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EAST ASIAN HISTORY AND CULTURE REVIEW

Japanese Mapping of Asia-Pacific Areas, 1873–1945: An Overview

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Abstract

Japanese mapping in the Asia-Pacific region up to 1945 calls for scrutiny, because its development was a multifaceted process with military, administrative, political, and cultural dimensions. This article traces the changes in Japanese mapping of overseas areas to the end of World War II and assesses the significance of the resulting maps, called *gaihōzu*, as sources for East Asian history. As implements of military operation and colonial administration, the *gaihōzu* were produced during a protracted period by various means under changing circumstances. Expanding military activity also promoted differentiation among the *gaihōzu* by increasing the use of maps originally produced in foreign countries. In conclusion, the need for detailed cataloging, in combination with chronologically arranged index mapping, is emphasized for the systematic use of the *gaihōzu*.

Introduction

The study of cartography in imperial and colonial expansion is one of the most important subjects today for scholars who are interested in the intersection of modern history and the history of cartography. For modern states, maps have been fundamental tools, serving multiple purposes in construction projects, public administration, land registration, and military operations. Likewise, maps were also important instruments for the exploration and administration of overseas areas that were incorporated into these modern states.

Scholars have studied the roles of these maps in international politics, the applications of modern surveying to colonies, and the cartographic representation of empire (Akerman

2009; Butlin 2009, 325–349). Particularly intensive studies of historical cartography concerning the former British colonies have been carried out (Barrow 2008; Edney 1997; Stone 1995). These studies suggest that similar frameworks are applicable for historical study of cartography in other areas.

Japanese mapping in the Asia-Pacific region up to 1945 is a typical case that calls for scrutiny of this kind. After the Meiji Restoration, Japan made continual efforts to extend its cartographic knowledge of surrounding areas as well as to upgrade the techniques of its surveyors. Modern surveying methods, including triangulation and aerial photogrammetry, were applied extensively in the later phase (Kobayashi 2011). After Taiwan and Korea were annexed, colonial governments produced thematic maps covering hydrography, geology, soil, industry, population, and urban planning in addition to topographical maps of the territories (Söul Yöksa Pangmulgwan 2006; Wei et al. 2008). Meanwhile, maps designed for the general public documented the expanding sphere of influence of the Japanese empire and the progress of its battles, which followed one after another. Bird's-eye views of the colonies and their cities were also actively produced, carrying on the early modern tradition of Japanese commercial mapmaking (Zhuang 1996). The development of Japanese overseas cartography during these decades was a multifaceted process with military, administrative, political, and cultural dimensions. It represented neither a simple accumulation of geographical intelligence nor a direct reflection of Japan's international relations. Accordingly, it provides a fertile field of inquiry for interdisciplinary research.

However, Japanese specialists in the history of cartography have not traditionally been interested in these maps. The main subject of their study has been the development of maps in premodern and early modern times (Nanba, Muroga, and Unno 1969; Unno, Oda, and Muroga 1972). Scholarly attention has concentrated on the transfer of geographical information, focusing on the development of world maps produced in Japan in comparison

with those made in China and Europe (Akioka 1988). Most historians of Japanese cartography considered their subject a branch of the history of ideas or the history of science.

As a result, the study of modern Japanese mapping of overseas areas was initiated by those who were charged with cataloguing the large number of military maps deposited in several institutions. These maps have collectively been called *gaihōzu* (maps of foreign countries).¹ After the end of World War II, geographers affiliated with the University of Tokyo and Tohoku University hauled away many maps that had been sequestered at the General Staff Office of the Japanese army and distributed them to several universities in Japan (Asai 1999; Hisatake and Imazato 2009; Tamura 2009). Meanwhile, the National Diet Library inherited maps that had been stockpiled at the Ministry of Foreign Affairs. It also collected those possessed by individuals (Suzuki 2009). As the *gaihōzu* were gradually classified and catalogued, their value in geographical research of the areas concerned came to be recognized. Of great importance among the catalogues published during this period are topographical maps of mainland China (Nunome and Honda 1976; Nunome and Matsuda 1987) and a series of lists of foreign maps housed in the National Diet Library (Kokuritsu Kokkai Toshokan Sankō Shoshi-bu 1966, 1967, 1982, 1983, 1984, 1991).

Along with the cataloguing, reprinted maps of Japan's former colonies were issued not only in Japan but also in Taiwan and Korea. In Taiwan, the earliest topographical map made by the government-general (*Taiwan Ho-zu* or *Taiwan bao tu*) was accorded special importance and reprinted twice (Rinji Taiwan Tochi Chosa-kyoku 1996; Taiwan Sheng wen xian wei yuan hui 1969). In Korea as well, the earliest topographical map was reprinted (Nam 1997a). The editors of these reprints published commentaries and papers on the maps concerned (Nam 1997b; Sih 1999).

Meanwhile, Japanese publishers began reprinting topographical maps of its colonies, especially the 1:50,000 series originally produced by the Land Survey Department of the

Japanese army (Gakusei-sha 1981, 1982; Rikuchi Sokuryō-bu 1983). Yasuo Shimizu provided commentary on these maps after examining collections in the National Diet Library (Shimizu 1982, 1983, 1986). Although these colonial maps were not called *gaihōzu* originally,² researchers began to call all prewar maps of the former colonial territories by this term. In addition, from the middle of the 1980s, Kagaku Shoin, a new publishing company, started to reprint Japanese military maps of mainland China (Kagaku Shoin 1986–1998). These extended from the 1:50,000 series to include 1:25,000 and 1:100,000 maps as well.

Fundamental data on Japanese overseas cartography were thus gradually accumulated through the process of cataloguing and making reprints of old maps. Yet it was still not easy to gain a comprehensive view of Japanese overseas mapping, for two main reasons. First, right up to the end of World War II, the Japanese army had kept not only its overseas maps but also its survey process secret. Moreover, most of its maps were destroyed before the advance of the Allied forces. As a result, the materials necessary to show the whole picture of *gaihōzu* production were decisively insufficient. Chronological notes on the history of *gaihōzu* production by Kikusaburō Takagi, who made investigations into the surveying processes employed at the Land Survey Department in 1941, were a rare exception (Takagi 1961, 1992). Second, after the colonies regained their independence, the Japanese Geographical Survey Institute, which succeeded the army's Land Survey Department in 1945, was restricted to working within the territory of postwar Japan. Thereafter, no governmental institution was responsible for controlling and preserving Japanese overseas maps. Classifying and cataloguing surviving maps deposited in universities, the National Diet Library, and the Geographical Survey Institute were the only ways to approach the *gaihōzu*.

By the late 1990s, researchers who had worked on the scattered collections in universities and libraries³ recognized the need for a more comprehensive study of *gaihōzu*, and a new study group was accordingly founded in 2002. The *Gaihōzu Kenkyūkai* (Meeting

for research on the *gaihōzu*) was organized to report up-to-date research achievements and to facilitate the exchange of information among scholars. The group's most important task was completing the cataloging of *gaihōzu* collections in universities, but it also studied Japanese overseas maps deposited in foreign libraries. In the United States, the collections of the Library of Congress and the American Geographical Society Library (presently held by the Golda Meir Library at the University of Wisconsin-Milwaukee) were the chief targets. In the United Kingdom, scholars visited the collection of the British Library. Meanwhile, in Japan, the group interviewed a former high-ranking officer of the General Staff Office and retired engineers, who had worked in the Land Survey Department and the Hydrographic Office of the Japanese navy, in order to obtain detailed information on mapmaking at the end of World War II. In addition, the group issued annotated reprints of materials related to overseas mapping (Kobayashi 2008–2009; Kobayashi and Watanabe 2010).

