Cloaca—New & Improved at the Power Plant Gallery in Toronto. Picture courtesy of Wim Delvoye.

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CHAPTER 1

HOW DO YOU DOO

WITH ENVIABLE EASE, poop slid out of the mechanical anus and onto the conveyor belt below.

Most of us know pooping as a struggle. Our bodies are optimized for the hunter-gatherer lifestyle—running around the savanna, eating berries and meat, pooping behind bushes in a squat. Pooping today is a battle against sedentariness, a diet of processed foods, and a rectum that's half-closed in the sitting position (on which more later). For most of us, pooping is a time-consuming, sweat-inducing battle between the life we lead and the life we're built for.

The machine's poop just slid right out. Only a few seconds passed from the moment the wizened head peeked until the tip of the tail dropped off. A single tubular mass, smooth and unkinked (because the machine's sphincter never clenched—because the machine never had to pause to catch its breath and push again, unlike we humans) flowed confidently and with constant velocity, falling a short distance to curl gently on a conveyor belt that then slowly moved the feces away from the artificial digestive system that had created it. Around the glass-enclosed conveyor belt, people crowded for a closer look.

Women in chic suits gaped. Men with white beards and bald heads pushed up their thick-rimmed glasses and leaned in. Young art students peered with genuine fascination, forgetting momentarily that young art students are supposed to be jaded. Critics, benefactors, reporters, collectors—all were enthralled by the foot-long piece of brown waste, 75% water, 8% dead bacteria, 8% fiber, 5% fat, 4% other, chemically indistinguishable from what's moving through your digestive system right now. What forty hours ago had been food from a local restaurant was now poop. The machine hummed, satisfied. The crowd applauded, astounded.

Every day from March 27 to May 23, 2004, art lovers gathered at The Power Plant gallery in Toronto to witness poop springing forth from the bowels of Belgian artist Wim Delvoye's *Cloaca—New & Improved*. Enclosed in steel and glass, this thirty-foot-long representation of the human digestive system functions just like yours. Food goes in through its mouth, gears chew it up, enzymes break it apart, and bacteria digest it, in a process involving the same chemicals and symbiotic organisms as serve digestion in humans. Electronic and mechanical systems play the part of the enteric nervous system, regulating food's passage through glass jars acting as *Cloaca's* stomach, small intestine, large intestine, and rectum, and timing secretions from its liver, pancreas, and gallbladder. Hours later, out the other end comes poop—brown, slimy, smelly, and chemically identical to the human version.

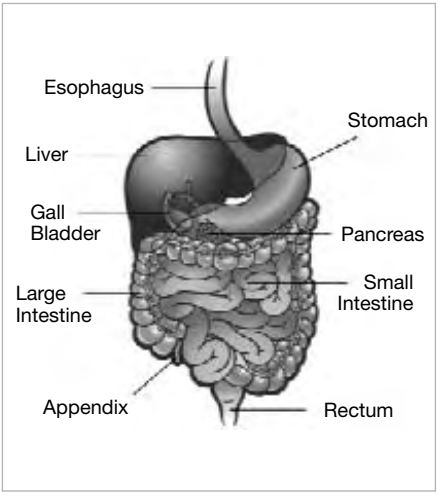
Cloaca—New & Improved is the second in a series of five pooping machines created by Delvoye. At speeds and efficiencies that have improved with each version, the *Cloaca* series all do the same thing: eat, digest, and poop. The first *Cloaca* could process a meal every forty hours; *Cloaca Turbo*, the third version, did it in as little as six. Besides Toronto, *Cloaca* has exhibited in New York, Antwerp, Vienna, Lyon, and Bordeaux.

As a work of art, *Cloaca's* meanings are numerous and profound. *Cloaca* desexualizes poop, sequestering it from gender and allowing analysis without the distractions of genitalia. It proves, in terms of efficacy and miniaturization, the superiority of the human body over today's technology. It reminds us that poop is a phenomenon experienced by every human being. It comments on the nature of modern art.

And, although this is not Delvoye's intention, it provides a great lesson in biology. In this plastic, steel, and glass torso, Delvoye has recreated our flesh-and-blood process. His version differs from ours by a few thousand pounds and a few hundred thousand dollars; but the basics (chewing, digesting, excreting) and the specifics (pepsin, creatine, symbiotic bacteria, and so on) are the same. The only major functional difference is that while we eat to create energy, and poop is the waste, *Cloaca* eats to create poop, and its waste is the energy liberated from the food by digestion.

The digestive tract

The purpose of the digestive system is to turn food into energy. Everything we eat can be broken down into proteins, fats, carbohydrates, and fiber. We can't digest fiber, but we convert the other three components into amino acids, fatty acids, and glucose—simple energy molecules small enough to pass through the walls of the digestive system and into the bloodstream for distribution to every cell in the body.



Mouth

Food goes in. Food gets mashed. Saliva is added to help it liquefy.

Esophagus

Food goes down.

Stomach

Food is stored and mixed. As food moves through, water is added to help digestive chemicals turn it into mush.

Small Intestine

An assembly line of specialized chemicals from organs including the pancreas, liver, and gallbladder break food down into molecules small enough to be absorbed through the intestine walls.

Colon (Large Intestine)

Whatever the small intestine hasn't digested spends hours or days working its way through your colon. Hordes of teeming bacteria live symbiotically in your digestive tract, working to liberate the more stubborn nutrients from the molecules that

made it this far without being digested. Most of the water added in the stomach is reclaimed here.

Rectum
Technically part of the colon but often considered separately, the rectum is where feces gathers until it is expelled. The rectum contains nerves that inform the body that it's time to evacuate; the more feces that gathers and the longer it waits, the more urgently those nerves implore you to drop off the kids at the pool.

Sphincter
Stays clenched (one hopes) until it's time to let go.

Anus
Poop comes out.

BLACK OR WHITE, man or woman, Christian or Muslim or Jew: pooping transcends all boundaries and embodies shared humanity—collectively understood, appreciated, and feared. It's a pleasure to some and a chore to others; but when it turns bad, its demands can force any of us at any time to abandon all pretense of civilized behavior to meet the exigency of an innocent meal gone wrong. The experience of needing to poop, of pooping, and of having pooped is universal.

Nevertheless, any particular poop represents a never-to-be-repeated confluence of diet, metabolism, and environment. The size, smell, density, and structural integrity of any given Lincoln Log depends foremost on what you ate and your body's response to it, and then on stress, environment, activity, and any other external influences during the digestive period. Like a snowflake, every poop is unique.

Discussions about poop must accept this uniqueness. Some people are thrice-daily poopers and others only triweekly. Some produce floaters; others, sinkers. Some produce elephantine masses, while others create modest Milk Duds. But even though some snowflakes reek of boiled egg and others leave great brown

smears, they both still fall under the general definition of "snowflake." And so it is with poop. The baseline for comparison is not the idiosyncratic end product, but the experience—urge, act, and aftermath.

