Japan's Paper and Pulp Industry in the 1930s: Where Did All the Wood Come From?

M. William Steele

Introduction

Japan's paper industry began with the establishment of the Oji Paper Company in 1873. Its founder, the entrepreneur and later economic moralist Shibusawa Eiichi (1840–1931), held that a modern paper industry was essential to the advance of Japan as a civilized country. The industry prospered and, by the 1930s, Japan was a global leader in wood pulp, paper, and paper products. Prewar paper production peaked in 1940 at 1.5 billion tons.

Where did all the wood come from? And of Japan's rich forestry resources, which trees were harvested? Until the end of the nineteenth century, the Japanese paper industry relied primarily on cotton rags and rice straw pulp. However, with the development of new technologies in mechanical and sulfite wood pulp in the early 1900s, core operations moved from central Japan to the vast coniferous forests of Japan's far north. Pulp mills were first established in Hokkaido but, by the end of the 1930s, some seventy percent of Japan's pulp and paper were produced in state-of-the art factories in the southern half of the island of Sakhalin, territory acquired after victory over Russia in 1905 and renamed Karafuto.

This article examines Japan's use of its forest resources by focusing on the operations of Oji Paper Company in semi-colonial Hokkaido and colonial Karafuto in the opening decades of the twentieth century. It argues that, despite increasing civilian and military demand for forest products in the 1930s, near unrestricted access to Karafuto's primeval forests allowed imperial Japan to maintain its status as a timber rich nation.[1)]

Paper: A New Industry for a New Japan

Japanese paper or *washi*, made largely with mulberry and hemp, has a long history in Japan and continues, both for its utility and beauty, as a major commercial industry. After the Meiji Restoration of 1868, however, demand for and production of Western paper or *yōshi* expanded dramatically as can be seen in Figure 1. There was an increasing need for paper suitable for government documents, bank notes, Western style books, and newsprint. Responding to this need, in 1873 Shibusawa Eiichi quit his position within the Finance Ministry to found Japan's first joint-stock company, the Shōshi kaisha (Paper Manufacturing Company), later, in 1893, renamed Oji Paper Company. Shibusawa saw the manufacture of paper and the printing industry as the origin of civilization and that the shortest and best way for

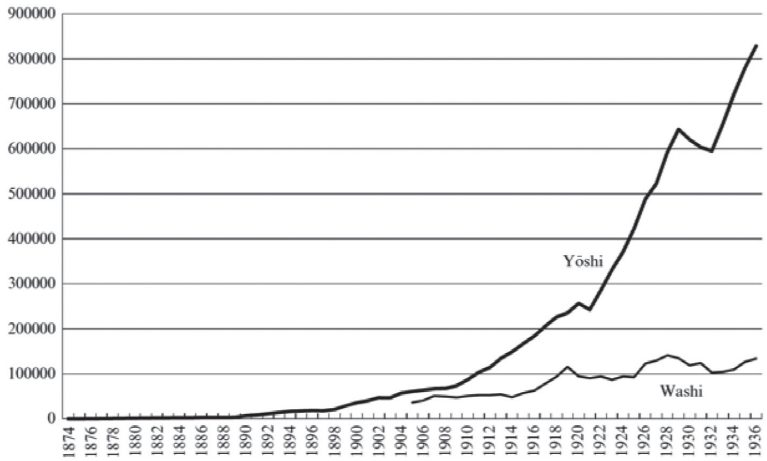

Figure 1: Production of Japanese paper (*washi*) and Western paper (*yōshi*) in Japan, 1874–1936. Source: Kurosawa and Hashino, "The Modern Japanese Paper Industry," 139.

Japan to become a cultured and civilization nation—to catch up with the West.[2] His Oji mill went into operation in 1875. Shibusawa was not alone in this realization; by 1875 there were six paper companies in operation, mainly around large cities such as Tokyo and Osaka. At that time the prime ingredient for paper making was cotton rags, later, in the 1880s, rags mixed with rice straw. In 1889, following the introduction of new wood pulp technologies, Shibusawa moved operations out of Tokyo, establishing Japan's first wood pulp mill at Keta, in a forested area in Shizuoka prefecture, along the upper reaches of the Tenryū river. The move also involved the purchase of private forest land or payments for permission to cut trees of a certain size in government lands for limited periods of time.

The Move to Hokkaido

In 1869, Hokkaido, with a land mass twice the size of Kyushu, was formally incorporated into Japan becoming, in effect, the first colony of the new imperial state. It was administered by the Hokkaido Agency (Hokkaidō-chō) in Tokyo and was not (until 1947) a part of mainland Japan (*naichi*). Before its takeover by the Meiji government, Hokkaido was ninety percent forest; by the 1920s the level had fallen to seventy-six percent. Timber played an increasingly important role in Japan's industrial modernization. The seemingly inexhaustible forests of Hokkaido declined rapidly as trees were cut for the export of wood to mainland Japan and later to foreign markets in the form of railroad sleepers, utility poles, construction lumber, match sticks and pulp for paper.

