Citation for published version


DOI

Link to record in KAR

http://kar.kent.ac.uk/64210/

Document Version

Author's Accepted Manuscript
The Philosophies of Feces: the Reuse of Sewage in Germany in the late Nineteenth and early Twentieth Century

David H. Haney

Over the course of the nineteenth century, the increasing centralization and densification of mass populations in the metropolises of the west resulted in an increasing separation of cities from the countryside. One of the obvious results of this was that wastes, human and otherwise, became concentrated in the cities, and were not returned to agricultural land as had previously been the practice. The problem of removing human waste was first approached through massive water-born systems in the mid-nineteenth century, and the practice continues today. Yet the problem of returning that waste to the land was much more problematic, and this situation still has not found a satisfactory resolution. What to do with human waste may seem to be purely a management issue, but like many technical problems, there was a very strong cultural and even philosophical tone, and certainly class differences were involved from the beginning. The soil that was being depleted in this case was not that of the inner city itself, but rather the agricultural ground of the surrounding metropolitan region, and even the nation as a whole. The mass-movement of populations from rural districts to cities was a central factor within these developments. This essay primarily considers the problem of human waste in German cities, with London acting as background, from the period before WWII, from more of a cultural than a technological perspective.

London, as the greatest metropolis of the nineteenth century, was the site of the first unified, mass-scale water born sewerage system. The invention of the practical flush toilet in the late eighteenth century was first the luxury of the rich, but was adopted rapidly by the more well-off classes. In central London this meant that much human waste was being piped directly into the Thames River, which was also a source of drinking water. The turning point came in the excessively hot summer of 1858, when the smell of the sewage in the Thames was so intense that it interrupted the business of Parliament, since it was located directly on the river banks. Politicians were forced to act. James Bazalgette was appointed as the leading engineer for the project, which was also aimed at significant civic improvements, not only sewage disposal. Part of the new sewage lines were installed under a new embankment and promenade along the Thames that still serves as much utilized public space. Overall, the system of pipes and canals containing water-borne sewage was divided into two major districts, one south and one north of the Thames. Two collection stations were constructed on either side of the river seventeen miles from the city center, where enormous steam engines pumped the sewage into the river at high tide, so that it would be carried out to the sea. The project was hailed as a great success, Prince Albert and other notables were present at the opening ceremonies in the pumping station at Crossness in 1856. (Fig. 1) One of the benefits of the new system came in the reduction of Cholera cases, many of which were the result of drinking water drawn from wells contaminated by human waste stored in cellars leeching into the ground. The poorer districts were most affected, as inhabitants often couldn't afford to have human waste removed, and so allowed it to accumulate. Thus from the beginning there was a class component to the problem,
which was only resolved once the lower classes were finally connected to the system, which did not happen all at once.

To south of London, in the small city of Croydon, then with a population of about 8,000, another system was being tried. There, sewage was led into canals where it was leached into the soil directly. This method was also used to fertilize adjacent farms where produce was raised for human consumption. Another such system was in operation at Craignentinny near Edinburgh. In a city the size of London sewage leaching fields obviously would need to be much larger in capacity. London’s location on a tidal river so close to the sea meant that simply sending the waste out to sea was the cheaper, more expedient option. Unsurprisingly, a number of people, including some unscrupulous businessmen, saw the wastes being collected in the two pumping stations as a valuable resource. For some, this was a matter of potential profit, for others, more of a social and ethical issue. One proposal was to collect the waste in a reservoir on an elevated site to the north of the city, where it could then be piped and hosed onto neighboring farms, for a fee. The other was to spread the liquid waste on unpopulated flats, the Maplin Sands, along the coast of Essex. Perhaps the most prominent personage to become embroiled in the ensuing debates was the eminent German chemist Justus von Liebig. Liebig sided with the proposal for storing the sewage in a reservoir north London, but he did this more for personal and political reasons, than for valid scientific ones. Liebig pulled out of the debate when he realized that it might damage his reputation as an objective scientist. In any case, none of these schemes was ever put into place, despite much interest among the public, including even the Corporation of the City of London.

Not insignificantly, Liebig’s international reputation was partly derived from his promotion of the use of salts and other minerals on agricultural fields, effectively the birth of the idea of artificial fertilizer. Before this point, the concept didn’t exist, nor did counterproposals for “organic” fertilizing methods. Liebig became known through his publications on the subject, with memorable statements in support of his conclusions:

It must be admitted as a principle of agriculture that those substances which have been removed from a soil must be completely restored to it, and whether this restoration be effected by means of excrements, ashes or bones, is in great measure a matter of indifference.