While one pooper's average production may be of a girth to make another pale in fear, both can relate to the struggle against a poop bigger than what one is used to, because the urge, act, and aftermath are alike enough for all. The urge starts as a distant sensation and works its way into consciousness, growing in urgency until it forces compliance. The act is the birth process—depending on how critical the urge, the act may be an exhausting bout of pushing or a simple unclenching of the sphincter or an uncontrollable explosion in one's pants. If the urge was moderate, the aftermath is unremarkable; if the urge was all-consuming, the aftermath is just as intense. The dichotomy between the urge and the aftermath is the first duality of poop. Poop is both pain and relief. The more it hurts to hold it in, the better it feels to let it out. The prelude of anguish, the postscript of tranquility—like childbirth, pooping is fruition achieved through suffering.

AN UNBALANCED SYSTEM: CONSTIPATION AND DIARRHEA

Pooping is normally an unremarkable event, essential to the function of the body. A typical poop—whatever is normal for a given person, whether its end breaches the water or it can be completely hidden by one square of used toilet paper—marks the peak of a metabolism-specific bell curve. From this norm one routinely deviates as diet, metabolism, and environment interact. One may not notice the minor variations, which manifest as a log slightly smaller, or slightly mushier, or slightly more stubborn than the average. But stray far enough beyond the standard deviation and the word "poop" no longer applies.

A cow's digestive system is good at processing plant matter, and not so good at digesting anything else. The human digestive system, on the other hand, can accommodate wide variations in diet, from bran muffins to curry vindaloo. It can convert large

simultaneous infusions of fats, carbohydrates, and proteins into the amino acids, fatty acids, and glucose the body needs for energy and maintenance. But it prefers not to. The digestive system seeks equilibrium with your diet: if it recognizes the consistent ingestion of particular inputs, it adjusts itself to produce more or less of certain chemicals and create an environment more or less hospitable to particular bacteria in anticipation of more of the same. This is why corn can come out undigested—the digestive system allocates certain resources to certain tasks, and digesting corn hulls requires a lot of resources to digest. Your stomach will work on the easy stuff first, and digest the corn only if it has resources left over. Nothing to worry about; undigested corn is a merely aesthetic problem.

What a cow lacks in digestive agility it makes up in specialization, wisely restricting its diet to what it can easily digest. Humans aren't so bright. Our systems adjust to anticipate food within parameters based on recent diet patterns, but our penchant for chili cook-offs shows how much we enjoy eating outside those limits. A diet within the margin of error set by the digestive system's adaptations results in regular, top-of-the-bell-curve poops. But for every six meals you eat at McDonalds, there's that seventh at Taco Bell. A digestive system anticipating a gentle dollop of ketchup and mustard tends to react with vengeance when you drown it in hot sauce.

There are two ways to confound your digestive system: overwhelm it with an input it could probably handle in smaller quantities (such as a whole wheel of cheese), or introduce new or unexpected inputs (consider a Westerner's first encounter with Indian food, or first hamburger after a decade of vegetarianism). The result: diarrhea or constipation.

Diarrhea

Government health literature preaches that a healthy adult poops no more than three times per day. Poop number four, according to them, is diarrhea. But we've already established that a normal poop can't be specifically characterized—poop is different for every person. And so is diarrhea. Government guidelines don't tell

you when you have diarrhea. Your nose tells you. Your eyes tell you. The back of your underwear tells you.

The digestive process requires up to nine liters of water, which comes from drinking, from saliva, and from secretions in the stomach. In your stomach, the food, water, and various chemical secretions mix into a partially-digested liquid mass (chyme) that your digestive muscles push through the system in undulations (peristalsis). Normally, your intestines reclaim up to 95% of that water, drying out the stool to the point of cohesion as a nice log. Diarrhea occurs when there's too much water left in the stool. The stool doesn't coagulate, but instead comes out in fits and spurts.

According to the technical literature, overly soft stool qualifies as diarrhea even if it coheres. To most people, though, that would fall within the accepted margins of regular pooping. Real diarrhea, to most people, comes with the cramps, the splatters, the explosions, the sporadic sprints to the bathroom to indulge a butt acting like a garden hose. There's no grey area—if it's diarrhea, you know it.

But there's a little-known fact about diarrhea. It's not the problem; it's the solution. Diarrhea is how the digestive system protects itself from intruders. If your body doesn't like what it detects—a particular species of bacteria, or some food it interprets as a threat, or whatever else might set it off—it adds water to your stool to flush everything out. Once it's in the clear, the diarrhea stops. Anti-diarrhea medicine doesn't help you get healthy. It halts the inconvenient symptoms, which is useful if you're due on stage at Carnegie Hall, but it ultimately prolongs your suffering, because the threat your colon wants to expunge is still inside.

Your diarrhea will continue until the threat has been squirted out. The biggest danger is water loss: your body relies on your colon to reclaim the water it's now using to flush itself out, which is why you should drink lots of fluids when you've become a human espresso machine. As long as you stay hydrated, the biggest threat from diarrhea is pain, inconvenience, embarrassment if you stray too far from the toilet, and a sudden increase in your dry-cleaning budget.

Constipation

Too much water in the stool causes diarrhea. Too little can cause constipation.

One of your intestines' jobs is to remove water from the liquid waste that passes through it—ideally, just enough to make a soft but cohesive poop. If the stool spends too long in the colon, it can dry out too much. Stool needs to be pliable to negotiate the colon's twists and turns; if too dry, it can get stuck. This results in little rabbit poops as your log dehydrates and breaks apart like mud on a dried lakebed—if you're lucky. If you're not, the result is a log stuck against your colon wall, too dry to overcome friction.

This is why fiber is so important for the human digestive system. Found in plant matter, fiber is a kind of carbohydrate too complex to digest. Instead, it acts as a bulking agent, absorbing water and giving your peristaltic muscles traction as they work the semi-digested mass through the system. Without fiber, your system has trouble moving things along, which means the poop may dry out too much or too soon. Peristaltic muscles in the upper parts of your colon are used to working with mushy chyme; a dry log at that point might put up a struggle, slowing to a stop.

An unhealthy diet is only one cause of constipation. An unhealthy outlook is another. If you ignore the urge to poop because you're too busy or don't like to poop at school or at work, your colon will nevertheless continue to reclaim water while the poop waits; by the time you're ready, the poop might be too dry to push out. If you abuse laxatives, your muscles can grow too weak to push along a normal stool. Or maybe you have a tumor in your colon, slowing the chyme until it dries out too much. There are many reasons, often cascading and self-perpetuating. Constipation is a vicious cycle, and the dried-out turds it creates are equally vicious on your o-ring.

INTERNAL AFFAIRS: INVESTIGATING YOUR INSIDES

For most people, diarrhea and constipation are rare—uncomfortable but brief slides to the distant slopes of the bell curve.

