

Transition to Municipal Management: Cleaning Human Waste in Tokyo in the Modern Era

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The purpose of this article is to clarify how and when the disposal of human waste in Tokyo changed from private to municipal management and to consider the City of Tokyo's reaction to the collapse of the system of circulation of human waste. Previous studies have focused on the value of human waste and the political conflict between farmers, landowners, and the city government over waste management. These studies have not focused on the transition to municipal management and therefore have ignored the economic side of this story during the Meiji, Taishō and Shōwa eras. By describing the characteristics of the waste disposal business and showing the necessity of transition to municipal management, I identify the factors underlying the decrease in the value of human waste and the process of the City of Tokyo's intervention. In the Edo and Meiji eras, night-soil peddlers bought human waste and removed it from the city because it had value as fertilizer. But by the Taishō era, this system ceased to be effective. Changes produced by urbanization, the development of chemical fertilizer, and inflation had adverse consequences for night-soil peddlers. More importantly, the hygiene of Tokyo was compromised. For sanitary reasons and to resolve problems arising from different rates and qualities of service between Shitamachi and Yamanote, the City of Tokyo municipalized the management of human waste removal and established a new infrastructure. To trace the transition to municipal management, this essay draws on contemporary newspapers and journals such as *Miyako shinbun* and *Kōshū eisei* as well as official documents.

Keywords: HUMAN WASTE, MUNICIPAL MANAGEMENT, TAISHŌ ERA, NIGHT-SOIL PEDDLER, TOKYO CITY ASSEMBLY, FILTH CLEANING LAW, PARASITIC DISEASE, CHEMICAL FERTILIZER, SEWAGE SYSTEM, GOTŌ SHINPEI

The purpose of this article is to clarify how and when the disposal of human waste in Tokyo changed from private to municipal management and to show how the City of Tokyo reacted to the collapse of the system of circulation of human waste that had been inherited

from the early modern city of Edo. Previous studies have focused on the value of human waste and the political conflict over waste management between farmers, landowners, and the city government.¹ These studies have not focused on the transition to municipal management and therefore have ignored the economic side of this story during the Meiji, Taishō, and Shōwa eras. In order to identify the characteristics of waste disposal business and demonstrate the necessity of transition to municipal management, I analyze the factors that accounted for a decrease in the value of human waste and I examine the process of the City of Tokyo's intervention.

In the Edo and Meiji eras, night-soil peddlers bought human waste because it had value as fertilizer.² Because of this system, hygiene was better in Tokyo than Paris and London. By the Taishō era, however, this system became ineffective. Urbanization, the development of chemical fertilizer, and general inflation combined to drive down the value of human waste. Consequently, the night-soil peddlers suffered and the hygiene of Tokyo was also compromised. For sanitary reasons and in an effort to resolve issues arising from different rates and qualities of service between low-lying Shitamachi 下町 areas and hilly, primarily residential Yamanote 山の手 areas, the City of Tokyo made the management of human waste a municipal service, establishing infrastructure and subsidizing the collection of night-soil. By the end of the early part of the Shōwa period, the city government had altered the local environment inside and outside the city, changing (and improving) the relationship between humans, their waste, and the ecology of water-borne diseases like typhoid, cholera and dysentery.

The research for this article involved close examination of a variety of municipal sources, including transcripts of the proceedings of the City Assembly (*Tōkyō Shikai giji sokkiroku* 東京市会議事速記録), a report on human waste in the city (*Shinai shi'nyō chōsasho* 市内屎尿調査書), several reports and surveys on human waste management practices in Tokyo (*Tōkyō-shi shi'nyō shori shiei ni tsuite* 東京市屎尿処理市営に就て, *Tōkyō-shi shi'nyō shobun chōsa gaiyō* 東京市屎尿処分調査概要, *Honshi shi'nyō unpan nōritsu chōsa hōkoku* 本市屎尿運搬能率調査報告, *Tōkyō-shi (kyūshibu) shi'nyō shobun chōsa gaiyō* 東京市(旧市部)屎尿処分調査概要, and *Shinshiiki shi'nyō shobun shiei keikaku ni tsuite* 新市域屎尿処分市営計画に就て), the official bulletin of the City of Tokyo (*Tōkyō-shi kōhō* 東京市公報), a city newspaper (*Miyako shinbun* 都新聞), journals and treatises on public hygiene and sanitation (*Kōshū eisei* 公衆衛生 and *Seisō monogatari* 清掃物語), and histories of sanitation (*Seisō jigyō 300 nen* 清掃事業300年 and *Tōkyō Seisō Kyōkai enkakushi* 東京清掃協会沿革史).

