## THE STORY OF SHIT

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# **Do-It-Yourself**

Humans are makers. They take pride in it. *Homo faber*. See them beaming beside their successful homemade cakes, the chicken coops they built themselves, their own begotten offspring. The writer eagerly plants his signature on the latest way to line up a hundred thousand words in a row. *His* way. Another addition to the structure of reality. A tower, a legislative bill, a football goal, a quarrel: humans make them. And all those creations make us human.

But the eagerness with which humans show off their handiwork is more than equalled by the secrecy with which they treat the speciality of their backside. Yet it's a wonderful product, the most homemade of them all, a top-notch solo performance. You'd be tempted to take out a patent on it if you didn't already know how little demand for it there was. The first person to see commercial value in it nevertheless was the Italian artist Piero Manzoni. In May 1961 he sold his faeces at a local gallery in 30-gram tins, neatly labelled in four languages as *Merda d'Artista* (artist's faeces). Each of the ninety tins was numbered and signed. One of them was auctioned at Sotheby's in 2007 for 124,000 euros—three thousand times more than the fresh merchandise cost in 1961. Even your most individual faecal statement doesn't bring in that much. Do artists really defecate so much better than you do? Of course not. But you have to be an artist to elevate a turd to the level of art.

As far as that's concerned, anyone can call himself an artist. A turd is the most democratic of all works of art, but that doesn't make it the simplest. Compared with the miracle of creating a full-blooded piece of excrement from a hamburger with fries, the transubstantiation of bread and wine into flesh and blood on the altars of the faithful is a magic trick for children's parties. Go ahead and try it. Bring home a hamburger with fries and you'll end up with an honest-to-goodness homemade human turd. Throw in a kitchen full of pots and pans, the most expensive chopping and kneading machines, *Escoffier* and *Julia Child*, but without the mechanics of our entrails you won't get very far. Even the top of the top chefs has to acknowledge the superiority of his own intestines.

Can shit be made without intestinal intervention? Nothing could be easier, or so you would think. Progressive schools and mischievous uncles encourage children to make turds out of moistened gingerbread. The result is just as feeble as the joke products from the party store. Nappy manufacturers who want to test their products under odourless conditions resort to substances like mashed potatoes, peanut butter or pumpkin pulp, but that only makes the muck worse. The American firm Kimberly-Clark switched to fake faeces made of cellulose powder, wheatgerm, resin, colouring agents and water. In Japan, Toto tests its toilets with artificial turds made of miso paste, a mixture of fermented soy beans, rice, and salt. Here the work of our intestinal bacteria is replaced by yeast. But it's still pretty rudimentary.

It took until the turn of the century before an artist produced

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artificial faeces with the help of intestines-albeit artificial intestines. In the year 2000 Wim Delvoye (1965) launched his Cloaca in an effort to imitate digestion. The machine consisted of six large retorts, connected by tubes and computer cables. It reproduced the processes that take place in your body. Three times a day, food prepared by a top chef was fed to the contraption via a funnel. By way of thanks, it shat a well-formed turd every day that in many respects could hold its own against one of yours or mine. For roughly a thousand dollars art lovers could take a sample home with them, not in a tin but in transparent plastic, so you could be sure you were getting your money's worth. It still seems expensive, but the Belgian artist did achieve something that no one before him had succeeded in doing. A turd from *Cloaca* wasn't waste material-collateral damage. It was the actual product. That's what it's all about. Unlike many other scatological artists, Delvoye didn't just make art from shit; he made shit art from artificial shit. The success of the Cloaca Original led to a series of new models in which the tempo of a single digestive cycle was stepped up from forty hours to six, making it possible to coordinate the completion of the cycle with the gallery's opening hours. Fortunately, many of the models have retained human characteristics. From time to time a Cloaca will release farts through its exhaust pipe, and occasionally it gets the runs. Probably something it ate. The botched turds are not sent to the rubbish bin but are properly transported to the toilet by a gloved assistant and flushed away.

How do you make a good turd? With care, experience, love, pleasure, and of course with intuition. But what you mainly need is luck. If your luck is bad, nothing will turn out right, no matter how hard you try. It's just as if you had no influence over the process at all. Cookbooks can really let you down. All they're interested in is the pleasure you enjoy immediately after every bite, so that the ultimate satisfaction loses a lot of its lustre the following day. Rarely, if ever, do restaurant reviews report the long-term effects of a particular meal. A restaurant can easily get three stars from Michelin for a menu with such an unhappy ending that yesterday's gourmet finds himself with an anal hangover today.

Many a dinner party has ended in a disappointing little turd. Cooks don't take our intestines into account, just as intestines weren't made with cooks in mind. Cookbooks are collectively responsible for the bad smell of human faeces. Pans and intestines compete with each other. Pans take over the work of the intestines to a large extent. Cooking is predigestion. Instead of tough meat and indomitable turnips, the intestines are served a predigested mush consisting of partially broken down muscle protein and plant cells that have been boiled to death. When cells come in contact with boiling water and hot fat, their walls burst open and the tightly entwined protein chains are loosened; the resistance of the tough tendons in braised beef is broken by acidic ingredients and simmering. What ends up on our plates is as predigested as the dollops that nestlings are fed, vomited into their beaks from the crop of their mother.

