (Tsushoshi) jurisdiction in March 1869, the government, Kishu, and four other clans lent 11 steamships to Mitsui Hachirobei's clerk Suita Shirobei who, with Goto Shojiro, formed Kaiso Kaisha, a company for shipping cargo between Tokyo and Osaka.

In May 1871, Kaiso Kaisha was dissolved to become the Kaiso Forwarding Agency, which was subsequently shut down in September 1872 and re-established as the Japan Mail Steamship Company. In August 1871, the order abolishing feudal domains and setting up prefectures in their stead was issued. All ships owned by the domains thus became the property of the government under Postal Service Agency (Ekiteishi) jurisdiction. The ships were then sold to the Japan Mail Steamship Company. Using these ships and those owned by Takashima Choemon, the company began a scheduled shipping service between Tokyo and Osaka and a non-scheduled service on the Tokyo-Hakodate-Ishinomaki and Tokyo-Okinawa routes, allowing it to transport tributary rice nationwide. However, the company could not compete with Pacific Mail and Mitsubishi Kisen.¹ It went bankrupt in September 1875, and the Postal Service Bureau (Ekiteiryō) bought back its 18 ships.

In November 1870, Iwasaki began shipping operations with his company Tsukumo Shokai that he had created with the loan of three ships from the Tosa clan. In 1871, when the domains were abolished, he bought the ships at bargain, long-term instalment rates. The company went through a series of name changes – Mitsubishi Shokai in 1872, Mitsubishi Kisen Kaisha in 1875, and eventually Yubin Kisen Mitsubishi Kaisha. Mitsubishi availed itself of a particularly golden opportunity for growth in 1874 when the Japan Mail Steamship Company, whose operations were gradually getting worse, failed to fulfil a government order during the Saga Rebellion. The government charged Mitsubishi with the operation of the ships it had purchased from the domains and through this and a continuing accumulation of capital, the company grew dramatically. It was also in 1874 that the Home Ministry was established, resulting in the creation of the so-called Okubo government, a cabinet formed around the home minister, Okubo Toshimichi. Under Okubo, the industrial development policy (“increase production and promote industry”) began to get a full head of steam.

The Industrial Promotion Policy and the Development of Coastal Shipping

As the *Memorial on Industrial Development*² that Okubo submitted in May 1874 shows, his government’s policy, since the time it decreed regulations on ocean navigation, was based on an industrialization model similar to that of British capitalism. The development of domestic transport, including shipping, was expected to form the foundation for developing the rest of industry. This is one reason that Okubo ordered Mitsubishi Shokai, in January 1875, to start competing with the Pacific Mail Steamship Company on the route between Yokohama and Shanghai.³ He worked to make Mitsubishi a replacement for the bankrupt Japan Mail Steamship Company, to give it government protection, and to protect the private corporate basis for ocean shipping. In September 1875, the Home Ministry transferred to Mitsubishi 13 steamships it owned at no cost and gave the first order for 15

years of grants to Mitsubishi at ¥250,000 a year that would subsidize Mitsubishi's shipping costs and provide it with ¥15,000 a year to train merchant seamen. It also engaged Mitsubishi for the transport of government mail.⁴

In October, Mitsubishi purchased Pacific Mail Steamship vessels and onshore equipment used for the Yokohama-Shanghai route. Mitsubishi thus elbowed out a competitor that had opened a branch office in Yokohama after Japan was opened to the West and was trying to move into Japanese coastal shipping. In February 1876, Mitsubishi began competing against the British P & O Steamship Company on the Hong Kong-Shanghai-Yokohama route and succeeded in causing P & O to cancel its Shanghai-Yokohama route in August of that year. Steadily gaining in its monopolistic control over coastal shipping, Mitsubishi was the beneficiary, in September, of a second government ordinance⁵ providing subsidy payments for scheduled coastal routes and a grant of 15 government-owned ships purchased from the bankrupt Japan Steamship Company. With the outbreak of the Satsuma Rebellion in February 1877, the government gave a grant-in-aid to Mitsubishi to purchase 10 steamships for military transport. This increased Mitsubishi's size and strengthened its monopoly.

