

# History of Japanese Industry (3): Opening of Ports and Modernization

By Tsukamoto Takeshi

## Opening of ports (1859-1867)

The Tokugawa Shogunate concluded a treaty of commerce with the United States in 1858, followed by the signing of similar treaties with the Netherlands, Russia, Britain and France. The treaties brought Japan's trade partners to six, including China, which had long been an old trade partner.

The move put an end to the nation's long-standing managed trade, under which only 10 Chinese and two Dutch ships were allowed annually to call at the port of Nagasaki and trade volume was severely restricted.

The opening of the ports of Yokohama, Nagasaki and Hakodate in 1859 broke the Shogunate's trade monopoly and allowed any Japanese to sell goods to foreign traders residing in Yokohama.

In order to maintain its trade privileges, the Shogunate issued a decree banning direct sales of raw silk, oil, wax, clothing and grain to the opened ports and ordering that the five products should be sent to Yokohama through wholesalers in Edo, though Japanese traders ignored the decree.

As shown in Tables 1 and 2, trade volume sharply increased during the 1859-67 period in the closing years of the Tokugawa Shogunate's rule, with raw silk accounting for the bulk of exports and cotton cloth and woolen textiles accounting for the bulk of imports.

### Silk industry

Cocoon production plummeted in France during the 1850s as a pébrine epidemic spread, affecting silkworms throughout Europe. This boosted world demand for Asian-made silk, with the result that Chinese and Indian raw silk held 75% and 19% shares, respectively, of the London raw silk market.

It was around that time that Japan opened its ports. Japanese raw silk, which was priced lower and of higher quality than its Chinese, Indian, French and Italian equivalents, was purchased by foreign traders in large quantities. Japanese wholesalers bought up raw silk in farming villages and sold it to foreign trading houses in Yokohama.

At the time of the port opening, selling prices of raw silk in Yokohama were twice the purchase prices, yet half the prices at the London market. Raw silk exports from Japan ballooned and Japanese raw silk held a 14-18% share in the London raw silk market in the 1860s, ranking next only to Chinese and Indian raw silk.

Raw silk by then had been widely traded in Japan and had already been established as an industry. With the addition of foreign markets, the raw silk industry developed into an export industry. Accordingly, raw silk production in 1863 doubled to 360,000 *kan* (1 *kan* roughly equals 4 kilograms) from the 180,000 *kan* before the port opening.

An increasing number of silk farmers was commissioned with silk production by wholesalers.

### Cotton industry

Imports of cotton cloth and woolen textiles jumped as fast as raw silk exports grew. Imports of cotton cloth increased sharply, as high-quality, low-priced foreign-made cotton cloth found its way into an already mature domestic market. The January 7, 1860 issue of *The Illustrated London News* quoted a letter from the Hague; "We have received interesting letters on the commercial and political situation of Japan from merchants established in the port of Kanagawa. They state that the articles most in demand are tissues of all kinds; cotton prints, calicoes, flannels, camlets, and grey buckskin with

small stripes sell best; then small-patterned chintz, woolen cloth, Utrecht velvet, red, blue, and cherry colour; red shawls with blue insides; cotton, and woolen blankets . . .

It is not difficult to procure back cargo; most kinds of food are cheap and sell readily in China . . .

Copper is also a good article to export. The exportation of the gold coin called *kobangs* is permitted, but the Government does not like to see it leave the country in any amount."

The Japanese, who were familiar only with hand-spun yarns or hand-woven cloth, were astonished at the exquisiteness of machine-spun yarns and machine-woven cloth. Machine-spun yarns were imported to the Ryukyu Islands in 1855 and were presented as a gift to Shimazu Nariakira, lord of Satsuma (now Kagoshima). The yarns were sent to Nishijin, the yarn spinning center in Kyoto, for examination and were assessed as a silk-cotton mix.

The Satsuma clan imported machines through trade with the Ryukyu Islands, and established a reflex furnace plant, an arms factory and a glass-producing factory in Isonohama near Kagoshima, the complex of which was called *Shuseikan* (complex house). The next clan chief, Shimazu Tadayoshi, dispatched a group of his close aides, including Godai Tomoatsu and Terashima Munenori, to Britain in 1865 to purchase throstle machines and mule machines. The clan then invited seven engineers from Pratt & Co. in 1867 and established Japan's first machine-spun yarn factory at *Shuseikan* with a workforce of 200.