For Liebig, the use of fertilizing agents in agriculture was a practical rather than a philosophical matter; here he expresses his own indifference towards the source of these agents, for he was not an ecologist as such in today’s terms. During the time of the mid-nineteenth century debates as to what to do with London sewage, Liebig came out clearly on the side of the reuse of sewage in agriculture:

Your nation, Britain, has caused the grave depletion of its fields’ fertility, by waste of its excretion. As a famous German chemist I issue the precaution that this cabin creates havoc of Noah’s Flood proportion. Each pull of the chain is like a Noah’s Flood taking in its cataracts so much nutritious good. What gets flushed away in these gallons of flood water in terms of drowned potential amounts to wholesale slaughter.
As noted, his own support of a particular sewage reuse scheme was more politically than altruistically motivated. The logistics of actually returning waste to agricultural soil was much more complicated than was acknowledged in many similar statements of the day. In any case, Liebig’s primary contribution was the propagation of the principle of artificial fertilizers, which revolutionized mass agriculture.

In Liebig’s home country of Germany, cities were also expanding at a rapid rate, although none was to reach the scale of London in the nineteenth century. About a decade after the system in London was dedicated, the city of Berlin commissioned the German engineer James Hobrecht to design and implement a new water-born sewage system for the city, divided into twelve radial districts. The ground-breaking ceremony for the first of these took place on August 13, 1877, and by 1883 the first five of twelve radial systems were in operation. However, Hobrecht did not wholly pattern the system upon London, rather, he based his system on the leeching fields of Croydon, which he was familiar with through the writing of the English engineer Baldwin Latham. Berlin did not have the advantage of being near the sea, and was much smaller in population at that time than London. Poor agricultural areas on sandy soils near the city were purchased to create a series of leeching fields that combined covered a greater area than the central city itself. The effluent was pumped into canals interspersed with agricultural fields, which were nourished by the liquid nutrients leached into the soil. This system of leeching fields and sewage farms was altered somewhat when new sewage clarification plants were introduced in the late 1920s. From that point, the effluent that was pumped into the leeching fields from the treatment plants already had the heavier solids filtered out, so that the leeching process was more efficient. Because of the rapid urban growth of Berlin at this time, the entire process came under question, and ways were sought to reduce the amount of land needed.

In the opening years of the twentieth century, the Berlin sewage farms were considered by many to be an unequivocal success. One of several studies published on the topic, this one by Siegfried Hagen from 1903, also considered the social implications. According to Hagen, who himself had been engaged in Berlin sewage farming, pointed out that whole districts near Berlin, such as Hohenschönhausen, were employed in the small scale farming by the leeching fields. He claimed to have observed a substantial increase in living standards in these agricultural suburbs during the thirty year period that the leeching fields had been in operation. There was no question in Hagen’s mind that the vegetables that were produced on these sewage farms were suitable for human consumption in nearby Berlin. Hay for farm animals was also grown on these fields. Hagen noted, however, that it was very hard work, and only provided employment during the growing season. However, farmers intensively utilized small plots of land, taking advantage of the enriched soil. Another social benefit praised by Hagen was the temporary employment of inmates from the nearby poorhouse at Rummelsburg. They were organized into military-style “Commandos” and housed in temporary barracks. From Hagen’s perspective, the work in the fresh air and sunshine, along with the military discipline would change these people’s lives for the better. Thus not only was produce grown for consumption in Berlin, from the city’s own waste, but lower class farmers were provided with a better living, and the destitute were shown the way towards a new life. But this situation was only to last in this form for another two decades.
Both the London and the Berlin methods of disposing of urban sewage reflected the practical, nineteenth-century perspective of the engineer and social reformer. Even the Berlin method, which did succeed in returning nutrients to the soil, was not aimed at any substantial social or cultural change, but rather was conceived as a further support of prevailing systems. During the closing years of the nineteenth century a spirit of cultural change known collectively in Germany as the “life reform” movements addressed every aspect of society, including the then well-known problem of disposing of urban waste at a mass scale. The German life reform movements were by no means closed to outside influences, and indeed one of the most important works on this topic to influence German thinking was written by the US American agricultural scientist Frank Hiram King, who was based in the agricultural school at the University of Wisconsin. His book titled, Farmers of Forty Centuries, published posthumously by his wife in 1911, was based upon his extensive travels in China and Japan, and is effectively a testament to what would now be labeled “organic” farming. (The book is still in print today and considered an important source on the subject.) King conceived of his book as a critique of agricultural practices in the United States in particular, and the West in general:

Again, the great movement of cargoes of feeding stuffs and mineral fertilizers to Western Europe and to the eastern United States began less than a century ago and has never been possible as a means of maintaining soil fertility in China, Korea or Japan, nor can it be continued indefinitely in either Europe or America. These importations are for the time making tolerable the waste of plant food materials through our modern systems of sewage disposal and other faulty practices; but the Mongolian races have held all such wastes, both urban and rural, and many others which we ignore, sacred to agriculture, applying them to their fields.

Surprisingly perhaps, King’s words have a strong contemporary resonance, although today foodstuffs are transported by airplane rather than ship, at a more rapid pace. But he already was considering the problem of resource mismanagement and displacement on a global, rather than a local or even national scale. He was also reacting against the misuse of the principles of artificial fertilizer as introduced by Liebig and propagated by others internationally.

One of the central themes, although not the only one, in King’s study of ancient Chinese agricultural practices was the reuse of human waste as fertilizer in agriculture. He considered the problem not only in the rural context, but also in the urban, drawing upon experiences in the metropolis of Shanghai, which although very heavily influenced by European culture, still returned human solid waste to nearby agricultural lands. King recorded that a contract had been awarded to one Chinese businessman, giving him the rights to remove all human waste from the city, a lucrative business. Human waste was collected manually in containers and loaded onto boats, by which it was transported via the extensive canal network of the city to nearby farms. (Fig. 4) Thus, although effectively transported via water, the waste never came into contact with it and remained in solid form. In 1899 one British colonial official enthusiastically reported on the process:
Regarding the bearing on the sanitation of Shanghai of the relationship between Eastern and Western hygiene, it may be said, that if prolonged national life is indicative of sound sanitation, the Chinese are a race worthy of study by all who concern themselves with Public Health....While the ultra-civilized Western elaborates destructors for burning garbage at a financial loss and turns sewage into the sea, the Chinaman uses both for manure. He wastes nothing while the sacred duty of agriculture is uppermost in his mind. And in reality recent bacterial has shown that faecal matter and house refuse are best destroyed by returning them to clean soil where natural purification takes place....While to adopt the water-carriage system for sewage and turn it into the river, whence the water supply is derived, would be an act of sanitary suicide

Although the author doesn’t provide any practical suggestions as to how Chinese practices might be applied in the West, his rhetoric implies his willingness as a colonial official to learn from the practical examples of foreign cultures. There is no sense of cultural superiority implied by his writing, but there is also no careful consideration of the appropriateness of Chinese practices for western cities of the period. King, on the other hand, studied methods of reusing human waste in more depth, but primarily in rural districts. One section in King’s book is titled, “Orientals Crowd both Time and Space,” suggesting an almost modernist concern for efficiency and economy. King also seems to be presenting the equipment and structures used in reusing human waste as cultural artefacts. In one illustration he shows a “Compost shelter and pig pen, with pile of wheat roots stacked at one end, for use in making compost, Chihili, China.” King’s critique primarily was aimed at agricultural practices, but implicitly this was also a means towards reconceiving western lifestyle and culture in general. As will be seen, the German modernist landscape architect Leberecht Migge understood King’s study in both senses, and tried to adapt such principles of human waste reuse in his own practice. (Fig. 5)

In 1913, a few years after King’s Asia travels, the German-speaking popular biologist Raoul Francé published a small book titled, Edaphon, Life in Agricultural Soil, discussing the many lifeforms in the soil necessary to both decomposition and growth. In a similar manner to King, Francé pointed out that ancient farmers had followed embraced natural processes of growth of decay in their practices. Francé’s own thinking was informed by the same spirit as the life reform movements, his scientific observations were intended as a cultural critique as well. Taking a conservative, anti-urban stance, he believed that the unhealthy conditions of the city were reflected in the dead soil under buildings and pavements, which was removed from any kind of process of natural renewal. The city may have been a “great dung heap” in his words, but not in the sense of being a source of life and nutrients for growth. Francé noted the importance of Liebig’s observations, that minerals and nitrogenous elements could be added to the soil, but he also pointed out that the organic matter contained in humus was essential to plant growth, and thus to human life. With the aid of drawings based on enlarged images of living creatures observed under the microscope, he created a picture in the reader’s mind of the soil as an intricate, highly populated world operating at numerous scales, from the beetle and worm, to fungus and algae, down to bacteria. (Fig. 6) Francé argued that humans needed to understand the life processes within the soil itself, so that we will pay more heed to the cycles of growth and decay within which
we, and our bodies, are enmeshed. In a section drawing cut through soil and atmosphere, Francé showed how the cycle of nitrogenous elements necessary to plant growth was replenished through various sources, including the air itself. (Fig. 7) He placed a primary emphasis on the connection between urban waste and rural agriculture, in another version of the town/country paradigm in the same period that produced the garden city. But like other critics before him, he did not provide any specific plans as to how this reconnection of resources and spaces would be achieved.