Both usually respond well to diet change: lots of fiber and water if you're constipated, lots of bland foods and patience if your ass thinks it's a faucet. But for too many Americans, bowel dysfunction is a way of life. From gallstones to hernias to colon cancer to irritable bowel syndrome to hemorrhoids to diverticulitis: the National Center for Health Statistics estimates that 60–70 million Americans suffer some form of digestive malady. For fourteen million people in 2002, it was serious enough to require hospitalization. And according to the American Cancer Society, colorectal cancer alone kills 55,000 people a year. Many factors contribute to these problems—most notably, as you'll learn, the American diet and lifestyle—but when you're suffering from endless constipation or ceaseless diarrhea or oscillating wildly between the two, you're not concerned with what you or your culture could have done differently. You want to know what's wrong and how to fix it. But your digestive system comprises thirty feet of twists and turns from your mouth to your anus. How do you find the culprit?

Stool samples are useful for identifying some causes of diarrhea, such as food poisoning or cholera. Beyond a few illnesses, however, their usefulness is limited. A scene from the 1994 film *The Madness of King George* shows the King's best scientists analyzing his stool, picking it apart and subjecting it to various archaic methods to find clues to his strange behavior. In the eighteenth century, there weren't too many ways to see what was going on inside the body short of cutting it open. Today's medical science has made a lot of progress in that department.

Unfortunately, the methods developed aren't much fun. No matter which way you go about it, if you're going sphincter spelunking, you're in for a rough time.

PHYSICAL EXAM

Every journey up your ass begins with a single step. To evaluate the muscle tone of your anal sphincter and search for tenderness, blood, or obstruction, the doctor uses a rubber glove and a jar of lube, while you try to think happy thoughts.

Discomfort quotient: Just hope your doctor has small fingers. And that he remembers to take off his ring.

COLORECTAL TRANSIT STUDY

To observe food moving through your body, you swallow capsules containing small markers that disperse as they pass through the digestive system. You're x-rayed several times 3–7 days later so doctors can see where the food goes, and when.

Discomfort quotient: Fortunately, you don't have to recover the markers.

ANORECTAL FUNCTION TESTS

If you're subject to chronic leakage or premature release, you may have a weak sphincter. To find out, doctors evaluate your muscle function by inserting and then slowly retracting a catheter or air-filled balloon.

Discomfort quotient: If your problem is indeed a weak sphincter, then you probably won't even notice this test going on. Otherwise… yeah, you'll notice.

BARIUM ENEMA X-RAY

The muscles of your colon don't show up well on x-rays. To search for irregularities in all its nooks and crannies, doctors fill your colon with barium, a chalky white substance. Yes, fill—they pump what seems like a cement-truck-load of it into you, so that the x-ray shows the outline of every lump and fissure. Starting about ten minutes after the procedure, you spend the next couple of days pooping it all out.

Discomfort quotient: For this to work, your colon must be empty. Emptying your colon, unfortunately, is not like draining the oil from your car—although it does become more so after you drink that whole bottle of laxatives they prescribe.

DEFECOGRAPHY

The barium enema x-ray provided a snapshot of the state of your bowels. But that's not enough—your doctor wants to see your muscles in action. Defecographers fill your rectum with a soft paste with a consistency similar to poop, then seat you

on a special toilet-*cum*-x-ray machine-*cum*-VCR to make a movie as you poop it out.

Discomfort quotient: The paste has to get into your rectum somehow. Imagine a medical turkey-baster.

SIGMOIDOSCOPY

After a period on a liquid diet and a few enemas for good measure, the doctor sticks a long, flexible tube into your now-empty rectum and lower colon. It's got a light and a camera and, if you're really lucky, an air-hose to inflate your colon to enable a better view.

Discomfort quotient: A sigmoidoscope only goes in about a foot. You'll barely know the doctor is sticking something up your butt.

COLONOSCOPY

This combines the spring cleaning you get before a barium enema with the fun of anal insertion. For this procedure, the doctor may or may not sedate you, but will lay you on your side and feed a camera cable up your ass—all the way up—in search of anything out of the ordinary. And when he finds it, the colonoscope has a set of pinchers to snip off a chunk for later examination.

Discomfort quotient: Take all of the previous, and add another five feet.

CAPSULE ENDOSCOPY: THE END OF INDIGNITY

Colonoscopies may soon join leeches and blistering as a medical archaism. Medical scientists have encased a camera, battery, transmitter, and light in a multivitamin-sized capsule the patient swallows. It tumbles through your system, taking thousands of pictures and uploading them to an external receiver. A few days and twenty-five feet later, doctors can have a complete snapshot of your digestive system, from mouth to squinting brown eye. Though today it's used mostly to examine the small intestine (which is too long and twisty

for scoping techniques to navigate), it's clearly the internal imaging technique of the future.

Discomfort quotient: The bad news is that you still need to empty your digestive system with laxatives. The good news is that you don't need to recover the camera once it comes out.

EATS, SHITS, AND LEAVES: MANAGING HUMAN WASTE

For a few canny art collectors, the *Cloaca* experience didn't end when the exhibit closed. Many collectors took home the ultimate *objet d'art*: an actual *Cloaca*-produced specimen, carefully vacuum-sealed in clear plastic to ensure a long display life, accompanied by a menu documenting what *Cloaca* had been fed to sculpt this masterpiece, for only $1,000. Unlike Piero Manzoni's 1961 *Merda d'Artista*, in which only the artist's word guaranteed that the tin cans he so successfully sold really did contain his feces, these souvenirs proudly emphasize every shimmering lump and fissure. Critics who long purveyed clichés about the worth of modern art had their most caustic opinions confirmed: it really is shit.

In Toronto, the Power Plant Gallery carefully preserved the finest specimens *Cloaca* produced, putting them in the freezer until Delvoye could package them for sale. *Cloaca's* digestive process is subject to the same sort of fluctuations as yours—it, too, has an average from which it sometimes deviates. If the food *Cloaca* eats falls within the margins its calibrators anticipate, the result is a nice, solid log. If the balance between protein, fat, carbohydrates, and fiber is off (or if there was an error in calibration), the result is constipation or diarrhea.

In Toronto, when *Cloaca* got diarrhea, a gloved attendant would scoop up the mess, take it into the bathroom, and flush it down the toilet.

The attendant didn't bag it up and throw it in the trash, or toss it out on the sidewalk. Flushing it down the toilet is what you're supposed to do with poop (at least, poop you can't get collectors to buy from you). Our parents spend much of the second

and third years of our lives teaching us that poop doesn't go in the trashcan, garden, or garbage disposal. Poop goes in the toilet. That's why there are an estimated 350 million toilets in America today—many more than one per person. That's why Americans buy eight million toilets a year. That's why federal, state, and local investment in the wastewater infrastructure has been $250 billion since 1972. That's why, according to the EPA, over eleven trillion gallons of water are processed by sewage treatment plants every year.

That poop is automatically consigned to the toilet—even when it's picked up off an art exhibit, even when there are probably ten trashcans between the mess and the toilet, even when it's not even human poop—isn't just a quirk of modern culture. It's the culmination of millennia of sanitary conditioning. It's a reaction instilled by both nature and nurture, by parental instruction and social pressure, for our individual and collective protection—and, these days, for our oppression.