In the early years of the twentieth century, responding to the demands of Japan's rapidly growing publishing industry (books, school textbooks, general interest magazines, newspapers, etc), the paper industry took aim at Hokkaido's abundant forests and water resources. Unlike the match industry that targeted poplars and aspen,

Figure 2: Oji Seishikaisha of Tomakomaki, Hokkaido. (postcard, author's collection)

the paper and pulp industry sought Hokkaido's fir, pine, hemlock and spruce, trees that were increasingly difficult to harvest in so-called "mainland Japan" (*naichi*).[3] According to a study by Yamaguchi Asuka, largely due to the felling of trees in Hokkaido and later in Karafuto, the domestic annual production of Western paper that in 1890 stood at 6,800 tons had, by 1920, reached 236,700 tons, continuing an upward path, interrupted only by the depression years in the early 1930s, to a peak of 915,000 tons (or roughly 21.9 million trees) in 1940. The production of wood pulp (both to produce paper and rayon) followed a similar steep rise in the 1920s and 1930s, with a similar peak just after 1940 and the outbreak of war in the Pacific.[4]

The Maeda Paper mill established in 1900 in Kushiro was the Hokkaido's first producer of paper pulp. In 1902, Oji Paper's main rival, Fuji Paper, began operations in Hokkaido taking over the Maeda plant and renaming it Hokkai Paper mill. Later in 1906, Fuji Paper opened a new factory in Kushiro. Other major paper manufactures followed and proceeded to carve out felling rights in various regions of the island: Kushiro, Akan, Ebetsu, Tomakomai, the area around Lake Shikotsu, the foot of Mt. Tarumae, and along the Saru and Mu river basins.[5] In 1910, Oji Paper began operations in its state-of-the art paper mill at Tomakomai, a port city in the southern part of the island. (Figure 2) It was touted as the largest paper mill in Asia and remains today, although relying heavily on imported timber, one of the largest papers mills in Japan. A 1910 report describes the factory that transformed the sleepy fishing village into an industrial boom town:

> The factory is the largest in the Far East and has cost $3,500,000 gold. The production is to be limited to paper for books and newspapers, and will reach, at full capacity, an output of 300 to 400 feet per minutes of paper 200 to 120 inches in width. Felling concessions over a very extensive area of pine forests in neighboring mountains have been granted to the company by the Government.

> The motive power of the machinery in the factory is electricity generated at the company's own power station at the outlet of Lake Shikotsu. … About 300 or 400 workmen will be employed, the number being comparatively few owning to the exclusive employment, where possible, of mechanical processes.[6)]

Oji Paper had made careful preparations. Water rights in Lake Shikotsu were obtained in 1904; construction of the paper mill began in 1906. And in 1911, soon after operations began, Hokkaido's first forest railway was opened between Tomakomai and the Mu River for the transport of timber. That same year saw the completion of the Chitose No. 1 Dam allowing for hydroelectric generation that not only powered the new factory, but the growing town of Tomakomai. The factory is often credited for making Japan self-sufficient in newsprint, but it also pioneered the production of rayon, a synthetic fiber made from wood pulp.[7)] One report notes that the Oji factory in Tomakomai processed 1.1 million *koku* (or 305,800 m^3) of raw wood in 1925 growing to 1.4 million *koku* (389,200 m^3) in 1940. By 1910, throughout Japan but with a concentration in Hokkaido, there were eleven paper companies, twenty paper mills, and paper production had reached 86 million tons.[8)]

Karafuto: Kingdom of Timber Resources

According to the terms of the 1905 Treaty of Portsmouth, the southern half of the island of Sakhalin or in Japanese nomenclature, Karafuto, was "returned" to Japan while Russia retained the northern half. Like Hokkaido, it became an external territory of Japan and was administered by the Karafuto-chō. Ōtomari, from 1908, served as its capital city. Suddenly, Japanese paper entrepreneurs had access to Sakhalin's rich forests. As the *Japan Yearbook* for 1922 described the newly acquired forests: "Various kinds of pine-trees abound and form dense primeval forests at several places. They make splendid timber, though lack of convenient transportation is a serious problem. … The conifers are *todomatsu* (*Abies saeha inensis*), *ezomatsu* (*pica a anensis*) and larch; white birch, *alunus* and *populus* predominate among the deciduous trees. For pulp and match-sticks the Karafuto forests are expected to acquire great importance."[9)] The *Japan Yearbook* for 1944–45 recalled that in 1905, when the island was ceded to Japan, "the entire island was nothing but a thick forest. …the land was almost as primeval as could be imagined."[10)] The reality of Sakhalin's forests in the late 1930s, however, was far different. As a result of over-harvesting, illegal logging, forest fires, and insect infections (and nominal afforestation projects, primarily relying on so-called natural regeneration), the landscape was anything but primeval. Here is how the economic historian Honjō Eijirō (1888–1973) described his visit to the island in the late 1930s: "The scenery along the railway is very bleak. The mountains are not high and the forests are not deep. Moreover, logged mountain forest, fire-damaged trees and large amounts of left-over long stumps stand in disarray, and their appearance makes one think that Karafuto's forest policy until today has been a tree-felling policy that forgot about tree-planting."[11)] The writer Hayashi Fumiko (1903–1951) also left an equally bleak account of her 1935 trip to Karafuto: "Between Ōtomari and Toyohara, and along the railway line from Toyohara … there were no large trees to be seen. Literally there were only burnt-out