Considering the rapid progress over the past decade of the study of Japanese overseas mapping, we should not ignore the contribution of researchers in Taiwan and Korea, who included and commented on colonial maps in published atlases (Sōul Yōksa Pangmulgwan 2006; Wei et al. 2008). In Taiwan, a special reprint of maps related to urban planning was issued (Huang 2006). The materials needed to produce a comprehensive overview of the modern Japanese mapping of overseas areas thus gradually accumulated, and a first collection of papers on the *gaihōzu* was compiled in 2009 (Kobayashi 2009). A historical sketch of the *gaihōzu* and Japanese overseas mapping was also published recently (Kobayashi 2011).

Drawing on this extensive groundwork, the present article traces the changes in Japanese mapping of overseas areas to the end of World War II and assesses the significance of the resulting maps as sources for East Asian history. In essence, it intends to develop a common basis for further research on the *gaihōzu* and Japanese overseas mapping among

scholars in all the countries concerned. In the first section, I review the development of cartography from the Tokugawa period to the early Meiji era as the basis of modern Japanese mapmaking. In the next section, I examine the duplication and compilation of maps made by foreign countries during the early Meiji era. The remainder of the article traces the development of surveys and mapping overseas up to the end of World War II. Finally, I describe the process by which the maps in question were distributed and deposited after the war to various institutions within Japan and abroad.

The Development of Land Surveys in Japan since the Tokugawa Period

A diverse array of maps was produced during the Tokugawa period (Unno 1994, 346). They include not only maps for administrative use on several scales but also printed maps produced for sale to the public, including city plans, panoramic visions of famous places and major cities, and even world maps influenced by religious ideologies (Nanba, Muroga, and Unno 1969; Unno, Oda, and Muroga 1972).

The application of surveys undertaken with the aid of a compass was gradually extended to administrative maps. The earliest example is the plan of Edo City by Ujinaga Hojo (ca. 1658), in which many measuring lines with notes can be observed on the compass bearing (Unno 1994, 400–402). At the end of the seventeenth century, the same kind of survey was applied to some provincial maps (*kuni-ezu*), which were submitted to the shogunate by the regional lords (Kobayashi et al. 1992; Narumi 2007, 148–149). Until the middle of the eighteenth century, this type of survey, called *mawari kenchi*, was established as the standard method and used widely in rural areas. Surveyed drawings were prepared using this method to record the precise boundaries of rural communities, which were arbitrated after land disputes (Narumi 2007, 65–159).⁴

On the other hand, it took a long time for triangulation to be introduced in Japan. The first Japanese survey to use triangulation was initiated by government institutions. The Kōbu-shō (Ministry of Engineering) and later the Naimu-shō (Ministry of Home Affairs), which took over survey works from the Kōbu-shō, mapped Tokyo and its outskirts beginning in 1871. The Kaitaku-shi (Agency for Development) surveyed Hokkaidō from 1873. In these early triangulations, foreign engineers played a crucial role (Sokuryō Chizu Hyakunenshi Henshū Iinkai 1970, 76–78).

Meanwhile, the army sent engineering officers to Europe to learn the latest technologies. After the return in 1882 of Toranosuke Tasaka, who had studied modern surveying in Germany for eight years, the army started using triangulation on a broad scale. The army became the proper authority on mapmaking in Japan after survey works were transferred from the Naimu-shō in 1884. That same year, Japan approved Greenwich as the prime meridian at the International Meridian Conference (Sokuryō Chizu Hyakunenshi Henshū Iinkai 1970, 33–43). In 1886, new topographical surveys based on triangulation were begun. The latitude and longitude from Greenwich were marked at the corners of all 1:20,000 maps published after 1886.

Maps of East Asia Compiled by the Japanese Military during the First Half of the Meiji Era

Soon after the Meiji Restoration in 1868, the Japanese military started to prepare maps of other East Asian countries. In the first stage, it depended heavily on geographical information from foreign countries, reflecting Japan's long isolation from the world during the Tokugawa period. In addition to duplicating maps from abroad, cartographers compiled maps based on traditional Chinese and Korean maps in combination with modern maps and charts made by Western countries. Among these maps, four groups are recognized. The first group consists of those made in the first stage, of which the earliest (*Chōsen Zen-zu*,

Complete Map of Korea) is a duplication of a map of Korea in 1873. According to a note, a survey ship of the Japanese navy obtained the original map in the coastal area of Korea in 1872. Most of the other maps in this group were duplications of maps and charts of China made by Western countries. The Japanese versions have place names written in kana and kanji, which were converted from alphabetical transliterations on the originals.

On the other hand, another map of Korea (*Chōsen Zen-zu*, 1:1,000,000), printed in 1875, and its sequel in 1876 were compilations of Korean and Chinese traditional maps, as well as modern charts from Great Britain and the United States, according to its note (figure 2). It is obvious that the coastlines with longitude and latitude lines were copied from the British and U.S. charts, whereas inland areas were drawn from Korean and Chinese maps, although the original versions of these foreign maps have not yet been identified.

Figure 2. A detail of the *Chōsen Zen-zu* (1875) Source: Map Room. National Diet Library [YG 913-129].



This map was reproduced abroad as an insert map (1:3,000,000) in an American book about Korea (Griffis 1882) and as a single sheet map (1:1,700,00) in Germany in 1883,⁵ with the place names rendered alphabetically. In addition, an English version of the German sheet map was published in the United States after 1894.⁶ These reproductions must have filled a popular demand for geographical information about Korea.

The second group consists of those maps prepared for the Japanese expedition to Taiwan in 1874. It includes the Japanese translation of a map of southern Taiwan provided by a U.S. diplomat, Charles Le Gendre, called *Taiwan Nanbu no Zu*. The scale of the manuscript is 1:93,000 and that of the print is 1:140,000. A map in the same style entitled *Southern Formosa Compiled by General Le Gendre*, printed in a weekly English-language magazine published in Japan,⁷ seems to be based on the original Le Gendre map.

The third group contains small-scale maps of the Asian continent. Most were compiled from maps and charts of various countries. It is interesting that the prime meridian of the earliest one, titled *Ajia Tōbu Yochizu* (A map of East Asia) (1875, 1:3,000,000), runs through Tokyo.⁸ The other maps of this group, which were produced later, measure longitude from Greenwich.