Let's start at the beginning.

A long time ago, before toilets, before urinals, before people paid $7 to see a machine do what they did in their bathroom that morning for free, human beings were wanderers. They lived off the land, hunting and gathering just as other animals did. Humans were not at the top of the food chain, as they are today—they were just a point in the circle of life. They took from the land, and pooped where they walked, and their poop returned to the land the resources they took. Organisms in the soil converted the poop into nitrates, and plants absorbed those nitrates as fertilizer, and it started all over.

Humans must meet three needs to survive: food, water, and shelter. About ten thousand years ago, agricultural skills had so advanced that humans could better attain all three by settling in permanent villages that allowed for shared resources and encouraged the specialization of labor. Now only some of the villagers were hunters, wandering around the countryside, pooping where they might. The rest stayed in and around their homes, dropping their poop in closer proximity to where they ate, drank, and slept. In and around these villages, poop began to accumulate.

And accumulating poop is dangerous.

For many forms of life, other species' feces is a reproductive vehicle. Many kinds of seeds pass undigested through an animal's system to disperse wherever the animal may poop; many kinds of parasite eggs, bacteria, and viruses use the same tactics. From tapeworms to typhoid, fecal contact is a disease vector—directly, if you take a bite of your afflicted neighbor's feces, or indirectly, through accidental ingestion (you step in poop, touch your shoe, and then eat without washing your hands), through water contamination, and through diseases carried by the insects and vermin that feces attracts. The more poop lying around, the bigger the potential threat.

Even if early village dwellers didn't know that poop could cause disease (a fact unknown until the 1850s) they knew that it smells bad. Poop is repulsive, and any vermin attracted to something so repulsive must be repulsive themselves. Just like modern ones, early villagers didn't want poop, its smell, or the vermin it attracts anywhere near them. To combat this, social codes arose to regulate the placement of poop.

For most early civilizations, acceptable places were rivers or ravines or even behind a bush, far from anyone's abode. This sequestered the poop from sight and smell—and, hopefully, from the village's food, shelter, and water (assuming they pooped downstream). As long as the ravine was deep enough for decomposition to occur before it filled up, the village was safe. As long as the river flowed swiftly enough to remove the poop faster than people could deposit it, the village was safe. In other words, as long as the method of sequestering enabled poop to disperse or decompose faster than the villagers could produce it, the village was safe.

An adult averages roughly a half-pound of excrement per day. Multiply that by the number of people in a community. Now contrast that to the amount of poop the community's sanitary management choices can disperse or decompose, and it's clear that as a population density grows, so too grows the threat from its accumulated poop. Its safety depends on being able to destroy poop faster than it can produce it. Once a population poops more than it can disperse or nature can degrade, a threat to health appears.

Sanitation is therefore vital for a community's survival: for the good of society, people need to put poop in its place. Taboos implement this imperative, and government enforces it. If you go outside and poop on the sidewalk, you'll be shunned or arrested —not because your half-pound of poop could bring an epidemic, but because society's health depends on keeping poop in its place. Individual dissent is intolerable because mass dissent would be catastrophic. One person pooping on the sidewalk because it's too much bother to walk to the ravine isn't going to bring plague upon the village, of course—but if each villager made that decision, the aggregate might.

This is the second duality of poop. It troubles the individual only until the moment it springs from its brown womb; then it becomes a problem for society.

Many societies knew that poop is more valuable as a fertilizer on the farm than it is in a ravine at the edge of town. Using poop as fertilizer returns humanity to its appropriate place as a link in the food chain. Eastern civilizations recognized this far more often than their Western counterparts. Unfortunately, Eastern cultures didn't know that human poop is only safe and sanitary for agriculture if it's properly composted.

(The composting process is simple: put poop in a pile and let it sit long enough for bacteria to convert it into nitrates and for organic activity to raise the temperature enough to kill lurking pathogens. Then spread it on your fields and enjoy your prize-winning tomatoes.)

As villages grew into cities, poop production inevitably outstripped cleansing capacity. Perhaps the ravine was too inconvenient, or perhaps the river dried up; whatever the reasons, when poop accumulated faster than it could be dispersed, the alternative to removing it was collecting it locally. Some societies restricted their poop to buckets or clay pots, but most eventually gravitated toward communal cesspools.

At its simplest, a cesspool is a hole in the ground. Cesspools span human history from the earliest settlements to pre-plumbing tenements in twentieth-century New York City. They proliferated because they're easy: dig a hole and put poop in it until it's full, and then either empty it or cover it and dig a new

one. Conventional wisdom holds that burying poop is a good way to compost it, but that's not necessarily true—cesspools do not allow oxygen to circulate through the material, which limits the prospects of organisms that break the poop down and heat it up to destroy pathogens. Over the years, poop in a cesspool will eventually decompose, but in the meantime, it'll just leach into the lakes, rivers, and—to the chagrin of the 15,000 Londoners who died in an 1848–49 cholera outbreak—wells.

For cities whose residents would otherwise be pooping in alleys and behind buildings, cesspools are a good solution in the short run. In the long run, though, cesspools just concentrate a neighborhood's poop closer to where they eat, drink, and sleep, ensuring that today's solution will be tomorrow's epidemic. Some landowners, perhaps recognizing this, might line the cesspool with a leak-proof material. A lined pit is a privy-vault, named after the little house built above a cesspool for privacy and protection from the elements. (Privacy, in this case, meant protection from passing eyes—cesspools were often shared by families or neighbors, and privies often featured multiple seats.) Privy-vaults protect the environment and the groundwater, but the poop in them takes even longer to decompose. When pits were full, landowners relied on night-soil men to cart the putrid poop away; sometimes farmers bought it for fertilizer, but typically it was just dumped somewhere else.

Two forces have driven sanitary evolution: social crises and individual laziness. Usually, the latter causes the former. Whether littering or polluting or pooping, if people can break the rules to cut corners with little or no accountability, they will. It's not necessarily a problem when one person does it, but it is a problem when it becomes standard practice. The chamber pot, for instance, existed originally for urinary convenience, a receptacle for when it was too cold, rainy, or otherwise inconvenient to go to the privy. Kept under the bed to be emptied later, chamber pots are ill-suited for poop because nothing stinks quite like a fresh turd lying uncovered in a bowl. But just as cesspools were built to deal with those who couldn't (or wouldn't) go all the way to the ravine or the river to poop, those who couldn't (or wouldn't) go all the way to the cesspool spurred innovation by turning their lazy asses toward their chamber pots.

Night (Four Times of the Day), by William Hogarth, 1738.

Chamber pot use spurred further innovation in the form of the close-stool, a cabinet for a chamber pot, with a hole in the top so a user could squeeze one out while sitting. With a well-designed lid, a close-stool could ensconce the scent; sprinkling sawdust or ash on the mess helped. With the smell contained, the owner could empty the chamber pot at his convenience. But who has time to lug a brimming chamber pot all the way from the close-stool to the cesspool? Especially when there's a window so close by?

