

Attacked by Excrement: The Political Ecology of Shit in Wartime and Postwar Tokyo

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Abstract

The Pacific War permanently transformed the political ecology of excrement in the Greater Tokyo area. Since the Edo period (1603–1868), a network of commercial night soil collectors had operated in the city, emptying its latrines for use as fertilizer. Although increasingly subject to strain in the interwar period, the system adapted enough to obviate significant municipal investment in sewer construction. Wartime mobilization and fuel shortages, however, pushed these night soil distribution networks to the breaking point, leading to an “attack by excrement.” The municipal government responded to the crisis by mobilizing residents’ associations and suburban commuter trains, sidelining commercial collectors in the process. The immediate postwar period further destabilized the old political ecology: a black market in excrement briefly flourished, only to subside with the rapid proliferation of commercial fertilizer. Finally, Occupation government personnel, upon encountering the chaotic postwar night soil trade, expressed contempt for what they viewed as a backward, inherently unhygienic custom. The Tokyo metropolitan government internalized this

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“colonizing nostril” during the run-up to the 1964 Olympics, when it finally decided to invest in a comprehensive wastewater sewer system for the city. Attention to the wartime political ecology of excrement illuminates how home front societies have responded to the unforeseen pressures of total war, and reveals the fundamentally contingent nature of embedded enviro-technical networks such as night soil distribution and sewer infrastructure. 5

INTRODUCTION

Toward the end of the Pacific War, shit attacked Tokyo. Wartime mobilization and fuel shortages severely disrupted existing networks of night soil disposal throughout the city. As one resident recalled, “toilets in every home were brimming. Night soil collectors refused to come, leading to arguments in every household.” A salaryman, shooed from the family latrine by his wife, would rush to work with sphincter clenched, only to find the office lavatory stalls already filled with coworkers. “It makes a funny story now but at the time it was a very serious problem that we all sweated about endlessly. . . . Just as [medieval warlord] Hideyoshi had attacked Shimizu Castle by flooding it with water, so the city of Tokyo was attacked by excrement.”¹ 10 15 20

Nothing permeates the membrane between nature and culture quite so effectively as shit. The act of excreting reminds us that “the epidermis is only in the most superficial way an indication of where an organism ends and its environment begins.”² As Alexander Bay puts it, the rectum “was one of the spaces where bodies and landscapes interfaced.”³ Given this, the wartime “attack of urine and excrement” (*fun'nyō-zeme* 糞尿攻め) was an unusual kind of urban environmental crisis, one that confronted Tokyoites during one of their most intimate bodily acts.⁴ It forced the municipal government to enact a series of emergency excrement disposal measures, mobilizing suburban commuter trains and urban residents via neighborhood associations, while also stimulating a vibrant black market in excrement that would last through the early postwar years. The crisis led to a permanent reorganization in Tokyo's excrement distribution and may even have hastened the eventual obsolescence of night soil use throughout the Greater Tokyo region and the rest of Japan as well. 25 30 35

Any environmental history of excrement must account for how societies have grappled with the dual aspects of the substance: potentially both agronomic resource and sanitary hazard. For instance, agricultural societies the world over have recognized shit's utility as a soil nutrient. Night soil was used by farmers in Europe long before Justus von Liebig identified excrement's high nitrogen content as the 40

source of its potency.⁵ In East Asia the custom is, if anything, even more venerable: excrement's association with agriculture is baked into the very ideograph *shi* 屎, written as "rice" below "human body." (The oldest known inscription of this character, carved into a fragment of turtle shell used in a Chinese augury ritual, dates to 1700 BCE.⁶) In Japan, too, agronomists extolled excrement's value as a fertilizer: "Waste not a single drop of shit . . . for shit nourishes the land."⁷ Agronomical manuals dating to the sixteenth century spelled out how human excrement could be combined with other forms of organic matter before being applied to the soil of vegetable plots. They also displayed acute awareness of the political ecology of shit within an agricultural context. The *Seiryōki*, perhaps the earliest extant Japanese agronomic text, bemoans how "during floods excrement is spread evenly, so that farmers downhill can take their neighbors' fertilizer without working."⁸

Densely populated cities such as Osaka, Kyoto, and Edo (now Tokyo) made for an obvious source of night soil, and urban landlords regularly contracted to sell the contents of their latrines to farmers or commercial fertilizer dealers.⁹ In 1831, for instance, the physician Takizawa Bakin recorded in his diary how a farmer offered him three hundred radishes per year in exchange for the right to empty his household cesspit.¹⁰ This system, later known as *nōson kangen* (農村還元 "returning [excrement] to the farming villages from whence it came"), in retrospect seems to have worked rather well.¹¹ Susan Hanley compares the sanitary conditions of eighteenth-century Edo favorably to that of Paris or London at the time.¹² *Nōson kangen* was an example of an enviro-technical system in that it comprised a series of linked technologies, all environmentally embedded, for collecting, distributing, processing, and applying excrement as fertilizer. The production of a sanitary urban environment was a largely inadvertent side effect of these technologies. Significantly, when the Tokugawa Shogunate did intervene in the excrement trade, it was not to improve urban sanitation but rather to cap night soil prices for the benefit of farmers.¹³ On the cusp of the twentieth century, the state still continued to treat human excrement primarily as an agronomic resource. The 1900 Filth Cleaning Law made municipalities legally responsible for maintaining public cleanliness but explicitly exempted excrement from its purview, most likely inserted in deference to the wishes of tenement owners, who continued to view the excrement produced on their properties as a valuable resource.¹⁴

Yet there were occasions when excrement could reveal an obverse, more troubling aspect. As Linda Nash has argued, the history of public health is intimately intertwined with the history of the environment, and both hygienists and laypeople alike understood human feces as a potential source of disease.¹⁵ In the countryside, improperly processed night soil applied to crops could transmit gastrointestinal

parasites to human bodies. In the city, uncollected or improperly disposed excrement threatened to render the urban environment malodorous and potentially unsanitary, a breeding ground for diseases such as dysentery, cholera, and bubonic plague. In pre-World War I Tokyo, for instance, freelance collectors, as well as those who collected on fixed contracts, wandered the streets of the city hoping to buy up excrement at discount rates from residents who found their latrine brimming due to unusually heavy rain, or simply because the “contracted collector was being lazy.”¹⁶ Contracted night soil collectors referred to these freelancers disapprovingly as “interlopers” (御間 *o-ai*) because they were seen as infringing on the contractual rights of other collectors.¹⁷ But the very existence of the *o-ai* reveals how excrement could abruptly invert from valued commodity to environmental hazard.

This dual aspect of excrement, potentially both agronomic resource and sanitary hazard, gave rise to a distinctive political ecology of shit that played out at a variety of scales, from intimate domestic squabbles over the use of the toilet, to doorstep haggling over the retail price of night soil, and eventually to legislative battles over sanitation standards and infrastructure investment. Entering the nineteenth century the stakes heightened considerably, as a series of cholera and plague epidemics swept round the world. Political elites, largely informed by a miasmatic understanding of disease, undertook to finance ambitious infrastructure systems that would drain excrement and its odor from the urban environment.¹⁸

Significantly, the earliest architects of waste sewer systems still sought to preserve the nutrient value of excrement by redirecting it to neighboring farmland. In practice, however, most sewerage systems ended up discharging excrement, either processed or unprocessed, into nearby water bodies. The failure on the part of sewers to capture the nutrient value of excrement efficiently is one reason why they have been rolled out so slowly in parts of the world with entrenched networks of night soil collectors. When the city of Tokyo planned to invest in sewer infrastructure in 1914, for example, agricultural associations protested that “to our country’s farmers excrement is a precious economic resource. To throw it away by flushing it into sewers would, along with affecting farmers nearby Tokyo, also hurt urban residents by raising the price of agricultural products.”¹⁹ Indeed, until the Pacific War, Tokyo’s municipal government preferred to work with commercial night soil dealers to maintain and re-vamp existing distribution networks rather than invest in comprehensive wastewater sewers.

