

WHAT IF WE JUST SAVE THE WORLD?

Taking Action on the Climate Crisis

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[pp. 11-17; 39-51; 74; 185-205]

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[pp. 11–17]

PART I

ACTUALLY –

I was intending to write a very different book, a thriller.

Then I thought to myself: we’re in a thriller.

You and I.

Not as reader and author.

As protagonists.

The thriller in question has been writing itself since the beginning of time, changing its title again and again along the way. Right now, it’s called Climate Crisis. Pandemic. Digitalisation. Terrorism. In the past, it was Cold War, Arms Race, and before that Second World War, First World War, Thirty Years’ War, Witch-hunt, Plague, Flood, and Expulsion from Paradise, to name just a few. New titles are constantly announced. A little taster of those to come? Super Meteorite, Rule of the Machines, Alien Invasion, or merely Overpopulation.

Germans – and we’re not the only ones, but Germans in particular – prefer crime novels to thrillers. In this part of the world, corpses and detectives are even more popular than golden retrievers and TV chefs. It’s not that we’re bloodthirsty. We just like to see a world that’s coming apart at the seams be restored to order. Unlike with thrillers, in a crime novel the escalation occurs at the beginning. Someone gets bumped off, suspects are lined up, ‘where were you last night?’, the noose tightens, showdown, case closed.

There's nothing more comforting than a good crime novel.

Thrillers work the other way round. At the beginning, normality reigns. An idyllic little world. Family, neighbours, friends. Then something disrupts it, in a sinister, inexplicable way. Order erodes, and the more things progress, the worse it gets. Ostensibly secure structures crumble, certainties come to an end, the familiar turns against us. Thrillers are about the loss of control. If Roland Emmerich's involved, they tend to end with the apocalypse. I get it. I share this delight in destroying things: it's fun to raze cities to the ground and unleash monsters on humanity. In literature and in film, it's a play with the unimaginable. How much would we be able to bear? What does the catastrophe, the downfall, do to us? Do we stay united? How thin is the veneer of civilisation; how close the human being to becoming a monster?

Finding out the answer can be entertaining, but also shocking. If you venture too close to reality, its clutch can be chilling. You may have watched the virus thriller 'Contagion'. The pandemic is contained by the time the credits roll, but the film doesn't exactly send you away with a sense of calm. Thrillers are perfidious. They only *seem* to restore order. The threat remains. In the case of 'The Silence of the Lambs', we're even able to enjoy this feeling. We may not want to meet Hannibal Lecter personally, but we do want to see him again. In real life, after all, the chance of walking into the trap of someone like him is close to zero. In Stephen Spielberg's adaptation of the H.G. Wells classic 'War of the Worlds', extra-terrestrials are the focus. Not our most urgent problem, and light years behind Hannibal the Cannibal on the scale of prospective threats, yet the film distressed many people. The aliens unleash a merciless genocide, and humanity doesn't stand a chance. The hero is, very un-heroically, on the run, and barely capable of protecting his own children. Through him, we experience total helplessness.

Why am I telling you this?

Because it has a lot to do with our present reality.

The good thing about fiction is that we can leave the cinema, close the book. Because of this, thrillers have something healing to them. The suspense can be discharged. Because we *are* under pressure. On a daily basis, we're consuming the sensitivities of an entire planet. The news is a concentrate of everything that's going wrong, so how could we *not* think the world's going down the pan? Relevant information has to be reported! But the fact is that condensing the bad news doesn't reflect the true circumstances – millions of people's lives play out in a peaceful and ordered way; a great many good things happen, and generally very little that would justify a prime-time news report. In the real world, catastrophes are diluted down by a far greater measure of normality, and there are less wars, poverty, illness and hunger than ever (albeit still too much and too many). In the media world, alarms go off without pause.

As a result, we feel that we're under constant threat: from climate change, killer viruses, refugee crises, A.I., job loss, religious terrorism, the breakdown of democracy, the rise of right-wing populism – the thriller we're living in barely resolves any of it, and this time we can't close the book or leave the cinema. We're stuck in limbo. The world hasn't yet come to an end, but nor have we been given the all clear. This intensifies the strain. Our fears outgrow the root cause. Typically, the fear of immigrants is greater in places that have barely any. Likewise, the things that threaten us don't even seem to exist. We open our front door in the morning and the sky looks just like it always does. Climate change? Where? And where are these intelligent machines that want to annihilate us? My post is still delivered by the postman, not the Terminator. There are no throngs of refugees trekking down my street. No one comes to blow me up in God's name, even though I hear again and again about it happening. There's no mushroom cloud in the sky. Coronavirus? A numbers game. I still haven't caught it, and my friends look more irritated than they do sick, but everyone knows that there are people ill with it, and that it can be fatal.

The thriller we're living in is stalling us.

This wears people down. There's one thing that's almost worse than the apocalypse: when it's repeatedly proclaimed, but never arrives. The problems only seem to multiply, and those who are responsible for solving them sign feeble agreements, only to later wriggle out of them.

So what can we do? Apparently nothing.

Who can we trust? Apparently no one.

As I write this, the second Coronavirus wave is swelling into a tsunami. In 2019, the German media was dominated by 'Fridays for Future' and Greta's Atlantic crossing. With 438,000 articles in the media, climate protection was the top subject matter, closely followed by immigration (over 430,000 articles), health and healthcare (268,000), digitalisation (235,000) and pensions (206,000). In 2020, the stats were completely different. In the first six months alone, the top place went to Covid-19 (health and healthcare) with 250,000 articles, and lagging far behind came immigration (over 143,000) and climate protection (a mere 127,000). The latter suffered more than a 52 percent loss in media presence.

Currently (as of January 2021), Covid-19 still dominates the news. The needle is stuck in the same old groove. And yet the other topics haven't gone away; they may have lost relevance in the media, but they're still there in the background. There's no psychological relief, therefore, it's just that the constant Coronavirus alarm is drowning everything else out. As prudent as it was (and continues to be, for the time being) to give the virus maximum media presence, we should still ask ourselves whether, for months on end, every talk show and every headline really needs to be subjected to this monothematic. There's no doubt that the monster is big. In the media, it has become overwhelmingly so, pushing its way to the foreground at every single second, and this may have contributed significantly to Corona-fatigue. It would have been nice to hear about something different for a change, except: 'Hey, let's talk about refugees and the climate crisis!', wasn't exactly suited for bringing comfort. We longed for something nice, but there wasn't anything nice. Old people grew lonely and isolated in

quarantine. Many died. Entire industries were plunged into crisis. Millions feared – and still fear – for their jobs.

The nicest thing available was Netflix.

But how much thriller can a person tolerate if Dustin Hoffman doesn't come around the corner with the vaccine?

And so climate change fell behind. For all the progressiveness of our species, we're simply not designed, in an evolutionary sense, to give equal ranking to an excess of global threats. Sure, there have always been threats. But never were we exposed to as many potential horrors simultaneously as we are today. We should count ourselves lucky that the colonisation of space has lagged behind science fiction writers' dreams, otherwise we'd have to cope with horror reports from Mars now too. So what do we do? We react to the immediate, tangible, visible threat and push the abstract aside, in order not to lose our minds through sheer fear. And while this is the correct course of action, it also means we lose sight of existential problems.

