

## The Dutch Science (*Rangaku*) and its Influence on Japan

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### Abstrak

Pada tahun 1609, Belanda memperoleh izin memasuki Jepang bersama armada dagangnya VOC (*Verenigde Oost-Indische Compagnie-Dutch East India Company*) dan menempati wilayah di pelabuhan perdagangan Hirado hingga tahun 1940. Pada tahun 1639 Jepang menutup negaranya untuk berhubungan dengan dunia luar (era *sakoku*). Namun, Jepang masih mengizinkan Belanda untuk tinggal dan memindahkan perusahaannya (untuk mudah mengontrolnya) ke Pulau Deshima pada tahun 1941. Meskipun Jepang sangat melarang masyarakatnya berhubungan dengan Belanda atau sebaliknya, kecuali orang yang ditentukan dan pada kondisi dan waktu tertentu, namun rasa keingintahuan negeri ini terhadap perkembangan ilmu dan teknik Barat telah membawa keterbukaan Jepang untuk menggantinya melalui Belanda. Dimulai dengan mempelajari ilmu kedokteran, Jepang terus menggali dan mengembangkan pengetahuan Barat, yang proses ini dikenal dengan era *Rangaku*. Melalui proses *Rangaku*, Belanda secara tidak langsung telah menjadi pintu pengetahuan bagi Jepang dan Jepang secara perlahan berhasil mengembangkan berbagai ilmu untuk kemajuan sosial, ekonomi, politik, budaya, dan militer hingga Jepang siap berkembang ketika kembali membuka diri pada tahun 1853.

**Kata kunci:** Sakoku, sistem *Rangaku*, studi Barat, Jepang, Belanda, VOC.

*“If Japanese society,  
which had been isolated from the rest of the world, was a solitary black box,  
Nagasaki was like a pinhole, and  
Holland was the faint ray of light shining in.”*  
(Ryotaro Shiba (1996), Japanese historical novelist  
in his work *Oranda Kiko* - “Travels in Holland”)

### Introduction

The period 1640 to 1853 was era when Japan was completely closed and isolated from the outside world or called *sakoku* era. At that time, only the Dutch remained

staying among the Occidentals who had had contact with Japan before the *sakoku*. Although Japan was closed for any Westernization and Christians, it did not stop Japanese to absorb the Western ideas and techniques. The curiosity of Japanese to learn European knowledge and made contact with the Dutchman, the only Westerner who remained in Deshima, had brought the interesting relationships between the Dutch and Japan. Its relationship with the Dutch, beside China, resulted in increasing number and variety of books of translation - from Dutch to Japanese - as well as popularizations of Western knowledge which were formed through *Rangaku* system (Marius B. Jansen, 1957:568). As the result, the Dutch as the trader and 'the tutor' gave a new dynamism to Japanese social, politics, economy and culture.

*Rangaku* is known as a Dutch learning system or Western or foreign knowledge. It started in the eighth Shogun Yoshimune who was a successful administrator, reformer, and aware of the superiority of Western science and technique. The Japanese translated the Dutch works into Japanese, such as works on medical botany, medicine, medical treatment, astronomy, the world maps and geography, physics, chemistry, social science, and the military science and techniques (Katagiri Kazuo, 1982:1) and took the notes from these translations for their study.

Since the *sakoku* era, Japan obtained the European information through the Dutch as the only Western that allowed staying in Japan peninsula. The Dutch provided the Japanese for over two centuries as their 'window on the West' (Grant K. Goodman, 2000:231). Grant K. Goodman (2000), Anna Beerens (2006), C.R. Boxer (1956), Bob Tadashi Wakabayashi (1998), analyzed the obstacle and the impact of the Dutch activity in transferring Western study - especially for the increasing number of Japan intellectuals.

Concerning of a long *sakoku* system and applying of Dutch learning system as Western education bring this paper to find the influence of Dutch learning system (*Rangaku*) within 1641 to 1867 on Japan society. This paper would like to assess the influence of Dutch learning system. How did Japan open for western knowledge? What was the influence of western learning? It is interesting to know the foundation of modern Japan that shows nowadays by tracing from the origin contact between the Dutch and Japan; especially on *Rangaku* process. Surely, this paper does not wish to make something new on the impact of *Rangaku* system. Besides, it would like to analyze the difference ideas around the influence of *Rangaku*, especially from two ideas: Grant K. Goodman (*Japan and the Dutch, 1600-1853*, 2000) and Anna Beerens (*Friends, Acquaintances, Pupils, and Patrons; Japanese Intellectual Life in the Late Eighteenth Century: A Prosopographical Approach*, 2006).

## The Early Contact of the Dutch and Japan

### 1. The Dutch in Hirado

*De Liefde* ('Charity') was one of twenty-two Dutch vessels which set sail in the Far East in 1598. It captained by Jacob Quaeckernaeck and piloted by the Englishman, Williams Adams. It had been blown by violent storms and buffeted by the pounding seas. It finally arrived at Bungo on the eastern shore of Kyushu on 19 April 1600 (Grant K. Goodman, 2000:9). Besides the Portuguese and Jesuit, the Dutch was permitted to remain in Japan. The arrival of Dutch seamen in Japan stimulated interest of the Netherlands in the possibility of opening trade and commercial relations with Japan. In 1605, Quaeckerneck (*de Liefde* captain) was allowed to depart and got a licence from the shogun Tokugawa Ieyasu for trading with Japan.