Figure 3: The Beautiful City Toyohara, Karafuto. A View of the Toyohara Oji Paper and Pulp Mill. (postcard, author's collection)

fields, and…only stumps, so that one felt as if passing through an empty graveyard."[12)]

Deterred by cold and otherwise harsh living conditions, entrepreneurs were at first reluctant to establish paper and pulp mills in Karafuto. In 1911, Ōkawa Heisaburō (1960–1936), a leader in Japan's paper industry, with working experience in both Oji and Fuji companies, took advantage of the special offers by the Karafuto Agency to purchase logging rights on government lands on the island.[13)] Unlike mainland Japan, in Karafuto nearly all forest land was considered government land (*kokuyūrin*), but administered independently by the Karafuto Agency; in effect, this meant fewer restrictions on logging rights. Ōkawa began his operations by shipping felled trees to pulp factories in Kushiro.[14)] However, when, from 1914 as a result of World War 1, paper imports from Europe were interrupted (causing a paper shortage), one after another paper and pulp factory was built on the island, freeing Japan's paper industry from dependency on foreign resources.[15)] In 1913, Ōkawa founded Karafuto Kōgyō (Karafuto Industries) and in 1915 built a pulp mill at Ōtomari and later, in 1919, another mill at the western port Maoka. Mitsui Industries constructed a pulp mill in Ōtomari in 1913 which was acquired by Oji paper in 1915. Later, 1917, Oji's own giant pulp mill at Toyohara went into operation. (Figure 3) Located in central Karafuto, and connected by rail to the port city of Ōtomari in the south, and later (in 1928) with Maoka, a port on the west coast, the mill transformed the Toyohara into the island's industrial center.[16)] Also in 1917, Fuji Paper established a mill at Ochiai on Karafuto's eastern coast, expanding it to include a sulfate pulp (Kraft) mill in 1922. This progress was by no means welcomed by Karafuto's fishing industry. Replaced by the pulp mills as the island's number one industry, the fishermen complained that logs clogged the rivers (Figure 4) and effluents from the paper mills poisoned their waters.[17)]

By the 1920s, Sakhalin had become a sort of boomtown with many opportunities

Figure 4: Grand Sight of Lock Hall at R. Daiya in Ochiai Town, Karafuto.
A view of the log drive on the Daiya River near the town of Ochiai in Karafuto. The logs are on their way to become paper pulp at the Oji Paper mill. (postcard, author's collection)

to make (and lose) money. Moreover, its population swelled as settlers from Hokkaido and mainland Japan as well as recruited laborers from Korea and China sought work in Japan in the forestry and fishing industries, the paper and pulp mills, coal mines, and in the beet sugar fields.[18] In 1908, soon after the acquisition of Karafuto, a census recorded 26,393, rising to 105,899 in 1920, to 204,754 in 1925, and to 294,196 in 1930. Karafuto's population had continued to climb to 350,000 in 1937,[19] eventually reaching over 400,000 in 1940.[20] In 1925 there were eight pulp mills operating in Sakhalin, growing to thirty-eight mills in 1930, but dominated by the trio: Oji Paper, Fuji Paper, and Karafuto Kōgyō. These three mills were able to purchase logging rights involving some two billion *koku* (556 million cubic meters) of timber or 80 percent of total Karafuto forested areas. Led by the paper and pulp industry, Karafuto's economy grew rapidly. By the early 1930s, the paper and pulp mills were turning out an aggregate of 175,000 metric tons of pulp and 150,000,000 kg of paper valued at 61,470,000 yen.[21] More than half of Japan's total pulp production derived from the "Kingdom of Forest Resources" (*shinrin ōkoku*) that was Karafuto. In 1935, for example, Japan's total production of wood pulp was 724,042 tons; this required the consumption of 7,367,604 *koku* of timber of which 76 percent was harvested in Karafuto and 20 percent in Hokkaido.[22]

During these boom years, even disasters such as insect infestations and forest fires were turned to advantage as enterprising capitalists quickly bought up so-called damaged wood (which still could be used for pulp) at discount prices.[23] The damage caused by pine caterpillars (*matsukemushi*) was extensive. (Figure 5) According to Yamaguchi, two major infestations, 1919–1923 and 1927–1931, resulted in the disposal of 100 million *koku* (278,000m^3 of timber.[24] The dense forests also offered ample opportunities for the unscrupulous. In the 1920s it was equally common to refer to the "Kingdom of Forest Resources" as the "Kingdom of Illegal Logging"