If you're looking for the ideal excrement, the artist or the cook are not the ones to consult. Go instead to the butcher. Butchers make sausages. Once you get them past your molars, sausages have little to offer; the turds they produce are just as nondescript as those that come from other meats. But when they're still in the shop, the racks full of sausages resemble a festive prelude to a Miss Turd Pageant. They hang there gleaming with pride, stuffed to capacity, and hoping for a trophy for the best mettwurst, a gold medal for salami, an honourable mention for genuine Thüringer Bratwurst. Amidst beer and obscene comments the prizes are awarded. The gratifying results later appear in the village newspaper, and the neighbouring pigs are less certain than ever about their future. Yet making a prize-winning sausage is not the most challenging job for the butcher. You learn to make sausage at the butchers' vocational school; all the necessary ingredients are for sale. In their own toilets, however, butchers are as much amateurs as everyone else. No diplomas hanging on those walls. You either can or you can't. But when it comes to the theory the butcher is definitely at an advantage. The physical resemblance between sausage and turd is not accidental.

How do you make a sausage? The same way you make a turd: with waste. For a good sausage you need good ingredients: remains of muscles, bits of lung, scraps of liver, blood, brain fat, everything the butcher deems too distasteful to be sold and too expensive to be used as dog or cat food. As the old saying goes (indelicate as it is accurate), buy a sausage or take a widow for a bride, you never know what's been stuffed inside. Good waste is still an oxymoron. To make it easier to process, and to hide it from overly sensitive eyes, the remains of the cadaver are ground up by the butcher with the help of a mincer or a cutter. This is the first step in artificial predigestion, and it saves our teeth a lot of work.

After spices are added, the discarded meat is mixed and kneaded into a mass that already bears a suspiciously striking resemblance to the contents of the turd it will eventually become. What's in it? A turd is made of shit. Shit has to meet the same kinds of requirements that sausage filling does. You have to be able to squeeze it out of the same kind of tube that sausage filling is packed into. The most striking resemblance between the two is the colour. In both cases there's something objectionable about it. To make things easier, these nebulous, rather gloomy tints are summed up in the word 'brown'. In many respects brown is the lowest of colours. In practice, brown is usually what you get when you rinse paint brushes used for several different colours in the same pot of turps. Even the cheeriest of colours are no match for brown. It's a colour graveyard. What this says about those rare periods in history when the colour was in fashion—the 1970s, the second half of the nineteenth century—is something I'll leave to the cultural pessimists.

Brown is offal. 'Offal' refers to animal waste, the chopped-up entrails and internal organs that was the food of the poor in earlier times (hence the expression 'eating humble pie'). Today the butcher uses offal in sausages, which accounts for the poo colour. The brown of both shit and sausage began as red. Shit owes its colour to red blood cells, whose job it is to circulate oxygen with the help of red haemoglobin. There's hardly any blood in sausage (with the exception of blood sausage), so there's little red blood pigment. But when the meat in the sausage was still muscle tissue it was also responsible for transporting oxygen. Instead of haemoglobin, a muscle uses myoglobin, which becomes just as red in the presence of oxygen, and for the same reason: the active part of the molecule that binds oxygen, the haem group, makes it turn red. This is where the iron can be found that you have to eat to keep from becoming anaemic.

Blood cells don't live forever. After more than a hundred days of tearing through the body, absorbing oxygen and releasing it, absorbing and releasing, absorbing and releasing, they get old and tired of life and are finally broken down by the spleen and the liver. Usable parts, like iron, are processed into new red blood cells, and the remaining waste, along with the bile, is sent on to the small intestine. The red colour is gone by then. In the small intestine the waste turns yellow from bilirubin. Bacteria convert it into urobilinogen, which oxidises into stercobilin and gets darker and darker as the concentration increases, until it leaves the body. But it could have been even browner. A lot of the bilirubinogen is transported to the blood early on through the intestines and put back into circulation. So some of it travels through your liver, bile and kidneys and ends up in your urine. The yellow in your urine comes from the same substance as the brown of your faeces, although (to make things more complicated) it has a different name: urobilin.

If all goes well, a sausage is completely eaten before the myoglobin is broken down into its constituent parts. Yet it doesn't take long for a slice of sausage to stop looking fresh. While a healthy, living muscle may be a cheerful red or pink thanks to the presence of oxygen, once it leaves the cow or pig and ends up as dead meat in the sausage only the exterior molecules continue playing the old trick of making red oxymyoglobin from purple myoglobin, and then only for a short time. Inside the sausage, the molecules use the small amount of oxygen that has worked its way in to make their iron atom rust, with the expected result: rust brown.

Brown is the colour of decay and mortality. Bruise a tree leaf and it turns brown, just like withered flowers, rotten apples and bad teeth. Substances that are no longer responsible for the continued existence of leaf, flower, apple or tooth, are broken down into complex compounds that absorb light from every possible point on the spectrum, and in so doing they reflect only brown light. All that death ultimately ends up in the earth, which consequently is also brown. And although all of life emerges from the soil—the green leaves from the brown branches, the green alpine meadow from the brown mountain—the first thing we associate with brown is death, the first thing we associate with the earth is the grave.

