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A proposal for a scatological global political economy

Or, making sense of capitalism through a shit-smeared lens

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For the past two decades, excrement and toilets have featured abundantly in research on politics (e.g., Hawkins, 2003; Molotch & Norén, 2010), sociology (e.g., Pickering & Wiseman, 2019; Wiseman, 2019), history and literature (e.g., Penner, 2013; Werner, 2017), philosophy (Žižek, 2017), and anthropology (e.g., Prabaharyaka, 2020). Excrement-related questions have also been of interest in political economy since at least the second agricultural revolution (1830s–1880s), which is characterised by the growth of fertiliser industry and soil chemistry that revolutionised industrial agriculture (see e.g., Foster, 1999). Excretion and how societies deal with it concern a myriad of global political and economic matters such as the global sanitation crisis, sewage dumping from households and industry, agriculture and animal husbandry, food production and food security, ageing societies, intimate care, gut health, more-than-human microbial life, inclusive urban design, public toileting inequalities, and using shit in political protests, to name just a few (see e.g., Baxter & Mtshali, 2020; Black & Fawcett, 2008; Chojnacka et al., 2023; du Plessis, 2023; Gesing, 2023; LaCom, 2007; Ramster, Greed & Bichard, 2018; Riungu, 2021; Smithwick, 2021; Twigg, 2000; Wear, 2019; Wiseman, 2019).

In the age of the Anthropocene—the proposed new geological age of human influence on ecosystems, biodiversity, and natural resources—the above-mentioned scatological matters are more acute than ever. For this reason, I propose in this chapter

an approach to global political economy that is specifically tuned to scatological issues. In simple terms, approaching global political economy scatologically means looking at excrement-related questions and how they might be interlaced with politics and the economy on a global scale. This proposal for scatological global political economy (scatological GPE) may sound self-explanatory, marginal and, especially if it concerns *human* excrement, something that can be shrugged off as a private matter. However, as I aim to show throughout, in the age of accelerating anthropogenic climate change, excremental issues cannot be taken merely as a private matter because they are crucial for analyses of how economic and political forces interact with and affect aquatic and terrestrial ecosystems, human and non-human health, and global justice.

I draw on two interrelated research foci, sometimes explicitly and often implicitly. First, Sagi Cohen's (2016, pp. 285–286) abject methodology of “thinking from a position of shit” offers global political economy a specific perspective: it reminds us that something inessential may be essential. As I discuss below, shit may be regarded as inessential waste, but it is absolutely essential for both the survival and destruction of life on Earth. Second, I draw on the inescapably “secretional” reality of embodiment (Rajala-Vaittinen, 2025), or the physiological fact that shitting “critters” (see Haraway, 2016, p. 169, n1) need to defecate to survive, is paramount for understanding the significance of scatology in global political economy.

One of the central themes for scatological GPE is the intricate balancing between excrement as a necessity of life (we all must do it) and excrement as a life destroyer (in the wrong place, it causes diseases and environmental crises). Shit is both life-threatening and life-giving, but neither definition can be fixed as a stable meaning for it. Rather, shit occupies an abject liminal space between fixed meanings, shifting between them depending on context. I discuss this shifting throughout this chapter. The first section delves into the importance of scatological matters for GPE. In the second section, I discuss how shit is both necessary and life-threatening from the perspectives of human health and global justice. I illustrate this with examples, such as constipation, diseases that are transmitted via the faecal-oral route, and care work conceptualised as “dirty”. The third section shifts the focus of excremental health from the human to the planetary and the more-than-human. I address anthropogenic nutrient flows and cycling, in which human excreta could offer alternatives to artificial fertilisers instead of ending up in aquatic ecosystems, destroying them irreversibly. In the final epilogue, I conclude with a summary.