1. Cleaning Human Waste in the Edo and Meiji Eras

In the Edo period, human waste had value, and farmers and night-soil peddlers bought it. By the beginning of the eighteenth century, that is by the Genroku 元禄 and Hōei 宝永 periods, farmers and night-soil peddlers were exchanging money for human waste.³ This situation did not change in the Meiji era. Farmers and night-soil peddlers continued to purchase human waste from urban residents. Four decades after the Meiji Restoration, human waste generated revenue in every ward of the City of Tokyo, although the price differed from ward to ward. The value in 1907 for the whole city was 640,022 yen.

Figure 1. Map of the City of Tokyo



Note: Yamanote ward names are underscored and in italic. Shitamachi ward names are in bold roman type.

Table 1. Price of Human Waste Per Annum in 1907 (Unit: yen)

<u>Ward</u>	<u>Revenue from night soil</u>
Kōjimachi 麹町	21,008
Kanda 神田	59,314
Nihonbashi 日本橋	61,093
Kyōbashi 京橋	67,464
Shiba 芝	75,589
Azabu 麻布	29,101
Akasaka 赤坂	27,392
Yotsuya 四谷	22,101
Ushigome 牛込	30,628
Koishikawa 小石川	30,134
Hongō 本郷	31,145
Shitaya 下谷	36,731
Asakusa 浅草	64,696
Honjo 本所	45,951
Fukagawa 深川	37,669
Total for City of Tokyo	640,022

Source: Tōkyō Shiyakusho 1907a, pp. 17–19. Note that the ward figures shown here add up to 640,016; the reported total figure for the city is greater because it includes the total of fractions of yen (i.e., sen) that were truncated from the ward figures in accordance with a reporting convention.

This value of human waste was reflected in the Filth Cleaning Law established in 1900. The fifth article of that law provided that the municipality had to clean various waste, but the twenty-second article excluded human waste from waste that it was required to clean.⁴ Responsibility for cleaning human waste was left to landlords, and night-soil peddlers continued to buy and sell human waste. The reason for the exclusion of human waste from the legislation was that it had market value, and the city did not want to change the relationship between night-soil peddlers, landlords, and farmers.⁵ Well into the modern era, then, the Edo-period system of waste management proved durable.

2. Introduction of Charges for Cleaning Services

In the Taishō era, the value of human waste fell, and its disposal came to a standstill. An increase in population and a decrease in farmland coincided with a transition to other kinds of fertilizer. Demand for human waste fell, and so did its value.⁶ Additionally, what has been called “general inflation” added to the woes of night-soil peddlers.⁷

In the face of these changes in their operating environment, night-soil peddlers began charging for their services. In 1918, two night-soil collection associations, the Minami-Katsushika Hiryo Kumiai 南葛飾肥料組合 and the Toshima Hiryo Kumiai 豊島肥料組合, merged to form the Tōkyō Fun’nyō Hiryo Kumiai 東京糞尿肥料組合. In April that year, they held a general meeting to deliberate fees at the Kinsenkan 金泉館 in Hongō ward.⁸ Night-soil peddlers were experiencing a decline in their livelihood. The history of the sanitation business, *Seisō jigyo 300 nen*, attributes the deterioration to four principal factors: a rise in wages because of price increases, a fall of the market price of human waste, an increase in use of other fertilizers and avoidance of human waste, and a reduction of farms which demanded human waste.⁹ In their April 1918 general meeting, some night-soil peddlers insisted that to survive, they had to begin charging for their services. It was especially peddlers who worked the Yamanote who argued that because it had become difficult to sell human waste, they needed to begin collecting fees for the service of waste removal.¹⁰

