

Waste, remediation, and maintenance in the 19th-century Paris sewer

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Presented at “Maintainers II: Labor, Technology, and Social Orders”
Stevens Institute of Technology, Hoboken, N.J., April 8, 2017

Between 1850 and 1870, Paris was transformed from a congested, dark, medieval city trailing vestiges of its Roman past into a modern metropolis. Baron Georges-Eugène Haussmann, Prefect of the Seine under Napoleon III, was responsible for this project. The “Haussmannization” of Paris during France’s Second Empire resulted in a radically changed city plan of broad avenues, squares, and monuments superimposed upon the old array of crowded blocks. It cleared swathes through crowded streets to help traffic, pedestrians, goods, and ideas circulate, and to prevent barricading. And Haussmannization had a secret centerpiece: overhauling the Paris sewer into a rational, mechanized operation.

The sewer had been a limited network of open and covered channels haphazardly placed amidst urban blocks and further cramping the narrow routes. Cesspools dug beneath houses weren’t particularly well sealed, leaving residents to struggle with seepage just as they coped with periodic overflow from the sewers, which were not designed for a lot of rain.¹ With all this clogging, filth was everywhere, its stink was pervasive, and both sewer and cesspit were impossible to ignore. The new sewer, like the new street plan, promoted circulation: water, waste products, and air moved through and away from the system. Combined with a new and improved water system, the Haussmannized sewer was meant to reduce disease, reduce crime, and stop everything from stinking. Just as Augustus claimed to have “found Rome a city of brick and left it a city of marble,” Napoleon III hoped to leave Paris “sweet below.”²

Something about the sewer captured the imagination of contemporary writers and artists, whose work demonstrates a diverse array of interpretations and reactions to Haussmannization. How writers and artists saw the sewer offered significant clues as to how they thought about Paris, and about cities in general. They framed the old sewer as an intestine, an underside, a repository of shame; while narratives about the new sewer spoke to modern ways of seeing, cleaning, and moving around in the city. The sewer also figured in the *circulus*, a socioeconomic concept and infrastructure for remediating and recycling urban waste in suburban and rural agriculture. This paper looks at what several works of art and literature – including the subterranean photography of Nadar and the novels *Les Misérables* and *La Terre* – have to say about the Paris sewer, the *circulus*, and maintaining urban infrastructure.

¹ David Pinkney, *Napoleon III and the Rebuilding of Paris* (Princeton, NJ: Princeton University Press, 1958), 20.

² Donald Reid, *Paris Sewers and Sewermen: Realities and Representations* (Cambridge, MA: Harvard University Press, 1991), 29. It also happens that Rome was founded on a sewer: the Cloaca Maxima.

Several sewer metaphors

As a subterranean space, the pre-Haussmann Paris sewer evoked awe, fear, and disgust. The first flash photographs, by Nadar (born Gaspard-Félix Tournachon), captured the sewer and sewer-cleaning machinery in Piranesian chiaroscuro. Nadar posed dummies in place of sewer workers, eliding the actual labor of sewer maintenance while framing the underground as no safe place for the living – he also photographed skeletons in the catacombs. Later, he would document how sewer tourism civilized the underground and produced spectacles for competitive consumption: “Not everyone has the leisure, the occasion, or the thought to descend here—and these are sufficient reasons to come.”³

Victor Hugo devotes several chapters of *Les Misérables* to the horrors of the sewer, following the nauseated Jean Valjean and wounded, unconscious Marius through the suffocating muck. A third traveler, the surveyor and engineer Bruneseau, calmly catalogs the sewer’s outlandish contents. (Hugo calls him the Columbus of the sewer.) In *Les Misérables*, the sewer is the “intestine of Leviathan,” a nod to both Thomas Hobbes and to a larger and more fully developed metaphor likening the city to a human body. According to Haussmann’s memoirs, the city-organism was front-of-mind as he envisioned a new sewer:

“The underground galleries, the vital organs of the great city, would function like those of the human body, without being exposed to the light of day; pure, fresh water, light and heat would circulate like the various fluids whose movement and maintenance are essential to life. Secretions would take place there mysteriously and would maintain public health without disturbing the orderly running of the city and without spoiling its external beauty.”⁴

The intestine wasn’t itself aesthetically appreciable, but it maintained the appearance and smooth operation of the body. Another key analogy is circulation, an extended metaphor for how blood moves through the body, people move through buildings, and so on. It’s a common embodied metaphor in architecture, but in Haussmann’s Paris, circulation is pervasive and it does more. It describes the movement of clean and unclean water, and it speaks to both social mobility (how people move within a hierarchy) and communication (the movement of ideas).

Speculative waste management: The circulus

Still another vision of what the sewer could be was the circulus, a kind of speculative waste management that addressed pervasive social fears of the sewer through a series of tubes. This model, conceived by political economist Pierre Leroux and predicated on reuse and maintenance, systematized the improvisation and ingenuity already well known to farmers and city dwellers.

³ Félix Nadar, *Quand j’étais photographe* (New York: Arno Press, 1979), 111: “Tout le monde n’a pas le loisir, l’occasion ou la pensée de descendre ici,—et c’était là raisons suffisantes pour y venir.”

⁴ Georges-Eugène Haussmann, *Mémoire sur les eaux de Paris, présenté à la Commission municipale par Monsieur la Préfet de la Seine*, 4 August 1854, Paris, 53, quoted in Jean-Pierre Goubert, *The Conquest of Water: The Advent of Health in the Industrial Age* (Cambridge: Polity Press, 1986), 67.

Leroux was convinced that “everyone is both a producer and a consumer; the ‘waste’ an individual produces can be used to raise the food necessary to keep that person alive.”⁵ He argued that the pursuit of wealth – “this dangerous forest where each is busy thieving from his neighbor” – produced and perpetuated economic inequality by disrupting the *circulus*.⁶ Leroux amplifying an individual’s contribution to the *circulus* many times over could offer city-scale sustainability, in which the sewer played a key role.

In practice, the *circulus* consisted of two simultaneous cycles for water and excrement. Sewage and wastewater, combined in the sewer into a single sludgy liquid, would flow out from there to the *banlieues* where it would irrigate fields. Passing through soil would purify the water, and its organic material would fertilize fruits, vegetables, and grains. Sewage-farmed crops could be sent back to the city and consumed, salvaging energy by processed waste for reuse. This scaled-up system was also inspired by British public health expert Edwin Chadwick, who advocated for an exchange cycle of pure and soiled water between city and country to balance water and waste in the name of health and productivity: “The countryside [suffered] from too much water and too little manure, while the city lacked the water to cleanse itself of its wastes.”⁷ Victor Hugo and Émile Zola were vociferous advocates for the *circulus*, stressing its contributions to purification, efficiency, and control. They attempted, through their socially conscious novels, to persuade Parisians that, “If our gold is filth, on the other hand, our filth is gold.”⁸

Purification and efficiency

Purification in relation to the *circulus* reflects a surge in contemporary consciousness about hygiene. Hugo and Zola represented the bourgeois as deathly afraid of filth, and many people mistakenly conflated cleanliness (a cultural attitude) with hygiene (a medical principle).⁹ This meant a skyrocketing *social* need for water, beyond even the needs stemming from industrialization. The volume of water associated with daily life rose dramatically “from a few liters to several hundred liters per inhabitant per day.”¹⁰ Acceptable ways of using water and conventional attitudes towards the body developed, and soon, water was involved in every aspect of daily life. Water companies and government officials streamlined their calculations to determine a “uniform supply,” accurately assuming that practically everyone used water, and lots of it. So, as the “water-devouring” lifestyle came into its own, the design of systems evolved to perpetuate this social reality.¹¹

The *circulus* was extremely concerned with efficiency, too, or eliminating waste. Cycling liquid sewage through an agricultural stage saved time and money and also turned the burden of waste into a profitable resource. Banishing excrement from the city would have cleansed the noxious atmosphere assaulting Parisian nostrils and lung – miasmas that read

⁵ Reid, 54.