Francé’s publications had a wide audience, and were read by professionals in other fields. The German modernist architect Mies van der Rohe based his own minimalist structural expression in part upon the natural economy of bone structures, as illustrated by Francé. Among German landscape architects of the early twentieth century, Leberecht Migge was undoubtedly the most engaged with the question of the reuse of urban waste in the growing of food, especially human feces. Migge was directly influenced by Francé’s diagram of the cycle of the elements, reinterpreted graphically as the “Tree of Waste” (Abfallbaum) recalling the Nordic Tree of Life (Lebensbaum). (Fig. 8) A copious writer in addition to being a gardener and designer, Migge frequently cited King’s book as an authoritative source on Chinese agricultural practice. One of his drawings was taken directly from King’s photograph of a Chinese compost shelter and pig pen mentioned above. Throughout his career, Migge made proposals at various scales for the reuse of waste in the garden. Like other cultural reformers, it was not only a practical matter, but also about restoring the experiential connection between food production, waste reuse, and food consumption. The restoration of the cycle of the elements was also related to a new kind of metropolitan lifestyle.

In 1918, a very lean year following the War, Migge published his polemical brochure, Everyone Self-Sufficient! (Jedermann Selbst-Versorger!), presenting in great detail how small village-like horticultural settlements could be planned so that all families could grow their own food. (Fig. 9) The spatial planning of this ideal settlement was based entirely upon organic gardening principles, in the service of the economic and nutritional self-sufficiency of individual families and the contained community. Garden plots and dwellings were to be provided according to family size: the more children, the larger the garden. (Childless couples were not allowed to join — as a means of encouraging human reproduction following WWI.) Intensive gardening, with smaller crops requiring more care, was to occur in the small house gardens, while extensive crops such as potatoes would be grown in larger communal fields. (Fig. 10) A key feature was the collective compost facility. Each family would bring its household waste to the composting area where it would be aged. Once aged, the compost would be carried back to each family garden, or applied to the communal fields. Human feces was an important resource in Migge’s mind, to be collected in dry toilets, for he was opposed to water-borne sewage systems at this point. These recycling processes would "make all use of scarce, expensive animal dung and artificial fertilizer in our garden unnecessary."

Migge proclaimed: "It is without doubt that with this limited attempt to reintroduce all of the products of human metabolism back into the substrate, success will be had (and it will have success!)." Although Migge considered this an economic measure, intended to provide support for the less-well-off classes, the inclusion of human waste within the cycle ensured a biological wholeness otherwise lost within the big cities. Adolf Loos, the modernist architect in Vienna known for his book Ornament
and Crime, praised Migge’s system, and compared the collective compost facility to traditional communal wine fermenting facilities in French villages, which acted as social hubs. 

Migge’s proposed his first serious waste-recycling proposal at an urban scale for the northern German city of Kiel, where a colleague, Willy Hahn, was the new city architect. In 1922, they published their “green-belt” plan for Kiel in a small brochure presenting "the construction of the collective-city as a living organism," following Migge’s, and Francé’s principles. Much like the earlier leeching fields and sewage farms in cities like Berlin, waste including human feces from the urban center was to be distributed to the outer green belt areas, where it would be reused in agriculture. (Fig. 11) However, there were some important differences. Migge still believed, as did others, that water-borne sewage carried infectious diseases, and that the process at the time of drying the waste and then burning it, meant a substantial loss of nutrients. The only ecologically acceptable solution was to collect human waste in dry toilets, and transport it to communal compost aging facilities. In principle, Migge simply expanded the scale of his earlier scheme that was more village-like in character. He would have been familiar with the discussion of the collection of waste in Shanghai from King’s book. However, Migge believed that collecting and sharing waste was a communal task, or “pioneering work.” Waste could be carried by streetcar to the compost facility at night, or during the day, when special “dung fares” would be offered to participants. (This concept was presented without any irony.) Migge illustrated one of the special compost parks, shown as an attractive landscape feature, sheltered from the winds by high poplars, which would also have reduced the spread of odors. (Fig. 12) Again, this was not merely a practical solution, but a means of joining the populace together in a shared cultural enterprise, of communal, metropolitan agriculture. It is unclear whether Migge intended such “pioneering work” primarily for the lower classes, but in any case, this was the period of great economic stability in Germany. Despite Migge’s efforts, the city of Kiel had already decided to substantially expand its water-borne sewage system even before this brochure was published.

