advocated private construction and operation. *See* Hoshino Takao, "Meiji shonen no shitetsu seisaku: 'Tetsudō kokuyūshugi setsu' 'kansen kansetsushugi setsu' no saikentō" (The policies on private railroads in early Meiji – Re-examining the theories of state ownership of railroads and of government operation of trunk lines), *Musashi Daigaku Ronshu*, vol. 27, nos. 3–5 (1979).

Roads

Hirofumi Yamamoto

The Appearance of Vehicular Transportation

National unification and growing foreign trade caused traditional transportation systems to collapse, transport demand to increase, and road transportation, around 1875, to begin marked progress. This progress is shown in sharp relief in the increase in vehicular transport. As previously mentioned, the traditional feudal system prohibited vehicular road transport. However, transport of goods by freight wagon was permitted for the first time in 1863, and in 1870 the new government modified the rules to allow passenger transport by rickshaw.

After the ports were opened in 1854, foreign ministries used their own horse-drawn carriages for travel in the port vicinity. But not until 1869 was permission first given allowing Japanese to operate horse-drawn passenger-carrying services on the route between Tokyo and Yokohama. However, this connection between the capital and a major open port was an exception, and it was not until 1872, with the beginning of the railroads, that this passenger service was permitted generally. When that happened, it led not only to the appearance of horse-drawn cabs and coaches within the cities but also to horse-drawn coaches running between stations along the highways.

Bids were submitted in 1872 to operate horse-drawn coaches on six routes: Tokyo-Takasaki, Tokyo-Hachioji, Tokyo-Utsunomiya, Sakai-Fukushima, Osaka-Kyoto, and Hakodate-Sapporo. All bidders were private operators except those asking for the route between Hakodate and Sapporo. Common to all is that a major city, Tokyo, Osaka, or Sapporo, was one of the terminals; these were routes with the highest transportation demand. The opposite terminals, Takasaki, Utsunomiya, Fukushima, and Hachioji, were in regions producing silk for export. So part of the high transportation demand came from the need to transport silk to Tokyo. The goods were rail-shipped to Yokohama and then overseas. This does show, however, that horse-drawn transport, from its inception, was different from railroad transport in being privately controlled and sought to supply the market's demand for transportation. Raw silk was light, it commanded high transport fares, and was sensitive to changes in price. It was a cargo most highly suited to the new mode of transportation. In addition to general cargo, the horse-drawn coach companies contracted to transport government mail in March 1871. Those carrying the mail travelled under govern-

Table 1. Number of vehicles for 1875–1890

Year	Horse-drawn carriage		Ox cart	Cart	Rickshaw
	Passenger	Freight			
1875	319	45	1,707	115,680	113,921
1880	1,455	337	3,109	316,664	160,531
1885	1,959	8,567	5,949	474,290	166,058
1890	2,877	29,088	11,027	763,056	178,041

Source: Compiled from *Nihon Teikoku tōkei nenkan* (Statistical yearbook of the Empire of Japan).

ment protection and displayed the shield indicating a government-authorized mail carrier. The groups traditionally providing transportation were feudally organized and saw the new private companies as invaders of their territory and not infrequently tried to obstruct passage. But as far as the government was concerned, the new mode of mail transport worked to its advantage because it did not have its own transportation machinery. The private companies also benefited because they got government protection.

Next we will look at horse-drawn transportation between Tokyo and Takasaki to get a more detailed idea of the situation and organization of transport at that time.

Horse-drawn coach transport between Tokyo and Takasaki was started by the Nakasendo Yubin Basha Kaisha (Nakasendo Mail Horse Coach Company) in June 1872. In February of the same year, the company had been given permission to operate as a mail transport coach company and could carry the name and shield designating it as such. One condition of that permission was the free transport of 37.5 kg of mail per day. The company was also provided with 50 ares of land in Tokyo and a no-interest, ¥5,000 government loan repayable in 10 years. Although the form of incorporation is not clear, it is believed to have been a partnership. The company was organized with headquarters in Tokyo, branches in Kumagaya and Takasaki, and agencies in Warabi, Okegawa, and Honjo. Two two-horse coaches travelled between Tokyo and Takasaki every day, and two one-horse coaches plied the route between Tokyo and Kumagaya. A total of 50 horses were stabled at stations along the way. The coaches set out from Tokyo and Takasaki every morning at six and arrived at the other terminal at six that evening. There was one circuit per day between Tokyo and Takasaki and between Tokyo and Kumagaya. Since the distance between Tokyo and Takasaki is 110 kilometres, the coaches would have been moving at about 10 km per hour. The fare for 150 kg was ¥2.37 on the up-slope from Tokyo to Takasaki and ¥2.13 on the down-slope from Takasaki to Tokyo. So even though the route was the same, gradient made a difference in prices. This was basically the same fare system used during the feudal period, and it shows that a modern method of charging fares had yet to be instituted. The