In short, the thriller in which we're the protagonists is pushing us to the limits of our ability to cope, psychologically and physically. Blanking out danger is a survival mechanism. It's also deeply human. If you've temporarily withdrawn your attention from climate protection in order to cope with a pandemic for which the endpoint is unpredictable, against which there's little protection and which is changing us as at every level of our society, that's entirely understandable and, let it be said, not to be criticised. Solving crises according to a 90-minute, tick-box script continues to be the realm of the TV detectives. We real people have to stick it out in the escalation – and nothing is escalating more dramatically than the climate crisis. If it hadn't been ignored by society, politics and the economy, we would be in a more comfortable position now. But time is running away from us. And there are increasing demands to scale down climate protection in the face of exploding Covid costs, which is about as shrewd as protecting oneself against burst water mains by abandoning the construction of a dyke

.

So how can we find our way out of the suppressing stage and back to action?

If you love thrillers, you'll know the only thing that helps against threats is understanding them. There's an overwhelming amount crashing down on us right now. But it's also true that human beings, like no other species, are gifted with the ability to bring order to chaos through the acquisition of information. Being threatened isn't a problem in and of itself. Impotence is the problem. Ignorance. Helplessness. Like in the Middle Ages, having no idea of how the plague is being transmitted, and doing everything wrong and growing desperate as a result.

This is why I have written this book (and, afterwards, I'll finish the other one, I promise). In order to remove the abstract and the dogma from the climate crisis, and to bring together on as few pages as possible (and I'm telling you, *that* is difficult for me!) as much knowledge as possible. Knowledge is magical! Knowledge makes us capable of acting purposefully. Knowledge gives us control and sovereignty. Knowledge is the magic bullet against questionable ideologies. Knowledge generates confidence! If a person understands things, you can't put the wind up them. Populism, no matter what grimy form it's spouted in, has no interest in nuanced thought. It can only survive in under-complexity, and so does its best to fan the flames of fear and prejudice, to spread conspiracy theories, to keep people stupid and direct their hatred towards scapegoats. Populists promise the past and gamble with the future. They declare stupidity a reason of state. We know too well from our own history where that leads. Now we're faced with a challenge for humanity as a whole, and the good news is: we can overcome it.

The following section is about our approach to catastrophes; climate, weather and greenhouse gases; climatology; the difference between natural and man-made climate change; and why, without climate fluctuations, there would be no Boris Karloff masks at Halloween. In Part Three we will act through the present and future, as befits a thriller. Part Four summarises the causes of the climate crisis and explains in detail which processes are

destabilising the environment. Then, in Part Five, we encounter the parties responsible for the crisis and the climate activists. Part Six is about our options: what can we do, who can do what, and how do we exert influence on the decision makers? In Part Seven, we turn our attention to the sacred cow of capitalist world order: growth. Finally, in Part Eight, I will depict the scenario of a future in which we’ve done most of it right.

But first I’m going to throw you into a black hole.

[...]

[pp. 39-51; 74]

PART 3

THRILLER

SEASON ONE 2015-20: 1°C

Paris, December 2015: As a reporter at the 21st UN climate conference, you witness a landmark agreement. History in the making! 196 states and the European Union agree to limit man-made global warming compared with pre-industrial levels to 1.5 degrees, if at all possible, and to under no circumstances exceed 2 degrees.

YOU (*inspired*): Wow! And you’ve all made a binding agreement to do this?

A PARTICIPANT (*enthusiastic*): Yes! We’ve made a binding agreement to make this our aim.

YOU (*confused*): Your aim? So... it’s not binding.

PARTICIPANT: Of course it is! Everyone has unequivocally declared their support. With no ifs or buts! The agreement intends a clear limitation.

YOU: Erm – intends or commits to?

PARTICIPANT: Oh, come on! Can’t you just be pleased?

You are pleased. Even though you still don’t completely understand. Was an agreement just made, or only vaguely promised, in the nature of all good intentions? Such as: next year I’ll slim down, eat less meat, exercise more, spend more quality time with the family, quit smoking – child’s play, I’ve done it a hundred times!

PARTICIPANT: You just have to have a little faith in good intentions.

YOU: But can everyone actually put their intentions into action?

PARTICIPANT: Of course. It’s all actionable.

Does everyone actually *want* to do what they *can* do, you’re about to ask, but he’s already gone. He’s probably right: you’re being too critical. Given that all the participants are gushing in superlatives, it really must be the case that history has been written.

Obama says so too.

The fact is, in order to achieve these aims, the measures agreed would have to be implemented instantaneously, and consistently at that. By 2050, and preferably sooner, all the nations have to reduce their greenhouse gas emissions worldwide to zero, and purify the atmosphere from as much of the CO₂ it already contains as possible. That’s quite an ambitious goal, but an achievable one technologically speaking (more on that in Part Seven). It’s a mild evening, unusually warm for December. You stroll through the 6th arrondissement. In front of *La Palette*, Cézanne and Picasso’s regular haunt, there are still chairs outside. You nab the only free seat, next to a well-known Greenpeace activist. He invites you to share his Côtes du Rhône. A nice, thoughtful contemporary, but you know he’ll probably pull the conference to pieces.

ACTIVIST: Not necessarily. Getting all of them around a table, that’s an impressive feat in itself.

YOU: And they’ve even reached an agreement.

ACTIVIST: Oui. A decent result.

YOU (*taking a sip*): And 1.5 degrees is still a good way off.

ACTIVIST: 0.5 degrees.

YOU (*confused*): Why? 1.5 is what they agreed, compared with pre-industrial levels, and at most –

ACTIVIST: We’ve already reached 1 degree –

– and now (January 2021) we’ve reached 1.2 degrees. With all the lousy side effects. Since the 1980s, cases of extreme weather have increased and hurricanes of the highest category have doubled in frequency. Global warming is also influencing the atmosphere’s circulatory processes. In 2017 Hurricane Harvey settled in over Houston for a week and tore 40,000 buildings to the ground there alone – together with Katrina, it’s the most expensive superstorm in U.S. history. Meanwhile, at the North Pole, the rise in temperature is approaching 2 degrees. The temperature differences between the Arctic and the tropics are shrinking, robbing the jet stream of its strength. By way of brief explanation: jet streams are meandering strong-wind currents, at a height of around eight to twelve kilometres above the Earth’s surface, which create well-balanced, swiftly changing weather. Global warming is destabilising them. High- and low-pressure areas are lingering in the same place for longer, heat waves and droughts are increasing.

ACTIVIST (*leaning forward*): Honestly? With the measures that were agreed today, we’ll barely manage 2 degrees.

YOU: So it’s not a milestone, then?

ACTIVIST: More like a pebble. The kind you get in your shoe.

Three years later, in 2018, you read in a study by the climate researcher Will Steffen that even limitation to 2 degrees won’t be enough to rule out ‘irreversible feedback through tipping elements in the earth system’. What in heaven’s name does that mean? You call a physicist friend. His phone has a bad reception because he’s currently in West Antarctica carrying out readings. As you don’t have anything better to do, you decide to pay him a visit. Once there, you stand in the perpetual ice and –

PHYSICIST (*snorts*): Perpetual? As if!