The inflation brought on by the Satsuma Rebellion made the shipping industry even more prosperous. Mitsubishi's success added further stimulus to that prosperity. The growth in shipping resulted in an almost complete link by Western-type ships of the nation's major ports. But the success also heated the criticism of the government's protection and subsidization of Mitsubishi. After Okuma Shigenobu's dismissal from office, Finance Minister Matsukata Masayoshi began a deflationary policy that brought about changes in the industrial development programme, changes that caused the government to tighten its control over Mitsubishi. The government received an application for subsidies from the financially strapped Tokyo Fuhansen Kaisha, a company established in August 1880. It took advantage of this application to establish a new shipping corporation that would be put in competition with Mitsubishi. The government amalgamated Tokyo Fuhansen and several other companies in July 1882 to create Kyodo Un'yu Kaisha (Kyodo Transport Company), a half-government, half-private company. As soon as Kyodo Un'yu started operations in January 1883, it engaged in fierce competition with Mitsubishi that precipitated decline rather than improvement in the operations of both. Government mediation provided a brief respite, but competition was even heavier within a month. The government negotiated with both parties and convinced them that they would have to be consolidated in the interests of national defence. The September 1885 consolidation created the new Nippon Yusen Kaisha.

After the Satsuma Rebellion, many small and medium-sized owners began operating vessels on the coastal routes to the west of the Kansai region, resulting in heavy competition in this area. However, these shipowners joined forces to form the Osaka Shosen Kaisha (Osaka Merchant Shipping Company) in 1884. Japan's ocean and coastal shipping industry embarked on an era of unprecedented activity when the Asano Kaisobu, predecessor

to Toyo Kisen, was established in 1887, and Mitsui Bussan's shipping business began to grow at a rapid rate.

The growth of marine transport was sustained by improving large segments of the infrastructure, including shipbuilding, sea-lane surveys, port and harbour repair and construction, and merchant seaman training.

Taking shipbuilding as an example, no matter how much the government argued the superiority of the Western ship, shipbuilding would not develop so long as the industries related to it, particularly steel production, remained in an underdeveloped state. Thus, the shipbuilding industry initially built Western sailing-vessels of wood before eventually building steel steamships. In the decade following 1877, there was a rapid increase in the number of Western sailing-ships; the iron ships that were built beginning in 1883 were, by the 1890s, being replaced by steel ships. The number of steamships rose sharply. The key players in the development of shipbuilding were the Ishikawajima Hirano Shipyard, begun by Hirano Tomiji in October 1876; the Tokyo Tsukiji Shipyard, started by Kawasaki Seizo in April 1878; Osaka Ironworks, established by E. H. Hunter in 1881; and the Nagasaki Shipyard, sold at a discount by the Ministry of Finance to Mitsubishi in June of 1887 and renamed Mitsubishi Shipyard in December 1888. Modern shipbuilding began in May 1890 when Mitsubishi Shipyard built Japan's first steel cargo ship, the *Chikugogawa Maru*, which was delivered to Osaka Shosen.

The progress of modernization in the marine transport and shipbuilding industries required safety standards. The shipping inspection system got its start with the Regulations on Measuring Ship Loads,⁶ created to establish safety standards in April 1884, and the government-decreed Regulations on the Inspection of Western-style Ships of December 1884.⁷ In the meantime, to ensure better shipping safety, the government set up a 12-year Japan National Coastal Measurement Plan in November 1881. It began surveying in May 1882, prohibited private installation of lighthouses in June 1885, and handed down an ordinance to standardize markers on navigational routes in October 1887. The government was also working to construct and maintain ports and harbours. It had begun the project to build Nobiru Port in Kamaishi Bay in 1878, and was now reclaiming Niigata Port and had employed foreign engineers for the work on reclaiming Mikuni Port. Port and harbour facilities were gradually being modernized as Kobe Sambashi Kaisha completed a Western-style pier for Kobe Harbour in November 1884 and construction began on breakwaters and piers for Yokohama Harbour in September 1888.

River Transport and the Establishment of a National Transportation Network

It is difficult to get an overall view of the size of inland shipping, which was chiefly shipping on rivers, at the beginning of the Restoration period. However, according to a survey by Kurosaki Chiharu,⁸ based on a survey of

