

The Production and Transport of Fish Fertilizer in the Mid-Nineteenth Century Japan

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I. Introduction

Fish meal made from sardines or herring was used as a fertilizer in cash-crop production in Japan in the eighteenth and nineteenth centuries. Particularly important was the herring meal produced in the northernmost island, Hokkaido, and shipped in *kitamaebune* (vessels operated by independent shippers and merchants in the herring trade) to a variety of ports in Honshu (the main island of Japan).

Japanese historians have made numerous studies of the structure of the production and transport of herring for fertilizer. The main emphases of historical research have been the mode of production and the division of labor in the transportation of herring. The main concern of scholars working on the history of the fishery is the transition from feudalism to capitalism in the production and transport of herring. Their studies clarify, for example, the transition from the putting-out system to manufactures in herring production; the emergence of a specialized transportation sector; and the move from wooden vessels to steamships as the main form of shipping.

This paper examines the characteristics of fish-fertilizer production in Hokkaido and the transport systems connected to it in the mid-nineteenth century. I am not concerned here with the transition from feudalism to capitalism but rather with geographical problems such as the occupation of Hokkaido by Wajin (non-Ainu Japanese) and the development of a mercantile and fishing frontier within the context of Hokkaido's history as an "internal colony" of Japan. By examining these two issues we can get to the heart of the economic relationship between Hokkaido and other areas in the mid-nineteenth century.

Before moving on to the main point, it is useful first to describe the regional structure of Hokkaido in the nineteenth century. Between the sixteenth and nineteenth centuries, Hokkaido was

politically divided into two areas--an area for Wajin settlement known as the Wajinchi, and the rest of the island, reserved for Ainu settlement, called the Ezochi (Figure 1). The Matsumae domain controlled both areas until 1869, except for two periods of direct administration by the Tokugawa shogunate during the nineteenth century.

In the Ezochi and most of the Wajinchi during the early modern period there was no agriculture, particularly rice cultivation, on an economically significant scale. Therefore, the Matsumae domain implemented two policies to supplement its income. The first was the contract-fishery system, in which merchants contracted to operate fisheries (*basho*) along the coast of the Ezochi by paying an annual fee (*unjōkin*). These merchants were called contract-fishery operators by the Matsumae domain. The second was a peculiar trading system, in which all ships entering from Honshu had to go through customs houses (*okinokuchi yakusho*) in the three ports of Fukuyama, Hakodate, and Esashi in the Wajinchi (Figure 1). Shipping agents had to pay port charges and commodity taxes, which supplied an important source of income for the domain. The substance of these two policies did not change during the two periods of direct control by the Tokugawa shogunate during the nineteenth century because the shogunate's economic policies were similar to those of Matsumae.

II. The Characteristics of Fish-Fertilizer Production

Herring were known as the harbingers of spring. Although there were regional variations, herring generally ran along the coast of Hokkaido between March and June. The two main harvesting methods were gill nets (*sashiami*) and pound traps (*tateami*). After the fishermen brought the herring ashore, a great number of workers boiled or gutted and dried the fish and processed it into fertilizer.