YOU: It looks pretty stable to me.

PHYSICIST: Sure, from your perspective. But that’s precisely our problem. We only ever see our immediate surroundings, and everything seems okay there. Come inside the station with me, I want to show you something.

You were eager to get into the warm anyway. The wind is howling over the ice, darkness is descending. On the flight over, you watched the two film adaptations of ‘The Thing’, traditionally shown to polar researchers before their missions in the Antarctic. It’s about expedition members who accidentally thaw out a parasitic, bloodthirsty extra-terrestrial that had been frozen in the ice for thousands of years. Purely fictional, of course – but can we be sure?

PHYSICIST (*brings you a coffee, laughs*): No, when it comes to monsters from outer space, you can sleep easy tonight. But your tipping points – now those you should be worried about.

YOU: So what are tipping points?

PHYSICIST: Turning points. In physics, tipping points are when the familiar development of a system is destabilised to such an extent that it abruptly begins a new development and can often no longer be reverted to its former state.

YOU: The classic *point of no return*.

PHYSICIST: Precisely. Take species extension, for example. We’re continually bringing species to the brink of extinction by over-hunting and over-fishing. As long as a minimum stock is protected, the species can recover, and often with astonishing speed if they’re left in peace for a while. But if this minimum stock level is crossed –

YOU: They die out.

PHYSICIST: And in the blink of an eye; there’s nothing more you can do. Unfortunately, their disappearance isn’t without consequence. It sets feedbacks in motion, often entire cascades of them. Further tipping elements –

YOU: Hang on. What are tipping *elements*?

PHYSICIST: Delicate systems. Ocean currents, like the Gulfstream for example. The Amazon rainforest. Permafrost soil. The West Antarctic Ice Sheet –

You think for a moment. What do you actually know about the Antarctic, apart from that there aren’t any polar bears there? At some stage, they agreed a division of territory with the penguins: we get the north; you get the south. If TV quizmaster Günther Jauch ever asks you how many penguins are eaten

by polar bears each year, the correct answer is: none. The two species live at opposite Poles, and right now the polar bears aren't doing too well. The ice masses in the Arctic are melting, and very quickly too – that's what happens when tipping points are crossed and cascade effects set in. Like an avalanche; they can be triggered by just one snowball. The sliding mass pulls ever greater quantities down with it, the avalanche swells exponentially (in other words, its volume continually doubles), and in the twinkling of an eye, a tiny ball of snow becomes a destructive monster capable of tearing down forests, wiping out animal and human life and burying entire villages. The Antarctic is the largest ice reservoir on earth, you remember. Inland, and in the shelf zone, it holds 90 percent of all global ice and 70 percent of all frozen freshwater. What would happen if all these masses thaw? What kind of avalanche would that set into motion?

PHYSICIST: I can tell you that down to the metre. The West Antarctic Ice Sheet essentially consists of shelf ice; in other words, ice that's connected to the land ice mass but jutting out into the ocean. If it melts, the sea level worldwide will rise by around three and a half metres.

YOU: Is there still an *if*?

PHYSICIST: Actually, no, only a when. The tipping point in the West Antarctic seems to have been crossed already. How quickly the water rises depends upon the scenario. With global warming of 2 degrees, by the end of the century we'll be somewhere between half a metre and one metre –

YOU: That's not too bad.

PHYSICIST: You reckon? I don't think they'll agree with you in the Maldives. And we're currently leaning more towards 3 degrees. With that we could be at a metre by the middle of the century.

If the sea level rises by one metre, your friend explains, 150,000 km² of land surface around the world will become uninhabitable and 180 million people homeless. The damage would cost billions of dollars, and once again most of these areas lie elsewhere: Bangladesh, Pakistan, Indonesia, Thailand, Egypt, the Maldives. Poor people would be hit the hardest; they are always the main sufferers of climate change. But even our glittering coastal metropolises would have to contend with a ‘one-hundred-year flood’ every few years. Steep coasts would be eroded; beaches washed away. The houseboats of Florida’s pensioners would chug along the flooded avenues of Miami, the North Frisian Halligen islands would only be inhabitable for crabs, and Germany would be faced with an unexpected influx of climate refugees – the Dutch.

YOU: And what happens then?

PHYSICIST: Next the underwater ice in East Antarctica would melt. Marine ice is directly exposed to the ocean, and that’s only getting warmer. Another rise, this time of 19 to 20 metres.

YOU: My God. That’s a five-storey house.

PHYSICIST: Even more drastic than that. It would mean the end of all infrastructure located in or linked to coastal regions, entire countries would be submerged, and all cities apart from those far inland would become uninhabitable.

YOU: And what if the entire Antarctic flows away?

PHYSICIST (*scratches behind his ear*): All of this? Hm. That’s where estimates diverge. Summa summarum, between 57 and 61 metres. The end of civilisation as we know it. But you have to add on another few metres, because if that happens all the interconnected glacial-, pack- and drift-ice in the North would melt too. The Greenland Ice Sheet alone would mean another seven metres –

YOU: Hang on. Greenland is predominantly inland ice, far above sea level. It wouldn't even come into contact with the warm water.

PHYSICIST: Of course it would. If the ice along the coast melts, ice masses located at higher levels will subside into warmer air levels, and the atmosphere heats up too. The glaciers will be quite literally sandwiched. And there's another thing you have to take into account if you want to calculate the rise in sea level. The water temperature. Warmer water expands.

YOU (*after taking a deep breath*): Okay, none of that sounds good.

PHYSICIST: So it sounded better in Paris?

YOU: When they reached an agreement, it even sounded somehow –

PHYSICIST: Euphoric? (*nods*) Yeah. They all patted each other on the back as though they hadn't even seen the IPCC's world climate report.

YOU: And which tipping points have been crossed? What about Greenland?

PHYSICIST: There's more ice flowing into the ocean in Greenland than is being replaced by snow. In the 1990s it was still balanced out. But it tipped around the year 2000.

YOU: But –

PHYSICIST: Wait.

As a precaution, your friend fetches you something stronger: whiskey. You're going to need it. Then he shows you photos of brown land surfaces which, just a year ago, were still covered in ice. Melt ponds forming around glaciers. A team of huskies ploughing through water instead of snow. Aerial photographs taken by NASA: before, after. You can actually see the ice disappearing.

Staring at the satellite view images of Greenland, you feel something tugging at your memory. Then it hits you. You’re a small child again. On a trip to the Cologne Zoo, which always included an ice lolly. Preferably a Capri. You’ve been looking forward to the monkey show at Pavianfelsen all day long. The multiple pulls on your attention – a hundred screeching primates with considerable entertainment value – aren’t good for the ice lolly. You lick at it distractedly with your warm tongue. The warm ocean. It begins to melt around the edges and run down over your fingers. And it’s only getting hotter; children generally want to go to the zoo when the bears and tigers are lying in the shade, exhausted by the heat. Global warming. The frozen mass becomes warmer and more viscous, and just as you’re about to bite into it wholeheartedly, the whole damn lolly falls off the stick. Tipping point. Someone should have told you that your Capri is an honest-to-goodness tipping element.

