

Japanese Advanced Toilets as a Product of the Country's Contact with the West

1980年代の日本に生まれた高機能トイレは、今や世界を席卷する勢いだ。しかしそれは、19世紀以来の過剰な「西洋化」の産物かもしれない。

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Abstract

How to deal with human waste is a problem that every country needs to deal with, but it is Japan that is known for its high-tech toilets.

This essay tells the story of Japan becoming the leading country in the toilet industry and names Western influence as a major contributor. Analyzing historical sources, it highlights the transition of human waste from economic good to aesthetical hindrance, finally ending up as pollution.

Night soil was in popular use from the 12th century and soon became an economic good. But foreigners that started to visit the country in the 19th century condemned it and saw Japan as inferior. To become an equal with the Western powers, Japan established a health regime which altered people's sanitary habits. Then, with the end of WW2, Japan was urged to modernize its toilets on the model of the American occupiers. Devalued night soil was dumped into rivers and the sea, which resulted in deterioration of adjacent waters. Then, in 1980 TOTO introduced electric toilet seats called *washlets* which now set the standard in the toilet industry.

I argue that the *washlet* should be analyzed as a product of the country's history and cultural background, and suggest that the ubiquitous Western toilets are not necessarily the best answer to the present sanitary crisis.

Keywords toilets, night soil, sanitation, Japan, Westernization

Introduction

Urbanization gives rise to the question: how to deal with human waste? It is a problem that every country needs to deal with and it proves not to be an easy task. According to the World Health Organization and UNICEF one third of humanity still lacks access to proper sanitation (2015). U.N. study shows that more people in the world have cell phones than toilets. Improper sanitation is a serious threat to public health, environment and human rights.

Japan is one of the two thirds that have sanitation and its toilets are often given as an example of

hygiene and modernity. Who has not heard of the Japanese advanced toilets with heated seat and water spray feature to clean one's bottom and genitals after defecation, among other futuristic features? They are definitely unique in the world and in recent years have been gaining more and more international attention. On "IS JAPAN COOL?" website run by All Nippon Airways, Japan's leading airline, hi-tech toilets are ranked the second "coolest" thing in Japan by foreign visitors, following Japanese hospitality (*omotenashi*). Even the Japanese government realized this commercial potential and has engaged itself in the promotion

of Japanese toilets abroad under the “Japan Toilet Challenge” (*Japan toire charenji*) project, which, among other goals, aims to improve toilets in tourist areas before the upcoming 2020 Tokyo Olympics.

Toilets have indeed become the Japanese flagship product and some even talk about “Japan’s toilet obsession”.¹ But the history of these modern toilets is surprisingly new—they came into widespread use in the 1960s, and at that time only 6% of population was connected to sewer lines,² while electric toilet seat called *washlet* was introduced in 1980. How did Japan manage to surpass Western powers that initiated transition of the country’s toiletry practices and become the toilet superpower in such a short time? Continuing to refine things even when others would stop can be said to be a characteristic of Japan’s craftsmanship approach, as even Hatoyama Ichirō, prewar Minister for Education and Culture, admitted in 1934 at the inauguration of the Association for the Propagation of Japanese Confucianism.

*“Considering the achievements of our long national history, the fate of the world some centuries from now may well be to see our nation assimilate and refine even Western culture. I firmly believe this is our nation’s great aspiration and indeed its manifest destiny.”*³

In this paper I will briefly tell the story of toilets and sanitation in Japan to portray the country’s rocky road to the toilet superpower. I pay special attention to the contact with the West, which initiated the transition from night soil to *washlets*, making them the symbols of the country’s postwar modernity. Moreover, I suggest to reevaluate the idea that the Western style toilets are markers of modernity and are necessary in every country, as sanitary improve-

ment should first consider each country’s history and cultural background.