The story of Will Adams is the best known. He got in himself with Shogun (military ruler with hereditary system and the actual power in Japan with emperor as a nominal ruler) and taught the Japanese about navigation and shipbuilding techniques. He built around two or three Western style ships for the Shogun (Leonard Blussé, 2000:18). This shows the contact of *De Liefde* crewmembers with Japanese and their Shogun. However, Adams had made earlier contact with Japanese when he and Van Lodensteyn worked as informal advisors and interpreters for Shogun Ieyasu and Dutch countrymen. Besides, there was captain Quaeckernaeck who took the first steps toward the establishment the relationships between the Japanese authority and the Netherlands (*Ibid.*, 19) when he sailed to Pattani (Thailand) as the pilot of the junk of the Lord of Hirado in 1606.

In 1607, at least one of 13 ships that set sail to Indies - under the Admiral Pieter Willemisz Verhoeven, was instructed to sail to Japan. This one was responsible to send the letter to Shogun or Tokugawa Ieyasu from the ruling Prince Maurice of Orange (1567-1625) who intended to establish a permanent Dutch factory. On the 6<sup>th</sup> of July 1609, the two ships, *Roode Leeuw met Pijlen* (Red Lion with Arrow) and *Griffoen* (Griffin) arrived at Hirado harbor. The envoys of ship, Abraham van Broeck and Nicolaes Puyck, visited local *daimyo* to give the respect and letters to Ieyasu then in retirement at Shizuoka (Grant K. Goodman, 2000:10). On 14 August, Shogun Ieyasu received the Dutch envoy in Sunpu – at his castle. A few days later, the Netherlands got the reply for Prince Maurice and four passes to be used for the Dutch in the future. The letter was written in a friendly tone and did not show the haughtiness. Afterward, the Dutch was permitted to open the permanent trading in Hirado based on the written charter.

In 1609, the Dutch built their factories in Hirado for the first time until 1641 when they had to move to Nagasaki. The trade between Japan and Netherlands was more dominant than previous two Latin powers, Portuguese

and Spanish, because the Christianity brought by these Latin powers had caused more anxiety of shogunal while these missionary efforts would be destructive to the safety of the state (*Ibid.*, 11). Thus, in 1612, Tokugawa Shogun banned the propagation of Christianity. The 1616 were the end of Christian missionaries and free residence for Westerners in Japan, as well as the restriction of foreign trade in the ports of Hirado and Nagasaki. In 1624, Spaniards were completely banished from Japan and no Japanese Christian was allowed to leave the country. Portuguese were under the careful restriction and surveillance. Their ships could not stay in Nagasaki but had to come and go every year. Their contact with Japanese was limited strictly in the matter of trade and all cargoes had to be sold in fixed prices and only to officially licensed merchants from particular designed areas (*Ibid.*, 11).

On the 23<sup>rd</sup> June 1636, the Shogunate issued new instructions to the authorities at Nagasaki providing death punishment in order to ban Japanese vessel go out of Japan. Portuguese was banished. Then, the Dutch was the only Westerner who still had commercial relations with Japan. However, in the year 1631-1636, the Dutch also met the difficulties at Hirado. After the death of Shogun Ieyatsu, the Dutch requested a new arrangement of the trading to the new shogun, Hidetada, but, he did not perceive well and might change his mind or cancel it. The Dutch found their position more and more limited by various restrictions, both economically and personally. In 1637, a new law forbade any foreigner to travel in Japan and, finally, Japan announced the *sakoku* ('closed country') in 1639.

In 1639, the officer, François Caron, arrived in Hirado as the chief of factory. He led and taught the mortar techniques to Japanese. Essentially, Dutch government in Batavia disagreed with François Caron to teach the technique to the Japanese. However, François Caron thought that it would be advantageous for closer trade relationship with Japan by giving what the Japanese Empire wanted (Seiho Arima, 1964: 355).

In 1640, the inspector general Inoue Masashige came to Hirado as the representative of Shogun. He informed to *opperhoofd* François Caron about the Shogun Iemitsu's orders. The Shogun instructed to demolish all the Dutch warehouses on Hirado and they were moved to Deshima island in Nagasaki Bay in the following year. The reason of this move was because the Dutch had been associated with Christianity as Portuguese and Japan had to prevent Christian dissemination. *Opperhoofd* François Caron did not protest against the order of Shogun. Caron thought conversely that the demolition of warehouse was because of the building itself. The warehouse was strong and built from stone. The Shogun, which in this period was establishing the system of national defense, considered this building as a threat; as well as combined by powerful guns of the Dutch ships and it could become a military power (Yukutake Kazuhiro in Leonard Blusse', 2000:27).