Some of the leading members of the Tokyo Fun’nyō Hiryo Kumiai, however, resisted the notion of establishing new service charges. The association split into conservative and radical factions, and soon the night-soil peddlers who demanded the institution of fees for their services withdrew from the Tōkyō Fun’nyō Hiryo Kumiai. Organizing a rival association, the Kanda Eisei Dogyo Kumiai 神田衛生同業組合, they went to the police headquarters (Keishichō 警視庁)—the police had jurisdiction over human waste collection—and pled the case for inaugurating fees for their services.¹¹

By the latter half of 1919, the Keishichō was persuaded, and the proposal to charge fees was approved.¹² Leading members of Tokyo Fun’nyō Hiryo Kumiai abandoned their opposition to the reformers, and they too began charging for their services. First, night-soil peddlers started charging in Kōjimachi and Kanda. Fees were not instituted simultaneously in all parts of the city. The section of the city administration that was responsible for hygiene, Tōkyō-shi Eiseika 東京市衛生課, observed that the practice of charging fees was implemented first in Yamanote areas, then spread to Shitamachi areas.¹³ In Shitamachi, night-soil peddlers still bought human waste in 1920.

The reason for the difference was a disparity in transportation costs. The main mode of transportation in Yamanote was by land, and in Shitamachi, by water. While most night-soil peddlers in Yamanote used handcarts, those in Shitamachi used barges.¹⁴ Compared with Shitamachi, transportation costs in Yamanote were high.¹⁵ Expansion of the area in which fees were imposed was influenced by this difference of transportation.

During the latter half of Taishō era and the beginning of Shōwa era, this situation gradually changed and night-soil peddlers came to charge for their services throughout the City of Tokyo, including Shitamachi. The city investigated the pricing of waste cleaning service, and the result of this investigation showed that the fee-for-service area had spread throughout the city.¹⁶ We see from Table 2 that the monthly fee per house differed according to location, with the average of Shitamachi areas being 0.46 yen and that of Yamanote areas 0.61 yen in 1933. This data attests to the spread of fee-for-service waste removal to Shitamachi, and shows that fees remained higher in Yamanote, where transportation costs were high, than in Shitamachi.

Table 2. Monthly Fee Per House for Waste Removal, 1933 (Unit: yen)

<u>Shitamachi wards</u>	<u>Fee</u>	<u>Yamanote wards</u>	
Nihonbashi	0.62	Kōjimachi	0.97
Kyōbashi	0.59	Shiba	0.62
Kanda	0.62	Akasaka	0.58
Shitaya	0.46	Azabu	0.56
Asakusa	0.44	Yotsuya	0.57
Honjo	0.37	Ushigome	0.58
Fukagawa	0.39	Koishikawa	0.58
Average	0.46	Hongō	0.58
		Average	0.61

Source: Tōkyō Shiyakusho 1933b, pp. 16–17.

Once the Keishichō had granted night-soil peddlers permission to charge for their services, the rate of decline in waste removal slowed. From the latter half of the Taishō era through the beginning of Shōwa, fee-for-service practices spread from Yamanote to Shitamachi.

3. Problems of Cleaning Human Waste after Introduction of Charges

Before 1918, with the number of night-soil peddlers decreasing, the problem of removal of human waste had become more and more acute. The *Miyako shinbun* in December 1918 quoted a resident of Shitaya on the situation: “I have trouble getting rid of human waste. On 17 November, a night-soil peddler told me that he wouldn’t clean human waste, and other night-soil peddlers also told me that they wouldn’t remove it because cleaning human waste didn’t pay.”¹⁷ Compared with the Meiji era and the first half of the Taishō era, the price of human waste was low, and as a result, the motivation of night-soil peddlers had fallen.

Even after fees began to be collected for human waste removal in Shitamachi as well as Yamanote areas, the problem of cleaning human waste remained extremely large and difficult across the whole city, and hygienic conditions continued to deteriorate.¹⁸ Parasitic diseases and water-borne diseases such as dysentery and typhoid increased in incidence.¹⁹ It was epidemics, or the fear of them, that spurred the transition from private ownership to municipal management in Tokyo waste removal.

