

Natural Resource Exploitation in Japan's First Frontier 1868-1918

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Abstract

During the mid 19th century Japan began their push for modernization in order to join the group of major powers. As part of this push for modernization, they moved into Hokkaido, the northernmost main island of Japan formerly known as Ezo which had before been a major trading outpost for the Japanese and became part of the Japanese nation at the beginning of the Meiji era. In this paper I will focus on Hokkaido and the way that this push for modernization led to the increased extraction and exploitation of natural resources in Hokkaido. I will explore in detail how Hokkaido's resources were exploited by addressing 5 major industries. I argue that the extraction of Hokkaido's natural resources were central to the development and modernization of Japan.

Introduction

The 18th century brought the biggest human induced change the world had ever seen up until then; the Industrial Revolution. The next century brought about the rise of several nations to power. With the rise of nations and commercialization came natural resource extraction and exploitation that the world had never seen before. The countries that gained enough wealth were soon expanding their borders and colonizing other parts of the world in search of more wealth, power, and natural resources. One of the countries that were experiencing such things was the nation of Japan.

The expansion of not only the Japanese state, but development and modernization began in the Meiji era (1868-1912). It was during this time frame that Japan expanded into Hokkaido, Sakhalin, Korea, China, and Taiwan. The first land that the Japanese officially claimed sovereignty over was Ezo, the island north of the main island of Japan called Hokkaido (Walker, 2001, 26). Japan had occupied Ezo, a few hundred years before it officially claimed it in 1868. During this time Hokkaido was to the Japanese as the American West was to the Americans; they were viewed as frontiers.

In 1869, Ezo officially became a part of the nation of Japan and was renamed Hokkaido. The Kuril Islands were also designated as part of Japan along with Hokkaido. Everything north of where a majority of the Japanese lived in Oshima peninsula (southern part of Hokkaido) was called Ezo before Japan took official sovereignty over it. Beasley (1972) says in his book titled *The Meiji Restoration* that Nariakira, head political figure of the Satsuma domain in the 1850's was a proponent of sending Japanese to settle in Ezo for three reasons: to show the Russians that Ezo is Japanese land, to have more political influence over Ezo, and to develop more of the

islands natural resources (215). Many scholars have said that the Meiji government claimed Hokkaido as part of Japan when the Russians began encroaching upon the island, because they saw it has a threat. What isn't mentioned as much in Japanese history is the degree to which the Japanese state relied on Hokkaido for natural resources.

With the intense push for modernization and development in Japan, it was only fitting that Ezo, considered a frontier land became increasingly exploited. The island of Hokkaido went through drastic changes especially during the Meiji era and afterwards. During this period natural resource extraction in Hokkaido began to significantly increase due to the swell in population, the development of the land, and the starting of many major industries on the island. Before this era, Japan had very limited interaction with countries beyond East Asia for over two and a half centuries. Therefore they had a lot of ground to make up if they were to join the western powers.

In this essay I will examine natural resource extraction and exploitation in Hokkaido between the years of 1868 and 1918. The question that this paper is based on is: what role did Hokkaido play in the modernization of Japan? The so called data of this environmental history paper lies in the discussion of five major industries; fisheries, forestry, agriculture, cattle, and coal. I argue that the extraction of natural resources in Hokkaido were central to the development and modernization of Japan. I will be focusing on the 50 year period from 1868-1918, primarily because it was during this time that Japan transitioned from an underdeveloped country (in the eyes of the major world powers) to standing at a similar height as the major world powers, and participating in a world war. Japan transformed itself from an agrarian based country with a moderately low consumption of natural resources to a fairly high consuming modern power, and it was with help from the resources of Hokkaido that this was made possible.

Throughout this essay “natural resources” will be interpreted in a broad sense to include things like lumber, coal, animals, and agricultural crops. The above mentioned industries are focused on throughout this paper due to their extraction and exploitation of resources in order to reap economic benefits and for the purposes of modernization.

Arrival of Perry

Japan got its rude awakening in 1853, when “Father of the Steam-Navy” American Commodore Perry and his four black ships arrived in Uraga bay with the purpose of presenting a treaty to the government of Japan (Goto-Jones 2009, 16-17). He returned the following year with five more ships (nine total), with the purpose of using force if the government, known as the Bakufu, refused to sign it. This treaty, known as the Kanagawa Treaty, gave the U.S. access to the ports of Hakodate and Shimoda. It also led to it an exploitative agreement in 1858 which 1) resulted in Japan losing its tariffs, 2) opened Japan to unequal trade with the U.S. and 3) opened ports to American ships and personnel, of which they received immunity from prosecution. In order to regain their tariffs they had to earn the respect of western countries like Great Britain, the United States, France, Russia, and others. This treaty came to be known as the unequal treaties or the Harris Treaty. This is a very significant event in modern Japanese history, because it helps to explain the future actions that were made by people of power in Japan, therefore it deserves some explanation.

From 1853-1868 many Japanese people grew more frustrated and disappointed in the Bakufu. As mentioned before, the Harris Treaty removed Japanese tariffs, which made Japan’s economy suffer. Furthermore, the Japanese government conceded many other unequal treaties with several countries, most likely because they didn’t have the power to repel them. The treaties allowed western countries to export tons of goods to Japan, which benefited foreign economies,

while Japan was overwhelmed with inexpensive imported goods, making goods produced in Japan very expensive (Halliday 1975). Furthermore, because of the unfair fees placed on imported goods, industries based in Japan found it difficult to establish a strong mode of producing goods.

The affects of the unequal treaties led to an intense debate within the country concerning what to do and which direction to take the country in. Japan's fighting forces were lacking in people, technology, and the modern warfare skills that most western countries possessed. Many Japanese, including Emperor Komei called on the Bakufu to kick the foreigners out of the country, and when the bakufu didn't listen they rebelled (Goto-Jones 2009).

Choshu and Satsuma became the major rebel domains in Japan, and because of their distance from Tokyo and their close proximity to western ideas and goods they had the opportunity to build an anti-bakufu army. The rebel domains managed to obtain weapons from westerners. In 1866, Choshu and Satsuma domains agreed to fight the bakufu together and beat them. That same year emperor Komei died and the Meiji emperor was named. The next year, Satsuma and Choshu rebels persuaded the new emperor to declare an "imperial restoration" which would make the emperor the temporary head of the government (Goto-Jones 2009, 41). The bakufu didn't like this and refuse to step down. This then led to the Boshin war of 1867. However, the bakufu surrender quickly. When the Tokugawa regime handed over power in 1868, Japan started a new era; one that would drastically change Japan forever; the Meiji era. During this era there were numerous reforms: Japan reinstated the emperor as head of country, abolished its previous class system, created a diet (legislature), a constitution, a modern army and navy, implemented a land tax, reorganized the country's provinces, created a new education system and much more.