First toilets

Japan’s first toilets are thought to appear as early as in Yayoi period (300BC-250AD). Palaeoparasitological analysis found dung beetles in moats encircling large settlements, so we can surmise that people used to defecate into them.⁴ In settlements with running streams available toilets were built over rivers so the excrement would be taken away with the water flow. These toilets were called *kawaya*, which literally means a river (*kawa*) house (*ya*)—we might say they were a kind of primitive flush toilet. The name *kawaya* was an equivalent for toilet and it was first mentioned in *Kojiki* (712), the oldest extant chronicle of Japan. In places without any convenient access to flowing water, cesspit toilets were used. They were very simple holes with two wooden boards put across. When they became full, they were simply buried and a new hole was dug.

During excavation works many holes are discovered and sometimes it is hard to decide what exactly the hole was in the past. An indicator of whether a hole was used as latrine or not is the presence of *chūgi*, sometimes called *kusobera*, inside. *Chūgi*, which literally means “shit stick”, are wooden sticks used to scrap away the feces after defecation. They became an important factor in estimating the beginning of the Kamakura period (1185-1333) as the start of popular use of night soil.

In the Heian period (794-1185) agriculture developed significantly and with that the number of fields increased. Thus, in the following Kamakura period manure was inadequate to fertilize crops. From that period on *chūgi* cannot be found in the cesspit toilets anymore. It is assumed that they made collecting night soil difficult so people stopped throwing them into the holes and started to put them into baskets near

1 See *The Washington Post’s* „How Japan’s toilet obsession produced some of the world’s best bathrooms” for an example.

2 Data from 1961, Japan Sewage Works Association 2002: 7.

3 Paramore 2015: 269.

4 Matsui et al. 2003:133.

toilets. Moreover, from the 12th century big cesspit toilets appear – until then they were relatively small.⁵ It seems plausible to think of this change in size as the result of developing night soil collecting habits.

By the Edo period (1603-1868) agriculture progressed so much that farmers started visiting towns in order to collect night soil for their crops. At the beginning they would give people vegetables in return, but soon it was not enough to pay for the fertilizer. In the middle of the Edo period professionals started to collect night soil from townspeople and sell it to farmers and it was bought with silver.⁶

Night soil as an economic good

Soon night soil became a profitable business. In Osaka, by the end of the 17th century the price of fertilizer rose so much that farmers from neighboring areas were forming associations to obtain monopsony rights to purchase night soil from various areas. Eventually even fights broke out over collection rights and prices. By the mid-eighteenth century night soil was so expensive that the poorer farmers had difficulty in obtaining sufficient fertilizer and incidents of theft began to appear in the records. In Edo, present day Tokyo, night soil collection was not as popular. Edo administrators seemed more concerned with appearance of the capital city than the ones in Osaka and even ordered to remove small toilets near rivers. Still, by the first half of the 18th century, demand for night soil rose even in Edo. Farmers wrote petitions to allow them to put out buckets at least for urine collection on the streets, but government did not give its permission.⁷

We can see that night soil was a highly valued economic good. Edo landlords who sold excrement from shared toilets in tenement houses could earn an extra 30-40 ryō of annual income – almost

twice as much as a normal carpenter earned a year!⁸ In Osaka, money for night soil from shared toilets became a standard part of the landlord's income and rent was based on the number of tenants – if someone moved out from the tenement house, the rent would rise, as the landlord would get less product to sell. Feces belonged to the house owner, while urine was the property of tenants.⁹ Urine was much more difficult to transport and so less valued as a product. It is also interesting to note that night soil collected from wealthy households such as those of feudal lords (*daimyō*) had higher price. The reason was that diet in such households was more nutritious, thus night soil collected from them served as a better fertilizer.¹⁰

First contact with the West

Valuing human waste as fertilizer kept Japanese cities relatively clean, which surprised the first Europeans who started visiting the country from the middle of the 16th century. Many of them praised Japanese sanitary standards and their practical attitude toward human waste.