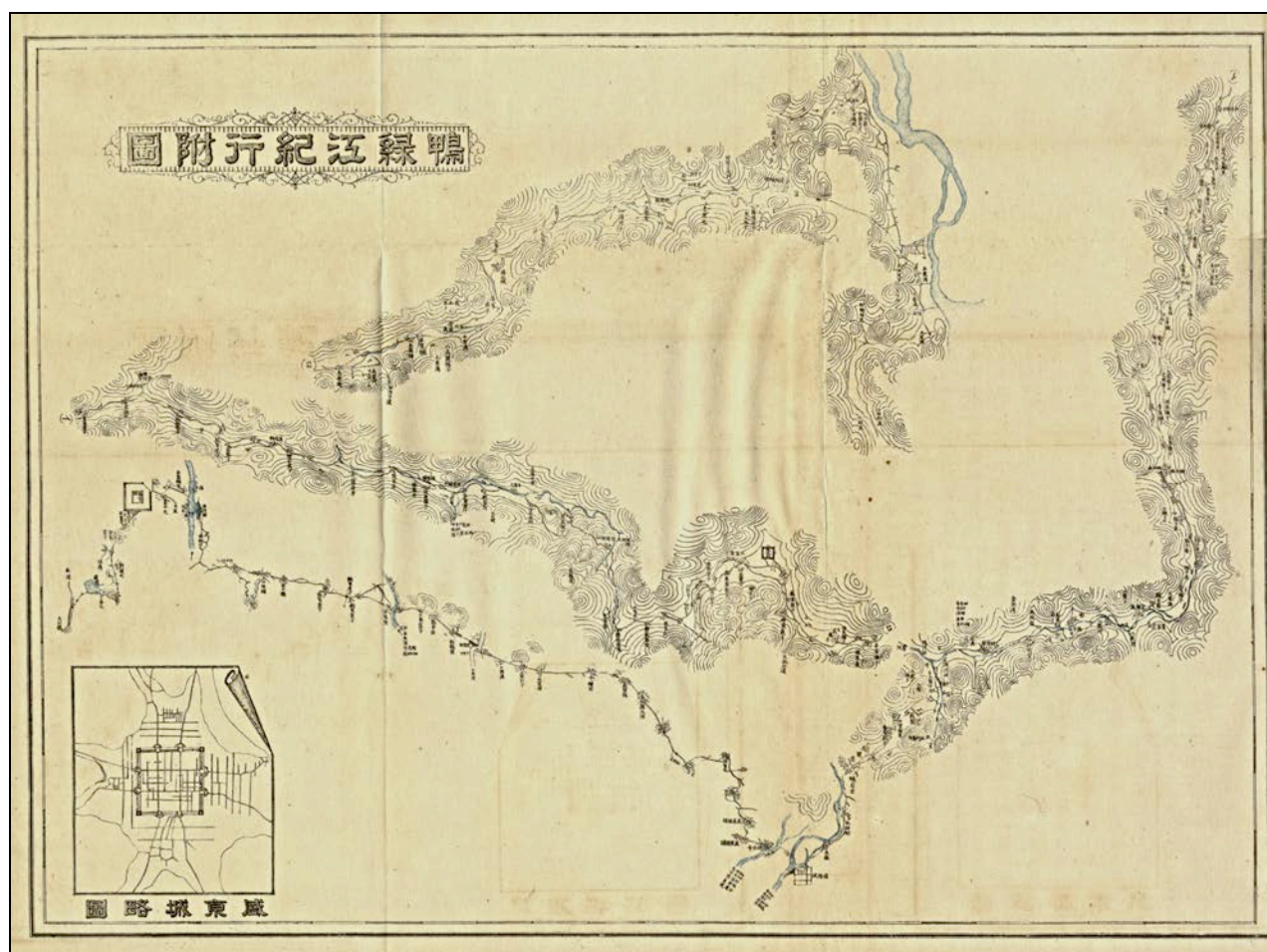
Provincial maps of China compiled from Chinese maps and British charts compose the fourth group. In 1879, Japanese cartographers were instructed to copy the coastlines from British charts and to draw inland areas from Chinese maps, using travel books for reference (Kobayashi, Okada, and Watanabe 2010).

In the process of duplicating and compiling maps from foreign countries, Japanese military officers realized the limitations of those maps as a source of geographical intelligence and felt the necessity of conducting their own direct surveys in China and Korea to acquire more reliable information.

Maps of China and Korea Drawn on the Basis of Surveys by Japanese Army Officers during the 1880s

After the establishment of the General Staff Office in December 1878, the Japanese army dispatched young officers to the coastal provinces of China for reconnaissance (Murakami 1981). It has been confirmed that some of those officers carried safe-conduct passes endorsed by Chinese authorities. A high-ranking officer wrote in *The Reports of the Tokyo Geographical Society* that a Chinese provincial office consigned soldiers to escort him from Mukden (Shenyang) to Liaoyang (Kajiyama 1883) (figure 3).

Figure 3. *Ōryoku-kō Kikō* by Kajiyama Tēsuke. Source: Kajiyama (1883).



An additional clause in the Japan-Korea Amity Treaty (Kanghwa Treaty), drawn after the Soldiers' Riot in 1882, made it possible for Japanese army officers to travel throughout Korean territory, much of which was closed to foreigners except the Chinese. With safe-conduct passes issued by Korean authority, the Japanese officers made trips prescribed under the escort of local officers (Kaizu 1884).

Numerous hand-drawn maps of China and Korea, which our research team discovered at the Geography and Map Division of the Library of Congress, have been identified as drafts prepared by these Japanese army officers. Most of these maps are on a middling scale (1:100,000 or 1:200,000) and mainly cover roads and waterways connecting central places (Watanabe, Yamachika, and Kobayashi 2009). The officers' field trips and surveys were carried out on the basis of the compiled provincial maps mentioned above. They found bearings with compasses and measured distance by pacing (Kobayashi, Watanabe, and Yamachika 2010). These drafts were edited into two series of maps by the Rikuchi Sokuryō-bu (Land Survey Department)⁹ in 1894, when the Sino-Japanese War broke out. One series included a collection of 131 sheets at a scale of 1:200,000, covering Korea, southern Manchuria, the surroundings of Beijing, and the Shantung Peninsula. The other series covers the same areas in ten sheets on a 1:1,000,000 scale.

The longitude, latitude, and coastlines shown in the former series were derived from foreign sources, especially nautical charts from Western countries. These maps show only the routes between major central places, and in most, blank space prevails between the main routes in inland areas. As a result, the maps were of limited utility on the battlefield of the Sino-Japanese War, and supplementary maps were made to compensate for such limitations (Kobayashi, Watanabe, and Yamachika 2010). The smaller-scale maps comprising the latter series were made available for public use. Subsequently, they were seen as up-to-date geographic reference works on East Asia and were drawn on extensively by military

cartographers making small-scale maps of East Asia in Germany, France, and China (Nagaoka 1992; Ogawa 1904).

Wartime Surveys by the *Rinji Sokuzu-bu* (Provisional Surveying Unit)

The Sino-Japanese War broke out at the end of July 1894. In the middle of September, two small groups of surveyors from the Land Survey Department were sent to Korea and the Liaodong Peninsula of China to map occupied areas. Meanwhile, the head of the Land Survey Department, Colonel Kanesuke Fujii, suggested that the General Staff Office establish an organization called *Rinji Sokuzu-bu* (Provisional Surveying Unit), which would consist of several hundred surveyors, to map the areas behind the front line. According to Fujii's proposal, the war created a rare opportunity for rapid survey of extensive areas, since the disturbance and hostilities near the front would enable the activity of a large number of surveyors. His proposal was quickly approved and many assistant surveyors were hired and trained. By February 1895, the newly dispatched surveying squads started their work. The surveys were carried out with plane tables, yielding far more accurate results than the sketchy surveys of the army officers in the 1880s. However, the results were not satisfactorily accurate to make standard topographical maps.

After the conclusion of war with China in April 1895, the *Rinji Sokuzu-bu* continued its activity to compile systematic surveys of Korea and Taiwan. In Korea, surveying squads confronted severe nationalistic resistance by inhabitants in some areas. Several assistants were killed and all squads in Korea were forced to switch to Taiwan, where the battle raged until November but inhabitants were less aggressive. After the completion of the survey of Taiwan in August 1896, all surveyors were repatriated. In addition, after the Sino-Japanese War, Japanese surveyors came across Russian military groups surveying various places in Korea, which soon became a contested area between Russia and Japan. Some of the Russian

groups were taking readings of latitude and longitude, according to a map printed in St. Petersburg.