Eventually it was decided by the emperor and his new officials that the foreigners would not be expelled but utilized in order to catch up with the powers of the west. They would launch a full-fledged push for modernization and transform Japan into a respectable modern nation that could defend itself against foreigners. Their determination to avoid being occupied by another country, to be declared equal with western countries, and to get their tariff autonomy back contributed to Japan's emphasis on modernization and development. If Japan was to become a modern nation capable of defending themselves they needed industrial development. In order for this to occur plenty of natural resources were needed, but being the very mountainous island archipelago that it is, Japan was not the most natural resource rich country, especially compared to a country like the United States. But there was Ezo, a large but fairly undeveloped "frontier" island full of resources right at their door step. If Japan was going to be a modern industrialized nation capable of fighting off the major powers they needed all the resources they could get, and Ezo was the first step.

Hokkaido and the Frontier

The area of Hokkaido covers 32,222 sq miles, which is almost the exact same size as the state of South Carolina. Hokkaido is the northernmost main island of Japan. Out of the four main islands of Japan, Hokkaido is the second largest island in the Japanese archipelago after Honshu, which is known as the largest main island of Japan (Statistics Bureau of Japan). Hokkaido is almost double the size of the island of Kyushu which sits in third place. Hokkaido has a few major mountain ranges. Although it rains in Hokkaido, most of the precipitation in Hokkaido is in the form of snow, with areas west of the Hidaka range typically getting more snow than the east side (Irish 2009). The west side is also on average warmer than the east side of the island.

The climate of Hokkaido is similar to that of the Northeastern part of the United States (Capron 1875).

In 1859 something quite profound happened that showed a frontier or colonial spirit in Japan. It was the Japanese treaty with Russia in which it was agreed that the Kurile Islands would be divided between the Russians and the Japanese as well as Sakhalin, with the Japanese claiming rights over the southern part and the Russians the northern part (Morris-Suzuki 1999). There were Japanese that lived in Sakhalin and the Kurile Islands during this time. But, essentially this meant that the Japanese claimed the land of Ainu as their own, and the Ainu had no say in it.

Frederick Jackson Turner in his book *The Frontier in American History* defined the frontier in the United States as “the line of most rapid and effective Americanization” (Turner 1920, 3-4). This quote draws some realities of what occurred in Hokkaido as the Japanese officially claimed and developed it. However, the frontier in Hokkaido during the Meiji era as I see it would be defined as “the line of most rapid and effective development”. The concept of the frontier played a direct role in the colonization, development and modernization of both the American West and Hokkaido simultaneously. The frontier is by no means an American only concept, it is a global concept.

The reason for this is that Hokkaido was developed in a similar frontier-like way that other American western states were developed. Many people who had experience in developmental capacities in the United States were brought to Japan and Hokkaido and assisted in modernization and development there. The United States was specifically sought out by the Japanese in developing Hokkaido because they had experience in frontier settings (Yaguchi 2002).

Previous Relationship Between Ezo and Japan

Ezogashima the long name for Ezo translates into “barbarian islands” (Walker 2001, 26). The Japanese were in contact with the native inhabitants of Ezo for over one thousand years, but it wasn't until the 1500s that the Matsumae clan, supported by the Japanese government, seized land and set up shop as a means of trading with the inhabitants of Ezo. It is widely known that the Japanese used to cast-away political prisoners into Ezo during the 12th and 13th centuries. The Japanese government through the Matsumae clan directed all trade with the local inhabitants of Ezo. At first, when the Matsumae clan occupied Hokkaido they stayed in the narrowest land area of the island which is the Southern-most part of the island. Lots of the people who lived there were called Wajin (Japanese people).

Before Perry arrived the Japanese had been utilizing the natural resources of Ezo for over two hundred years and trading for hundreds of years longer. There was a large variety of goods that came from Ezo and were brought to Japan through trade. Some of them were fish, fisheries products, minerals including gold, hawks and hawk feathers, fur and skin from animals such as otters, deer and bear, Some of the main resources the Japanese were interested in Ezo was fish, but more specifically herring and the furs of animals. Herring was eaten as well as used in fertilizers on agricultural land across Japan. Although there was commercialism, capitalism didn't come until the Meiji era for the most part (Howell 1995).

In the early 1600's the head of the Bakufu gave permission to the well-known and powerful family called the Matsumae clan to control all trade within Ezo (Walker 2001). However, it was since 1550 that the Matsumae clan had held actual land in the southern portion of the Oshima peninsula (Howell, 1995, 31). The Matsumae had land on the island of Ezo, which they claimed to be Wajinchi, which essentially means Japanese land. Fukuyama Castle was built

in southern Ezo to house the Matsumae clan. The 1600's also brought increased exploitation of resources in Hokkaido. Gold was quickly found in Ezo, and in 1617 mining began in the streams of Sotsuko and Osawa in southern Ezo (Wajinchi) and quickly expanded outside Wajinchi (Walker 2001, 82-83).

The Ainu People

The Ainu were the native inhabitants of the Ezo before the Japanese sought to control it. The Ainu are a separate people than the Japanese although they have been influenced by the Japanese for many centuries. It is believed that Ainu culture is a mixture of three different older cultures, the Okhotsk, Satsumon, and Epi-Jomon (Walker 2001, 25). They have their own language, culture, traditions, and religious beliefs. These yukar essentially depict how one should act towards gods, animals, nature, and other people. Ainu had many different tribes just like the Native Americans in the Americas. According to Brett Walker, one of the most celebrated foreign scholars of Japanese history, in his book *The Conquest of Ainu Lands* says that Ainu from the Ishikari region (the largest plain in Hokkaido, located in western part of the island) believed “they shared a sacred relationship with the animals that lived there: the animals let themselves be hunted so that Ainu might live, and Ainu played the roles of liberators, freeing the godlike essences (kamuy) of animals via the slaughter” (Walker 2001, 52). This belief was especially put in jeopardy when the Japanese pushed for commodification of animals, meaning the emphasis was no longer on subsistence but economic gain.