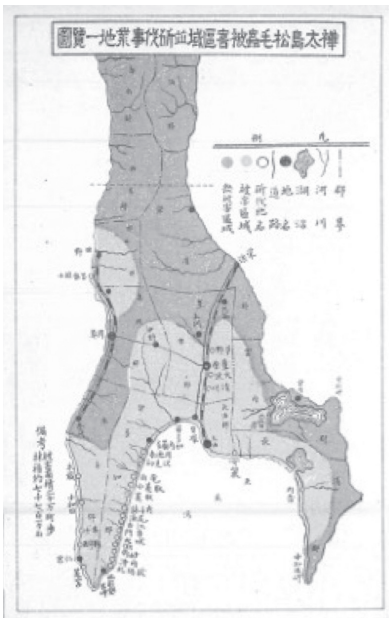

Figure 5: Karafuto Island Pine Caterpillar (*matsugemushi*): Areas Damaged and Logged, 1924 (postcard, author's collection). According to the key, the lighter areas (originally in yellow) suffered significant pine caterpillar damage; the darker area to the north (originally in green) suffered little or no insect damage. On the lower left side: Note: The damaged area is 200,000 *chōbu* [about 1900 sq. km], and the volume of timber felled is about 77 million *koku* [about 21.4 cubic meters].

(*tōbatsu no ōkoku*). As the section of forestry policy in the 1932 *Karafuto Nenkan* noted:

> For Karafuto, the past ten years has been a golden age. But at the same time, it was the era of [great profit by] operators with logging rights. And, sad to say, the island's natural resources suffered great devastation due to overcutting and illegal logging. By 1930, over 186,337,000 *koku* [51,801,686 m^3] of timber had been cut, valued at some 97 million yen. Finally, the so-called Karafuto Forest Scandal [involving misuse of public funds] had been widely publicized, giving Karafuto a bad name. Whatever surplus there is has sunk to the depths, confronted as we are now with a period of financial backlash.[25)]

The text went on to say, however, that by no means did these troubles mean the end of the timber industry in Karafuto. It recalled that in 1929, Japan's leading authority on forestry, Honda Seiroku (1866–1952), had carried out an inspection of Karafuto's forests. While lamenting the wonton felling of tress, he remained optimistic, estimating the island's timber reserves to be around 400 million *koku* or 111.2 million cubic meters. The text concluded that if reforms in forest management were undertaken, Karafuto can remain, of the colonies, Japan's the most important treasury of natural resources.[26)]

Paper and Pulp Go To War

In 1933, as part of reforms seeking to rationalize and deal with the onslaught of the world depression—and to halt illegal logging—the three leading paper and pulp manufacturers in Karafuto (Oji, Fuji and Karafuto Kōgyō) merged under the umbrella of Oji Paper, giving it a near monopoly over Japan's timber, pulp, and paper industries, but especially in pulp. That year, 1933, the new Oji Paper Manufacturing corporation, with mills in the Japanese mainland, Hokkaido, Karafuto and Chōsen (Korea), produced a total 590,000 tons of pulp, equivalent to 95.2 percent of Japan's total production.[27] It also had a near monopoly over the trees that produced the pulp; 80 percent of them located in the forests of Karafuto.[28]

To insure stable and long-term use of these resources, the Karafuto Agency required the newly expanded Oji Paper to conduct rigorous forest inspections, enhance security measures and observe harvest quotas. The proposal was to limit harvest to six million *koku* (or 1.67 million cubic meters) annually, calculating that this would insure ample wood resources for the next thirty years. At the same time, the Karafuto Agency attempted to strengthen programs aiming at conservation and reforestation. In 1932, it initiated reforms in forestry administration to improve forest supervision and bring an end to illegal logging, seeking to rid Karafuto from its unwanted nickname, the "Kingdom of Illegal Logging." The next year, 1933, saw the beginning of a fifteen-year afforestation program, centering on fire prevention measures and the planting of seedlings.[29] Finally, to guarantee future supplies of pulpwood, the new Oji Paper Company was urged to invest in pulpwood plantations in Manchuria and the Maritime Provinces.[30]

This directive notwithstanding, in the years leading to full-scale war on the China mainland in 1937 and with the United States and its allies in 1941, Japan's paper and pulp industry increasingly came under pressure to increase productivity. This resulted in a systematic felling of tress—what Conrad Totman has termed "the greatest assault on woodland in Japan's entire history."[31] Military demand for timber products grew beyond the obvious: to the outfitting of modern warships, airplanes, and military vehicles, to conventional gunstocks, buildings, and shipping crates. Looking backwards, firewood and charcoal in quality were needed to replace oil and gas for heating and fuel; looking to the future, however, research was underway to covert wood into plastics and explosives.[32] The Karafuto pulp industry was urged to increase its output despite competition with other developing industries on the island also requiring timber, especially the coal industry. In 1935 Japan's total production of pulp had increased to 724,042 tons which required the consumption of 7.4 million *koku* of timber, 76 percent of which derived from timber harvested in Karafuto and 20 percent from forests in Hokkaido.[33]

Concurrently, Kobayashi Junichirō, an Oji Paper official, expressed deep reservations over plans to drastically increase pulp production, pointing out that this necessarily would involve intensive wood cutting. According to his sources, the goal was to reach an annual production of 2.4 million tons (of which, paper pulp 1.5 million tons and rayon pulp 900 thousand tons) in ten years, 1945. He calculated (using the formula 14 *koku* of wood for 1 ton of pulp) that this would require, in 1945 alone, an extraordinary harvest of some 34 million *koku* of timber.[34] Knowing this to be im-