As mentioned, in Berlin the Hobrecht system was supplemented by the addition of new sewage clarification plants that supplied relatively clear effluent to the fields, without heavy solids. Not only was land no longer readily available around the rapidly growing metropolis, new technologies also meant that sewage could be more effectively treated. Whereas the previous alternative had been to dry sewage and then incinerate it to make a powder with very low fertilizer value, now the liquid effluent itself contained much of the nutrients needed for plant growth. One of the first of the new sewage clarification works was opened in Stahnsdorf to the southeast of the city in 1928, a development not lost on Migge. (Fig. 13) In a report of 1932 that Migge later referred to, the author specifically considered the new Stahnsdorf facility. He pointed out that although methane gas would be produced the quantities were relatively limited, and that so far the gas was either used in the plant, or simply released. The solids and effluent produced had some value as fertilizer, but not enough to justify the costs of transportation. These observations clearly influenced Migge, who proposed a specific set of solutions. In 1932, when his friend and colleague the modernist architect and planner Martin Wager was still city architect for Berlin, Migge presented his report to the city titled, “A World City Colonizes!” ("Ein Weltstadt kolonisiert! Berlin versorgt sich
Selbst! Eine Million Berliner siedeln aus!") co-authored with his professional partner Max Schemmel. Now the Migge had accepted the new sewage clarification methods, he was no longer arguing for dry toilets and the collection and distribution of dry human waste. Realizing that a series of new clarification plants would be constructed around the city, he proposed a series of satellite settlements to be located immediately adjacent to each. Berlin as a whole would be self-sufficient, it would literally be fed from food grown from its collective waste. In his report, Migge again cited Justus von Liebig, "What is taken away from the acre must be returned to acre." He also optimistically claimed that the resulting population shift of one million people towards the periphery could be exploited to create more open space in the center of the city, without explaining how this would be carried out. The location of gardens directly adjacent to the primary source of nutrients meant that the problem of the cost of transporting the solid waste and effluent was solved, and because gardeners would live on site, public transportation needs would also be reduced, with numbers of riders shifted from the center to the periphery.

In each settlement, the nutrient-rich effluent would be piped directly into hundreds of small gardens, each assigned to one family. (Fig. 14) The methane gas from the clarification plant would also be used to heat greenhouses in cold weather. Planned as massive blocks of small gardens connected to a central irrigation system, the gardens were separated from the dwellings, resulting in the loss of the village-like character of his 1918/1919 scheme. In fact he had never proposed such a large settlement scheme, with five large-scale and nineteen small-scale greenhouse units; fourteen commercial settlers' units; 400 homestead settlers' units, and 130 smaller regular settlers' units. Community needs would be provided for with meeting and sports facilities locate in a park area. In 1908, the city of Berlin had constructed a model village of Hobrechtsfelde, a rationalized and aestheticized sewage farm community. But the scale was much smaller, and the concept more traditional. In Migge's mind, his proposed ring of gigantic settlements represented a kind of inner-colonization, a great opportunity for the city and a prototype for the nation. Such inner-colonization proposals were a direct rebuttal to conservative calls for settlement in the thinly populated districts of eastern Germany, as a means of providing more living space for the German people. Migge's answer instead was to intensify agricultural practices and settlement, as an augmentation of urban rather than rural life. Although an emergency settlement was built near Stahnsdorf in the early years of the 1930s depression, Migge's proposal would come to naught. Once the National Socialists seized power of the national government in 1933, Migge lost influence, for even though he tried to court their favor, he was still regarded as a former communist and a modernist. Migge died of cancer in May 1935, and his name was quickly dropped from professional journals.