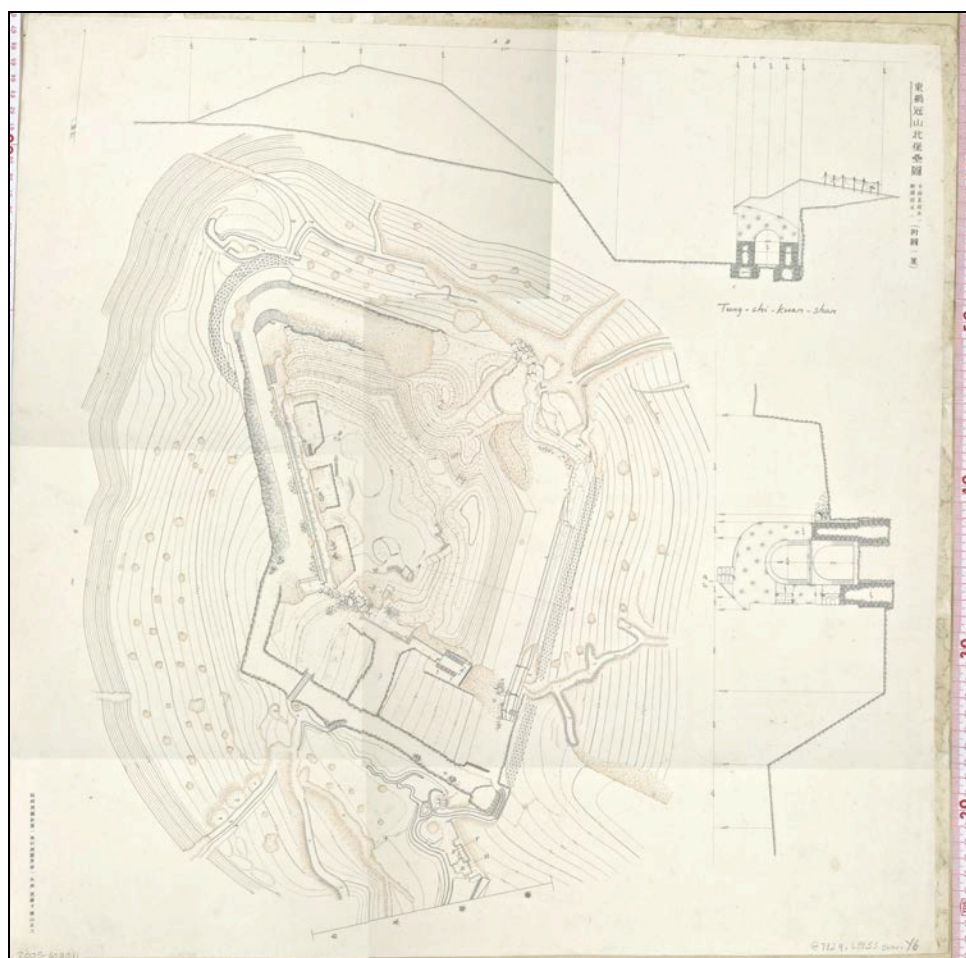
After the dissolution of the *Rinji Sokuzu-bu*, small groups of surveyors were dispatched to Weihei, China, as well as some other unsurveyed areas of Korea. In 1900, at the time of the Boxer Rebellion in China, a similar group was sent to survey the routes from Tanggu to Beijing; another group sent to Amoy could not work, due to the strong anti-Japanese feelings of local people. Just before the start of the Russo-Japanese War, small groups of surveyors were also dispatched to northern Korea.

The survey style of the *Rinji Sokuzu-bu* was followed when the Russo-Japanese war broke out in February 1904. Kanetsuke Fujii, promoted to major general, was still the head of the Land Survey Department, and he played a key role in the formation of the new *Rinji Sokuzu-bu*. This time, a group equipped to take readings of longitude and latitude was also included to improve the accuracy of the maps. Meanwhile, copies of captured Russian maps were used along with sketch maps made by the scouting officers in the front lines. Every military unit had instruments for printing in order to update maps for its troops. Handy mimeographs were utilized at the headquarters of army divisions. Lithographs were used at those of army corps. At the lower level of individual units, copies were made using carbon paper (Kim 2009).

It is noteworthy that maps of battlefields were also produced as materials for military history by the surveyors of the *Rinji Sokuzu-bu*. The most remarkable of them are those of the fortifications and landforms in and around Port Arthur (Fujimori et al. 2011). The *Rinji Sokuzu-bu* carefully surveyed these sites from April to September 1905, producing two series of maps. One consisted of 1:5,000 topographical maps (95 sheets), covering Port Arthur and its outskirts. The other consisted of 1:500 manuscript maps of major fortifications such as strongholds and batteries (about 50 sheets, now in the vault of the Geography and Map

Division at the Library of Congress) (figure 4). On the basis of these maps, the surveyors produced relief models for presentation to the Emperor Meiji.

Figure 4. Higashi Keikanzan Kita Horui (1:500, A Stronghold of Port Arthur). Source: Geography and Map Division, The Library of Congress [G7824.L8955 SVAr y6].



Even after the end of the Russo-Japanese War in September 1905, the *Rinji Sokuzu-bu* did not cease its activities. Surveying squads were concentrated in Korea after October 1905. However, they appear to have been dispersed in Manchuria subsequently. A small group sent to Karafuto (Sakhalin) participated in a survey to establish a new frontier line with Russia. In autumn 1906, all the squads were recalled back to Japan.

In 1907, the reorganized *Rinji Sokuzu-bu* sent squads to various areas of China and Korea. In Manchuria, surveyors and assistants were frequently attacked by mounted bandits, resulting in the deaths of eleven members in 1907. In 1909, three members were killed by inhabitants of northern and southern China. The size of the *Rinji Sokuzu-bu* was gradually reduced to avoid such risk of life, and surveyors and assistants were instructed to represent themselves as peddlers of medicine. In March 1913, the *Rinji Sokuzu-bu* was dissolved.

At the same time, the *Rinji Sokuzu-bu* carried out a survey for preliminary triangulation to improve the accuracy of topographical maps in Korea. Beginning in 1910, more than a hundred surveyors and assistants were dispatched. By 1914, they had produced a series of 1:50,000 maps, covering the whole of Korea.

Cadastral Surveys in Taiwan, Kwantung Province, and Korea

After the Sino-Japanese War (1894–1895), Japan acquired its first colony, Taiwan. After the Russo-Japanese War (1904–1905), Japan took over the leased territory of Kwantung Province from Russia. And in 1910, after repeated political interventions, Japan annexed Korea.

In each of these territories, the new Japanese colonial government saw the importance of establishing its financial base in order to build up the local economy. Each colonial government set up a land registration system, including a cadastral survey, which was indispensable for raising revenue from landed property. This kind of project in the colonies has been considered an extension of the Land Tax Reform in the Japanese mainland (1873–1881). Concerned researchers widely accept that the modern landholding system established by domestic reform was reproduced in the colonies. However, if one scrutinizes the cadastral surveys in Taiwan (1898–1905), Korea (1910–1918), and the Kwantung Leased Territory (1914–1924) along with that in Okinawa Prefecture (1898–1903), several

distinctive features can be found (Kobayashi and Narumi 2008). First, these surveys were carried out by special provisional government offices with specialized equipment and instruments, in contrast to the Land Tax Reform, which depended heavily on local administrative offices and inhabitants. Second, as a result of the experience of the Land Tax Reform, the surveys were conducted systematically and efficiently. The provisional government offices investigated thoroughly traditional land systems, which were deemed incompatible with modern landownership, and developed policies to cope with them carefully. Cadastral maps based on modern surveying techniques, including triangulation, were made along with land registers.

The cadastral survey of Okinawa Prefecture, which preceded those in Japan's overseas colonies, became an important model for the colonies. Tanetarō Megata (1853–1926) (figure 5), a high-ranking officer in the Ministry of Finance, played the key role throughout this survey. He promoted the application of modern survey techniques in order to make detailed maps for accurate land measurement, which the Land Tax Reform had not realized. Moreover, from 1904 to 1907, Megata, as the Korean government's financial policy advisor, recommended the adoption of modern survey techniques in order to prepare a cadastral survey. The surveyors of the Land Survey Department, who were dispatched to the colonies, played a significant role in carrying out modern surveys, including triangulation. In addition to Japanese youth, native young people were trained to be surveyors as well as workers in the provisional offices for land registration (as discussed in Fedman's article in this issue).