The histories of cities such as Paris, Edinburgh, and Cambridge are redolent with the stench of neighborhood cesspools, of endless rains of poop and urine from upper-story windows, of piles of garbage and dead animals and rotting food in the streets—of an utter lack of sanitation. These histories show the consequences of population growth outpacing crap-cleansing capacity. The Black Plague, for example: twenty to thirty million people across fourteenth-century Europe dead from an illness spread by fleas living on rats that thrived in filth. In contrast with epidemics to come, such as cholera and typhoid, fecal contamination was only an indirect cause of the Black Plague; nevertheless, proper sanitation management could have averted this holocaust. The end of the crisis came, unfortunately, not through improved sanitation, but through the elimination of 25–50% of the continent's poop-producing population.

Many large Western cities built municipal sewer systems, but before the nineteenth century, not for sanitation. Cities from ancient Rome to eighteenth-century London built sewers to combat flooding on poorly-drained streets. They were for rain, and for the poop, garbage, and dead animals the rain washed down, but not for household poop. (The rich and important were exceptions—wealthy neighborhoods and municipal facilities often had the privilege of connecting directly to the sewers, but most households stuck to cesspools.) Still, because they helped keep the streets clean, rain sewers gave a city a tremendous boost in its crap-cleansing capacity; had fourteenth-century European cities built sewers, the plague would have been much less severe.

This was the situation in America and England in the early eighteenth century: wastewater sewers helped keep streets clean in only the biggest cities, and people everywhere pooped in cham-

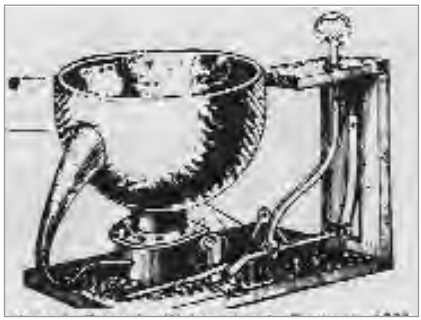
ber pots, close-stools, or privies. Aside from the conveniences of the extremely wealthy, sanitary management hadn't progressed much between ancient Rome and the seventeenth century. But the Industrial Revolution changed cities and everything else. Rural workers inundated the cities. From 1750 to 1800, London grew by 300,000 people to nearly a million—and that million produced 500,000 pounds of poop a day. The accumulation of waste spiraled out of control as cesspools were overwhelmed. Cities like London became ideal breeding grounds for diseases like cholera, which is spread by fecal contamination of water. By 1854, London's population was well over 2.3 million, but a number of cholera epidemics had killed thousands at a time. Unlike during the Black Plague, however, this time sanitary innovation would save the masses—by subjugating them to the flush toilet.

The Flush Toilet: See No Evil, Smell No Evil

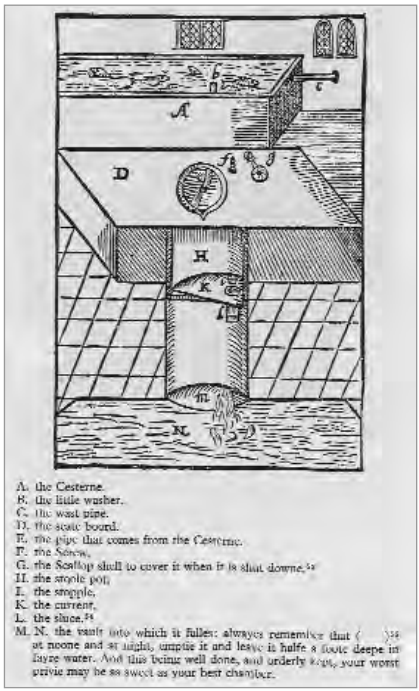
The Industrial Revolution changed the basis of the class structure from heredity to economics. Power had thitherto been concentrated among the gentry and royalty, whose ranks were nearly impenetrable to the low-born. The royalty maintained their power by convincing the masses that it was God-given; the rest kept it through economic might and brute force. But under capitalism, for the first time, the system that made one person rich could just as easily elevate another. And with opportunity achievable through sweat instead of just blood, the threat of God or the King's wrath could no longer keep the masses in check. The elite now had to differentiate themselves in other ways than money.

Thus the rise of capitalism begat meritocracy and a new form of the Protestant work ethic. Both concepts posit wealth as a reward for hard work—that if you wanted to enjoy life as those with money did, you had to work hard, as they had. The promise of social ascent through work oppressed as much as it seemed to empower, because it was the rich for whom the workers worked so hard.

But as the middle class grew, so did the worries of the elite. In late eighteenth- and early nineteenth-century England, so many were attaining comforts previously unknown in the slums that it was diluting the elitist advantage of wealth. More worrisome: if



Water closet design by Joseph Bramah.



A design for John Harington's Ajax.

the pleasures of life were available to the masses, the masses might grow complacent and not work as hard for their bosses.

The elite realized it was in their best interest to make the gulf between the classes as wide and visible as possible—visible so the masses couldn't be happy with a mere middle-class existence, and wide so they'd never exceed one.

Cleanliness is next to godliness, and everyone wants to be next to God, something money makes easier. The elite in every culture have always tried to differentiate themselves from the rabble through the trappings of wealth—fancy clothes, fine perfumes, cultivated table manners, affected speech. But in the late eighteenth and early nineteenth centuries, as capitalism spread wealth wider than ever before, fears of the surging middle class forced the elite to continuously raise the bar. Their dress, food, and houses grew increasingly opulent and unattainable. When that wasn't enough, they developed exacting etiquette to pretend that more than money elevated them above others.

This Victorian ideal—known as such today because its heyday coincided with Queen Victoria's reign, from 1837–1901—could

only be achieved by adhering to customs, morality, and etiquette that mandated the total denial of the sights, sounds, smells, and desires of the human body. The elite perfumed their bodies because the masses reeked of sweat. They powdered their faces white (or, after Queen Victoria declared makeup vulgar, ate chalk or drank vinegar or iodine) because the masses were tan from working in the sun. The masses pooped in communal outdoor privies, so the rich embraced the opposite extreme: private indoor rooms. The stench of shit permeated poor neighborhoods, so the rich filled their chamber pots with water to eliminate open-air logs. To sweat, to have bad breath, to burp, to show sexual desire or other strong emotion—all these were taboo because the Victorian elite identified them with the brute masses.

But the Victorians made a mistake: they believed their own propaganda. Soon it wasn't enough for masses to believe the elite didn't poop—the other elites had to believe the same thing. Before ceremonial balls, for instance, Victorian ladies took medicines to clean themselves out, because there were no toilets at the balls to contradict the Victorian worldview. To answer nature's call, a woman had to make excuses and take her carriage home. It was a problem of decorum outpacing technology: Victorian men and women could poop in odorless privacy in a water-filled close-stool, but standing up nevertheless revealed a floater just as repellent as those dropped by the servants who would be coming in shortly to collect it. Victorian etiquette taxed even its authors. Thus, as Dan Inglis points out in *A Sociological History of Excretory Experience*, the desire for an apparatus to hide feces existed well before the apparatus itself. But desire spurs demand. And fortunately for the Victorians, demand spurs innovation.