A scatological primer

This primer seeks to explain why excrement is such a central matter for all life on Earth, and as such, it also matters greatly for politics and the economy. We all produce excrement, have always done so, and will do so in the future—all 8 billion of us human animals that live on this planet. Some sit on a ceramic seat and flush it with drinking-

quality water. There are also dry toilets that use little or no water at all but instead offer an opportunity to put valuable nutrients back to work in food production (see e.g., Aburto-Medina et al., 2020). Some use squat toilets, which are physiologically more beneficial for bowel function, and others do not use toilets at all in the conventional sense but instead use continence technologies that are mostly thrown in the waste bin after use. Some 419 million people, according to the World Health Organization (2024), defecate in the open, meaning anywhere else than toilets or latrines. In the lack of better options, some do it in plastic bags that are flung out in the streets, hence the term “flying toilet”. In 2022, only 4.6 billion people used a sanitation service that is safely managed, and over 1.5 billion people do not have private toilets or latrines, which are considered to be basic sanitation services (World Health Organization, 2024). Wherever and however excretion is performed, it is done out of the necessity of survival, because not shitting is not really an option. At the same time, shitting is banal and mundane and often performed without giving it a second thought.

An average adult human person produces 400–500 grammes of faeces per day, which amounts to about 145 kilogrammes per year—“just a little more than an adult panda weighs” (Weisberger, 2018). I do not think I need to point it out, but that is a significant amount of shit on a global scale. Because shit has always been abundant wherever people dwell, the history of human communities, regardless of the prevailing political or economic system, is also the less-talked-about history of the problem of poo and how to deal with it. For example, the Romans built aqueducts and sewer systems and had multi-seat latrines under which flowing water floated human waste away towards more open waters (see e.g. Koloski-Ostrow, 2015, pp. 3–4). The oldest flushing toilet that we know of dates back 2,400 years to a palace in China, although “flushing” was most likely performed by servants who poured water into the lavatory after use (Chen, 2023). Londoners threw and later flushed all their excreta into the Thames, leading to the infamous Great Stink of 1858. This event highlighted the need to construct the then-innovative and oft-copied, but now-inadequate sewage system designed by Joseph Bazalgette, which has for several more recent decades caused raw sewage discharges in the Thames as the system could no longer handle the burden of the rising number of flushers (Jackson, 2014, pp. 97–98). Even the Bible gives a practical tip on how to personally deal with shit:

Thou shalt have a place also without the camp, whither thou shalt go forth abroad:

And thou shalt have a paddle upon thy weapon; and it shall be, when thou wilt ease thyself abroad, thou shalt dig therewith, and shalt turn back and cover that which cometh from thee. (KJV, Deuteronomy 23:12–13)

Kathleen Myer’s (1994/2020) classic *How to Shit in the Woods: An Environmentally Sound Approach to a Lost Art*, the backcountry backpacker’s bible on how not to pollute that river from which someone might drink at some point, shares this same

age-old wisdom. The problem of how to deal with excrement has always followed human populations out of practical necessity because it cannot be simply left lying around untreated, or else it may end up somewhere it is unwanted. Shit in the wrong place, such as in drinking water or in waterways, is detrimental to both human and non-human health. In turn, shit in the right place can be life-giving: shit is full of microbial life and nutrients that can safely be utilised in food production after having been treated and composted properly.

While excrement in general has less to do with capitalism, shit is increasingly interwoven with capitalism as, on the one hand, capitalist societies and neoliberal policies manage the way in which shit is dealt with and, on the other, the capitalist world-order maintains stark inequalities of wealth and health between human communities. For example, London's super sewer constructed by Tideway, an investor- and pensioner-fund-owned company, is expected to solve raw sewage discharges after 150 years of the completion of Bazalgette's sewage system. Almost a decade in the making, the construction of the massive sewer tunnel was sparked by an EU directive that requires member countries to protect the environment from wastewater pollution. The cost of the construction project "is being paid for by Thames Water's 15 million wastewater customers through their bills, which will rise by no more than £25 per year" (Tideway, n.d.). Customers will have paid £540 million during the tunnel's construction up until the time of its opening, while shareholders have received £298.1 million during the same period. After the tunnel is operational, the customers will continue to pay for the returns of shareholder loans and continuing debt with interest (Plimmer, 2024). Building the so-called super sewer is as necessary as shitting as it is needed to manage sewage safely in the future, and both the tunnel and the return on investment are being paid for by ordinary citizens. This mammoth construction project enables profiting from the physiological necessity of excreting, which demonstrates one possible way to turn inessential waste into profit.

