

## 4 Establishing Whaling in the North

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In early 1808, the Confucian scholar Ōtsuki Heisen (1773–1850) was just finishing his magnum opus *Geishikō* (Manuscript on Whale History), when news broke about a mass whale stranding in northern Japan: eighty-seven whales of all sizes had beached near the village Tanabu in Morioka domain (today Mutsu City, Aomori Prefecture). As Heisen recounts, a merchant from Edo heard of this news and – expecting an opportunity to get rich – travelled to the Shimokita Peninsula to harvest as much of these whales as possible. However, when the merchant arrived at the scene days later, he discovered that the animals had turned into rotten stinking carcasses. To make matters worse, he found no one among the locals with the right flensing tools – or even enough space to store the whale bones. With all his hopes crushed, the would-be whaler had to return home empty-handed. Heisen drew two lessons from this incident: first, one had to be prepared with tools, capital, and workers before entering the whaling business, and second, the frequent whale strandings demonstrated the immense potential of the Northeast as a whaling place.

Heisen and his cousin once removed, Ōtsuki Gentaku, were among the most prominent voices calling for the establishment of whaling in northern Japan. However, while whaling proliferated in western Japan, all attempts to establish whaling groups at the Sanriku Coast had ended in failure. Only in the 1830s, did the Sendai government decide to closely investigate the possibility of a state-sponsored whaling enterprise in the north. At the time, Japan was ravaged by the fierce Tenpō famine (1833–1837), which hit the coastal communities especially hard. Under these circumstances, the prospect of additional whale meat that could save the starving fishing communities gave much hope to the locals. Nevertheless, after only four years, this new whaling operation was once again given up.

This chapter will follow the debate surrounding the establishment of whaling in northern Japan in the late Edo period, through the eyes of whale scholars like Ōtsuki Heisen and Ōtsuki Gentaku, as well as the

physician Sasaki Bokuan (1785–1861) who was tasked by the Sendai authorities to make whaling a reality in the north. This chapter examines the reasons why proto-industrial whaling was never able to take root in northern Japan. As I will argue, besides organisational deficits, lacking funds, and demand for whale products in the north, were also the changing environmental circumstances that affected the cetosphere in the nineteenth century and thus also the prospect of new whaling enterprises.

### The Whale Scholars

Among the Japanese elite of the Edo period, knowledge about whales and whaling was disseminated commonly through picture scrolls and handwritten manuscripts. According to the historians Mori Hiroko and Miyazaki Katsunori dozens of these whale scrolls and manuscripts from the main whaling regions of the Kii Peninsula and northern Kyushu existed.<sup>1</sup> As discussed in the previous chapter, only a single scroll has been found in the Northeast, which is in the possession of the Ayukai family, and it remains unclear what kind of whaling enterprise it does depict. Heisen's *Geishikō* belongs to the most well-known and widely discussed manuscripts of the time. As Heisen was a scholar working for the Sendai domain, he also discussed at various points in the manuscript the current whaling situation at the Sanriku Coast and in Ezo, lobbying for the establishment of whaling in the north. Heisen's comments are thus a rare insight into scholarly knowledge regarding proto-industrial whaling and the Ebi whale culture in northern Japan.

The *Geishikō* is a product of *honzōgaku* (natural knowledge studies). This scholarly field emerged in the first half of the Edo period by drawing inspiration from *materia medica* texts that ordered plants and animals according to a Chinese classification system. Based on the Japanese translations of these texts, scholars made similar investigations of Japanese flora and fauna. As Japanese scholars began to realise how inaccurate this knowledge system was, however, the scholars began to make their own observations of the natural world and thus created new scholarly knowledge. This process was accelerated under the sponsorship of the eighth shogun, Tokugawa Yoshimune (1684–1751), who encouraged experimentation with agricultural ideas and the translation of Dutch books. The latter led to a separate field of inquiry called *rangaku* (Dutch learning), which had an especially strong impact on medicinal and

<sup>1</sup> See for a full list: Mori and Miyazaki, *Kujiratori no shakaishi*, 93–6; Arch, 'Bringing Whales Ashore', 2014, 127–8. Some of these picture scrolls were reprinted in a museum catalogue by the Mie Prefecture Kumano Kodo Center in association with the Taiji Whale Museum, see Sakurai and Ishihara, *Rikugei or Six Types of Whaling*.

anatomical knowledge production.<sup>2</sup> With this, early modern European natural knowledge began to disseminate among the intellectual elite of Edo Japan and influenced the further development of *honzōgaku*.<sup>3</sup> Federico Marcon argued that *honzōgaku* stood in close relationship to the increased commercialisation of agricultural and proto-industrial products. Through the commodification of plants and animals in isolation from their original ecosystem, the secularisation of nature and objectification of natural species became stronger.<sup>4</sup> Similarly, the *Geishikō* not only incorporated other Japanese scholarly texts of the time but also referenced Chinese classics and even made use of translated Dutch books, which covered a wide range of topics from medicine to natural knowledge.

The origin of the creation of the *Geishikō* begins, however, not with Heisen but with his cousin once removed Gentaku. The Ōtsuki's were a wealthy farming family that also bore the title of district headman in Nishi-Iwai in Ichinoseki domain, a subsidiary domain of Sendai. Many male members of the family served as physicians and scholars for the Sendai domain.<sup>5</sup> Among those, Gentaku was the most successful, serving as the personal surgeon of the Sendai daimyo in his Edo residence and opening his own *rangaku* school in Edo. Today, Gentaku is remembered for translating Johan Jonston's *Historia naturalis* from Dutch into Japanese in the 1780s. One animal portrayed in the book was the narwhale and Gentaku became interested in the pharmaceutical uses of their horns and whales in general.<sup>6</sup> In 1785, he met a fellow physician in Kyoto who had just returned from a visit to Ikitsukishima in Hirado domain, where he had treated the sick chief of the local whaling group. The eyewitness account of the whaling village left a deep impression on Gentaku. As he was working on a revised edition of the *Kaitai shinso* (New Text on Anatomy), the first Dutch anatomical book translated into Japanese by Gentaku's teacher Sugita Genpaku (1733–1817), he developed an interest in the anatomy of whales. In 1800, Gentaku had the chance to meet a whaler in Edo from Hirado domain who had been ordered by the shogunate to supervise whaling in Iturup (Etorofu) on the Kuril Islands. Based on this conversation, Gentaku wrote the *Geigyosōwa* (Miscellaneous Stories about Whale Fish) in 1801.<sup>7</sup>

<sup>2</sup> See, for example, the memoirs of one of the founders of *rangaku*: Sugita, *Dawn of Western Science in Japan*. For further reading, see Jansen, 'Rangaku and Westernization'; Jackson, *Network of Knowledge*.

<sup>3</sup> Marcon, *The Knowledge of Nature and the Nature of Knowledge in Early Modern Japan*.

<sup>4</sup> Marcon, *The Knowledge of Nature and the Nature of Knowledge in Early Modern Japan*, 5–6.

<sup>5</sup> Katō, *Hitodsukuri fūdoki*, 3:184–5. <sup>6</sup> Arch, *Bringing Whales Ashore*, 2018, 126.

<sup>7</sup> Mori and Miyazaki, *Kujiratori no shakaishi*, 193–207.

For his anatomical studies, Gentaku needed first-hand descriptions of whale carcasses. As he was the headmaster of his *rangaku* school, he did not have time to travel to the whaling places in Kyushu. In 1803, Gentaku wrote a letter to the Sendai authorities and inquired if his oldest son Genkan (1785–1837) could go to Nagasaki to learn Dutch and study whaling practices in Ikitsukishima in his stead. As Gentaku worried for the safety of Genkan – who was only eighteen years at the time – he asked for permission that the thirty-one-year-old Heisen would be allowed to accompany him. Both Genkan and Heisen were at the time enrolled in the *Shōheizaka gakumonjo*, the Confucian academy of the shogunate in Edo. Heisen and Genkan would eventually stay for over two years in Nagasaki, where they learned among many famous *rangaku* scholars.