YOU: And now it’s all thawing out?

PHYSICIST: No. There’s not just one tipping point, after all, but many. Imagine them as a flight of stairs. Once we cross one, we’re a step further down. We have to watch and see whether the trend continues. It’s undeniable that the current loss of ice is making the sea level rise. And that further tipping points will be crossed if we don’t finally take rigorous action.

YOU: Like implementing Paris.

PHYSICIST: The promises made there are no longer enough to stay below 2 degrees, let alone 1.5. And 2 is the tipping point.

YOU: But it looks like that’s where we’re headed!

PHYSICIST (*shrugs*): It’s very likely.

YOU: Great. So is there any good news?

PHYSICIST: We still have whiskey.

By now you're wondering what history was actually made in Paris. And where political protagonists draw their information from in order to make the right decisions in important matters like climate protection. It seemed to you at the time that many of the delegates were well informed, but that just as many were not. There was often less debate over facts than over questions of belief. Some claimed that the only certainty was that nothing was certain. Climate research? Only partially reliable, they said. Everyone's saying something different.

Does that sound familiar?

API, Lee Raymond, Exxon –

On this polar night, as the snowstorm rages outside and black, monstrous waves crash against the shelf, as penguins huddle together and something else, something unspeakable, may be prowling the ice, able to shapeshift and take on the form of a researcher, until no one knows who's friend or foe, you read the Fifth Report of the *Intergovernmental Panel on Climate Change*, IPCC for short. This inter-governmental research institute was founded in the late 1980s by the United Nations and the WMO, the World Meteorology Organisation, in order to rule out precisely that – everyone saying something different. The membership list of the IPCC comprises 195 nations and, as observers, more than 120 NGOs. Day after day, thousands of researchers combine their findings, which the IPCC then publishes in status reports on up-to-date climate research. Around the world, these reports are considered to be so substantiated and dependable that, in 2007, the IPCC was awarded with the Nobel Peace Prize.

The fifth and most recent world climate report, which you now read (the sixth is expected in 2021/22), was published long enough before the Paris climate conference for all the participants to have had ample time with it. A depressingly thick stack of papers, admittedly. But its key points are unequivocal even in summary:

- The global climate is heating up unnaturally. The atmosphere and oceans are becoming continually warmer, snow and ice are reducing, the sea level is rising at an ever-quickening pace. Atmospheric concentrations of CO₂ are the highest in 800,000 years, having increased by 40 percent since industrialisation, and are continuing to rise.
- Since the beginning of the 21st-century, the Greenland and Antarctic ice sheets have lost significant volume, over 360 billion tonnes per year between them. This loss is not being balanced out by snowfall. Simultaneously, the surface area of summer sea ice in the Arctic and snow cover in the North Pole are reducing more with every year.
- Neither fluctuations in solar radiation nor volcanic activity play a significant part in the climate changes. It is *extremely* probable that human influence is the main cause for the global warming that has been increasing since 1950.
- If we continue to emit greenhouse gases, this will lead to further warming and change in the global climate. Regardless of what we do or do not do, by 2100 the climate will either heat up by between 0.3 and 1.7 degrees (best case) or between 2.6 and 4.8 degrees, and possibly by over 5 degrees (worst case). Currently (January 2021) the development is tending towards the worst-case scenario, in which, by the year 2050, a global warming of around 3 degrees would be reached, having drastic consequences on our lives.
- The oceanic ecosystems in particular – the use of which is essential for mankind’s survival – are being subjected through climate change to rapidly accelerating alterations that are already resulting in species extinction, the largest since the disappearance of the dinosaurs. In many tipping elements, critical points have been crossed, and cascade effects and chaotic changes are to be expected.

If all that sounds bad enough, the following is even worse: these developments are not progressing linearly, but exponentially! What this means is best illustrated by the timelessly wonderful chessboard analogy. I

must confess to having used it before, in ‘News from an Unknown Universe’. As a rule, I try not to repeat myself, because you have a right to demand I think up something new in exchange for your money. But it’s simply too fitting.

So, there was once a powerful king who felt compelled to reward the inventor of chess: an old man. The king loved chess. He promised the old man that he could have anything he wanted, absolutely anything! But all the man wanted was a little rice; more specifically, as many grains as the chessboard has squares. That would be 64 grains of rice. If a restaurant served you a side dish with that volume, you would immediately send it back; if you could even find it beneath the parsley, that is.

Now let’s presume that one square on the chessboard corresponds to one decade, and one grain of rice to a 1 mm rise in the sea level, then in 640 years’ time the sea level would be 6.4 cm higher than today. And all this excitement over that? No!, the old man clarified his request; he didn’t want one grain of rice per square – he wanted one grain on the first square, double that on the second square – so, two grains of rice – and on the third square double the amount of the second square, four grains of rice, on square four double the amount of the third square, eight grains of rice, and so on. To cut a long story short: all the rice in the world wouldn’t have been enough to pay the old man, so the king decided to have him beheaded instead – since time immemorial, a beloved method amongst rulers for settling debts.

The comparison is a little crude, of course. One square doesn’t exactly correspond to a decade, nor one grain of rice to a millimetre rise in the sea level or a temperature increase of 0.1 degrees (specifically: since 1971, the oceanic water temperature in the uppermost 75 metres has increased by an average of 0.11 degrees per decade), and the effects don’t precisely double either. But in principle it’s true that almost all developments characteristic of man-made climate change accelerate, and that’s what’s so dangerous. In our chessboard story, there are two decisive tipping points. One was crossed the moment when the king was no longer able to source enough rice without

plunging his land into bankruptcy, upon which a stable economy of many decades’ duration would have broken down in a matter of hours, with catastrophic cascade effects for millions of people. The other point was crossed when the king realised what kind of game the old man was playing with him, with the irreversible result that the old man’s head became the tipping point.

Based on the IPCC report, the efforts agreed at the Paris climate summit to reduce emissions won’t be anywhere near enough to achieve global climate neutrality by 2050. But keeping all the promises would be a pre-requisite for at least meeting the goal of 2 degrees – let’s not kid ourselves, 1.5 degrees is already in the realm of fantasy. And yes, your doubts in Paris were justified! The countries may have voluntarily entered into agreements, but not binding ones. They were merely good intentions: to stop smoking. As if. More CO₂ is being released into the air than ever before. The softly-softly compromise of not committing anyone by international law had dire consequences, if not before, when the U.S. under Donald Trump was able to leave the climate agreement unpunished, following which the country with the second largest CO₂ emissions after China was no longer in the team (happily, the new U.S. president Joe Biden immediately reversed this decision as one of his first actions in office).

On your last day in West Antarctica, your friend takes you to the sea-ice edge, where you watch it melting. Yes, you can actually see it! Sure, it’s slow, and under favourable circumstances it would be hundreds of years before the shelf completely disappears. But the circumstances are unfavourable. Given that the developments we’ve set into motion – global warming, pollution, species extinction – are accumulating simultaneously, even the best analysts and AI programmes aren’t able to calculate this with precision. The non-linear realm remains a mystery, but one thing is unequivocal: everyone in the world has to engage uncompromisingly in climate protection.