## 2. The Dutch in Deshima

On the 24<sup>th</sup> July 1641, the Dutch moved their position from the trading port in Hirado to Deshima, a small peninsula in Nagasaki - the south of Japan which was such an isolated place for outsider in order to easier to be controlled. The Dutch were not allowed to leave Deshima without the permission of the Japanese authorities. Japanese were also strictly forbidden to set foot on the island. Company servants were only in touch with staff of Japanese day and night watchmen, their officers, coolies, and also prostitutes. Dozens of Japanese interpreters took care of communication, since the Dutch were not allowed to learn Japanese (Els M. Jacob, 2006:146).

Deshima literally means 'projected island'. It was built for Portuguese in some five years before the harbour of Nagasaki on the shore of Edo-machi (Grant K. Goodman, 2000:18). Nagasaki was territory under the direct control of *Bakufu* (government warrior) and *bugyo* (the Dutch called him *Gouverneur*) who appointed by Edo, as the government of the city. The *bugyo* had nominal authority over the internal administration of the city. However, his real control of local affair was strong in the *machidoshiyori* (town councilors, called *Stad-Burgemeester* or *Burgemeester* by the Dutch). He also controlled the conduct of trade by working as inspectors in the market places (Itazawa Takeo (1935) in Grant K. Goodman, 2000:18).

The rent of the Deshima island was 55 *kamme* (1 *kamme* is 8.27 pounds) of silver per year or around more than 15,000 guilders (Itazawa Takeo (1949) in Grant K. Goodman, 2000:19). The buildings were built for the residences and warehouses of the Dutch & several residences of Japanese officials such as the supervisors, the interpreters, and the guards. Additional necessary buildings were also built by the Dutch expenses. The buildings were a place for the sale of goods, two 'fireproof' warehouses, a large kitchen, a house for deputies - appointed by *bugyo* to direct and control the trade - and for the interpreters (Grant K. Goodman, 2000:20).

The number of the Dutch in Deshima was varied from year to year. Generally, the Dutch who stayed in Deshima were *opperhoofd* (captain) or *opperkoopman* (chief) - after 1640, the *Bakufu* regulated the annual rotation to prevent them having a friendship with Japanese; *onderkoopman* (vice-chief) - usually 1 man; *pakhuismeester* (warehouse guardian) - usually 1 man; *schrijver* (secretary) - usually 1 or 2 men; *oppermeester* (doctor) - 1 or 2 men; *ondermeester* (medical assistant) - 1 or 2 men; *boekhouder* (bookkeeper) - 1 or 2 men; *assistent* (assistant) - any number, also including gunners, shipwright, carpenters, and slaves (Itazawa Takeo, 1935). Essentially, the number of Western residents - the Dutch in Deshima island, was limited to eleven persons.

For these small and isolated Hollanders, the Japanese developed an overgrown bureaucracy. Some officials (Japanese) in Deshima were in Dutch financial responsibility. These officials as described by Engelbert Kaempfer

(1651-1716) - at Deshima in 1692, were (Engelbert Kaempfer, 1906: 5 gate guards (*monban*), plus their servants, whose duties are to guard the gate from Deshima to Nagasaki (also harbor guards, spies, and deputies to town officials); 6 night guards (*mawariban*) who watch for thieves, fires, or accidents, 1 chief officer (*otona*) - supported by a deputy, 5 secretaries, 15 colliers supervisors, 36 treasures, a chief Japanese official who takes care the Deshima government, the supervisor of trade, the jurisdiction over all servants and general control of the Dutch; 24 landlords of Deshima (*Deshima chonin*), who control Dutch tenants; 150 Dutch interpreters (*Oranda tsuji*), who will prevent the Dutch to learn Japanese; 17 commissioners for victualling (*kaimono tsukai*) with their families, who provide the island with the food, household goods, and prostitutes; officers of the kitchen (*daidokoro no mono*) - 3 cooks, 2 kitchen chores; and small number of personal servants and boys as messengers.

Deshima is near Nagasaki city. The island and city were connected by a stone bridge, but the high wall prevented someone to make contact outside Deshima area.

The contact and communication between the Dutch and Japanese in Deshima were very limited. Change information looked scarcely, since only particular people could communicate with the Dutch, like said before such as interpreters, staff of Japanese day and night watchmen, their officers, coolies, and prostitutes. Japanese was not allowed to come closer or enter Deshima except certain person with certain appointment and at specific time. The guards in the gate prevented the Dutch to all communication with the city of Nagasaki. They could not come and leave Deshima without official authorization which was given only on the special occasion (Grant K. Goodman, 2000:21).

Since 1609, annually, on the first day of the eight month of each year, the Dutch were required to visit the Shogun. They had to pay homage directly to Shogun and in the beginning of the new year, they had to present the gifts to Nagasaki officialdom. It was accustomed in Japan that the *daimyos* had to make pilgrimage to the capital to pay respects and make presentation to the Shogun (*Ibid.*, 25). The visit was known in Dutch as *De Hofrais naar Edo* and in Japanese as *Edo Sanpu* or *Sanrei* (*Ibid.*).