During their stay in western Japan, in the first month of 1804, they made the trip from Nagasaki to Ikitsukishima in Hirado domain and stayed for one week at the house of the chief of the whaling group.<sup>8</sup> Especially Heisen became intrigued with the whaling business, and when they returned to Edo in 1805, Heisen began working on his own whaling book, the *Geishikō*. While writing his manuscript, Heisen was appointed as an official Confucian scholar of the Sendai clan and in 1806 returned to Sendai to become headmaster at the *Yōkendō*, the Confucian school of Sendai domain. He finished the *Geishikō* there in 1808 and although the manuscript was not printed, copies of it circulated among the scholarly elite of Tokugawa Japan and were widely read.<sup>9</sup>

The *Geishikō* is considered the most comprehensive and sophisticated study of whales and whaling to this date in Tokugawa Japan.<sup>10</sup> In the first three of the six volumes, Heisen traces the etymology of the word ‘whale’ in different languages, introduces and categorises all known whale species, and presents the first account of whale anatomy (probably co-written by Gentaku). While the first three volumes were concerned with the classification and knowledge about whales as a biological species in the tradition of *honzōgaku*, the following three volumes, called ‘appendix’, showed whaling as a profession, mainly, but not only, based on Heisen’s observation in Ikitsukishima (Figure 4.1).

In the fourth volume, Heisen describes the current state of whaling in Japan and in the rest of the world. Based on his readings of Dutch books he believes that whaling operations in other places were more widespread and successful than in Japan. He was aware of whaling in the South Sea of China, apparently with very similar methods to those in Japan. He also

<sup>8</sup> Mori and Miyazaki, *Kujiratori no shakaishi*, 167–71.

<sup>9</sup> Mori and Miyazaki, *Kujiratori no shakaishi*, chap. 7; Jackson, *Network of Knowledge*, 95–6.

<sup>10</sup> Mori and Miyazaki, *Kujiratori no shakaishi*, 158.

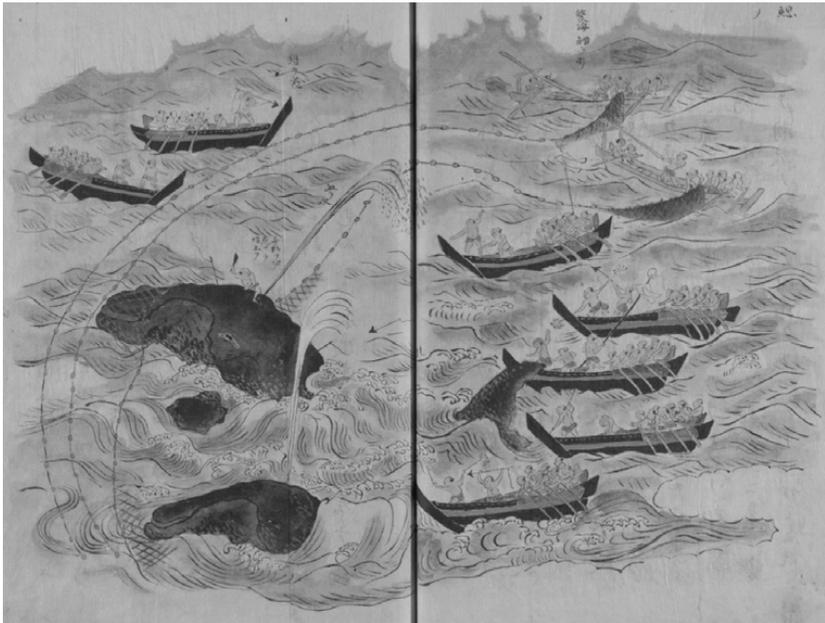


Figure 4.1 Net whaling operation in western Japan, *Geishikō*. Courtesy of the National Diet Library of Japan.

referred to whaling in America and in Europe, especially in the Arctic region around Spitsbergen and Greenland.<sup>11</sup> He then lists all known whaling places in Japan, ordered by region. According to his count, over fifty whaling places were active in Japan at the time, concentrated in western Japan.

In northern and eastern Japan, whaling was non-existent, however. Instead, Heisen explained, local fishermen in Matsumae domain in southern Ezo or on the Izu Peninsula would often refer to whales as *ebisu-kami* (god Ebisu) and believe that they were gentle animals who were keen to not hurt humans. Even more, as the whales loved herring, they would drive them directly towards the boats of the fishermen.<sup>12</sup> Another noteworthy point for Heisen was the frequent strandings of whales in the north. Commenting on the Tanabu Incident of 1808, Heisen also mentioned the Akamae mass stranding we have discussed in Chapter 2.

<sup>11</sup> Ōtsuki, *Geishikō*, 1976, 289–92. <sup>12</sup> Ōtsuki, *Geishikō*, 1976, 51.

According to the *Saiyakushiki* in a certain year (1701) 139 whales beached at once in the bay of Akamae village in Ōshu, and they all died after three days. Incidents like this happen occasionally in the Sea of Ōshu (Sanriku Coast). If a whaling group should be established here, without a doubt, a great number of whales could be hunted, and the *kokueki* would be furthered immensely.<sup>13</sup>

Heisen's uses here the term *kokueki* (national interest), which, as Luke Roberts has shown, describes a form of inter-domainal contest to establish and attract proto-industries to secure economic advantages over the other domains.<sup>14</sup> For Heisen these strandings were a clear sign that the region would be ideal as a whaling base, as whaling would be beneficial not only for the locals but also for the finances of the domain. He had little concern for the role the whales played for local fisheries and was rather transfixed by the idea of bringing whaling to the north. Heisen highlighted the various benefits organised whaling could have for the northern domains: 'The truth is that the whole domain will become prosperous. As the common saying goes: One whale will make seven villages flourish.'<sup>15</sup>

One realisation Heisen had through the study of foreign books was that European and American whalers were so successful as they could follow whales along their migration routes off the coast of Greenland and America. He speculated that whales in the Pacific must also follow a similar route. Likely whales would gather in the winter months in the south to hunt fish, before swimming northwards along the Japanese coast in spring and summer: 'But what is the farthest point north? . . . During the summer, many right whales gather around the western sea of Ezo, but the most northern point of their journey is even farther than Ezo. From there they probably return south.'<sup>16</sup> Indeed, ten years prior, a whale that was targeted by whalers near Shinagawa in the early fifth month was found a few weeks later stranded at the Sanriku Coast. This was proof for Heisen that the whales that were hunted during the winter season in western Japan belonged to the same group of animals that frequently stranded in the north during the summer.

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As we have seen in Chapter 2, an average whale stranding in the north generated around 18 *ryō* of wealth that was distributed among the authorities and the locals. Compared to the 150 *ryō* that whaling groups could expect in

<sup>13</sup> Cited from: Ōtsuki, *Geishikō*, 1976, 297–8.

<sup>14</sup> Roberts, *Mercantilism in a Japanese Domain*, 168. <sup>15</sup> Ōtsuki, *Geishikō*, 1976, 519.