The shift in power and dominating cultural policies following the Nazi takeover colored every aspect of endeavor, including the profession of landscape architecture, and the question of the disposal of human waste from the cities. Another landscape architect to become involved in the cultural as well as technical discussion of human waste disposal and urban planning was Munich-based Alwin Seifert, who was an arch-enemy of Migge and partly responsible for his career downfall in the early years of Nazi rule. Seifert wholly belonged to the spirit of the new era under the Nazis, he was a close colleague of Rudolf Hess, and designed his family garden, including a small-scale farm...
Seifert was heavily influenced by the bio-dynamic gardening system first proposed by the founder of anthropocentrism, Rudolf Steiner. Steiner adamantly opposed the reuse of human feces in gardening, but not on hygienic grounds. Rather, Steiner argued that because humans had an intellectual capacity, they used up an essential element that he referred to as the “ego factor” (Ich-Anlage), which humans needed to have replenished through their foodstuffs. Thus, plants grown from human feces would not contain this factor. Animals did not have an intellectual capacity, and their dung thus contained the necessary ego factor, which would be transmitted back to humans through plants fertilized with animal dung. Steiner and his followers also rejected Liebig’s proposals for artificial fertilizer. Bio-dynamic gardening could be classified as another species of organic gardening, but it is embedded in Steiner’s general philosophies. For example, it is “dynamic” because related to the dynamic effect of the position of the plants on the growth of plants and other beings on earth. While Seifert and others propagated bio-dynamic gardening and agriculture during the Nazi era, the more spiritual dimensions of this system cast it under suspicion. Seifert was thus cautious in his public associations with the bio-dynamic movement.

Seifert was a highly successful landscape architect in Germany under the Nazi regime. He was the primary landscape architect for the new Autobahn system, and a public figure among professional circles. Therefore he was in a position to publish on a wide variety of topics, and was taken very seriously. Because of his work on water management at the scale of regional landscape planning, he became involved with the topic of the reuse of urban wastewater. Seifert penned a highly polemical article on the topic, which as he confessed to friends he intended to be controversial from the beginning. First published in an engineering journal in 1940, it was considered important enough to be re-published as a separate volume two years later (during the War), along with articles of support and rejection. Without mentioning him by name, Seifert consciously took the completely opposing position to Migge and those like him, whom he condemned in a private letter to his superior on the Autobahn projects, Fritz Todt. In his article, Seifert began by denigrating the nineteenth-century worldview of Liebig:

For agricultural chemistry in the nineteenth century all was in order. It was irrelevant, whether the primary plant nutrients nitrogen, phosphorus, and potassium were taken from mines or chemical plants, or were found in cow stalls or urban wastewater

As a follower of Steiner and bio-dynamic agriculture, Seifert rejected the nineteenth century “mechanical worldview,” as well as the functional arguments of “intellectuals” like Migge, arguing instead for intuitive thinking based in part on observation. The source of plant nutrients was critical for Seifert, not incidental. For Migge it had been important to reestablish the cycle of the elements through the direct connection between household waste and food production, both to facilitate economic freedom and to create a more holistic life experience. Seifert also believed that the cycle of the elements be preserved, but he used the example of cows refusing to eat grass growing out of cowpats as common-sense evidence proving that animals should not be given feed that was grown using their own waste. For Seifert: “The cycle cow-manure sludge-grass-cow is an unnatural, pernicious short-circuit; the re-introduction of meadow and hay mean
the breaking up of this overly narrow circuit, and thus in any case an improvement…”

The elements that the cow needed for its health would not be found in its own excrement, since these had already been used up. Seifert’s argument was similar to that of Steiner, but he went further, arguing that the same principle was true for all higher-level animals, not just humans.

The use of human feces to fertilize human foodstuffs intended for human consumption would endanger not only the bodily hygiene, but also the racial-hygiene of the entire nation. Seifert was writing at the height of the excesses of Nazi racial theory, summarized by the “blood and soil” principle, meaning that race (or “blood”) was directly connected to region and nation (or “soil”). Following Seifert’s logic, the symbolic association of human blood with the soil was acceptable, but the physical connection of human feces with soil was an unacceptable form of contamination. Seifert went to great lengths to completely discredit the Chinese use of human feces as agricultural fertilizer as a model. He argued that there were a number of significant differences which made their practices irrelevant and unsuitable for European practices. The Chinese only ate vegetables, and used an extraordinarily complex process of fertilizer and soil preparation. But most importantly, Seifert pointedly observed that, “…we are no Mongolians.” The Chinese and their culture were clearly inferior to Germans and their higher level of achievement. Seifert pinpointed the source of the problem: “…the Chinese are stuck at the point in their cultural development when they introduced feces agriculture.” Their fate had thus been sealed: “They were a warlike master race, and are today the pawn of anyone who attacks them militarily.” But in the context of Nazi Germany he dutifully observed that, “…we indeed want to be a master race.” Whether Seifert was aware or not that his arguments were strained, the production of healthy foodstuffs was of vital importance to him, to insure the racial-hygienic superiority of the nation.