The journal *Kōshū eisei*, published by the national hygiene association Dainihon Shiritsu Eiseikai 大日本私立衛生会, reported frequent outbreaks of parasitic diseases in the early years of Shōwa. It identified *kaichū* 回虫 and *jūnishichōchū* 十二指腸虫 as the most common parasitic worms. According to medical reports, most people had *kaichū*, and half the population had *jūnishichōchū*.²⁰ *Kaichū* caused diarrhea and stomachache in children, who had low resistance; *jūnishichōchū* caused anemia.²¹ These two parasitic worms were infectious through human waste. Vegetables from farms that used human waste for fertilizer often carried the parasites. In order to solve the problem of parasitic diseases, city health officials and citizens focused new attention on cleaning human waste and improvement of fertilizer.

Dysentery and typhoid, infectious diseases spread by contact with human waste, contaminated water or vegetables, and flies, were especially worrisome.²² Failures in the systems of cleaning human waste caused epidemics of dysentery and typhoid not only in farm villages but also in cities. In the City of Tokyo, disease crises, along with improved understanding of the etiology of the diseases, finally brought about realization that removal of human waste was a vital public health issue.

At the same time, issues arising from different rates and qualities of service between Shitamachi and Yamanote also appeared. As already noted, compared with Shitamachi where night-soil could be carried away by barge, in Yamanote, overland transport was hard, and complaints about cleaning human waste frequently appeared.²³ In Yamanote, the number of night-soil peddlers decreased, human waste removal grew harder and harder, and the peddlers who remained in the business attempted to raise their prices to a level that householders regarded as expensive.²⁴ As Table 2 shows, the average service fee was higher in Yamanote than in Shitamachi. Especially in the Kōjimachi and Shiba wards of Yamanote, compared with other areas, the price of cleaning service was very high.²⁵

4. Transition to Municipal Management

City of Tokyo officials understood that hygienic conditions were deteriorating and that the different rates and qualities of service between Shitamachi and Yamanote were sources of popular dissatisfaction. The city government intervened. It created new mechanisms for paying the expenses of collecting human waste and building infrastructure for waste disposal.

Talk of conversion to municipal management first appeared in the late Meiji period. In the Tokyo City Assembly meeting of 3 June 1907, it was decided to investigate the problems and prospects of municipal management.²⁶ The City of Tokyo would sell human waste and spend the income improving sewage.²⁷ But the old system still seemed to work, and so the city took no action as a result of the investigation. It was decided in Tokyo City Assembly of 18 December 1908 that replacement of privately provided waste disposal services with a municipally managed service was unnecessary.²⁸

More than a decade later, in February 1919, a movement to consider concrete plans emerged. Its proponents argued that the City of Tokyo needed to build infrastructure and take responsibility for cleaning human waste.²⁹ That month, the city appropriated extraordinary funds of 5,000 yen to support expanded activity in sanitation services.³⁰ The city's intervention was motivated primarily by the standstill in human waste cleaning service in Yamanote areas.

In December 1919, the city began cleaning human waste in Shitaya, Koishikawa, Hongō, Asakusa and Ushigome.³¹ The budget for this purpose was 20,000 yen, an insufficient amount to cover the costs of frequent collection of human waste. Inescapably this meant that the frequency of human waste removal was low. Moreover, Azabu ward was not included along with the other Yamanote wards. The city remained far from resolving its human waste cleaning problem.³²

There was also a shortage of final disposal sites.³³ The city government deliberated plans for building more infrastructure as well as for transferring the activity to municipal management. Improvement of sewage disposal and toilet systems was proposed as the fundamental solution. In 1920, *Miyako shinbun* said, "If we aimed at fundamental solutions, we would need to wait for the completion of a sewage system, and human waste problems could be solved".³⁴ It was obvious, however, that the improvement of a sewage system would take a long time. It was not seen as suitable way for addressing the dire current situation. *Miyako shinbun* stated that "it would take the City of Tokyo more than ten years to complete sewage construction";³⁵ facing a health crisis, officials and citizens alike were seeking quicker results.