David Edgerton describes the persistence of traditional technologies in the face of innovations that might be thought to render them obsolete as “the shock of the old.”²⁰ Economists might describe this phenomenon as “path dependence,” reflecting the fact that it is often

easier to adapt existing technologies than to replace them completely.²¹ This helps explain the persistence of excrement collection networks in Tokyo (and indeed elsewhere in Japan) well into the twentieth century, in the face of competition from innovative technologies such as chemical fertilizer and the wastewater sewer.²² The impetus for investment in sanitation infrastructure therefore cannot be separated from the breakdown of older networks of excrement collection, distribution, and application. It was the wartime attack of excrement that was decisive in sweeping away these older entrenched networks, thereby clearing the way for comprehensive wastewater sewer construction.

CRISIS AND ADAPTATION, 1918–41

A report commissioned by the Tokyo municipal government in 1907 portrays a night soil distribution network operating largely unchanged from the seventeenth century. As in the past, collectors paid property owners for the right to empty residential latrines. In the High City to the west, small-scale collectors dominated: single farmers lugging a few pails back to their fields for their own personal use, generally using carrying poles, handcarts, or horse carts as transport. But in the Low City, linked to the Sumida River by its network of canals, larger operations dominated, and distribution networks tended to be more complex, involving a host of brokers, wholesalers, and other intermediaries. It was not unusual for a pail to change hands as many as three times before reaching its end user. A rural merchant or landowner, for instance, might charter a 150-pail barge for distribution as far as 15 kilometers upstream, from where the night soil would be sold to neighboring smallholders on seasonal credit.²³ The municipal government had comparatively little interest in the day-to-day running of this night soil economy.²⁴ Its 1907 report adopted a robustly laissez-faire tone, warning against undue state interference in a smoothly self-regulating market economy: “to hastily destroy established customs would disturb the tranquility that exists in the industry. It would not merely disregard the whole purpose of reform but would constitute an act of misgovernment.”²⁵

The end of World War I marks a significant turning point, however, that in many ways foreshadowed the wartime crisis. As David Howell shows, in 1918 collectors across the city abruptly began refusing to purchase excrement from landlords, or in some cases even to collect it at all.²⁶ This triggered a crisis across large swathes of the city as unemptied cesspits began to overflow. As one irate assemblyman put it in a floor speech haranguing the municipal legislature for its inaction, “Especially in the High City, as anyone who lives there knows very well, excrement is accumulating, piling up day and night.”²⁷

The High City's limited riverine access and hilly topography had always posed a steeper logistical challenge for night soil collectors. Moreover, during the war years the city had sprawled westward, gobbling up the market gardens that had previously absorbed High City excrement.²⁸ High wartime wages and increased availability of chemical and Manchurian soybean fertilizers also played a role in collectors' decisions to cease operations.²⁹ 5

The crisis forced the city of Tokyo to revise its laissez-faire attitude toward the night soil trade. In the worst afflicted areas, the sanitation department began collecting excrement directly. Elsewhere, the municipal government offered various inducements for commercial night soil collectors to return to work. In April 1918, a breakaway faction of the largest collectors' association had rebranded itself as the "Kanda Association of Sanitation Professionals" and petitioned the police for permission to begin charging residents for night soil collection. After a delay of over a year, this permission was eventually granted.³⁰ The mayor's office also began disbursing subsidies to selected commercial collectors, on the condition that they undertake to "dispose of collected excrement appropriately."³¹ 10 15

One consequence of these reforms was that the sanitation department began to differentiate between different types of night soil collector: direct municipal employees, farmers who collected excrement to use on their own fields, and commercial operators who collected regularly in order to sell onward to third parties. Farmers were essentially unregulated. Commercial collectors, however, were subject to regulation but also eligible for subsidies.³² It was these 303 commercial operators, employing a total of 800 collectors between them, who formed the mainstay of Tokyo's night soil economy in the interwar period. According to a 1929 survey, they collected some two-thirds of excrement produced within the wards of the Old City. Farmers (or those categorized as such) collected another 15 percent while the municipal service collected less than 10 percent. The remainder was either "disposed of spontaneously," flushed down the limited sewer system, or decomposed in small-scale purification tanks.³³ 20 25 30 35

Thanks to these reforms, Tokyo's night soil distribution networks remained remarkably resilient during the interwar period. Although the value of excrement at the point of production had inverted, transforming from commodity to waste product, night soil collectors adopted new professional identities and lobbied vigorously to protect their livelihoods, securing municipal subsidies and attempting to shape regulation to suit their interests. Where once they had purchased excrement, now they charged urban residents a fee to remove it while continuing to sell to farmers on Tokyo's receding rural periphery. To this end, they also adopted new technologies such as automobiles that allowed them to market their product further afield. 40 45

MUNICIPALIZATION AND ITS DISCONTENTS

In the interwar years, Tokyo saw a heated debate over how best to resolve what became known as the “excrement problem.”³⁴ Hygienists emphasized the sanitary hazard posed by excrement while agronomists emphasized its economic value as fertilizer. Legislators, for their part, simply balked at the high cost that reforming the system would entail. These differing priorities played out in a range of policy solutions that were alternately floated and jettisoned by successive mayoral administrations. 5

One solution that was tabled, and eventually shelved, involved constructing a comprehensive waste sewer system for the city along European lines. The first ever blueprint for a citywide sewer system was drawn up in 1921 by the administration of Mayor Gotō Shimpei.³⁵ As a young man, Gotō had studied medicine in Germany under the hygienist (and diehard miasmatist) Max von Pettenkofer. Later he had pursued a distinguished career as a colonial administrator, in which he oversaw ambitious public hygiene projects in Taiwan and Japanese Manchuria.³⁶ Back in the metropole, Gotō’s vision of “hygienic modernity” failed to carry the day. The Tokyo municipal legislature rejected his sewer plan as too costly, even after the great Kantō earthquake of 1923 provided the ideal opportunity for redesigning the city’s infrastructure.³⁷ In the end, a consensus arose that the best way of dealing with Tokyo’s excrement was also the cheapest: *nōson kangen*. As a result, during the interwar period the Tokyo municipal government and commercial night soil collectors negotiated an increasingly explicit reciprocal relationship, whereby the former regulated but also subsidized the latter so as to keep the night soil economy running smoothly. 10 15 20 25