While shit is increasingly tied with how capitalist economies function, it also gives rise to community projects and diverse, other-than-capitalist economies (see Gibson-Graham & Dombroski, 2020). As another contemporary example of how poo is tied to the distribution of wealth, Kenya's Kibera, one of the poorest areas of the world, was once infamously filled with flying toilets. Community-led toilets and bathrooms, biocentres, and biogas production facilities are now replacing them while at the same time creating "opportunities for economic stability through employment, environmental sustainability through waste management and clearance, and social and political stability by providing venues for various social activities that brought the community together" (Wambui, 2020, p. 24). In any community, and especially on a global population level, figuring out how to deal with shit takes a major political effort and economic investment. On the one hand, it offers opportunities for capitalist "salvage accumulation" in which things not dependent on capitalism, like the need to excrete, are translated into capitalist value (Tsing, 2015, p. 53). On the other, it enables people to practise economies otherwise, as shit can also be salvaged in an other-than-capitalist manner: it can be returned to the community, for example, as

cooking gas or as nutrient-rich compost. Such alternatives are desperately needed because all life depends on nutrient cycles to which anthropogenic disturbances have been detrimental, and especially the radically unjust and deeply colonial global distribution of excrement-related life-threatening processes, are crises of capitalism and social reproduction (cf. Çelik 2023; du Plessis 2023).

While scatological GPE can address all these matters above and more, my focus in this chapter is on how shit is intertwined with global inequalities of health and wealth on the one hand and with the ecological crisis on the other, both closely related to profit-driven economic growth. This entanglement is complex and works through different interconnections, but there is one thing that stays constant: shitting is a necessity for all critters who shit. Human beings are *visceral*: the interiority of our bodies, the workings of our organs, the oozing of bodily fluids through our skin and orifices are an integral, but often neglected and silenced, part of what it is to be a living organism, but also a political being; a citizen (cf. Montsion & Tan, 2016; Morales et al., 2014; Rajala-Vaittinen, 2025; Tsakiris, Vesar & Tucciarelli, 2021). To be visceral is to acknowledge that we need to eat and defecate, we need care and assistance, and our lives depend on the wellbeing of more-than-human life, such as gut microbiota. Crucially, the necessity of excretion makes shit radically equal; everybody *without exception* does it one way or another, even kings and philosophers, and ladies, as Montaigne (1588/2003) put it. So, we must begin with a simple universal physiological fact: excretion concerns all critters that eat, in all places, throughout history, without exception, and this physiological necessity pertains to the entire history and pre-history of the human species. However, of the 1.2 million animal species we know of on Earth, none other than humans are destroying the planet as they excrete. Defecating, and eating to be able to do so, is a necessity without which there would not be life as we know it but, at the same time, the planet is facing an anthropogenic catastrophe in which poo plays a significant role. Like all human existence, the physiological workings of secretion and excretion are increasingly interlaced with global capitalism, which exacerbates the detrimental consequences of human existence for more-than-human life on the planet and aggravates inequalities between human communities.

Because excretion is radically equal, the threat of radical inequality is always present, and equality can turn into inequality sometimes in an instant. This can happen under many circumstances and be triggered by different events. For example, imagine an able-bodied person who later suffers a severe injury to their spinal cord that causes paralysis that also affects bladder and bowel functions. Then suddenly, something that they used to do independently and in privacy becomes something for which they may need the assistance and presence of another person. Now imagine that this person lives in a conflict area with extremely limited healthcare resources and practically non-existent water and sanitation services or waste management, as all essential infrastructures have been bombed to the ground. Everything they need to be more independent, such as a wheelchair, personal assistance, rehabilitation, incontinence pads, stoma bags, or catheters, is unavailable to them. However, after receiving refugee status in another country with universal access to healthcare, they

finally get what they need to take care of their personal hygiene more independently. In other words, equality and inequality related to excreting depend on, for example, where one lives, what one's status in society is, what kinds of things the healthcare system covers, whether one can afford those things that the healthcare system does not cover, and whether one affords professional assistance or has relatives and friends who are able or willing to offer help when needed. Moreover, as the necessity of shitting makes all shitting critters equal, inequalities of wealth and health throw shitting inequalities into even sharper relief: those who cannot excrete independently or those who do not enjoy adequate and safe sanitation are in an unequal and unjust position compared to those who can use the toilet with an adequate level of sanitation, safety, and independence.