The use of human feces in Germany had been linked by German modernists to the concept of “minimal existence,” as a means of ensuring that people of less means could have their own house and garden, and lead healthy lives in relative economic independence. As might be expected, for the elitist conservative Seifert, minimal standards represented another cultural anathema:

…we must indeed admit, that fertilizing with feces in central Europe until this point was only common in small-house, small-settler, and small-garden circles, that is, among people who worked themselves up out of repressed conditions…

“Small” houses and gardens referred to lives of the lower middle classes, whom Seifert seems to be referring to with some condescension. These people turned to human feces as fertilizer because, “no decent stall dung was available.” Furthermore, their greedy desire for profits had “suppressed the traditional farmer’s instinct,” that would been latent within them as Germans. Far from being an asset to the community, such small gardeners and farmers were representative of the worst of metropolitan profit-driven culture divorced from true, traditional German values. But presumably through education, this “farmer’s instinct” could be re-awakened within them.

Seifert concluded that urban wastewater must not be used directly for the production of foodstuffs to be consumed by humans. Instead, “The ideal utilization of
urban wastewater is for the production of energy and materials that are only used technically, that is, outside of the nutritional cycle."45 Seifert was involved intensively in regional planning and water management, not only with the Autobahn design. In that respect, he was conscious of other landscape uses besides agriculture. Since urban wastewater could not be used in agriculture, he envisioned another possibility:

...cities such as Nurnberg or Berlin have the possibility of transforming the poorest pine forests struggling in sandy soils, into lush woods, that would definitely not become recreational woodlands, but which for the overall landscape ecology would have a disproportionally positive effect in comparison to any area utilizing wastewater for agriculture.46

While the logic of this proposal, essentially to create “sewage forests” as opposed to sewage farms may have some appeal on an abstract level, he provided no concrete suggestions as to how this could be carried out. (Even though Migge’s proposal for sewage-plant settlements may have been somewhat implausible, he did at least provide detailed plan diagrams.) Berlin was already moving away from the old leeching field system, because the enormous amounts of land required could no longer be acquired in the outskirts of the rapidly expanding world metropolis. Seifert ignored this fact, and although he gave what he considered to be clear reasons for not using urban wastewater and human feces for agricultural production, he essentially left the problem of what to do with urban waste unanswered. His article on this topic was more of a negative position taken in the context of then current cultural theories of race, biology, and environment.

Although Francé, Migge, and Seifert took very different positions, they could nevertheless all be categorized under the umbrella of life reform movements in Germany in the early twentieth century. Whereas their predecessors in the nineteenth century had seen the problem of human waste disposal and its reuse feces as a technical, management problem, for early twentieth century cultural reformers these were philosophical matters effecting human existence. For Migge it was both a biological and an experiential issue, the reconnection of waste and consumption would result in a more holistic understanding. For Seifert, urban wastewater and feces in agriculture was an aberration, or a diversion from his real interest, which was the elimination of the use of artificial fertilizer in favor of a more balanced form of compost preparation following bio-dynamic methods. Seifert’s theories were also based on philosophical assumptions, connected to racial hygiene and national character. After WWII, the rhetoric surrounding racial hygiene disappeared, or was at least reframed in more neutral terms as a general concern for national nutrition and health. But this should not been seen only as a matter of de-Nazification, for it was also a partial shift away from worldviews which sought to imbue apparently technical problems with cultural and even spiritual values.