In the sixteenth century, a member of the court of Queen Elizabeth I named Sir John Harington had invented the Ajax, the first flushing toilet that used moving parts to remove the poop and refill the water tank. His invention didn't take off. Although some of the elite between the sixteenth and eighteenth centuries had systems that used water from cisterns to flush their chamber pots, those primitive water closets were prohibitively laborious to install and maintain. But in 1775, Alexander Cummings, an English watchmaker, recognized the economic potential for a functional

flush toilet. Cummings drastically simplified Harington's design with a single sliding valve that emptied the bowl, released water from a cistern to clean it, and then refilled the cistern. This new toilet clearly had great potential, so other inventors jumped on the bandwagon. In 1778, Joseph Bramah converted the sliding valve to a hinge flap, simplifying the mechanism even further. By the turn of the century, Bramah's company had sold and installed over six thousand toilets across England.

Early toilets were cast-iron contraptions that flushed inadequately (leaving smears and clogs), and early plumbing couldn't keep smelly sewer gasses from creeping the wrong way through the pipes. Significant improvements came seventy-five years after Bramah, during the heart of Queen Victoria's reign. George Adamson incorporated siphonic flush-down, George Jennings improved on it, Thomas Crapper devised the pull-chain method for flushing, and Thomas Twyford encapsulated the whole system into porcelain for easy cleaning and sanitizing. While early toilets were by today's measures loud, inefficient, and hard to clean, they sufficed for those who wanted to poop and leave no evidence.

In England, the spread of flush toilets coincided with the modernization of the water infrastructure. In the past, water came through communal wells and pumps; now, for the first time, it was piped directly into the home. Water consumption skyrocketed as people enjoyed the benefits of washing, bathing, and flushing. Surprisingly, fresh water infrastructures were usually installed before wastewater infrastructures. Early engineers usually tried to direct wastewater into cesspools, but flooding was the inevitable result. Engineers eventually realized that the water and waste had to go somewhere. This flooding and fears of "miasma" (disease-causing air emanating from stagnant water) eventually spurred wealthy households to connect their wastewater outputs to municipal drain systems.

Water went in, poop went into water, and water and poop went out. By the last third of the nineteenth century, the gilded throne of feudal monarchy had given way to the porcelain throne of Victorian morality. The Victorian demand for a seemingly impossible degree of fecal denial had engendered an infrastructure that could provide it. Now the affluent could

emerge from their bathroom with no evidence left behind, as though they didn't poop at all. Social strivers now had one more thing to strive for. The rest, enveloped by the stench of their privies, close-stools, and chamber pots, could only stare in envy at the flush toilets they could never afford.

The Throne for the Common Man

Just as the poor and middle classes coveted the food, housing, and clothing of those who had better, so did they covet their fecal fastidiousness. But even to afford a toilet was not yet to afford the plumbing it required, and the lower classes had to continue squatting over communal facilities. And so the reek of their homes and clothes and asses served as a constant reminder of their place in the economic system. The toilet not only allowed the wealthy to realize their impossible fecal denial, but also served as yet another marker of class stratification.

Across the Western world, the Industrial Revolution was uprooting traditional population distribution. People from the countryside streamed into the cities in search of jobs at the new factories, and overcrowding followed. The slums were packed with people, industries, cow-sheds, slaughterhouses, and grease-boiling dens, all discharging their waste willy-nilly. The streets were toilets for horses; the sidewalk was a cesspool for upper-story chamber pots. Some neighborhoods had sewers, but these were often poorly built, leaching contaminants into wells and other water sources.

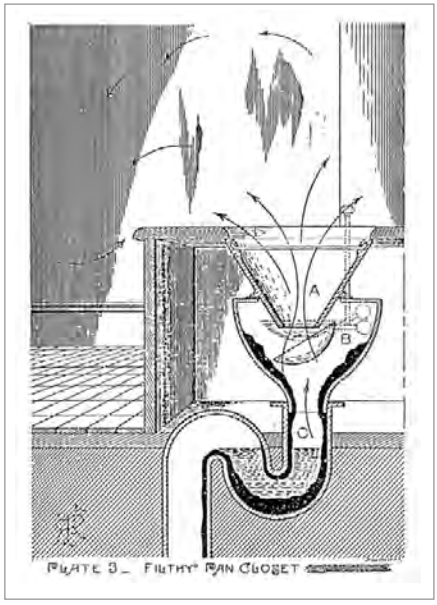
In the nineteenth century, the crap-cleansing capacity of the cities grew ever more strained as population densities skyrocketed. Tenements grew taller, and the poop-productivity of the slums soared with them. A number of great cholera outbreaks—including ones in 1831, 1849, 1854, and 1866—ravaged the west. The 1849 outbreak killed 35,000 in England and Wales beyond 15,000 dead in London alone. All over the Western world, as endless waves of migrants flocked to the cities for jobs, cholera followed. 2,200 people died in Quebec City in 1832, 8,000 in Havana in 1833, 5,000 in New York City in 1848–49, and 1,000 in Sacramento in 1850.

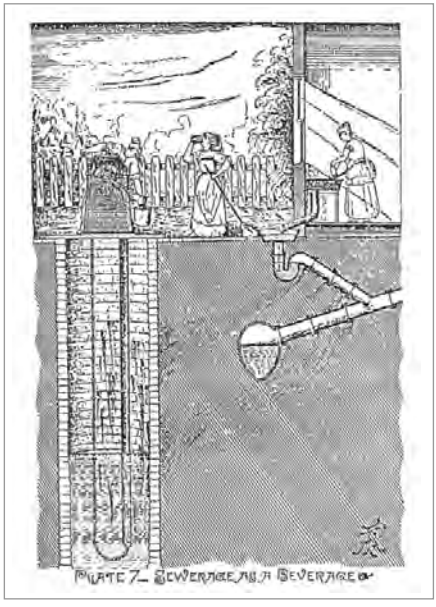
During London's 1854 epidemic, a doctor named John Snow proved the correlation between cholera and contaminated water by observing the death rate among Londoners around the Broad Street pump in Soho. As chronicled in Steven Johnson's 2006 book *The Ghost Map*, Snow painstakingly investigated the afflicted neighborhood during the very height of the epidemic, going door to door to learn where the sick and the dead in each house got their water. Working later with a local reverend named Henry Whitehead, Snow was even able to trace the contamination to its source: a woman named Sarah Lewis who had dumped the wash water from her sick daughter's soiled clothes into a cesspool in front of her house. That cesspool drained into the Broad Street pump's water supply.