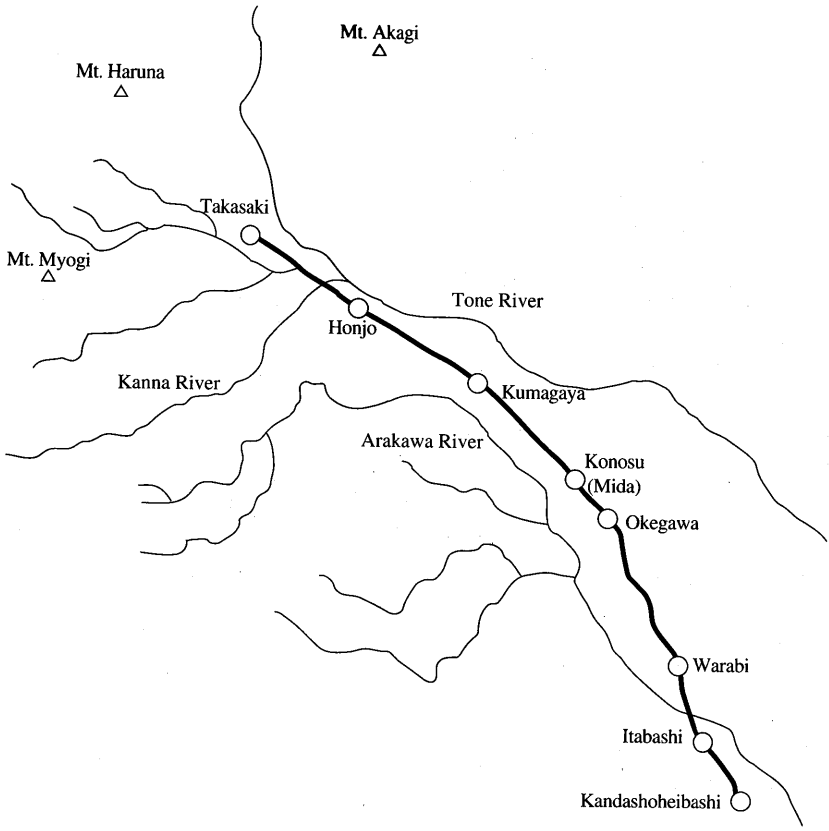

Fig. 1. Routes operated by the Nakasendo Yubin Basha Kaisha
Source: Yamamoto Hirofumi, *Ishinki no kaidō to yusō* (Roads and transport in the Restoration period), expanded edition (Tokyo, Hosei University Press, 1983).

standard was quite high, about 1.8 times the amount of horseback transport.

However, not very long after it had started operations, Nakasendo Yubin Basha Kaisha's horse-drawn transport had to directly confront the problem of poor roads. Japan's roads had never before carried horse-drawn vehicles, roadbeds and road surfaces were weak and deeply scarred with pock-marks and holes. There were no bridges over the rivers, and if a vehicle could not drive across a river, it had to be ferried to the other side. Very rare indeed was an on-time arrival of a horse-drawn coach, delays of two or three hours being the norm. Travel was particularly hazardous during rainy periods, with vehicles often overturning or suffering other types of damage.[1]