And that’s not something we can assume is happening right now.

You fly back, humbled. There’s no Thing from another world striking terror at the Pole. The threat comes from this world. From a lack of political will, from short-sightedness and ignorance. Pompous crisis summits – where lip service is passed off as breakthrough – sprinkle sugar on collective failure. It’s nice, of course, to see so many countries gathered together. But what use is that if the agreed upon measures are insufficient and not even put into practice?

[...]

In our thriller scenario, I have outlined what the IPCC global climate organisation predicts for the case that we continue as we have so far: with half-hearted activism, inadequate Green Deals, insufficient climate packages. But does it have to go that far? We can still exchange RCP 8.5¹ for a more pleasant scenario. Long term, perhaps even for the glittering vision of the utopians. We have a decade in which to change course; after that, things get tight. In the next section, we’ll turn our attention in more detail to the tipping points and elements, before subsequently looking at the perpetrators and activists in the climate crisis, and sounding out the possibility of avoiding RCP 8.5. We’ve already messed up quite a lot. But there’s a great deal more that we can get right.

We’ve hypothetically let the world go under.

Now we reinvent it.

[...]

¹ A scenario developed by the IPCC. RCP is short *for representative concentration pathway*, and RCP 8.5 is the worst case scenario based on the premise that no countermeasures are taken. The scenarios are explained in more detail in the preceding section, which is omitted in this sample.

[pp. 185-205]

PART 6

ACTION

WHO WE ARE AND CAN BE

There are a few peculiarities in our behaviour which are worthy of investigation. Not in order to become better human beings. We're not that bad (most of us aren't, in any case), but we do stay below our abilities. The reason for this is that the dinosaurs didn't completely die out. When they bit the dust in the asteroid blitz, they left to prosperity the so-called reptilian brain – a somewhat hazy definition for the evolutionarily oldest part of our brain, which for around 500 million years has characterized all vertebrates – as well as non-reptilians, but it's fun to imagine we're all carrying a little bit of T-Rex around in us. While many vertebrates have, in the course of their development, gained the limbic system and neocortex, to this day lizards have to content themselves almost exclusively with their original equipment.

The reptilian brain, better known as the brainstem, doesn't read Shakespeare, nor does it know the art of intricate differentiation. But it's excellent at regulating the heartbeat, respiration, food intake and digestion. It can do an astonishing number of things simultaneously. As you read these lines, your organism is digesting your last meal, your metabolism is running at full speed, and blood is being pumped through your veins. The brainstem is the perfect control system for thousands of automatised processes, and it has three emergency buttons: flight, fight and freeze. It reacts to sensory impressions. If it smells or sees food, its commands are: hunt, eat. Securing the immediate advantage is right at the top of its priority list. Not through negotiation, but immediate action.

In the struggle for survival, this was very useful. A reptilian brain is a fine thing, and we have the rest for Shakespeare, after all. On the other hand, the reptile often forces its way into the foreground when we least need it. For example, when we need to coordinate our personal actions in a future-focused way with the needs of the community at large, or to protect resources and weigh up short-term advantages against long-term negative consequences. And we're not so bad at that. But we're not that good at it either. That's why we have a climate crisis; that's why we continually tell children 'Don't eat it all at once!', at which they still scoff down a bar of chocolate in one gulp; that's why we see the wall and drive into it regardless.

We can't change who we are. But we can alter our behaviour for the better if we understand *why* we are who we are. So I'm going to introduce you to two theories. More theory, I hear you protest, weren't we going to talk about action? Absolutely. That's what the theories are about. They're the software, as it were, for action in the climate thriller. If they're not already installed in your cerebral cortex, let me rectify that now. The first theory is the –

Tragedy of the Commons

I know, it sounds as though Peter Handke and the economy co-authored a novel. The creator of this unwieldy term is the American ecologist Garrett Hardin, based upon the following observation of the Canadian economist H. Scott Gordon: “Wealth that is free for all is valued by none, because he who is foolhardy enough to wait for its proper time of use will only find that it is being taken by another.” In other words, open-access resources are, after initial cooperation, unscrupulously plundered. Self-interest trumps the common good. Secure your share, and quickly! The tragedy of the commons lies in the fact that it's exploited until there's nothing left. Because it doesn't cost anything (wood sprites and water spirits don't charge usage fees), it isn't valued, despite its importance, and so we don't treat it with consideration. We would hardly toss a banana skin on the floor in our apartments or houses, but in public parks we throw them into the bushes. At

home we don't pee in the corner, but into the toilet bowl, and we clean it afterwards. As soon as you enter most public toilets, you generally want to back straight out again. Stop, you say, I don't do such things! I believe you. Nor do I. But many do. And let's be honest – do we always treat all public property as carefully as we should?

The tragedy, according to Hardin, is that everyone with access to cost-free, public resources that can be profitably exploited will try to maximise their own gain – if only because others are doing it, and to avoid being disadvantaged. A competition begins, demand increases, and the resource dwindles. Now there's no longer enough to go around. But everyone will pay the cost of overexploitation. That was essentially clear from the start, but immediate gain outshines the foreseeable long-term losses. The T-Rex demonstrates its strength, and common sense may whisper 'exercise moderation', but what can you do against a hungry T-Rex? And so everyone accelerates the ruin of the group and, in the process, their own. Over-fishing, the plundering of fossil fuels, decimation of wild animal stocks, deforestation, the pollution of public bodies of water and land by pesticides and over-fertilisation, the pollution of the atmosphere – in the tragedy of the commons, there are no winners, only complete breakdown in the final act.

This has brought us to the situation we now find ourselves in. Hardin's theory reads like a natural law of failure. But can the tragedy be rewritten, perhaps? After all, we are living in a thriller, and that's very different to a tragedy. In a thriller, there are heroes and solutions. And there really are attempts being made at a solution: governing institutions and legal systems ensure that everyone can't just do whatever they want. Norway is exemplary: they established a sovereign wealth fund for oil revenue. Cleverly invested, it benefits the general public instead of lining individuals' pockets. Unfortunately, something that functions on a communal and national level, in the framework of local jurisdiction, is less effective on an international level. So how can we achieve moderation and cooperation worldwide? Free access to the Internet is an example for the worldwide use of a collective resource, and unfortunately not a positive one – if you look

closely, the web is financed by far too few players. The vast majority don't contribute anything, but instead surrender to the thrill of getting it for free (or supposedly for free, because they're actually paying with their personal data). Our understanding of such processes is helped by theory number two, the –

Game theory

From the day when we climbed down from the trees, we became players from which life continually exerts decisions. Game theory explicitly investigates decision processes involving a number of participants, in other words, where cooperation is required. There are many experimental arrangements. Here is a classic one: four participants, ten Euros starting capital per person. The players interact anonymously, for example from their homes, on laptops. There is also a public pot which represents common property. Each participant can now invest money in the preservation and development of the common property. The funds contributed are doubled and divided by four. If each player has put his ten Euros in the pot, then eighty Euros (including dividends) are paid out, twenty per head. A hundred percent increase in profit. An investor's dream. Everyone's delighted. Round two. Once again, everyone contributes ten Euros from the twenty they now have. Again, the combined sum is doubled and distributed equally, round after round. Everyone's wealth grows, the common property flourishes and prospers. The lesson: cooperation is the best path. The Euros symbolise any kind of personal investment for the common good: donating time, money, work, picking up litter after a barbecue, investing in environmental start-ups, creating a charitable foundation; anything of this nature. Sometimes a player gives a little more, sometimes a little less, but as long as everyone contributes, everyone profits. And it could continue in this idyllic fashion – were it not for the reptile's interest being awoken. From the ancient depths of the brainstem, it whispers to Player A: ‘Be shrewd. Hold onto your dough next time.’