With global capitalism and the planetary crisis that we are facing, we no longer have the possibility to think about excretion as something private. Such thinking would be crudely ableist and ignorant of the fact that millions of people do not have the opportunity to excrete in privacy, either due to the lack of sanitation facilities or due to being disabled. Shit is a shared matter when it comes to organising adequate sanitation, care, assistance, and continence technologies, such as incontinence pads, catheters, or stoma bags, for all those in need. Moreover, once poo leaves anyone's body, once it becomes *waste*, it becomes a shared matter of political economy in urban planning, constructing and maintaining sanitation infrastructures, organising waste management and recovery, and protecting the environment from destructive nutrient pollution. In short, even if excretion happens under the privilege of privacy, shit and the continence technologies that are sometimes needed to manage toileting needs end up in aquatic ecosystems and landfills, and so what shit causes to the environment makes it a global, transnational, and shared problem in which the most vulnerable human and other-than-human life tends to draw the shortest straw. To put it bluntly, shit is not merely a shared matter; it is also political (Baxter & Mtshali, 2020; Doron & Raja, 2015; Hawkins, 2003; LaCom, 2007; Wiseman, 2019; see also Vaittinen et al., 2023).

My proposal for scatological GPE is not, of course, exclusive to retheorising capitalism. However, capitalism dominates the economy globally and many of the excrement-related issues discussed in this chapter are closely tied to capitalism and neoliberal policies. Therefore, scatological GPE can be utilised in making sense of capitalism and how wealth is distributed within it. In Anna Lowenhaupt Tsing's (2015) terms, shit could be called pericapitalist: its production is not dependent on capitalism per se—except, of course, through food production—but it can be salvaged for capitalist accumulation (Tsing, 2015, p. 53). Tsing (2015, p. 53) argues that salvage accumulation is an integral feature of how capitalism operates, not just an add-on. London's £4.5 billion super sewer, which finally became operational in 2025 after nine years of construction, is a prime example. This project has enabled shareholders to profit from the physiological needs of citizens and the legal requirement to prevent raw sewage dumping in the River Thames. Conversely, dealing with human waste can also create opportunities for practicing alternative economies. As demonstrated by

Kibera's example, human waste can be returned to a cycle that counters the capitalist exploitation of the soil through artificial fertilisers, which depletes its natural fertility. By doing so, it may begin to repair the "metabolic rift" between humans and the soil, where the metabolic exchange of material between humans and the soil is based on a capitalist exploitative interaction that leaves the soil depleted (see Foster, 1999, pp. 383–384).

How a necessity of life becomes the making of a disaster

In this section, I discuss how excrement constitutes a persistent question of global justice. This question is currently closely tied to global capitalism as the dominant economic system, in which inequalities of wealth and health feature in many harmful ways, including the way in which inequalities cause population health and wellbeing to worsen (Wilkinson & Pickett, 2010). Achieving global justice and mitigating the persisting inequalities of wealth and health (see e.g. Balakrishnan & Heintz, 2019; Cash-Gibson et al., 2018; Jumbri et al., 2019; Lynch, 2019) add to the challenge of dealing with excrement. For example, these inequalities exacerbate the burden of faeces-related diseases in financially disadvantaged areas due to the unjust distribution of wealth that capitalism thrives upon.