Road conditions made transport a strange patchwork throughout the

country. A good example is Rikuun Moto Kaisha (the predecessor to Naikoku Tsuun Kaisha), which started transporting mail on the Tokaido in August 1874. The company was formed from groups of foot-messenger agents who had contracted for the transport of correspondence, currency, and high-quality cargo since the early years of the Edo period. When the government began transporting the mail, the foot messengers launched a company in July 1872 to subcontract for that transport and at the same time became the recipients of special government protection. Rikuun Moto started horse-drawn coach transport for quick delivery of government mail between Kanagawa and Odawara in August 1875, but the route was subsequently extended to Atsuta in November 1875 and to Kyoto in August 1876. A December 1877 order from the postal authorities to Rikuun Moto Kaisha required it to divide the 495 km between Kanagawa and Kyoto into 14 segments. The order also called for the afternoon departure from Kanagawa to arrive in Kyoto in 56 hours and the evening departure to arrive in 60 hours. However, the poor roads made horse-and-wagon use impossible over the entire route. Runners had to be used between Odawara, Hakone, and Mishima, between Shimada and Nissaka, and between Atsuta, Kuwana, and Tsuchiyama; rickshaw had to make the run between Utsunoya and Shimada and ferry had to be used to transport the mail between Hamamatsu and Shinjo. Coaches could be used only on the remaining seven segments. Rikuun Moto Kaisha continued this patchwork mail-carrying method into the 1880s. An order of February 1883 called for some improvements by shifting from runners to rickshaw on the route between Atsuta, Kuwana, and Tsuchiyama and from rickshaw to coach between Utsunoya and Kanaya (the station west of Shimada).[2]

Horse-drawn transport of this kind spread throughout the nation in the 1880s. The number of horse-drawn coaches increased rapidly from 364 in 1875 to 31,965 in 1890. The increase in freight wagons was particularly astounding, from 45 in 1875 to 29,088 in 1890, surpassing the number of passenger-carrying horse-drawn vehicles (1,920) in 1882 (2,623 freight carriers). It goes without saying that progress of this kind in horse-drawn transport reflects the rapid increase in product distribution that accompanied the development of domestic industry. Japanese industry began to grow at the same time, and water-wheel-powered manufacturing appeared throughout the country with the greater systematization of local administration and the increases in foreign trade at the end of the 1870s. A great many improvements were also made in the traditional technologies of silk reeling and cotton spinning. The age of horse-powered transport intrinsic to a revolutionizing industry was beginning.

The Development of Urban Transit

At the same time, urban transit, especially in the large cities of Tokyo, Yokohama, Osaka, and Kobe, was undergoing dramatic change. The first change was seen in the great mix of traditional and new modes of transport