This is not to say that hygienic concerns did not have any impact on excrement disposal. As Hoshino Takanori shows, concern that night soil was a vector of disease underpinned efforts to regulate collection procedures during the 1930s. Night soil might be treated improperly before being applied to cropland, which risked spreading intestinal parasites. And because commercial collectors now derived a dwindling portion of their revenue from the sale of night soil, it was sometimes more economical for them to dump their cargo illicitly rather than find a buyer for it. By midway through the interwar period, night soil sales likely comprised nearly half of total revenue earned by commercial collectors. But the retail value of excrement fluctuated substantially. Demand for fertilizer peaked during the summer growing season, at a time when hot weather and university holidays also caused supplies to contract.³⁸ During the winter months demand slackened, however, and it was rumored that at this time collectors would dump unwanted excrement into the bay at Shinagawa 30 35 40

and Daiba, from where it might contaminate food and water supplies.³⁹

In response to these concerns, the national government amended the Filth Cleaning Law in 1930 to make excrement disposal a municipal responsibility. The Tokyo municipal government did not exactly 5
hurry to respond to the revised law. It requested permission from the Home Ministry to delay implementing the new law for two years, and in 1932 requested another two-year extension, until the central government lost patience and set a deadline for municipalization by November 1, 1934. Commercial night soil collectors also opposed the 10
revised Filth Cleaning Law, delivering the following petition, signed “On Behalf of All Professional [Night Soil Dealers],” to the Imperial Diet: “We filth cleaning professionals have undertaken our duties for the past three hundred years, ever since the Tokugawa Era. But on 15
May 7th, 1930 the Filth Cleaning Law was enacted, utterly infringing on our established rights. . . . It was our hope that the state which has enacted such legislation would provide us with some kind of subsidy, but in fact no such subsidy was implemented.”⁴⁰

Commercial night soil collectors also attempted to block legislation at the municipal level, using a variety of tactics. Dealers’ associations 20
threatened to go on a citywide strike. Sanitation department employees and pro-municipalization assemblymen found themselves threatened by toughs to the point where armed police were deployed to their offices for protection. So polarizing was the issue of municipalization that the assembly remained deadlocked right up until the 25
November 1 deadline. A meeting of the Tokyo Assembly on October 29 dissolved into chaos when twenty or so ruffians from the observers’ gallery stormed the stage during a speech. In the ensuing melee five people were injured.⁴¹

The bill that eventually passed did impose greater regulation on 30
Tokyo’s night soil economy. Most significantly, a new fixed payment system was introduced, whereby residents purchased coupons issued by the sanitation department. These coupons, issued in denominations of one, half, or quarter pails, could then be handed over to licensed collectors who would then remove a corresponding quantity 35
of excrement. In practice, however, the new system worked imperfectly as the sanitation department struggled to scale up its operations to meet the goal of full municipalization. It constructed a sewage plant at Ayase and also collaborated with agricultural cooperatives to build digester tanks that could treat excrement before market- 40
ing it to farmers.⁴² But processing capacity was still insufficient, and in 1935 the department was forced to purchase a ship, the *Musashimaru*, in order to dump surplus night soil into Tokyo Bay.⁴³

In the face of these difficulties, the sanitation department preferred to rely on the existing network of commercial night soil collectors, 45
now known as “contractors.” In 1938 “contractors” were still

collecting 90 percent of excrement in the Old City wards, in comparison to the 10 percent collected directly by the sanitation department. The western wards that made up the New City received no direct service at all. In reality, these commercial contractors operated under only loose supervision, exercising much of the autonomy they had enjoyed before municipalization. The sanitation department could not account for the final destination of nearly a third of all excrement produced in the metropolitan area.⁴⁴ Contracted night soil collectors also managed to circumvent the department's pricing policy by demanding extra tips from residents, a practice that increased in frequency from 1937 because Japan's invasion of China heightened labor shortages. By 1941 sanitation department offices in every ward of the city were receiving letters of complaint about this practice. But the department's director admitted publicly that customary tipping was so engrained that it could only be eliminated by abandoning the contractor system altogether.⁴⁵

In all, "municipalization" reformed but did not fundamentally restructure the night soil economy in interwar Tokyo that continued to rely on a network of small-scale commercial collectors. The municipal government concentrated its modest resources not on replacing commercial night soil collectors, but on attempting to make existing distribution networks more efficient, for example by promoting the use of trucks to transport excrement over longer distances more cheaply. By 1938 trucks accounted for over half of all excrement transported. As a result, commercial night soil collectors continued to collect and dispose of the bulk of Tokyo's excreted matter, operating with the permission and indeed support of the municipal government.⁴⁶

THE WARTIME EXCREMENT CRISIS

The compact between the municipal government and commercial contractors did not survive the Pacific War, however. One reason for this is simply that wartime mobilization, rationing, and labor shortages drove many commercial collectors out of business. But also, toward the end of the war, the municipal government became markedly less willing to cooperate with those few commercial collectors who managed to stay running. This was partly because wartime mobilization permitted the state to enlist new groups of actors—farmers, neighborhood associations, suburban railway lines—to manage urban excrement.⁴⁷ The result was that, by August 1945, excrement collection had become either state directed or effectively a black market activity, a state of affairs that continued throughout the early years of the Occupation.

The first signs of trouble emerged shortly before Pearl Harbor, against a background of worsening labor shortages caused by the

escalating conflict in China. A survey conducted in July 1941 revealed worryingly high levels of staff turnover among night soil collecting companies, with 20 percent of collectors having worked on the job for less than two years.⁴⁸ The next month, Tokyo's Bureau of Health and Welfare organized a conference to address the breakdown in excrement collection services. At the conference, the sanitation department announced a 400-person shortfall in the number of contractors required to service the urban area, representing roughly a quarter of the total number of collectors (including sanitation department employees) who had been active three years earlier. Moreover, a shortage of gasoline and machine parts hobbled the trucks on which municipal and contracted collectors alike had come to depend.⁴⁹ Department figures showed that usage of sampans to ferry excrement had increased more than sevenfold since 1937, suggesting that collectors were increasingly resorting to less fuel-intensive means of ferrying their cargo.⁵⁰

Tokyo's municipal government attempted to bypass these shortages by encouraging farmers from neighboring prefectures to resume their old habit of collecting night soil directly. This policy sought to capitalize on the wartime reorientation of the Japanese chemical industry toward munitions manufacturing that had curtailed production of the chemical fertilizer that farmers had come to rely on. Wartime scarcity, in other words, encouraged farmers and urban planners alike to look to the past in order to make ends meet. In November 1942, Tokyo began subsidizing travel costs for farmers who traveled into the city to collect excrement. Via the pages of the *Yomiuri Shimbun*, the sanitation department exhorted Tokyoites to "please refrain from treating the peasants unkindly and hand over your coupons promptly."⁵¹

By 1944, however, as the war situation deteriorated, worsening shortages of fuel, labor, and matériel threatened to bring night soil collection in Tokyo to a standstill. After the military requisitioned the *Musashi-maru*, dumping at sea was no longer an option, and people resorted to emptying excrement into ditches and the city's storm drains, a practice known as "manhole-ing."⁵² By March, so much shit was being dumped directly into urban water bodies that "the moss on the riverbank at Asakusa turned a golden color."⁵³

That month, the mayor's office began discussions with the Seibu and Tōbu railway companies to transport excrement by what were euphemistically known as "golden trains." The phrase was meant to evoke the old association between night soil and value, "the superior farmer values shit as he values gold," as one Edo-era agronomy manual had put it.⁵⁴ The idea of transporting excrement by rail was not new in itself either. As early as 1907 the Tokyo Fertilizer Company had contracted with Tōbu to freight night soil from urban areas out to rural Saitama, and during the interwar period various mayoral

administrations had intermittently sponsored similar ventures before eventually settling on automobile transportation instead.⁵⁵ Under wartime conditions, however, Japan's rail network possessed a key advantage over motorized transport: it was powered mainly by hydroelectricity and thus did not require gasoline to run. The context of total war also placed private railway companies in a delicate position: from 1938 the railway minister had the power to nationalize any railways deemed strategically important, and between 1944 and 1945, twenty-two railways throughout Japan were indeed brought under central government control.⁵⁶ Companies like Seibu and Tōbu were therefore at pains to show willingness to cooperate with the war effort, if only to avoid being nationalized.