*We pay someone to carry our excrement away; in Japan they buy it and give rice and money in exchange for it.*¹¹

Luis Frois, 1585

*The interior of the privies is kept extremely clean and a perfume-pan and new paper cut for use are placed there. The privy is always clean without any bad smell.*¹²

Joao Rodrigues, lived in Japan from the late sixteenth into the early seventeenth century

5 Ota kuritsu kyōdo hakubutsukan 1997: 192-3; 215.

6 Hanley 1987: 9.

7 Ibid.: 9-12.

8 Ota kuritsu kyōdo hakubutsukan 1997: 4.

9 Rotberg 2000: 149.

10 Mansfield 2009: 117.

11 Frois et al. 2014: 205.

12 Hanley 1987: 19.

*In the entrance one finds a new pair of reed or straw slippers for those who have an aversion against stepping with their bare feet on the floor, which, however, is clean and covered with mats. People relieve themselves by crouching in Asian fashion over a narrow opening in the floor. The pot below is placed there from the outside and filled with light chaff, wherein the dirt disappears immediately.*¹³

Engelbert Kaempfer, 1690-1692

In Europe at the time, night soil was not in popular use as fertilizer and human feces were nothing more than waste. Lack of a sewage system resulted in cities literally drowning in excrement. Stories of Londoners emptying their chamber pots out the windows or of the famous Palace of Versailles being a huge latrine have become well-known myths, and even though we should take them with a pinch of salt there is definitely some amount of truth in them.

It is a common misconception that the invention of water closet improved this dire condition of European cities. In reality it made them even more unsanitary. For example in London, every day tons of feces were dropped untreated into the Thames, the main source of the city's water supply. It means that Londoners were literally consuming their own waste, which certainly was not without consequence. There were several outbreaks of cholera in the 19th century, but it was only after the Great Stink of London in 1858, that works on a sewer network for London finally started. It was opened in 1865 (though the project was not completed until 10 years later). No matter how dreadful in reality was the sanitary condition soon after the invention of water closet, it succeeded in removing human excreta from people's private spaces and leaving them clean. The idea of all the dirt moving to the rivers did not bother them as much.¹⁴

¹³ Kaempfer et al. 1999: 266.

¹⁴ For detailed information on roots of condemn for toilets and feces in the Western culture see Martha Bayless' „Sin and Filth in Medieval Culture: The Devil in the Latrine”.

In Japan on the other hand, a similar transition of human waste did not take place. Night soil was too valuable to simply dispose of it and as the cities remained clean and in a decent sanitary condition, there was not really any need to change the way things were. Even with the development of medical knowledge, when it became obvious that many diseases like cholera are transmitted mostly via fecal-oral route of contaminated food and water, usage of night soil was not questioned. In 1889 Nagayo Sensai, the first head of the Sanitary Department of the Japan Home Ministry, and W. K. Burton, consultant engineer for the Sanitary Department, proposed the construction of a sewer network in Tokyo.

*Night soil is a necessary fertilizer for farmers and as such night soil from the city of Tokyo can be sent to nearby prefectures for a potentially high price. Therefore we see no need to follow the example of Western cities and discharge it into the sewer pipes.*¹⁵

The proposal was postponed because of insufficient funding and work focused on the water supply system instead, but we can see that sanitation and improvement of hygienic standards was an important issue for the Meiji government, especially in the context of cholera epidemic. Nevertheless, the use of night soil was not in contradiction with the government scheme. Moreover, in 1900 the first Filth Cleaning Law (*Obutsu sōjihō*) was established, but it excluded human excrement from the list of waste that was to be cleaned. The handling of human waste remained landlords' responsibility, so they could continue to sell it as night soil.¹⁶

Opening of Japan

In the second part of the 19th century the difference of toiletry habits between Westerners and Japanese

¹⁵ Tokyo Metropolitan Government Bureau of Sewerage 1978: 82.

¹⁶ Hoshino 2008: 192.



