Rangaku Medicine and “Foreign” Knowledge in Late Tokugawa Japan

JOHN E. VAN SANT
University of Alabama at Birmingham

Challenging the stereotype of pre-modern Japan as closed and isolated, this article examines the diffusion of Western medical ideas in Japan from the publication of Kaitai Shinsho (New Anatomy Book) in 1774 to the end of the Tokugawa shogunate in 1868. It specifically examines Japan’s assimilation of Jennerian cowpox vaccination despite government regulations limiting Japanese contact with Westerners.

The large-scale diffusion of Western medical ideas during Japan’s Tokugawa Era began with the publication of Kaitai Shinsho (New Anatomy Book) in 1774. The publication of Kaitai Shinsho not only helped Japanese physicians correctly diagnose and treat their patients—even physicians who relied primarily on Chinese medical knowledge—but also led to other advances, most notably the embrace of Jennerian cowpox vaccination. The publication of Kaitai Shinsho and the medical awakening that resulted demonstrate that Japanese intellectuals and physicians actively pursued Western knowledge despite central government regulations limiting Japanese contact with Western representatives. Furthermore, in an era of national crisis stemming from internal disputes between the imperial house and the Tokugawa shogunate and external demands for expanded trade, this medical breakthrough conceivably saved the life of the future emperor and thereby safeguarded the transition from the Tokugawa shogunate to the Meiji imperial government.

Rangaku or “Dutch Studies” emerged in the seventeenth century. The “Dutch” designation was a consequence of the so-called sakoku (closed-country) restrictions that the early Tokugawa shogunate placed on Japanese interactions with Westerners. From 1639 to the 1850s, employees of the Dutch East India Company were the only Westerners allowed to enter Japan. The Dutch East India Company (then stationed at the artificial island of Deshima in Nagasaki) and imported Dutch books were the media of transmission, but the information and knowledge transmitted was broadly European. This interest in the West is therefore...
sometimes called *Yōgaku* 洋学 or “Western studies.” As the term *Rangaku* was standard during the Tokugawa Era, and as Japanese translators, scholars, and physicians who specialized in this knowledge were called *Rangakusha* 蘭学者 (“Dutch Studies” scholars), I will adhere to this usage.

### Opening the Door

In 1721, Tokugawa Yoshimune 徳川吉宗 (r. 1716–45), the eighth Tokugawa shogun, rescinded long-standing restrictions on foreign books that could be imported by Dutch trade ships harbored at Nagasaki. He was especially interested in information about Western astronomy, botany, horsemanship, medicine, and weaponry (Goodman 2000, 49–65). The shogunate sent Japanese scholars to study with the Dutch at their restricted compound in Nagasaki. Japanese scholars also met the Dutch during the required annual visits of the Dutch *opperhoofd* (chief trader) and his entourage to Edo. The Dutch entourage always included a medical doctor employed by the Dutch East India Company. Japanese who sought to meet the Dutch in either Nagasaki or Edo needed permission from the Tokugawa *bakufu* 幕府 (the shogun’s government). As few employees of the Dutch East India Company knew more than a smattering of Japanese, the medium of communication was Dutch. This proved extremely cumbersome, especially when discussing scientific concepts and medical procedures, and Japanese interpreters struggled painstakingly to master the obscure terminology of these discussions. Nevertheless, Japanese physicians were fascinated by Western medicine and increasingly sought to add Western knowledge and techniques to their knowledge of Chinese medicine.

March 4, 1771, was a landmark date in the history of this scientific interchange. The physician Sugita Genpaku 杉田玄白 (1733–1817), along with Maeno Ryōtaku 前野良沢 (1723–1803), and Nakagawa Junnan 中川淳庵 (1739–86), were invited by a local official to observe the dissection of the corpse of a fifty-year-old female criminal in Kotsugahara, one of three execution grounds in Edo. According to Sugita’s account, the woman was originally from Kyoto. She was known as Aochababa, literally “green tea hag,” and was executed for “a heinous crime” (Sugita 1969, 29). An elderly man who was a member of the *burakumin* caste performed the dissection. Standing at the bottom of the Japanese hierarchical system of samurai, peasants, artisans, and merchants, the *burakumin* caste was alone permitted to handle corpses, whether animal or human. The elderly vivisectionist told Sugita he had performed several dissections since his youth. Sugita and his companions brought with them a Dutch medical text called *Ontleedkundige Tafelen* (Anatomical Tables) in order to compare the diagrams and drawings in the text with the parts of the dissected body. According to Sugita’s later account:
On this occasion . . . the old man went on explaining various organs such as the heart, the liver, the gall bladder and the stomach. Further, he pointed to some other things and said, ‘I don’t know what they are, but they have always been there in all the bodies which I have so far dissected.’ Checking them later with the Dutch charts, we were able to identify them to be the main arteries and veins and suprarenal glands. . . . Comparing the things we saw with the pictures in the Dutch book, Ryotaku and I had with us, we were amazed at their perfect agreement. (Sugita 1969, 29–30)

Sugita mentioned that he and his colleagues examined some human bones found in the execution area and discovered “they were nothing like those described in old [Chinese] books, but were exactly as represented in the Dutch book. We were completely amazed” (Sugita 1969, 31). Sugita was aware that two of the shogun’s doctors had recently witnessed dissections and had noted the differences between what they saw and what was indicated in Chinese anatomical texts. They explained the differences by hypothesizing that Chinese and Japanese have different internal structures (Sugita 1969, 31).