The wartime resumption of the golden trains service was inaugurated by a ceremony attended by the home minister and the minister of agriculture and forestry, at which the Seibu chief executive, Tsutsumi Yasujirō, attempted to portray the stopgap measure as embodying sound hygienic and ecological virtues. "In a field, excrement is turned into vegetables. This can be repeated for eternity. It is a principle of nature. But to turn one's back on the principles of nature and dump excrement into the sea, this is surely a waste. . . . The way I see it, a venture like this may involve the handling of unclean matter, but it is actually a clean enterprise that is in accord with the principles of Nature."⁵⁷

But however attuned they may have been to natural principles, the golden trains did not run smoothly at first. Tsutsumi had assumed that farmers would eagerly receive the night soil when it arrived at the station depots, but demand was initially sluggish, to the point where he had to order his employees to transport the excrement themselves. Several quit in protest at the indignity. Farmers also complained that Seibu staff had overapplied night soil to mulberry trees, causing them to wither.⁵⁸ It was not until after the war, when troop demobilization alleviated agricultural labor shortages, that demand for night soil from railway depots picked up to the point where farmers' cooperatives were willing to purchase the stuff.

Finally, in September 1944, three months after the American victory at Saipan pierced Japan's aerial defense perimeter, the sanitation department drew up an emergency plan to respond to the breakdown in excrement disposal.⁵⁹ The department diverted spare personnel from its garbage disposal operation and reduced the area served by automobile from 720,000 households to approximately 300,000. It also deployed a contingent of "peninsular laborers" to help supply extra muscle power, likely drafted from among the 1.5 million Koreans transported to Japan as part of the war effort.⁶⁰

The department made up for the remaining shortfall by mobilizing urban residents, via the city's network of neighborhood associations, to collect and transport excrement themselves. This marked

something of a departure. Although neighborhood associations had been charged with maintaining aspects of Tokyo's public hygiene since 1900, they had previously played no direct role in excrement disposal. From 1938, however, the (previously broadly autonomous) associations were increasingly mobilized to assist in all matters even tangentially connected with the war effort. A Home Ministry directive issued in 1940 formally placed all existing neighborhood associations under local government supervision to promote "dissemination of national policy and the achievement of a controlled economy."⁶¹ Tokyo's Bureau of Health and Welfare had invited representatives from neighborhood associations to participate its conference as early as 1941, suggesting that even then it was mulling over whether to involve citizens directly in excrement disposal. It was not until September 1944 that the decision was finally made.

The details of this emergency plan are revealing in several respects. Neighborhood associations were to coordinate residents in gathering together buckets, handcarts, and other equipment for communal use. Each association subunit would collect its own excrement according to a rota and transport it to a predetermined vacant spot for disposal.⁶² The plan explicitly forbade residents from employing a full-time night soil collector to do the work for them; instead, each family was to either empty its own latrines or to rely "on the goodwill of a neighboring Samaritan."⁶³ This suggests that some commercial collectors still operated in the city and that the sanitation department was anxious to prevent residents from competing for their services. This prohibition was the only reference to commercial collectors in the emergency plan, however, and references to the "contractors" who had formed the backbone of the interwar system were conspicuously absent. By the closing years of the Pacific War, night soil collection for commercial profit had become an entirely extralegal activity, decoupled from the coupon system and from official municipal supervision.

EXCREMENT UNDER OCCUPATION

Excrement collection toward the end of the war became increasingly chaotic. In one sense the excrement crisis was alleviated by the simple fact that, as aerial bombing intensified, most Tokyoites fled the city. Tokyo's population dropped from a prewar peak of nearly seven million to under three million by August 1945.⁶⁴ This, together with the acute food shortage, substantially reduced the total amount of excrement produced within the urban area. Nevertheless, by the end of the war the city's excrement disposal system had clearly fallen into disarray. Beyond the practice of "manhole-ing," even excrement that did make it out to the urban periphery was increasingly applied

to crops as raw sewage rather than being processed to eliminate parasites.⁶⁵ In a report submitted to Supreme Commander Allied Powers (SCAP) in October 1945, the sanitation department emphasized the degree to which its operations had been impacted by the war. “With the scarcity of materials and labor in wartime, the capital’s sanitation operations have suffered a remarkable weakening, due to the irregular disposal of night soil by the neighborhood associations, the interruption of drainage maintenance and refuse collection, the cessation of factory trash burning, the decreased frequency of night soil and trash collection and other such wartime blows to sanitation operations.”⁶⁶ According to the department, the majority of the city’s 892,650 households were serviced by farmers and “usage associations” who distributed night soil for application to the network of urban allotments that had sprung up to augment Tokyoites’ meager food supply.⁶⁷ But a quarter of households, the report claimed, continued to receive direct municipal collection service. The report then appealed for SCAP’s help in restoring the prewar system of “returning [excrement] to the farming villages from whence it came,” including a long shopping list of resources required in order to do so: more workers, vehicles, spare parts, fuel, and lumber for buckets and pails.⁶⁸

The head of the sewers department yielded a quite different picture of excrement collection in the immediate postwar period. Interrogated by SCAP officers in October 1945, he made no mention of any municipal excrement service. According to his testimony, 30 percent of the city’s households were still emptying their excrement by manhole-ing. The remainder, he claimed, “discharge it into cesspools from which the sewage is collected periodically by contractors employing Korean labor, and sold to farmers.”⁶⁹

Interestingly, the role of these Korean laborers in Tokyo’s excrement collection, presumably the same workforce the sanitation department had procured for its emergency plan of 1944, is the one point on which both reports concur. The disagreement lay as to who exactly employed them. The sanitation department’s report maintained that the Koreans continued to be municipal government employees. Indeed, it studiously omitted any mention of the commercial “contractors” on whom it had relied during the interwar period. Instead, it insisted on “the principle of direct metropolitan control,” claiming, for instance, that the department was responsible for serving some 468,590 households, or approximately half of Tokyo’s 1945 population.⁷⁰ But this responsibility had only ever existed in the abstract; in practice the department had collected night soil from a quarter of Tokyo’s households at most. For the sanitation department, Japan’s defeat offered an opportunity to fulfill its long cherished dream of bringing Tokyo’s night soil economy under complete municipal control.

The onslaught of excrement did not abate overnight. One Tokyoite recalled that shortly after the war ended, “There were some twenty-five people living in our house, so the toilet would become full immediately. We would use the toilet at work as much as possible; at night the husband was reduced to taking the children to ditches in empty plots around the neighborhood. If we didn’t get up early and carry our excrement to the manhole, then [the toilet] would overflow before the collector came.”⁷¹

But one of the ironies of Japan’s postwar austerity was that demand for urban excrement soon spiked, and the night soil trade became a seller’s market once more, to the point where most urban residents no longer had to pay collectors a fee for their services. Several factors may help to explain this alchemic transformation in the value of shit. Military demobilization, combined with the widespread shuttering of factory gates, meant no shortage of people willing to haul shit to make ends meet. Moreover, with chemical fertilizer production crippled, many farmers had little option but to go back to using night soil.