The first modern topographical maps in these areas were produced by reducing the scale of the cadastral maps (which were issued at a very large scale of 1:1,200). A newspaper company in Taipei published 463 maps at a scale of 1:20,000 in 1906. In Korea and Kwantung Province, the provisional land registration offices published 727 maps at 1:50,000

and 82 at a scale of 1:25,000 in 1914 to 1918 and 1919 to 1923, respectively (figure 6).

Figure 5. Megata Tanetarō (1853–1926). Source: Matsumoto (1938, frontispiece).

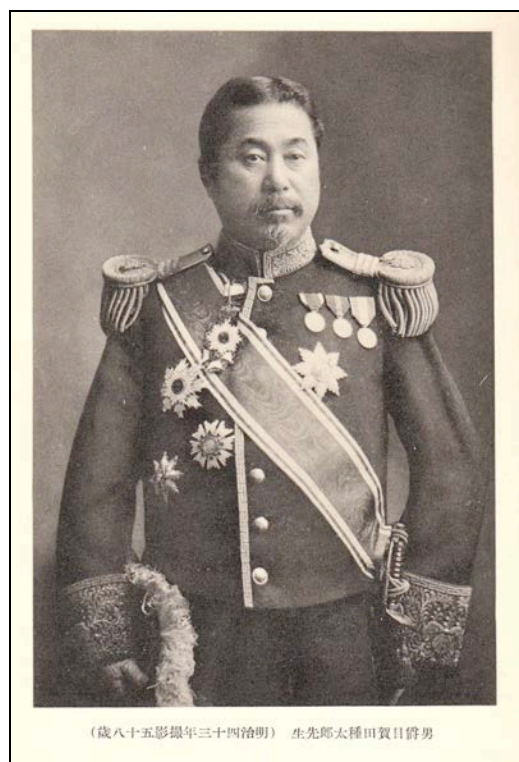
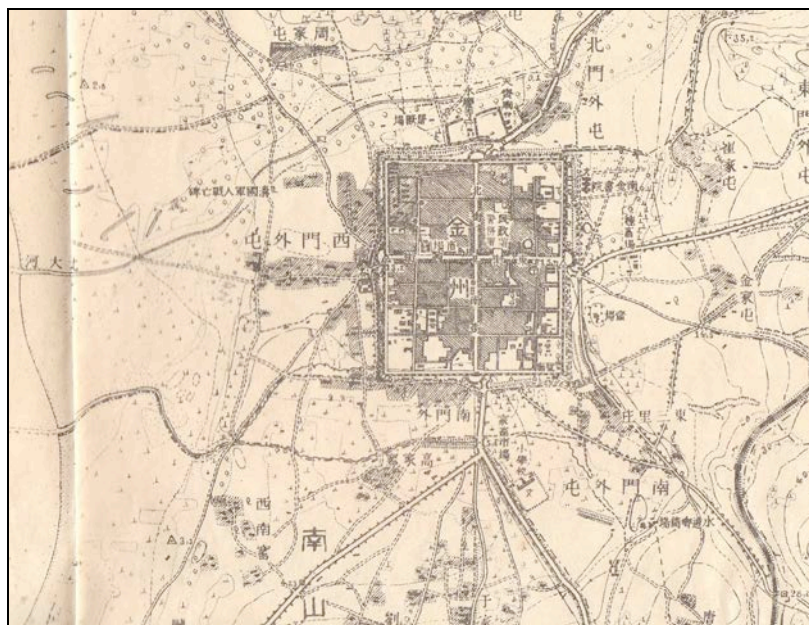


Figure 6. Detail of a topographical map of Kwantung Province. Source: 1:25,000 map, *Kinshū (Jinxian)*, produced by the Kwantung Government and Land Survey Department in 1923.



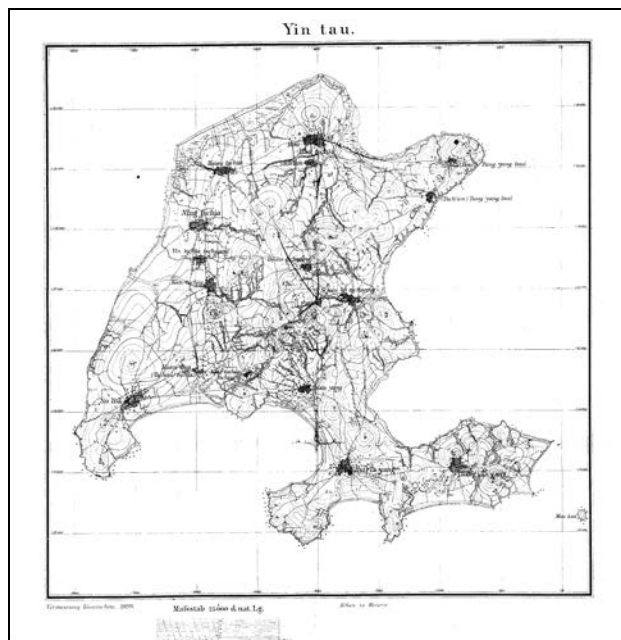
Secret Surveys in China and World War I

In contrast to the colonies' public surveys, a small group of surveying engineers carried out secret surveys in China with compass and pacing starting in 1913. The group was attached to the Shina Chūton Gun (Stationary Troops in China), and its members moved under assumed names, pretending to be merchants. They used slang terms to try to conceal their real purpose and wrote words of important letters in code. In principle, their activities were supposed to be private, in order to avoid raising diplomatic issues if they were exposed; the Ministry of Foreign Affairs stood against this kind of survey and confronted the army over it. However, the army carried out its plan every year by making a compromise with the Ministry of Foreign Affairs.

It should be noted that most army officers considered those maps made by secret survey to be of poor quality. In a proposal to the General Staff Office in 1919, a high-ranking engineering officer of the Land Survey Department confirmed this view by comparing the maps of the Shantung Peninsula and Manchuria produced by Germany and Russia with those made by the Japanese secret surveys. In this officer's opinion, maps produced by secret surveys were incapable of serving the age of automobile, airplane, and wireless communications. He was not hesitant to propose a joint survey with Chinese troops in order to improve the accuracy of Japan's maps. Nonetheless, this sort of secret survey was retained until 1935. The development of aerial photogrammetry not only in the army but also in civilian corporations provided the technical background to this change.

Meanwhile, Japan occupied Qingdao, the German-leased territory in the Shantung Peninsula, at the beginning of World War I. Many books, maps, and design drawings were seized and some of the maps were duplicated for distribution in the army (figure 7).

Figure 7. A topographical map of Germany's leased territory confiscated by the Japanese army. Source: *Yin tau* (1:25,000 German map based on the survey in 1899, Osaka University Library [391.9/YIN]).



After the outbreak of the Bolshevik Revolution in 1918, Japan along with the United States sent troops to Siberia, which was disturbed by competing political and military powers. Many Russian military topographical maps were seized in Khabarovsk at this time, and subsequently duplicated.