<sup>16</sup> Ōtsuki, *Geishikō*, 1976, 321–8.

western Japan, this was a rather small amount. For whale scholars like Heisen or Gentaku, this begged the question: Why were there no whaling groups operating at the Sanriku Coast? Looking at the Hachinohe records, we find two entries about would-be-whalers asking for permission from the domain to establish a whaling enterprise. Both entries are from 1699 and it is not entirely clear if these were connected or not. The first request came from a merchant from Edo who wanted to conduct net whaling in Same-ura. It was agreed that he would pay 6 *ryō* and 30 barrels of whale oil as tax for each hunted whale. The second entry is from a whaler from Hizen, who similarly tried to establish net whaling in nearby Minato. He wanted a whaling licence for seven years and was willing to pay for three years as well as 6 *ryō* and 30 barrels of whale oil for each whale while providing a 55 *ryō* deposit to the domain.<sup>17</sup> As no further records of either enterprise exist, we have to assume that they were not successful. That the domain was satisfied with a tax of 6 *ryō* per whale might indicate that the government expected that a hunted whale would bring in around the same amount of money as a beached whale, of which the government would claim half of the profits as tax. The Hachinohe officials did apparently not expect that a hunted whale if processed correctly and if the necessary distribution system was established could be worth well over 100 *ryō*.

After the unsuccessful whaling attempt on the Oshika Peninsula in 1677, these two entries were the last recorded attempts to introduce whaling at the Sanriku Coast until the nineteenth century. Coming from a northern domain themselves, both Heisen and Gentaku promoted the establishment of net whaling in northern Japan, for example in Ezo. Gentaku wrote:

Oceans surround eastern Japan. Whales appear here often at river mouths, especially in the sea Northeast of Nosaku [in Ezo]. Therefore, if the whaling method would be transmitted to the fishermen, the economies of the domains would flourish, and the liveliness of the people would undoubtedly increase.<sup>18</sup>

Gentaku argued that it was not only the local fishermen but the northern domains as a whole that would profit from the introduction of whaling. In the late eighteenth century, many domanical lords had to fight chronic fiscal problems and local governments supported whaling and other proto-industries to secure economic advantages over the other domains. Gentaku specified, however, that it could not be expected that the local fishermen would learn whaling techniques themselves and that these would have to be ‘transmitted’ to them. This could be understood as a solicitation

<sup>17</sup> Hachinohe shishi hensan iinkai, *Hachinohe shishi: Shiryōhen Kinsei*, 1970, 2:247, 255; Hachinohe shishi hensan iinkai, *Shinpen Hachinohe shishi: Kinsei Shiryōhen*, 2:231.

<sup>18</sup> From the *Gyōyōyakushi*, cited after Mori and Miyazaki, *Kujiratori no shakaishi*, 208–9.

towards the shogunate or the northern domains to initiate whaling operations. For Heisen, the most pressing problems were the lack of experienced whalers and the difficulty of securing enough funding for a whaling enterprise:

In the past, I asked [someone] how much funding I needed to start whaling in the western sea [of Japan]. [He] answered that I needed 400 *kanme* of silver . . . The regions in the east and north are different, however. It is because there is no one who is engaged in whaling in the land in the Northeast; they only captured whales that happened to get close to the shore, and they have no experience in catching whales in the open water, which means that they have no methods and are not accustomed to it. If they wish to start a whaling enterprise, they should first hire [whalers] from [the southwest], and together with them employ some crews from their own area [the Northeast].<sup>19</sup>

According to Heisen, the Sanriku fishermen were not only inexperienced in whaling, but they also did not know how to flense a whale. Employing whalers from the whaling regions was expensive, however. An informant from Hirado estimated that introducing whaling to the Sanriku Coast would cost 800 *kanme* of silver (ca. 13,000 *ryō*), double the amount than in western Japan. Heisen himself, however, believed 500 *kanme* silver (ca. 8,125 *ryō*) would be sufficient. While he conceded that bringing whaling experts to the north would be expensive, Heisen argued that hemp, iron, rice, and firewood could all be produced locally and would be cheaper than in western Japan.<sup>20</sup>

There was a further reason Gentaku and Heisen pressed to introduce whaling in the north. Due to the expansion of the Russian Empire towards the east, territorial conflict with Tokugawa Japan over the island of Ezo had become more urgent. Between 1799 and 1821, the Matsumae domain was under the direct control of the Tokugawa government to secure the border region against Russian intruders. During this time, the government also had plans of bringing settlers to the north to cultivate the land and develop the local fishing industry and among them were whalers from Hirado domain.<sup>21</sup> Gentaku met the whalers in 1800 while they were passing through Edo. When the Hirado whalers arrived in Iturup a few months later, they found rich whaling ground but could not determine a suitable place for a whaling base. As Iturup was extremely remote, they were not able to recruit enough skilled locals and the plan had to be abandoned.<sup>22</sup> According to Heisen, whalers could also function as part-time navy soldiers:

[T]he whaling group is the best guard for a country surrounded by the ocean . . . A whale boat can carry out the duties of a warship, and the spears and so forth that

<sup>19</sup> Ōtsuki, *Geishikō*, 1976, 339–40. <sup>20</sup> Ōtsuki, *Geishikō*, 1976, 340–3.

<sup>21</sup> Itabashi, *Kita no hogeiki*, 52–3; Howell, *Capitalism from Within*, 33.

<sup>22</sup> Mori and Miyazaki, *Kujiratori no shakaishi*, 175–7.

they used to bring down a whale can be converted into military weapons. Those who hunt whale-fish can move around on the ocean free and therefore are the most suitable war preparations for protection against foreign invaders.<sup>23</sup>

For Heisen, the introduction of whaling was therefore not only necessary to boost the economy of a domain but also a critical military asset against foreign aggressors. For example, the coastal defence of the Sanriku Coast was heightened, with watchtowers looking for foreign ships. The same watchtowers were also used in western Japan to look for whales swimming by and to alert the whaling groups. Furthermore, after the Tokugawa takeover of the Matsumae domain, the Tokugawa government ordered that the northern domains bring troops to the northern border to defend against possible Russian intrusions in 1808. The Sendai domain, the most powerful of the northern domains, subsequently dispatched 1,700 soldiers to Hakodate. With this increased military presence, the Sendai government extended influence far beyond its own borders. Indeed, another Sendai domain physician and mentor of Gentaku, Kudō Heisuke (1734–1800), had even suggested that developing Ezo would make Sendai a prosperous region and that Sendai could one day become the new capital of Japan.<sup>24</sup> Seen in this light, the publication of the *Geishikō* just around this time is certainly no coincidence but shows a renewed economic and strategic interest in the northern domains. It seems plausible that the Ōtsuki family had a specific agenda for promoting whaling in the north as part of a scheme of expanding the influence of the Sendai domain.

### The Disappearance of the Whales

Heisen's and Gentaku's calls for establishing whaling in the Sendai domain did go unheard for almost thirty years. Only in 1837 did the Sendai government show interest in the prospect of establishing a new proto-industry, when they ordered the physician Sasaki Bokuan to establish a whaling enterprise at the Sanriku Coast. However, by that time, some major shifts in the cetosphere were underway, as whales were disappearing from the waters around the Japanese Archipelago.<sup>25</sup> In the secondary literature, the decline of the whale stocks in the nineteenth century is attributed to the appearance of American whaling ships off the Japanese Coast, who hunted great whales on the open sea before they

<sup>23</sup> English translation by Jakobina Arch, see Arch, 'Bringing Whales Ashore', 2014, 200.

<sup>24</sup> Godefroy, 'Rethinking Ezo-Chi, the Ainu, and Tokugawa Japan in a Global Perspective', 390–1; Gramlich-Oka, *Thinking Like a Man*, 85.