What happens? Only three players pay in. Sixty Euros are distributed. According to the rules of the game the pot is always divided by four, so the dividend shrinks. Fifteen Euros each instead of twenty. Those who invested continue to make a profit, but only half as much. The only person cleaning up is the egoist: fifteen Euros plus the ten held back makes twenty-five. The others realise that someone hasn't coughed up, but because everyone is playing anonymously, no one knows who it was. What to do? They contemplate their next steps, while Player A smoothtalks his conscience. Looking at it rationally, he's done the right thing. Hasn't he? He's only doing what any good businessman would do. Besides, what if the others hadn't contributed? Then he would have been the only one. All he's done is minimise his risk, and because it turned out so well, he immediately does it again, but in the meantime Player C has started to mull things over. The profit maximisation doesn't seem that reliable after all, and why pay for the egoist? In the next round, he doesn't pay in either. Consequently, only forty Euros are distributed amongst the group. Players B and D, who have invested, are no longer making any profit, and that's the last straw for Player D; he quits. Player B is now making a loss and quits too, the game breaks down. No-one earns another cent, the common property falls apart.

How could this happen? Translated into reptilian language, the answer is: I want my advantage *now*: to scoff the bar of chocolate alone (before my little sister sees it), polish off the big steak (even though I had one only yesterday), drive the SUV (even though it pollutes the air), fly to the Bahamas (even though that pollutes the air even more), drill the oil source (even though I should build a wind farm instead), over-fish cod (even though the stocks are in danger), pocket my annual bonus (even though employees are being laid off). Once I've got something, no one can take it from me. And every once in a while, that viewpoint is understandable. It isn't always accompanied by greed, but often by fear, insecurity, pressure. You're going through hard times. You're stressed. Not earning enough. You want your family to be okay. To treat yourself. Go for it, you've earned a trip to the Bahamas! You think: no one around me is going without, so why should I? What's the point

of planting trees with the few pennies I have when Bolsonaro is razing the entire rainforest to the ground? Let him do the planting! Why should I go without my little piece of meat and my car when in Germany we only contribute 2 percent to climate change and the Americans and Chinese are having intoxicated CO2 parties? Why can't a developing nation build a coal power station when those trying to forbid them from doing so are emitting millions of tonnes of greenhouse gases themselves?

There are countless reasons not to cooperate. Egoism has many faces and knows many justifications. In every case, you're better off if you keep your ten Euros. But therein lies the tragedy of the commons, that the quick personal advantage actually disadvantages the common good in the long run, and therefore each individual too. This complex situation is what economists call –

The social dilemma

There are usage dilemmas, for example when over-fishing leads to stocks dwindling more quickly than they're able to regenerate. The fishing companies argue that they're under pressure from stockholders; the small local fishers are under pressure to survive; both are concerned about job retention. And so the tipping point is crossed. Once the fish die out, it's bad for everyone. Fatally, it's precisely this realisation that leads to the compulsion to fish even more. If it'll all be over soon anyway, why not grab as much as possible now? If I don't, others will. Responsible fishers see themselves falling behind, so they too throw in the towel with sustainability. In the short term, the individual's profits increase, but everyone pays the price once things fall apart. Contribution dilemmas, on the other hand, arise when a collective invests in something, a village road, let's say, which is then also used by those who haven't contributed. The willingness to engage shrinks. Environmental dilemmas come about when somebody who invests in climate protection has reason to fear that others aren't investing to the extent they should. The investor loses their capital and the consequences of

global warming set in regardless. How can we get people from all nations to take united action against climate change if everyone is afraid of ending up as the fool?

We’ve seen how quickly cooperation can break down when players prioritise their own immediate advantage over the common good. Conversely, that which most benefits everyone also benefits the individual most in the long term. Exercising moderation today means that no one will be empty-handed tomorrow. Most people would immediately buy into that approach. In order to avert the tragedy of the commons, therefore, what we need is not better people, but –

Better rules of play

The existing system rewards the egoist, but not in the long run. In the short term the hangover is certainly much worse, but the uncooperative person profits, so the new rules of play have to be aimed at rewarding cooperation and altruism. Generally, altruism is defined as selfless actions carried out for the good of others, usually those who are badly off. Looking at what has already been said, it seems that altruism in this context isn’t actually that selfless, but rather a particularly considerate expression of egoism – and that’s precisely what we need. Acting for the benefit of the collective, while keeping one’s own advantage in mind.

If there are too few altruists in the game, the others’ reaction tends to be: ‘Bummer’. If the number of altruists exceeds the critical amount, they can set new behavioural norms. If enough players are prepared to sacrifice their share of the profit for the common good, they can achieve a reciprocal understanding that leads to even bigger profits for everyone. The Paris climate agreement, as inadequate as it may seem in hindsight, was still a great moment of cooperation: an absolute majority of countries committed to uncomfortable measures, steep cuts and system alterations. Even at the turn of the century, Trump’s withdrawal would have been enough of a

blueprint for many others to follow suit. But the consistent work of the climate movement has led to a shift in mindset. Trump instead found himself to the recipient of widespread disapproval. If you look at the EU, you also see a different picture to the one some years ago. It may be in deficit, cumbersome and laden with rules that should never have been drawn up in the first place, but the good thing is that any members who indulge in foul play find themselves in an increasingly difficult position. If a Victor Orbán or Mateusz Morawiecki try to extort the community in order to dismantle democracy on the home front, they lose status at a spectacular rate, and find that the wind has changed even in their own countries.

Now, in order to change the rules in the climate game, there are a few different options.

Punishment

Egoists are excluded from the collective and – if their actions cause quantifiable damage for the community as a whole – are immediately subjected to a tax. Polluting companies forfeit their subsidies, national and private financial institutions and investment companies withdraw their support from the climate sinners. Fossil fuels are highly taxed, the CO₂ price reaches a level at which emitting carbon dioxide (and other harmful substances) simply becomes uneconomical. Egoists also have to fear future punishment for having un-cooperatively gained the advantage; like oil and coal companies being inundated with complaints from climate-damaged countries. And leaders who delay climate protection during their time in office later find themselves in court – this scenario was played out in 2020 in the German television film “Ecocide”.