As I mentioned earlier, Matsumae contracted

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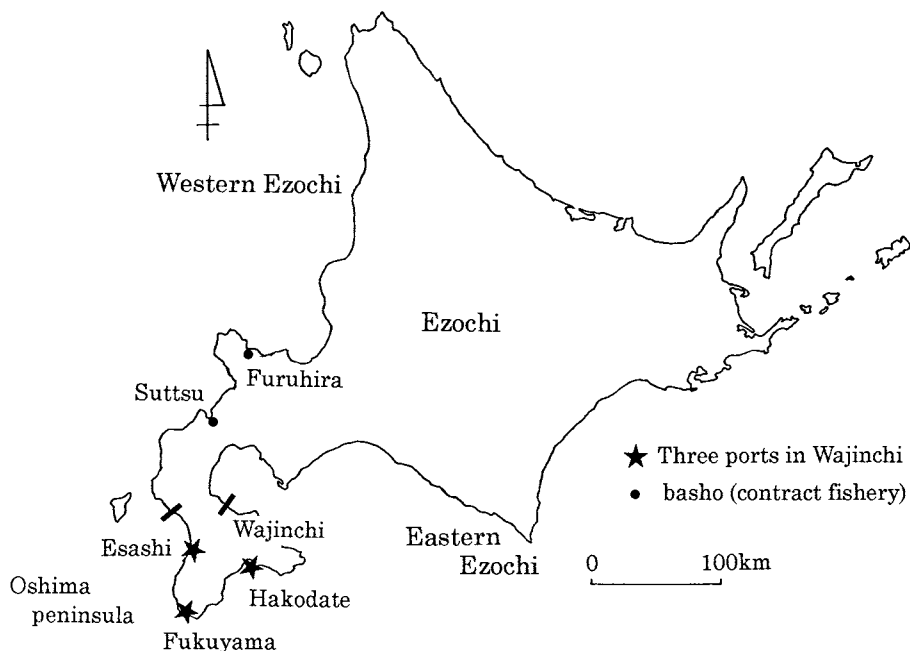


Figure 1. Hokkaido between 16th and 19th centuries

the management of Ezochi fisheries to merchants, who were usually based in Fukuyama or Hakodate. These merchants maintained a store (*unjōya*) on the shore, to which they dispatched a manager, overseers, and an interpreter. The managers needed to recruit large numbers of laborers to work the fishery and process the herring fertilizer. Many aboriginal Ainu people lived in the Ezochi. The managers compelled the Ainu to participate in the harvesting and production of herring fertilizer (Figure 2).

It may be worthwhile to outline in passing the history of the penetration of Wajin settlement into Hokkaido. Wajin Japanese first advanced into Hokkaido in the twelfth and thirteenth centuries. They were called “immigrants” (*wataritō*) and lived in the southern part of the Oshima peninsula. In the mid-sixteenth century, the area of Wajin settlement was fixed, though many Ainu also resided in the Oshima peninsula at this time. After that, the Wajinchi (an area for Wajin settle-

ment) was expanded to include the entire peninsula.

Conversely, in the seventeenth century the Ainu were driven out of the Oshima peninsula into the Ezochi in the north. The Ainu lived mainly on salmon and therefore established their settlements in areas adjacent to rivers and lakes. In the eighteenth century, as we have seen, the coastal fishery developed in Ezochi. Managers gathered Ainu near their coastal stores and compelled them to work in fishing and herring-meal fertilizer production, with the result that Ainu settlements came to dot the shore.

In the nineteenth century, herring production increased, particularly in the western Ezochi. Table 1 indicates productivity of herring fertilizer in mid-nineteenth century Hokkaido. These data reveal two points: First productivity in the Western Ezochi, Fukuyama and Esashi increased from 87,000 metric tons to 181,587 metric tons in the mid-nineteenth century. Second the productivity

Table 1. Productivity of herring fertilizer (metric ton)

	c. 1836	1854
Western Ezochi, Fukuyama and Esashi	87,000	181,587
Eastern Ezochi and Hakodate	26,063	—

Source: Hokusui kyokai (1935) “Hokkaido gyogyo shiko,” pp. 61–63.