⁶ Jacqueline Hecht, "French Utopian Socialists and the Population Question: 'Seeking the Future City,'" *Population and Development Review* 14 (1988): 60.

⁷ Reid, 56.

⁸ Victor Hugo, *Les Misérables*, trans. Charles E. Wilbour (New York: Alfred A. Knopf, 1997), 1234.

⁹ Goubert, 51.

¹⁰ *Ibid.*, 52.

¹¹ *Ibid.*

as energy leaks. Implementing the circulus via sewage farming came to represent “a redistribution not only of the fruits of labor, but of its detritus as well,” moving underused and dangerously accumulating resources like water and excrement to where they were needed most.¹² Sewage, a threat to urban public health, could be agriculturally productive if relocated, while water languishing unused in rural marches could boost health and industry if channeled into Paris. If no resource were left untapped, everyone’s needs would be satisfied.

Eliminating waste

Victor Hugo, who dedicates a chapter in *Les Misérables* to the reuse of sewage, was most interested in eliminating the concept of waste. Lamenting that “Paris throws five millions a year into the sea ... by means of its intestine,” he exhorts the Parisian bourgeoisie to consider a scheme that could, if not make Paris, then at least halt its undoing.¹³

To Hugo, the circulus is both very simple and very advanced. Here he seems to embarrass Parisians into reconsidering their own habits:

Science, after long experiment, now knows that the most fertilizing and the most effective of manures is that of man. The Chinese, we must say to our shame, knew it before us. No Chinese peasant, Eckeberg tells us, goes to the city without carrying back, at the two ends of his bamboo, two buckets full of what we call filth. Thanks to human fertilizer, the earth in China is still as young as in the days of Abraham. Chinese wheat yields a hundred and twenty fold.¹⁴

This account was drawn from contemporary travelogues in China and Japan, which also inspired circulus-related projects by Jean-Baptiste Dumas, one-time Minister of Agriculture and Commerce under Napoleon III.¹⁵ In Hugo’s retelling, it reflects badly on 19th-century Parisians that a practice it took Western science “long experiment” to reach was a commonplace of Chinese society ages ago. Stressing East Asian provenance also played to a bourgeois desire for worldliness in an age of expositions and World’s Fairs.

Hugo mixes flattery with rebuke, effusing over Parisian grandeur while admonishing the city’s economic tactics:

Paris, that model city, that pattern of well-formed capitals of which every people endeavours to have a copy, that metropolis of the ideal, that august country of the initiative, of impulse and enterprise, that centre and that abode of mind, that nation city, that hive of the future, that marvelous compound of Babylon and Corinth, from the point of view we have just indicated, would make a peasant of Fok-ian shrug his shoulders.¹⁶

¹² Reid, 69.

¹³ Hugo, 1234.

¹⁴ *Ibid.*

¹⁵ Dana Simmons, “Waste Not, Want Not: Excrement and Economy in Nineteenth-Century France,” *Representations* 96, no. 1 (Fall 2006), 73-98.

¹⁶ Hugo, 1236.

The bourgeois by this point feels the sting of insult: For all his liberalism, education, and mastery of social mores and structures he has not yet learned to manage his own waste as well as the poorest Chinese farmer. While the *circulus* isn't conceptually difficult, Hugo needed to over-sell its simplicity. Despite failing to recognize this "easy seesaw, the simplest in the world" for so long, Parisians could still correct course.¹⁷ Immediately adopting the *circulus* into politics, economics, and everyday life would redeem centuries of ignorance and "the hundred millions thrown away."¹⁸