While there are also positive applications for faecal matter in healthcare, such as treating ulcerative colitis with faecal transplants (e.g., Laperrousaz, 2024), it poses many serious life-threatening risks. Shit may contain pathogens that are lethal when consumed, in addition to being unpleasant and transgressive to the senses. Shit in the wrong place, such as in food or drinking water, poses a serious threat to health. For example, since cholera first spread across the globe in the 19th century, millions of people have died in the consequent six pandemics. The current seventh cholera pandemic started in 1961, and in many parts of the world, the disease is now endemic. It is estimated to kill around 21,000 to 143,000 people each year (World Health Organization, 2023b). Cholera is only one of several diseases that are transmitted via the faecal-oral route. While the burden of diarrhoeal disease attributable to inadequate water, sanitation, and hygiene (WASH) has dropped significantly during the past 20 years, unsafe drinking water was accountable for 35% of human diarrhoea deaths in lower and middle-income countries in 2019, which equals more than 505,000 deceased (World Health Organization, 2023a). Poor sanitation is also a major contributor to malnutrition and several debilitating and lethal tropical diseases. Higher-income countries are not, of course, immune to diseases of faecal origin. For example, foodborne Shiga toxin-producing *Escherichia coli* (*E. coli* O157: H7 or STEC) outbreaks are not uncommon (Yang et al., 2017). An infection may lead to a life-threatening condition, but as *E. coli* usually responds to antibiotics, poorer countries and conflict areas again bear the greatest burden as basic medicines, such as antibiotics, are not always available (Knowles et al., 2020). So, while shit does not

depend on any particular political or economic system per se, global inequalities exacerbated by capitalism cause shit to become an even more life-threatening issue in the poorer areas of the world.

Accidents and illnesses that affect mobility and hence also the way one uses the toilet concern all people. Such illnesses and accidents include, for example, having a stroke that causes paralysis, living with debilitating pain that makes moving about more laboursome, breaking a leg or a finger, having major surgery that can cause difficulties with independent mobility, having a spinal cord or head injury, having a mobility-affecting neurological condition that may cause the loss of dexterity of hands to wipe, or just simply getting older and frailer. These are just a few causes for possibly needing assistance to use the toilet or continence technologies independently, and sometimes it is temporary and other times permanent. Furthermore, even if a disability does not cause loss of independence in toileting, public toilets, in particular, can be hostile environments that do not accommodate the needs of disabled people (Wiseman, 2019).

Needing assistance with toileting concerns millions of people across the world. If assistance is scarce, then not being able to defecate on one's own or to clean afterwards becomes a question of life and death. When I embarked on my postdoctoral research on the politics of excrement in 2022, one of the first stories I was told was about the loss of an elderly but still very much independent parent due to a minor incident. This incident had caused a temporary restriction on independent walking and toileting, and it should have been a case of a relatively short hospital stay. Due to chronic understaffing, this person was not assisted to use the toilet often enough, and they ended up contracting bacterial sepsis of faecal origin, which cost their life. Soiling oneself is not simply incredibly uncomfortable and inconvenient, it may end lives. Similarly, not being able to excrete can end tragically. A young British man, Mr. Richard Handley, lost his life suddenly in 2012. Aged just 33, he suffered a heart attack. Having lived with chronic constipation all his life, his bowel was severely obstructed by faecal impaction, which caused him to vomit up liquid faeces and inhale it. Behind the abject medical cause of death, however, there is another more tragic one: Mr. Handley's death was ultimately caused by factors that led to his constipation to worsen. There had been changes to his diet and the monitoring of his bowel movements at his care home, both of which are against the recommended medical care of chronic constipation (Hill, 2018).

The examples in this section about how shit may constitute a threat to life globally are tragic because most of them are avoidable. In the case of understaffing and lack of due care, such as monitoring the bowel movements of a care home resident, the solution is not blaming staff who are often already underpaid, work under limited resources, and suffer repeated moral injury for not being able to do their work as ethically as they would like to—as is often the case in healthcare organised according to neoliberal principles (see e.g., Whiley & Grady, 2022). Such moral violence was even more prevalent among nursing staff during the COVID-19 pandemic (Liang et al., 2023). Care work has been conceptualised as dirty work because it deals with bodies

and their fluids, and it is often gendered and devalued both economically and in social status because of this (Twigg, 2000; Wibberley, 2013). The stigma of dirty work, perceived as social and moral taint, and poor occupational conditions—the stigma can also be internalised and (re)produced among nursing professionals—negatively predicts willingness to work especially in institutional aged care (Manchha et al., 2022). Intimate care, such as toileting or bathing, always requires a lot of professional skill, sensitivity, and connectedness, but it may be considered “common-sense” and thus it does not receive much attention on a policy level (Göransson, Larsson & Carlsson, 2023; Twigg, 2000). Reversing the stigma of dirty work would be to recognise that it is not only necessary and lifesaving, and should be compensated accordingly, but that it can also be perceived positively and as rewarding for both caregivers and care receivers (Meldgaard Hansen, 2016).