Iwakura Mission and Arrival of Foreign Advisors

It is in the context of modernization and development that the Iwakura Mission of 1870 comes into the picture. The agency that led the way for the early development of Hokkaido was the Kaitakushi, which took on the duty in 1870 (Hokkaido Prefectural Government 1968). The

head of the Kaitakushi was Kiyotaka Kuroda. The Iwakura mission was a group of Japanese who with the support of the new Japanese government and emperor traveled throughout the west in order to gain knowledge on how best to develop and modernize Japan (Healey et al 2004). One of the many places they went was Washington D.C. where the Iwakura Mission asked the U.S. President if he could make any recommendations for agricultural experts, and one of the people the president recommended was Horace Capron (Hokkaido Prefectural Government 1968). After speaking with Horace Capron they asked him to come to Japan and be a major advisor in helping to develop agriculture throughout the country, and he agreed. On this mission they also went to several places in Europe. When they returned the delegates came back with the feeling, “If Europe and America... had been able to undergo such a revolution, why should Japan not follow suit?” (Healey et al 2004, 98).

The Iwakura Mission led to the recruitment of several foreign experts to Japan to share their knowledge. Since Ezo was the least developed part of the country, thought of as the frontier, many of the foreigners who came were Americans. They helped out with the planning, education, developing industries, development of land in Hokkaido and more.

Settlement of Hokkaido in the Meiji Era

In order to have the industries that would extract the natural resources and lead to Japan’s development and modernization, they needed settlers and people willing to move to Hokkaido. Therefore before discussing the natural resource extraction and exploitation with the help of the foreign advisors, I must explain some history of the settlement of Hokkaido.

The settlement of Hokkaido was significantly affected by the many industries that emerged, and the creation of more roads and railroads. Horace Capron, one of the most well-known foreign advisors to the Kaitakushi emphasized throughout his stay in the 1870s that in

order to attract more settlers to Hokkaido building more roads and eventually railroads was crucial (Capron 1875). In Hokkaido, early in its development phase, most of the population was on the outskirts of the island. Before the railroads came, boats and wagons were used to transport goods and raw materials.

Hokkaido the frontier was not very appealing for the Japanese at least at first. According to Jones (1921) some of the reasons were: not many people were familiar with it, it was colder than the rest of Japan, was thought of as a foreign land, and staple foods that are important to the Japanese traditional diet like rice, could not be successfully grown until the later part of the 19th century. Hokkaido's climate was much more like the Northeastern part of the United States, and therefore was colder than any other part of Japan (Jones 1921). Furthermore, Hokkaido was behind most of the rest of Japan development-wise because it was the last part of the country to be claimed (other than Okinawa). Most of the growth in immigration did not come right away, but once the development of the islands progressed slowly, and with the creation of better transportation and roads, it became easier to access industry on the island (Office of Population Research 1946). The Ishikari plain in western Hokkaido was the major region that the Kaitakushi paid attention to in terms of settlement because of its fertile land and plans for development.

Sapporo, the capital city of Hokkaido located on the Ishikari plain was to become the center of this activity. Within this plain run a few different major rivers, the main ones which are the Toyohira River and the Ishikari River. The city of Sapporo was built close to the Ishikari River so that it could be used to transport materials and resources. Sapporo was not the first major city, in fact Hakodate and Otaru were the more populous cities even decades into the 20th century. According to Ann Irish author of *Hokkaido: A History of Ethnic Transition and Development on Japan's Northern Frontier*, during its first year being designated the capital of

Hokkaido, in 1871, Sapporo had about 600 people living in the city, and about 58,000 (as of 1869) in all of Hokkaido (Irish 2009). However, According to the book *Foreign Pioneers* written by the Hokkaido Prefectural Government early in the island's development there were approximately 100,000 people that lived in the southern area of Hokkaido that had been occupied by the Japanese for centuries (Hokkaido, Prefectural Government 1968, 152). But what I do know is that due to the fish industry in Hokkaido many people came very year, and then once the season was over they went back home to Japan. So this could be why the number given in the book *Foreign Pioneers* is different than the numbers given by Ann Irish. What Irish could have been referring to was the population of the island outside of the long occupied Wajin zone. In the 30 years after 1870, Hokkaido's population had grown to over 780,000 (Davis 1934, 398).

In 1869, Ezo was renamed Hokkaido, and settlement land claims were established by the Kaitakushi. They were revised several times in the next decade or so. Many of the original immigrants that came to Hokkaido in post-restoration were paid for by the Kaitakushi to settle land in Hokkaido (Harrison 1951). However, there was also a minority of Japanese that volunteered to move to Hokkaido early on. Some of the first to come to Hokkaido post-restoration were peasants, because they were eager to have some land for themselves. The Kaitakushi soon realized how expensive it was to sponsor and pay for migrations and settlement. Therefore, the new policy in 1870 stated that settlers had to pay per acre of land, that they could purchase up to 85 acres if they began farming their land between 10 and 25 years. Furthermore, the settlers farming machinery was paid for, their housing was free of cost, and the seeds and fertilizer could be obtained by taking out a loan. The first couple years of settlement in Hokkaido weren't very effective and the policy was changed again two years later in 1872. This time it was

more influenced by foreigners who used the homesteading ethics and policies from the United States to try to attract more people.

Natural Resource Usage/Exploitation

Even though the Japanese had been exploiting the natural resources of Hokkaido for over two centuries, the Meiji era is when exploitation increased. The ways that many of these resources were extracted was through the industries of Hokkaido. Many of these industries were new to Hokkaido, while others had been around for centuries. The industries that will be discussed are: fisheries, forestry, agriculture, cattle, and coal.

Two events in particular that led to increased exploitation of resources in Hokkaido; the Russo-Japanese war (1894-1895) and the Sino-Japanese war (1905-1906). It was a direct result of these wars that industrialization in Hokkaido and the rest of Japan was truly born, although it wasn't until the end of the Meiji era that this was taking shape (Ericson 1996).