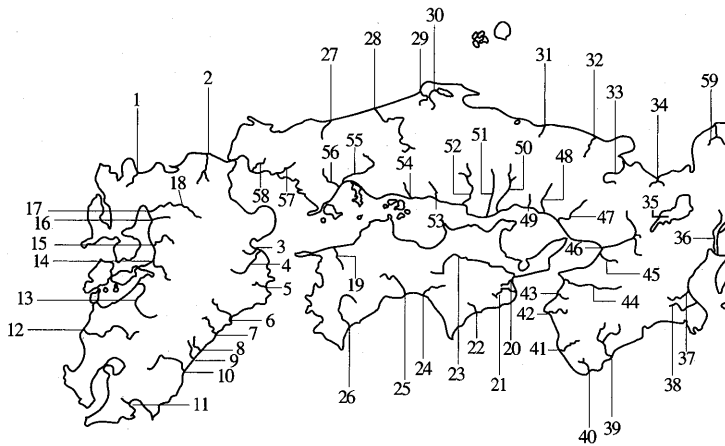
135 rivers by the Home Ministry's Construction Bureau and reported in its tenth annual statistical report of 1901, the nation had more than 10,000 km of navigable river routes and 93,000 river boats carrying more than 324,000 litres of cargo. Considering that railroads were becoming the dominant mode of inland transport and that inland shipping had begun to decline by this time, the number of river boats in the early years of Meiji must have been much larger. In 1872, the 180,000 Yamato sailing-vessels, which constituted most of the ocean-going ships, carried over 595,000 litres of cargo. Comparing these numbers with the figures for river boats in 1901 leads to the conclusion that there were about five times as many river boats as sea-going ships and that their cargo-carrying capacity was about half. This is a very rough estimate, but it gives some idea of the importance of river transport as a part of inland transport.

The Meiji government made inland shipping part of its policy in the process of creating a national transportation network. In its programme to establish a national transportation network, the government gave special protection and aid to Rikuun Moto Kaisha – set up in 1872 by the Kyoto-Edo-Osaka guilds of full-time messenger-runner agents. In June 1873, the cabinet issued Decree 230 to prohibit the operation of private transport after 1 September and require those who desired to operate transport facilities to join with Rikuun Moto Kaisha or establish an independent company. The decree applied to all transport except maritime.⁹ Up to this time the major emphasis in government transportation policy had been land transport, but the government now took a more active stance on inland water shipping, augmenting land transport in the building of a national transport network.

The policy of developing Rikuun Moto Kaisha to build a national transportation network was adopted during the period the Home Ministry was being established, from November 1873 to January 1874, and the Okubo government made the policy part of its programme to increase production and promote industry. In February 1875, Rikuun Moto Kaisha was renamed Naikoku Tsuun, and the national transportation network was completed. The government disbanded local land transport companies. Amalgamating inland shipping and coastal agents with Naikoku Tsuun brought them into the national transport network. Since the government's protecting and aiding of Mitsubishi also established a nationwide network of delta ports around the same time, a national transportation network came into being that unified inland and ocean transport.

River Transport Development and the Industrial Fund Project

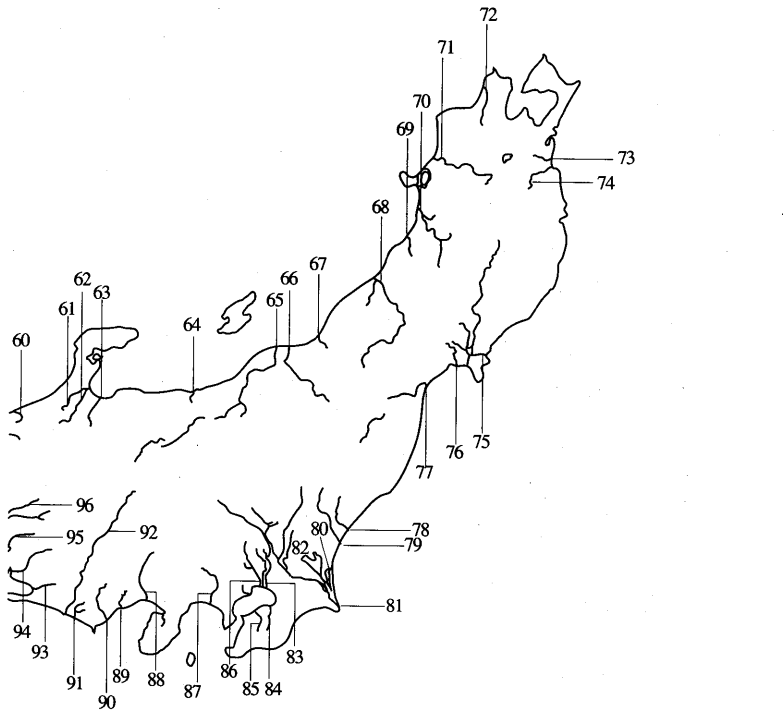
Inland shipping, chiefly that on rivers, was being modernized in various ways prior to the creation of the national transportation network that began with Cabinet Decree 230 in 1873. Two examples are the Tokyo government's permission in 1869 to allow steamboats on the Tone and Edo rivers¹⁰ and Rikuun Moto Kaisha's opening of an office on the Takasaki River and