Fines are effective, beginning with ticket-, facemask- and roadside spot-checks. Sometimes you have to choose the hard way. Environmental sinners and predatory capitalists are only seldom called to account at present, and the penalties are too lax. Nonetheless, punishment has a catch: it’s

uneconomical. Fining and being fined costs both sides time and money. Often the expenditure is so high that that it cancels out any benefit arising from the fined individual’s increased willingness to cooperate in the future, so it’s better to set our sights on –

Reward

Anyone who contributes to common property by cooperating is rewarded with municipal and national privileges. Climate-friendly industries, initiatives, products and services are given financial support, green behaviour like conversion to e-mobility is subsidised. Tax reliefs incentivise us to improve our ecological footprints. Additional climate bonuses, like repayments from the carbon tax to the population, are particularly helpful to low-income households. Anyone living a more carbon neutral life is rewarded with free annual tickets for the theatre, cinema, concerts and museums – Vienna was the first metropolis to introduce these culture tokens: a motion-tracking app measures journeys made on foot, by bicycle or on public transport, and calculates the carbon dioxide saving. Vouchers for sustainable, fairtrade retail, second-hand shops and repair services offer incentives for more conscious consumer behaviour. Companies reward environmentally-conscious employees; the companies, in turn, are supported by the state, country and community, for example through subsidies for photovoltaic systems, to generate energy for the company’s own e-car park, and so on and so forth.

Measures like these can be very effective, especially when they go hand-in-hand with a penalty system for uncooperative behaviour. Admittedly, even reward systems have a catch. Like penalties, they cost money. The outlay of money and time cancels out some of the benefits. Furthermore, game theory has shed light on something interesting. Rewarding players for cooperative behaviour can go wrong if they’re worried about their status – in other words, that the general public could think they’re only cooperating because of the money. This brings us to the most effective motivation for good social

conduct, more effective than all the others and, what’s more, entirely cost-free.

Good reputation

It’s the magic word, more effective than “Expelliarmus!” and “Abracadabra!” combined:

“Rep-u-tatio!”

So far, we’ve looked at games which guarantee the players anonymity. Not being recognised generally implies not being disciplined for misbehaviour. This is why a Palaeolithic cave would probably have surpassed any railway toilet in terms of hygiene, why public beaches look like rubbish heaps, why bins overflow, why pasta and toilet paper are stockpiled in times of crisis (or, in France, red wine and condoms), why people keep their ten Euros and are even proud of having made a profit at the cost of others. Under the cover of anonymity, egoism, bullying and deceit run rampant. The Internet has a vast amount of positive, transparent realms, but Facebook, with its anonymous shit-stirrers, is the cesspool. Invisibility encourages misbehaviour: people only pick their noses when they think they’re not being watched. As soon as someone looks over, the finger is whipped out; pennies are given to the homeless person; the litter is picked up.

Lapsing into selfish behaviour when there’s no-one looking is human, and not necessarily accompanied by malice. It’s just how we are. On the other hand, as soon as the spotlight is on us, we want to shine and look good. The supreme discipline of pleasing self-representation is altruism: helping others, giving more than we receive, self-sacrifice. It strengthens our good reputation and, above all, it’s smart, because good is repaid with good. In game theory, the term for this is reciprocity: tit for tat. If I show my willingness to cooperate, I’ll benefit in the long term; if I act selfishly, I’ll be disadvantaged. In a further experimental arrangement of game theory, only two players join, and this time not anonymously, but face-to-face. After

each round, the partners are switched. You’re sitting opposite someone new every time – or rather, almost every time. Because there’s the possibility that you’ll encounter some playing partners again. The higher the chances of this are gauged to be, the more cooperatively we play. If I cheat someone, there’s reason to fear that they’ll do the same to me in future. But even if the reunion never occurs, it’s still worth cooperating, especially if my typical playing behaviour might be made public. Am I known for throwing my ten Euros in the pot, or for holding onto them? The answer dictates my reputation. If I’ve got a bad reputation, the others won’t trust me and will exclude me from cooperatives. If people wax lyrical about my generosity and willingness to help, I can count on being rewarded with trust and cooperation in future. Neither expensive penalties nor costly bonuses are needed for this. Simply the will to contribute to common property.

But this only works if my good deed, my sacrifice, my investment is seen and attributed to me. All experimental arrangements of game theory lead to the same result: if the players step out from the cover of anonymity and into the light, their willingness to act altruistically increases threefold, because they are rewarded with something far more valuable and desirable than money – social status. If non-anonymous players play for common property, it is rescued almost without exception, and everyone profits. Human beings, as we can see, are alright after all. Well, up to a point. Because, unfortunately, if the same players relinquish their good name in the next game and slip back into anonymity, an altruist becomes an egoist once more. But it doesn’t matter. We now know the trick: do good deeds and talk about them. Loud and clear, so that everyone hears: I – am – good!

Avoiding the Tragedy

As soon as we know what sort of people our fellow players are, whether they’re willing to help or quite the opposite, we can play the common property game in such a way that it doesn’t end in tragedy. The more people you teach to act altruistically, the better your reputation, the stronger your contingent, the greater your societal influence. Playing the game well works

both within specific cultural circles and more broadly. The Petri dish of the United Nations is abundant with differences, but it's been proven time and time again that cooperation is viewed positively by all cultures.

The most important game of our time is to limit global warming to 1.5 degrees, 2 at most. In March 2020 there were 7.77 billion players, and by now it must be a good few more. A series of experiments investigating the behaviour of players in the climate crisis show that the will to cooperate increases the better informed the players are about climate change. With growing education, participants are acting more responsibly and successfully. Their willingness to invest in the greater good increases further still when they can be certain the public will find out about their engagement and level of commitment, and connect both with them. Crucially, the more exemplary a player's actions, the more generously and selflessly the other players support them.

States, countries, local authorities and companies are powerful players – but the most important player is you. You are representative of all human beings; it is only through us, collectively, that the blueprints of those in power can be brought to life. The way you act personally is of paramount importance, even though you're *just* one individual player; because in this game, there are only individual players. States and systems are constructs. As institutions, they change the world of the individual. Just like the individual changes the institutions, as the change of personnel in the White House impressively demonstrates. Institutions have great power, but the reins of this power are held by individuals. In his analysis of the Trump years, the American novelist Richard Ford wrote that the difference between a failed state and a beneficial union is a few idiots – or a few good citizens. At the end of the day, humanity decides whether to protect or destroy our world, and this decision is the sum of all individual decisions. The determined individual has numerous opportunities to pull those who are undecided onto their side, to improve their reputation and reduce their ecological footprint – wait a moment! What exactly is that?

THE ECOLOGICAL FOOTPRINT

A recent definition, an indicator of sustainability, developed in 1994 by the Swiss visionary Mathis Wackernagel and the Canadian professor William Rees. The ecological footprint describes the portion of the earth’s biologically productive surface area required to provide for the maintenance of a person’s living standard long-term. Included in the calculations are sustenance, clothing, housing and energy needs, objects used and consumed on a daily basis, waste disposal and carbon dioxide emissions. The basis – given that different areas of the earth’s surface are fertile to differing degrees – is the global hectare, a fictitious area with average biological productivity. The footprint can be captured for the individual, for households, companies, local authorities, cities, nations or the whole of humanity – but what we’re looking at here is your (and my) very personal footprint. What does the planet have to expend in order for us both to stroll contentedly through life?