After the port opening, cotton producing areas declined due to the influx of low-priced, high-quality cotton cloth from abroad. To remain competitive, some cotton cloth producers lowered material costs and enhanced quality by



switching from domestic hand-spun yarn to imported machine-spun yarn as material.

### **Iron industry**

In the late 18th century, Russian, British and U.S. ships began to call at Nemuro, Muroran, Hitachi, Nagasaki and Uraga ports for replenishment of fuel and water supplies and for commercial trade. Japan's response varied at different times. In 1825, the Tokugawa Shogunate issued a decree banning port calls by foreign ships. But it adopted a flexible approach in 1842 by issuing a new decree permitting supply of fuel and water to foreign ships. At the same time, the Shogunate reinforced its coastal defense against possible foreign invasion. In 1853, the Shogunate lifted its ban on the building of ocean-going ships and allowed all regional clans to build large ships. The Satsuma, Choshu, Saga, Mito and Sendai clans immediately started building large ships as well as manufacturing cannons.

They also started research on the construction of reflex furnaces which were necessary for shipbuilding and cannon production. The Saga clan succeeded in building Japan's first reflex furnace in 1850 under the tutorship of Dutch engineers. Oshima Takato, a member of the Nambu clan, studied the Dutch language in Nagasaki and translated into Japanese a Dutch book, *On Cannon Casting in Liege National Cannon Casting Factory*, U. Heguenin. He was invited by the Mito clan to help build a reflex furnace and succeeded in casting one in 1856. But the cannon Oshima built was cast with sand iron. A cannon-cast barrel made in that way was apt to develop cracks, so the cannon was not used for practical purposes. The gun barrel is believed to have been made of sticky magnetic iron similar to Swedish, Norwegian and Russian cannons of the time.

In 1857, prior to the port opening, Oshima succeeded in building a furnace for making pig iron with iron ores. However, iron in Japan was mostly

made with the use of foot bellows. This iron-making method using sand iron continued until around 1890.

### **Modernization (1868-90)**

In December 1867, anti-Shogunate clans, led by the Satsuma and Choshu clans, declared war against the Shogunate to overthrow the feudal government and establish a new government under Imperial rule. The Satsuma-Choshu allied military forces marched from Kyoto, which was then the residential site of the emperor, toward the national capital of Edo (Tokyo), thus kicking off a civil war which would last for a year and a half. The Shogunate finally surrendered and opened Edo Castle without bloodshed in March 1868. The Satsuma-Choshu alliance established a new government under Imperial rule in what was called the Meiji Restoration. The Emperor moved his residence to Edo, which was renamed Tokyo, and his era was named Meiji.

The Meiji Restoration government abolished all regional clans in 1871 and established prefectures in their stead in a new regional administrative set-up. Under a new currency act, the yen and *sen* were introduced as new currency units replacing the *ryo* and *bu*. The new government then abolished the feudal annual tribute payment system in favor of a new land ownership system, under which landowners paid 3% of their land value as land tax.

As a means for introducing advanced technology and know-how, the government invited U.S. and European engineers and teachers, attracted by high salaries, and dispatched brilliant young people to institutions of higher learning in the U.S. and Europe. The government also encouraged the adoption of a Western lifestyle, under which most people cut their topknot in favor of a Western hairdo, began to wear Western clothes and at home used matches instead of firestones. *Rikisha* and horse carriages ran through Tokyo streets lined with gas lights. This trend was called "civilization and enlightenment."

In 1872, Japan's first railways opened between Shimbashi and Yokohama and people watched in astonishment as British steam-powered locomotives were driven by British engineers. The railways would extend to Kobe in 1889 to become what is now the Tokaido trunk line. Though a regular ocean-going steam boat route had opened between Yokohama and Osaka in 1867, the last year of Shogunate rule, steamboat, sailboat and tugboat services in inland seas and rivers remained the main transportation means in Japan throughout the first half of the Meiji era. Japan's infrastructure during the enlightenment period relied on water power for energy and on ships for transportation. Railways were yet to come into widespread use. The telephone was introduced in 1877, the year after Alexander Graham Bell invented it, for public use, but it was not until 1890 that telephone facilities for private use were established.