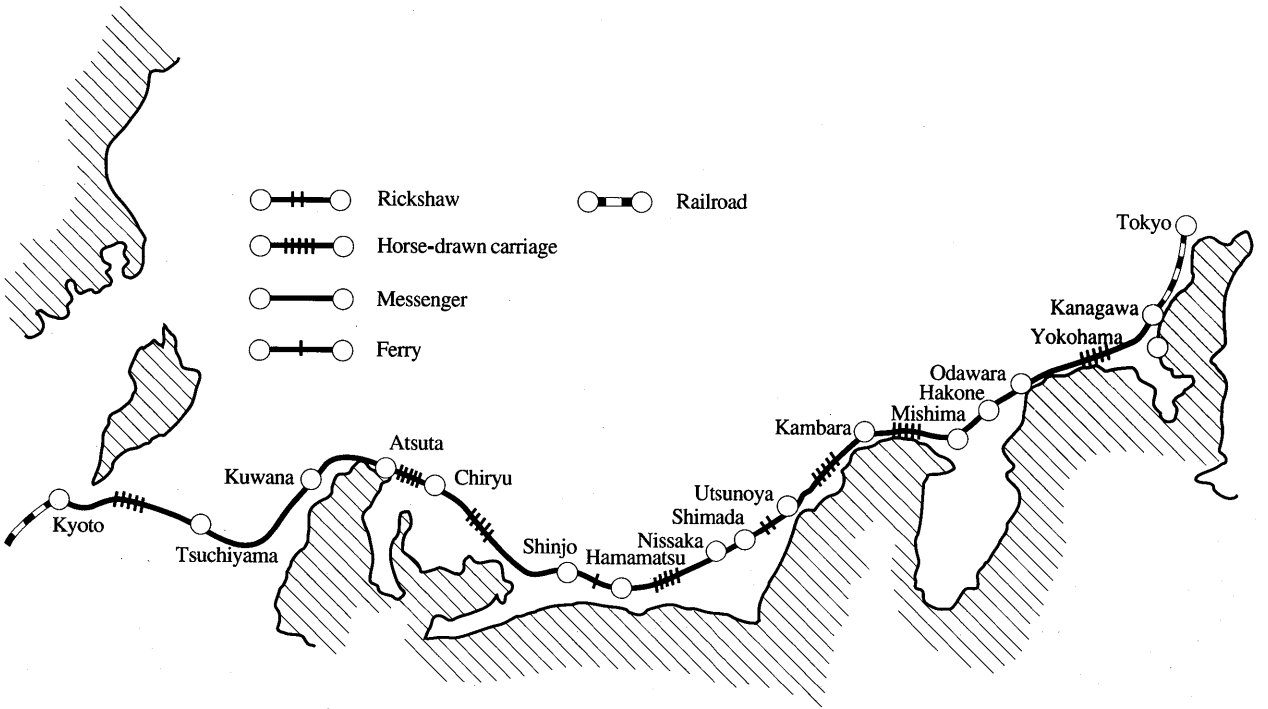

Fig. 2. Modes of postal transport along the Tokaido in December 1877
Source: Yamamoto Hirofumi, *Ishinki no kaidō to yusō* (Roads and transport in the Restoration period), expanded edition (Tokyo, Hosei University Press, 1983).

Table 2. Number of vehicles in Tokyo (1876–1890)

Year	Horse-drawn carriage		Ox cart	Cart	Rickshaw
	Passenger	Freight			
1876	249	40	72	19,475	25,038
1880	476	61	76	30,238	25,257
1885	547	?	149	50,973	31,838
1890	693	1,806	132	68,775	41,958

Source: Tokyo-fu tōkei sho (Tokyo statistical report).

and in noisier streets, caused by the rapid influx of population and the emergence of vehicular transport. The population of Tokyo went from 957,000 in 1880 to 1,531,000 in 1890, a 160 per cent increase. Horse-drawn cabs and coaches had been imported early on from overseas and they added to the variety of the transportation mix.

The first horse-drawn vehicles after the opening of the ports were the carriages run by the foreign ministries between Yokohama and Tokyo. Their appearance changed the face of urban transportation overnight. In June 1869, the first Japanese operator was given permission to run coaches between Yokohama and Tokyo. Then in April 1870, permission was given to operate rickshaws, a traditional cargo cart modified to carry passengers. Human-powered carts like these were easy to use and did not go very fast, making them well suited to the roads of that time; indeed, by the early 1880s, 25,000 rickshaws were in operation. The increasing numbers of packhorses and freight wagons of every type were an additional factor pushing the old-new traffic mix to the extreme. Artists of that time have vividly depicted such scenes in woodblock prints.

Many vehicle regulations were issued, with increasing frequency, to control city traffic. In approving the previously mentioned passenger coach service between Yokohama and Tokyo in May 1869, the Tokyo government issued eight-article sets of regulations to the applicants. It also issued regulations to control horse-drawn vehicles in March 1870 and for rickshaws in April of that year. Each regulation was intended to prevent the occurrence of dangerous situations and promote safe operation, but also included instructions on the proper formalities to be extended to members of the nobility, high government officials, and members of the armed forces. If such a personage were to pass by, driver and passengers were supposed to get out of the vehicle and bow correctly. Such regulations were hardly what could be called modern traffic regulations. The articles on courtesies were still part of the May 1871 regulations on operating horse-drawn vehicles and rickshaws, but were no longer seen by April 1872. Traffic driving on the left-hand side of the road seems to have been the rule in Japan from the very beginning, for horse-drawn vehicles were required to travel on that side, and the rule was extended to cover rickshaws in 1872.[3]

Table 3. Cost of roads and bridges and providers of funds in 1875 (in yen)

	Roads	Bridges
Government (national) funds	63,439	166,975
Private sector funds	601,029	156,179
Total expenses	664,468	323,154

Source: Naimushō dai-ikkai nempō (First annual report of the Home Ministry).

Table 4. Number of roads and bridges reconstructed or newly constructed 1875–1879

Fiscal year	Roads	Bridges
1875	130	70
1876	179	116
1877	284	79
1878	377	34
1879	437	34

Source: Naimushō nempō (Annual report of the Home Ministry), nos. 1–5.
Note: Fiscal years are from 1 July to 30 June.

Improving and Constructing Roads

Development of road transportation created demand throughout the country for the construction of new roads and the rebuilding of old ones. The existing network of roads had been built during the Edo period for military and administrative purposes, and the routes that had been selected in the network and the road structure itself were often not suited to the transport of products from the outlying regions to the urban areas. Narrow roads with weak surfaces were hardly able to withstand the onslaught of vehicular traffic.