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|--------------|---------------|--------------|---------------|-------------|
| 1. Matsuura | 11. Kimotsuki | 21. Naka | 31. Sendai | 41. Tonda |
| 2. Onga | 12. Sendai | 22. Kaifu | 32. Maruyama | 42. Hidaka |
| 3. Oita | 13. Kuma | 23. Yoshino | 33. Yura | 43. Arita |
| 4. Ono | 14. Midori | 24. Monobe | 34. Kita | 44. Kino |
| 5. Banjo | 15. Kikuchi | 25. Niyodo | 35. Lake Biwa | 45. Yamato |
| 6. Gokase | 16. Yabe | 26. Shimanto | 36. Imben | 46. Yodo |
| 7. Mimi | 17. Chikugo | 27. Takatsu | 37. Kumozu | 47. Kako |
| 8. Omaru | 18. Rokkaku | 28. Gono | 38. Miya | 48. Ibo |
| 9. Hitotsuse | 19. Hiji | 29. Kando | 39. Kumano | 49. Chikusa |
| 10. Oyodo | 20. Katsuura | 30. Hii | 40. Koza | 50. Yoshii |

Fig. 3. Navigable rivers in the 1890s

Source: Kurosaki Chiharu, "Meiji zenki suiun no shomondai" (Problems in water transport during early Meiji), in *Kindai Nihon yusōshi* (History of transport in modern Japan) (Seizando Shoten, 1979).



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|---------------|-------------|---------------|-----------------|------------|
| 51. Asahi | 61. Oyabe | 71. Yoneshiro | 81. Tone | 91. Ota |
| 52. Takahashi | 62. Shou | 72. Iwaki | 82. Kasumigaura | 92. Tenryu |
| 53. Ashida | 63. Jinzu | 73. Aisaka | 83. Arakawa | 93. Toyo |
| 54. Nuta | 64. Seki | 74. Mabechi | 84. Yoro | 94. Yahagi |
| 55. Ota | 65. Shinano | 75. Kitakami | 85. Obitsu | 95. Shonai |
| 56. Nishiki | 66. Agano | 76. Naruse | 86. Tama | 96. Kiso |
| 57. Asa | 67. Arakawa | 77. Abukuma | 87. Sagami | |
| 58. Koto | 68. Mogami | 78. Kuji | 88. Fuji | |
| 59. Kuzuryu | 69. Koyoshi | 79. Naka | 89. Abe | |
| 60. Kakehashi | 70. Omono | 80. Kitaura | 90. Oi | |

Notes: 1. Taken from the "River Survey" for 1892-1899; 2. Only the navigable portions of rivers are shown.

an agency on the Akutsu River that began shipping freight in August 1872. In June 1873, the company opened water routes on the Tone, Arakawa, and Kinu rivers, and in 1874 set up a freight office in Koami-cho in Tokyo's Nihombashi to handle freight relays to the Oshu region in northern Japan.¹¹ Boat handlers on the Fuji River submitted a petition for incorporation in June 1872 and received authorization in January 1874 to start their company, Fujikawa Un'yu.¹² The route was only 6 km long, but the new canal that was cut through eliminated the need to transfer cargo by land between Iwabuchi and Kambara.¹³ In 1869, a petition was submitted to lengthen the navigable portions of the Minuma Substitute Waterway, the connection between the Tone and Arakawa rivers. In 1873, permission was given for this expansion to extend to the Motoara, Hoshi, and Shinobu rivers, and in September 1874, the Minuma Tsusen shipping company was set up.¹⁴

As these examples show, traditional inland shipping continued, but work was also under way to improve transportation by rehabilitating old waterways, opening new ones, and bringing in steamboats and other new equipment and, at the same time, reorganizing traditional river-bank agents, shipowners, and ferrymen. Proclamation of Cabinet Decree 230 in 1873 had a very important effect on the reorganization by providing strong guidance from national and local governments. In Chiba Prefecture, for example, a stream of petitions was submitted requesting government permission for the building of new river-bank facilities and the starting of cargo and passenger transportation by steamboat and traditional river boat.¹⁵