Fig. 1 *Etoki gojō yomaki*, Digital Library from the Meiji Era: People holding their noses as a man walks by with “honey baskets” on a pole.

resulted in negative comments from the foreign visitors. In 1853, with the arrival of the Black Ships of Commodore Matthew Perry, Japan was forced to open after more than 200 years of limited contact with the outside world. Foreigners started to visit Japan again, but most of them were not as enthusiastic about what they saw as their predecessors from the middle of the 16th century.

Isabella Bird, in a travel diary from her trip to Japan in 1878 complained that “*bad smells, and the torments of fleas and mosquitoes are, I fear, irremediable evils*”. She mentions “*miasmata produced by defective domestic arrangements*” but does not give any more detail but admits that “[*m*]*any unpleasant details have necessarily been omitted*.”¹⁷

In *Terry's Guide to the Japanese Empire*, Terry Philip describes the “*evil odors from the sanitary arrangements*” which are “*abominable and suggestive of typhoid*.”¹⁸

Finally, Henry Adams who visited Japan in hot Summer of 1886 noted: “*Tokyo is beastly... nothing but a huge collection of villages, scattered over miles after miles of flat country; without a building fit to live in, or a sewer to relieve the stench of several hundred thousand open privies*.”¹⁹

As shown before, the use of night soil was not questioned in Meiji Japan. That does not mean though that the government did not care about the foreigners' opinions. One of the Japanese customs that shocked foreigners was public urination. In the Kansai region, pots collecting urine were set up beside roads so people could use them whenever they needed to. In Edo though, urine was not valued as fertilizer so it was not collected – once one felt the need to urinate they would simply do it. There was little if any embarrassment associated with relieving oneself in public, but such behavior seemed barbaric in the foreign eyes. Soon many claims from foreign visitors stating that such customs are unbecoming for a civilized nation appeared and urged Japanese government to do something about it. Such comments hit a raw nerve, as becoming a civilized nation in Western eyes was exactly what the Japanese government was occupied with at the time. Long isolation left the country relatively unaware of the latest technology in the age of industrial revolution and resulted in Japan being seen as inferior to the Western powers. In order to stand equal with the West, Japan rushed toward modernization and by the end of the 19th century it became Japan's priority. That is why foreign claims were taken seriously and in 1871 an ordinance that forbade public urination was passed. The fine was 100 mon. Next year, in 1872, public urination and collection of night soil in buckets without covers were banned by law which was the Meiji equivalent of the present Minor Offense Law.²⁰ To make it easier for commoners to under-

¹⁷ Bird 2013: 95.

¹⁸ Terry 1933: xlvii, xxxiv.

¹⁹ Mansfield 2009: 117.

²⁰ Ota kuritsu kyōdo hakubutsukan 1997: 5.

stand the new law, the government published *ukiyo-e* paintings portraying how bothering those habits are.

Government's efforts did not really pay off, as public urination proved to be fairly deep-rooted – nearly a decade after the first restriction was passed, Tokyo police recorded more than 4000 violations in a single year.²¹ This became a really serious issue as incidents of people urinating in public were even described in newspapers!²²

Health regime

In the Meiji period the idea of hygiene (*eisei*) came to Japan. The government believed that hygiene is the key to becoming equal with the West and promoted staying healthy as the citizen's responsibility. The transition of one's health from private to national issue left many Japanese wary of the government's scheme. To stop the cholera outbreak, infected people were isolated and as there was no treatment at the time, not many of them came back alive. The rumors that people are being killed spread and created an uproar among the people.²³ Strong national engagement in people's everyday life was even criticized by some intellectuals such as Natsume Sōseki, one of the greatest writers in modern Japanese history. In one of his essays he writes: "*But what a horror if we had to... eat for the nation, wash our faces for the nation, go to the toilet for the nation!*"²⁴

Soon hygiene became crucial for the Japanese militarism. One report on sanitary conditions in the Japanese navy during the Russo-Japanese war (1904-1905) notes that "*a discipline exists that has no parallel*"²⁵ and suggests that this was one of the main reasons that Japan defeated the more numerous Russian fleet. Although health and hygiene were

²¹ Campbell 2014: 107.