Local people began to petition for the construction and rebuilding of roads, or started to do the work themselves, before government leadership took a hand. The *First Annual Report of the Home Ministry* (1876) lists 41 major improvement and construction projects for fiscal 1875, but only 8 of them were directly controlled by the government, the rest were all undertaken privately with private funds. Only 9.5 per cent of the total ¥664,468 expended on roads during the fiscal year was government provided.

Forty-nine locations of major bridge construction and repair are listed, 26 of them being government projects. Money provided by the government for bridges was 51.7 per cent of a total ¥323,154. Funds from the national treasury for bridges were much higher than those for roads, but this is probably because the projects were just too huge for private funding to handle. Projects under direct government control during this year include

those for the capital's large bridges of Ryogokubashi and Azumabashi (construction costs for these two bridges, respectively, were ¥53,306 and ¥26,141).

The trend of relying on local people for construction began to change around the time that the Home Ministry was established in November 1873. The Regulations on River, Port, and Road Construction provided for three classes of roads, from one to three, and roughly determined the distribution of sources for road funds. Cabinet Decree 60, of June 1876, divided roads into three new categories of national, prefectural, and local, and labelled them as, respectively, first, second, and third class.

However, Japan's road situation would not have improved by private construction and government order alone. Sir Harry Parkes, the British minister, submitted the following report to his government on 5 October 1877.

> It is notorious that in constructing the great roads which traverse all the principal Japanese islands, military considerations were chiefly looked to, and the convenience of trade little consulted. Besides, the Japanese were, until lately, unacquainted with the invention of Macadam, and their roads are constructed of such soft materials that, with few exceptions, they become almost impassable for wheeled vehicles after heavy rains. Much has been done to improve the existing roads and open new ones, but at the present time the only tolerable roads in Japan are the Tôkaido, as far as Odawara, and one or two other sections, the Oshiu Kaido to Utsunomiya, and the Nakasendo, as far as Takasaki.[4]

Parkes's report indicates that the Nakasendo between Tokyo and Takasaki was one of the best three roads at the time. But, as mentioned earlier, horse-drawn vehicles travelling these roads rarely arrived on schedule.

The 1880s was a decade of large-scale construction under prefectural direction. Roads were constructed or rebuilt to traverse the Ou Mountains and the Kitakami Highlands in the Tohoku region. The prefectures of the Chugoku region cooperated to construct roads that crossed the Chugoku range to connect Matsue with Hiroshima and Hamada with Hiroshima. Near Tokyo, Kanagawa and Yamanashi prefectures completed building a replacement road over Kobotoke Pass in May 1888. However, all these large projects to build national trunk highways were funded from local taxes and the citizenry reacted strongly. Logically, those who paid for national roads during the era of long-distance road transportation should have been those who benefited most, the state and the long-distance road haulers, not the citizen. However, the policy of funding roads remained the same as it had been during the feudal period, one of regionally supported transportation paid for by local people. Table 5 is taken from the *Statistical Yearbook of the Empire of Japan* and shows a distribution of payments in which the percentage of national treasury money for roads is far below the costs for national roads. The government's raising of funds through currency reorganization put a stop to grants for construction to the prefectures in fiscal 1881

Table 5. Costs and division of burden for roads and bridges (1879–1897) (in yen)

	Road costs			Bridge costs		
Fiscal year	Total	Percentage of costs for national roads	Percentage from national treasury	Total	Percentage of costs for bridges on national roads	Percentage from national treasury
1879	1,451,082	31.9	13.2	573,907	25.0	21.3
1880	1,618,893	17.8	15.6	672,411	21.3	20.0
1881	2,249,755	27.6	4.0	782,507	22.4	0.4
1882	2,248,646	26.6	5.6	846,416	21.8	2.1
1883	3,090,526	19.0	10.8	780,226	23.7	8.9
1884	2,625,749	27.6	12.6	797,586	25.4	13.8
1885	2,741,978	20.9	14.4	968,520	19.6	16.4
1886	3,255,686	21.2	13.2	912,320	19.3	6.1
1887	3,225,233	18.4	13.7	1,005,369	17.5	6.5
1888	3,543,810	18.8	12.4	1,056,446	23.9	11.7
1889	4,042,658	18.4	16.7	1,323,754	21.6	15.8
1890	4,382,964	14.0	12.2	1,404,428	23.6	11.3
1891	3,940,307	14.6	13.3	1,281,797	19.4	6.9
1892	4,692,871	12.2	15.5	1,558,953	18.3	17.4
1893	4,801,380	12.0	12.0	1,555,608	19.1	12.1
1894	5,389,911	11.3	12.4	1,752,684	14.8	11.1
1895	5,163,390	12.0	9.4	1,761,135	21.1	19.3
1896	5,883,121	10.1	8.5	2,133,681	16.1	12.4
1897	7,752,182	7.9	9.8	3,355,568	17.9	23.7