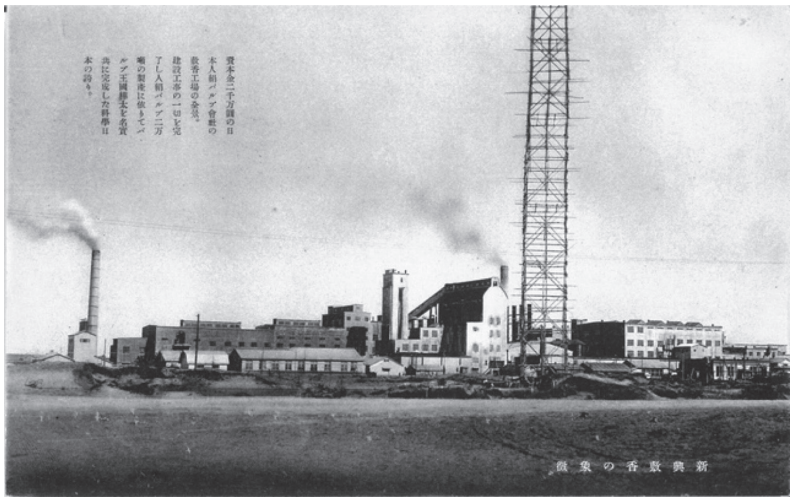

Figure 6: The Symbol of the New Shisuka: The Japan Rayon Pulp Factory (postcard, Kyoto University Digital Archive)
The caption reads: Panoramic view of the Shisuka Factory of the Japanese Rayon Pulp Company, capitalized at 20 million yen. Construction work has been completed and 20,000 tons of silk pulp are produced, making the Pulp Kingdom of Karafuto the pride of scientific Japan in both name and reality.[38)]

possible and that even the attempt would totally exhaust all available timber in Karafuto, he wrote: "Due to past misguided forestry policies, the forests in Sakhalin are now [in 1935] so depleted that even the existing supply of materials for pulp mills will be exhausted in a dozen years or so. Therefore, it is impossible to foresee the construction of new pulp mills or the expansion of existing mills in a rational manner based on the current forests of Sakhalin."[35)]

Nonetheless, the five-year plan announced in 1938 to end dependence on imports while increasing domestic pulp production remained optimistic. Its goal was to reach 1.65 million tons of pulp by 1942. In fact, total pulp production, which stood at just under 900,000 tons in 1937, peaked in 1941 at 1.25 million. Interestingly, while the production of wood pulp failed to increase significantly, rising from 829,646 tons in 1937 to a peak of 853,110 in 1942, the production of rayon pulp increased nearly fivefold, from 57,292 tons in 1937 to a peak of 291,481 tons in 1941.[36)] Indeed, as a result of the Great Depression and the consequent decline in consumption and export of silk, Japan's textile industry turned to rayon as a substitute. By 1937 Japan was the world largest rayon manufacturer.[37)] The new industry, however, was largely dependent on the import of chemically treated wood pulp (dissolved pulp or rayon pulp). Hence, as the war in China expanded, government and business necessarily sought to increase domestic production of rayon pulp. Karafuto's Japan Rayon Pulp Factory and its cutting-edge technology was built with these goals in mind. Construction had begun in 1935. (Figure 6)

Rayon had become a strategic industry.[39)] On the one hand, rayon could substitute for imported cotton and wool and contribute to the goal of self-sufficiency in an

increasingly hostile world economic environment. Wearing rayon was not only patriotic, but in many cases mandatory.[40] Moreover, as Paul David Blanc has noted, rayon (and, in turn, trees) could literally "go to war" given "the close chemical and manufacturing links between artificial silk [rayon] made through the nitrocellulose process and the production of explosives."[41] Japanese rayon manufactures may not have been as "lethal" as those in other countries, but Blanc notes that Japan's rayon industry was a particular target of American aerial bombardment.[42] Moreover, an occupation era (1947) paper on the "Pulp and Paper Industries of Japan" takes notes of Japan's wartime rayon industry and "the manufacture of cellulosic derivatives, such as cellulose nitrate plastics, explosives, lacquer, coatings, films, artificial leather, rocket propellants, and dynamite."[43]

The number of trees harvested for both paper and rayon pulp grew every year, from 3.86 million *koku* (just over 1 million cubic meters) in 1933, peaking in 1941 at seven million *koku* or just under two million cubic meters—and for the ten years between 1933 and 1943, a total of 58.36 million *koku* (16.2 million cubic meters). (Figure 7) This may seem huge, but as Yamaguchi suggests, given the reality of significant illegal logging practices and other bureaucratic loopholes, the actual volume of timber harvested (especially in the late 1910s and the 1920s) may have been as much as twice the number given in official statistics.[44] During these same years, official encouragement of afforestation projects remained largely aspirational, especially as demand for timber increased, both by entrepreneurs hoping to remain in business and by political and military officials hoping to remain in power. One scholar even suggested that reliance upon so-called natural regeneration meant the abandonment of practical attempts at reforestation. By the 1940s there was no question that all available timber had to be cut: Karafuto had become an indispensable treasury of resources for Japan's war effort.

