

On the applicability of GIS analysis to modern military and colonial maps of East Asia

Shigeru Kobayashi (Osaka University, Professor emeritus)

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The British embassy of George Macartney to China in 1793 was the first applier of modern surveying instruments for map making in East Asia. In addition to the hydrographic survey with chronometer, astronomical observations to measure the latitude of Peking and Chengde of Jehol was carried out. Several charts and maps included in Staunton's report show geographical reconnaissance of the coast and main routes of China was successfully accomplished by this embassy, whose end has been generally described as failed.

Following this beginning, successive surveys by British hydrographers such as Daniel Ross extended charted areas from southern coast to northeastern sea including Korea and Japan. During the Opium War (1840-1842), this kind of survey penetrated into the interiors of China. Small British gunboats with steam engines went up the Yangtze to find the channels suited for Western large ships.

The survey during the Opium War was important not only because the Western map making intruded into the interior of China for the first time, but also because it was the first wartime modern survey in East Asia. Thereafter, warfare such as the Arrow War(1856-1860), Byeong-in yangyo (丙寅洋擾、1866) and Simmi yangyo (甲未洋擾、1871) at the coast of Korea, the Sino-French War (1884-1885), and the Sino-Japanese War (1894-1895) accompanied land survey by intruders. Whereas almost all of the wartime surveys were tentative in nature, and plane table and alidade was main instruments, Russia adopted triangulation for the survey of important parts of Manchuria occupied after the Boxer Rebellion (1900).

Along with the wartime survey, some of the consuls, who were dispatched to the diplomatic offices set up at treaty ports, engaged land survey. The British consul, Robert Swinhoe (1836-1877) and American consul, Charles Le Gendre (1830-1899) are early examples. Japanese army officers, who surveyed the main routes of Korea during 1880s are also included in this category. As members of Japanese legation or consulates, they traveled remote areas under the escort of Korean officials.

In contrast to these surveys, the mapping of colonies was carried out systematically in most of cases. Japanese colonial government applied triangulation in Taiwan, Korea, Kwantung Province and Karafuto (Sakhalin), just like land surveys in the colonies of Western countries as British India and Dutch East Indies.

In order to apply GIS technology to these military and colonial maps, we have to know their diversity in the first place. Most of the surveys by consuls depended on a simple traverse survey. They took bearings with compass and measured distance by pace and maps produced show only the routes which connect important places. The wartime survey during and after the Sino-Japanese War, plane table and alidade were the main instruments of the surveyors. Although the maps prepared by this method are far more accurate than those by simple traverse survey, its accuracy is limited in small extent. Accidental errors accumulated as the mapped areas extended. Although the maps prepared on the basis of triangulation are accurate in general and suited for the application of GIS technology, such as the overlay analysis, the areas covered with this kind of map are limited.

Accordingly, in order to apply GIS technology to these maps, we have to know not only their diversity but also their spatial and temporal coverage of the areas concerned. A unified catalogue with sufficient metadata and chronologically arranged index maps, showing the space-time location of all mapped areas, should be created making use of GIS. A database of the images of these maps also should be prepared for easy access from researchers and citizens concerned.

The Gaihōzu Digital Archives dispatched from the Department of Geography of Tohoku University and a newly opened database from Osaka University called *Early Japanese Imperial Maps of China and Korea* are experimental examples toward the formation this kind of catalog. The former shows images of Japanese military and colonial maps of Asia-Pacific areas, which are housed in several Japanese universities, whereas the latter shows those of manuscript maps prepared by Japanese army officers during 1880s, which were found in the Library of Congress, Washington, D.C.

As one of the promoters of these archives and database, the presenter hopes that they will be a focus of discussion of researchers of the Asian Network for GIS-based Historical Studies.