<sup>25</sup> Nakazono, 'Whaling Activities of Ikitsuki Islanders', 145; Shimamura, 'The Introduction of Harpoon Gun Whaling to Tosa Whaling', 95.

could reach the coastal waters of Japan.<sup>26</sup> Indeed, sperm, bowhead, and right whale stocks collapsed all over the world soon after the appearance of American and European whalers.<sup>27</sup>

By the 1810s, the American whaling industry had depleted the commercially desirable whale species in the seas close to the coast of South America. They subsequently moved across the Pacific Ocean to seek untouched whaling grounds.<sup>28</sup> A whaler from Massachusetts discovered the Japanese whaling ground in 1820.<sup>29</sup> The number of British and American whaling ships that participated in whaling around Japan increased steadily from around 100 vessels per year to over 800 in 1846.<sup>30</sup> The American whalers soon realised that the most promising whaling grounds were in the south around the Ogasawara Islands and farther north, off the Sanriku Coast, where the Kuroshio and Oyashio currents meet. Therefore, most of the ship sightings and landings took place in the northern domains. The following source from the nineteenth century details the situation from the Japanese perspective:

During the Bunsei period (1818-1830) many Chinese ships (i.e., foreign ships) were coming from the open sea to our coves [in Sendai domain]. The bonito fishermen had been exchanging many goods with them. But in Bunsei 6 (1823) their goods were confiscated [by the government], and they were ordered not to go near them. . . . As [I] understand it, the reason why these Chinese ships came was that they hunt whales and sperm whales. . . . Perhaps due to this, whales did not show up at our beach anymore. . . . Since the middle of the Bunsei Era we haven't seen a single whale and fishing has become extremely poor.<sup>31</sup>

Apparently, these foreign whalers had occasionally participated in commercial exchanges with the local population, something explicitly forbidden under Tokugawa law.<sup>32</sup> The Sendai government increased the coastal security and erected a watch tower near Ayukawa, while hunters were ordered to defend themselves with their hunting rifles, in case of an unauthorised landing.<sup>33</sup> But if we believe this source, the appearance of

<sup>26</sup> Morita, *Kujira to hokei no bunkashi*, 316–17.

<sup>27</sup> The reconstruction of the whale population before (and even after) the advent of scientific data remains one of the greatest challenges for marine environmental historians; see Taylor, 'Knowing the Black Box'; Josephson, Smith, and Reeves, 'Historical Distribution of Right Whales in the North Pacific'.

<sup>28</sup> Freeman, *The Pacific*, 130.

<sup>29</sup> Mcomie, 'Of Whale Oil and the Spirit of Adventure', 27.

<sup>30</sup> Kondō, *Nihon engan hokei no kōbō*, 144. Recently, Jonas Rüegg has mapped the spread of western whaling ships in the 'Japan Sea' in his dissertation, see Rüegg, 'The Kuroshio Frontier', chap. 4.

<sup>31</sup> Cited after Watanabe, *Kadoyashiki kyūsuke oboechō*, 33.

<sup>32</sup> For a case study of such encounters, see Howell, 'Foreign Encounters and Informal Diplomacy in Early Modern Japan'.

<sup>33</sup> Kondō, *Nihon engan hokei no kōbō*, 149–50.

the foreign ships also had a profound influence on the whole coastal ecosystem. Sightings of whales near shore became rare, while fish catches also decreased. This observation confirmed the locals in their belief that whaling and fishing were directly connected. The authorities, on the other hand, likely draw a different lesson from the activities of the foreign ships: it showed them that Ōtsuki Heisen and Gentaku had been right. There was great potential for proto-industrial whaling in the Sea of Kinkazan, but unfortunately, it was foreign powers and not their own fishermen that took advantage of this.

The American whalers were not alone to blame for the disappearance of the whales, however. Environmental circumstances like colder sea surface temperature during the period of the fierce Tenpō famine (1833–1837) might also have had a temporary influence. Moreover, whaling communities in western Japan had placed constant pressure on the whale stocks since the early Edo period and this pressure only intensified after the invention of proto-industrial net whaling in 1675. With more competitors at different points of the whales' migration route along the Japanese Coast, whales had a much higher chance of getting captured than in the centuries before. As noted in the Introduction, Jakobina Arch has estimated that the Japanese whalers hunted as many as 200,000 whales before the American whalers even arrived.<sup>34</sup> The Masutomi whaling group from Ikitsukishima alone was responsible for at least 20,000 killed whales.<sup>35</sup> We can only speculate on how the mass killing of whales influenced the behaviour of the animals. Heisen noted, for instance, that the humpback whales reached in recent years the Kii Peninsula a month later than in previous decades.<sup>36</sup> As discussed in Chapter 2, whale strandings became much rarer in the Hachinohe domain, while killer whale attacks likely increased. By the early nineteenth century, the cetosphere had come under serious anthropogenic pressure and whale abundance and behaviour had begun to change.

### **The Tenpō Famine and Sasaki Bokuan**

The aforementioned Tenpō famine likely played a critical role in the decision to establish a whaling enterprise in the Sendai domain. The famine coincided with the last cold phase of the waning 'Little Ice Age', a time interval between 1550 and 1850 when temperatures in the northern hemisphere were regionally cooler than in the periods before and after.

<sup>34</sup> Arch, *Bringing Whales Ashore*, 2018, 9, 71.

<sup>35</sup> Nakazono and Yasunaga, *Kujiratori emonogatari*, 136–7.

<sup>36</sup> Ōtsuki, 'Geishikō', 1926, 121.

Compared to the average temperatures of the second half of the twentieth century, the temperature in the northern hemispheres was 2°C below this baseline.<sup>37</sup> Already fifty years prior, during the Tenmei famine (1782–1788), caused by rainy and cold summers followed by volcanic activities, over 100,000 people had died of starvation in the Northeast and around 20,000 fled to other domains.<sup>38</sup> The Tenpō famine was even worse, with the cold *yamase* winds contributing to wet summers that destroyed the crops. Over 180 uprisings were recorded, and the population of the Sendai domain decreased by almost 100,000. The hardest hit people were not peasants living in the inland regions, however, but people living in coastal communities. As large-scale agriculture was not possible in the mountainous regions near the coast, the fishing villages were reliant on importing food from inland. As a consequence, between 30 and 60 per cent of the population on the Oshika Peninsula perished.<sup>39</sup>

While the Northeast was ravaged by frequent famines, many domains in southwestern Japan coped considerably better. This was not only because of the less devastating weather (there were no *yamase* winds in the southwest) but also because of better disaster prevention measures. Indeed, economic historians have explained that the Tenmei and Tenpō famines were only this fatal in the northern domains as the local and central authorities had been less willing to dedicate resources to disaster relief programs.<sup>40</sup> This can be exemplified by whale oil as since the Kyōhō famine (1732–1733), southwestern domains had invested in huge stockpiles of whale oil that could be

<sup>37</sup> It is noteworthy, however, that the climate during this time interval was not uniformly cold and could differ drastically across regions and time. The coldest temperatures were recorded in Northwest-Central Asia, where the period from 1811 to 1840 was especially cold, see Matthews and Briffa, 'The Little Ice Age'. Crowley et al. argued that around forty per cent of the decadal-scale variance in the Little Ice Age can be traced back to volcanism, see Crowley et al., 'Volcanism and the Little Ice Age'. Historians have suggested that humans could also have provoked part of the climatic shifts during the Little Ice Age and some suggest that the downturn in carbon dioxide in the atmosphere was caused by the drastic depopulation of the indigenous population in the Americas in the sixteenth century after epidemics from Europe had been imported. This led to former fields and cities being taken over by natural vegetation that absorbed a substantial amount of carbon dioxide, thereby lowering the global temperature, see Headrick, 'Global Warming, the Ruddiman Thesis, and the Little Ice Age'; Ruddiman, *Plows, Plagues, and Petroleum*.

<sup>38</sup> Komatsu, *Uminari no ki*, 140. Fabian Drixler notes that the population in eastern Japan had been declining since 1700, a process that was accelerated during the Tenmei famine, see Drixler, *Mabiki*, 129.