The story of Takasugi Kihei illustrates both of these trends. Demobilized in 1948, he returned home to Tama, on the outskirts of Tokyo, and decided to continue the family tradition of farming. A Tokyo friend from his army days did him a favor, giving him the rights to the twenty rental properties he owned. Takasugi would trudge into the city, a five-hour round trip, his cart laden with home-grown vegetables for barter. He eventually added as many as a hundred houses to his route, which meant he was collecting more fertilizer than he could use himself on his own land. The remainder he divided up and sold for a fee to other farmers. As he scaled up his operations, he purchased a horse and cart and then an auto rickshaw, and began employing other people to help him on his rounds. He thus made the leap from end-user collector to commercial dealer, all without establishing any relationship with the municipal government or even paying any tax.⁷²

In the years following surrender night soil distribution became, like many other aspects of the Japanese economy, a largely extralegal activity. In May 1946 the sanitation department formally suspended its coupon system in favor of free collection, recognizing that the tokens it issued had long since become worthless.⁷³ Unsurprisingly, the circumstances allowed scoundrels to flourish. Takasugi’s success in the night soil trade may have been owed to his diligently cultivated reputation, but other dealers were not so scrupulous. The *Asahi Shimbun* complained that some brokers were resorting to old tricks, such as watering down their product to make it go further.⁷⁴ With the breakdown of regulation by the sanitation department, farmers also seem to have grown less scrupulous in adhering to hygienic treatment of night soil. By one 1948 estimate, 80 percent of Japanese suffered

some sort of gastrointestinal parasite, largely spread via human excrement.⁷⁵

Given the chaotic, rampantly unsanitary nature of this new black market trade in night soil, one option would have been to restore the prewar system, whereby licensed contractors operated under sanitation market supervision. Indeed, as an interim solution, SCAP instructed the Tokyo metropolitan government to set up a licensing system for “private scavengers,” with the twin aims of increasing the supply of night soil to farms and imposing some degree of sanitary best practice on collectors. According to an ordnance issued in September 1946, all companies were to register with the ward or city office in exchange for certificates their employees would carry when they worked.⁷⁶

Tokyo’s sanitation department appears to have ignored this directive that essentially sought to restore the prewar status quo ante. Postwar sanitation department records are scrupulous in avoiding any mention of contractors or licensed handlers. In April 1947, for instance, the department claimed to be collecting night soil from 151,303 Tokyo households, a third of the residences that it was mandated to service under the provisions of the Filth Cleaning Law. The remainder of its catchment area, the department claimed, was temporarily reliant on “collection by farmers.”⁷⁷ But as Takasugi Kihei’s story suggests, the distinction between end-user farmer and commercial collector was a fuzzy one. As far as the sanitation department was concerned, “farmer” was most likely an accounting identity assigned to any nonmunicipal collector of night soil.

To the extent that any of Tokyo’s prewar commercial collectors continued to operate, their negotiating position had manifestly weakened. Not only did they face renewed competition from farmers collecting night soil for their own personal use (the more entrepreneurial of whom sought to scale up their operations), but the municipal government had ceased to recognize them as a legitimate industry body. The wartime and early postwar crisis had dislodged commercial night soil collectors from an economic niche they had defended for thirty years.

TWILIGHT OF A NIGHT SOIL ECONOMY

The postwar revival of Tokyo’s night soil economy was short lived, for a number of reasons. Two of these have, indirectly at least, to do with the impact of Occupation policies in the early postwar years. SCAP was distinctly ambivalent about the black market in excrement. It recognized that, in the short term, some form of night soil collection was essential, not merely to avert a sanitary crisis in urban areas but also to stave off impending mass famine. Six months after Japan’s

surrender, SCAP's Natural Resources Section held a conference on fertilizer at which "the increased use of night soil and other waste products was discussed, as was the necessity for proper treatment of this material for the protection of the health of Japanese and Occupational Personnel." But although the conference concluded with guarded support for night soil, the Public Health and Welfare Department nevertheless insisted that "statements made in this discussion should not be construed as meaning that we approve of the use of untreated night soil as fertilizer. . . . Nothing is to be gained by saving people from starvation only to lose them from disease."⁷⁸

The long-term solution to the excrement problem, as SCAP saw it, lay in restoring Japanese chemical fertilizer production so as to obviate farmers' reliance on night soil altogether.⁷⁹ Fertilizer manufacturers were thus exempted from the general order dismembering the large industrial conglomerates that were seen as responsible for fueling Japanese military aggression.⁸⁰ The result was that Japan's chemical fertilizer industry rebounded during Occupation years with unparalleled speed. By the end of the war, nitrogen fertilizer production had ground to a halt. With SCAP's blessing, however, by 1949 it had already exceeded its prewar peak.⁸¹

One secondary effect of this rapid resurgence was that demand for night soil began to subside once again as farmers turned to chemical fertilizer as a substitute. By the end of 1948, the sanitation department had noticed that night soil prices had begun to slide and that fewer so-called farmers came to collect from urban households.⁸² As one housewife in Toshima Ward complained to NHK radio's *Citizen's Hour*, "recently [excrement] collection has not been running smoothly; it's causing me a great deal of trouble. Hardly any farmers are kind enough to come round anymore." The director of the sanitation department explained, "The farmers' situation has changed greatly compared to the three years after the war. Now that they have enough chemical fertilizer, they don't come to collect night soil as much as they did before."⁸³

The collapse in demand was particularly abrupt for excrement transported via rail. Demand peaked in 1947 along the Seibu commuter line. Two years later the sanitation department was managing to sell all its Seibu night soil to agricultural cooperatives. But in 1950, demand suddenly tailed off; the sanitation department was reduced to burying surplus excrement in landfills. The department reduced its prices, until it was offering night soil for free to any agricultural association that would take it. Despite some response to this offer, more excrement than ever had to be landfilled the following year, and the year after that the rail-freight service was discontinued permanently.⁸⁴

A technologically deterministic view of this shift from night soil to chemical fertilizer might hold that the latter was inherently a

superior product, or was at least one more suited to the techniques of capital-intensive mass production favored by an industrialized society. Chemical fertilizer companies had made substantial inroads into rural Japan, even in the interwar period, with many farmers avowing a preference for the newer product.⁸⁵ Even so, commercial night soil collectors succeeded in maintaining their established networks of customers throughout the Greater Tokyo area. Legitimate concerns about faked or diluted products, combined with the high stakes involved (a farmer's entire crop could be lost, after all) tended to make buyers risk averse. The fertilizer market in Japan was thus highly localized, with particular trusted retailers tending to retain loyal customer bases within rural communities.⁸⁶ These interpersonal retail relationships, which could count for as much as or even more than any notional comparative efficacy, did not survive the war. And the sheer rapidity with which chemical fertilizers became available again in the postwar period mitigated against the formation of new networks, especially given the fly-by-night nature of the black market in night soil.

Instead, the sanitation department stepped in to fill the gap directly, taking on responsibility for collecting excrement from an increasing proportion of Tokyo's residents. In November 1948, the department revived the coupon system that it had suspended two years earlier and began charging residents for collections once more.⁸⁷ It also pushed to expand the area it served, aiming to provide total municipal coverage so as to make up for the discontinuation of service by "farmer" collectors. By the end of 1950, it claimed to be collecting from over half a million households, a more than threefold increase over April 1947.⁸⁸

A question arises as to whether the newly municipalized night soil collection service could have, in the long run, succeeded in seeking out new customers for the excrement it was now charged with collecting. Beginning in 1950, an increasing proportion of excrement collected by the department was dumped into Tokyo Bay, using dedicated ships that the mass media dubbed "the golden fleet."⁸⁹ But the sanitation department also invested in new technologies, such as vacuum trucks, that could both empty cesspits more efficiently and transport their contents more hygienically.⁹⁰ The department also maintained agreements with a number of agricultural cooperatives in Chiba and Saitama that continued to accept Tokyo excrement until as late as 1960. Any possibility that the department might have sought out new means of perpetuating *nōson kangen* was foreclosed, however, by the metropolitan government's decision, in the run-up to the Olympic games, to begin constructing a comprehensive wastewater sewer system for the city.⁹¹

THE POSTCOLONIAL NOSTRIL?