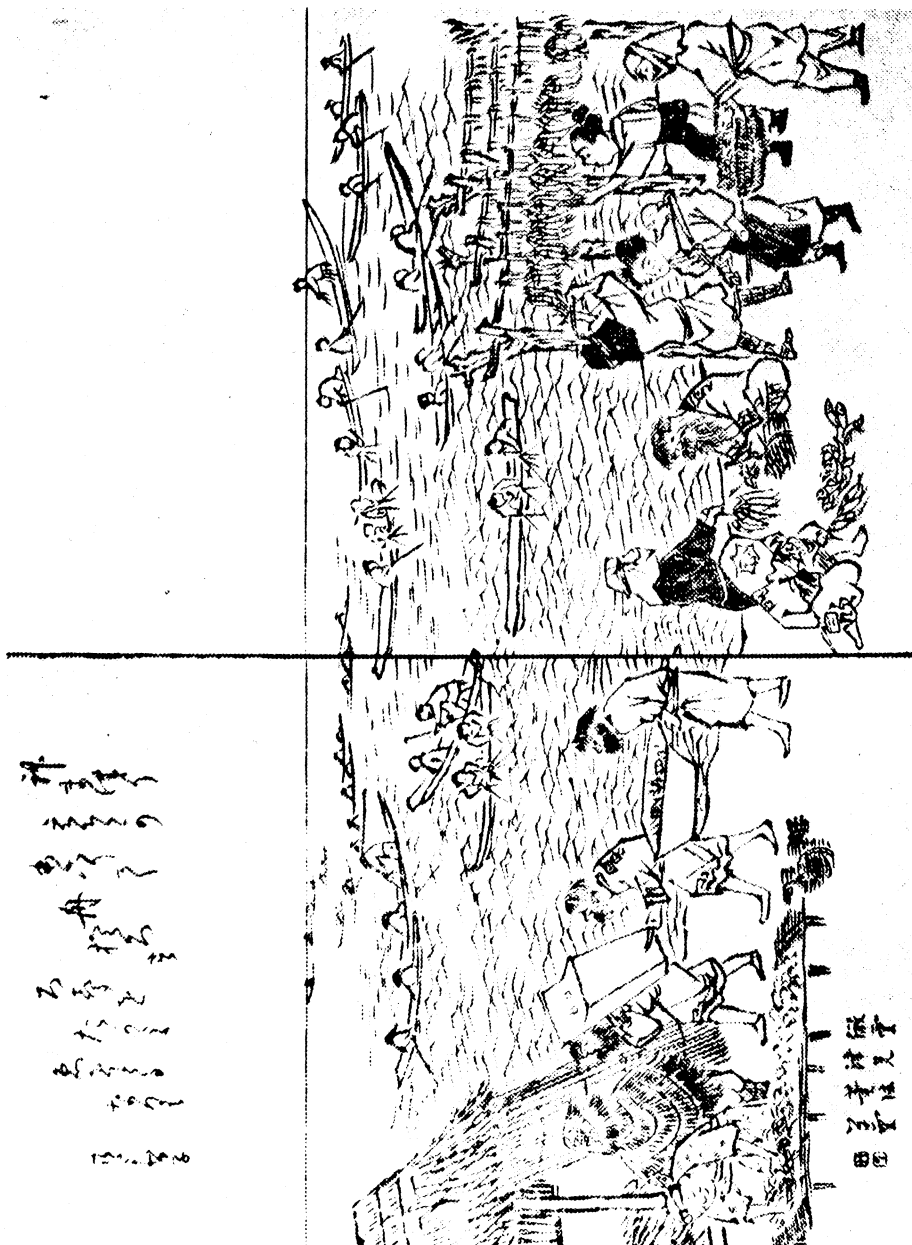


Figure 2. Ainu workers in the production of herring fertilizer
Source: Takeshiro Matsuura, "Nishi-ezo nissshi (Journal of Western Ezochi)"



Figure 3. Old map of Suttso in the mid 19th century
Source: "Nishi-ezochi on-basho ezu" in Esashi-cho-shi Hensan-shitsu (1977) "Esashi-cho-shi, Shiryo-hen vol. 1
(History of Esashi-cho, Documents vol. 1)"