You can't go any lower than brown, which hasn't done much to raise the prestige of shit. How different the world would have looked if we all shat sky blue! Every now and then (certainly not every day) it would be nice to produce excrement of a more festive shade. To get this result you'd have to mix the necessary pigment with your food, pigments that don't lose their colour along the way. For a celebratory red turd you'd eat red beets with crimson berries, washed down with red wine. Consume the meal one or two days before the party, to give the pigment the required head start. You get yellow turds from rhubarb. You can also use senna leaves, but don't forget that senna is a laxative.

Black shit is easy to achieve, with the help of activated charcoal. I've produced white shit only once, after a lower GI series using liquid barium sulphate for contrast. Yet when I was a child, white shit seemed perfectly normal—for other people. If white people like me pooed brown, then brown people must poo white, or so I thought. Now I know better. Birds often shit white. This is due to white crystals full of uric acid, by which a bird is able to get rid of its nitrogen with minimal loss of water. Penguins alternate their white shit with a cheery orange variety, which comes from a heavy diet of lobsters. Flamingos themselves turn orange or pink from eating lobsters; penguins apparently don't want to attract too much attention in the middle of all that white snow and ice, and they excrete the lobster pigment in plenty of time.

Even bears reveal what they've been eating in the colour of their excrement: blue after blueberries, black after meat and brown after acorns. This results in a whole palette over the course of a year. Artist Gary Blum made use of this, but with geese.

I collect the droppings, dry them in a toaster, and then crush them into a powder. When making the pictures you can't be too timid. I do get my hands right in there, but after the poop has been baked, it really doesn't smell. Each picture has four different colours of poop, which vary depending on what the geese eat. Dark brown is usually available in October-December, and is the result of the geese eating the tender roots of plants after the farmers have turned over the fields. The lighter colours are usually the results of eating grains.

Since 1994, when Goose Poop Art came on the market, Gary Blum has sold thousands of pictures.

In daily life, there are subtle variations in the browns found in chocolate and coffee. In the case of shit, too, the colour has a lot to do with the amount of milk that's been added. If you want to know whether there's sugar in your coffee you have to ask, but coffee with a lot of milk, or a little, is easy to spot. Milky shit is more yellow than pure shit. That's why baby poo is so light. Marie-Antoinette was so enthusiastic about the poo produced by her son, the dauphin (the crown prince), that she launched a whole yellow-green fashion under the name *caca de dauphin*. Later, many an English country estate was painted this poo colour by order of the National Trust in order to give it an authentic French look. As people grow older, the colour of their excrement changes along with the

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alterations in their eating patterns. Vegetarian poo usually stays light brown, but carnivores intensify the brown of their own discarded haemoglobin with that of the remaining myoglobin from sausage and steak. Lovers of blood sausage even manage to produce black turds with the help of the alien blood they consume.



In The Garden of Earthly Delights by Hieronymus Bosch (1450–1516) the fruits of the intestines are plucked like roses.

One big difference between sausage and shit is the smell. A pinch of spices may be enough to mask the sickly stench of the meat scraps in the sausage, but it won't work in your faeces, even though there are spices that can travel through the intestine without losing their fragrance. Thanks to the tenacity of allyl sulphides and vinyl sulphides you can always smell the onions or garlic you've been eating when you go to the loo. The odours of some foods fade, while others intensify. No matter how delicious the food may have smelled, once it reappears to greet the light of day it stinks to high heaven. The reason for this is that your intestinal bacteria have salvaged the amino acid tryptophan from the proteins in your food, which further decomposes into the notorious skatole. Skatole is the substance that makes shit smell like shit, and even makes you recoil from a turd that has long since been flushed away. Legend has it that the researchers who untangled the chemical structure of skatole in 1877 had to work far away from their laboratory colleagues, and that their white lab coats were later incinerated. An impact like that almost has to have been deliberate. Skunks actively repel attackers with their stench, and in much the same way our faeces keep other people at a distance in order to discourage the spread of disease.

As in the case of a volcanic eruption, it's the accompanying gases that make the biggest impression, no matter how much the shit itself may stink. That's because it's easier for gases to find their way to your nose from far away. The most feared gas is hydrogen sulphide, better known from stink bombs, which is distilled from sulphurous amino acids by the intestinal bacteria. The worst stench can be avoided by eliminating beans and cabbage from your diet and cutting down on meat, since meat contains a lot of tryptophan. Lowering your consumption of alcohol and pepper also helps. Alcohol and pepper throw your intestinal flora into overdrive, so they ferment even more rapidly. As far as odour is concerned you're better off fasting, in which case you end up shitting mainly intestinal pigments and other bodily residues. They don't smell bad. But in doing so you strike at the very heart of a turd. '*Was wäre Dreck*,' Luther wondered, '*wenn er nicht stinkt*?'—What's filth if it doesn't stink?

What kind of sausage is it? Does the turd meet every expectation? You don't know that until the sausage has been sliced, or the turd shat. Is it too hard, too soft or just right?

If sausage filling is too thick you won't be able to stuff it into its casing. The preferred material for such a casing is a real intestine, which

breathes and stretches along with its contents. This intestine may come from the same animal that produced the meat scraps. Thus in the pastand to add insult to injury-many a pig was stuffed up its own backside. These days, most pigs are permanently separated from their entrails right after being slaughtered. While the actual animal is being processed into meat, its intestines are washed and sent on to the sorting plant. In China there are enormous factories that process ten million kilometres of pig intestines a year, good for about five million kilometres of sausage. Sheep intestines are 2.5 centimetres in diameter, only half as thin as pig intestines, but they make much better frankfurters. Back in the country of origin, the intestines are filled with scraps from a subsequent generation of animals. Naturally they don't have to come from the same family, and often they belong to an entirely different species, an intimate entanglement that suggests a kind of bestiality. And then you have intestines that are filled with intestines, but for such a perversity—the *andouillette*—you have to go to France.