### **Cotton industry**

Imports of cotton yarn and cotton cloth as well as exports of silk yarn and tea continued to expand from the start of the Meiji era. Imports of high-quality, low-priced machine-spun cotton yarn and cotton clothing replaced domestic hand-woven cotton yarn and cotton clothing. Farmers stopped spinning yarn themselves and began to buy imported yarn, mainly made in India. This prompted the Meiji government to build spinning factories for the purpose of domestically producing machine-spun cotton yarn with domestic cotton, and thus curbing the influx of foreign cotton yarn.

Under the policy, the government imported two spinning machines with 2,000 spindles from Britain and set them up at government-operated factories newly opened in Aichi and Hiroshima prefectures. The government later imported an additional 10 spinning machines and sold them by 10-year installment plans and without interest to private companies, which were urged to



Table 1: Trade in the Late Tokugawa Period

(\$1,000)

	Exports	Imports
1859	891	603
1860	4,714	1,659
1865	18,490	15,144
1867	12,124	21,673

(Source: History of Yokohama Vol. 2 Reference 2)

Table 2: Ratio of Raw Silk and Tea Exports and Imports of Woolen and Cotton Cloth, Cotton Yarn and Raw Cotton

(%)

	Exports		Imports			
	Raw Silk	Tea	Woolen Cloth	Cotton Cloth	Cotton Yarn	Raw Cotton
1860	66	8	40	53	—	—
1865	86	10	44	36	—	0
1867	57	17	22	25	11	4
1871/1875	41	29	21	20	15	2
1896/1890	35	12	9	7	17	4
1891/1895	36	8	7	6	8	16

(Note: 1865 raw silk exports include cocoon and silk worm eggs.)

build spinning factories. However, private spinning factories had such small production capacity that they were unable to compete with their British counterparts and soon found themselves hard-pressed.

Shibusawa Eiichi, a business tycoon of the Meiji period who was then the president of Daiichi Bank, wrote a letter to Yamabe Takeo, who was in London to study economics, asking to learn spinning technology and assist his plan to build a spinning factory in Japan. Shibusawa emphasized in the letter the urgency of domestically producing high-quality cotton yarn and driving out foreign products, which were flood-

ing Japanese markets and pressuring the Japanese economy.

Shibusawa decided in 1880 to establish a spinning company with the largest cotton production capacity in Japan. On his return to Japan, after learning engineering in London and receiving on-site training at spinning factories in Manchester, Yamabe joined the company, which would soon face rough going due to the lack of sufficient energy sources for the planned factory. The company first planned to set up shop near a river to use water as a power source, but found water flows were not enough to produce the power needed by the factory. The company gave up the

plan in favor of the use of steam power and built a mule factory with a total 15,000 spindles at Nishinari Sangenya in Osaka. The site was chosen due to its proximity to cotton and coal supply centers.

The factory started operations on a full-time basis in 1883 with 128 male and 160 female employees who worked in two shifts around the clock. The factory first used 650 oil lamps for lighting, which were soon replaced by electricity for safety. On the back of mass production and long working hours, the factory continued to post profits, and after repeated capital increases and investment, it developed into a large factory with 60,000 spindles in 1887.

Meanwhile, small spinning factories were established in various parts of the country, installing privately developed spinning machines using water as a power source. Farmer and ex-priest Gaun Tacchi invented a manually operated 24-spindle throstle spinning machine in 1873 and a 40-spindle machine of the same type in 1887, the latter winning a prize at an industry promotion fair. Tacchi's invention prompted the spread of throstle spinning machines, with the result that spinning factories combining water wheels and throstle machines were built throughout Japan.

From 1887 onward, 20 large spinning companies using steam-powered machines with more than 10,000 spindles were established one after another. The number of spindles in Japan rose from 80,000 in 1886 to 360,000 in 1890. Cotton yarn production surged from 770,000 kan to 5,200,000 kan. Production of hand-spun and throstle-spun cotton yarn declined and, at the same time, domestically produced cotton yarn gradually replaced imported cotton yarn and imports of raw cotton rose sharply. In 1890 Japan started exporting cotton yarn.

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