Source: Nihon Teikoku tōkei nenkan (Statistical yearbook of the Empire of Japan); fiscal years for 1879–1884 are from 1 July to 30 June. Fiscal 1885 begins 1 July 1885 and ends 31 March 1886. From 1886 on, the fiscal year is from 1 April to 31 March.
Note: The percentages of national road costs, of costs for bridges on national roads, and of costs borne by the national treasury are percentages of total road expenses and total bridge expenses for the fiscal year.

Table 6. Area of road construction (in *tsubo*[a]) in Tokyo and distribution of cost (1878–1882) (in yen)

	Construction area and breakdown				Costs and distribution of expenses			
Fiscal year	Total	National roads	Tokyo prefectural roads	Town/village roads	Total	National	Tokyo prefecture	Town/village
1878	37,985	9.9%	6.3%	83.8%	83,254	1.1%	95.2%	3.7%
1879	86,312	16.6	9.6	73.8	83,913	2.5	93.0	4.5
1880	40,454	9.2	7.4	83.4	45,641	9.3	78.3	12.4
1881	77,853	14.1	6.4	79.5	75,006	0.5	91.6	7.9
1882	106,752	17.6	10.3	72.1	126,442	5.0	90.3	4.7

Source: Tokyo-fu tōkei sho (Tokyo statistical report).
[a] 1 *tsubo* = 3.30579m^2

and 1882, two years of extremely heavy burden on local government. Most costs for national roads and bridges were heaped onto the prefectures. The Fukushima Incident of November 1882, a major popular uprising of the Meiji period, is directly attributable to forced procurement of labour and funds for constructing national roads.

As vehicular traffic increased, urban roads, too, needed to be improved. Tokyo road problems appeared in governmental affairs in November 1870 when the Finance Ministry made its first inquiries to the Tokyo prefectural government on a vehicular tax. However, the Tokyo government at that time had no clear guidelines for road rebuilding and for sources of funds; the most that it did was issue a report on a fixed tax (25 *ryo* for two horses for one year; half that for one horse) for commercial vehicles.

In the spring of 1871, the Tokyo government compiled a plan to rebuild the city trunk roads having the largest traffic volume into vehicular roads. The money for road improvements would come from a vehicular tax equivalent to three per cent of vehicle transport revenue. The new roads were to be vehicular roads 5.5 to 7 m wide, with pedestrian paths on both sides. Although no specifications for roadbed and road surface or width of walkways are given, this is historically important because it was the first time in Japan that there was a plan for roads to be divided into vehicular thoroughfares and pedestrian paths.

However, the expense of repairing and maintaining roads in the capital, where traffic from throughout the nation converged, was too great for local government to handle. Despite the appropriation of vehicle tax revenue and fixed funds, Tokyo's road rebuilding plan required digging into, in the autumn of 1872, the old town council's grain tribute, land, and buildings saved since the Edo period as relief for the needy. But still funds were not enough to handle long-term road rebuilding and maintenance. The Tokyo government requested the Home Ministry in February 1879 to take the costs for rebuilding national roads, which stretched out in all directions from Nihombashi, from the national treasury. That request was rejected, on the grounds that treasury funds had to be used for many other more pressing matters. Thus, most of the money to pay for national roads had to come from local government coffers, even in the capital of Tokyo. Table 6 shows that 14 per cent of the road costs from fiscal 1878 to 1882 went to national roads and that the national treasury paid only 3.4 per cent. Thus, most of Japan's social capital accumulation, in roads and bridges, was paid for by local citizens.[5]

Notes

1. Yamamoto Hirofumi, *Ishinki no kaidō to yusō* (Roads and transport in the Restoration period), expanded edition (Hosei University Press, 1983).
2. Kanagawa Prefecture, ed., *Kanagawa-ken shi* (History of Kanagawa Prefecture), reference edition 18 (1975).

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