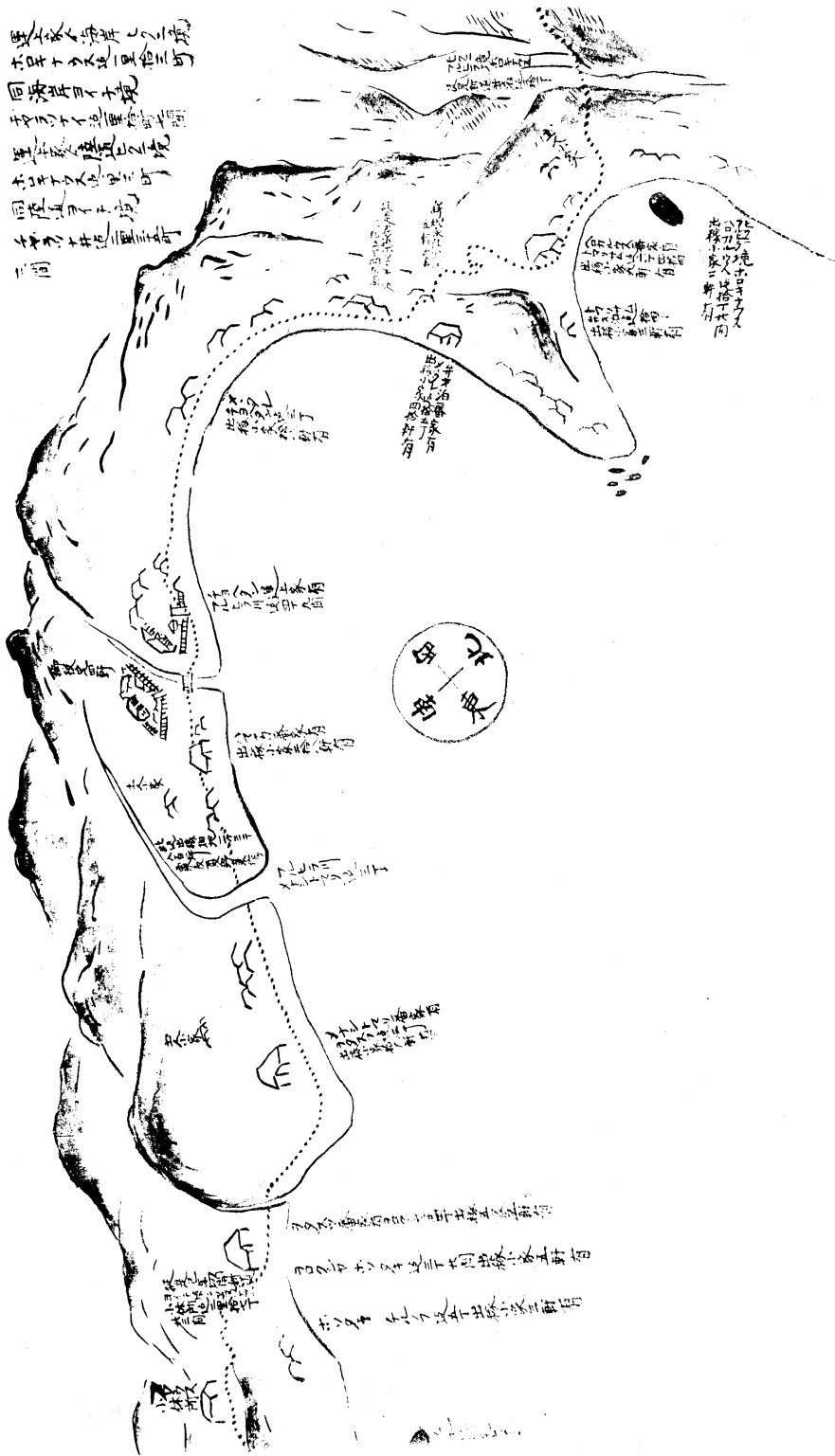


Figure 4. Old map of Furuhiro in the mid 19th century
 Source: "Nishi-ezochi on-basho ezu" in Esashi-cho-shi Hensan-shitsu (1977) "Esashi-cho-shi, Shiryo-hen vol. 1
 (History of Esashi-cho, Documents vol. 1)"

of western Ezochi fisheries was much larger than that of the eastern Ezochi. At that time, the contract fisheries spread smoothly throughout the western Ezochi. We can see the distribution of the Wajin populations in the coastal areas of the western Ezochi from 25 maps that are thought to have been drawn in the middle of the nineteenth century.