During the tenure in office of Mayor Tajiri Inajirō 田尻稲次郎, the City of Tokyo planned construction of an ammonium sulphate plant. This plan called for the city to build its own ammonium sulphate plant and run it as a new final disposal site.³⁶ The plant would use human waste to make ammonium sulphate, and the city would sell the ammonium sulphate for a profit. At the outset, the City of Tokyo forecast that "if the city disposes of human waste and makes ammonium sulphate, the city will earn about 500,000 yen a year."³⁷ Plant construction costs were estimated at about 2 million yen, a figure that was high enough to render an immediate start impossible. The Tokyo City Assembly began considering alternatives—a two-year plan or a three-year plan, with different budget scenarios.³⁸

But the interest of the city and that of citizens appeared to conflict, and no decision was reached.³⁹ Tajiri resigned as mayor after a corruption case involving public works came to light.⁴⁰ Gotō Shinpei 後藤新平, originally trained as a medical doctor and renowned as a colonial administrator, succeeded him in the Tokyo city office.

In February 1921, Gotō withdrew the plan of building an ammonium sulphate plant and put forward instead his own set of plans. He recognized that the fundamental solution required improvement of the sewage system, and he called for that. He supplemented this long-term project with emergency stopgap measures, namely expansion of the transportation routes and transportation of human waste to Saitama prefecture by train.⁴¹

Because the plan to build an ammonium sulphate plant would have taken as many as three years to complete and was not supported by chemical research, that plan was withdrawn.⁴² It became known that making ammonium sulphate from human waste was more expensive than other methods of making ammonium sulphate.⁴³ This was also a factor in the

abandonment of Tajiri's plan.

Aware that fundamental improvement of sewage and toilet systems would take a long time, Gotō and the City of Tokyo put emphasis on short-term fixes rather than the fundamental plans. The city installed simple sewage in Shitaya and Asakusa, and it arranged for freight trains to provide expanded service in the area where human waste was used in Yamanote and outside the City of Tokyo.⁴⁴

The idea of mobilizing rail transportation for human waste disposal had been discussed from the time of Mayor Tajiri, and the city of Tokyo had tried to secure railroad cooperation.⁴⁵ Under Mayor Gotō, concrete progress finally began to appear, but the Tokyo Railroad Bureau rejected a proposal to build a railroad exclusively for this purpose. The Railroad Bureau pronounced its judgment in unvarnished language: "This plan is very foolish. It would cost about 500,000 yen to build an exclusive railroad and trains."⁴⁶

The City of Tokyo thereupon shifted its efforts to entering into contracts with surrounding counties and private railroads. In July 1921, a contract with Iruma 入間 county in Saitama prefecture facilitated the rail transportation of human waste by the Tōjō 東上 and Musashino 武蔵野 railroads. It was decided that these carriers would transport human waste from Yamanote (from Ushigome, Hongō, and Koishikawa, for example) to Iruma county. Further, the City of Tokyo allocated 103,000 yen for building human waste tanks along the Tōjō and Musashino railroads.⁴⁷

As a first step toward the long-term solution to the waste problem, sewage regulations were established in 1921. A sewage disposal center began operations at Mikawajima, and human waste was included as an object of sewage disposal.⁴⁸ In 1900, when the Filth Cleaning Law and Sewage Law had been established, human waste was not regarded as among the objects of sewage disposal. But by 1921, the value of human waste had fallen, and it had become necessary to revise the coverage of the Sewage Law.⁴⁹

On 14 July 1921, the standing committee on hygiene of the City of Tokyo passed a "Human Waste Makeshift Plan." The city began transporting human waste from Yamanote wards by train, disposing of it in a sewage system in Shitaya and Asakusa.⁵⁰ In October 1921, the transition to municipal management got underway in earnest in Ushigome, Koishikawa, and Hongō.⁵¹ The following April, the area of municipal management expanded into Shitaya and Asakusa.⁵² Municipal service was inaugurated in Kōjimachi, Shiba, Akasaka, and Yotsuya in October 1922.⁵³ Because cleaning human waste under municipal management in Ushigome, Koishikawa, and Hongō went well, municipalization was readily accepted in other areas.⁵⁴ While the Great Kantō Earthquake of 1 September 1923 radically changed the City of Tokyo, it had no immediate influence on the system of disposal of human waste.