In the case of poor sanitation and diseases transmitted via the faecal-oral route, the solution is better sanitation. This is easier said than done, because the contemporary flushing toilet, which has become a metonym for good sanitation in popular imagination, is not a sustainable solution—at least not in its current state and form. This brings us to a segue between human health and planetary health, which I address in the following section.

Going around in circles: from the colon to the table

The global sanitation crisis discussed above is also a crisis of planetary health, because the crisis is not only about open defecation and how people needlessly die of diseases of faecal origin. It is also about the metabolic rift between humans and the soil (Foster, 1999): vast masses of nutrient-rich human waste end up in places where they are harmful rather than useful, and this affects planetary health, on which all life on Earth depends. Nutrient-rich waste is detrimental when consumed, for example when consuming food irrigated by untreated wastewater, but life-giving when used safely in food production. In this section, I discuss how scatology might guide us to rethink our relationship with biochemical flows. The necessity of eating and defecation and the consequent necessity of the existence of vast amounts of nutrient-rich flows tie our existence on this planet to the visceral guts of the earth, the soil: “We are humus, not Homo, not anthropos; we are compost, not posthuman” (Haraway, 2016, p. 55). However, our current capitalist relationship with nature and the soil is one of estrangement rather than kinship (Foster, 1999).

Let us begin with flushing. The undeniable fact is that as the use of flushing toilets increased in different societies, it became necessary to build more comprehensive sewage systems, and consequently the streets were cleaned of faecal waste. Where comprehensive sewage systems exist, problems with open defecation are not widespread, although open defecation is often the only option for homeless populations. In areas with sewage systems, cases of sanitation-related diseases are fewer (see e.g.

Tiwari, Tirumala & Shukla, 2022). The problem, however, was usually not eliminated but merely transferred elsewhere. For example, in the Finnish capital Helsinki in the late 19th century, flushing toilets were at first either illegal or exceptional luxury items, but as legislation changed, they became more common in households, ending many infectious diseases of faecal origin as the city sewage infrastructure caught up. The downside was that all the sewage was dumped in Töölö Bay, destroying its ecosystem for decades to come. In the summer of 1910, local newspapers recorded a large fish kill and the smell of the bay as so disgusting that even train passengers passing by Helsinki had to hold handkerchiefs over their noses (Laakkonen, 2001, p. 178).

The planet cannot handle the current nutrient pollution. Nutrient-rich excreta are extremely harmful in aquatic ecosystems, which are essential in stabilising the climate (Häder et al., 2020). The widespread use of flush toilets is among the reasons for the pollution, as sewage infrastructures and water treatment facilities are inadequate or lacking in many areas globally. The environmental cost of flushing is growing. For example, in the UK, flushing the toilet accounts for nearly a third of household drinking-quality water consumption. According to a Guardian article, water treatment is responsible for about 1% of UK greenhouse gases (Saner, 2019). Options for the flushing toilet exist. For example, dry toilets turn waste into compost when used correctly, thus enabling users to put nutrients back to use, either in food production or landscaping. They can also be integral in community-building, as the case of Kenya's Kibera demonstrates. They can also offer a means of enacting countercultures (Kuhn et al., 2022, p. 73). There are also low-flow toilets and toilets that use little to no water. All these types of sanitation systems can be installed in urban areas and even in blocks of flats. However, for some, there is just something about the apparent efficiency of those toilets that use a whole bucketful of water, allowing them to avoid looking at their faeces or facing the shame of the next person finding something floating around the bowl.

A good example of the love for flushing efficiency is the United States Energy Policy Act of 1992 (EPACT92) and its aftermath. It set household toilet flush volume to 1.6 gallons, effectively banning the installation of the monumental 3.5-to-7-gallon (13–26.5 litres) flushers (GovTrack.us., 2024), which created a new market demand for importing used and now illegal 3.5-to-7-gallon toilets from Canada. This case demonstrates the lengths to which people are prepared to go just to evade environmental policies (Perman, 2000) and to manage the shame and stigma that pertains to the functions of our bladder and bowels.