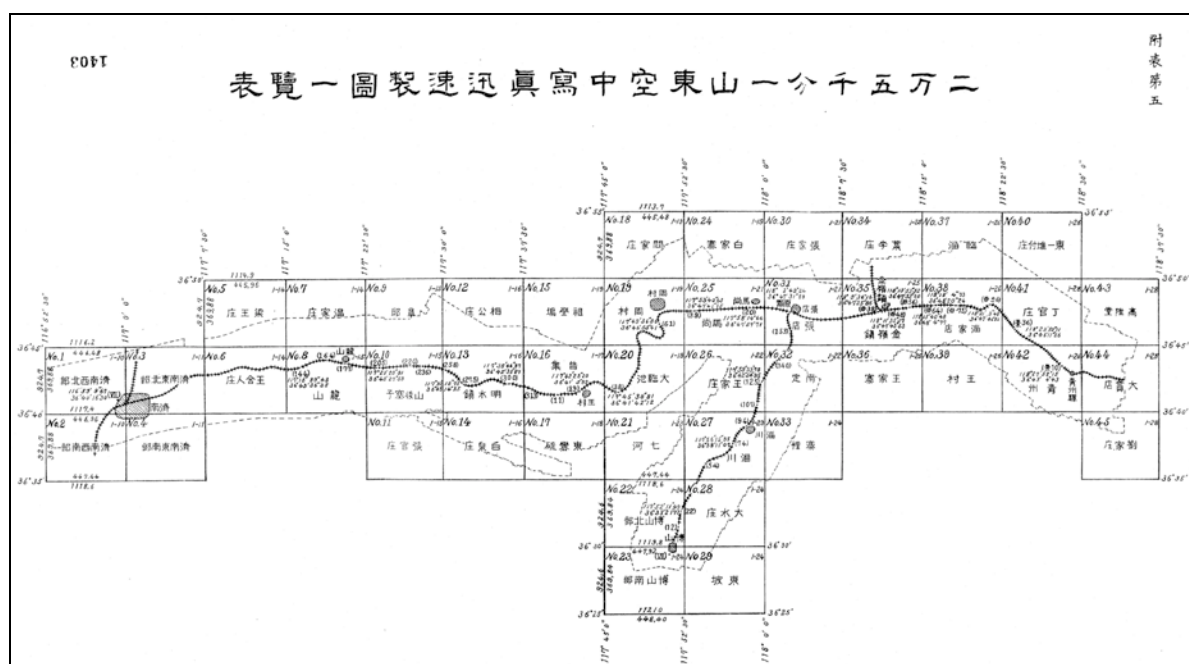
Mapmaking with Aerial Photographs

During World War I, the utility of aerial photographs was recognized widely in the Western Front. Aerial photography was utilized not only for reconnaissance but also for surveying (Collier 2002). The Japanese army had long been interested in reconnaissance from higher altitudes. During the siege of Port Arthur in the middle of the Russo-Japanese War, the Japanese army used balloons for reconnaissance. Japanese army officers who observed the battles on the Western Front of World War I realized the potential of aerial photographs for mapping. In 1921, an army school for aerial reconnaissance was established and French

officers were invited in order to promote this new technology. At the Land Survey Department, researchers of aerial photographic surveying were appointed and experimental surveying was undertaken.

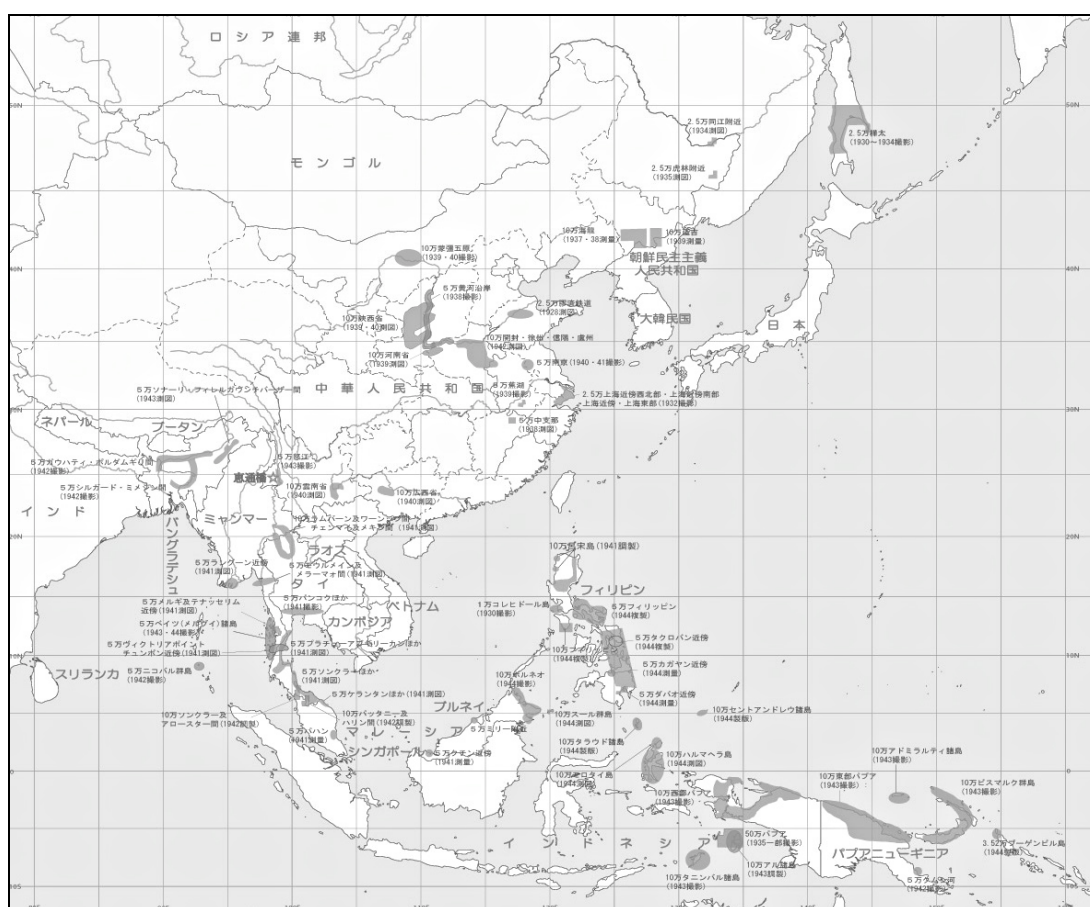
In 1928, when Japanese troops were sent to Shantung, China, the Japanese army started to make topographical maps with air photographs in overseas territories. For the provision of control points, a team trained in triangulation was dispatched from the Land Survey Department in October. Meanwhile, officers of the school for aerial reconnaissance, mentioned above, took photographs from airplanes. Starting in January 1929, mosaic maps based on these photographs were produced, conforming to the control points surveyed at the Land Survey Department. Finally, in February 1929, one hundred copies of forty-five sheets at a scale of 1:25,000 were printed (figure 8).

Figure 8. Maps made by aerial photographs in Shantung Province, China. Source: Santo Kūchū Shashin Jinsoku Seizu Sagyō Jisshi Kiji (A Report on the Drafting Works of Maps with Aerial Photographs of Shantung Province), 1929, Japan Center for Asian Historical Records [Ref. C01003939900].



Full-scale instrumental photogrammetry was carried out for the first time in 1929 in a survey for the construction of a new railway line in Korea. Lieutenant Colonel Ujifusa Kimoto of the Army Technical Institute played a significant role in this experimental mapmaking project. Thereafter, aerial photogrammetry was applied extensively for multiple tasks, such as forest surveys in Karafuto (Sakhalin) (1930–1934), the survey of routes for a new railway in Manchuria, and mapping the battlefield of Shanghai (1932). In 1933, a special team for photogrammetry was founded in Manchukuo National Airways (*Manshu Kōku*), which was established in 1932 as a government-controlled corporation. Kimoto was appointed the leader of this team.

Figure 9. The areas covered by topographical maps made with aerial photographs. Source: Kobayashi, Watanabe, and Narumi (2009).



Subsequently, aerial photogrammetry by the Japanese army focused on China, as the Sino-Japanese War was enlarged. After the outbreak of war with the Allies in 1941, Japan took over some Western colonies in present-day Southeast Asia and in the western Pacific. Although the Japanese army copied many maps made by colonial survey institutions, it still urgently needed to map newly captured territories and front areas, such as New Guinea, where geographical intelligence was scanty. As a result, Japan tried to map in these areas using aerial photography extensively (figure 9 above).