The journey became customary event. From 1790, the visit reduced to once every four years. Until 1859, there were 166 court journeys and every trip took nine days. This journey was the opportunity for the Dutch to know anything about Japan outside of vicinity Nagasaki. For Japanese, this journey could be a major factor for Japanese public to recognize the existence of the Dutch and Western world.

The present of Dutch in Hirado to Deshima such as modern ship, army and administration indirectly had attracted Japanese attention to western technology instead of European threat to Japan's authority, especially Japan's

motivation to improve (national) social, economic, and political conditions. Nevertheless, Japan kept really careful and strict in controlling all Dutch activities in Japan to prevent any circumstances from outsider.

### The Shogunal Policy

The significant Shogunal policy since the Dutch remained in Japan was the *sakoku* and *Rangaku*. *Sakoku* was the reaction of the Japanese ruler to the spread of Christianity and *Rangaku* was the Western learning which was carried out by the Dutch. There is current consensus among Asian historians that even though Japan had been isolated from outside world but Tokugawa Shogunate succeeded in carrying out a state formation process in which old feudal concepts were combined with new social and political ideas, and guiding Japanese to the modern period (*kinsei*) (Leonard Blusse', 2000:13).

#### 1. Japan and Sakoku Policy

*Sakoku* is represented with a variety of nuances. It translates literally as 'closed land' and the word by simply mean as 'closing country'. The *sakoku* era defined as the period of isolation. Based on Tashiro Kazui (1982:283-284), the word *sakoku* was not strictly of Japanese origin. It was used only in 1801, when a Nagasaki interpreter named Shizuki Tadao translated part of The History of Japan - by the German physician Engelbert Kaempfer (1651-1716), and called his work *Sakoku ron*. Then, *sakoku* was Shizuki's own invention, a word formed by reversing the characters for *kuni o tozasu*, an expression coming out in the translation. The usage of the *sakoku* word soon spread, and it was as the opposite of *kaikoku* (literally, 'opening the country'), which usually used by Bakumatsu intellectuals before (Itazawa Takeo, 1959:552-60).

The *sakoku* policy finally applied, preceded when Portuguese expelled from Japan. At that time, the *daimyo* or feudal lords were instructed to strictly guard the entire coastline of Japan. Essentially, the prohibition of Portuguese ships was not only a single legal measure, but also the implementation of the defensive system to prevent the foreign ships to reach Japan (Reinier H. Hesselink and Matsui Yōko in Leonard Blusse', 2000:35). For the Dutch, they still had chance to stay in Japan and it was more of trading factor than other reasons. The Dutch moved its factory (VOC) from Hirado to Nagasaki, one of cities under the direct jurisdiction of the *Bakufu*. The shift to Nagasaki was the first step of the relationship between Japan and Netherlands, or, more specifically, between the *Bakufu* and VOC. Even though, it was believed that Nagasaki was the only place where Japanese and foreigners had any contact, however it was not only Netherlands and China that had relations with Japan, but also Korea and Ryukyus had similar relations with Japan.

## 2. The Implementation of Rangaku System (1641-1867)

*Rangaku* implies extensive knowledge related to the West and the Western techniques, including the Dutch language, medicine and medical botany, astronomy and geography, military science, and human sciences (Katagiri Kazuo, 1982:1). Japanese began to study medicine in seventeenth century when medicine was not always scientific and reliable, but it was the core knowledge to study the body. The Dutch played the role of transferring the medical technique, particularly surgery as the basic medicine in the West. However, East Asian ignored it because they generally believe that surgery would damage the body which inherited by the ancestors (Marius B. Jansen, 2002:211).

Through the chief of Dutch factory, Colonel Jon Willem de Sturler (1823-1827), Japanese studied military technique and gunnery (Seiho Arima, 1964:361-362). Then, many books of gunnery and strategy were translated to Japanese for example: *Ensei kakō seisen* (A Selection of Works on Western Gunnery) translated by Namura Motoyoshi in 1841 which the original was written by Sessler in 1823 and *Sampei senjutsu sho* (Strategy of the Three Military Forces) translated by Takano Chōei, Suzuki Shunzan, and others which the original was written by Decker and Brandt in 1831. Japanese also learned the iron-casting that important for gun industry and some other useful knowledge such as electricity, chemistry, steam engine, telescope technology, mapping (geography), surgery, and soon.

The *Rangaku* started when the eighth shogun Yoshimune attempted to reconstruct the declining of *Bakufu* (A shogun's office or administration - Tokugawa Shogunate) by carrying out a reform - called "Kyoho" and by encouraging the practical learning (*jitsugaku*). The shogun Yoshimune was practically aware of the superiority of Western science and technique and he was interested and excited to introduce the Western knowledge to Japan. He actively invited talented men to come to government service and ordered his men - as scholars, such as Aoki Kon'yo (1698-1769), a Confucian scholar, and Noro Genjō (1693-1761), an herbalist, to interview the Dutch. It became the starting point of the practical learning of *Rangaku*. The achievement of scholars, besides the former study of Dutch language and the latter's translation of Dutch works on medical botany, are significant (Katagiri Kazuo, 1982:8). Furthermore, they translated the Dutch works to Japanese and took the notes from these translations for their studies.