The politics of flushing, from ending open defecation to protecting aquatic ecosystems, is an important consideration in discussions about the Anthropocene that is entangled with disturbances in nature's biochemical cycles, such as enhancing nutrient-rich flows that exchange and transform organic matter in ecosystems. Human influence has been disturbing nature's biogeochemical cycles for millennia; for example, by putting nutrients (i.e. animal and human waste) in concentrated areas for farming and growing crops, as well as through landscaping, building dwellings, and redirecting waterways. The current scale of anthropogenic disturbance is a more

recent phenomenon. Human action has accelerated the magnitude and rate of nutrient flows, such as the flow of nutrients between soil and water (e.g. through leaching) or soil and atmosphere (e.g. carbon cycling and aeolian transport of dust), and the movement of minerals (e.g. the physical shipping of phosphate rock), as well as plants and animals to some extent (Smithwick, 2022, pp. 140–142). While all greenhouse gases exist and cycle naturally, human actions have increased their amounts in natural biochemical cycles, with numerous adverse effects on the planet (Olah, Prakash & Goeppert, 2011; Raimi et al., 2021). Human influence on biogeochemical cycles is so significant that we can talk about anthrobiochemical cycles (Fairchild et al., 2022).

The current large-scale disturbance is largely attributable to industrial agriculture driven by capitalist means of production, which currently depends on chemically produced artificial fertilisers (see Foster, 1999). The replacement of guano (bird droppings) and manure with such fertilisers has had many adverse effects. First, it has increased nitrous oxide (N_2O) emissions beyond natural atmospheric levels during the past century (Gmitrowicz-Iwan & Ligeza, 2023). N_2O is the third largest anthropogenic greenhouse gas emission after methane and carbon dioxide, with its human-related sources mainly being agricultural production processes, industrial production, and livestock emissions (Hu, 2021). Second, the Haber-Bosch process of synthesising ammonia from atmospheric nitrogen by reacting it with hydrogen is essential for artificial fertilisers and it has made agricultural land use significantly more efficient, but also increased soil acidification, increased the formation of fine particulate matter in the atmosphere, accelerated the eutrophication of semi-natural ecosystems, and altered the global greenhouse balance (Sutton et al., 2008). Third, in addition to synthesising ammonia, artificial fertilisers depend on the mining of rock phosphate, which is the source of raw phosphorus used in mineral fertilisers. Phosphorus plays a key role in energy transformation, enzyme activation, photosynthesis, the formation of nucleic acid, and adenosine triphosphate (ATP) synthesis in plants (Plaxton & Tran, 2011). It is an essential and irreplaceable mineral for all life on Earth, but deposits of minable raw phosphorus sources are becoming increasingly scarce. The European Commission (2023) has listed phosphorus and phosphate rock as critical raw materials. Their demand will increase in the future. In 2040, the global supply of phosphorus will fall below the global requirement, while the climate impact from mining and processing the mineral sources of phosphorus will double between 2000 and 2050 (Nedelciu et al., 2020).

Urine and faeces are full of nutrients and there is significant potential in the safe recovery of nutrients from sewage sludge or animal by-products to address the current and future fertiliser crisis (Chojnacka et al., 2023; Koskue et al., 2022; Samoraj et al., 2022; Sichler et al., 2022). Wastewater and sewage sludge are notable and more sustainable sources of nitrogen and phosphorus compared to using atmospheric nitrogen in the Haber-Bosch process and mining for phosphate rock (Kar et al., 2023; Sichler et al., 2022). According to different scenarios, the phosphorus potential in all human urine and faeces accounts for a total of 13–22% of the global fertiliser demand (Kok et al., 2018). In Europe, approximately 25% of phosphorus from human excreta is

already recycled back to agriculture, all via the application of sewage sludge (Cordell et al., 2011). While this may not seem like much, it is likely that there is much more potential in sludge recycling as recovery methods and technologies improve. The efficiency of recovery also depends on improving sewage infrastructure and water treatment processes globally. According to the United Nations (2023), of the household wastewater generated globally, 42% is discharged without safe treatment. Of the total wastewater nitrogen pollution in coastal areas, 63% comes from sewage waste (Tuholske et al., 2021). If solids and wastewater were to end up in sewers, treatment plants, and other places where they could be recovered, there would be more to recover.