In a perfectly equal society, poop threatens each member equally. But cities during the Industrial Revolution were far from equal. The wealthier neighborhoods, with much lower population densities, were clean and relatively sanitary. Most migrants settled in the poor neighborhoods, and the poor bore the punishment of the Industrial Revolution's poop. But tens of thousands of working men and women dying year after year does affect the high classes in one way: it's the workers toiling in the factories that earn profits for the owners. Thanks to Snow, Whitehead, and a number of other scientists and sanitary reformers, the upper classes now knew how to fix a major threat to their labor pool: replacing cesspools with modern, watertight sewer systems to separate poop from people and water supplies.

By the end of the nineteenth century, reforming the sanitary conditions of the poor became a pet cause of the English bourgeoisie. Led by people such as Edwin Chadwick and Octavia Hill, a movement grew to transfer the responsibility for clean water and sewage disposal from individuals to societies and governments. These sanitary reformers were probably genuinely concerned for the well-being of their less fortunate neighbors; the enthusiasm of the lawmakers and business and social leaders who joined them may have been motivated more by an understanding of the influence of sanitation on the unskilled labor force's numbers, and on the capitalist's bottom line.

Chief among the sanitary reformers' proposals was eliminating the dangers of leaching cesspools, open street-level gutters, leaky sewer pipes, and flying feces dumped from chamber pots, by instituting a system for the simple and efficient removal of feces: flush toilets in all homes, and the water and sewage system they necessitated. To save the population from the dangers of poop, the elite's fecal habits had to be disseminated across society. The English launched massive public works campaigns toward that end—there, the state engineered the spread of the toilet. Between 1859 and 1865, London city engineers led by Joseph Bazalgette built 100 miles of main sewers, 450 miles of interceptory sewers, and 13,000 miles of local sewers, using 318 million bricks and excavating 3.5 million tons of Earth in the process. And in the decades following London's last great cholera outbreak in 1866, the state legislated a number of provisions mandating the same kind of amenities for the working class that the middle and upper classes had long since embraced. By World War I, England was a toilet-based society.





In the late 19th century, American scientists discovered the dangers of a weak sewage infrastructure. Images from Cyrenus Wheeler, Jr. "Sewers: Ancient and Modern; with an Appendix," a paper read before the Cayuga County Historical Society on December 14, 1886. From the Collections of the Cayuga County Historical Society.

In America, the fecal infrastructure was equalized across classes through a different process. According to Maureen Ogle in *All the Modern Conveniences*, the state wasn't initially involved. The vibrant sanitary reform movement in America, led by men such as John Griscom and Jacob Riis, concentrated mostly on the plight of the urban poor. More important in introducing the toilet across American society were the trends of optimism, faith in industry, and belief in family that swept the country in the mid-1800s. Improving domestic life was a cornerstone of these trends, and modern conveniences such as running water, dumbwaiters, and speaking tubes were eagerly adopted by the middle class as well as the rich. Soon they turned their attention to the backyard privy, built over cesspools that were, for obvious reasons, some distance from the house. To take advantage of running water and to save people the embarrassment of being seen walking to and from, Americans were soon feverishly constructing bathrooms adjacent to and even inside the house. Toilets and technology were imported from England at first, but American inventors provided an endless rush of innovation, resulting in a confusion of techniques and designs as more and more variations were rushed to market. The technology was faulty and inefficient, but Americans were caught up in the spirit of sanitizing their domestic experience. Across the country, flush toilets flourished.

Then came the Civil War. American optimism crashed, and faith in cold, hard science took its place. By the 1870s, scientists had started to look at the conveniences that had been installed in the previous decades, and they were horrified. Cheap pipes, defective faucets, faulty drainage, leaky gas traps, leaching cesspools: this was plumbing without science. The nation was soon awash in hysteria over the dangers of poor plumbing, the potential for disease built into everyone's homes. People began to realize that the problems earlier thought confined to the poor actually threatened the middle and upper classes, too. The laws of science, they realized, did not discriminate. Nor should the laws of man. The solution was public responsibility. Municipal governments received the mandate to enact plumbing laws and public health codes, and they did. By

the end of the century, the water going into the house and the water and poop coming out were under stringent government regulation. The fecal infrastructure across America was standardized: rich or poor, urban or rural, no household was complete without a private bathroom and a flush toilet.

The flush toilet emerged to meet the ideological demands of the elite Victorians. In England, the state spread it to all classes to protect the labor supply. Although America took a different route—America's interest was in protecting the middle and upper classes from the dangers of bad plumbing—it reached the same place. In both countries, pooping practices were no longer the individual's private choice; they were in the government's purview. Private bathrooms and flush toilets were the will of the state.

And their will was done; today it's nearly impossible for us to imagine doing it any other way.

Sewers: Not in My Backyard

If the half-pound-per-day average is accurate, then Americans grunt out about 150 million pounds of poop every twenty-four hours. According to the EPA, 72% of the population is served by the 16,000 publicly-owned multi-million dollar wastewater treatment facilities around the county. So every day roughly 108 million pounds of poop are dumped into 32 billion gallons of pure drinking water and sent through 600,000 miles of publicly-owned sanitary sewage pipes to sewage plants that return the drinking water to circulation by separating out the original 108 million pounds of poop. It would be much easier and cheaper if the poop didn't have to be separated; and for a half-century of widespread water-sluiced sewage disposal, deciding that it did not was exactly how cities solved the problem.

Until the 1870s in America, household wastewater disposal was wholly the household's responsibility. Some houses used cesspools, some diverted their waste into nearby streams, and some built private sewer systems. Upon recognition of the noxiousness of America's abysmal plumbing infrastructure, the government instituted standards requiring urban household wastes to be channeled into municipal sewers.

In both England and America, sewer design assumed the then-predominant filth theory of disease. This theory, espoused by the great scientists and reformers of the first two thirds of the eighteenth century, held that the smells generated by rotting organic material—called "miasma"—were the cause of disease. But by the mid-nineteenth century, researchers such as Louis Pasteur were advocating germ theory, hypothesizing that microscopic filth-loving organisms caused disease. Though germ theory had firm experimental support by the 1870s, it didn't gain widespread acceptance until the 1890s. By that time, the damage was done: most municipal sewage systems had been engineered in accordance with filth theory, which held that it was enough to just channel sewage into moving water. The maxim of sanitary engineers: "The solution to pollution is dilution." To them, "dilution" meant municipal sewage systems that emptied directly into rivers, lakes, and oceans.

Some people saw folly in channeling a city's filth into its waterways, and many techniques arose to deal with the raw waste pouring through the city's sewers. The motivation, however, was almost always economic—the search for a profitable method for the conversion of rivers of poop into fertilizer. Attempts to mine this brown gold included chemical precipitation (introducing chemicals that combined with dissolved poop to form particles that could be strained from the water) and sewage farms (pumping uncomposted sewage directly onto farmlands to irrigate and fertilize them). But no one ever made it profitable. And since science hadn't yet repudiated sanitary engineers' maxim about dilution, downstream pollution ensued. This was, of course, a problem for cities downstream. Cities dutifully invested in water purification plants, which saved their drinking water, but beaches and waterways became cesspools, and the smell of sewage wafted along the streets once again.