Ultimately, the pig in sheep's clothing, or the sheep in pork casing, reaches the casing of our own human intestines. Quickly stripped of their sausage skin and surrounded by nothing but human bowels, the meat scraps inch their way through the small intestine, the large intestine and the rectum until they reach the exit. Now the big difference between excrement and a real sausage comes to light. A turd makes its appearance stark naked. If a real sausage were to do that it would immediately fall apart. Without an outer casing, soft sausage filling loses its cohesion, unless you've fried it to form a hard exterior crust. Then you end up with a croquette or a meatball. But that wouldn't work in our bodies. If you were to fry the turds in your body you'd fry your intestines along with them, and that would destroy them. The temperature of a healthy body is never more than thirty-seven degrees Celsius, so that's the temperature at which a turd is served up. Consequently, a turd reflects the temperature of the body's inner sanctum. That's actually the normal method for taking

an elephant's temperature; inserting a thermometer into a fresh elephant dropping is easier than inserting it into one of the animal's bodily orifices.

Without crust or casing, a turd depends entirely on its own cohesion after leaving the body. But while it's easy for butchers to add less water to their sausage filling, there's almost nothing they can do to thicken the content of their own faeces. The tap is located in their insides, where they can't get at it. Actually, the reabsorption of water in the intestines is mainly regulated by the tempo of the conveyor belt. If the belt speeds up, there's less time for the water to be absorbed and the end product tends towards diarrhoea. The term 'the runs' is particularly apt in this regard. Excessive speed is usually just what is called for, since contrary to what is generally assumed, diarrhoea itself is not the problem but the solution. If the intestines think the wrong thing has been eaten, they'll want to get rid of it as fast as they can, at the cost of consistency. A great deal of water has to be removed to produce a good firm turd. But a minimum of fluid does not in itself mean maximum cohesion. Filling that is too dry just crumbles like sand. The particles have to stick together. That's why butchers add a binding agent to their sausages or stir an egg into the mince. In their own intestines they don't have to add anything at all. The intestines make their own binding agents from the products resulting from the breakdown of proteins in our food. Lubricants are also produced, to keep everything moving smoothly and to prevent disintegration. But thickening, binding and lubricating alone won't get you very far. You still run the risk of ending up with a long tube of brownie dough that gums up the whole works.

Wouldn't we have been better off with a casing or crust around our turds? The shit produced by young songbirds comes out in a little sack, which is tidily carried off by the parents. Elsewhere in the animal kingdom, among the insects and the crustaceans, the principle of casing and crust has been a great success. Inside its armour, a beetle or shrimp is as safe as a snail in its shell, a sausage in its casing, a croquette in its crust. But that wouldn't work with an animal as big as a human. If our skin was all that held us together, we'd implode like a beanbag with the first bit of pressure. Instead of an exoskeleton, like that of the wasp or the sausage, we have an endoskeleton. Inside our bodies is a hat rack of bones on which all our organs can be hung. Flay a man and the cohesion remains unharmed; a casing isn't necessary. In this respect, a human being is the opposite of a sausage. A sausage cannot do without its casing because all the bones have been removed from the filling. Bones in your sausage are bad for your teeth. But bones in your turd would do considerable damage as well, especially to your delicate intestinal wall. So instead of bones, a wise turd contains fibre to serve as its skeleton-something it cribbed from the plants. Plants also manage quite nicely with fibre instead of bones. Intestines produce good, sturdy turds from the plant fibre in food. You eat not only to please your taste buds but to please your backside as well, and both ends make demands that comply with the Biblical injunction 'Render unto Caesar that which is Caesar's and to God that which is God's'. Unfortunately, the commandment seems to have lost some of its force. Belly and chest get their share—and often more than that—of well-cooked, refined, fibre-free edibles, but gut and anus can't count on any fibre from a fast-food diet.

There isn't a bit of straw left in the turd for the shit to hold onto, and it has no choice but to slide out the backdoor.

For an example of how beautiful an old-fashioned fibre-turd can be, take the horse. How glorious it must have been to be a coachman back in the day and to watch from the box as the noble animal lifted its tail, brought forth great masses of excrement neatly bundled into little bales, and then, without any wiping, piously shut its equine arsehole like a virginal oyster. Thanks to the horse's body, which can manage quite nicely with a portion of its feed, there's more than enough building material left over to produce a pile of manure. An elephant goes one better. Despite 25 metres of small intestine, 1.5 metres of appendix, 6.5 metres of

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large intestine and 4 metres of rectum, half the elephant's food goes undigested. Its droppings know a trick that your turds don't: they float. Turds tend to sink as a rule because, like all other organic tissue, they're heavier than an equivalent volume of water. But when fibres are excreted

their bacteria keep emitting gas, which makes them act like built-in swimming tubes. The strict vegetarians among us also have turds that float, although they only notice it when they use a toilet that contains plenty of water. An extra large quantity of bacteria advance on the undigested fibre in their rectums, giving their excrement the light yet cohesive quality of a particularly successful doughnut. In certain parts of Africa where the human diet is heavy in fibre, the people shit up to four times as much as we



X-ray of the large intestine. The contents have been made visible with the use of barium.

do in the form of lovely, upside-down toadstools, which float along gracefully and impart a cheerful look to a village built on the banks of a slowmoving river.