The idea of constructing sewers was not a new one in Japan. The country's steep topography renders it particularly susceptible to flooding, and storm drains appear to have been constructed in even the earliest urban settlements.⁹² Since the Meiji period (1868–1912), certain members of the political class had been inspired by Western models to plan grandiose systems of wastewater sewerage as well. Members of the Iwakura Mission who traveled the world between 1871 and 1873 were fascinated by the great set-piece sewer systems they encountered in Berlin, Paris, London, and even frontier towns such as Salt Lake City.⁹³ In the interwar period, progressive urban planners drew up similarly ambitious schemes. Seki Hajime, the mayor of Osaka from 1923 to 1935, incorporated wastewater sewers in his plans for suburban garden cities. And (as discussed earlier), it was around this time that Gotō Shimpei, himself an architect of “hygienic modernity” in Japan's colonies, devised the first comprehensive wastewater sewer plans for the city. But in the end, Seki was able to lay only a limited number of wastewater sewer pipes.⁹⁴ Likewise, Gotō's plan failed to sway the Tokyo legislature that preferred to maintain or adapt existing networks of night soil collection, distribution and disposal.

The snail's pace of wastewater sewer construction in the interwar period raises the question of why so many Japanese cities, with Tokyo at the forefront, finally did decide to invest in them so enthusiastically in the postwar period. The decision stems from multiple factors, only some of which are connected to the night soil economy. These include growing concern about industrial waste products leaching into water bodies, and the increasing number of flush toilets installed in the new public housing projects that sprung up in the postwar period.⁹⁵ But, as argued earlier, the wartime and postwar excrement crisis also helped clear the way for sewer construction by permanently disrupting the embedded networks of night soil distribution that had previously linked city and country.

There was one more way in which the wartime and postwar crisis may have influenced Tokyo's decision to invest in comprehensive wastewater sewer infrastructure, insofar as it gave rise to a particular postcolonial anxiety about night soil filtered through the gaze of the West. Some Japanese policymakers had been sensitive to foreigners' olfactory impressions of their capital before the war. At the height of the 1919 excrement crisis, a Tokyo counselor bemoaned, “Our country stands among the first tier of nations, and Tokyo is its front hall. How can it be that, as every layperson knows, it lags seventy years behind civilized countries!”⁹⁶ But it was the Occupation years that significantly sharpened sensitivity to the foreign (read: American) gaze, which was now to all intents and purposes a colonial one.

Occupation officials and their families frequently made clear their distaste for the practice of *nōson kangen*. SCAP took pains to ensure that its personnel would not come into contact with Japanese excrement, setting up public toilets throughout Tokyo for the exclusive use of the occupying forces, and establishing a hydroponic farm on the outskirts of the city so soldiers would not have to risk consuming contaminated vegetables.⁹⁷ Night soil pails, a ubiquitous presence on Japan's city streets, were referred to snarkily as "honey buckets." Some even used the term as a synecdoche for the backwardness of Japanese civilization as a whole. One SCAP housewife, for example, wrote contemptuously of Japan as "this almost primitive land of the cherry blossom and the honey bucket."⁹⁸

Perhaps this disgust was reflexive to a certain degree or amplified by the usual Orientalist tropes. But it did not help that SCAP personnel encountered Japan's system of night soil distribution at its nadir. Chris Aldous has shown how Occupation personnel often extrapolated wildly based on their narrow exposure to Japanese society, forming a general indictment of Japanese public health based on the severely degraded services they surveyed after years of total war.⁹⁹ The same tendency may also account for SCAP's poor opinion of night soil: the black market night soil economy that Occupation officials and their families encountered was but a chaotic refraction of its former self.

Postcolonial scholars write of a "colonizing gaze," whereby the surveillance of the colonizers shapes the behavior of those they govern long after the moment of formal decolonization.¹⁰⁰ If this is the case, then we can say that many internationally minded Japanese experienced something akin to surveillance by a "colonizing nostril" during the Occupation and early postwar years. Japanese media remained acutely sensitive to the foreign distaste for night soil, even after the formal end of the Occupation in 1952. A 1957 *Tokyo Times* editorial was typical when it lamented that "we can't be proud of Tokyo when some foreigners call it a city of bad odor. The smell comes from trucks loaded with night soil. . . . The city must rapidly complete installation of its sanitary system to ruin the offensive smell plaguing Tokyo."¹⁰¹ In this way the wartime night soil crisis, when inhaled and then exhaled through the colonizing nostril of the US Occupation, permeated postwar Japanese attitudes toward excrement disposal.

This effect of this was manifested when, in 1959, Tokyo successfully bid for the right to host the 1964 Olympics. The Tokyo Olympiad marked a significant shift in the history of the Games, marking the first time that a host city invested not just in stadia and athletic facilities, but also in sweeping infrastructure programs such as transportation and urban beautification. As Yoshikuni Igarashi argues, the Olympics' organizers saw it as a chance to slough off wartime



Figure 1. Night soil collector and so-called honey cart figurines sold to foreigners as souvenirs, as featured in the *Asahi Shimbun* (Tokyo) newspaper, May 31, 1959. Credit: Asahi Shimbun Photo Archive.

memories by exhibiting Japan's capital city as the "clean, bright metropolis" of a modern, sovereign peace-loving nation.¹⁰²

But wags also punned that Tokyo, far from being a *kokusai toshi* ("international city"), was in fact an *unkokusai toshi* ("a city that stinks of shit").¹⁰³ One legislator harangued the National Diet that "When foreigners come to Japan, the first thing they notice is the stink of the toilets ... even Tokyo, the so-called metropolis of the Orient, is not clean ... with things in the state they are now there's no way the Olympics will come." Editorials in major national newspapers echoed his point.¹⁰⁴ The morning after the Olympics news broke, the *Asahi Shimbun* announced the city's plan to "banish the 'honey carts!'" The paper printed a picture of a souvenir said to be much in demand among visiting foreigners, a figurine of a Japanese farmer pulling a wagonload of night soil pails (figure 1).¹⁰⁵ This was precisely the wrong face for Japan to present to the world. *Nōson kangen* had to go. In 1956 wastewater sewers had provided coverage to slightly less than one in five Tokyo households. But after winning the Olympic bid, the metropolitan government revised its ten-year sewer development plan, nearly doubling its investment.¹⁰⁶ By the time the Olympics rolled around, Tokyo's Old City had nearly complete wastewater sewer coverage, rendering night soil collection finally obsolete.