The Duplication of Maps Produced by Foreign Institutions

Maps produced by foreign institutions were also an important source of geographic intelligence for the Japanese military. As mentioned above, the army duplicated German and Russian maps, seized at Qingdao in 1914 and at Khabarovsk in 1918, converting place names to kana and kanji. During the Manchurian Incident in 1931, the Japanese army confiscated many maps from the Land Survey Department of the Three Eastern Provinces (Liaoning, Jilin, and Heilongjiang) of Manchuria. Maps brought from the General Staff Office in Beijing by Zhang Zuolin (1873–1928), who was expelled from Beijing by the Nationalist Army of Jian Jieshi (1887–1975) in 1928, were included as well (Takagi 1992, 213–214). The most massive seizure of foreign maps occurred at the time of the fall of Nanjing in 1937, when the Japanese army captured more than one hundred thousand sheets at the General Staff Office of the Nationalist Army. Some of those maps were the latest ones, and they were soon duplicated in order to make up for the deficiency of existing maps.

The duplication of maps produced by the United States, United Kingdom, Netherlands, and Australia also proceeded both before and after the Japanese entered World War II. Unfortunately, the processes by which these maps were secured are not known except

in a few cases. For instance, the Japanese army obtained some maps of the Dutch East Indies in 1939 by claiming that one of the Japanese imperial universities was planning to found a cartographic research institute and requesting maps to be used for academic purposes.

In addition, the Japanese army established new units to produce military maps. The largest of these was the *Kantō Gun Sokuryō Tai* (Surveying Units of the Kwantung Army) formed in 1934. This unit was in charge of the triangulation of Manchukuo and the secret aerial survey of Siberia and Mongolia. Small survey units for field operation were also formed as battlefields expanded.

World War II and the Post-War Period

During World War II, survey units dispersed extensively along with the expansion of the front line. Japanese surveyors took over the U.S. Coast and Geodetic Survey Office in Manila and the Topographic Survey Office in Batavia and tried to extend the surveyed areas on the basis of existing maps. However, such expansion of survey areas was not as successful as expected. For example, a squad for aerial photogrammetry attached to the Survey Unit of the Kwantung Army was transferred to the southwestern Pacific front, but its activities were limited because air supremacy had been lost and the supply of necessary material was interrupted by Allied attacks.

After the surrender of Japan in the middle of August 1945, most of the maps produced during the preceding months and years were burned before the disarmament of the Japanese army. At the Land Survey Department, which had been evacuated from Tokyo to Nagano Prefecture, massive incineration of maps and aerial photographs was enforced. In Manchuria, the staff of the surveying units of the Kwantung army burned many maps and air photographs before leaving their place of work.

The Allied occupation forces gradually advanced onto the Japanese mainland. On September 25, 1945, a team led by Colonel Dunbar of the U.S. Army¹⁰ visited the Geographical Survey Institute (*Chiri Chōsa-sho*), successor to the Land Survey Department as of early September 1945, in Nagano Prefecture. At that time, the Americans confiscated original copies of many maps of overseas areas along with plates for printing. The maps were sent to the Isetan building in Shinjuku, Tokyo, where the Sixty-Fourth Engineer Topographic Battalion was stationed. The plates were sent to Inage, Chiba Prefecture, where fifty copies of each map were printed. The original copies and the newly printed maps were sent to the Army Map Service (AMS) in the United States, which was established in 1942 to supply geographic intelligence. The remaining aerial photographs taken by the Japanese army were also confiscated. A Japanese engineer, who had worked for the surveying units of the Kwantung army and was employed by the Sixty-Fourth Engineer Topographic Battalion after the war, was engaged to identify where those photos were taken.

It seems that the U.S. army saw these Japanese military and colonial maps (*gaihōzu*) as important geographic intelligence on East Asia. Special emphasis was put on maps of China, Korea, and Siberia. According to some American geographers who worked in the Office of the Strategic Service, maps of East Asia had been insufficient during World War II (Harris 1997). These newly captured maps thus had great significance, not only because of the imminent Korean War but also due to the looming threat of the Cold War.

In the United States, the AMS started its postwar depository program for surplus maps in 1946, donating them to 150 academic and public libraries in the United States and Canada (Ehrenberg 1981; Harris 1997). Later, maps captured from Germany and Japan were sent to some of the same institutions (Anderson 2001) (table 1). The hand-drawn maps made by Japanese officers, mentioned earlier in this article, were awarded to the Library of Congress, which played an important role in the distribution of surplus maps from the AMS.

Table 1. Libraries and institutions that received “captured maps” from the Army Map Service. Source: *Army Map Service Depository List (Captured Maps)*, attached to a letter from Lieutenant Colonel C.V. Ruzek, Jr. of AMS to AMS depositories, February 27, 1950, provided by Mr. John M. Anderson (Cartographic Information Center, Department of Geography and Anthropology, Louisiana State University) and Ms. Gwen Curtis (Map Collection, Science Library, University of Kentucky Libraries).

State	Library and Institution	Remarks
Alabama	Main Library, Alabama Polytechnic Institute	
Arizona	University of Arizona Library	
Arkansas	General Library, University of Arkansas	
California	University of California (Berkeley) Library	
	Claremont College Library	
	Hoover Library, Stanford University	Presently in Branner Earth Science Library
	San Diego Public Library	
	California Academy of Sciences Library	
Colorado	University of Colorado Libraries	
Connecticut	Yale University Library	
District of Columbia	National Geographic Society	
Georgia	University of Georgia Library	
Hawaii	University of Hawaii Library	
Illinois	Map Library, University of Chicago	Rosenwald Hall
	Map Library, Northwestern University	University Hall
Iowa	State University of Iowa Libraries	Government Document Department
Louisiana	Geology Library, Louisiana State University	Presently in cartographic Information Center
Massachusetts	Institute of Geographical Exploration, Harvard University	Presently in Harvard Map Collection
	Clark University Library	
Michigan	General Library, University of Michigan,	
Minnesota	Department of Geology and Geography, Carleton College	
New Jersey	Princeton University Library	
New Mexico	University of New Mexico Library	
New York	American Geographical Society	Presently in the Golda Meir Library, University of Wisconsin-Milwaukee

	New York Public Library
Ohio	Cleveland Public Library
	Department of Geology and Geography, Oberlin College
Oklahoma	Department of Geography, University of Oklahoma
	Oklahoma State Library
Oregon	Library Serials Department, Oregon State College
Pennsylvania	University of Pittsburgh Library
Puerto Rico	University of Puerto Rico Library
Tennessee	University of Tennessee Library
Texas	Fondren Library, Southern Methodist University
Washington	State College of Washington

By contrast, those maps that survive in Japanese universities were mostly carried out secretly after the end of World War II from the General Staff Office of the Japanese army at Ichigaya, Tokyo, as mentioned above. Students and graduates of the University of Tokyo and Tohoku University participated in this work under the instruction of their professors, Tada Fumio and Tanakadate Hidezo. Watanabe Tadashi, an army officer of the General Staff Office, who organized a research committee with geographers in universities in late World War II, played a crucial role in this eleventh-hour transfer of maps (Tamura 2009).

The routes that Japanese overseas maps followed to their present institutional homes after the surrender of Japan suggest that more study of those deposited in other countries is necessary. Those maps that escaped destruction by the Japanese military at the end of World War II had to be appraised as an important source of basic intelligence on the areas concerned by the militaries of the Soviet Union, China, and the other Allied countries. In the near future, we anticipate that these collections also will be opened to the public as historical sources, having lost their military significance with the application of remote sensing.