A turd's cohesion determines its length. The softer the shit, the shorter the turd; in the case of diarrhoea length isn't even an issue. You could try to produce a really long specimen if the intestinal content were good, but you'd have to have a well-developed pushing technique and lots of patience. It would be more comfortable to divide a single portion into several turds, like a butcher getting a whole string of sausage links out of one long intestine. It's all a matter of pinching. Sometimes, however, you have no choice, and the shit decides on its own whether it's going to be a bowlful of sludge or a pile of pellets. For other species of animals that choice is permanent. Instead of one continuous turd, a rabbit can shit up to five hundred pellets a day. Deer do the same, but in their case the pellets are bunched together like gigantic brown raspberries. You can tell how much an insect shits by studying caterpillars that live together in one big cocoon. Once the caterpillars have turned into butterflies and flown away, their black droppings remain in the cocoon. In a small woodland, all the caterpillars together easily shit half a tonne per hectare. The little piles of sawdust that are shat out by woodworms are nothing in comparison. But those who fail to heed this warning will eventually find themselves minus a roof beam—or a cathedral.

You can tell how much a person shits by weighing it. But how do you weigh your own excrement? There are two methods: a yucky one and a tidy one. For the first method you simply shit on a set of scales. A handier way is to weigh the shit while it's still neatly tucked inside your body. Then go to the toilet and weigh yourself again when you're finished. The difference is the weight you're looking for, and it's bound to be gratifying: easily half a pound, a block of butter. But sometimes all you get is about a hundred grams. An average of 175 grams is fine.

For the sake of convenience, let's say the specific gravity of shit is equal to that of water—one kilogram per litre. So an average amount has a volume of 175 mL. At a diameter of 3.5 centimetres, you end up with a length of 18 centimetres. In terms of daily bowel movements that's 125 centimetres a week, 65 metres a year, 5 kilometres a lifetime. If you shit 175 grams a day, that's 65 kilos a year. But even the best shit machine breaks down every now and then, and there are days that you don't excrete at all. A good rule of thumb is 50 kilos. In order to produce that in one year you would have to eat a thousand kilos. That's 1:20 for a human being. On average. The variation is enormous. Sometimes all you produce is a mouse dropping, and sometimes the toilet bowl is so full you think you can actually feel the top of the pile brushing against your arse. The size of the biggest human turd will always be unknown as long as no contests are held. Boys try to see who pisses furthest, not who shits the most. We know what you'd have to do to win such a shitting contest. You'd have to increase the water content. You'd have to pump up your turd with water like a battery chicken. But then there's the danger of diluting it and causing diarrhoea. If you take a good solid turd with a 20 per cent dry matter content and water it down to 10 per cent, you'll have shit coming out of your ears like bouillon. You have to bind the water, with fibre. In order to produce a winning turd, the idea isn't to drink extra water—a healthy body has enough water on board—but to eat extra fibre. The fibres swell with water and your turd becomes both thicker and heavier. You shit more, even though you eat less.

This brings you to a revolutionary idea: can you shit yourself thin? Is there anything like a shit diet? It sounds attractive. Ordinary dieting is no good. It only makes you hungry. Hunger makes you eat, and eating makes you fat. Why not do the opposite: don't put in less but take out more? If you defecate four times a day instead of just once, you'll lose four times 175 grams = 700 grams, which is 5 kilos a week and 20 kilos a month! Within a year you'd have shat yourself from the face of the earth!

A living advertisement for the shit diet is the Dutch writer Maarten 't Hart, skinny as a rail all his life and an inexhaustible shitter:

When I was in nursery school no one wanted to sit next to me on the bench because, according to my classmates, I 'let such awful farts'. Sadder still, I had to keep going to the toilet to do what they called a number two. But at first Miss Dekwaaisteniet refused to believe that after going out for my first number two I could feel a second one coming on only half an hour later. 'You've already had your time on the pot!' she would shout incredulously. So I'd try my best to hold it, but usually that didn't work and I'd end up 'doing it in my pants', as my mother put it so expressively, and sure enough, a terrific stench would make its way through the Dam School. I can see it all before me as clear as day, my classmates leaving off from their cutting, pasting, and colouring activities and pointing their accusing fingers in my direction. It wasn't unusual for the girls to burst into tears.

And that's the way it's always been. 'Having to do a number two six or seven times a day probably accounts for the fact that I've always weighed 76 kilos, even though I can dig into my meals with both fists,' Maarten 't Hart writes with satisfaction almost sixty years later in *The On-Deaf-Ears Diet.* 'I can eat anything at all, as long as it makes me shit.' 't Hart is naturally gifted, but it shouldn't be that difficult for an ordinary person to go to the loo more frequently. There are pills for this purpose—or stew, or coffee. But you can't keep it up very long. One look behind you and you'll understand the reason why. A runny mess. You'd be losing water instead of calories. There's scarcely any extra shit to be got rid of from a single meal. At the very most you dilute it, like orangeade with water or whisky with soda.