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Notes

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 3. Alexander Bay, “Nation from the Bottom Up: Disease, Toilets and Waste Management in Prewar Japan,” *Historia Scientiarum* 22, no. 2 (December 2012): 151–52.
 4. *Yomiuri Shimbun*, “Rinsetsu ken no ohyakushō ga ōen (shinyō kumitori ni,” November 27, 1942. For other examples of wartime environmental crises, see Richard P. Tucker and Edmund Russell, eds., *Natural Enemy, Natural Ally: Toward an Environmental History of Warfare* (Oregon State University Press, 2004); David Biggs, *Quagmire: Nation-Building and Nature in the Mekong Delta* (Seattle: University of Washington Press, 2012); and William M. Tsutsui, “Landscapes in the Dark Valley: Toward an Environmental History of Wartime Japan,” *Environmental History* 8, no. 2 (2003): 294–311.
 5. Olivia Robinson, *Ancient Rome: City Planning and Administration* (New York: Routledge, 2003), 106; Justus von Liebig, *Organic Chemistry in Its Applications to Agriculture and Physiology* (J. Owen, 1841).
 6. Kusubayashi Katsuji, “Shinyōyotsbunka shi,” in Gomi no Bunka Shinyō no Bunka Henshū Iinkai, *Gomi no bunka, shinyō no bunka* (Tokyo: Gihōdō Shuppan, 2006), 47–64; 48.
 7. David L. Howell, “Fecal Matters: Prolegomenon to a History of Shit in Japan,” in *Japan at Nature’s Edge: The Environmental Context of a Global Power*, ed. Ian J. Miller, Julia Adeney Thomas, and Brett Walker (Honolulu: University of Hawaii Press, 2013), 137–51; 140.
 8. Nōsangyoson Bunka Kyōkai, *Nihon nōsho zenshū*, vol. 10: *Seiryōki* (Nōsangyoson Bunka Kyōkai, 1980), 12, 104.
 9. For a discussion of night soil use in Osaka and Kyoto, see Aratake Ken’ichiro, “Kinsei kōki ni okeru shimogoe no ryūtsū to kakaku keisei,” *Ronshū kinsei* 24 (2002): 1–21; Mitsumata Nobuko, “Shimogoe to naitosoiru no kankyō-keizaiteki kōsatsu: toshi to nōson no aida no busshi junkan ni kan suru rekishi to seisaku” (PhD diss., Dōshisha, 2011).
 10. Takizawa Bakin, *Bakin nikki* (Tempō 2 [1831] Month 7 Day 18); Nagai Yoshio, *Edo no fun’nyōgaku* (Tokyo: Sakuhinsha, 2016), 44–46.
 11. Inamura Mitsuo, “Taishō no shakai tenkanki ni gomi mondai—nōson kangen shisutemu no hōkai,” *Proceedings of the Annual Conference of Japan Society of Waste Management Experts* 16 (October 31, 2005).
 12. Susan B. Hanley, “Urban Sanitation in Preindustrial Japan,” *Journal of Interdisciplinary History* 18, no. 1 (Summer 1987): 1–16.
 13. Anne Walthall, “Sōdai and the Sale of Edo Nightsoil,” *Monumenta Nipponica* 43, no. 3 (Autumn 1988): 279–303.
 14. 汚物掃除法 *Obutsu sōji hō*. See Nagai, *Edo no fun’nyōgaku*, 209; Inaba Kikuo, “Gesuidō hō keisei ryakushi: gesuidōhō to kanren shohō no kankeisei,” *Gekkan Gesuidō* 37, no. 2 (2013): 70–76; 71.

15. Linda Nash, *Inescapable Ecologies: A History of Environment, Disease, and Knowledge* (Oakland: University of California Press, 2006).
16. Tokyo Metropolitan Archives, *Shinai shinyō chōsasho* (1907), 44.
17. The Japanese term for “interloper” was a pun on “owai” (汚穢) meaning “filth.” This was a word used for human excrement since the Edo period; it was also the word that “interlopers” called out to prospective sellers as they made their rounds. 5
18. Stephen Halliday, *The Great Stink of London: Sir Joseph Bazalgette and the Cleansing of the Victorian Metropolis* (London: The History Press, 2001).
19. Tōkyō-shi Gesuidō Kaizen Jimusho, *Tōkyō-shi gesuidō enkaku-shi* (1914), 45, cited in Nihon Gesuidō Kyōkai Gesuidō-shi Hensan Iinkai, *Nihon gesuidō-shi: sōshū-hen* (1989), 113. 10
20. David Edgerton, *The Shock of the Old: Technology and Global History since 1900* (New York: Oxford University Press, 2011).
21. Stan J. Liebowitz and Stephen E. Margolis, “Path Dependence, Lock-In, and History,” *Journal of Law, Economics and Organization* 11, no. 1 (1995): 205–26. 15
22. Although many cities installed limited wastewater sewers as early as the Taishō period (1912–25), municipalities did not invest in comprehensive wastewater sewer infrastructure until well into the postwar period. See *Nihon gesuidō-shi*, 157–59; Appendix, 104–5. 20
23. *Shinai shinyō chōsasho*, 25–26, 31, 36–37, 42.
24. By 1907 the night soil trade was already subject to limited regulation by other government bodies. During the epidemics of the late nineteenth century, the police department had issued a raft of hygiene regulations: night soil was to be transported in closed pails, for instance, and was forbidden to be left out in the sun during the heat of the day. Tanaka, Shin’ichi, “Meiji zenki minji hanketsu ni miru hiryo keizai,” *Hokkaidō Daigaku Keizai Kenkyū* 47, no. 2 (September 1997): 23. 25
25. *Shinai shinyō chōsasho*, 1–2.
26. Howell, “Fecal Matters,” 146. 30
27. Tokyo Metropolitan Archives (TMA): Tōkyō shikai gijisokkiroku 3, 270–75 (February 28, 1919).
28. Loren Siebert, “GIS-Based Visualization of Tokyo’s Urban History,” *Proceedings of the Computers in Urban Planning and Urban Management* (July 2001).
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30. Mogi Kōzō, *Seisō monogatari* (Tokyo: Toshi Seisaku Kenkyūkai, 1960), 41. 40
31. TMA: Sanjikai 80, March 23, 1925.
32. TMA: Tōkyō Shiyakusho Hoken-kyoku Seisō-ka, Tōkyō-Shi Shinyō Shobun Chōsa Gaiyō (Tokyo: 1929), 188–91.
33. 自然処分 *shizen shobun*. 45
34. 糞尿問題 *fun’nyō mondai*. See *Kokumin Shimbun*, “Issen man en wo tōjite iyoiyo fun’nyō shiei, shinai nana, hachi jū man to kara kumitoru, ichi nichu no fun’nyō ichi man go sen kan, shi de wa bakudai no shūeki ni naru” (September 12, 1919).
35. Tōkyō-to, *Tōkyō tosei 50-nenshi*, vol. 2 (Tokyo: Tōkyō-to, 1994), 496–70. 50
36. Ruth Rogaski, *Hygienic Modernity: Meanings of Health and Disease in Treaty-Port China* (Oakland: University of California Press, 2004). For a discussion of Von