Firstly: the planet is groaning beneath our weight. If we divide the earth’s productive surface area among 7.77 billion people, each person has a mere 1.8 hectares at their disposal, which equates to two football fields. Not bad, you might think, deducting your living and working space and imagining yourself breeding chickens, pigs and cows on the remaining 99 percent, planting fruits and vegetables, a nice little fishpond in the middle perhaps, and vines growing cheerfully around the penalty area. A lovely image, but unfortunately it doesn’t work. A Burmese shepherd, a Thai rice farmer, or an employee in Windhoek may be able to manage on 1.8 hectares, but not you. Nor me. If everyone lived at the level of the industrial countries, we would need another two or three planets. Astonishing, isn’t it? What kind of clodhoppers are we stomping through the world in, surely our footprints can’t be that big?

A significant measurand for the ecological footprint is water consumption. Only 0.008 percent of all water on earth is readily accessible drinking water; cumulatively, around 100,000 cubic kilometres. Freshwater is the most important resource for our survival, limited and in constant danger of

becoming unusable through industrialisation and climate change. 70 percent of this water flows into food production, 20 percent into industry, the rest into private households and local authorities. In the 2018 per capita annual consumption study, Estonia topped the list with around 1,350 cubic metres (I’m not sure why), followed by the USA with 1,200 cubic metres. After that, Greece, Canada, Turkey, Australia and countless more, before Germany appears, a surprisingly sparing water consumer with a mere 300 cubic metres. Calculated by country, a different picture emerges. Here, India, China and the USA together use almost half of the freshwater worldwide (here, too, Germany is exemplary). A growing number of countries are taking more water than resources are able to renew, especially Kuwait, the United Arab Emirates and Saudi Arabia. The United Nations 2019 water report estimates that, globally, two billion people are suffering permanently from severe water shortages, and almost two thirds of the global population for at least one month per year. This is a trend which climate change is intensifying, while population growth and rising living standards in the developing countries are pushing water consumption up even further.

With this in mind, you modestly drink your small mug of white coffee at the start of the day, then polish off an egg and a small slice of buttered toast. A glass of apple juice and a banana round off this reasonable meal, with an estimated water consumption of between one half and three quarters of a litre. Commendable. Yet we predominantly consume latent (also referred to, erroneously, as ‘virtual’) water – in other words, water that has to be expended elsewhere so that coffee and wheat can grow; so that a cow can produce milk; a chicken can lay an egg; apple and banana trees can bear fruit; and all of these lovely things can make their way into your refrigerator. Now the calculations read like this:

Cup of coffee	140 litres
100 ml milk and 10 grams butter	100 litres

Egg	200 litres
Large glass of apple juice	300 litres
Banana	200 litres

Even by the time you finish breakfast, you’ve already clocked up almost a thousand litres of water! The pork schnitzel at lunch adds another 1,200 litres. That means... but wait – pork isn’t the healthiest of choices. Better to have steak. And now look: 3,500 litres. Roast potatoes on the side, 225 litres, tomato salad, 65 litres. You coyly follow it down with a chocolate bar. That can’t be too water intensive, can it? Sorry, 2000 litres. This is because the cocoa beans need a great deal of water, 27,000 litres per kilo. In the evening, you guiltily scoff a cheese sandwich (90 litres) and a small bag of crisps (another 90 litres, but how can you watch ‘Breaking Bad’ without crisps?). You don’t even want to know the water consumption for your glass of red wine. But sorry, it’s relevant to the discussion: 120 litres! Just one single glass!!!

So, now let’s cheer ourselves up again. There’s no need to go thirsty or gnaw at your fingernails. We established at the outset that every living being has an ecological footprint. Even a bark beetle, on closer inspection, has a lousy eco-balance. When the Big Bad Wolf devours Little Red Riding Hood, he consumes her ecological footprint too, and she really partied hard with the huntsman and the grandmother! The same goes for the Fox and the Goose. Do you have a dog? Even if you rarely eat meat, Rover would rather kick the bucket than go vegetarian, and dog food comes from intensive livestock farming. Rover’s latent water consumption is enormous, producing eight tonnes of carbon dioxide in his lifetime (the equivalent of flying to Iceland and back eight times), so long as he’s a dachshund or something similarly modest. Golden retrievers and German shepherds carry a different weight.

The problem isn’t that our latent consumption and the accompanying greenhouse gas emissions are high (every agricultural, industrial and private

production process creates carbon dioxide and other greenhouse gases), but that they're *too* high. And not only where food is concerned. A cotton T-shirt, depending upon its origin and manufacturing, needs around 4,000 litres of water, a pair of jeans between 6,000 and 11,000 litres. Up to 400,000 litres flowed for your new car, 20,000 for your computer, 13,000 for your mobile phone, and this book didn't ripen in a drought either: you're holding 1,500 litres in your hand, not to mention the water I gulped down while writing it.

Ecological footprints put a strain on the environment and atmosphere, but that's okay as long as the resources used don't exceed the volume that can regenerate; as long as the ecosystems aren't subjected to irreparable damage; as long as we don't destroy the basis of our existence (and that of other species); and as long as everyone on earth can get by, have enough to eat and drink, and live in decent conditions. Ensuring this is a mammoth task, and it begins with –

REDUCING THE ECOLOGICAL FOOTPRINT

Not only for the sake of good reputation. The footprints of big cities amount to between one hundred and two hundred times their urban area. The competitive standing of a metropolis or region now increases with its ecological efficiency, which is why London, Berlin, New York and others regularly have their footprints calculated. In this way, weaknesses in transportation, housebuilding and energy supply can be disclosed. This is how Vienna was able to implement a successful climate protection programme, and how Berlin reduced its use of fossil fuels. Shortening transport routes, refurbishing buildings to be more energy-efficient, electricity and heating management; you can turn a thousand adjusting screws without having to live in self-castigation. On the contrary, companies that have their footprint analysed generally reduce their operating costs by improving their eco-balance, and at the same time increase productivity. It's also the case that employees become significantly more aware of

sustainability if a company discloses its eco-balance. For private households, the following applies: Live, and live well! Your everyday life will probably improve in quality (and, happily, so will the lives of others), when you reduce your ecological footprint. Hygiene products, food, electronic devices, you can become more ecological in practically every regard. And yet climate protection is complex. Not everything that’s labelled as organic is better than non-organic (more on that later). Should you buy an organic product that was flown in from far away, or a non-organic one from your local area? Manufacturing, transport, packaging – it all plays a part in the final calculation. Estimating your personal footprint isn’t easy. Products often declare their carbon dioxide balance, but the regulations from country to country are nonuniform. An internationally-recognised climate label would help. Even Nestlé would be on board; the company aims to introduce carbon dioxide neutral products to the market and become climate neutral by 2050. For some products, admittedly, the emission balance is difficult to determine. In most cases, a product doesn’t reveal the size of its ecological footprint.

You can investigate your own ecological footprint online: myclimate.org and tredom.net calculate for you (as long as you don’t sugar-coat anything) with relative precision where you stand, how many planets would be needed so that everyone could live like you, or whether you’ve long been exemplary without even realising. I would also recommend footprintnetwork.org. Further on in this section, you’ll find suggestions for how to reduce your ecological footprint. But first, we’re going shopping.

[END OF SAMPLE]