After the earthquake, hygienic problems and human waste problems became important issues all across the country. Eventually, on 17 May 1930, the government revised the 1900 Filth Cleaning Law. The amended law institutionalized municipal service, making cleaning human waste an obligation of cities, towns, and villages. For the service of collecting and disposing of human waste, municipalities were permitted to collect fees.⁵⁵

The City of Tokyo, however, decided to postpone the expansion of municipal management to the entire city for four years.⁵⁶ During that time, the city prepared for the transition to municipal management. At the beginning of the Shōwa period, Tokyo established a municipal system for disposing of human waste, improved infrastructure, and decided how

much the city should collect in terms of service and disposal charges. The city improved the quality of cleaning human waste and advanced transition to municipal management.

With respect to infrastructure improvements, the spread of motor vehicle transportation provided the impetus for some road-building, and construction of more tanks for human waste disposal treatment continued the progress that had begun in the Taishō era.⁵⁷ The City of Tokyo investigated motor vehicle transportation in 1932, compiling data on mileage and costs and concluding that motor vehicles, which provided fast and suitable transport, could improve hygienic conditions.⁵⁸ After this investigation, motor vehicle transportation increased, especially in Saitama and Chiba prefectures. By 1935, motor vehicle transportation had increased to five times the level of 1931, while ship transportation fell by half in the same four-year period.⁵⁹

After the revised Filth Cleaning Law came into effect, the Tokyo City Assembly discussed construction of final disposal plants and human waste tanks, and took actions to improve these facilities.⁶⁰ The policies it adopted came to be regarded as important factors for realizing the transition to municipal management. On 31 October 1934, for example, the assembly determined that the service charge for human waste disposal would be set at 10 *sen* 銭 per barrel.⁶¹ In the discussion leading up to that decision, the assembly debated whether charges should be the same or different in Shitamachi and Yamanote wards. In the end, it adopted an equal service charge for the whole of the City of Tokyo.⁶²

After these preparations, the city took responsibility for cleaning human waste in old city areas, beginning from November 1934.⁶³ The new system combined direct management and contract arrangements. The quantity of waste disposed of by the direct management system was about 1,900 *koku* 石 per a day, while that dealt with by contractors was 9,900 *koku*.⁶⁴ According to an investigation of December 1933, the city disposed of 1,200 *koku* per a day, night-soil peddlers disposed of 9,800 *koku*, and farmers disposed of 1,000 *koku*.⁶⁵ Following implementation of the new system, the waste that had formerly been handled by night-soil peddlers came to be disposed of through the contract system. The disposal capacity of the city at that point was 11,800 *koku* a day, through direct management and contract system channels.⁶⁶

By November 1936, Tokyo was able to extend its management to the areas (counties) of Tokyo urban prefecture that lay outside the city limits.⁶⁷ At the beginning, because many farms remained in these old county areas or nearby prefectures, night-soil peddlers and farmers themselves were still capable of providing adequate human waste removal service. But after the system of cleaning human waste under municipal management proved itself efficient in old city areas, the City of Tokyo expanded its coverage to surrounding communities.⁶⁸

Conclusion

By concentrating on the economic conditions and public health considerations that made it impossible for the modern City of Tokyo to continue to live with the arrangements for human waste removal that had been inherited from the early modern city of Edo, this article has illuminated the process of transition from private to municipal management. Previous studies have not provided a sufficient explanation of the reasons for this transition. Emphasizing conflict between farmers, landowners, and the city government, such studies underestimated the importance of the falling value of human waste and the seriousness of declining hygienic conditions,

Here I reviewed how an increase in population and decrease in farmland, the introduction of other fertilizers in preference to night-soil, and inflation decreased the value of human waste and consequently the profit level of the night-soil peddlers who had been essential service providers in the traditional waste removal system. As the market for night-soil as fertilizer declined, the old system fell apart, and fecal-oral route epidemic diseases increased. Hard-pressed to survive these changes, peddlers began charging fees for their services, but the problems associated with the cleaning of human waste were not resolved by the introduction of fees. Deterioration of hygienic conditions and differences from one ward to another in quality of service and fee levels became serious problems. The City of Tokyo was impelled to intervene.