Three years later, after diligently translating Ontleedkundige Tafelen, Sugita, Maeno, and Nakagawa published Kaitai Shinsho. Sugita and his colleagues were apparently unaware that Ontleedkundige Tafelen was itself a Dutch translation of the German work Anatomische Tabellen by Johan Adam Kulmus, originally published in 1722. Kaitai Shinsho, an illustrated anatomical text, was the first Western medical text, indeed the first Western scientific book of any kind, translated into the Japanese language.

Kaitai Shinsho was revolutionary in its premises and approach. It appeared at a time when most Japanese scholars—excepting the Kokugaku 国学 (National Learning Scholars)—considered Chinese wisdom paramount. The Middle Kingdom was still the center of the universe. The Yin-Yang tension of the cosmos, the properties and interactions of the “Five Elements” (fire, earth, metal, water, and wood), and the Neo-Confucianism expounded in the writings of Song-dynasty Chinese philosopher Zhu Xi 朱子 (1130–1200) were the basis of scientific knowledge in Tokugawa-era Japan. Western science was a haphazard mosaic of exotic information understood through the prism of Dutch merchants and the Dutch language, with many pieces of the mosaic misunderstood or missing. These foreign contacts had been helpful, but only a relative handful of Japanese had been allowed to confer with the Dutch in Nagasaki or Edo, and they had only partially understood what they had been told and had translated even less. Western scientific texts imported by the Dutch were expensive, and the Japanese could not purchase them without permission from the shogun’s government. Compounding the general difficulty, the first Dutch-Japanese and
Japanese-Dutch dictionaries did not appear until the 1850s. Against this backdrop, the publication of *Kaitai Shinsho* was an event of prime importance. It does not go too far to say that it initiated the systematic study of Western science in Japan.

**The Von Siebold Incident**

The Von Siebold Incident of 1828 was a major setback to the Japanese assimilation of Western medical and scientific practices. The incident occurred amid heightened political tensions: a few years earlier increasing intrusions by Western ships (especially Russian and British vessels) had compelled the Japanese government to reinforce earlier restrictions with a more concerted expulsion edict (Wakabayashi 1986, 60). As the German physician Philipp Franz Von Siebold (1796–1866) prepared to depart Japan after serving five years as physician in the Dutch East India Company enclave at Nagasaki, Tokugawa government officials discovered prohibited artifacts, including maps of Japan, among the items in his trunks. These items were given to him by Japanese physicians and scholars he met in 1826 when he accompanied Dutch officers on their annual journey to Edo. Japanese officials, scholars, and physicians who had conferred with Von Siebold in either Nagasaki or Edo were accused of treason. About thirty were arrested and jailed, and some were executed. Even Takahashi Kageyasu 高橋 景保 (1785–1829), the highest-ranking Tokugawa government official for scientific affairs, was arrested. He died in prison and was posthumously convicted of espionage (Janetta 2007, 94).

The government held Von Siebold under house arrest for one year and then deported him. Anyone associated with Von Siebold or with Western science was tainted with suspicion of disloyalty to the shogunate. According to Ann Jannetta, Japanese students of Von Siebold who survived the government crackdown developed networks to share medical knowledge. These networks endured and discretely expanded, particularly in rural areas. According to Numata Jiro, these students were “the gifted generation destined to carry on the banner of rangaku” and their influence was “felt most directly in the field of medicine . . . .” (Numata 1992, 123). True enough, but the Von Siebold Incident and the shogunate’s suspicion that those who sought Western knowledge aspired to disrupt and perhaps overthrow the shogunate’s rule delayed advances in *Rangaku* for two decades.

**Vaccination—the Imperial Connection**

By the late 1840s, *Rangaku* scholars and physicians were aware of cowpox vaccination as a method to combat smallpox, a disease that often devastated
parts of Japan. Dutch medical texts introduced Jennerian vaccination methods to those who earlier studied with Von Siebold or with his surviving Japanese students. Government officials in Nagasaki and on the island of Kyushu were in close contact with the officials of the Dutch East India Company and asked the Dutch to import cowpox virus from Batavia, which they did in the fall of 1849. When Nabeshima Naomasa 鍋島直正 (1814–71), daimyō of Saga domain, which included the port of Nagasaki, heard that cowpox lymph had arrived aboard a Dutch vessel, he sent his chief physician to acquire some of it and to learn from the Dutch physician Otto Mohnike how to perform the vaccination. On October 8, 1849, Nabeshima’s eldest son and heir was vaccinated against smallpox. Within one year, several instructional pamphlets, woodblock prints, and assorted stories relating to cowpox vaccinations were produced and distributed throughout much of Japan. Tokugawa government officials did not encourage this Western medical practice, perhaps because it was contrary to the Chinese medical orthodoxy taught at the Tokugawa Medical College in Edo. Knowing its effectiveness, however, they did not attempt to prohibit vaccination, even in bakufu-controlled areas such as Edo, Kyoto, Nagasaki, and Osaka (Janetta 2007, 132–38).