Year	Timber harvested
1933	3864
1934	4313
1935	4560
1936	5026
1937	5357
1938	5180
1939	5385
1940	7040
1941	7043
1942	5849
1943	4746
Total	58363

Figure 7: Timber Harvested for the Production of Pulp, 1933–1943 (in 1000 *koku units*)
Source: *Parupu: Gendai Nihon sangyō hattatsu shi* 12 (Pulp: The Development of Modern Japanese Industry, vol. 12: 259)

When the war ended on August 15, 1945, not only had Japan's major cities been incinerated leaving many people homeless and hungry, nearly all accessible forests had been stripped bare as people scavenged for fuel wood. The necessity of wood for reconstruction meant that even during the occupation years harvesting of wood deep in mountainous areas continued. Demand exceeding supply also meant that Japan, once proud of being self-sufficient in timber resources, was increasingly forced to rely on imports. It was not until the early 1950s that programs of reforestation were pursued, eventually restoring Japan to its status as a green archipelago. Oji Paper was reborn, becoming once again Japan's premier paper maker, this time, however, with a strong commitment to sustainability. The company mission statement has become: "Grow and manage sustainable forests, develop and deliver the products from renewable forests, and Oji will bring this world a brighter future filled with hope." All this sounds good, but Oji and other Japanese paper makers rely largely on imported timber and pulp. And instead of looking north to Hokkaido and Karafuto, Oji now looks south to massive tree plantations in Thailand, Cambodia, Laos, and Vietnam.

Transitions—A Summary

Japan's pioneer capitalist, Shibusawa Eiichi, established Japan's first joint-stock corporation in 1873—the company that became Oji paper—with the vision that the manufacture of paper was especially important for the development of Japan as a modern industrial society. Despite the recent claim by Oji Holdings that the company "has been aware of CSR (Corporate Social Responsibility) since its foundation in 1873," Shibusawa most likely was not aware of "sustainable development," but he was interested in using wealth for good of society, including Japan's natural environment.

This article has described various transitions in the development of Japan's paper industry. It was founded in 1873 in Ōji, a village in the northern suburbs close to Tokyo, Japan's new national and imperial center. Ōji was pastoral and had ample access to fresh water. A second transition took place in 1889, when Japan's first pulp mill was opened in Keta, deep in mountains of Shizuoka prefecture, close to necessary timber resources and fresh water. A third transition came in 1910 with the opening of the Tomakomai Mill in Hokkaido, outside of mainland Japan. Demand for timber had increased and the area around Tomakomai was rich in forest resources, especially trees suitable for wood pulp. Another transition followed shortly. In 1915 Oji Paper began operations on the northern island of Karafuto, a colonial or external possession of Japan, small, but almost entirely covered by forests and with fewer logging restrictions. Oji's state-of-the-art pulp and paper factory began operations in 1917 producing paper the meet the demands of a rapidly expanding market for books, newspapers, and magazines. Moreover, wood from Karafuto helped rebuilt Tokyo after the Great Earthquake of 1923 and restore the millions of books and other publications that had been lost in the disaster. By 1933, Oji Paper Company was able to absorb its rivals and came to have a near monopoly over the production of paper. Finally, by the late 1930s there was another sort of transition, both for Oji paper and for the use of wood—from the promotion of culture and conve-

nience to the promotion of wealth and power. Responding to call for national mobilization of people and resources, the president of Fuji Paper, Fujiwara Ginjirō, declared that "Money spent on armaments is capital which promotes the advance of us businessmen."[4,5]

These historical transitions remind us of the complicated relationship between center and periphery that characterizes most national histories, a relationship that was mutually or synchronically both exploitative and enriching. The forests of Karafuto provided the newsprint for Tokyo's newspapers but at the same time provided opportunities to raise standards of living, education, and health to local and settler populations. The forests of Karafuto were also used for military firepower. Trees became weapons of war. This paper has focused on resource exploitation—the logging and in many instances the over-logging of trees. An ecological and human tragedy to be sure, but as history, a reminder of the limits of growth and conquest. The story of Japan's forests, a story by no means unique, has and will continue to raise awareness of the need for responsible and sustainable use of the natural environment and its resources. That, we hope, will be the final transition.