This article described the city's actions to improve sanitation between 1919 and 1936. Tajiri Inajirō and Gotō Shinpei, successive mayors, offered contrasting schemes, but both promoted an increased role for the city. After the Filth Cleaning Law was revised in 1930, the city improved its infrastructure for cleaning human waste, and set new service rates for human waste removal and disposal. The transition to municipal management can be said to have been complete in old city areas by 1934, and in bordering areas outside the city limits by 1936. This case is highly instructive as we evaluate the roles of cities, towns, and villages in the modernization of Japan's sewage systems.

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NOTES

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- 6 Fujiwara 1928, pp. 18–19.
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- 9 Tōkyō Kankyō Hozen Kyōkai 1977, p. 98.
- 10 Mogi 1960, p. 40.
- 11 Ibid., p. 41.
- 12 Ibid., p. 42.
- 13 “Komatta mondai shiei ka tokkyo ka” 困った問題 市営か特許か. *Miyako shinbun*, 23 December 1920.
- 14 Tōkyō Shiyakusho 1907a, pp. 27–31.
- 15 “Sendō no ko (1)” 船頭の子 (一). *Miyako shinbun*, 23 September 1918; “Sendō no ko 2” 船頭の子 (二). *Miyako shinbun*, 27 September 1918.
- 16 Tōkyō Shiyakusho 1929, pp. 8–9.
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- 19 “Yamanote mo shitamachi mo fun’nyō zeme” 山の手も下町も糞尿攻め. *Miyako shinbun*, 25 November 1919.
- 20 “Kiseichū no hanashi” 寄生虫の話, *Kōshū eisei* 49:2 (1931), p. 104.
- 21 *Ibid.*, pp. 105–109.
- 22 “Chifusu ya sekiri wa dōshite utsuru” チフスや赤痢はどうして感染る, *Kōshū eisei* 56:7 (1938), pp. 415–416.
- 23 Mogi 1960, p. 44.
- 24 “Fun’nyō zeme no Tokyo shimin” 糞尿攻めの東京市民, *Miyako shinbun*, 10 November 1920.
- 25 *Ibid.*
- 26 Tōkyō Shiyakusho 1907c, pp. 86–87.
- 27 Tōkyō Shiyakusho 1907b, p. 11.
- 28 Tōkyō Shiyakusho 1908, p. 198.
- 29 “Obutsu no shobun wa (jō)” 汚物の処分は (上), *Miyako shinbun*, 8 February 1919.
- 30 Mogi 1960, p. 44; “Fun’nyō no shimatsu” 糞尿の始末, *Miyako shinbun*, 12 February 1919.
- 31 “Fun’nyō no kumitori wa shiei ni kagiru to” 糞尿の汲取は市営に限ると, *Miyako shinbun*, 27 December 1919.
- 32 *Ibid.*
- 33 Mogi 1960, p. 45.
- 34 “Fuketsu na Tōkyō (1)” 不潔な東京 (一), *Miyako shinbun*, 18 January 1920; “Fuketsuna Tōkyō (4)” 不潔な東京 (四), *Miyako shinbun*, 21 January 1920.
- 35 “Fuketsu na Tōkyō (5)” 不潔な東京 (五), *Miyako shinbun*, 22 January 1920.
- 36 “Fun’nyō shiei no keikaku” 糞尿市営の計画, *Miyako shinbun*, 22 April 1920.
- 37 “Fuketsuna Tōkyō (6)” 不潔な東京 (六). *Miyako shinbun*, 23 January 1920.
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- 40 Tajiri Sensei Denki Oyobi Ikō Hensankai 1933, pp. 116–119.
- 41 “Tōkyō fun’nyō shobun’an” 東京糞尿処分案, *Miyako shinbun*, 12 February 1921
- 42 “Fun’nyō shobun kekkyoku shiei ka” 糞尿処分 結局市営か, *Miyako shinbun*, 13 February 1921.
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- 44 “Fun’nyō shobun’an naiyō” 糞尿処分案内容, *Miyako shinbun*, 23 June 1921; “Kugatsu yori fun’nyō shobun” 九月より糞尿処分, *Miyako shinbun*, 15 July 1921.
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- 49 Nihon Gesuidō Kyōkai Gesuidōshi Hensan linkai 1986, pp. 51–56, 69.
- 50 “Kugatsu yori fun’nyō shobun” 九月より糞尿処分, *Miyako shinbun*, 15 July 1921; “Tōkyō-shi Sanjikai” 東京市参事会, *Miyako shinbun*, 23 July 1921.
- 51 Tōkyō Shiyakusho, *Tōkyō-shi kōhō* no. 657 (1921), p. 549.
- 52 Tōkyō Shikai Jimukyoku 1936, pp. 547, 550; Tōkyō Shiyakusho, *Tōkyō-shi kōhō* no. 713 (1922), p. 113; Tōkyō Shiyakusho, *Tōkyō-shi kōhō* no. 731 (1922), pp. 237, 240.
- 53 Tōkyō Shiyakusho. *Tōkyō-shi kōhō* no. 779 (1922), p. 578.
- 54 “Obutsu shobunjo kensetsu ni hantai” 汚物処分所建設に反対. *Miyako shinbun*, 27 January 1922.
- 55 Kojima 1961, pp. 181–182.