<sup>39</sup> Komatsu, *Uminari no ki*, 141; Kikuchi, 'Kikinshi no riariti-'; Oshika chōshi hensan iinkai, *Oshika chōshi: Jōkan*, 143–5. Amino Yoshihiko has made the argument that famines first occurred in urban places and other communities that were not directly linked to food production as they had to buy agricultural products, see Amino, *Rethinking Japanese History*, 104–7.

<sup>40</sup> Saito, 'Climate and Famine in Historic Japan', 280; Francks, *Japan and the Great Divergence*, 60.

utilised as a pesticide against planthoppers. Similar relief plans were not established in the northern domains, however.<sup>41</sup> Therefore, it may not be a coincidence that Gentaku first became interested in whaling during the Tenmei period. Indeed, the traumatic experiences of this famine may have been one of the reasons why Gentaku and Heisen pushed to establish whaling in the north shortly after the Tenmei famine.

On a first glance, it may seem peculiar that the Sendai authorities chose a physician for the task of bringing whaling to their domain. Looking at Bokuan's biography more closely reveals much about the possible intentions of the Sendai domain to establish whaling. Sasaki Bokuan was born in 1785 in Nakatsuyama, an inland town in the Monō District a bit north of Ishinomaki. He had studied gynaecology in Kyoto and was trained in internal medicine and *honzōgaku*. In 1819, at the age of twenty-five, he returned from Kyoto to accept the position of principal at the *Igakkō*, the Sendai medicine school.<sup>42</sup> Originally, the medical education in Sendai had been part of the domanial school *Yōkendō*, but when Ōtsuki Heisen became headmaster, he initiated reforms, such as the founding of the new medical institute *Igakkō* in 1812. Furthermore, on the initiative of his cousin Gentaku, Heisen made Dutch learning an integral part of the curriculum at the *Yōkendō* and the *Igakkō*.<sup>43</sup> As the principal of the *Igakkō*, Bokuan must have been a close associate of Heisen, who would remain headmaster of the *Yōkendō* until his death in 1850.

After the death of Gentaku in 1827, Heisen was the only remaining authority on the matters of whaling in the Sendai domain and was most likely consulted when the domanial authorities finally decided to establish a whaling group. Already sixty-five years old in 1837, Heisen found it probably easier to leave the establishment of whaling delegated to someone he trusted but was younger than him. Furthermore, the selection of Bokuan had probably two additional advantages for the authorities: First, he had already published in 1833 a small booklet about herbs and grasses that could be eaten during a famine; vital knowledge for many commoners starving during the Tenpō famine.<sup>44</sup> This might indicate that the authorities saw whaling as a famine relief program.

Second, he came from a respected family in the Monō District, making him familiar with the local politics, without being involved too closely in the politics of the coastal districts as his hometown was farther inland. Bokuan most likely knew many of the influential

<sup>41</sup> For more on this topic, see Arch, 'Whale Oil Pesticide'.

<sup>42</sup> Yamagata, 'Sasaki Nakazawa to Sasaki Bokuan', 2–6.

<sup>43</sup> Jackson, *Network of Knowledge*, 95–6.

<sup>44</sup> Yamagata, 'Sasaki Nakazawa to Sasaki Bokuan', 7. The book can be accessed online via the National Diet Library: Sasaki, 'Kyūkōryaku'.

families on the Oshika Peninsula. Since we last left the political scene of the Oshika Peninsula in the 1680s in Chapter 3, a new class of wealthy families had consolidated most of the economic output in the coastal communities under their control. Political titles, such as village headman or district headman, had become virtually hereditary among these families, who often traced back their lineage to samurai families from the Warring States period or to descendants of Kii fishermen arriving on the Sanriku Coast in the 1670s. As go-between with the samurai authorities, these families also received various privileges otherwise reserved for the samurai caste. For example, district headmen were allowed to use surnames, were excluded from the annual tax, and even received a yearly stipend of up to fifty-five *koku*. They also had the right to wear a sword and silk kimonos.<sup>45</sup> In some instances, retired district headmen received honorary samurai status.

Contemporary sources called these influential families ‘net owners’ (*amimoto*) as they owned most of the nets, boats, and other fishing equipment. We can find the rise of the net owners at the beginning of the eighteenth century when after the opening of the new sea-route around the cape of Chōshi, salted and dried marine products and fish fertiliser were exported in large quantities from the Sanriku Coast to Edo and Osaka.<sup>46</sup> A significant portion of these marine products, namely abalone, sea slugs, seaweed (kelp), and shark fins was further exported via Nagasaki to China, where they were valued as medical ingredients. Net owners played a significant part in these transactions and could accumulate wealth, which they began investing in the sardine fertiliser proto-industry, often backed by additional capital from wholesale merchants in Edo or Osaka.<sup>47</sup>

Concurrently, economic instabilities during the Tenmei and Tenpō famines had caused many of the poorer peasants and fishermen to flee the northern domains to Ezo, where they became *dekasegi* (migrant workers) in the herring fertiliser business.<sup>48</sup> Others stayed, but became heavily indebted to the net owners, losing their economic independence. They became paid workers of the net owners and were called ‘net children’ (*amiko*). The relationship between the net owners and the net children was close and members of the net children were sometimes adopted into the net owner families. All said, by the early nineteenth century, these net owners formed their own social class of ‘proto-capitalists’ that had accumulated most of the village’s capital, fishing equipment and political influence.<sup>49</sup>

<sup>45</sup> Chiba, *Sendairyō no ōkimoiri*, 9. <sup>46</sup> Iwate-ken, *Iwate-ken gyogyōshi*, 68.

<sup>47</sup> Arai, *Kinsei no gyoson*, 388–9. <sup>48</sup> Howell, *Capitalism from Within*, 54.

<sup>49</sup> Tōhoku rekishi shiryōkan, *Sanriku no gyogyō*, 22. A similar socio-hierarchy also existed in agricultural communities, where so-called *gōnō* (translated as ‘wealthy farmers’ or ‘rural

### The Net Owners' Whaling Enterprise

Most of our knowledge regarding the local politics of the Oshika Peninsula and the Monō District is based on the letters of the Hiratsuka family, who were themselves net owners and hold the title of district headmen of Kitsunezaki. Like many other local notables, the Hiratsuka family claimed to have been a vassal of a local warlord during the Warring States period. They apparently lost their samurai status at the end of the war, but by 1641, when the oldest document is dated, they possessed the title of district headmen of Kitsunezaki. They would keep this title for the rest of the Edo period, except during two short transitory periods. In other words, it was also a member of the Hiratsuka family that signed the 1677 and 1685 anti-whaling petitions we have discussed in Chapter 3. Around 1800, the family took over all sardine fishing, fertiliser production, and trade in Kitsunezaki and the surrounding fishing hamlets, hiring other fishermen on a wage basis. In 1829, at age twenty-five, Hiratsuka Yūgorō became the new head of the family and functioned as district headman of Kitsunezaki until his resignation in 1840.<sup>50</sup>

It is through the family documents of the Hiratsuka family that we know that Sasaki Bokuan was put in charge of the whaling venture.<sup>51</sup> Bokuan's order was to assemble a whaling group from local fishermen and organise a trial hunting to see if a commercially sustainable whaling venture was possible. The Sendai government also hired Awajiya Seisaemon, a whaling expert from Osaka. Seisaemon was asked to evaluate the prospect of whaling in the domain and to identify a suitable place for a whaling base. He received a local guide and all the district headmen were instructed to provide him with a ship and to take him to all the places he wished to investigate. Seisaemon also met with Hiratsuka Yūgorō and requested a coastline map of Sendai domain. Yūgorō forwarded the appeal to the authorities, but they were not willing to show such a map to an outsider. In the end, based on Seisaemon's report, Ōsu-hama (lit. Ōsu Beach) on the Ogatsu Peninsula in Monō District was chosen as the base of the new whaling group.

entrepreneurs') controlled much of village economic output, see Pratt, *Japan's Protoindustrial Elite*, 2–3.