The government's idea that transportation would provide the foundation for industrial development first became part of an actual series of fund-raising projects in 1878. These projects can be categorized as either part of the Home Ministry's port construction for marine transport or construction of rivers, waterways, and roads for inland transportation or the Public Works Ministry's building of trunk railroads. The Home Ministry's construction of Nobiru Port and related works was momentous, because it connected river and land transport in the Tohoku region to marine shipping at Nobiru and contributed significantly to the building of a national transportation network. The construction of Nobiru Port had its origins in the project to improve shipping on Kitakami River and the reclamation of the estuary port of Ishinomaki, an indication that the project was first intended to develop river shipping. Nobiru Port was constructed to connect Kitakami River shipping through the Kitakami Canal, Abukuma River shipping through the Teizan Canal – Matsushima Bay – and Tona Canal, and Naruse River shipping directly to Nobiru. Funds for industrial development encompassed construction of roads between Sakunami and Sekiyama and between Kurosawajiri and Yokote that would provide a land connection to river transport.¹⁶

The Complementarity of River Transport and Railroads

The period in which the Industrial Fund Project was begun was one of organization and progress in river transport. For example, Naikoku Tsuun began

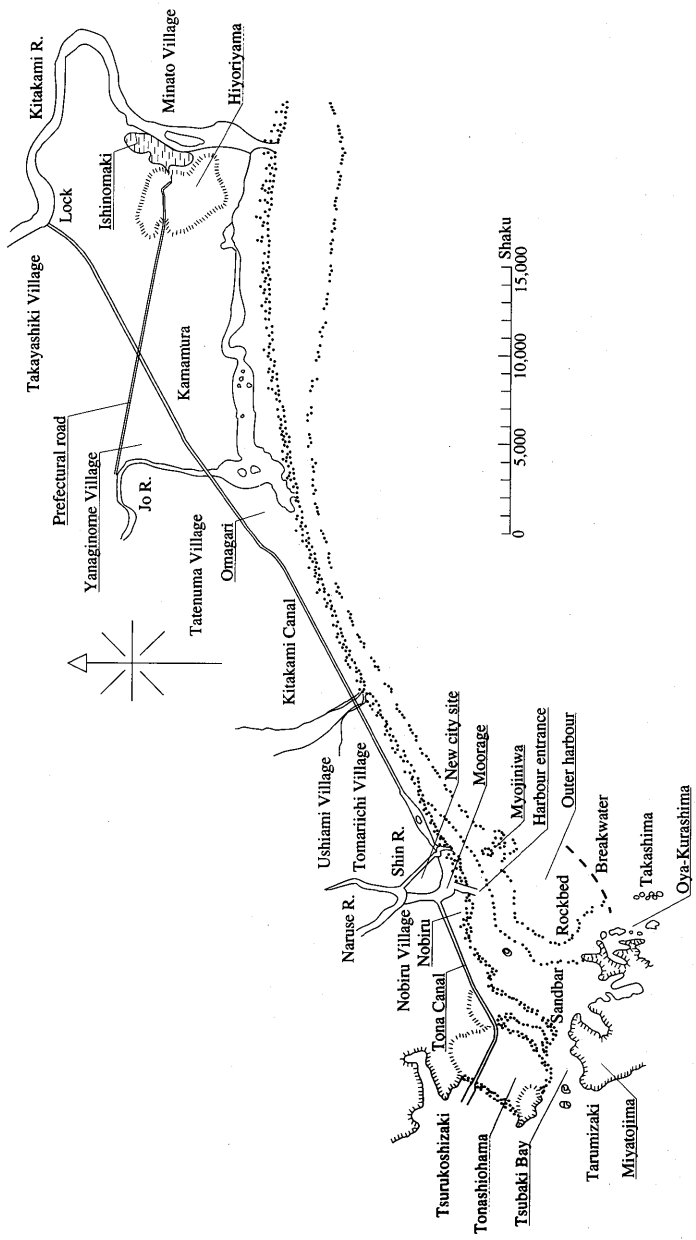


Fig. 4. Map of Nobiru Fort construction
 Source: Hiroi Isamu, *Nihon chikkō shi* (History of Japanese port construction) (Maruzen, 1977).
 Note: One shaku = 30.3 cm.