Commonly accepted (received official permission from Shogun Yoshimune), that the interpreters<sup>1</sup> could study some special Dutch books for specific purpose. These interpreters acted as mediator and transferred the knowledge; then they became the scholars in their own right and had role in spreading of Western sciences. The *Bakufu* never issued a general prohibition

1 Japanese interpreters for the Dutch were known as "Orando Tsuji"

of Western books and Western language which was almost universal in Japan between 1640 and 1860. Books were prohibited in which works related to Christianity or science treaties composed by Jesuit in China (C.R. Boxer, 1950:62). Influentially, the Nagasaki interpreters became proficiency in Dutch, oral and written. They began the origin of the *Rangakusha* or amateur Dutch scholars (Dutch scholars – the Japanese who studied the Dutch and its knowledge).

The *Rangaku* activities were created by *Bakufu* and *han* (territory governed by a *daimyo* - the most powerful landholding – feudal rulers) lords with good rewards. Effectively, the scholars could translate various fields of Dutch knowledge such as medicine, medical treatment, astronomy and geography, physics, chemistry, the military science and techniques, etc. Finally, more than 200 years closed from outside world until the Meiji Restoration, Japan had already had intellectual sources and ideas.

The diffusion of knowledge in Nagasaki and Edo showed the curiosity of the increasing number of scholars, which was being aroused about foreign system, products and customs (Grant K. Goodman, 2000:49). Started by Yoshimune, the *Bakufu* adopted an official policy from Western idea. This was a part of Yoshimune's Kyoho Reform (*Kyoho no Kaikaku*). Kyoho itself was the name of year period 1716-1735. This period was the increasing prosperity of merchant class, the spread of economy, the entry of the farm village, commercial economy, and the growth of capital. However, it aroused the decreasing of holding down commodity prices. Thus, the national treasury was depleting and the controls were strengthening. This tightening control stimulated the stagnation and the decrease of rural population and the emigration of peasant to the city. These conditions were later directly threatening the stability of the system. Conversely, the era of *sakoku* and the *Rangaku* system was the part of Japanese histories that shape the development of Japan in the next of the nineteenth and twentieth century.

## **Rangaku and Japan (1641-1868)**

### **1. Historiography**

Rangaku is important to be noted as the new development in society and a momentum to a number of original thinkers (*Ibid.*, 44). In Goodman, Western 'scientific' study (*Rangaku*) were the principal new intellectual undertaking which appeared alongside the official orthodox Chu Hsi Neo-Confucianism which became the essential part of Tokugawa effort to indoctrinate literate sector of Japanese society (*Ibid.*, 4). Goodman tried to describe the role of *Rangaku* intellectuals, for example by translating Dutch medical and science books. Goodman observed the spread of the Western knowledge and application of *Rangaku* knowledge in private school or in Japanese society. By

investigating the intellectual history, Goodman found the problems around that could be categorized as *Rangakusha* and what was the actual effect of the research, writing and teaching that they had carried out.

Goodman (2000:2) emphasized the obstacles – both the Dutch and the Japanese – in which the limitation of Western knowledge that applied by the Dutch. The conclusion suggest that to very great extent Dutch studies in Japan were superficial phenomenon which seriously limited by the Neo-confusion philosophical commitment on the part of educated Japanese; the set down by a powerful government; by unsystematic method – information from the West entered to Japan; and by the mercantile preoccupation of the Dutch who never saw themselves as cultural mediators.

Since the *sakoku* era, Japanese obtained the European information through the Dutch that provided the Japanese for over two centuries as their ‘window on the West’. However, because of the disruptive effect of Christian mission in Japan, the *Bakufu* wanted to set specific limit on the scope of Western knowledge in Japan.

The achievement of knowledge was promoted mainly by a group of Japanese scholars who interested themselves in certain Western techniques. Even though the political power of this group was non-existent and they subjected to often oppressive atmosphere of feudalism and isolation. However, their achievements gained sufficient prominence and respect to be given the general designation ‘Dutch studies’ (*Rangaku*) (*ibid.*, 223).

*Rangaku* was never a ‘grassroot’ movement and did not reflect any support from below. It came from above, such as economic necessities that forced the desire to improve agricultural productions. However, Goodman observed that *Rangaku* tended valuelessness. Dutch Studies was “a kind of miscellaneous collection of practical data and techniques without cohesive structure or inner meaning.” Its limits were set early on and maintained, sometimes ruthlessly, by an accepted willingly and, indeed, voluntarily reinforced by a scholarly community which was bound to an almost universally permeating Confucian ethos (*ibid.*, 228).

The development of *Rangaku* seemed to conform to the system. They did not express the critical thinking, because of the threat of persecution and lack of interest in politics. The rigorous government supervision and intense government cooptation affected that self-supervision that also greatly weaken the potential critical thinking in *Rangaku* (*ibid.*, 229).