Fisheries

Fisheries are one of the oldest major industries in Hokkaido. The local Ainu had been trading fish products to the Wajin for several centuries, however the relationship fundamentally changed between the Ainu and Japanese regarding fisheries after Shakushain's war (Howell 1995, 25). This was when the contract fisheries began to emerge in Hokkaido. However, contract fisheries became more widespread starting in the 1700's. Trading outposts began popping up across Ezo, most of them close to the coastline. Before Shakushain's war, the Ainu were free to go where they wanted whether it was outside Ezo, or within it. But with the end of the conflict the Matsumae told them that their movement within Ezo was up to them, but they could not leave the island. They also had to trade at the nearest trading post (closest to where they lived).

After the war there became a much more pronounced and defended border between Wajinchi and Ezo. Also, the Wajin gained considerable territory from the Ainu during and in the aftermath of the war. Before the contract fisheries came about the Ainu had control over getting the raw materials themselves, but with the arrival of contract fisheries this was controlled by the Japanese. The Japanese supervised the Ainu workers and dictated to them what they had to do. This was to ensure more materials made it to the other islands, and also to ensure profit and power for the Matsumae.

In the Meiji era, the fisheries industry was still a vital industry in Hokkaido, even though it was one of the longest running on the island. When the 20th century was in its infancy, the catch of herring climaxed and fishers shifted northward and further off shore in order to find more fish (Historical Museum of Hokkaido). Every year after that, the herring catch would never be as high as it was around the turn of the century. Herring season was very short-lived starting typically by the beginning of April and finishing up in May (Howell 1995) yet during that short period of time herring was very popular.

According to Hokkaido Prefectural Wakkanai Fishery Experiment Station (2006) during the mid 1880's the herring catch in northern Hokkaido was just shy of 500,000 tons per year, while at the time the herring catches reached their azimuth (around the turn of the century) herring catches were approaching 1 million tons. Therefore the catching of other fish such as cod and flat fish expanded (Historical Museum of Hokkaido). In fact, examining the statistics of fishery products from 1899-1901 dried cod didn't change much in the first two years staying fairly stable around 1.2 million pounds and the final year it shot up to 8.9 million pounds (Imperial Japanese Commission... 1904, 271). As for salted cod, during those same years the statistics were 1.2 million pounds, 2.7 million, and finally 3.25 million. It should also be noted

that during the approximate time that the herring catches were reaching a ceiling, they also had the highest value on average than any other catch over a three year period (Imperial Japanese Commission... 1904, 271).

Other important marine life that was caught was kelp or seaweed, salmon and trout in the summer and fall, and cuttlefish and shellfish in the winter (Howell 1995). After the herring catches reached its maximum around the turn of the 19th century, they quickly went into to a several year decline which seems to have occurred between the years between 1903 and 1904 and continued until between 1911 and 1912 when it started to pick up again. Although, some years there were drastic dives in herring and other fish catches, while other years the declines are much more moderate declines or sometimes not a decline at all but an increase. But overall, herring catches wouldn't stay stable for long, a few years at most.

Salmon hatcheries in Hokkaido were also some of the most successful ones in the country during the Meiji era. Starting in 1879-1890 there was a study done on salmon hatcheries in four different places around Japan, and the only one that had some success was the one in Hokkaido. Salmon eggs were collected and then placed into bodies of water in separate locations in Japan. The one that turned out to be the most successful was Lake Chujenji, nearby the town of Nikko in Hokkaido. The author mentioned that during the year that the article was being written the lake had plenty of fish and it attracts tourists to the area. Furthermore from 1892 to 1901 the amount of salmon that successfully hatched increased from about 3.5 million to 12.6 million (Imperial Japanese Commission... 1904, 268-269).

Starting in the mid 19th century the pound trap was put into use by fishers in Ezo and Wajinchi (Howell 1996). This new innovation allowed fishers to catch more fish at a time, which became very controversial with the majority, who were gill-net fishers. Due to this controversy

the pound trap was banned by the Tokugawa regime. Starting in the Meiji era, the pound trap was less restricted by the government due to the stronger emphasis on capitalism, and accelerated development. Howell also states that the usage of the pound trap was one of the factors that led to a fisheries industry that was more capitalist and that with the continued focus on pound traps in a changing economic system decline to very low levels much later in the 20th century.

Forestry

Forests have been utilized for their products in the Japanese archipelago for thousands of years. Conrad Totman argues in his book *The Green Archipelago* that Japan “should be an impoverished, slum-ridden, peasant society subsisting on a barren, eroded moonscape” (Totman 1998, 1). He justifies this in terms of three things; that the large concentrated population, limited resource base, and the very mountainous landscape. He says that the reason it is not the way he described it above is because the Japanese out of desperation learned through trial and error an effective and efficient way of re-growing forests and incentivizing that growth.

The forests found in Hokkaido and other northern latitudes of Japan are not the same as the forests found in the other three main islands, and did not experience the same degree of exploitation. Hokkaido is home to the most severe cold in all of Japan (other than maybe Mt. Fuji in Honshu). The forests of Hokkaido have greater quantities of hardwood trees like oak and other trees like spruce and temperate and boreal conifers (Jones 1921). “As usual the logging methods in a new country are wasteful, taking only the best and leaving slashed and cutover forests to disastrous fires” (Jones 1921, 21). Alan McQuillan and Ashley Preston (1998) authors of *Globally and Locally: Seeking a Middle Path in Sustainable Development* state that indeed in

Hokkaido the transformation from forestland into farmland during the Meiji era involved burning and cutting of old-growth forests (215).

The places that were cut more extensively were the Oshima peninsula area of Hokkaido, specifically what before was called the Wajinchi. There were other areas that were cut, but this region was probably one of the first areas cut by Japanese colonizers. With the increased settlement and industry in Hokkaido, the cutting of forests were bound to increase. Materials were needed for construction. Another important reason that the forests were cut back was for agricultural purposes. In order to cultivate crops room was needed, therefore forests needed to be cut back. The forests that were cut the most were the forests on the Oshima peninsula and the forests of the Ishikari plain. Sawmills were built near Hakodate, Sapporo, Murooran and other places. Jones (1921) states that because trees that were cut were floated downstream as a simple form of transportation, major sawmills tended to be located near the mouth of major rivers in Hokkaido. Jones notes that railroads were also used for transporting wood to the sawmills. “The steam sawmill was capable of sawing 12,000 feet of boards a day and during its first season turned out about a million feet” (Pursell, 2007, 191).