²² Rinoie 1988: 70.

²³ Rogaski 2004: 152.

²⁴ Bellah 2003: 43.

²⁵ Braisted 1906: 7.



Fig. 2 Poster from 1930 saying: "Health is for the body, for the country" in Kawabata 2003: 45.

extremely important in Japanese nation-building from the second part of the 19th century, just before the Second World War they were taken to a whole new level. When it became clear that the Second Sino-Japanese War (1937-1945) would involve the main islands of Japan and the country would engage in a total war, the government strove to prepare the nation for war. The National Spiritual Mobilization Movement (1937-1940), an organization under the supervision of the government, was established to rally popular consciousness of and support for the war. It strongly relied on the *kokutai* ideology, literally "national body", which viewed the Japanese nation as one superior entity organized around the emperor. Staying healthy was equal with the whole country being healthy. "Train both body and soul"

(*Mi mo kokoro mo kitaeru*) was one of the slogans urging people to lead a healthy life and getting up early, walking to work and regular exercises were some of the recommendations for people.²⁶ The answer as to why the health regime has become so important in the wartime propaganda is simple – Japan needed a healthy nation to fight the enemy.

The health regime could not possibly leave out toiletry habits. In 1928 hemorrhoids were classified as a “national disease” by the *Asahi* newspaper and around the same time reports of politicians, including Prime Minister Katō Tomosaburō, suffering from them hit the news.²⁷ Hemorrhoids were such a big problem that the army had regulations for rectal inspection, which were not easy to pass. Alexander R. Bay estimates that “in 1925... over 55,000 army workdays were lost to hemorrhoid treatment.”²⁸ Some saw the reason for the disease in Japanese-style toilets – Dr. Hirano Kōdō declared that “squatting over the latrine and exerting all one’s strength blocked circulation and caused blood congestion around the anus”,²⁹ thus toilets needed improvement. To meet the need many latrines with creative names were developed: the Taishō-toilet and Shōwa-toilet, the Home Ministry-style improved toilet, the Ministry of Health and Welfare-style improved toilet, but none of them got into popular use.

American occupation

On August 15th, 1945 Japan surrendered to the Allies and the American occupation started. As the victor, Allied Powers began to change Japan under slogans of liberalization and democratization, but they also set new standards of everyday life. Americans saw Japanese toiletry habits as unsanitary and looked down on them – Japan was urged to modernize its

toilets on the model of the American occupiers. We can imagine that for Japan, which believed in its higher sanitary standards and aspired to lead and set standards for other Asian countries in the Greater East Asia Co-Prosperity Sphere, such contempt was difficult to accept.

Night soil proved to be a problem. Japanese used to cook vegetables before eating them, but Americans were eating raw vegetables in salads and because of that there were many cases of soldiers infested with intestinal parasites. Foreigners saw night soil as filthy and were hesitant to eat Japanese food. When they saw night soil baskets on the street, which they called “honey baskets”, they ran away, but we can suppose the smell was more of a reason than some kind of a trauma. At the end of 1946, the American army set hydroponic farms, meaning farms that do not use soil in agriculture, for their exclusive use. Government eschewed usage of night soil and called for total replacement by chemical fertilizers, and they soon became the standard fertilizers in agriculture.

Japan was faced with the problem of what to do with the excess of human waste. As night soil was traditionally used as fertilizer, there was no public sewer system in Japan. In the 1930s, handling of human waste came under municipal management because there was not enough demand for it in big cities and especially Tokyo had problems with night soil removal.³⁰ Still, night soil was needed in rural areas, so a railway transport of night soil from cities to remote villages started. It is true that even before the postwar period some human waste had been disposed of by dropping it into adjacent waters, but most of it was used as fertilizer.³¹ But the American aversion made night soil nothing more than a shameful aesthetic hindrance and Japanese started to massively dump untreated human waste into rivers and the sea.