<sup>50</sup> Ishinomaki shishi hensan iinkai, *Ishinomaki no rekishi: Sangyō Kōtsūhen*, 5:214–16; Ishinomaki shishi hensan iinkai, *Ishinomaki no rekishi: Tsūshihen (Shita no 1)*, 2:458–67.

<sup>51</sup> A reprint of these letters can be found here: Ishinomaki shishi hensan iinkai, *Ishinomaki no rekishi: Shiryōhen 3 Kinsei*, 9:282–90. The letters have been briefly discussed in Japanese in the following books: Karakuwa chōshi hensan iinkai, *Karakuwa chōshi*, 346–8; Tōhoku nōseikyoku Ishinomaki tōkei jōhō shucchōjo, *Michinoku kujira monogatari*, 14–16; Kondō, *Nihon engan hōgei no kōbō*, 141–3; Ishinomaki shishi hensan iinkai, *Ishinomaki no rekishi: Sangyō Kōtsūhen*, 5:218–31.

Bokuan recruited the fishing group in Ōsu-hama, which was led by the young village headman Abe Ganzamon (1815–1872). Hiratsuka Yūgorō was also offered to join, as he was one of the largest and most influential net owners in the region with the necessary capital to finance such an operation. Together, the three men made first calculations for the necessary capital that would be needed from the Sendai domain for such an undertaking. We do not know for how much money they initially asked for, but thirty years earlier, Heisen had estimated that a full-fledged whaling enterprise in the north would require the equivalent of at least 8,000 *ryō*, so we can assume that Bokuan asked for the sum of several thousand *ryō*. However, the Sendai domain denied this request, arguing that they only wanted a trial whaling operation, with one or two whales caught. The five-year-long struggle against the Tenpō famine and other bad investments had drained the domain's finances. Bokuan tried again with a reduced plan for 589 *ryō*, but even this was cut by the government to 400 *ryō*; 200 *ryō* for each fishing group to buy equipment, while all other costs, such as paying the wages for the hired fishermen, had to be financed by the net owners themselves.<sup>52</sup>

With these underwhelming funding prospects, the whaling project was already in jeopardy before it had even started. In order to save the operation, Bokuan wrote a confidential letter to Yūgorō proposing that Yūgorō should hire ten whalers from Kii domain as instructors. As the Sendai domain lacked the financial capacity to fund this, Yūgorō needed to advance the money and Bokuan offered to be liable with his own stipend in case the domain did not pay the money back later. Also, Bokuan urged Yūgorō to burn the letter after he had read it, indicating that this scheme could get Bokuan in trouble. As the letter remains today and we have no reports about whalers from Kii arriving in the region, it seems likely that Yūgorō was not willing to follow Bokuan's suggestions. Despite all this trouble, Yūgorō started a net whaling operation in the summer of 1838 in Ōsu-hama. It was reported, however, that the inexperience of the local fishermen led to no whales being seized. Without additional monetary assistance from the domain, Yūgorō ceased all further whaling operations. As Yūgorō resigned shortly thereafter as district headman in 1840 at the young age of thirty-seven, there may have been other factors at play here as well.

Losing Yūgorō was a major setback for Bokuan, but in the same year, a local cargo merchant, Nagunama Jōsaku, put forward his own whaling request. As Bokuan's whaling project was on hold, the responsible local

<sup>52</sup> To put this number into perspective, buying a new trap net for sardine fishing cost around 300 *ryō*, while a small pull net cost 30 *ryō*, Arai, *Kinsei no gyoson*, 388.

official was very eager to direct Jōsaku's appeal to his superior. The magistrate who reviewed the request was more cautious, however, and ordered an inquiry into the feasibility of the project. All district headmen were asked for their opinions and although they did not explicitly advise against Jōsaku's whaling proposal, they raised some major concerns in a joint letter:

We have learned that [Naganuma Jōsaku] is considering using firearms to kill the whales. In the western region of the country, when they hunt whales, they surround them with boats and intimidate them by rhythmic beats from the boats and drive them into nets. Because whales don't like the sound of the beats from the [whaling] ships, they fear even more the sound of the firearms and flee from the shore to the open ocean. We know that since the ancient past fishermen on the beach detested the sound of firearms. The use of firearms is harmful not only for hunting whales but also for hunting other types of fish.<sup>53</sup>

The district headmen did not argue against whaling per se, but against the method Naganuma intended to use as they saw firearm whaling as a possible disturbance to their own fishing operations. While there was a restriction on firearms during the Edo period, they were sometimes used by hunters in the mountains. That this could be a problem for fishermen can be seen with a prohibition from Matsumae domain dating back to 1691, according to which the discharge of firearms was forbidden within earshot of the ocean so as not to startle the herring.<sup>54</sup>

I suspect there was also another reason the district headmen argued against the new whaling proposal: the other net owner families might have regarded Naganuma Jōsaku as an unwanted upstart. The Naganuma family had only recently made their fortune by transporting rice on their cargo ships on the Kitakami River and introducing fixed shore-net salmon fishing in their district.<sup>55</sup> In 1839, Naganuma Heizaemon, most likely a relative of Jōsaku, became the first member of the Naganuma family to hold the title of district headman of Kugunari.<sup>56</sup> The Naganumas may have been seen as competitors and their involvement in organised whaling may have been perceived as a threat to the other powerful net owner families. Unfortunately, we have no further information on Jōsaku's project, but it was likely refused, possibly because of the concerns put forward by the other district headmen. We have to conclude that both the

<sup>53</sup> Cited from Ishinomaki shishi hensan iinkai, *Ishinomaki no rekishi: Sangyō Kōtsūhen*, 5:229–30; Ishinomaki shishi hensan iinkai, *Ishinomaki no rekishi: Shiryōhen 3 Kinsei*, 9:286–7.

<sup>54</sup> Howell, *Capitalism from Within*, 35–6.

<sup>55</sup> Sasaki, 'Sanriku kinkai no ōmono gyogyō', 144.

<sup>56</sup> Ishinomaki shishi hensan iinkai, *Ishinomaki no rekishi: Tsūshihen (Shita no 1)*, 2:463–4.

Hiratsuka net whaling and Naganuma firearm whaling projects failed at an early stage.

With the withdrawal of the powerful families of Kitsunozaki and Kugunari, Abe Ganzaemon, the young village headmen (and later district headman) of Ōsu-hama was the last remaining net owner interested in continuing the trial whaling. Ganzaemon was the fourth family head of the local Abe dynasty. His grandfather had started a successful fishing business and had worked as village headman, while Ganzaemon's father had become the first district headman of the family and had even received honorary samurai status after retirement. Ganzaemon himself became wealthy in 1835 – when he was only twenty-one years old – through the shipping of commodities between Matsumae and Edo. A year later, in 1836, at the peak of the Tenpō famine, he became famous throughout the region due to his relief support. As mentioned, the famine was especially severe for the coastal communities on the Sanriku Coast and to make matters worse, the famine also coincided with poor fish catches. To ease the situation in his home district, Ganzaemon organised the transport of 1,600 straw bags of rice from the Akita domain overland with cattle and horses to the Sanriku Coast. He also bought and opened up new land to be transformed into rice paddies.

All told, Ganzaemon invested more than 600 *ryō* in his relief effort to save the sixteen fishing villages in the Monō district. In his own home village of Ōsu-hama, not a single person died of starvation, leading to the local saying: 'More than Buddha, more than the gods, we are grateful for the master of Ōsu.'<sup>57</sup> As historian Maren Ehlers has argued, such private famine relief programs were not an altruistic gesture but an integral part of the Tokugawa society. While domainal lords were eager to prevent social unrest in castle towns and other centres of commerce during famines, they expected the local elite of agricultural and fishing villages to mitigate disaster effects by themselves. In return, local notables such as district headmen were given titles and privileges.<sup>58</sup> Ganzaemon also profited indirectly from his generosity as he could expand not only his political influence in Monō district but also his commercial interest in fishing.