Under the Meiji regime in the 1880’s, large stretches of forested land as well as even “wooded common land” shared by local villagers were placed under government control (Totman 1998, 192). The government’s justification for this was that “timber stands must be protected and lumber production enhanced tasks best handled by officialdom” (193). However, national forests were not the only kind of forests in Japan, there were also crown, municipal, shrines & temples forests, and private forests. All forests of Japan were divided into protection forests and utilization forests. According to *Exhibition of the Empire of Japan* in 1904 all of Japan had about 23 million cho (1 cho= 2.5 acres) of forest land, and 97 percent of that was

labeled utilization forests (226). Also, out of the 23 million cho, about 13 million cho was considered national forest, by far the largest proportion, with private forests coming in just shy of 6 million cho. Hokkaido forests in this same year accounted for over 25 percent of all forests in Japan.

According to Totman, in his book *The Green Archipelago: Forestry in Pre-Industrial Japan*, the people of Japan have a long history of issues involving access to forests. It was crucial to their way of life because in the forests was fuel and fertilizer. Throughout the centuries there have been innumerable cases of villagers frustrated with other villagers, with the local government or national government over access to forests. This was especially apparent during the great booms in construction of temples, monuments, cities etc, in which the elite would try to limit the access that the commoners had to the forests because they wanted more lumber to feed their construction campaigns. This repeated itself several times over the course of several centuries, and it happened again in the 1880s. Therefore this seizure of forestland led to negative consequences for the commoners who depended on the forestland for their livelihood throughout Japan including Hokkaido (McQuilan and Preston 1998).

According to Wellington Jones (1921) the cutting of forests in Hokkaido became more significant during the last decade of the 19th century and the beginning of the 20th century. It would make logical sense that extraction of forestry products increased during these decades due to the two wars that Japan fought in this time period. The first war was with China in 1894 (Sino-Japanese War) and lasted less than a year, and the second war broke out with Russia in 1905 and was also over within a year. For both of these wars it seems that resource extraction overall increased in Hokkaido due to the demand for more products and goods to support the wars. To give an idea of the degree to which forests were cut consider this: as mentioned early in 1904 the

total amount of forested land in Japan was about 23 million cho. In 1915, the total had dropped to about 18.6 million cho (Sato 1918, 452). To put this in perspective that means that over an 11 year period 19 percent of all forests in Japan were cut down. If we consider how this could have affected Hokkaido, well Hokkaido had more forested land than anywhere else in Japan, and had so much of it, it was being exported to the Asian mainland. Although the affects were clearly spread throughout Japan, I would guess that in the years from the beginning of the Meiji era until the end of WWI in 1918, Hokkaido's forested landscape was changed quite significantly. Especially if we consider the hundreds of thousands of people that moved to Hokkaido during this period, as well as the growth of cities throughout Hokkaido, but especially the growth of Sapporo.

Agriculture

One of the industries that was emphasized the most in colonizing Hokkaido was agriculture. The Japanese had tried bringing their agricultural practices from Japan, especially rice to Hokkaido, but at first it wasn't very successful because of Hokkaido's climate and the things they were planting wouldn't grow. The Ainu in some parts of Hokkaido had a form of agriculture in which they grew millet and beans and other similar grains (Capron 1875, 315). So this was by no means the first attempt at practicing agriculture in Hokkaido, however, due to the experiment farms which were established quite strongly during the Meiji era this was the first time that such a wide variety crops were cultivated in Hokkaido.

The experimental farms were just like they sound, farms that tested which crops could grow in which areas, or how to make crops grow in certain areas. In Japan, overall rice was the major agricultural good, accounting for a market value of 445 million yen in 1904 (Imperial Japanese Commission 1904, 200). However rice was not quick to establish itself in Hokkaido,

therefore other crops had to be tried. Rice did eventually establish itself on Hokkaido thanks to the experimental agriculture that was being practiced in Hokkaido and other parts of Japan. Horace Capron, one of the most well-known of the foreign advisors in Hokkaido pushed for experimental farms in Japan as well as Hokkaido (Hokkaido Prefectural Government 1968). According to the Financial and Economic Annual of Japan in 1908, the experimental farms of Hokkaido are recognized for their fertile soil and success in growing potato, barley, wheat, several different varieties of beans, and peas and greens (200). In a letter addressed to Kiyotaka Kuroda from Horace Capron in November of 1873 Capron states that a mill was built in Sapporo for the purposes of grinding grains like rye, wheat, corn, buckwheat and oats into flour and meal (Capron 1875). During the spring of 1872, corn was planted in Hokkaido. As for horticulture there were strawberries, apples, and grapes, among other fruits brought from the U.S. that were grown in Japan and in Hokkaido (Hokkaido Prefectural Government 1968).

Davis (1934) in his article titled *Occupance Patterns in Hokkaido* states that peas, beans, oats, buckwheat, and potatoes tend to be the crops that are grown on the less flat hillside areas, and wheat, barley and rye are also grown in these areas, but are less prevalent (222). Rice on the parts of the island that it can be grown tends to be grown in more flat areas. Wheat was yielded in Hokkaido for the first time in 1874 by a reaper (Machine in America).

Cattle Industry

Hokkaido, which has more open space than any other Japanese island was better suited to the cattle industry, at least in terms of space. When the cattle industry was established all across Japan it changed many things ranging from eating habits to ecology. Many more natural resources and products became available to the people of Hokkaido and Japan due to the cattle

industry. Before the cattle industry came to Hokkaido and other parts of Japan most Japanese were not used to eating farm animals (Walker 2005). Horses and cattle also had been in Japan for several centuries, so this was by no means the first contact with all typical western farm animals. However, this was the first time that so many of these animals were brought into Japan and especially Hokkaido. As of 1887, there were about 1 million cattle and 1.5 million horses in Japan (Imperial Japanese Commission 1904, 200). Due to the fact that Hokkaido had the most open space than any other island, a significant portion of all the cattle and horses throughout Japan were in Hokkaido. The cattle industry was part of the industrial agriculture that arrived in Japan and Hokkaido in the early Meiji era. The Kaitakushi advisor most associated with cattle and farming was Edwin Dun, whose, main assignment was to manage the experimental farms in Niikappu, Izari, Makomanai, and Shizunai (Walker 2005).

The Kaitakushi and foreign advisors like Edwin Dun contributed to the growth of natural resource extraction. One of the ways they did this was in the form of Some of these goods were new meats like beef and pork, fertilizer made from farm animal manure, dairy products, and more. The idea in bringing a cattle industry to Hokkaido was for the overall development of the island.