Drawing a mildly disturbing line between cesspit and plate, Hugo links the disgusting with the bucolic in this passage on the *circulus*' considerable rewards:

These heaps of garbage at the corners of the stone blocks, these tumbrels of mire jolting through the streets at night, these horrid scavengers' carts, these fetid streams of subterranean slime which the pavement hides from you, do you know what all this is? It is the flowering meadow, it is the green grass, it is marjoram and thyme and sage, it is game, it is cattle, it is the satisfied low of huge oxen at evening, it is perfumed hay, it is golden corn, it is bread on your table, it is warm blood in your veins, it is health, it is joy, it is life.¹⁹

This evokes not the unhygienic French peasants Parisians thought they knew, but a paradise where the *circulus* works its magic in a soft-focus countryside as exotic to city dwellers as a Chinese village would have been. Fecundity was recast as fertility. Hugo, gaining steam with the rhetoric of a prosperous, infrastructure-enabled future, offers vague descriptions and hilariously arbitrary asides: "Add the suppression of parasitism, it will be solved."²⁰

Waste as production

Hausmann reluctantly approved the *tout à l'égout*, a combined system for moving wastewater and solids, which meant a goldmine for agriculture if this rich humus could be diverted to the countryside. Sewage farming went into production, for example in the town of Gennevilliers, outside Paris. Here, visitors sipped from glasses of clear water purported to be filtered liquid, and explanations of the *circulus* had a magical bent. Gravity filtration paled in comparison with mystical underground forces that, concentrated in the country soil, could purify a substance too vile and taboo for human exposure.²¹

Using waste and wastewater in agriculture was not a new idea when Leroux first proposed the *circulus*, and we can look to contemporary novels for evidence. Émile Zola's Rougon-Macquart cycle, for example, includes rich detail about use, reuse, and waste in Les Halles (the Parisian central market), and depicts farmers blending everyday refuse into fertilizer to form a resource loop out of country life. Late in Émile Zola's novel *La Terre* (*The Earth*), an eccentric old farmer named Hourdequin contemplates the virtues of human

¹⁷ Hugo, 1236.

¹⁸ *Ibid.*

¹⁹ *Ibid.*, 1234.

²⁰ *Ibid.*, 1236.

²¹ Reid, *Paris Sewers and Sewermen*.

excrement as fertilizer. Being somewhat of an agricultural scholar, he has dabbled in applying a multitude of materials to his fields:

He had experimented with one thing and another, various sorts of grass, leaves, vine pressings, rapeseed and colza cake; and then bonemeal, meatmeal and dry powdered blood; his great grief was to have been unable to try real liquid blood, there being no abbatoirs in the district. Now he had taken to using road-sweepings, muck from ditches, clinker and ash, and, above all, wool-waste which he bought from a cloth manufacturer in Châteaudun. His principle was that anything coming out of the land is good to go back into it. He had built huge compost-pits behind his farm, filled with all the refuse of the whole district, any odd shovelfuls of muck, dead animals, decomposing dog droppings or filth drained from ponds. It was a real gold-mine.²²

This catalog of trash echoes the parade of oddities that Bruneseau discovers in the Paris sewer. Value may be eluted from sewer and compost pit alike. Hourdequin dreams of a sewer-based circulus, convinced that what comes of the land can and must return to it. Rather than eliminating waste, his approach as a farmer is to discover, assemble, or attempt to derive a substance capable of producing the most and highest-quality agricultural growth.