Tokugawa shogunate implemented an important policy permitting Wajin fishermen from the Wajinchi to build permanent houses in the Ezochi. Previously, the Matsumae domain had prohibited fishermen from taking their families to the Ezochi. The shogunate provided 25 maps of the Western Ezochi to the Esashi customs house from 1855 to 1860 during its second period of direct control over Hokkaido. These maps offer relatively little information on the Ainu people, but instead include detailed geographical information on the stores and offices of contract fishery operators in the Ezochi and on fishers from the Wajinchi.

Figure 3 is one of these maps, which shows Suttu in the Western Ezochi. The location of this contract fishery (*basho*) is indicated in Figure 1. We can see Wajin fishermen advance into places along the shore in this map. Figure 4 is a map of Furuhiro. This map shows not only populations of Wajin laborers but also fields plowed by them. They cultivated millet, wheat, and vegetables on a large scale in this coastal shore. Both maps reveal the occupation of Wajin (including both *unjōya* officials and Wajin laborers) and portrayed the western Ezochi as territory reclaimed by Wajin for fishing and permanent habitation. Wajin political power determined the way geographical information on the western Ezochi was perceived, and affected mapping practice.

Let us briefly consider other examples to explain the relationship between the Wajin and Ainu. Tables 2 and 3 indicate population trends among the two peoples in the mid-nineteenth century. While Table 2 indicates Ainu population, Table 3 indicates Wajin population. The number of Wajin increased, but that of Ainu decreased. It shows in particular that the number of Ainu in the western Ezochi decreased. These data show that although the fishery flourished in the western Ezochi, severe working conditions in the industry were the main cause of the depopulation of the Ainu in the region.

Table 2. Estimated Ainu population

Year	Eastern Ezochi	Western Ezochi	Total
1804	12,227	8,944	21,171
1822	12,028	9,648	21,676
1854	10,003	5,253	15,256
1873	12,432	3,581	16,013

Source: Ashikaga (1977)

Table 3. Estimated Wajin population

Year	Population
1701	20,086
1756	22,632
1787	26,564
1804	31,740
1853	63,834

Source: Ashikaga (1977)

III. The Transport Systems of Fish Fertilizer

The western Ezochi was the center of herring-fertilizer production in the nineteenth century. Let us therefore examine the system for transporting herring fertilizer from the region to Honshu. Herring fertilizer produced in the western Ezochi was always collected in Fukuyama and Esashi in the Wajinchi. Thus we need to explain two processes: the characteristics of transportation from the western Ezochi to Fukuyama and Esashi, and from Fukuyama and Esashi to Honshu.

First, many coastal fishing boats carried freight from the western Ezochi to the Wajinchi. These boats belonged to fishermen operating in the western Ezochi. As we saw in the maps (Figures 3 and 4), the number of fishermen who migrated temporarily from the Wajinchi to the western Ezochi increased during this period. They advanced into fisheries already contracted to merchants, where they paid a fee of 20 percent of their catch to the herring-fishery managers in exchange for the right to fish along the coast of the western Ezochi. In addition to purchasing these fishing rights, they participated in a putting-out system under the control of Wajinchi merchants.

Under the putting-out system, merchants (based in Esashi in this case) supplied cash, fishing supplies (boats, nets, straw mats, and so on), and daily necessities to the fishermen. This