Boukan's request for whaling might have been a good opportunity for Ganzaemon to further enhance his position as the most important net owner in the district. In 1839, he hired local fishermen and assembled a small fleet of thirteen fishing boats for his whaling operation. Each of these thirteen boats had a crew of six to eight fishermen and the fleet was

<sup>57</sup> Ogatsu-machi kyōdoshi hensan iinkai, *Ogatsu machishi*, 207–26.

<sup>58</sup> Ehlers, 'Benevolence, Charity, and Duty'.

divided into two groups of six ships plus a head boat that organised the hunt. The crew of around a hundred novice whalers used the harpoon method to catch four humpback whales in the first year. Another three animals were injured but escaped and their dead bodies were later found ashore by other fishermen. Already in 1837, the authorities had declared that because of the trial whaling, all beached whales injured by harpoons belonged to the respective whalers. The local fishermen ignored these orders, however, and secretly disposed of the harpoons and nets that were attached to the beached whales. When Genzaemon learned of this, he went to Bokuan, who wrote to the local authorities on his behalf. Bokuan argued in the letter that the illegal harvest of whale carcasses was a terrible loss for the whalers as they lost their harpoons and net equipment, which cost over 100 *ryō*.

The ad-hoc flensing of beached whales by local fishermen was a highly improvised and messy business. Whale meat was only one of the products a ‘correctly’ flensed whale carcass produced: whale blubber needed to be cooked in order to produce whale oil, while bones were crushed and made into fertiliser. Bokuan argued that this uneconomic treatment of the whale was also an economic loss for the domain. He requested that every beached whale should be handed over to the whalers, regardless of the cause of death. The bureaucrats in Sendai agreed to this but insisted that the finder of a beached whale would receive one-third of the profit when the whale products were sold on the markets.

During their second whaling season in 1840, the whalers from Ōsuhama killed several right whales and humpback whales. This was not nearly enough to sustain the high fixed costs of the operation, let alone to reimburse the initial investments used to buy the flensing material and build a coastal base where the whales could be flensed. In the seventh month of 1840, Ganzaemon wrote a petition to the Sendai authorities:

Since last year, I have been entrusted of establishing a whaling operation, which I have done at my own financial expense. This spring we have caught six whales with harpoons outside of the coastal area and together with stranded and drifting whales we found, we caught nine whales in total, which was a great result. Compared to before, the skill of my fishermen has increased tremendously. The tools we have used until now, were just [normal fishing] equipment we picked up and these cannot compare to the tools used in the whaling areas in the western part of the country. We hope that our whaling operation can become as large as in the western part, but it is difficult with our current equipment to make a nice catch.<sup>59</sup>

<sup>59</sup> Cited after: Karakuwa chōshi hensan iinkai, *Karakuwa chōshi*, 346–7.

Ganzaemon estimated that he would need 5,000 *ryō* for a full-scale whaling operation. He told the authorities he would be able to shoulder most of the funding, but that he needed a loan of an additional 1,500 *ryō* to continue operating. He further argued that he could lend additional money from another domain if the Sendai domain had difficulties in funding his operations, but in this case the whale meat, oil, and fertiliser would be brought to the other domain, which was not in the interest (*kokueki*) of the Sendai domain. However, the bankrupt Sendai Domain refused his request and instead of finding a different investor, Ganzaemon downscaled the operation for the 1841 season from thirteen to six boats. They caught another three humpback whales, but in the following year, not a single whale was captured.

The whalers did not have much more luck when they tried to sell their whale products on the markets. As they were hunting during the summer, their main problem was getting the fresh whale meat from Ōsu-hama to Sendai before it spoiled. Bokuan asked for permission to use the post-horse system of Sendai domain, which was able to transport the products in four days, but consumers in Sendai still preferred tuna, sea bream, and raw bonito over raw whale meat. As an alternative, Bokuan requested that the meat be salted and together with whale dregs (used for fertiliser) be sold outside the domain. The authorities agreed in principle but stated that the whale oil had to remain in the domain and be sold there, even though the demand remained minuscule. All told, the Ōsu-hama whalers had trouble catching enough whales and there was also no interest for whale products in Sendai. After not being able to catch a single whale in 1842, Ganzaemon gave up on his whaling operation at the end of the season.<sup>60</sup>

### The Failed Whaling Venture

This second attempt to start a whaling proto-industry on the Oshika Peninsula failed just like the Kii fishermen had to give up their operation over a hundred years earlier. This time, however, the reason seemed not to have been the opposition of the local population. First, we have to understand why the local fishermen did not protest as vehemently against whaling as they did in 1677. Indeed, conflict with the locals only occurred due to the sound of the firearms used when hunting whales and regarding who was allowed to flense a beached whale. Our primary sources do not convey any large-scale opposition against whaling or mention any

<sup>60</sup> Ishinomaki shishi hensan iinkai, *Ishinomaki no rekishi: Sangyō Kōsūhen*, 5:218–31; Ishinomaki shishi hensan iinkai, *Ishinomaki no rekishi: Shiryōhen 3 Kinsei*, 9:282–90.

religious concerns. This can be partly explained by the bias of our sources as they are all letters and petitions written by Bokuan, the involved net owners, and the authorities, giving little room for the perspective of the ordinary fisherman.

The weak resistance might also have been related to the fact that the whaling was conducted by the local net owners, whom many fishermen were indebted to or worked for, rather than whalers from other domains. The Tenpō famine had only strengthened these dependencies as in the years prior to the whaling venture, thousands of fishermen had starved and the survivors had been mostly dependent on the relief supplies provided by the net owners.<sup>61</sup> Net owners like Abe Ganzaemon had taken over the responsibilities of the local government, which had been unable to provide proper famine relief. It, therefore, would have been difficult for the locals to protest against the whaling enterprise of their net owners.

It seems likely that the Tenpō famine was also the principal reason the Sendai authorities had pushed for trial whaling. The development of a whaling enterprise not only promised to replenish the domain's finances, but whale meat was probably also seen as an alternative to fish for feeding the population. Apart from this, the prohibition of the domain to not sell whale oil to other regions despite it being the most valued whale product indicates that the domain knew about the properties of the oil as an insecticide and saw it as crucial for fighting locust invasions.

Although the whaling enterprise was supposed to strengthen the domain's *kokueki*, the authorities had underestimated the financial investment necessary to build a new proto-industry. Besides the inexperience of the contracted fishermen, the stakeholders themselves identified the lack of financial backing as the main reason for the failure of whaling. Ganzaemon estimated that about 5,000 *ryō* would be necessary to build a sustainable whaling venture, but the domain finances allowed for less than a tenth of this sum, making the financial cooperation of the net owners indispensable. Instead of working together, however, the three net owners involved persisted in their own schemes and even actively sabotaged Naganuma's proposal. Not even the wealthy Abe Ganzaemon could shoulder the cost alone, having just spent a fortune on his famine relief program.

Even if the necessary capital had been available, however, the trial whaling was too small in scope. Abe Ganzaemon had been able to assemble a fleet of thirteen ships and one hundred men, but if we look

<sup>61</sup> Fukai and Ueno, 'Tenpō Kikinki, Ecchū Himichō No Gyokyō to Gyomin', 579–80.

at whaling operations in Taiji or Kyushu, it can be seen that even a simple harpoon whaling operation needed at least twenty ships, while hundreds of people and dozens of ships were needed for a successful net whaling operation.<sup>62</sup> It is unlikely that the half-starved and inexperienced Sanriku fishermen could have pulled off net whaling without the help of instructors from an established whaling group, which Yūgorō had most likely not been willing to pay for.