²⁶ Inoue 2013: 15-52.

²⁷ Bay 2012: 143, 147.

²⁸ Ibid.: 155.

²⁹ Ibid.: 148.

³⁰ Hoshino 2008: 192.

³¹ Nakamura 2010, 2015.

Environmental crisis

In 1956 the Cabinet Office released its annual economic white paper (*Keizai Hakusho*) which announced that “the postwar period is over” and the TV, refrigerator and washing machine became the symbols of economic revival. But when it came to the toilets, only 6% of the population was connected to sewer lines at the time,³² while most of Japanese had to rely on “vacuum cars” for human waste disposal. It is estimated that in 1961 as much as 44% of untreated waste water from Tokyo was dumped into the sea.³³ The major source of water pollution is industrial wastewater, but domestic sewage comes close in terms of degradation of the water environment. Finally in the 1960s environmental damage became a problem that could no longer be ignored: tankers were used to dump the waste as far as possible from the shores, but because of the reverse flow much of it came back to the bays. Some of the contractors did not actually stick to the rules to save some fuel. Dropping of untreated human waste into adjacent waters resulted in “yellow waves” in Tokyo Bay, yellowish fish in Osaka Bay and stinking shrimps in Hiroshima. Dokai Bay in Kita-Kyushu was so polluted that it was known as the “Dead Sea” and even *e.coli* bacteria could not survive in it! Western enforcement of their own sanitary standards and abrupt “modernization” of the Japanese toiletry habits resulted in serious deterioration of the environment.

As a key measure to prevent water pollution, the Japanese government revised the Sewerage Law in 1970. It brought new nationwide standards for water quality and a series of subsidized programs supported the construction of night soil facilities. From that time, the public sewerage system quickly spread in densely populated urban areas to become the main sanitation system from the late 1980s. Today it cov-



Fig. 3 Ship disposing human waste in the sea, 1968 (Takashima n.d.)

ers 77.6% of population.³⁴ In rural areas of Japan the onsite sanitation system (septic tanks) functions and access to improved sanitation are universal.

Washlets set the new standard

As the sewer system spread, so did the western-style toilets. They first appeared in Japan in harbors open to foreigners after the arrival of Black Ships of Commodore Perry in 1853, but did not gain popularity then. After WW2 western toilets started being installed in urban areas, but they came into popular use only after 1959, when they became the standard ones in newly built apartment houses. In 1977 the number of Western-style toilets sold in Japan surpassed that of Japanese-style toilets for the first time.³⁵

In 1980 TOTO introduced *washlets*—electric toilet seats with various other features, water spray cleaning after defecation being probably the most

³² Japan Sewage Works Association 2002: 7.

³³ Shibata 1961: 12.

³⁴ Japan Sewage Works Association 2015.

According to the Japan Sewage Works Association, after the 2011 Tōhoku earthquake and tsunami there are some places in Fukushima prefecture where it is impossible to estimate the coverage of sewer system, thus the prefecture was excluded from the statistics – this definitely had a great impact on the final rate.

³⁵ Ueda 2015.

well-known. Interestingly enough, the original came from... America. It was invented in 1964 by American Bidet Company for medical use by patients with hemorrhoids. Sells were not going too well, but TOTO saw the potential, improved the concept and introduced it as *washlet* in 1980. As of 2015 77.5% of homes in Japan have high-tech bidet toilets.³⁶ The *washlet* has become an international phenomena: it is appreciated not only in Japan, but maybe even more abroad! TOTO in a series of commercials aimed at foreigners coming to Japan introduce the country as “the *Washlet* country” and, well, they might not be wrong!