Goodman (*Japan and the Dutch, 1600-1853*, 2000:233) thought that the *Rangaku* in single study (such as medicine) in which it became most advanced was unable to provide an ease entry into the full modern Western science. Without the foundation in Western scientific theory the *Rangakusha* - Dutch scholars’ classified translation of a randomly chronological and relevant

collection of books from Netherlands were insufficient for an understanding of such disciplines as physics or mathematics. Therefore, *Rangaku* can by no means be called as adequate preparation for Japanese to face the Western science in the post-Perry era.

In line with Beerens (*Friends, Acquaintances, Pupils, and Patrons; Japanese Intellectual Life in the Late Eighteenth Century: A Prosopographical Approach*, 2006:276), *Rangaku* and the educational reform were less giving impact to the whole Japan's intellectual community, but it were because of the role of the intellectual that sometimes did not have support from the samurai. However, Anna Beerens emphasized the intellectual dynamism of the period that was positive and actual. Moreover, it is undeniable that the social movement took place, and intellectual activities offered opportunities to increase social mobility; opportunities to gain wealth, respect or prestige, or all, and even to completely change the path someone's life. However, it did not affect all their fields and occupations especially for the intellectuals.

Both Goodman and Beerens pointed out that *Rangaku* was less to force the creativity and initiative of *Rangakusha* since they faced and followed the conformity of feudalism. However, *Rangakusha* had a significant role since they had chance to study and translate Western books until it was socialized the knowledge to the Japanese. It showed that *Rangakusha* tried to be flexible to the condition.

Nevertheless, Goodman (2000:234) looked the attitudes which under restrictions, officially and intellectually, had still cultivated the curiosity about the West and which led to extensive development of Tokugawa. *Rangaku* was clearly attitudes which were the values of modern Japan in its quest for international equality. For the *Rangakusha*, it was assumed that the high degree of adaptability which surely facilitated Japan's rise to leadership in international, political, economic, science, and military strategic areas. It was at least in part of result the *Rangaku* product. Nevertheless, an exaggeration of the importance *Rangaku* and a misunderstanding of its true character that the variety of curios research by *Rangakusha* into limited parts of Western technology, had provided a foundation on the basis of the arising Japan's rapid modern and economic growth.

In Beerens (2006:276), in spite of existing ideologies concerning geographies mobility (migration) and 'heredity system' (comes from the same family), there is evident that making use of someone's talents for art, literature and/or learning was one of the way to improve and develop someone's conditions, both materially and socially. People used their knowledge to improve their condition and it showed in Tokugawa period. Anna Beerens underlined – as explained before, the intellectual dynamism of the period was positive and true which offered opportunities to gain social mobility, wealth, respect or prestige.

Urban character is one of the most prominent features of early modern Japan to give an illustration of castles and towns during the seventeenth century. Besides, Japanese shed their military grab in town and it became a center of manufacture, commerce and culture. Port, towns and religious center (*monzen machi*) likewise joined in the bustle of urban activity and a leading part in these developments is Kyoto, Osaka and Edo urban communities (*ibid.*, 15).

In her research, Beerens (2006:19) used prosopography method; known as 'collective biography', 'collective life histories', *quantitative personenforschung* or *biographie sérielle*; which is "the investigation of the common background characteristics of group of actors in history by means of a collective study of their life." She selected biographical data of 173 individuals and limited her studies in three metropolises, Kyoto, Osaka, or Edo. She 'encountered' individuals who had regular contact with the Japanese intellectuals between 1775 and 1800 that mentioned in their biographies and very much as they met each other. For the sources, she used sufficient published material, few unpublished sources; most material is a biographical nature. She also used monographs about individual artists and scholars, and also Chinese and Japanese texts.

Berrens (2006:275) tried to see the image of late eighteenth century intellectual life; modern scholarship may in fact have contributed to the 'factional' image of Tokugawa period intellectual life. She wrote that the commodities available in urban centers were scholarship and art both products and practices. The fact that modern scholars distinguished three main courses, the Chinese, the 'native', and the Western, in orderly fitted it. Besides, there was attractive condition that these courses also seemed to offer explanation for Japan's spectacular modernization after the development of Bakumatsu period<sup>2</sup> and the Meiji Resolution.

In this narrative, however, Goodman looked the relations between Western learning and the Japanese by looking at research, writing and teaching that were carried out by *Rangakusha*, as well as the manifestation of knowledge through study and translation of Western or Dutch books into Japanese. Beerens also described the impact of Western learning by observing the intellectual life in Tokugawa period. She looked at the networks of scholars and artists. She paid attention to the relations between Western learning and the Japanese. For example she looked at the social mobility which belonged to the *ex-Rangakusha*.

Goodman showed that, in 1811, the *Bakufu* established an official translation bureau, *Banshowagegoyo*. This bureau had role to spread *Rangaku*. Knowledge of *Rangaku* was transferred from the senior *Rangakusha*, mostly was the senior interpreters, to the junior *Rangakusha* by giving them a lecture or provided them with Western or Dutch books and its translations. For

2 Bakumatsu is the final year of Edo period and the end of Tokugawa period.

example, Otsuki Gentaku (born in 1757), was one of the greatest *Rangakusha*. He had many writings in many disciplines. Gentaku was the son of the Dutch trained physician of the Ichinoseki *han*. He studied with some earlier *Rangakushas*.