Your intestines are just too smart for you. Laxatives put them into overdrive, so they don't have time to absorb the nutrients that make you fat. But they also don't have time to reabsorb a sufficient amount of water, so you end up with diarrhoea. The only thing left is to get older. In old people, the papillae in the intestines that absorb food get worn out, so that more food is transported unused. That's why old people are often so thin. But you also have people whose intestines work too well, which makes them fat. They gain weight 'just by breathing'. That's not necessarily their own fault. It often has to do with their bacteria. Some of these bacteria convert the waste product ( $CO_2$ ) from other types of bacteria into human food, which is then absorbed in the large intestine—handy in times of famine but disastrous in our age of milk and honey, if you're already on the heavy side.

Those who do see something in the poo diet are guilty of misjudging

their intestinal tract. Its job isn't so much to get rid of things as to absorb them. When the intestines are working well, they absorb so many nutrients that there's hardly anything left to excrete. The excretory organ par excellence is the not the intestine but the kidney. It gets rid of really superfluous and harmful products like table salt and protein waste. You hardly lose any weight at all through your kidneys. What you pee is mostly water. A pee diet is as senseless as a shit diet. If you were to try to pee a kilo off your body weight, the once proud and mighty stream would soon dwindle into increasingly scanty drips until even the hardest squeezing wouldn't help. The salt in your body jealously retains fluids. Your kidneys are too smart for you, too. So is our body always out to get us? Who knows? But you can always fool it—with fibre again. Whatever food may be found in fibre is almost impossible for the intestines to get at, but they do get tricked into thinking they've had a good meal. As long as the stomach and intestines are full, you don't get hungry, and both the intestines and their fat boss are satisfied. The best way to lose weight is by eating hay. It comes out no different than it was when it went in, unopened return mail, like a nun in heaven. But not even the worst glutton has a hankering for hay. That's why we give hay to the cows, who know what to do with it better than we do. But we turn the cows into roast beef, which our intestines do have a taste for. Your best bet is to have a roast beef sandwich on wholewheat bread: the roast beef for your taste buds, the full grain for your bum.

A well-filled stomach makes for good shitting. If the filling turns out well, you can work it into any shape, as every butcher, every baker and every biologist knows. Shape is what a good turd has over such amorphous secretions as snot or ear wax. And the best shape for a turd is the worm shape, which it naturally assumes from the intestines that produce it. Intestine and turd fit together like a biscuit in its tin, an underground in its tube, a mole in its tunnel. We can thank our lucky stars that our turds don't clear a path to the exit in the shape of a cube or a garden rake.

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Like a train, a worm-shaped turd, no matter how long, needs no more than a narrow tunnel. If the first carriage can get through, the rest of the carriages will follow. Both carriage and turd keep their shape throughout the ride. The last section of intestine, the rectum, is as straight as its name— Latin for 'straight'—suggests. It's only when they nestle into the toilet bowl that they assume the elegant spiral shape of a cartoon turd. With its pointed tail standing straight up, the turd looks as if it had been pulled through a ring. And in fact it *has* been pulled through a ring. The anus.

It can be tempting to see your own turd as a living animal. For those who gaze with tenderness on their offspring, nothing looks more like a litter of sleeping puppies than four turds, intimately curled up together.

What a turd lacks in order to be numbered among nature's living creatures, besides four legs, is reproduction. There are no male and female turds. Never has anyone ever seen turds clasped in a loving embrace by the light of a full moon in an effort to make little droppings. Turds can divide, but the halves don't grow to reach the original dimensions. The fact that there are turds at all is only because their manufacturers themselves manage to reproduce.

And yet a turd lives. It's bursting with life, like a reef full of fish or a rainforest full of monkeys. In every gram of shit there are more than a billion living bacteria. Together with their deceased family members they form half the poo's volume. If you could hear the life in your turd, you'd be listening to the deafening noise rising from a hundred billion little throats. The reproduction that the turd itself does not exhibit is more than made up for by that of its residents. As long as the monster stays warm—watch it steam!—they'll divide a couple of times an hour.

You'd hardly dare wipe your backside if you knew how much it was teeming with bacilli. But then you wouldn't dare eat any sausage, either. A sausage is also crawling with microorganisms, externally and internally, not ones that accidently dropped in but ones that were deliberately planted there. The butcher adds lactic bacteria to the sausage to attain the right acidity and staphylococcus bacteria (known from boils) for flavour. That white layer on the sausage is exactly what you were afraid it was: mould. Bacteria, moulds and other microorganisms have already started eating. Biologists call it rotting, but butchers prefer to speak of ripening. It's good work. These microorganisms make sausage taste better, and they make the gut healthier. Gut bacteria are the little gnomes at work in your tummy. They diligently clear away poison, knock together vitamins and dig new mines in yet undigested fibre.

In addition to *Escherichia coli*, the ultimate in intestinal bacteria, there are hundreds of other varieties that usually have better things to do than make you sick. The most useful thing about these good bacteria is just that they're there. The presence of a good bacterium means the absence of a villain. But evil always finds a way, especially if it streams in in torrents. That's how holidays get ruined. The *E. coli* bacteria living in the water in holiday resorts abroad have a slightly different appearance, reason enough for our xenophobic intestines to erupt into cramps. So instead of seeing the sights you make repeated visits to the toilet, or what passes for a toilet in that particular country. A third of all tourists spend their first week in the loo. Only after several rounds of flushing does your intestine recognise the weird strangers as family, and peace is restored. Couldn't our intestines have behaved more hospitably from the start? Perhaps, but people who have overly hospitable intestines usually succumb to an infectious illness sooner or later.