Conclusion

In this paper I analyzed how Japanese high-tech privies came to set the sanitary standards in the toilet industry. Analyzing the history of toiletry habits in Japan, I focused on the contact with the West and the Western pressure to alter toiletry habits in the country. As a result, human waste transformed from economic good through aesthetic hindrance to dangerous pollution.

Although Japan faced a serious environmental crisis, creative adaptation of Western standards led to the development of probably the best toilets in the world. Therefore one might think that all's well that ends well, but is it really so? Japan managed to deal with the environmental crisis, but let's remember that when it happened, the country was the second strongest economy in the world. As stated in the beginning of this paper, in many developing countries open defecation poses a serious public health, environmental and humanitarian issue. In India about 70% of Indians in rural and 13% in urban areas defecate in the open. But what is really surprising is that even people living in houses with access to a working toilet continue to relieve themselves in the open, suggesting that simply providing people with a toilet

does not solve everything.³⁷ Some even state bluntly: “*Locking us inside these booths with our own filth? I will never see how that is clean.*”³⁸ I do not mean to suggest that sanitation is not necessary, as it is a prerequisite for a healthy life. But I suggest that it is about time to understand that Western standards with their Western toilets do not necessarily fit in every context, thus they are not the best solution to everything. In order to truly improve sanitation, end open defecation and simply enable people to lead a healthy and safe life, it is absolutely essential to first consider each country's history and cultural background, and then adjust sanitation, as well as any other, facilities to the country's needs. Only when one understands what factors have shaped a country's toiletry habits can they try to improve them, from the bottom up.

References

- 1) Bay, A.R. (2012). Nation from the Bottom Up: Disease, Toilets and Waste Management in Prewar Japan. *Historia scientiarum. Second series: International Journal of the History of Science Society of Japan* 22(2), 142-158.
- 2) Bellah, R.N. (2003). *Imagining Japan: The Japanese Tradition and its Modern Interpretation*. University of California Press.
- 3) Bird, I.L. (2013). *Unbeaten Tracks in Japan*. Courier Corporation.
- 4) Biswas S. (2014, October 6). Why India's sanitation crisis needs more than toilets. *BBC News India*, Retrieved from <http://www.bbc.com/news/world-asia-india-29502603>
- 5) Braisted, W.C. (1906). *Report on the Japanese Naval Medical and Sanitary Features of the Russo-Japanese War to the surgeon-General, U.S. Navy*. Washington: Government Printing Office.
- 6) Cabinet Office, Government of Japan. (2015). *Shuyō taikyū shōhizai no fukyū; hoyū jōkyō [Survey on the Prevalence of Principal Consumer Durables]*. Cabinet Office, Government of Japan.
- 7) Campbell, G.J. (2014). Toilets Tell Truth about People: 150 Years of Plumbing for “Real Japan”. In Cobb R. (Ed.), *The Paradox of Authenticity in a Globalized World* (pp. 103-121). Palgrave Macmillan.
- 8) Fifield, A. (2015 December 15). How Japan's toilet obsession produced some of the world's best bathrooms. *The Washington*

³⁷ Biswas 2014.

³⁸ Mehrotra 2014.

³⁶ Cabinet Office, Government of Japan 2015.