Notes

1) An important book on imperial Japan and its forest resources is Nakajima Kōji, ed., *Teikoku Nihon to shinrin* (Imperial Japan and Forests), Tokyo: Keisō Shobō, 2023. See especially Chapter 4: Nakayama Taishō, *Hokkaidō•Karafuto no rinsei to kaihatsu mondai* (Forestry in Hokkaidō and Karafuto and the problem of development), 161–192. For forests and forestry details, see *Karafuto ringyō-shi* (A History of Forestry in Karafuto), Tokyo: Nōrin Shuppan, 1960 (NDL digital). For an overview of the history of the Japanese paper industry, see Takafumi Kurosawa and Tomoko Hashino, "From the Non-European Tradition to a Variation on the Japanese Competitiveness Model: The Modern Japanese Paper Industry Since the 1870s," in Lamberg, Ojala, Peltoniemi, and Särkkä, eds., *The Evolution of Global Paper Industry, 1800–2050*, Springer, 2012, 136–165.
2) *Shibusawa denki shiryō* (hereafter *SDS*) 11: 6–7.
3) M. William Steele, "From a Tiny Matchstick Does a Mighty Forest Fall: Hokkaido Wood Products in Japan's Modern Economic Development." *Asian Cultural Studies*, vol. 47, 2021.
4) Yamaguchi Asuka, "Senzen-ki Nihon no seishi-gyō ni okeru genryō chōtatsu" (The role of timber in the prewar Japanese paper industry), *Mita gakkai zasshi*, 195. 2, 2012: 207–245. For details on the pulp industry, see Suzuki Hisao, *Parupu: Gendai Nihon sangyō hattatsu shi* 12 (Pulp: The Development of Modern Japanese Industry, vol. 12), Tokyo: Kōjunsha, 1967. The number of trees is based on a rough calculation: 1 ton of paper requires 24 trees.
5) See Yamaguchi, "Senzen-ki Nihon no seishi-gyō ni okeru genryō chōtatsu" for details on various mechanisms involved in the procurement of forest lands, 115–19.
6) *Daily Consular and Trade Reports*, 1910: 825 (Google online).
7) Yanagisawa Fujitaka, *Midori no Hakkaidō kaitaku* (The Development of the green of Hokkaido), *Sapporo Jiyū Gakkō Yū*, 2005: URL: http://www.sapporoyu.org/modules/sy_html/index.php?f=chosa-yanagisawa
8) Conversion rate for lumber *koku* to cubic meter is 0.278 m^3 to 1 *koku*. See Ishii Yutaka. "Development of the Pulp and Paper Industry in Japan and the Importation of Pulpwood." n.d. URL: https://www.jstage.jst.go.jp/article/jfeb/7/0/7_1/_pdf. For a report on the state of the Japanese paper industry in 1906, see: "Report on Japanese Paper Mills by Mr. Oswald White, Second Assistant in His Majesty's Consular Service in Japan," *Diplomatic and Consular Reports*, 660, May 1907 (Google online).
9) *Japan Yearbook*, 1922: 607 (NDL digital).
10) *Japan Yearbook*, 1943–44: 939 (NDL digital).
11) Quoted in Tessa Morris-Suzuki, "Colonialism and Migration: From the Landscapes of Toyohara,"

in Iacobelli, Leary, and Takahashi, eds., *Transnational Japan as History: Empire, Migration, and Social Movements*, New York: Palgrave Macmillian, 2016: 111.