The most well-known of the ranches was Niikappu ranch. It was at this ranch that there was an especially bad problem with the local wolves and dogs getting into the ranch and killing several horses (Walker 2005). In Walker's book he mentions an ecologist by the name of Inukai Tetsuo which hypothesized that lots of wolves and dogs in 1878 may have been gathering not far from the ranch because of the exceptionally cold winter and being pushed off other land due to development. Tetsuo claims that wolves were after the deer in the region, but due to increased hunting of deer, there may have been less of them. According to (Kaji et al 2000) between 1873

and 1878 over 500,000 Sika deer were killed for the purpose of exporting their fur and antlers (699). Instead of the wolves and dogs hunting deer, they were mostly going after the horses it seems due to the lack of deer. Sadly, the wolves through no fault of their own were gunned down by ranch lookouts. In 1878, Niikappu Ranch began using a poisonous substance called strychnine to kill wolves and dogs on the island of Hokkaido, and within about a decade, they were all gone (Walker 2005, 119, 154). This was carried out because the wolves posed a threat to business.

Coal Mining

Mining in Hokkaido had been carried out by the Japanese long before the Meiji period, and long before the foreign advisors arrived in Hokkaido. In the early 17th century, the Japanese began mining gold from several rivers in Hokkaido (Walker 2001, 82-83). Coal mining has a fairly recent history in Hokkaido compared to other types of mining. Blake and Pumpelly, foreigners with expertise in engineering and geology were the first to introduce using dynamite at mines in Hokkaido (Hokkaido Prefectural Government 1968). Blake also wrote to future advisor of the Kaitakushi Horace Capron and provided him with valuable insight and information. The next group of specialists brought in 1872 by Capron was Benjamin Lyman and his hired-hand Henry Munroe who completed dozens of surveys and maps in Hokkaido on the geology and minerals above and below ground.

The majority of the major coal mining districts were in western Hokkaido, in what are called the Ishikari coal fields. Well-known mines in this area were the Sorachi, Horonai, and Yubari mines. According to a mining and metallurgical journal article Fritz J. Frank (1902) called *Mines and Minerals*, the Sorachi and Horonai mines employed approximately 3,100

people (51). The development of these mines and the roads to the mines encouraged many people to settle in the area around the Ishikari coal fields.

In Hokkaido railroads were especially important for the transportation of coal. A majority of the coal that was mined on the island came from the western part of the island, primarily in the Ishikari region. The first coal mine to be connected with a railroad to a harbor was the Horonai coal mine, which connected with Sapporo, and then Otaru, the major port in western Hokkaido. The first section of the railroad from Otaru or Temiya to Sapporo was about a year in the making, from 1880-1881, and from Sapporo to Horonai was completed in the next few years (Hokkaido Prefectural Government 1968). It wasn't until 1892 that the other Ishikari coal fields were connected with the port of Muroran (another major port in western Hokkaido) by railroad. Hokkaido quickly became one of the largest producers of coal in all of Japan. In fact, in 1906, Hokkaido's coal production was the third highest in all of Japan (Ericson 1996, 42). Eleven years later, Hokkaido produced 3.7 million tons of coal, which was 14% of all coal mined in Japan (Jones 1921, 22). The railroads were a major catalyst for the increase in production and movement of coal in not only Hokkaido, but all of Japan. The coal of course had to be transported by steamship between Hokkaido and Honshu, so water transportation was even more vital in the movement of coal.

Of course coal mining would not have been half as successful in Hokkaido if there hadn't been enough labor. Wages in the mines were very low and even lower for women (Lahiri-Dutt and Macintyre 2006). Work was very difficult and uncomfortable. It was especially uncomfortable if you worked in the coal mines of Chikuho in Kyushu, which was the largest supplier of coal in Japan for several decades. In this specific mine workers were required to venture hundreds of feet underground, and once in the mine, it wasn't uncommon to have to

bend uncomfortably for hours because there wasn't much room in the tunnels and shafts (Menton et al. 2003). Inside the mines the ground was not level and because the coal mines were located in a group of mountains it was steep going into and coming out. The first prison in Hokkaido was built in Kabato in 1881, followed by several more in the years afterwards, and it was some of these prisoners that were used in the mines (Historical Museum of Hokkaido). Both women and children were allowed to work inside mines until regulations came into effect in the early 1900's (Lahiri-Dutt and Macintyre 2006, 65). Under the new regulations put into law in 1916, children below 15 years old would be limited to working 12 hours a day as well as women. 3 years later the hours were reduced to 8 for women and kids. However, Lahiri-Dutt and Macintyre claim in their article that in Hokkaido there were nowhere near as many women working in mines than in places like Chikuhō. It seems that women in mines in Hokkaido were mostly employed doing the tasks of sorting and washing the coal (Frank 1902).

The conditions in the mines posed a serious health risk to the people who worked in them. Coal mines were very dark, the air quality was poor due to the amount of dust and particulates floating around in the mines, humidity and temperatures tended to be high, and the mines overall were just unclean places. Essentially, in coal mines hazards were everywhere, such as the risk of mine collapse, explosions, carrying and transporting of coal and many more (Lahiri-Dutt and Macintyre 2006). The coal mines overall were such a hazard that some mining companies like Hokkaido Tanko Tetsudō Kaisha (Hokkaido Colliery & Railway Co) even built hospitals, hired doctors and nurses and even had a fire department in the event of an injury or accident (Frank 1902). There was also the risk of being beaten if a supervisor of the company overheard a worker talking about their discomfort during their shift. Lahiri-Dutt and Macintyre (2006) claim that "Japan's coal industry was developed in response to the demands of industrialization associated

with militarism” (52). With the increase in coal production over time the coal industry worked the employees even harder, especially during times of war when the coal was needed the most. Between the years of 1899 and 1902, coal extraction increased by 3 million tons, from 6.7 million to 9.7 million (Imperial Japanese Commission 1904, 251). 13 years later this increased to 26.4 million tons (Jones 1921, 22).