- Post, Retrieved from <https://www.washingtonpost.com/news/worldviews/wp/2015/12/15/how-japans-toilet-obsession-produced-some-of-the-worlds-best-bathrooms/>
- 9) Frois, L.S.J., Reff, D.T., Danford, R., Gill, R. (2014). *The First European Description of Japan, 1585: A Critical English-Language Edition of Striking Contrasts in the Customs of Europe and Japan* by Luis Frois, S.J. Routledge.
 - 10) Hanley, S.B. (1987). Urban sanitation in preindustrial Japan. *Journal of Interdisciplinary History, Volume 18, Issue 1 (Summer, 1987)*, 1-26.
 - 11) Hoshino, T. (2008). Transition to Municipal Management: Cleaning Human Waste in Tokyo in the Modern Era. *Nichibunken Japan review* (20), 189-202.
 - 12) Inoue, T. (2013). *Risō darake no senjika nippon [Idealism of wartime Japan]*. Chikuma Shobō.
 - 13) Japan Sewage Works Association. (2002). *Making Great Breakthroughs - All about the Sewage Works in Japan*. Tokyo: Japan Sewage Works Association.
 - 14) Japan Sewage Works Association. (2015). *Gesuidō shori jinkō fukyūritsu [Population connected to wastewater collecting system]*, Retrived from <http://www.jswa.jp/rate/>
 - 15) Kaempfer, E., Bodart-Bailey, B.M. (1999). *Kaempfer's Japan: Tokugawa Culture Observed*. University of Hawaii Press.
 - 16) Kawabata, N. (2003). *Modernism on Paper: Japanese Graphic Design of the 1920s and 30s [Japanese Edition]*. Rikuyosha.
 - 17) Mansfield, S. (2009). *Tokyo: A Cultural History*. Oxford University Press.
 - 18) Matsui, A., Kanehara, M., Kanehara, M. (2003). Palaeoparasitology in Japan - discovery of toilet features. *Mem Inst Oswaldo Cruz. Vol. 98 (Suppl I)*, 127-136.
 - 19) Mehrotra, K. (2015). India's Toilet Race Failing as Villages Don't Use Them. Bloomberg August 4, Retrieved from <http://www.bloomberg.com/news/articles/2014-08-03/india-s-toilet-race-failing-as-villages-don-t-use-them>
 - 20) Nakamura, O., (2010). Disposal of human waste in Kyoto and water pollution. *Ningenkagaku*, 6, 213-239.
 - 21) Nakamura, O., 2015. Disposal of Human Waste in Osaka and Water Pollution. *Jinbungaku ronshū*, 33, 137-157.
 - 22) Ota kuritsu kyōdo hakubutsukan [Ota municipal museum]. (1997). *Toire no kōkogaku [Toilet archeology]*. Tōkyō bijutsu.
 - 23) Paramore, K. (2015). "Civil Religion" and Confucianism: Japan's Past, China's Present, and the Current Boom in Scholarship on Confucianism. *The Journal of Asian Studies*, v.74;2 (May): 269-282.
 - 24) Rinoie, M. (1988). *Kawayama mandara [Lavatory mandala]*. Setsukasha.
 - 25) Rogaski, R. (2004). *Hygienic Modernity: Meanings of Health and Disease in Treaty-Port China*. University of California Press.
 - 26) Shibata, T. (1961). *Nihon no seisō mondai: gomi to benjo no keizaigaku [Japan's cleaning problem: economy of garbage and toilet]*. Tōkyō: Tōkyō Daigaku Shuppankai.
 - 27) Takashima, E. (n.d.). *Japanese experiences of Sanitation and Sewage works History, law, organizations and present situation*. National Institute for Land and Infrastructure Management. Available at: <http://www.nilim.go.jp/lab/eag/japaneseexperiencesofsanitationandsewageworkstakashima.pdf>
 - 28) Terry, T.P. (1933). *Terry's Guide to the Japanese Empire: Including Chōsen (Korea) and Taiwan (Formosa) with Chapters on Manchuria, the Trans-Siberian Railway, and the Chief Ocean Routes to Japan; a Handbook for Travelers, with 8 Specially Drawn Maps and 23 Plans*. Houghton Mifflin.
 - 29) Tokyo Metropolitan Government Bureau of Sewerage. (1978). *Tōkyōshi gesuidō enkakushi [History of sewage system of Tokyo]*. Tokyo Metropolitan Government Bureau of Sewerage.
 - 30) Ueda, M. (2015, February 13). TOTO Have Changed the Japanese. *Tokyo Business Today*, Retrieved from <http://toyokeizai.net/articles/-/59449>