Between 1794 and 1814, Gentaku had contact with the Dutch six times at Edo for studying medicine. In 1783, Gentaku made first work about *Rangaku kaitai* (Steps to Dutch learning). It was about European language that was ever composed and printed by the Japanese and became the essential text for someone who wanted to study Dutch tongue (Grant K. Goodman, 2000:121). In 1790, Gentaku completed a translation of *Yoi shinsho*, a new book on surgery which published in 1825. In 1792, Gentaku wrote *Ran'en tekiho* (Picking Blossoms from a Field of Orchids). It was a collection of essays, translated from Western materials, official reports, and various remarks on medicine, pharmacology and natural history (*Ibid*, 125), and as well as many others of his works.

Private school, such as a school as Otsuki Gentaku's Shirando, was one of places to transfer Dutch studies. Shirando private schools had given influence by giving experience and extending their role as well as educator to the feudatories (feudalism) who sent their young samurai to study. The schools became centers of the study of botany and chemistry, military science, artillery techniques, etc (*Ibid*, 175).

Beerens (2006:18) looked that the transferring knowledge did through contact between the *Rangakusha* as the earlier scholars and the next generations. The contact was important to intellectuals in the society without university. Then, people were brought together in private academics, salons and gatherings, and network of friends and acquaintances, patrons and clients. However, Beerens emphasized the explanation more on the intellectual image, and the intellectual life rather than the impact of Western learning itself to the Japanese.

According Beerens (2006: 290), "the network sufficiently demonstrates people's aspirations to take part in cutting edge research; to tackle new (recently rediscovered) ways of dealing with texts of all kinds; to do away with the 'presumptions' and 'empty' pastimes associated with old elites; to find new artistic idioms and new way of expression, or to give new forms to old ones. It is important to realize that in the process of the 'Western', the 'Chinese', and the 'native' operated exactly the same level." It gives a description that the network tried to develop previous works and ideas which were more significant, modern, and available to improve.

Generally speaking, the *Rangaku* system had stimulated a variety of new intellectual manifestations. According to Goodman, even in under restrictions, officially and intellectually, *Rangakusha* had cultivated interest and curiosity towards the West, which had led to extensive development of Tokugawa and

it had possible contribution for Japan's future. Then, Anna Beerens underlined that the intellectual dynamism of the period was positive and real, which had gained significant social movement and intellectual activities. However, both Goodman and Beerens seem to see the role of the Dutch, the knowledge, and the *Rangakusha* as Dutch scholars. Moreover, Goodman looked more to the spread out the knowledge to the Japanese development in economic, social, and cultural, which obviously existed in the late of nineteenth century.

## 2. Japan (started Modernization) in the 19<sup>th</sup> Century (1800s)

Generally, the main line of Western learning, such as medical botanical and astronomical-calendrical, was to improve Japanese life toward the end of the eighteenth century. It was a great period of activity of Edo *Rangaku* (Grant K. Goodman, 2000:119). During the nineteenth century, the *Rangaku* and its usefulness were extended. This era was an era of a general expansion of Dutch studies and also the emergence of outstanding individual scholars whose encyclopedic knowledge covered several fields. Even only the small number of scholars involved in the *Rangaku* movement and also the limitation of their works, much information on medicine, pharmacology, physics, chemistry, astronomy, cartography, geography, military science, science - mathematics and surveying, and art was spread widely (*Ibid*, 119). Therefore, from early nineteenth century (1800s) Japan started to develop especially sciences, military power, and culture (art).

Actually, in almost every case Western learning in the *han* was stimulated by the presence of interest and curiosity of *daimyo*. The greater interest of those *daimyo* who sponsored Western study, intended to use this knowledge to improve and develop the conditions of two main practical directions: defense and technology. The military preparation was applied by *Bakufu* to have a soft military control and to encourage the *daimyo* enlarge their local defense. Technology was necessary, not only for military built-up, but also to find appropriate answer to economic problems, such as to develop and diversify agriculture, to develop natural resources, to set up industrial enterprise, to better health conditions, also to reclaim land. Thus, *Bakufu* had succeeded to relate the Western studies with the application as the increase of agricultural production and the building up of coastal defenses (*Ibid*, 190).

Western knowledge in science, ship, military technique and gun, had supported Japan to have a modern arm power in Asia in the twentieth century. Japanese material culture also developed. Japanese intellectual improved with their own right with more productivity and creativity, such as art and painting. Furthermore, the economic growth and the succesful agriculture system brought well Japanese standard of living when technology also helps them to gain profitable commodities for Japan. However, the growth of

military technology and economic stability (including the demand of natural resources) were other factors that lead Japan to one of imperialist countries in Asia in the late nineteenth centuries.