Despite the Von Siebold Incident, Western science, from the publication of Kaitai Shinsho in 1774 to the smallpox vaccination of Nabeshima Naomasa’s eldest son in 1849, proved that effective “outside” influences could be incorporated into Japan’s traditional body of knowledge. Although there were arguments over the efficacy of vaccination, mostly propounded by Chinese physicians who worked for the shogun, Jennerian vaccination became widespread in much of Japan beginning in the 1850s.

One person who pointedly refused to be vaccinated was Emperor Kōmei 孝明天皇 (r. 1846–67). He was in nearly all respects anti-Western and notably repudiated the negotiations and treaties the shogun and his officials had approved in the 1850s and 1860s. His displeasure with the shogun and the Tokugawa government was widely known, and samurai from Choshu, Satsuma, and other domains joined forces and adopted his anti-Tokugawa stance, eventually overthrowing the Tokugawa shogun’s government in early 1868. Emperor Kōmei, however, died one year earlier, at the age of 36, in January 1867—from smallpox during an epidemic in Kyoto.

The 1933 publication of Meiji Tennō Ki 明治天皇紀 (Chronicles of Emperor Meiji), the official record of the imperial household of the Meiji Emperor, revealed that the emperor’s only surviving child, Prince Sachinomiya, was vaccinated as a young boy in 1857 on the orders of his maternal grandfather, Nakayama Tadayasu中山忠能 (Meiji Tennō Ki 1933, 454–55). Upon his father’s death, Prince Sachinomiya became Emperor Meiji 明治天皇 (1852–1912). He reigned until his death in 1912,
overseeing what most scholars call the “industrialization” or “modernization” of Japan. Emperor Meiji was more politically open to Western ideas and Western ways than his father, though he personally preferred Japanese traditions. Given the devastation periodically wrought by smallpox, it is at least conceivable that the cowpox vaccination developed by Edward Jenner and adopted by Rangaku physicians saved the future emperor’s life and ensured the future course of Japanese history.

Assimilating Outside Influences

Around the time when young Prince Sachinomiya was vaccinated against smallpox, the samurai scholar Sakuma Shōzan 佐久間象山 (1811–64), who had intensively studied both Chinese Confucianism and Western science, wrote that Confucian gentlemen of his era had the good fortune to be “born after [Asian] reason and logic were enlightened by Westerners” and were thus in a position to understand “principles unknown to the sages of ancient times.” The ultimate satisfaction of the Confucian gentleman, Sakuma continued, “is to thoroughly investigate Eastern ethics and Western scientific arts, whether fine and spiritual or large and coarse. By combining this inside and outside knowledge to the matter he will benefit the people and bring favor to the nation” (Sato et al. 1971, 244).

Despite the stereotype of Japan as closed and isolated, the actuality is that Japanese artisans, artists, and scholars were receptive to “outside” ideas and influences long before U.S. Commodore Matthew Perry supposedly “opened” Japan in 1853. To take the most sweeping examples, Buddhism and Confucianism originated “outside” the realm and migrated to the Japanese archipelago around 500 CE. Government officials were naturally wary of foreign imports like firearms and Christianity that could upset the internal social and political order, and Tokugawa Iemitsu 徳川家光 (r. 1623–51) issued consequential edicts during the 1630s that restricted contact with the West. Nevertheless, “outside” influences were permitted if they could be adapted and utilized in ways obviously beneficial to Japan. Kaitai Shinsho demonstrated the usefulness of foreign medical knowledge and raised important questions about the validity of Chinese medical practices. Kaitai Shinsho aroused a great deal of interest in Western medicine in the late eighteenth and early nineteenth centuries, though Chinese medical practices remained dominant. The success of cowpox vaccination further validated Western medicine. Despite pockets of resistance indicated by the Von Siebold Incident, Japan had begun its long and diligent assimilation of Western technical knowledge.
Notes

1 The term *sakoku* was not used to describe these edicts, such as the “Edict of 1635,” until the mid-nineteenth century. The edicts were not always as absolute as the phrase “closed country” implies.

2 *Kokugaku* scholars emphasized Japan’s native literature, traditions, and values, and sought to expunge what they believed were the foreign influences of Confucianism and Buddhism. Though their numbers were small, *Kokugaku* scholars and their ideas influenced activist samurai who sought to overthrow the Tokugawa shogun and “restore” the emperor in the 1850s and 1860s.

References