- 56 Mogi 1960, p. 49.
 57 Kojima 1961, pp. 224, 226–228; Tōkyō Shiyakusho 1933a, pp. 1, 36–37; Nihon Gesuidō Kyōkai Gesuidōshi Hensen Iinkai 1986, pp. 137–138.
 58 Tōkyō Shiyakusho 1933a, pp. 1, 36–37.
 59 Kojima 1961, pp. 224, 226–228.
 60 Tōkyō Shikai Jimukyoku 1938, pp. 746–747; Nihon Gesuidō Kyōkai Gesuidōshi Hensen Iinkai 1986, pp. 137–138; Tōkyō Shikai Jimukyoku 1939, pp. 1130–1131.
 61 1 *sen* = 0.01 yen. 1 barrel = 0.5 *ka* 荷 = approximately 36 liters. Tōkyō Shikai Jimukyoku 1939, p. 1144.
 62 *Ibid.*, pp. 1140–1143.
 63 Tōkyō-shi Hokenkyoku 1934, p. 9.
 64 *Ibid.*, p. 11.
 65 *Ibid.*, pp. 6–7.
 66 *Ibid.*, p. 9.
 67 Tōkyō Shiyakusho 1936, pp. 2–3.
 68 *Ibid.*, pp. 2–3, 18–20.

要旨

近代東京における屎尿処理の市営化

星野高德

本稿の目的は、近代東京において屎尿処理の市営化がいつ、どのように行われたのかを明らかにし、屎尿の循環システムの崩壊に対する東京市の対応について考察することである。先行研究では、屎尿の経済的価値をめぐる農民、地主・家主、市の政治的な対立関係を明らかにしたものは見られるが、市営化の具体的な過程とその背景にある屎尿の経済的価値の低下については言及されてこなかった。屎尿の経済的価値が低下した要因や東京市の介入過程を明らかにすることは、廃棄物処理ビジネスの特徴や市営化の必要性について考える上で有用であろう。江戸・明治期においては、屎尿が肥料としての価値を有していたため、屎尿処理業者は屎尿の買取処理を円滑に行うことができた。しかし、大正期になると、都市化、化学肥料の発展、物価上昇などの影響で、この処理システムが崩れることになった。その結果、屎尿処理業者は苦しい状況に追い込まれ、東京の衛生は悪化することになった。衛生的要因と下町・山の手の価格・サービス格差を改善するために東京市は屎尿処理業を市のサービスとし、インフラの整備を進めた。本稿では、『都新聞』、『公衆衛生』、公文書などを利用して、論証していくことにする。