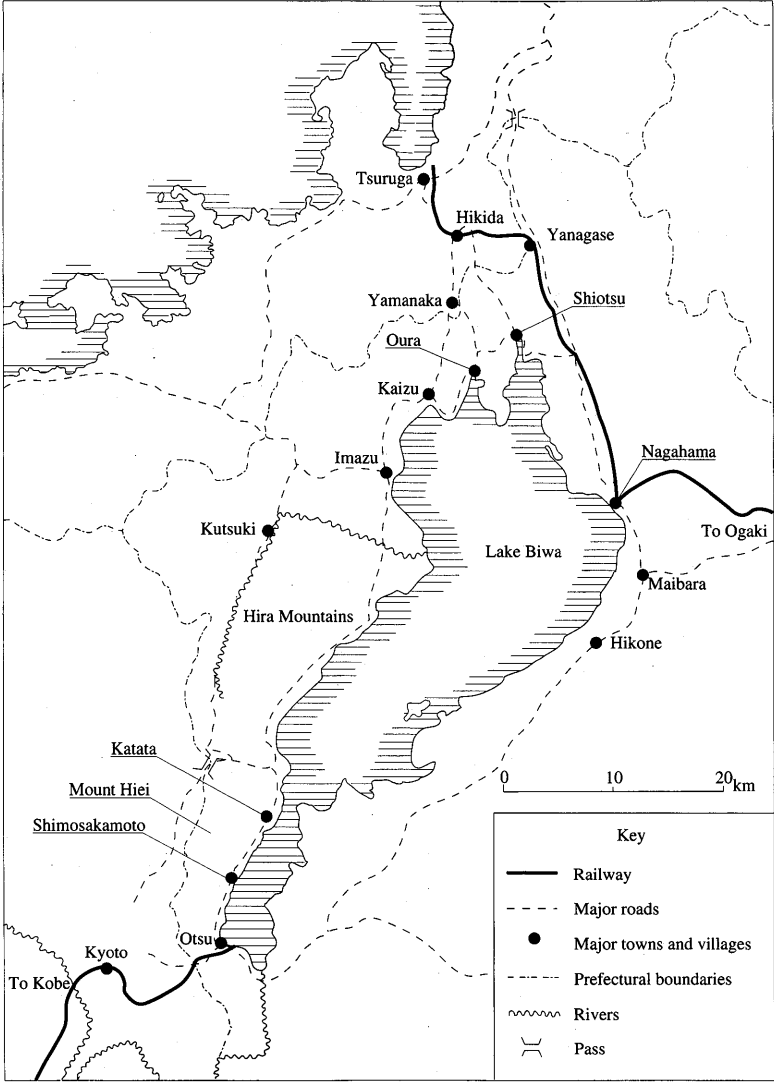


Fig. 5. Transit routes in the Lake Biwa vicinity (1887)

to operate steamboats on the Tone River in 1877, and that led to a rapid diversification of routes. Competition stiffened as new steamboat operators entered the field, such as Nagashima Yoshiyori with his five *Nagashima Maru* ships in 1880 and Choshi Kisen in 1891. In view of the rapid progress taking place in river transport, the planners of the Industrial Fund Project became

firmly convinced that they should develop inland transport to augment marine shipping. These convictions are evident in the building of Nobiru Port and the Public Works Ministry's railroad construction. Not only was Nobiru to be one of the terminals for Tohoku railroads, but a railroad was also going to be laid between Tsuruga (on the Sea of Japan) and Ogaki (Gifu) that would connect Ogaki and Yokkaichi (on the Pacific) by Ibi River transport, thus linking to marine transport at both Tsuruga and Yokkaichi.¹⁷ Water transport on Lake Biwa between Otsu and Nagahama connected railroads at those two points.