The history of the disposal of human feces is bound up in the emergence of technologies that facilitated the creation of mass urban culture, resulting in many significant spatial separations, symbolized by the simplistic figure of the alleged town-country polarity, perpetuated through Ebenezer Howard’s classic diagrams. What had been acceptable in the nineteenth century when many such systems were being put
into place, became the subject of great criticism among early twentieth-century reformers who believed that the nineteenth century conception of urban living was intrinsically flawed. Because of the highly polarized political situation in Germany in the early twentieth century, one may see how reformers on the left and later the right responded to these problems, the one position bringing the other into greater focus by comparison. In architecture and landscape architecture, these positions were represented in a highly visible manner, through modernism on the one hand and traditionalism on the other (although this alleged dichotomy may also be questioned). In retrospect, one may see that the concern of Seifert and others that urban wastewater should not be introduced into the nutritional cycle may be justified, because of the number of pollutants now present that could not have been imagined in the nineteenth century. This story may be read in at least two ways. On the one hand, the cultural imperative may stand for the integration of all aspects of human existence in a conscious manner, as means of enriching human experience. On the other, extreme polemical positions attached to technical and ecological problems may in fact result in alienating environments, or indeed, in alienating social and political systems. Today, there appears to have been a shift towards a more managerial attitude towards such environmental problems, although we are now much more sophisticated in terms of our understanding of global ecosystems and the place of urban culture within them. But even within an apparently purely technological worldview lie cultural assumptions that deserve further investigation. And the problem of urban wastewater remains largely unsolved, especially in relation to the depletion of soils.

11 Siegfried Hagen, "Die Berliner Rieselfelder, Ihre Einrichtung und volkswirtschaftliche Bedeutung, besonders vom landwirtschaftlichen Standpunkte aus." PhD diss., Königliche Württembergischen Eberhard Karls-Universität, 1903, p. 82.


13 Frank Hiram King, Farmers of Forty Centuries, or, Permanent Agriculture in China, Korea and Japan, Madison (WI): Mrs. F. H. King, 1911.

14 Frank Hiram King, Farmers of Forty Centuries, or, Permanent Agriculture in China, Korea and Japan, Madison (WI): Mrs. F. H. King, 1911, p. 1.

15 Frank Hiram King, Farmers of Forty Centuries, or, Permanent Agriculture in China, Korea and Japan, Madison (WI): Mrs. F. H. King, 1911, p. 194.

16 Frank Hiram King, Farmers of Forty Centuries, or, Permanent Agriculture in China, Korea and Japan, Madison (WI): Mrs. F. H. King, 1911, pp. 198-199.

17 Frank Hiram King, Farmers of Forty Centuries, or, Permanent Agriculture in China, Korea and Japan, Madison (WI): Mrs. F. H. King, 1911, p. 261.

18 Frank Hiram King, Farmers of Forty Centuries, or, Permanent Agriculture in China, Korea and Japan, Madison (WI): Mrs. F. H. King, 1911, p. 269.


22 Migge, Jedermann Selbstversorger, eine Lösung der Siedlungsfrage durch neuen Gartenbau, Jena: Diederichs, 1918, 1919. I have translated the title to emphasize the slogan-like character; "Selbstversorger" translates more accurately as "self-provider," but lacks rhetorical resonance in English.


25 April 7, 1921, Magistratssitzung Protokoll, Stadtarchiv Kiel.

26 Willy Hahn and Leberecht Migge, Kiel, p. 9.


28 Karl Laux, Abwasserwirtschaft durch Feldregnung, Potsdam: Verlag von Edumund Stein, 1932, pp. 16-18, cited in: Ernst Fuhrmann, Der Mensch und die Fäkalie, Leipzig: Verlag "Bebauet die Erde," 1935. This report is referred to next to the line drawing of the Stahnsdorf plant, which appears to be by Migge.


31 Hermann Hahn, and Fritz Langbein, eds., Fünfzig Jahre Berliner Stadtentwässerung 1878-1928. Berlin: Verlag von Alfred Metzner, 1928, pp. 300-336, 343. Note that a number of other sewage farms were built, but Hobrechtsfelde was equivalent to a small garden city.


33 Uwe Werner and Christoph Lindenberg, Anthroposophen in der Zeit des Nationalsozialismus, Munich: Oldenbourg, 1999, p. 89.

34 David H. Haney, When Modern was Green: Life and Work of Landscape Architect Leberecht Migge, London: New York: Routledge, 2010, pp. 239-240. Note: Steiner’s teachings were by no means inherently conservative, and the fact that some leading Nazis embraced some of his principles should not be taken as a repudiation or contamination of his bio-dynamic gardening principles, which are still being applied around the world today.
36 See for example: Alwin Seifert, **Im Zeitalter des Lebendigen**, Munich: Müller'sche Verlagshandlung, 1942.
37 Alwin Seifert Papers, School of Landscape Architecture, the Technical University of Munich, Weihanstephan, Folder 035: “Abwasserverwertung.”