By the early twentieth century, as germ theory took hold, the danger of dumping unprocessed sewage into waterways finally became clear: fecal contamination threatened the users of downstream water supplies with disease. Algae thrived on the nitrogen in poop, blocking sunlight from aquatic plants and consuming the oxygen other water creatures needed to live.

Supposed solutions to local sanitation crises had created regional ones, merely smearing the threat around instead of wiping it out.

Encouraged by environmentalists and sanitary reformers, state and national governments realized that it would be cheaper to treat sewage as it left a city than to suffer the environmental damage, disruption of the aquatic food chain, and poisoning of drinking water downstream. Cities slowly began putting treatment plants at the outflows of their sewer systems—a difficult and inefficient process, of course, because sewage treatment plants are an afterthought, not an integral part of the system. But they did their best, with impressive results. Most modern sewage treatment plants are multi-billion-dollar poop-processing behemoths. The North River wastewater treatment plant in New York City, for instance, processes 125 million gallons of wastewater every day during dry weather. Serving westside poopers from Greenwich Village to the tip of Manhattan, North River is built on a 28-acre reinforced concrete platform over the Hudson River. It opened in 1986, eliminating discharge of raw sewage into the Hudson for the first time in New York City's history. The roof of the structure is a state park, with three swimming pools, sports fields, an athletic center, a skating rink, and an amphitheater. Like most modern sewage treatment plants, North River processes sewage in a few stages: primary treatment that settles the water, secondary treatment by organic digestion, and finally, sterilization. Disinfected water is released into the Hudson, and leftover solids, after further organic digestion and dewatering, become concentrated sludge used as fertilizer.

Getting Water from Grime: Modern Sewage Treatment

Preliminary treatment uses screens or grinders to capture or macerate solids such as wood, Q-Tips, and dead alligators so that they don't muck up the works further down the line.

Primary treatment, the simplest, involves letting suspended solids settle. This treatment removes up to 70% of suspended solids, but leaves high levels of pathogens.

Water then flows to secondary treatment tanks for digestion by the organisms introduced here along with oxygen to help them thrive. Byproducts of this process (for example, methane) sometimes help power the plant. Leftover solids, in a concentrated form called sludge, are sequestered for further processing.

After secondary treatment, sewage water is still rich in concentrates of nitrates, phosphates, and other pollutants. Sadly, many plants say "good enough" and discharge such water into the environment. Other plants employ tertiary or advanced wastewater treatment, from ultraviolet light to sand filters, to finish the job.

Of the incredible volume of solids and liquids that enter sewage treatment plants each year nationwide, several billion gallons pass straight through, untreated, back into the water cycle. In some cases this neglect is by design; in others, it's unavoidable. To save money while building capital-intensive municipal sewage systems, many cities elected to combine their wastewater sewers with their drainage sewers. Consequently, rainfall channeled into the treatment plant is much more than it can handle. Rather than overload the system, cities divert the confluence of rain and sewage, untreated, into the water. New York City's fourteen treatment plants process 1.4 billion gallons of wastewater per day. An inch of rain falling on the 120,000 acres of city property served by combined sewers yields an additional 3.14 billion gallons. That's much more than the system can handle, which is why city officials advise against going to the beach the day after a heavy rain.

A sewage treatment plant removes solid contaminants from water, meaning that a lot of solids remain. This sludge is

pumped into anaerobic digestion tanks that accelerate decomposition. First, raising the temperature creates a stimulating environment for bacteria to ingest the organic matter, and then raising it further kills the bacteria off. The process is similar to composting, and responsible municipalities dewater the sludge and sell it as fertilizer or apply it to depleted land. Less responsible municipalities bury it in landfills or burn it. In 1998, Congress wisely voted to ban dumping sludge at sea.

Sewage treatment is an expensive and impressive solution to a social crisis, and it's seemingly effective. City, state, and federal governments assure us that the treated water is pure and the sludge safely disposed of or recycled. This may tempt one to think that humanity has solved the problems of poop accumulation. After all, our cities no longer smell like poop, cholera epidemics are past, and the population poops compliantly, sanitarily.

But there's still a problem: sludge is dangerous.

If it were only poop, pee, and water flowing into sewage treatment plants, then we'd have a perfect waste disposal system. After all, it's easy to separate water from organic matter and convert the leftover sludge into fertilizer. But poop and pee can contain residual antibiotics, hormones, and other pharmaceutical chemicals. Household wastewater often includes paper products, blood, soapy water, bleach, Drano, paint, motor oil, and pharmaceutical compounds that have passed through the body. Worst of all, industrial waste regularly flows into the sewers—sometimes illegally, but sometimes with the municipality's blessing. Consequently, inorganic contaminants pass through the sewage treatment plant, discharged into waterways—or, worse, concentrated in the sludge.

What happens to those contaminants when the sludge is applied to the land? We don't know. Sludge fertilization concentrates a large amount of contaminants in a very small space. Farmers can use lime to maintain a pH balance that binds the toxins in the ground, keeping them from moving up to accumulate in plants and the animals that eat them, or down to accumulate in groundwater. Ensuring the right pH balance, however, requires work and oversight, and we've already seen how people tend to respond to situations requiring effort when accountability is

negligible or nonexistent. One farmer's negligence might not cause an epidemic. But how long will isolated lapses take to add up to big problems? And what happens if a farmer moves on and no one maintains the pH balance on his land?

Our current system might be infusing concentrated contaminants into the food chain and water cycle at a rate of 108 million pounds of poop per day.

FIVE THOUSAND YEARS of history records the struggle of people and governments against ever-higher mountains of poop. As settlements grew into cities, and as food and water became more plentiful, social customs standardizing waste disposal begat laws regulating it; waste disposal technology advanced, and investment in infrastructure grew larger and larger. For the good of society, the urges of the individual came under the authority of the state. Today's infrastructure of private bathrooms, flush toilets, and sewers is the culmination of humanity's struggle against the personal and social ramifications of the urge to poop.

Our current system of sewage treatment indubitably is a drastic improvement over dumping untreated sewage into the water. That system indubitably was a huge improvement over neighborhood cesspools. And toilets indubitably are an improvement over close-stools and chamber pots. But the dissemination of modern sanitary practices isn't without some major disadvantages. The potential environmental impact is just one.

The psychological and sociological impact of the toilet is another. The toilet was designed to implement the Victorian mandate for fecal denial. Disseminated as a convenience and aid to hygiene, it is still an apparatus of ideology. The toilet and the bathroom conceal the sight, sounds, and smells of poop, making them everyone's dirty secret. Consequently, contemporary culture is a culture of fecal confusion. Everyone knows that everyone poops, but everyone poops using apparatuses designed to create the appearance that no one does. Our infrastructure makes invisible what our bodies make universal. A tremendous social contradiction is the result.