Eva Horn

Tipping Points: The Anthropocene and Covid-19

As I wrote this text in the spring of 2020, a large part of the world was under lockdown because of the outbreak of SARS-CoV-2. It was barely six months since the *Fridays for Future* demonstrations. So one could read quite a few articles dealing with the relationship between the coronavirus and the current ecological crisis which we have come to label the "Anthropocene." Are shrinking wildlife habitats, species migration and dangerously close human-animal contact directly or indirectly responsible for the Covid-19 pandemic? Or does the corona crisis rather present a temporary break in the otherwise relentless increase of greenhouse gases, a breather for air pollution hotspots, a chance for an ecologically sound reconstruction following the economic collapse? Due to reduced traffic and halted industry, blue skies have suddenly returned to many cities for the first time in decades. Many see Covid-19 as an opportunity to implement a completely new and more appropriate approach to environmental policy. The virus and its spread have taught us something about the fatal global interweaving of supply chains and tourist flows which are a driving factor in climate change. Is Covid-19, some columnists asked, not in fact a symptom of the Anthropocene (Scherer 2020)? Is it a "dress rehearsal" for the Great Climate Collapse (Latour 2020)? Or, looked at from a different perspective, does it offer, albeit by force of circumstances, an experimental space in which to test out how things might be done differently – proof that it is possible after all to limit travel and transportation, to reorganize work and communication, and to reduce the consumption of fossil fuels? Could it even present an opportunity to reinvent international cooperation in the face of a global threat?

These questions can hardly be answered at present. What I propose to consider here are epistemic links between the ecological crisis of the Anthropocene and the corona crisis. These are to be found, as I will argue, less in causal or metonymic relationships (the Anthropocene as the *cause* of Covid-19, or the pandemic as a *symptom* of the Anthropocene), than in temporal structures and event forms. What kind of caesura are we witnessing? What do the two crises – the ecological metacrisis of the Anthropocene and the global pandemic – have in common? In the case of the Anthropocene, this involves asking what it means to proclaim the beginning of a new geochronological epoch. How do we account for this beginning and on the basis of which historical thresholds? Which time scales come into view? A number of these questions have already been exten-

https://doi.org/10.1515/9783110713350-009

sively discussed (Hamilton 2016, Veland and Lynch 2016, Chakrabarty 2018, Horn and Bergthaller 2020). I will focus on a particular type of event that I deem emblematic of the Anthropocene: the *tipping point*. Both the Anthropocene and the SARS-CoV-2 pandemic are characterized by such tipping points, which combine slow latency periods with sudden rapid escalations. How does the structural, slow and barely perceptible crisis of the Anthropocene relate to the acute corona crisis which is occurring at breakneck speed but with an unclear time horizon? Where is their point of convergence, and what forms of planning for the future can be derived from it? Put simply: What can we learn from Covid-19 for the future of the Anthropocene?

In recent years, the Anthropocene has been discussed primarily as a geochronological concept: It has been established that humans have changed the Earth System to such an extent that the traces of these interventions can be found all over the world as a distinct sedimentary layer (Waters et al. 2016, Zalasiewicz et al. 2019). This also means that the state of the planet has changed so radically from the preceding 10,000 years of stability that it is no longer possible to speak of the present as the Holocene. The concept of the Anthropocene presents an ecological threshold, a break with the unusually stable ecological conditions of the Holocene (Hamilton 2016). Earth System science has shown that the earth has entered a state for which there is no parallel in its recent history (Moore et al. 2001).

The point of the term Anthropocene is thus to give an ecological diagnosis of the present – but one that locates it within the vast time scales of the history of the earth. This solicits a new understanding of history, with novel actors (such as fossil fuels), different kinds of narratives (along ecological lines) and unusual time scales. Both historical dimensions – the vast temporality of "deep time" and the rapid change brought about by threshold transitions – must be related to each other in order to understand how human history is inscribed in the larger framework of the Earth System. This also involves telling the history of humankind in a different way. A history of the Anthropocene tells of ecological transitions rather than political revolutions, of changing energy regimes rather than social change, and of technology rather than world-views. What it is interested in are the *material factors* involved in the threshold transition from the Holocene to the Anthropocene: first and foremost the change of energy sources (from renewable energy to fossil fuels), the rapid consumption of certain resources, the worldwide networks of trade and economic relations and, not least, the transfer and transformation of living organisms.