12) Hayashi Fumiko, "Karafuto e no tabi" (My trip to Karafuto) in *Watashi no Kikō* (A Record of my travels), Tokyo: Shinchō Bunko, 1939, 153–82 (NDL digital). See also Hiromi Mizuno "Japan's Agriculture, the Empire, and Postwar Reconstruction," in Laura Hein, ed., *New Cambridge History of Japan*, vol. 3, Cambridge, UK: Cambridge University Press, 2023: 338–72.
13) Yamaguchi, "Senzen-ki Nihon no seishi-gyō ni okeru genryō chōtatsu," 120. For a biography of Ōkawa, see: Yomoda Masafumi, *Ōkawa Heisaburō*, Kyoto: Minerva, 2020.
14) Yamaguchi, "Senzen-ki Nihon no seishi-gyō ni okeru genryō chōtatsu," 123.
15) For a comprehensive report, published in 1919, on Japan's paper industry with focus on the effects of WWI, see "The Paper Industry of Japan," in *Commerce Reports*, April 8, 1919: 164–77 (Google online).
16) On Toyohara, see Tessa Morris-Suzuki, "Colonialism and Migration: From the Landscapes of Toyohara," in Iacobelli, Leary, and Takahashi, eds., *Transnational Japan as History*, New York: Palgrve Macmillian, 2016: 97–120. See also, Tessa Morris-Suzuki, "Northern Lights: The Making and Unmaking of Karafuto Identity," *Journal of Asian Studies*, 60.3, 2001: 645–71.
17) On the fishing industry in Karafuto, see "A Right to be Rational," in David Howles, *Capitalism from Within: Economy, Society, and the State in a Japanese Fishery*," Berkeley: University of California Press, 1995: 149–76.
18) Steven Edward Irvings, "Colonial Settlement and Migratory Labour in Karafuto 1905–1941," Unpublished Ph.D. thesis, London School of Economics and Political Science, 2014. See also Morris-Suzuki, "Colonialism and Migration: From the Landscapes of Toyohara."
19) *Karafuto nenkan*, 1938: 36 (NDL digital). Included is a short discussion of rapid increase in Karafuto's population.
20) Official census numbers for Karafuto under Japanese rule are included in the Japanese Wikipedia site on Karafuto. For 1938 official statistics, see *Karafuto nenkan*, 1938: 35–42 (NDL digital).
21) *Japan Yearbook*, 1935: 1135.
22) Suzuki, *Parupu: Gendai Nihon sangyō hattatsu shi*, 263. See especially Chart 133. For a chart showing the percentage of pulp produced in Karafuto in comparison with pulp produced in Honshū (Japan's main island), Hokkaido, and Korea, see Ishii, "Development of the Pulp and Paper Industry in Japan and the Importation of Pulpwood," Figure 2: 9.
23) According to R. N. Sabirov, a total of 1107 forest fires caused significant damage to the forests in southern Sakhalin during the period of Japanese occupation. R. N. Sabirov, "The role of anthropogenic factors in forest transformation in Southern Sakhalin," *IOP Conf. Series: Earth and Environmental Sciences*, No. 946, 2020. URL: htts//iopscience.iop.org/article/10.1088/1755-1315/946/1/012044/pdf.
24) For information on insect damage, see Yamaguchi Asuka, "Senzen-ki Nihon no seishi-gyō ni okeru genryō chōtatsu," 126–27. For further details, see *Karafuto ringyōshi*, 96–107 (NDL digital). American newspapers carried news of Karafuto's insect problems. On November 29, 1922, the *Seattle Star* asked its readers: "Ever hear of the Matsukemushi? Well, it's a lasiccampidae. This little insect last year destroyed 85,000 acres of forests—800,000,000 cubic feet of timber—in south Sahailin Island, belonging to Japan."
25) *Karafuto nenkan*, 1932: 122 (NDL digital).
26) *Karafuto nenkan*, 1932: 122.
27) *Japan Yearbook*, 1936: 631 (NDL digital).
28) According to the *Japan Yearbook* for 1940 (p. 909), the location of the eight pulp factories in Karafuto under the Oji Paper umbrella were listed, along with their date of establishment: Ōtomari (Dec. 1914), Toyohara (Jan. 1917), Noda (Nov. 1921), Tamarioru (Dec. 1913), Maoka (Jan. 1918), Esutoru (Nov. 1925), Ochai (Apr. 1917) and Shirutoru (May 1924). It was also noted that, under independent administration, the Japan Rayon Pulp factory was established in 1935 at Shisuka and that rayon pulp production had, in 1937, reached 21 metric tons.
29) For details, see the forestry sections in the *Karafuto nenkan* for 1932 and 1933 (NDL digital).
30) *Karafuto nenkan*, 1933: 325 (NDL digital).

31) Conrad Totman, "Japan's Forests: Good Days and Bad—Rhythms of Damage and Recovery," *About Japan: A Teacher's Resource*, Japan Society, 2023. URL: https://aboutjapan.japansociety.org/japans_forests_good_days_and_bad_--rhythms_of_damage_and_recovery_-#sthash.xALR98tc.dpbs
32) Conrad Totman, "Japan's Forests: Good Days and Bad."
33) Sukuki, *Parupu: Gendai Nihon sangyō hattatsu shi*, Chart 133: 263.
34) Sukuki, *Parupu: Gendai Nihon sangyō hattatsu shi*, 264. In fact, Japan's peak timber harvest was 1941 at 16 million *koku*.
35) Sukuki, *Parupu: Gendai Nihon sangyō hattatsu shi*, 264.
36) Sukuki, *Parupu: Gendai Nihon sangyō hattatsu shi*, Chart 123: 258.
37) Kurosawa and Hoshino, "The Modern Japanese Paper Industry," 148.
38) The Symbol of the New Shisuka, postcard from the Kyoto University Digital Archives. URL: https://rmda.kulib.kyoto-u.ac.jp/item/rb00032828#?c=0&m=0&s=0&cv=0&r=0&xywh=-362%2C235%2C1102%2C234
39) For the example of Toray Rayon Company, see "Toray's Founding and Rayon Business Development: 1925–1952). URL: https://www.toray.com/global/aboutus/history/pdf/90years_04.pdf
40) On controls over clothing during the war years, see Tanaka Yōko, "1937 nen kara 1945 nen made no senjika ni okeru ifuku tōsei to kyōkyū jijō" (1937–1945: Wartime Controls over and Supplies of Clothing), in *Nihon kasei-ka kyo¯iku gakkai-shi*, 52.3 (Oct. 2009), 203–211. For a report on children's kimono made of rayon with propaganda motifs, see Paul David Blanc, *Fake Silk: The Lethal History of Viscose Rayon*: Hartford: Yale University Press, 2016: 135.
41) Blanc, *Fake Silk*, 111.
42) Blanc, *Fake Silk*, 150.
43) Robert J. Seidl, *Pulp and Paper Industry of Japan*, Madison, Wisc: United States Department of Agriculture, 1947, p. 7.
44) Yamaguchi, "Senzen-ki Nihon no seishi-gyō ni okeru genryō chōtatsu," 134.
45) Richard Rice, "Economic Mobilization in Wartime Japan," *Journal of Asian Studies*, 8.4 (Aug. 1979): 695. The Oji Paper involvement in Japan's war effort is mentioned in a company history, URL: https://www.company-histories.com/OJI-PAPER-CO-LTD-Company-History.html