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Sludge

Abstract

This article narrates a journey taken with wastewater at Shieldhall Wastewater Treatment Works in Glasgow as it courses through a number of treatment areas engineered to separate out solids and clear water. The journey is taken by two water scientists and a cultural geographer who follow the slowing and settling, filtering and dredging, the bubbling and churning, as the wastewater system seeks to order material chaos - “turbidity” as it is known here. But between the water sampling and testing undertaken on the journey, these attempts to categorise and make meaning of the stuff at Shieldhall, waste continues to resist determination. Its meanings leak, and its pathways through space and time spill out in unpredictable ways. This article uses Hird’s discussions of the “fully inhuman” exuberance of waste to consider the way in which life at this wastewater facility opens on to an uncertain future (Hird 2012), and the responsibility we therefore have to remember it (Hird 2013).

Keywords

Wastewater, sludge, science, immersion, flows, leaks.

We are standing over the inlet of Shieldhall Wastewater Treatment Works where the rush of stuff banished to an underworld of sewers and culverts spews from a protruding pipe to meet the light of day once again: the sewage and wastewater of half a million people, and the surface run off that has mopped up city streets; a flow of precipitation, cleaning products, fuels, acids and chemicals, organic matter, disposed rubbish and sanitary products, and on occasion, money, dentures, jewellery, and illegal trade discharges. This week, notable arrivals have included a large and very much alive snake subsequently collected by the RSPCA, and a giant Winnie the Pooh soft toy that momentarily blocked the outfall.

This is the stuff that was forgotten with the last gurgle as it slipped down the drain. The dirty, stinking stuff on whose expulsion our modern selves and cities depend. “What remains after our disgorgement” Hird observes “is what we (want to) consider our real self” (Hird 2012: 456). But there is one last opportunity for redemption here at the inlet. The operators monitoring the facility’s frontline keep a trophy wall of things they discover in the murky soup. These are Shieldhall’s “garbologists” who have found value in an urban archive.

Here at Shieldhall, Scotland’s largest wastewater treatment works, the task is to separate water from waste. Wastewater runs a course which sees it filtered, settled, dredged and then metabolised by nitrifying and carbonaceous bacteria. The rubbish that has been filtered out is sent on to landfill, the sludge and scum is piped to an incinerator and the water that finally runs clear is directed back into the River Clyde. But Shieldhall leaks and spills, and the life of matter doesn’t end with its final **relocation**. Wastewater at Shieldhall “fails to be contained, fails to be predictable, fails to be calculable, fails to be a technological problem (that can be eliminated), fails to be determinate” (Hird 2012: 465).

The concrete walls at the inlet are high and the water is black and frothing and sloshing up against the sides. I’m with two water scientists from Scottish Water and together we are setting out to follow the course that wastewater runs before it is finally released into the city’s

arterial river, taking water samples along the way. One of the water scientists is visiting from a works in Inverness and the other, our guide, is based at this facility.

The inlet narrows to meet four big wheels that rotate side by side, plunging filters into the black water that emerge covered in “rags”; an offensive medley of nappies, wipes, tampons and ear buds. Only two wheels are in operation today. Bearing the brunt as they do, breakdowns are standard our guide explains. They are **staffed** around the clock. We watch two operators inside the cage of a motionless wheel remove a choked filter. When the problem is underwater, the diving squad are called in.

We’re decked out in steel capped boots, waterproof trousers, high visibility jacket, hard hat, blue rubber gloves and plastic goggles, and we observe the Health and Safety protocols that we were briefed in earlier this morning. As we collect water samples from automated sampling stations and discuss the various practices employed by this facility in the battle against turbidity, waste emerges as “hazard”, “filth”, “risk”, and “object of management” (Moore 2012: 782).

But what about those that dive in this sulphurous fog day in day out, those that dive in the thick of night with it, those that dive in in its very medium? What world of waste do they know? We stand back from the edge, and though I can feel the vapour cling to my pallid face like a fever, I compensate by hardly breathing. “Diving”, as Bos reminds us, “is an umbrella term for all exercises that enable us to switch from a ‘confronting’ mode of being to a ‘medial’ mode of being”. If there is indeed a “deep connection between swimming and believing” then what does that say about our belief in waste? (Bos 1999: 77).

Our guide suggests we climb up on to the gantry of the big wheels to get a better look at the grit troughs on the other side. On our way around the inlet we’re faced with a head high mound of silty aggregate peppered with bright yellow speckles. Sweetcorn. This, our guide explains, is the heaviest stuff that is first to settle. Gravel, sand, sludge, and all those things that our bodies fail to metabolise. Then we skirt around a skip piled high with blackened rags. They are headed to landfill, provided the operators agree to take them - they can refuse if they are too toxic our guide explains. These are “the few people whose job it is to remember waste” (Hird 2013: 120), to remember that even though its “buri[ed] out of site, and mainly, out of mind” it “doesn’t really go away” (Hird 2013: 107”).