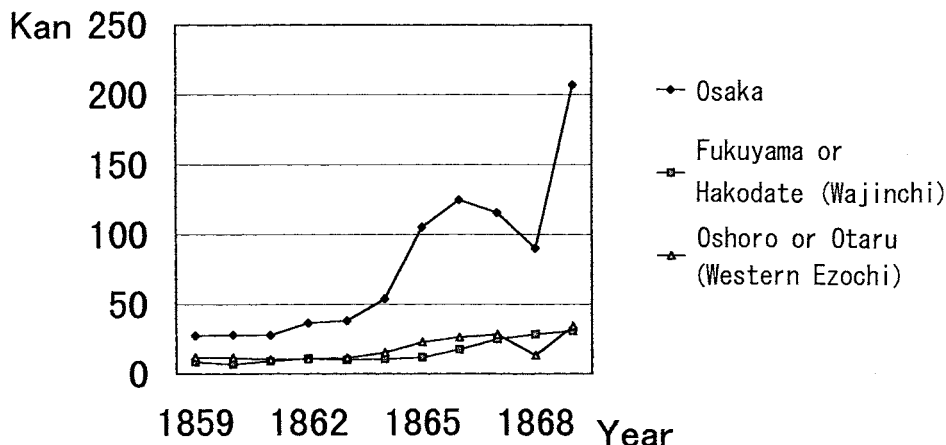


Figure 5. Price of herring fertilizer per koku

Note: 1 koku = 0.75 metric ton

Source: Nakanishi (1992)

system was commonly found at fisheries throughout Japan. Because fishermen from Esashi and its environs were supplied not by ordinary creditors but rather by Esashi-based herring-fertilizer wholesalers (*ton'ya*), they invariably returned to Esashi at the conclusion of the fishing season. In contrast, the contract-fishery operators in the western Ezochi shipped their fishery products in their own boats to Fukuyama or to Honshu. Cargoes shipped to Fukuyama were either sold to local wholesalers or reshipped to Honshu for sale to merchants there.

Second, in the nineteenth century, independent shippers and merchants began to transport herring fertilizer from the Wajinchi to Honshu in vessels known as *kitamaebune*. They repeatedly called at one of the three licensed ports in the Wajinchi, buying herring from wholesalers and transporting it to Honshu for resale. There was a great demand for herring in rural areas in the Kansai region surrounding Osaka, and a significant price differential between Hokkaido and Osaka. Figure 5 shows the price of herring fertilizer from 1859 to 1869. Note that in 1869 in particular herring prices were very high in Osaka. In the Wajinchi (in this case Fukuyama or Hakodate), and the Western Ezochi (in this case Oshoro or Otaru), the price remained unchanged at a low level.

Who supported this fishing and transportation system in the nineteenth century, and where were they from? Table 4 indicates the number of boats entering in Esashi in the Wajinchi. In Figure 6, I express this data on the map. Most of the vessels

Table 4. Number of boats entering Esashi (1803–69)

Origin	Number	Rate (%)
Kyushu	4	0.22
Shikoku	5	0.28
Chugoku	18	0.99
Kansai	101	5.57
Kanto	6	0.33
Hokuriku	1,283	70.73
Tohoku	212	11.69
Hokkaido	172	9.48
Unknown	13	0.71
Total	1,814	100.00

Source: 'Mashaku-cho' in Sekigawa-ke monjo (archives in the Sekigawa family)

(70.73%) came from the Hokuriku district. Table 5 lists contract fishery operators in the Western Ezochi. Many merchants' home and main offices were in Ōmi in the Kansai region. These data reveal that many shippers and merchants operating the vessels (*kitamebune*) came from the Hokuriku district in central Honshu, while the contract-fishery operators were from Ōmi in the Kansai.

Table 4 is based upon the records of Sekigawa Yozaemon, an Esashi herring meal merchant. Matsumae domain recognized Sekigawa as a wholesaler and granted him a contact to collect commodity taxes and port charges levied on commodities and boats passing through the Esashi customs house. Accordingly, the Sekigawa rec-

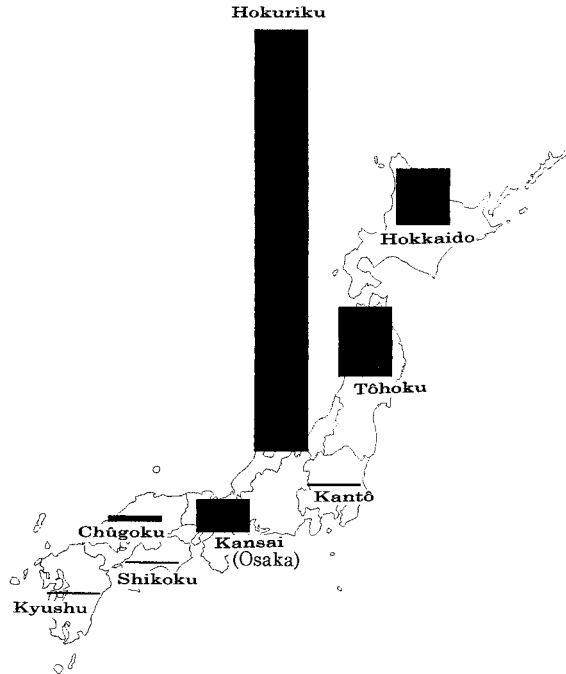


Figure 6. Number of boats entering Esashi (1803-69)