Soon after the Ministry of Public Works completed constructing the railroad between Kyoto and Otsu in 1880, it began receiving shipments of materials at Kobe Port to construct a railroad between Tsuruga and Ogaki, the shipments being carried on Lake Biwa by special boats from Otsu. After the line between Tsuruga and Nagahama was opened in 1884, a ferry connection was made for cargo and passenger transport using boats of Taiko Kisen between Otsu and Nagahama, the operation of which continued until all segments of the Tokaido Line were completed in 1889. Business relationships and cooperation of this nature between railroad and water transportation continued for many years afterwards. A project to build a Lake Biwa canal was begun in 1885 and almost finished in 1890, so that a shipping route could be started that would operate with the railroad that began with a line from Kobe to Osaka in 1874 and was extended to Kyoto in 1876 and to Otsu in 1880. Completion of the Kamo River Canal in 1894 connected Osaka with Lake Biwa through the Yodo River, Kamo River Canal, and the Biwa Canal. A steamboat line was also started on the Yodo in 1888 (some sources say 1887),¹⁸ which also paralleled the railroad. After the Tokaido railroad line was completed in 1889, shipping on the Fuji River increased the volume of goods to the Yamanashi and Nagano areas, and a new canal was dug from the Fuji River to Iwabuchi Station on the Tokaido Line.¹⁹ This canal remained active until a connection was established between the Chuo Railway Line and the Shinoi Line in 1906.

During this period, we see cases such as transportation on the Fuji River actively providing connections and being used with Mitsubishi's scheduled ships to transport cargo from the port of Shimizu (Shizuoka) to Tokyo, Yokohama, Yokkaichi, and Osaka, but there were also instances like the transport on the Kitakami and Abukuma rivers, where transport rapidly declined when railroads went into operation.²⁰

Notes

1. After Japan opened its ports in the mid-1850s, Pacific Mail Steamship Company opened an office in Yokohama and began regular service on routes between San Francisco and Shanghai.
2. See *Okubo Toshimichi monjo* (The Okubo Toshimichi papers), no. 5, pp. 561-566.

3. The route between Shanghai and Yokohama was opened on 3 February, to become Japan's first overseas shipping route.
4. The company name was changed from Mitsubishi Kisen Kaisha to Yubin Kisen Mitsubishi Kaisha.
5. The second order provided funds of ¥15,000 annually to build a school to train a merchant marine.
6. Cabinet Decree 10 of 24 April 1884 went into force on 1 July 1884.
7. Cabinet Decree 30 of 22 December 1884 went into force on 1 July 1885.
8. Kurosaki Chiharu, "Meiji zenki suiun no shomondai" (Problems in water transport during early Meiji), in *Kindai Nihon yusōshi* (History of transport in modern Japan) (Seizando Shoten, 1979), pp. 162–163.
9. *Hōki bunrui taizen* (Collection of laws by category), "Inquiries on Transportation and Stations," pp. 349–350. Response to questions from Shiga prefectural government about range of applicability.
10. *Tōkyō-shi shikō* (Historical materials for the city of Tokyo), "Ports and Harbours," vol. 1, p. 594.
11. *Tonegawa kisen kōro annai* (Guide to steamboat routes on the Tone River), pp. 13–14.
12. Masuda Hiromi, "Fujikawa Un'yu Kaisha no sōgyō ni tsuite" (On the founding of the Fujikawa Transport Company), *Bunkyo Daigaku Joshi Tanki Daigaku Kiyō* (Bulletin of Bunkyo University, Women's Junior College), no. 20.
13. Ibid., "Kambara Shinsuidō no kenchiku to keiei ni tsuite" (On the construction and management of the New Kambara Waterway), *Bunkyo Daigaku Joshi Tanki Daigaku Kiyō* (Bulletin of Bunkyo University Women's Junior College), no. 22.
14. *Minuma Daiyōsui enkakushi* (History of the Minuma Substitute Waterway), p. 1136.
15. *Chiba-ken shiryō* (Historical documents for Chiba Prefecture), "Industry."
16. Masuda Hiromi, *Shokusan kōgyō seisaku to Nobiru chikkō* (Industrial development policy and the construction of Nobiru Port) (United Nations University, 1979).
17. *Nihon Kokuyū Tetsudō hyaku-nen shi* (Hundred-year history of the Japan National Railways), vol. 2, pp. 206–211.
18. Kuroha Heijiro, *Kinsei kōtsū shi kenkyū* (Research in modern transportation history) (Nihon Hyoron Sha, 1943), pp. 387–402.
19. Masuda, "Kambara Shinsuidō no kenchiku to keiei ni tsuite"; see note 13 above.
20. Ibid., "Meiji zenki kasen shū'un no tenkai – Fujikawa Un'yu Kaisha Shimizu Shutchōjo o chūshin to shite" (Development of river transport in early Meiji – Focus on the Shimizu Office of the Fujikawa Transport Company), *Bonchi – Sono rekishi to chūikisei* (Basin areas – History and regional characteristics) (Yuzankaku, 1984).