Of course it's important to fight pernicious bacteria. But excessive hygiene is counterproductive. You end up killing the robins and the sparrows of your own ecosystem along with the rats. And a total extermination of all the mischief-makers isn't possible anyway. Better to strive for a good balance by leaving it up to the lodgers themselves. They have more knowledge of this than you do. They live in a balance that was achieved during your first years of life, a balance so stable that experts can divide the intestinal flora into types in exactly the same way that blood is divided into blood groups. There are three, each characterised by the bacteria *Bacteroides*, *Prevotella* and *Ruminococcus*. Which group you belong to partly depends on what you eat. *Prevotella*, for instance, feel most comfortable in the gut of a sugar-lover.

Nothing tops a stable intestinal flora that keeps out the foreigners. But what if the established order itself is a mafia state? No use swallowing a dose of good bacteria then; they don't stand a chance. The only thing that can help is an actual transplant. You might need a transplant if a heavy course of antibiotics has wiped out your original intestinal flora, the good along with the bad, allowing a tenacious colony of clostridia to move in—with all the resulting diarrhoea and even death threats. In a transplant, a hefty portion of faeces from a healthy donor is introduced from above, through the nose, or from below, through the anus. Doctors are confident about the future of faecal transplantation. First of all, there are fewer people in need of someone else's shit than those in need of someone else's heart or liver; and, second, it's much easier to find a donor than in the case of a heart or liver; and, third, it really helps.

Bacteria are too small to be seen darting around in your shit, licking here, peeing there. Maybe it's just as well. It's all the more terrifying to actually see something white wriggling through all the brown. Optical illusion? No. Pinworms (*Enterobius vermicularis*). Just looking at them makes you itch, if you haven't had them already. At night the adult females creep through your rectum to your anus to lay their eggs. That itches. Itching makes you scratch, and scratching makes you itch. And you should be glad it isn't roundworms (*Ascaris lumbricoides*). At thirty centimetres in length they're at least fifty times bigger than pinworms—really giant earthworms. Adult females lay some 200,000 microscopic eggs a day in your shit. The larvae in their golden-brown eggshells wait in a damp corner of the big bad outside world until they're picked up and ingested by a less hygienically inclined human. That marks the beginning of a long,

adventurous journey through the human body, in which the larva hopes to be coughed out of the lungs by any means necessary and immediately swallowed down the same throat before settling in the small intestine as an adult roundworm, to fleck your faeces with eggs. Even though you can't see them.

What you might come across are little white bits in your shit. If you do, you have tapeworm (Taenia solium). What you see are the worm segments, each one packed with fertilised eggs. At ten segments a day, each one good for 100,000 eggs, you easily arrive at a million. The worm won't miss them because it has thousands already and makes them in its neck as quickly as it releases them from behind. The tapeworm doesn't need a mouth or intestine to eat; it feasts with its entire body surface on the half-digested manna around it. Supposedly this makes you lose weight. At one time it was the fashion in Hollywood to treat yourself to a tapeworm. It wasn't expensive. You simply ate a raw or undercooked piece of intermediate host: ground beef with pig tapeworm for the Christians, steak tartare with beef tapeworm for the Jews, and a lick from a dog full of canine tapeworm for the vegetarians. People did indeed lose weight, but that was mainly from the diseases they contracted. Tapeworms secrete harmful substances and can block the intestinal tract with their bodies. If you remained healthy with such a worm inside you, at most you'd end up eating more, just like pregnant women eating for two.

As notorious parasites, intestinal worms have long been regarded as degenerate. While cautious animal species living in the open air climbed up the evolutionary ladder step by step, the worms in our intestines neglected both their behaviour and their entire anatomy because they didn't need them for the cushy existence they were living. Blind, deaf and toothless, they just hung around in the tepid warmth of the gut. Actually, if you're going to be a burglar and a freeloader you've got to be very cunning. Compared with a predator like the wolf or the lion, parasites are extremely sophisticated when it comes to putting food on the table. Running stupidly after their food, aggressively swinging their claws, murdering and terrorising are not their approach. Instead of killing the goose that lays the golden eggs, both parasite and host spend their whole lives eating together. But in order to do that the parasite has to find a way to get inside the host, often in the guise of an unrecognisable stage in its life cycle, and then to stay put, despite safety precautions like an elaborate immune system. How does such a flawed animal manage to survive in someone else's body despite its increasingly striking dimensions? That's something you ought to know very well. After all, you did it yourself, years ago, for nine long months.

Checking for worms is a good reason to take a look behind you before you flush. If anything's wrong you should see your doctor, and take your faeces with you. It will involve a lot of fumbling with pots and spoons. How do biologists manage with animal shit? They just scoop it up, often with their bare hands. Most animal turds are remarkably dry and clean. Those made by predators are sometimes like perfect cigars. Usually there's a pointed tip where the cigar and its maker parted company; in the case of the fox there's a wisp of fur furnished with a festive tuft.