The gantry is made of steel grilles pinched together with removable clips that allow the operators access to the machinery beneath. An assessor from the Scottish Environmental Protection Agency (**SEPA**) fell into the primary basin at a works in Dundee recently when a clip hadn’t been fixed down again properly; an event which prompted Scottish Water to outline refurbishment plans for many of their works our guide explains. Until then, it’s best to hold on to the railing she says.

Stray rags hang from the gantry like stalactites. The inlet must experience some wild days in the winter when the sewers storm. The microclimate created in here during the summer is worse our guide tells us. She couldn’t keep her lunch down when her inaugural induction day coincided with a rare Scottish heatwave. But the hotter weather doesn’t only cause problems for sensitive noses. Our guide takes a sample from the grit troughs using an automated sampling machine. The blue topped bottle is as black as the stormy April morning outside. After the hot dry weather of the previous week a backlog of sewage has finally made it through in one big purge.

This is a system designed to manage smooth, laminar flow; a “governable, perfectly functioning system of reversibility, and thus predictability” (**Cresswell & Martin 2012: 519**). But the stuff coursing through the inlet beneath us is an entanglement of all manner of mobile systems; the seasons, domestic routines, weather, precipitation, and industrial processes just to name a few (Hird 2012). The recent purge at Shieldhall does not signal “a serious breakdown in the order of things” - as it is framed here - rather it is an event that exposes the turbulence that is inherent to all infrastructural mobilities; neither inherently ordered or disordered, but rather “an event in the production of transitory order(ings)” (Cresswell & Martin 2012: 517).

On our way to the next processing area we pass a large tanker parked outside next to the inlet. Our guide explains that the facility supplements its income by taking industrial waste.

But the management do practice discretion of course she explains. They declined the liquid waste of a shampoo factory this morning, for fear that the city might descend under a blanket of shampoo froth and sewage bubbles, and all that stuff we hadn't expected to see again.

The next processing area is the primary basins and, as before, we are on a metal grille platform, this one flying over four water bodies each with a water plough travelling slowly down their extensive length. Wastewater is immobilised here so that all its constituent parts settle out. The ploughs dredge the "sludge" and scrape the surface "scum". In the first water body a mixture of oils, fats and grease slowly creeps towards us, solid like an iceberg. The second body is glittering with an illegal trade discharge that wasn't easy to contain our guide explains. In the third body the "scum" has been pulled right up to the edge of the basin where it now clogs up the arterial drainage channel.

The smell lives, and it invades my nostrils as it rises up from the fatty ground beneath the platform. The scientists take another sample here, then begin a lengthy discussion about 'levels', 'solids', and 'turbidity' - using acronyms that would make it all completely incomprehensible even if I had been paying attention.

I'm looking out over the third water body where the plough has almost ground to a halt in the scum and my stomach is churning. This is looking that is touching - a touching that makes our bodies sick (Dixon 2010). We are a culture of waste, "a mobile and morphing ensembles of topographies, bodies and precepts" (Wylie 2006: 533). And I'm full of horror. Or is it shame? Is it the confrontation with my disillusioned humanity? Am I ok? my guide asks - I've gone very quiet she says. I nod that I'm fine, just taking it all in.

Our guide takes another sample from the dispensing unit at the primary basins. She holds the bottle up to the sky to light the turbid water. The situation is even worse here. Not only are they dealing with a backlog, but the pipe to the Sludge Treatment Works in Daldowie has closed for the day because they have exceeded their quota. The exceptional influx of solids has nowhere to go.

The sludge line is relatively new our guide explains. Before then sludge was transported down the Firth of Clyde by the *Garroch Head* and *Dalmarnock* steam ships, and dumped in waters between the Isles of Bute and Arran. During the summer months the sludge steamship would also bring parties of day-trippers along for the journey. Before the development of Shieldhall and other facilities like it, the River Clyde was an open sewer notorious for its "highly offensive smell" and "absolutely sickening sights" (Ridell 1979: 129). Because of its tidal dynamics "sewage went with the ebb and came back up with the flood - a mess that, like an unwanted stray dog, could not be shooed away" (O'Hagan 2008: 152).