La Terre shows a different side of the circulus than *Les Misérables*. For Hugo, the problem is that tons of excrement go to waste by being flushed into the Seine; Parisians must avoid losing an ample potential resource by finding a use for it. Zola's perspective is that a need exists for even more effective fertilizer in agriculture, and the excess of Parisian sewage could be that life-producing substance. In fact, French chemists and animal scientists of this era were extremely interested in excrement, rather than labor, as a source of "production" i.e. economic value drawn from returning urine and manure to the earth.²³

Hourdequin's ideas about smart fertilizer extend far beyond his own small farm:

He made an explosive gesture, embracing the immense flat plain of Beauce. Enthusiastically, he drew a picture of the whole of Paris opening the floodgates of its sewers and releasing their fertilizing flood of human manure while streams of liquid dung came pouring through brimming channels and covering every field. And bathed in sunshine, this ocean of excreta would rise up and up, its stench invigorated by the steady breezes of the plain. The great city would be restoring to the land the life which it had received from it. The soil would soak up these riches and the fertile, bloated land would lavish giant harvests of good wheaten bread.²⁴

Zola's circulus was monumental. It could feed an entire people and still leave a surplus of grain, a vision of vast tracts of farmed fields in contrast with Hugo's picturesque idyll of country life. Hugo writes of capture, retrieval, and containment to deploy the generative power of waste. But in Zola's telling, Paris is a reservoir of accumulating excrement, whose "floodgates" need only be opened for a supply of nourishing sewage to rush out. Hugo's circulus is based on control, while Zola's is about freedom.

²² Émile Zola, *The Earth*, trans. Douglas Parmée (New York: Penguin Books, 1980), 392.

²³ Simmons, "Waste Not, Want Not."

²⁴ Zola, *The Earth*, 393.

Maintenance, regulation, and control

This brings a third principle of the *circulus* into play: *control*. Hugo coaxes and manipulates his readers with sunny visions, but is in fact very dark about what really happens to Parisian sewage. Continuously emptying into the Seine, it is “the wretched vomiting of our sewers into our rivers,” and civilization’s demise is inevitable if these involuntary anatomical reactions cannot be controlled.²⁵ Paris, the urban organism, may purge itself to maintain acceptable levels of waste content, but it pollutes its habitat as it self-regulates. Unless Parisians can stem these violent, sporadic, and wasteful flows through capture and reuse, the uncontrolled city will destroy itself.

Leroux argued, as a corollary to his waste-elimination strategy, that “social practices, not nature, are to blame for so-called Malthusian crises” like impoverishment, starvation, and overpopulation.²⁶ Only widespread attitude change would make the *circulus* possible in a culture of waste pre-dating industrialization. A “waste society” is self-fulfilling because designating a resource *as waste* makes it unusable, promoting ever more consumption of pristine resources. Not treating waste as economically viable perpetuates the cycle, ultimately exhausting the system. And a society that sees itself as partaking of inexhaustible resources is more likely to have wasteful practices than one whose members sense their own mortality in the dwindling fuels and materials available. Leroux held that culturally ingrained wasteful practices give rise to flawed economic strategies, which in turn perpetuate social ills.

However, in a recycling economy dedicated to eliminating waste, every resource is effectively under surveillance. What could previously be put out of sight and mind would now confront Parisians in a rather unpleasant way. Perhaps they were less than enthusiastic to know the ultimate destination of their sewage when the answer was, “On your plate.” Cleaning up the city and introducing new infrastructure was a kind of social, political, and architectural re-ordering that imposed greater control. Tracking the progress of excrement through the stages of the *circulus* was a form of social management as well.

Fundamentally, the popularity of the *circulus* is less about the fear of *excrement* and desperately casting about for what to do with it, than it expresses a fear of *waste*. The Paris sewer fascinated 19th-century science, economics, and literature in part because it embodied the ultimate problem in systemic waste management and waste reduction. It was seen not only as socially dangerous but also as an economic hazard: Millions in productive potential passed straight through it and were gone forever. The sewer-as-financial-sink inspired many to take up the *circulus* as an “‘elegant’ and economical solution to the disposal of waste generated by modern technology,” and infrastructural maintenance went from undesirable labor in the dark to an intellectual calling.²⁷ The sewer, once the bane of metropolitan life, could now be its savior.

²⁵ Hugo, *Les Misérables*, 1235.

²⁶ Reid, 54.

²⁷ *Ibid.*, 53.

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