- Pettenkoffer, see Richard Evans, *Death in Hamburg: Society and Politics in the Cholera Years, 1830–1910* (New York: Penguin Books, 2005), 241.
37. Takanori Hoshino, “Transition to Municipal Management: Cleaning Human Waste in Tokyo in the Modern Era,” *Japan Review* 20 (2008): 189–202; 196; Tōkyō Gesuidō-kyoku, *Tōkyō Gesuidō 100-nen* (Tokyo: Tōkyō Gesuidō-kyoku, 1989), 308. 5
38. TMA: Seisō-ka, *Tōkyō-shi shinyō shobun chōsa gaiyō* (1929), 14, 164–65.
39. Mogi, *Seisō monogatari*, 92; TMA: *Seisō jimu geppō*, December 1948, 21.
40. Mogi, *Seisō monogatari*, 54, 66.
41. *Tōkyō Nichinichi Shimbun*, October 31, 1934. 10
42. Tōkyō-to Sōji-kyoku, *Sōji jigyō 50-nen no ayumi* (Tokyo: Tōkyō-to Sōjikyoku, 1977), 31.
43. Murano Masayoshi, *Bakyūm kā wa erakatta! Ōgon kikaika butai no sengo-shi* (Tokyo: Bungei Shunjū, 1996), 134.
44. TMA: Tōkyō Shiyakusho, *Tōkyō-shi Seisōbu jigyō gaiyō* (1939), 7–8. 15
45. *Kokumin Shimbun*, “Sate komatta shinyō shobun: shichō fujin mo nayamasareru,” August 16, 1941.
46. *Tōkyō-shi Seisōbu jigyō gaiyō*, 7–8.
47. Other examples of wartime mass mobilization include air raid defense, rationing, war bond purchasing campaigns, and austerity drives; at the same time, wartime mobilization also drove the expansion of state-provided social welfare programs. See Gregory J. Kasza, *One World of Welfare*; Sheldon Garon, “The Home Front and Food Insecurity in Wartime Japan: A Transnational Perspective,” in *The Consumer on the Home Front: Second World War Civilian Consumption in Comparative Perspective*, ed. Hartmut Berghoff, Jan Logemann, and Felix Römer (New York: Oxford University Press, 2017), 29–53. 20
48. TMA: Tōkyō-shi 1942 kokuji: Tōkyō-shi Seisō Kumiai Rengōkai “Seisō kumiai no genkō.” 25
49. *Kokumin Shimbun*, “Sate komatta shinyō shobun: shichō fujin mo nayamasareru,” August 16, 1941. 30
50. *Seisō jimu geppō*, August 1949, 26.
51. *Yomiuri Shimbun*, “Rinsetsu ken no ohyakushō ga ōen (shinyō kumitori ni),” November 27, 1942; “Tokyo Sewerage” in US Strategic Bombing Survey USB-13 R089.
52. Murano, *Bakyūmu kā wa erakatta!* 134. Storm drains were designed to channel rainwater runoff, not sewage. 35
53. Tsutsumi, *Kutō sanjūnen*, 40.
54. *Ibid.*, 56; Howell, “Fecal Matters,” 138.
55. TMA: *Tōkyō-shi sōji jimu seiseki [Shōwa 10-nen]* (1936).
56. Tōbu Tetsudō Kabushikigaisha, *Tōbu tetsudō 100-nen shi*, 1 (Tokyo: Tōbu Tetsudō, 1998), 472. 40
57. Tsutsumi, *Kutō sanjūnen*, 52–53.
58. *Ibid.*, 56–57.
59. TMA: Seisō-kyoku 9 (1944–46), “Shinyō shori sagyō hijō sochi yōmō.”
60. *hantō rōmusha* 半島勞務者. During World War II, the term *rōmusha* almost always signified conscript laborer. See Pak Kyong-shik, *Chōsen mondai shiryōshū 1* (1982), i. 45
61. Sally A. Hastings, *Neighborhood and Nation in Tokyo, 1905–1937* (Pittsburgh: University of Pittsburgh Press, 1995), 77–78, 81–82.
62. “Shinyō shori sagyō hijō sochi yōmō.” 50
63. *Ibid.*, *chōkai nai tokushika* 町会内篤志家.

64. Theodore Bestor, *Neighborhood Tokyo* (Stanford: Stanford University Press, 1990), 72.
65. Tsutsui, "Landscapes in the Dark Valley," 301.
66. USB-13 R089 GHQ SCAP Public Health and Welfare Section: "Fukkō to seisō jigyō" (October 30, 1945); "TOKYO Reconstruction and Scavenger Service [Provisional]," October 31, 1945. 5
67. 利用組合 *riyō kumiai*. See "Fukkō to seisō jigyō," 5.
68. "TOKYO Reconstruction and Scavenger Service [Provisional]," 7–9.
69. "Sewage System of Tokyo City," November 11, 1945, in USB-13 R089 Medical Division. 10
70. "Fukkō to seisō jigyō"; "TOKYO Reconstruction and Scavenger Service (Provisional)."
71. Yoshida Taki, "Watashi no bāi" in *Fujin Kōron*, February 1948, reprinted in *Dokumento Shōwa sesō shi: sengo hen* (Tokyo: Heibonsha, 1976), 197.
72. Gomi no Bunka Shinyō no Bunka Henshū Inkaï. *Toire kō shinyō-kō* (Tokyo: Gihōdo, 2003), 6–9. 15
73. Tōkyō-to, "Tōkyō tosei 50-nenshi," 678–79.
74. *Asahi Shimbun*, "'Fun'nyō no yami'" taiji: 'mizuwari' issō ni To no kaizen yōbō," April 26, 1946.
75. *Kokkai sokkirōku* [002/187], 2; Shūgiin honkaigi 9, January 28, 1948. 20
76. USB-13 R089 Tokyo-to Ordinance No. 25, September 17, 1946. "Regulation for Control of Banding of Scavenger, Garbage, and Night Soil, "'Extracted.'"
77. 農民汲み取り *nōmin kumitori*. See TMA: Seisō jimu geppō, 1947–51: Eisei-kyoku seisō-ka, *Seisō jimu geppō*, April 1947.
78. USB-13 R089, "Fertilizer Conference," March 20, 1946. 25
79. USB-13 R089, "Fertilizer Conference, July 1, 1946," July 3, 1946.
80. John W. Dower, *Embracing Defeat: Japan in the Wake of World War II* (New York: W. W. Norton, 2000), 75–76.
81. "Chōki keizai tōkei: nōringyō," vol. 9 (1967); Tsutsui, "Landscapes in the Dark Valley," 301. 30
82. *Seisō jimu geppō*, November 1948.
83. *Seisō jimu geppō*, March 1951.
84. TMA: 328 A6 3. Seisō Honbu, "Seibu tetsudō ni yoru shinyō unsō no gaiyō ni tsuite," Chōgi 14, January 27–February 24, 1953.
85. TMA: Tōkyō Shiyakusho Hoken-kyoku Seisō-ka, Tōkyō-shi shinyō shobun chōsa gaiyō (Tokyo: 1929), 1–2. 35
86. On the logistics of distribution structures and local fertilizer markets, see Shū, Takahashi, "Tōkyō Jinzō Hiryō Kabushiki Gaisha no seikō to kamari seisan," *Shibusawa Kenkyū* 25 (January 2013): 45–64.
87. Tōkyō-to, *Tōkyō tosei 50-nenshi*, 678. 40
88. *Seisō jimu geppō*, December 1950.
89. Seisō Honbu, "Seibu tetsudō ni yoru shinyō unsō no gaiyō ni tsuite"; Mogi, *Seisō monogatari*, 129–30; Nagai, *Edo no fun'nyōgaku*, 224. Marine dumping would only be discontinued as late as 1999. Ishii Akio, "Tōkyō ni okeru shinyō no shori shobun no henkan," *Gomi no bunka, shinyō no bunka*, 71–75; 75. 45
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91. Tōkyō-to, *Tōkyō tosei 50-nenshi*, 618–19.
92. Gesuidō Kyōkai, *Nihon gesuidō-shi*, 20.
93. Rogaski, *Hygienic Modernity*, 140–41.
94. Jeffrey E. Hanes, *The City as Subject: Seki Hajime and the Reinvention of Modern Osaka* (Oakland: University of California Press, 2002), 238, 247, 249. 50
95. Gesuidō Kyōkai, *Nihon gesuidō-shi*, 192, Appendix 104–5.

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