Naganuma Jōsaku's firearm whaling would probably have been not successful either. As far as I am aware, Jōsaku's proposal in 1838 to use firearms for whaling was the first of its kind in Japan. Just two years later, however, a whaling group from the Gotō Islands in western Kyushu ordered a whaling gun from a Japanese gun manufacturer in Nagasaki. The gun manufacturer had been instructed by a Dutch expert from Deshima on how to manufacture firearms, but his skill was not sufficient enough to produce a gun that could be used for whaling.<sup>63</sup> If the whaling groups near Nagasaki, where all the knowledge about western technologies was concentrated, could not obtain a whaling gun, how did Jōsaku in Sendai intend to get one? The domains and the Tokugawa government carefully safeguarded the stock of firearms in Japan and although professional hunters had access to these weapons, as seen during the wild boar famine in 1749 in Hachinohe,<sup>64</sup> it is doubtful that these hunting rifles could have killed a whale due to their thick blubber. An alternative was to buy a whaling gun from an American whaling ship that had appeared off the coast since the 1820s, but it was forbidden to trade with them and it is also doubtful whether the Americans would have sold their guns as they were essential for their hunts. We also know from later accounts that the Japanese had trouble using the American bomb lance whaling technique, which became popular in the 1850s. As we will discuss in the next chapter, even fifty years later not a single whaling group had been able to use the American bomb lance whaling successfully enough to establish a sustainable whaling business.

In the end, the most straightforward and least advanced technique of harpoon whaling turned out to be the only method that brought results. Genzaemon's crew of over one hundred whalers only managed to kill eleven whales in four years. Under ideal circumstances, the Ōsu-hama whalers could sell one right whale for 60 *ryō* and a humpback whale for 25 *ryō*. This was not nearly enough to cover the wages and food provisions of

<sup>62</sup> Wakayama kenshi hensan iinkai, *Wakayama kenshi*, 4:453.

<sup>63</sup> Kondō, *Nihon engan hōgei no kōbō*, 139.

<sup>64</sup> Walker, 'Commercial Growth and Environmental Change in Early Modern Japan'.

the workers, which amounted to 550 *ryō* per season. All said, Ganzaemon and his partners lost 1,046 *ryō* between 1840 and 1842.<sup>65</sup>

To make matters worse, the whalers also had difficulty selling their products at the markets. The local demand for whaling products was negligible as no established whale product merchant network existed in the domain. This meant most of the products had to be shipped outside of the domain, which was theoretically beneficial for the domain as it increased its trade balance, but it also added substantially to the transport costs. While whaling was conducted mainly in the winter months in western Japan, whaling operations on the Sanriku Coast had to be conducted during the summer months, when most whales reached the region on their yearly migration. However, this brought the problem of fast spoilage of whale meat because of the summer temperature. Moreover, the Tenpō famine had effectively ended in the early 1840s and the population did not have to get accustomed to new forms of meat. As for the use of whale oil, the low prices indicate that the Sendai merchants did not recognise its potential as a pesticide. In other words, to be profitable, the whalers would have had to hunt at least twenty-five to thirty whales in the four-year trial period and would have needed to establish a market for whale products in Sendai.

### Conclusion

While socio-economic circumstances were not favourable and partly to blame for the failure of the Sendai trial whaling, I suggest that the Tenpō famine itself may have also played a role in the disappointing fish and whale catches. Fishing was a highly seasonal occupation and could not be operated around the year. For example, during the Tenmei famine in the 1780s, many coastal villages were only saved from starvation in late spring when the fish swarms arrived on the Kuroshio and Oyashio currents.<sup>66</sup> The Tenpō famine in the 1830s, however, also coincided with several years of poor fish catches.<sup>67</sup> In a letter to the domain, the Hiratsuka family argued that whaling would bring relief for the struggling fishermen as ‘recent years have continuously brought bad fish catches and especially the last year has been difficult’.<sup>68</sup> Here, whaling was presented as a solution for the poor fish catches. This is an interesting inversion of the local knowledge of the locals, who believed that whales were necessary for good fish catches, as they brought them to the shore. The net owners,

<sup>65</sup> Tōhoku nōseikyoku Ishinomaki tōkei jōhō shucchōjo, *Michinoku kujira monogatari*, 16.

<sup>66</sup> Kanō, ‘Nendaiki [1784]’, 218.

<sup>67</sup> Ogatsu-machi kyōdoshi hensan iinkai, *Ogatsu machishi*, 217.

<sup>68</sup> Ishinomaki shishi hensan iinkai, *Ishinomaki no rekishi: Shiryōhen 3 Kinsei*, 9:284.

on the other hand, seem to have believed that poor fish catches could be compensated with whale catches.

Poor fish catches during famines were a common phenomenon. On land, the cold and wet *yamase* winds that spoiled the rice in the north during the summer were generated by the unusually low sea surface temperature of the Oyashio Current.<sup>69</sup> In the Atlantic, such drops in the sea surface temperature during the Little Ice Age had been known to influence the abundance of boreal marine species like salmon, cod, and herring.<sup>70</sup> In Japan, the lower sea surface temperature and slower velocity of the Oyashio Current actually increased the salmon and cod catches on the Sanriku Coast in early spring. When this current collided with the warmer waters of the Kuroshio Current in summer, however, it caused more rain and mist that would haunt the coastal regions for weeks, making fishing activities much more difficult.<sup>71</sup>

This probably influenced not just fishing, but the whaling activities of the net owners as well as these were also conducted during the summer months. Zooplankton in the perturbed region and fish species migrating on the Kuroshio Current such as sardines were also influenced by the lower sea surface temperature. Studies of sediment cores and historical data show that while not perfectly matched in time, most of the poor sardine catches occurred during the cooling phases of the Little Ice Age. Here, it is especially important to note the partial collapse of sardine catches between 1820 and 1840.<sup>72</sup> Also, while interdecadal regime shifts are a natural phenomenon, their frequency and force can be influenced by global climate changes like the Little Ice Age. A recent study from Peru suggested that after 1820, radical changes in the ocean biochemistry caused a mass disappearance of sardines.<sup>73</sup> Unsurprisingly, many whale species as consumers of zooplankton and sardines also react to oceanographic regime shifts. For example, changes in blue whale migration routes have been correlated with regime shifts in the eastern North Pacific.<sup>74</sup>

<sup>69</sup> Arakawa, 'Meteorological Conditions of the Great Famines in the Last Half of the Tokugawa Period, Japan', 112–14.

<sup>70</sup> Lajus et al., 'The Use of Historical Catch Data to Trace the Influence of Climate on Fish Populations'.

<sup>71</sup> Komatsu, *Uminari no ki*, 141.

<sup>72</sup> Sugimoto et al., 'Shigen hendō no rekishiteki hensen', 564.

<sup>73</sup> Gutiérrez et al., 'Rapid Reorganization in Ocean Biogeochemistry off Peru Towards the End of the Little Ice Age'.

<sup>74</sup> Mantua and Hare, 'The Pacific Decadal Oscillation'; Calambokidis et al., 'Insights into the Population Structure of Blue Whales in the eastern North Pacific from Recent Sightings and Photographic Identification', 827.

In summary, the cold Tenpō weather most likely caused famines on land and also led to poor fish catches due to lower plankton and sardine abundance. Whaling was supposed to compensate for the bad fish catches, but due to the increased whaling activities of the American pelagic and Japanese coastal whalers and the reduced abundance of zooplankton and small fish like sardine, whales were probably also scarcer on the Sanriku Coast. It would not be until the 1870s, when both forms of whaling were subsiding, that whales returned in large numbers to the coast and the cetosphere recovered slightly.