Transportation of Natural Resources

Transportation was crucial in getting these natural resources to the market. Japan, being an island nation used ships to transport lots of their goods. But starting in the Meiji era railroads were built in across Japan. The first railroads in Japan were built from Yokohama to Shinagawa in 1872, and later that year, the track was completed to Shinbasha, making it 18 miles long (Ericson 1996, 26). The first section of railroad in Hokkaido from Otaru to Sapporo was finished in 1881 (Hokkaido Prefectural Government 1968, 52). This railroad would eventually extend to Horonai coal mine a few years later a distance of about 45 miles (Pursell 2007, 191). Although these railroads direct purpose was to transport coal initially, they also ended up transporting all sorts of goods from the agricultural fields, forests and more. The islands of Hokkaido and Honshu were not connected therefore ships were needed to transport the materials to the other Japanese islands. Although river transport was basically drastically reduced with the rise of the railroad, the ships that transported goods from island to island remained a vital part of transportation for decades (Ericson 1996). One of the truly beneficial things about railroads was that they could get the goods from the source to the ports to ship in a much more timely manner. As decades past, the country became increasingly connected and more commodities were transported by trains. As this happened there was a drop in rates for freight transport which benefitted the industries and the communities that relied on their goods being consumed and

transported. “The Meiji rail network had a significant impact on particular localities and industries, especially export-oriented ones” (Ericson 1996, 52). The railroads linked many sectors of the economy and industries together.

The first 10 years of railroad building in Japan were funded by the Meiji government (9). Starting in 1883-1884 the first private lines were built in Japan (9). Numerous private railroad companies began to emerge in the 1880’s. Ericson (1996) says that “Japan’s first railway boom lasted until 1889,” however it should be noted that the true boom didn’t start until the early 1880’s (63).

In general, railroads are useful for carrying three types of objects: Passengers, commodities, and heavy industrial goods. However, at least during the Meiji era, the emphasis was on the former two, due to the west’s reluctance to import heavy industrial products to Japan, with the exception of railcars and others.

Conclusion

Throughout this paper I have tried to illustrate how Hokkaido’s natural resources were significant in the development and modernization of Japan. The modernization of Japan was achieved partly because of extraction and exploitation of resources in Hokkaido. What led Japan on the road to modernization was the forced opening of the country beginning with the Kanagawa and Unequal treaties, combined with the determination to not be occupied by the west, and to catch up with them. The road of modernization led Japan to seek more resources in order to develop themselves into a truly modern nation capable of defending and supporting itself. Hokkaido, a resource rich frontier land to the north which was a key trading outpost for centuries then became a major contributor to the development and modernization of Japan during the Meiji era and afterwards.

At least two factors kept Japan as a country of agriculture and light industry well into the 20th century; Japan didn't have any heavy industrial raw materials other than coal and copper, and western countries did not import many heavy industrial materials (Halliday 1975, 57). Therefore, even though Japan's development throughout the Meiji era was quite profound, the country, including Hokkaido was predominantly agricultural and light industry based well into the 20th century.

All the industries mentioned throughout this paper continued to be successful for decades and expanded their output overall. The only way that Japan could significantly expand agricultural land was through Hokkaido, because there was not enough space for much expansion in the other islands of Japan. The same goes for the cattle industry in Hokkaido which could support more cattle and horses than anywhere else. Coal was increasingly needed for Japan's further industrial development as it was one of the only key energy sources that it had. With the increase in population, industrialization, and increase in agricultural land the forest products of Hokkaido would be demanded in even larger quantities in the years after 1918. Finally, the fact that Japan is an island nation means that they would always rely on resources from the ocean. Therefore fish or fish products whether it be fertilizers or just for feeding the population continued to have a strong demand.

One topic that this paper did not address was the extraction of resources from other Japanese colonies in order to better understand the degree of Hokkaido's contribution to Japanese modernization. If more research were to be conducted, the above mentioned is one of the possible approaches that could be taken to have a more complete understanding of Japanese modernization.

Work Cited

- Anon. 1946. "Hokkaido and Karafuto: Japan's Internal Frontier." *Population Index* 12 (1) (January 1): 6–13. doi:10.2307/2730453.
- Beasley, William G. 1972. *The Meiji Restoration*. Stanford University Press.
http://books.google.com/books?id=k2FQEaQtWHIC&pg=PA125&lp=PA125&dq=Meiji+era+Hokkaido+fisheries&source=bl&ots=EQHt2Haguq&sig=ODeBQJRfbL2vVFR0e_QUfOpoXpQ&hl=en&sa=X&ei=2TGWT5y2J-KTiQKNquCHCg&ved=0CFQQ6AEwCA#v=onepage&q&f=false.
- Brown, Richard, M. "Violence." In *The Oxford History of The American West*, 393–425. New York, N.Y: Oxford University Press.
- Capron, Horace. 1875. *Reports and Official Letters to the Kaitakushi*. Kaitakushi.
http://books.google.com/books?id=8hgNAAAAYAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q=beautiful&f=false.
- Christ, Carol Ann., Christ, and Carol Ann. 2000. "The Sole Guardians of the Art Inheritance of Asia?: Japan at the 1904 St. Louis World's Fair." *Positions: East Asia Cultures Critique* 8 (3): 675–709.
- Davis, Darrell H. 1934. "Present Status of Settlement in Hokkaido." *Geographical Review* 24 (3) (July 1): 386–399. doi:10.2307/208910.
- Davis, Darrell Haug. 1934. "Type Occupance Patterns in Hokkaido." *Annals of the Association of American Geographers* 24 (4) (December 1): 201–223. doi:10.2307/2560577.
- Ericson, Steven J. 1996. *The Sound of The Whistle: Railroads and the State in Meiji Japan*. Cambridge Massachusetts: Council on East Asian Studies, Harvard University.
- Exposition, Japan. Imperial Japanese Commission to the Louisiana Purchase. 1904. *The Exhibition of the Empire of Japan, Official Catalogue*. International Exposition.
http://books.google.com/books?id=xWwEAAAAYAAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false.
- Frank, Fritz J. 1902. "Mines and Minerals: A Mining and Metallurgical Journal" 23 (2): 49–52.
- Goto-Jones, Christopher. 2009. *Modern Japan: A Very Short Introduction*. New York, N.Y: Oxford University Press.
- Halliday, Jon. 1975. *A Political History of Japanese Capitalism*. New York, N.Y: Monthly Review Press.
- Hamada, Shingo. 2011. "A Review of Japan's Herring Cultural History" Burnaby, BC, Canada.
<http://www.sfu.ca/content/dam/sfu/hakai/pdf/Hamada%20-%20Japan%27s%20herring%20cultural%20history.pdf>.