Table 5. Contract Fishery Operators in Western Ezochi (1854-60)

Name	Home	Main office	Branch office
Okada	Omi, Kansai	Omi, Kansai	Fukuyama
Nishikawa	Omi, Kansai	Omi, Kansai	Fukuyama
Hirata	Omi, Kansai	Omi, Kansai	Fukuyama
Tazuke	Omi, Kansai	Omi, Kansai	Fukuyama
Tazuke	Omi, Kansai	Omi, Kansai	Fukuyama
Fujino	Omi, Kansai	Hakodate	Fukuyama
Suhara	Kii, Kansai	Edo (Tokyo)	Fukuyama
Date	Ou, Tohoku	Edo (Tokyo)	Fukuyama
Yamada	—	Hakodate	Fukuyama
Sano	Echigo, Hokuriku	Teradomari, Hokuriku	Hakodate

Source: Nakanishi (1991)

ords can be regarded as official documents. They offer extremely detailed information concerning the shipping of herring by-products. Analyzing these records, we can examine a shift in the system by which herring cargoes from Ezochi were collected in the port town of the Esashi in the mid-nineteenth century.

The Esashi *ton'ya* had rights to herring from the western Ezochi during the first half of the nineteenth century. These rights derived from their roles as supply merchants, in which they provided loans to fishers living in and around Esashi in return for exclusive access to the her-

ring caught by their clients in the western Ezochi. However, when eight villages along the northern coast of Matsumaechi between Esashi and the Ezochi border came under the second time of direct administration of Tokugawa shogunate in 1855, the ship owners and fishers in the villages were permitted to trade directly with other districts, including Honshu. In other words, they were allowed to fish and trade herring independently of Esashi *ton'ya*. This led to an upheaval in the system of collecting herring Esashi.

In 1864, the eight villages were returned to Matsumae domain, with the result that all ships

from Ezochi once again had to discharge their cargoes at Esashi. Ship owners and fishers living in the eight villages opened branch stores in Esashi, through which they started selling herring meal directly to the Esashi *ton'ya*, without borrowing money or supplies such as nets and boats from them. At the same time, the number of *kitamaebune* entering from Hokuriku district peaked: they were employed by Esashi merchants in shipping herring loads from western Ezochi to Esashi. Consequently, the systems for collecting herring cargoes from western Ezochi to Esashi were reorganized by merchants, *kitamaebune* ship owners living in Hokuriku district, and fishermen living in and around Esashi in the mid-nineteenth century.

IV. Conclusion: The Relationship between Hokkaido and Honshu

Let us conclude by reviewing the major findings of this study. First, in the mid-nineteenth century, Hokkaido was a frontier island that attracted many Japanese merchants and fishermen. They proceeded to occupy the coastal areas to develop the herring fishery—a process that put great pressure upon the island's Ainu people. Second, the distribution of herring fertilizer was carried out mainly by merchants living in the Hokuriku district on the Japan Sea coast of central Japan and by the Ōmi merchants, the most prominent merchant group in the Kansai region.

These findings clarify our understanding of the pre-modern structure of regional intercourse in Japan, which relied on the great shipping route joining the northern part of the country in Hokkaido with Kansai and the rest of central Japan. By contrast, as the Japanese economy developed during the industrialization of the twentieth century, Hokkaido became the main center of coal production, which was centered in the inland areas. In other words, as the Japanese economic base shifted from agriculture to industry, so too did the orientation of the main shipping routes to Hokkaido move from the Japan Sea coast to the Pacific.

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