With the installation of Shieldhall and other facilities like it, trips 'doon the watter' became increasingly popular. The sludge boats were free, and frequented by and large by pensioner groups who would hardly notice the "billowing columns", the "fierce puffs, great Turner clouds of wayward brown matter" (O'Hagan 2008: 156). By this point in the voyage they would be too busy "dancing on the deck, or if the weather [was] wet or windy, playing bingo in the lounge" (O'Hagan 2008: 150).

But a European Union directive banned this dumping at sea in 1998. Today sludge is piped to Daldowie where it is moulded and dried into processed sludge pellets which are burned to produce electricity. From tourism to energy production, the histories and geographies of sewage on the Clyde demonstrate the myriad ways we've capitalised on our own shit.

We walk on to the storm basins where untreated wastewater is directed on those stormy occasions when the Shieldhall reaches critical capacity. Two mallards are padding out over the silty bottom 6 feet below us, searching for food on this urban mudflat. The brand new South Glasgow Hospital, a £840 million effort to centralise the city's medical services, towers over these basins, and plans are already in place to cover them and install air conditioners our guide explains. When the storm basins are full, they have no choice but to direct unfiltered, untreated wastewater straight into the river. I've already seen the evidence for myself; rags hanging from tree canopies by the river's edge, and fish that have suffered asphyxiation floating lifeless in the Clyde channel. The boundaries enacted between bodies, environments and waste

at Shieldhall are “continually in the making”: the boundaries are meant to provide “fixed delineations for marking the clean from the dirty”, but they are just as often “key operators for indicating how things emerge and transform” (Gabrys 2009: 676). In other words, things spill.

After the primary basins, wastewater is directed out to the aeration chambers where it runs a figure of eight watercourse over a variety of oxygen pumps. With the increase in dissolved oxygen, carbonaceous and nitrifying bacteria spawn and break down the suspended solids. We take a turn around the course. The mix of bacteria, solids and water is called “mixed liquor” and it’s like a choppy sea, sloshing up against the concrete walls and falling through the air as mist. Our guide lowers an old margarine tub lashed to the railings into the water and pours its contents into a sample bottle. Next to the others we can see that the water is becoming clearer. The bugs are working hard, she says.

We bring the samples into a small lab next to the control room to take a look at the mixed liquor under the microscope. My eye comes to focus on the ‘free swimmers’ that swirl through this miniature cosmos, using tiny hair-like structures that beat in unison so that they can move, feel and feed. These are the ciliates our guide explains. They feed on the other bacteria and are usually an indicator of good quality sludge. The darker bacterial floc is the one that contain the carbonaceous and nitrifying bacteria. A whole world has fallen out from a drop.

The waste in these aeration chambers is now “part of bacteria’s production and consumption economy” (Hird 2012: 457). It is waste that bacteria are thriving on - bacteria which will subsequently be enjoyed by the seagulls and the ducks. To understand waste as the remainder of our human economy, the by-product of all our fish suppers and cooked breakfasts, is to miss the fact that it has long since transformed. In her writings on landfills, Hird cites Ingold to discuss waste’s mutations, that “wherever life is going on, they are relentlessly on the move - flowing, scraping, mixing and mutating. The existence of all living organisms is caught up in this ceaseless respiratory and metabolic interchange between their bodily substances and the fluxes of the medium” (Ingold 2007: 13). Waste, as Hird reminds us, is symbolic too of life, and its exuberance “is fully inhuman” (Hird 2012: 457). The life of waste doesn’t end at the landfill, the incinerator, nor the river, as we would like to think.

We move on to the circular settling ponds, where the visiting water scientist explains that their works at Inverness is just the same, only on a smaller scale. I have my arms draped over the concrete wall of one of the twelve, fifty metre wide ponds as I’m thinking about waste and scale – can it be the *same* on a smaller scale? - but then the huge metallic arm spanning the radius, ploughing up the settled sludge, nudges me out of the way.

At the outlet we watch as the treated water rushes down a series of drops and into a culvert that will bring it out to the River Clyde. The Scottish Environmental Protection Agency come to the outlet each month to monitor Shieldhall’s output, which must comply with set standards for dissolved oxygen, turbidity, and ammonia content. Consent is less stringent here than a stone’s throw up the estuary, where SEPA have cut the estuary with a boundary line to delineate where freshwater begins. The topic of conversation then turns to Water Framework Directive guidelines, but again I’m distracted by the view below. The water is clearer now but there are still traces of fat and ear buds that make curious constellations in the outlet’s little nooks. Then a lone condom glides gracefully through the water and over the last drop, making its final bid for freedom. From here, Shieldhall’s wastewater “spills into the future” (Gabrys 2009: 677), but the city has already forgotten.

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