Legal, political, and economic accountability for discharging untreated wastewater is needed. For water companies operating on a for-profit basis, sewage dumping may be a more lucrative option than environmental protection, even when legislation is in place. For example, several privatised water companies in the UK periodically dump raw sewage into rivers and coastal waters. Discharges of raw sewage are allowed to be released from storm overflows on the UK network, but only in exceptional circumstances, for example due to unusually high rainfall. This is to release pressure in the sewage system, which is designed to take in both wastewater and rainfall, thus causing overflows and discharges. This dual system, dating back to the design of Joseph Bazalgette, is also the reason for building London's super sewer discussed above. In 2021, raw sewage was dumped in the UK 372,533 times over 2.7 million hours, and in 2022, 301,000 times over 1.75 million hours. The vast majority of these raw sewage discharges were illegal cases of dumping on dry days (Laville & Horton, 2023). In 2021, the water company Southern Water pleaded guilty to discharging vast volumes of raw sewage into coastal waters for close to six years, causing "very considerable environmental damage" while reaping "considerable financial advantage"—and because it was cheaper than treating it (Laville, 2021).

Nutrients in soil, working together with more-than-human microbes that transform biochemicals into forms that plants can use to grow, are essential for feeding the global population. However, as discussed above, capitalism and its industrial-scale agriculture are not succeeding in this task, as the consequences for the environment have been detrimental. Moreover, as Uma Lele writes:

The world has produced enough food since the Second World War to feed itself despite rapid population growth, owing to extraordinary technological and institutional change. The rise in world food production, however, has been accompanied by unequal access to that abundance, as well as soil degradation, loss of biodiversity, and growing water scarcities. (Lele, 2021, p. 1)

Rethinking our relationship with biochemical flows is not merely about replacing one harmful industrial-scale process with another of the same scale, just more sustainable, while maintaining the unjust distribution of its products and letting

“cannibal capitalism” continue to devour everything on its path with its voracious appetite (Fraser, 2022). Rather, it must bring us back to the question of global justice, both distributive and environmental, because the planet is quickly becoming inhospitable for all life—including human life, whose excremental existence plays a significant part in the climate crisis.

Epilogue

Thinking from the position of shit demonstrates that shit is both inessential waste and something essential and salvageable. Both in the context of global justice and the ecological crisis, shit is caught up in an infinite inversion in which its necessity to life never escapes the fact that, in the wrong place, it is potentially hostile to life. What we have is a kind of Schrödinger’s cat’s poo situation: shit is both potentially destroying and preserving life at each moment. To put it concisely, we all must do it to survive, but some of our shit ends up in places it does not belong, and so what was a necessity may end up killing you while destroying whole ecosystems, even though those nutrients could be put to better use in more sustainable fertiliser production. Shit is tied to politics and the economy in many ways globally, because human communities have always had to deal with their waste either by recycling it into something useful or by treating it as just that: waste.

In discussing inequality of wealth and health, I aimed to show that where injustice is allowed to exist, shit often poses a threat to well-being and even to life. I also discussed how the way shit is dealt with, or not dealt with, can be detrimental to the environment. Its value could be salvaged for something other than shareholder profits by recycling excreta into fertilisers, instead of letting the nutrients end up in the environment. The common denominator between human and more-than-human health is solving the sanitation crisis, which I argue includes both inadequate sanitation (human health) and inadequate wastewater treatment (more-than-human health). This is one of the most urgent crises of global justice that must be solved. However, the adverse effects do not happen due to some natural order of things or necessary causes; behind them are policies, profit-seeking, and active and conscious human decisions to act one way rather than the other. This is crucial because of what I referred to as radical equality and radical inequality: while we all must do it to keep alive, the very necessity of life is also vastly unjust to those living in the poorest areas of the globe. Understanding this offers ways to make sense of capitalism and its machinery of inequality.

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