Since Japan opened for Western study and knowledge which were not in line with feudal Japan, Japan was ongoing on roads of modernization. Besides, the feudal system of Tokugawa period indirectly was conducive to accept the penetration of Western knowledge on political and economic realms which have led Japanese to the economic growth. Japan started its modernization by taking free of assistance or making indebt to other superior countries. The aid that Japanese had was the knowledge from Western studies. In line with Edwin O. Reischauer (1963:306) that "in the nineteenth century Japan dared not borrow very heavily, because at the time of rampant imperialism, it was dangerous to become heavily indebt to more powerful countries."

Furthermore, the development of native Japanese culture was overshadowed by the influence of European. The stability of Tokugawa shogunate for 265 years had made him to pay off in productivity and creativity by the end of seventeenth century (Martha Chaiklin, 2003:5). Thus, population increased in-line with the agricultural productivity and created the standard of living. Important technological movements were made in handicrafts industries such as textiles and porcelains.

In 1853 and 1854 was the coming of Commodore Matthew Perry which was the first American contact to Japanese at the end of *sakoku* period. The knowledge supported Japan to do many changes after the end of Edo period (besides the treaty with Commodore Perry to open the Japanese port for trading) and the new ruler of Emperor Meiji. The change was carried out by the *Rangakusha*, the technicians and the bureaucrats. The change existed especially in social, political and economical spheres. In 1868, Japan began opening the main ports for foreign trades. Then, they created civil society and abolished the feudal institution (David S. Landes, 1999: 372). In Meiji Restoration, Japan tried to catch up with western development, especially in economic improvement. The modern economic was applied in heavy works, such as the machines and engines manufacturer, ships and locomotives, railroads, ports and shipyards (*Ibid.*, 380). Japan also hired the foreign technicians, scientist and other experts to build together Japan. On the other sides, they sent their chosen people to study in Western countries to get more significant knowledge for Japan development.

Furthermore, Japan succeeded in rapid industrialization by high technology adopted from Western countries, such as water power, electric power, stem technology, etc. The Japanese went about modernization with characteristic intensity and system – in political and economic especially (*Ibid.*, 374) by good government, nationalist people and spirit to develop. Generally, they were ready for modernization by having good quality tradition and

effective government, by their high levels of literacy, their tight family structure, their work ethic and self-discipline, their sense of national identity and inherent superiority (*Ibid.*, 375) which assisted to modernize Japan. Generally speaking, a long history of Tokugawa period and the knowledge that the Japanese obtained, had already given the readiness to Japan to set up industrialization, modernization, and join the international sphere. In the late nineteenth century, the development of Japan was also stimulated by the rise of Japan's relationships to international sphere, which it was needed to facilitate Japan's position among other influential countries.

What we can learn from this information is that even though Japan was closed and limited in access but they could take the opportunity/advantage from the presence of outsider to arouse better economic, social, political, and technological condition as well as defense strategy for national benefit with its own independency. They (Japanese societies) developed their own civilization with western knowledge and information without neglected their own dignity and culture. Thus, Japan modernized his nation as it is seen as Japanese styles/ways.

## Conclusion

Curiosity to western knowledge, science, and development had encouraged Japanese to open to western studies even though in the position of being closed for every influence of ideas and countries. In 1853, Japan realized that it could not be longer to close its country, especially after the American Commodore Mathew Perry's black ship' landed in the Bay of Edo. The Far East new era started. Japan - in the preliminary open era, succeeded to adapt the new situation. Shortly, Japan formed the legal system according to the Western model; improved the military and agriculture system; introduced a national system; and gave priority to set up an export oriented national industry (Leonard Blusse', 2000:6).

Indirectly, *Rangaku* can be called as the era when Japan started their intellectual life, then, at the end became the modernity force for Japan. Through willingness, curiosity, and enthusiasm, Japan chose the Dutch as an ideal bridge and window for outside world. Through translating Western books, taking the notes for their study, learning the sciences, implementing and transferring the Western knowledge, Japan built the economic growth and cultural development. The knowledge about science and European matters encouraged Japan government to build a foundation for revolution that was taken over by *Rangakushas*, technicians and also bureaucrats. Even though in transferring the knowledge - from the Dutch to the Japanese, Japanese also had obstacles, such as conforming to the system and lacking of critical thinking of scholars. However, at least, the result of *Rangaku* created

the readiness of Japan to face the change after the coming of Mathew Perry in 1853 and opening the country (in 1867-1868) for any international relationship. Japan was successful in economic revolution by doing rapid industrialization and became the first non-western country to industrialize.

The *Rangaku* as a modernity force was real enough. It derived the development of Japan in agricultural, medical, industrial, science, arm technique, etc in the late of the nineteenth century. Then, the knowledge of many fields of studies had assisted Japan to get conducive economic and political development. Western science furthermore had forced Japan to develop a theoretical and technological scientific base. *Rangakusha* or Dutch scholars, even in any limitations, had the chance to increase their social mobility and offered the path for Japan's economic and social modernization after the end of Edo period with Tokugawa shogunate and come to the development of the Bakumatsu period (1867) and the Meiji Resolution. ●

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