Pellets, turds and pats are the turds produced by herbivores as a rule. A cursory inspection confirms it. The fibre turns the whole mass golden brown, and sometimes it even contains cheerful orange, red or purple berries, which accounts for the not unattractive sweet scent. Pellets come in many different sizes. Pellet no. 1, with a 5-millimetre diameter, is made by squirrels; no. 2 (10 millimetres) will have been the work of a rabbit, since no. 3, 20 millimetres across, comes from hares. Rabbit pellets lie together on raised areas.

The turds of insectivores do credit to their name. They're full of wing cases, legs and other parts of the prey. A good example are the turds of hedgehogs. There are very fine insect bits in the excrement of bats, often piled up under the places where they sleep. Many mammals have anal glands near their anus which give each turd an individual stamp, like the production number on a cheese or a radio. That message is not meant for human noses. Yet we can sometimes tell what kind of animal produced the turd by its smell. You don't have to look to identify the shit of fish eaters, for example.

The hardest ones are the birds. The formlessness of their faeces gives us little to work with. Yet there is a certain structure in their shit and pee combination. Often the shit is like a dark yolk in a runny fried egg, sitting in the midst of the egg-white urine. To identify the species you can look it up in What Bird Did That? by Peter Hansard and Burton Silver. In addition to photos, the authors provide detailed descriptions of excrement based on a main division of splerds, sklops, sploods, schplutzen, and schplerters. A sklop, for example, has a 'small, clearly defined envelope and nucleus of roughly equal proportions. No tendency to lobe.' Schplerters, on the other hand, are 'large [with] multiple extended and detached lobes', and they're splash-shaped. The best place to identify these types is on the windscreen of your car, which offers a good, smooth surface. A more comfortable place for bird-watching doesn't exist. Nor can it get any simpler. After a bit of practice you'll be able to identify 'an extended sklop with an attractive cloud-like appearance' as the 'moist, loose, fragile' splotch of the blackbird, certainly if the grains that are its regular feature are not located in the nucleus but in the envelope. In season, the rather loosely formed schplutz of the song thrush can mainly be identified by the 'bright streaks and flecks' that berries and other fruits have left behind in the creamy goo. All this comparison with white sludge (and its occasional crunchy bits) puts you in mind of popular dessert puddings. In his book Merde, leading scatologist Ralph Lewin doubts the accuracy of this approach:

Although this booklet [*What Bird Did That?*] is certainly among the most entertaining of all the works cited here, one is led to question the authenticity of the information in contains. (Healthy

geese, I know, do not make splattery splotches like those they have illustrated, and many other entries, though perhaps more plausible, are equally suspect.) However, as an amusing item for coprophile-bibliophiles the book is to be strongly recommended.

Personally my suspicion was mainly aroused by the introductory pages and the material in the back of the book, where literature like A. Crichton's *The Chinese Hat Method of Splay Collection* is included, and successors to *What Bird Did That?* are announced, such as *What Toad Did That?*, *What Camel Did That?* and *How Do You Know It Wasn't a Dromedary?* 

As so often happens, nothing beats observation and research. The problem in this case is the short lifespan of the material. Faeces are made to decay as soon as possible, otherwise the world would be a much less attractive place to live in. If they don't get eaten, they shrivel up, dry out and discolour, thereby losing their value for the researcher. Serious collectors have to preserve their material. In order to write his *Field Guide to Animal Tracks*, Olaus Murie collected more than 1200 specimens, dried them, varnished them, stuffed them and labelled them. For her collection, Annemarie van Diepenbeek made use of modern kitchen appliances:

Faeces have to be thoroughly dried, preferably followed by several weeks in the freezer in order to kill off any insects and microorganisms. The drying process can be accelerated by placing the specimen in a microwave oven at a low setting. Harmful organisms can be killed off by reheating at a high setting. Objects containing metal, such as pellets with bird rings, should not be heated in the microwave.

Occasionally we find that nature has already done the collector's work, with faeces that have been petrified into fossilised turds: coprolites. One of the first collectors was Dean Buckland, who identified the stones he found in a cave along the coast of Dorset in 1823 as hyena droppings. As becomes an eccentric Englishman (Buckland also studied the footprints of people with wooden legs and liked to serve his guests roasted mouse or crocodile), he was soon showing off a whole table full of petrified turds. The high point of his collection, of course, was the turd of a dinosaur. These turds tell us a great deal about what the animal ingested. The largest specimen so far is a 45-centimetre coprolite that was found in Canada in 1995 and came from a *Tyrannosaurus rex*. In it were the remains of a young herbivore the size of a cow. Collectors pay thousands of euros for a dinosaur turd. That sounds like a lot, but it must give you an extraordinary feeling to stand there with a giant turd in your hands shat by such an animal from its enormous arse millions of years ago.

More recent but equally interesting are the coprolites from our own species. The value of the most expensive human shit in the world has been estimated at 20,000 British pounds. It's the Lloyds Bank Turd found under the building of the same name, 1000 years old but in mint condition. Usually an antique dropping like that is first soaked before being spun in a centrifuge, then sifted, and then further analysed. This procedure has brought to light the eggs of roundworms from specimens more than 24,000 years old. If there's still DNA in it even the sex of the defecater can be identified. The finest investigation was carried out by Andrew Jones of the University of York. He kept eating different things until he was able to shit out a turd that was exactly like the one whose contents he wanted to discover. He had to eat a whole lot of fibre to work up a genuine Viking turd, but that didn't stop him. They still exist, eccentric Englishmen.



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