Conclusion: Japanese Overseas Maps as Historical Sources

The Japanese overseas maps deposited in universities have recently aroused the attention of researchers in Japan and the United States. These maps are gradually being recognized as sources of modern history (Anderson 2001; Kobayashi 2006). The researchers and librarians who participated in the symposium entitled “Japanese Imperial Maps as Sources for East Asian History,” held at the beginning of October 2011 at Stanford University, showed much interest in learning about these cartographic documents. The *gaihōzu* are increasingly appreciated for their irreplaceable potential as resources for various studies, such as military and colonial history, the history of cartography, historical geography, and the environmental history of East Asia and the western Pacific. On the basis of the historical sketch presented here, I would like to raise a few points that require special attention concerning the *gaihōzu*.

As we have seen, Japanese overseas maps were produced during a protracted period. As implements of military operation and colonial administration, they were made by various means under changing circumstances. Consequently, their potential as a historical source is uneven and should be carefully evaluated.

According to their usage, the *gaihōzu* are classified into two categories: military and colonial. The former has a wider diversity than the latter, reflecting the technical progress that took place during the decades of their preparation.

In the beginning, the only methods to be adopted by the Japanese military were duplicating and compiling maps produced in foreign countries, reflecting the lack of geographical information. Subsequently, army officers traveled and surveyed China and Korea, where modern maps had rarely been prepared. Before the Sino-Japanese War, the transect maps drawn by these officers were compiled into 1:200,000 maps, where settlements (represented as points) were connected by traffic routes (expressed as lines), but vacant areas

still prevailed. Mapping in this era was still at an exploratory stage.

The surveys begun by the *Rinji Sokuzu-bu* after the Sino-Japanese War, using plane tables and employing numerous surveyors, constituted a second stage. The maps produced by this organization's systematic efforts cover the area concerned extensively and evenly, and come within the category of topographical maps. However, the maps prepared by the subsequent secret surveys were effectively mere sketch maps, in spite of their appearance mimicking that of topographical maps.

On the other hand, maps of Japan's formal colonial territories were produced with modern cartographical technologies, including triangulation. Even here, however, it should be noted that the application of triangulation was not prescribed from the first stage of this kind of survey. Consequently, different surveying standards were applied in each area according to local conditions.

The introduction of aerial photogrammetry marked the advanced stage in the history of Japanese cartography. This new device made it possible to make accurate maps in a short time, and could be readily applied to overseas areas. However, the accuracy of the resulting maps depended on the establishment of fixed control points on the ground. In practice, a considerable number of these maps were prepared without control points confirmed through triangulation.

The technical aspects described above depended chiefly on the circumstances in which surveyors worked. In general, triangulation was possible only at sites where the safety of the surveyors was assured. Although the *Rinji Sokuzu-bu* tried to carry out triangulation in Manchuria in 1907, they made little progress due to the lack of security on the ground. The surveying of mountainous areas of Taiwan also lagged considerably behind that on the coastal plains, due to fierce armed resistance from the local aboriginal peoples.

As for the maps prepared by duplicating those made by foreign countries, their quality was determined largely by the quality of the originals and the process of reproduction. In general, the original maps were transformed for the use of Japanese soldiers at the time of printing. Legends were frequently translated into Japanese and scales were converted. In order to duplicate multicolored maps, special attention was paid to retaining the original contents, even if the number of colors had to be reduced.

In order to properly utilize those maps produced by foreign institutions, information on the mapmaking process was necessary. According to the materials available, however (Kagawa 1943; Saida 1943; Takagi 1940, 1992, 339–334), the Japanese Land Survey Department appears not to have collected information systematically on the surveying activity of foreign institutions.

Nonetheless, this kind of map use, which was promoted in wartime, increased the flow of cartographic information between Japan and overseas. This process also contributed to an increase not only in the diversity of the *gaihōzu* but also in the areas they covered. The surviving archive contains maps originally made by many institutions of various countries: China, Russia (the Soviet Union), Thailand, Australia, France, the United Kingdom, the Netherlands, Germany, and the United States.

The value of the *gaihōzu* as sources for East Asian history can be found both in their diversity and in their extensive coverage. The surviving collections of *gaihōzu* are best understood as repositories of the geographical intelligence that imperial Japan amassed in order to meet the growing military demand and to manage its colonies effectively. Of course, the spatial and temporal coverage of the *gaihōzu* seems to be fragmented. However, we have to be conscious about two important features of the actual maps. First, almost all of the maps carry a temporal record indicating the dates of surveying, printing, and revising, which render them valuable as primary historical sources. Second, the geographical areas that these maps

depict can be easily identified by several methods. In addition to the longitude and latitude recorded on the maps themselves, we have such devices as Google Earth to identify the areas they depict precisely. Applying Geographical Information Systems (GIS) technology, we can readily grasp the spatial distribution of the images covered by the *gaihōzu*.

Accordingly, for the most efficient and proper use of this scattered archive, a catalogue with sufficient metadata¹¹ and chronologically arranged index maps, showing the space-time location of all mapped areas, should be created. *The Gaihōzu Digital Archives*, which was recently constructed by geographers at Tohoku University in Japan, is already disseminating images of individual maps widely.¹² A combination of these facilities will open the possibility of multiple uses of the surviving *gaihōzu*, which amount to about twenty-five thousand maps. From the analysis of urban landscapes (Sri Smantiyo, Soekanto, and Tateishi 2009) to reviewing the changing military concerns of Japan's General Staff Office (Kobayashi, Watanabe, and Yamachika 2010), the *gaihōzu* promise to aid in the development of new studies.

The description of Japanese overseas mapping provided in this article is intended as a first step toward facilitating the active use of the *gaihōzu* in various fields of research. What remains is to further investigate the fundamental aspects of these maps and to construct a well-organized database in cooperation with researchers in related fields.

Shigeru Kobayashi is professor of human geography at Osaka University. The author notes that this historical overview depends heavily on the results of the study by the participants of the Gaihōzu Kenkyūkai. He appreciates their laudable contributions to the study and preservation of the gaihōzu, which have been accumulated since the end of World War II. In addition, the author expresses his gratitude to Professor Kären Wigen for inviting him to be the keynote speaker for the "Japanese Imperial Maps as Sources for East Asian History" symposium. This invitation provided an invaluable chance to organize fragmentary knowledge on the old Japanese military and colonial maps into a paper, which introduces them to researchers of various countries. He expresses thanks for the facilities provided by the staff of the symposium, especially those of the JSPS San Francisco Office.

Notes

1. The term *gaihōzu* was used by the Japanese army beginning in 1884 to designate military maps of foreign areas.
2. Colonial maps depicted regions that were legally part of Japan at the time they were produced.
3. In addition to the National Diet Library, the Gifu Prefectural Library started collecting Japanese overseas maps in 1997 (Nishimura 2005).
4. It is surprising that Yonemoto (2003) does not mention this kind of survey.
5. *Korea oder Tschōsen der Japaner* (Gotha: Justus Perthes).
6. *Korea or Chōsen of the Japanese*. Military Information Division, A.G.O.
7. *Tokei Journal* (1874, plate 3).
8. In some maps of East Asia drawn in the beginning of the nineteenth century, the prime meridian was drawn on Kyoto (Unno 1994, 439–441)
9. The Rikuchi Sokuryō-bu was established in 1888 under the General Staff Office.
10. Colonel Dunbar seems to be Colonel Earnest A. Dunbar of the Army Map Service mentioned by Dod (1966, 607–608).
11. In the metadata, the technical information on surveying should be included. In order to analyze the landscape change quantitatively by means of Geographical Information System, those prepared by triangulation are necessary.
12. *The Gaihōzu Digital Archives* are online at <<http://dbs.library.tohoku.ac.jp/Gaihōzu>>.

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