Harrison, John A. 1951. "The Capron Mission and the Colonization of Hokkaido, 1868-1875." *Agricultural History* 25 (3) (July 1): 135–142.

Historical Museum of Hokkaido. "Early Modern Era" and "Progression of Colonization". 53-2 Atsubetsucho, Atsubetsuku, Sapporo, Japan 004-0006. 12 November, 2010.

Hokkaido Prefectural Government. 1968. *Foreign Pioneers: a Short History of the Contribution of Foreigners to the Development of Hokkaido*. [Sapporo, Japan?]: .: Hokkaido Prefectural Government.

Howell, David Luke. 1995. *Capitalism From Within: Economy, Society, and the State in a Japanese Fishery*. University of California Press.
http://books.google.com/books?id=UUGNGEkU4DoC&pg=PA57&lp=PA57&dq=wajinchi&source=bl&ots=cdAvW6z_qc&sig=G7nxMPA2_4RZAw9-xin3HnuOfTc&hl=en&sa=X&ei=YzGGT8nELomfiAKT2KS5Dw&ved=0CCcQ6AEwAQ#v=onepage&q=wajinchi&f=false.

Irish, Ann B. 2009. *Hokkaido: A History of Ethnic Transition and Development on Japan's Northern Island*. McFarland. http://books.google.com/books?id=-9EBuQK-NRQC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false.

Jones, Wellington D. 1921. "Hokkaido, the Northland of Japan." *Geographical Review* 11 (1) (January 1): 16–30. doi:10.2307/207854.

Kaji, Koichi, Masami Miyaki, Takashi Saitoh, Satoru Ono, and Masami Kaneko. 2000. "Spatial Distribution of an Expanding Sika Deer Population on Hokkaido Island, Japan." *Wildlife Society Bulletin* 28 (3) (October 1): 699–707.

Lahiri-Dutt, Kuntala, and Martha Macintyre. 2006. *Women Miners in Developing Countries: Pit Women and Others*. Ashgate Publishing, Ltd. http://books.google.com/books?id=KnOIJ1XY-MUC&pg=PA111&lp=PA111&dq=Women+miners+in+Japan&source=bl&ots=37lujqA0yC&sig=DlGDvT6Rnp2zu3_TIJLNE0nW7X0&hl=en&sa=X&ei=SwOft5CnHeWQiAKx4rGEAQ&ved=0CD0Q6AEwAw#v=onepage&q=Women%20miners%20in%20Japan&f=false.

McQuillan, Alan G., and Ashley L. Preston. 1998. *Globally and Locally: Seeking a Middle Path to Sustainable Development*. University Press of America.
http://books.google.com/books?id=SBJUcogRIToC&pg=PA215&lp=PA215&dq=sawmills+in+Hokkaido+Meiji+era&source=bl&ots=htoP3ZgEA2&sig=tB4g_Qt9ZCL210ltUohsaTz5y8I&hl=en&sa=X&ei=K2uKT9HSOamjiALSqrmlCw&ved=0CDAQ6AEwAg#v=onepage&q=sawmills%20in%20Hokkaido%20Meiji%20era&f=false.

Menton, Linda K. 2003. *The Rise of Modern Japan*. University of Hawaii Press.
<http://books.google.com/books?id=khz3CCpwEoC&pg=PA75&lp=PA75&dq=Japanese+coal+mining+meiji+era&source=bl&ots=7P7Y-KnJ->

[Q&sig=ML7Tk4L4MFVkaaUrNT2vgWjG5jQ&hl=en&sa=X&ei=4WGeT9qCA6ShiQKy3K15&ved=0CFIQ6AEwBw#v=onepage&q=Japanese%20coal%20mining%20meiji%20era&f=false](http://www.jstor.org/stable/2307267?seq=1&sig=ML7Tk4L4MFVkaaUrNT2vgWjG5jQ&hl=en&sa=X&ei=4WGeT9qCA6ShiQKy3K15&ved=0CFIQ6AEwBw#v=onepage&q=Japanese%20coal%20mining%20meiji%20era&f=false).

Morris-Suzuki, Tessa. 1999. "Lines in the Snow: Imagining the Russo-Japanese Frontier." *Pacific Affairs* 72 (1) (April 1): 57–77. doi:10.2307/2672336.

Notehelfer, F. G., Igor R. Saveliev, and W. F. Vande Walle. 2004. "An Extraordinary Odyssey: The Iwakura Embassy Translated." *Monumenta Nipponica* 59 (1) (April 1): 83–119.
Ōkurashō, Japan. 1908. *Financial and Economical Annual of Japan*. Printed at the Shueisha.
<http://books.google.com/books?id=8jDRAAAAMAAJ&printsec=frontcover&dq=inauthor:%22Japan.%20%20C5%8Ckurash%C5%8D%22&hl=en&sa=X&ei=RLehT8PCL8SZiQLo-cyeBw&ved=0CDAQ6AEwAA#v=onepage&q=inauthor%3A%22Japan.%20%20C5%8Ckurash%C5%8D%22&f=false>.

Pursell, Carroll W. 2007. *The Machine in America: A Social History of Technology*. JHU Press.
http://books.google.com/books?id=ZmXbNsXZMQkC&printsec=frontcover&source=gb_s_u_mmary_r&cad=0#v=onepage&q=Hokkaido&f=false.

Sato, Shosuke. 1918. "The Rice Industry of Japan." *The Economic Journal* 28 (112) (December 1): 444–452. doi:10.2307/2223341.

Totman, Conrad. 1998. *The Green Archipelago: Forestry in Pre-Industrial Japan*. Ohio University Press.

Statistics Bureau, Japan. "Statistics Handbook of Japan".
<http://www.stat.go.jp/english/data/handbook/index.htm>, Accessed 1 May, 2012.

Turner, Frederick, J. 1920. *The Frontier In American History*. New York, N.Y: Henry Holt and Company.

Walker, Brett L. 2001. *The Conquest of Ainu Lands: Ecology and Culture in Japanese Expansion*. Berkeley CA, and Los Angeles, CA: University of California Press.

Walker, Brett L. 2005. *The Lost Wolves of Japan*. Seattle, Washington: University of Washington Press.

Yaguchi, Yujin. 2002. "American Objects, Japanese Memory: 'American' Landscape and Local Identity in Sapporo, Japan." *Winterthur Portfolio* 37 (2/3) (June 1): 93–121.