The Anthropocene: Thresholds and Tipping Points

As the "start" of the Anthropocene, the *Anthropocene Working Group,* along with many environmental historians, have proposed the "Great Acceleration," referring to the marked escalation of numerous parameters of consumption and environmental change from 1950 onwards (McNeill and Engelke 2016, Steffen et al. 2004, Steffen et al. 2015). The acceleration of social and economic change alongside the increasing consumption of resources are captured in a famous graph that visualizes this escalation in 24 curves, the common "hockey stick" shape of which is striking. On one side, the graph shows socio-economic developments, from the increase in the world's population to global GDP, urbanization and financial flows, water and paper consumption, transport and junk food. On the other, it shows ecological factors in the Earth System: the increase in greenhouse gases (nitrogen oxides, methane, carbon dioxide), the hole in the ozone layer, rising temperatures, species loss, deforestation etc. Even if in some of the curves there is a slight up-turn as early as the nineteenth century, it is this sharp escalation of socio-economic factors that has, within two generations, turned humankind from a small environmental factor into a large-scale force in the Earth System (Steffen et al. 2015: 94).

While the concept of the Great Acceleration impressively captures the parallel escalation of socio-economic trends and changes in the Earth System since the end of the Second World War, it cannot explain its own precondition – the switch to fossil fuels. The most serious consequence of this switch for the Earth System – the increase of CO_2 in the atmosphere – remained barely noticeable for a long time. This curve begins to rise gently but visibly in the last decades of the nineteenth century, grows significantly from the 1930s and then in the 1950s the sharp upward turn associated with the Great Acceleration occurs. The diagnosis of acceleration must therefore be supplemented by a different temporality – a slow, barely noticeable increase in side-effects that only come into view belatedly. The Anthropocene thus encompasses very heterogeneous temporalities: on the one hand, the rapid acceleration of consumption, technical innovation, mobility, global networking, etc., and on the other, latent, subtle changes in society and the environment that occur in imperceptible gradations – and thus are difficult to address politically.

The strange coupling of long, continuous, seemingly uneventful latency periods with moments of sudden acceleration and rapid change is captured in the concept of the "tipping point." The term stems originally from the social and economic sciences, where it denotes the abrupt change of a given development.

Yet in order to grasp the use of the concept in the context of the Anthropocene, it is necessary to consider the specific understanding in Earth System science of the relationship between human civilization and nature. Earth System science treats human life forms and human activity as part of a system of nature that is active and dynamic (cf. Lenton 2016). Nature is understood to be a planetary, self-regulating system. What emerges is a model of nature without a stable state. Thanks to new measurement and computing capacities, Earth System science today has a detailed understanding of the complex interaction of the various components of the Earth System. The biosphere – comprising all living organisms on the planet – has repeatedly acted as a stabilizer and "thermostat" in this system (cf. Lovelock 1991, 2006). However, this dynamic is inflected by sudden and profound changes in the overall system. With the Anthropocene, humankind as an agent of these changes is coming into focus. The founding document of Earth System science, the 2001 *Amsterdam Declaration,* is already informed by this perspective:

> Earth System dynamics are characterised by critical thresholds and abrupt changes. Human activities could inadvertently trigger such changes with severe consequences for Earth's environment and inhabitants. The Earth System has operated in different states over the last half million years, with abrupt transitions (a decade or less) sometimes occurring between them. Human activities have the potential to switch the Earth System to alternative modes of operation that may prove irreversible and less hospitable to humans and other life. ... The nature of changes now occurring simultaneously in the Earth System, their magnitudes and rates of change are unprecedented. *The Earth is currently operating in a no-analogue state.* (Moore et al. 2001)

What we are looking at here are tipping points – hard-to-predict moments of dramatic change in a complex self-regulating system. A tipping point occurs when a threshold value is reached at which a slight increase of a certain factor suddenly causes a massive change in the overall system, which thus irreversibly transitions to another state. At the tipping point, a small quantitative increase leads to drastic qualitative change in the entire system, or to the emergence of unpredictable new phenomena.

Tipping points refer to a type of event that lies beyond the difference between culture and nature, between human decisions and natural processes. Malcolm Gladwell's bestseller *Tipping Point* (2001) is for the most part concerned with social phenomena. His thesis is that certain emergent phenomena – from fashion trends, crime waves to bestsellers – are to be understood as epidemics: "Ideas and products and messages and behaviors spread just like viruses do" (Gladwell 2001: 5). According to Gladwell, social processes with tipping points have three basic characteristics: (1) They are contagious, i. e. they require partic-

ipants to be in contact with each other and to pass on characteristics or opinions in increasing numbers; (2) in this process, small causes can have large consequences; and (3) after a long lead-up time, changes happen suddenly and quickly. Gladwell's examples are largely cheerful – the enforcement of fashions, the ebbing of crime, the effectiveness of drug and health policies. But of course, the idea can also be turned towards the catastrophic. "Catastrophe" – etymologically meaning "a sudden turn downwards" – is actually nothing other than a Greek word for tipping point. Accordingly, the term has become a catchword for the catastrophic tendencies of the present.

The problem is that tipping points are relatively difficult to predict. They come suddenly at the end of slow, seemingly continuous processes that solicit the deceptive expectation of further continuity. They begin as micro-trends that can hardly be measured and seem so minor that they can be ignored. Or they emerge from a new constellation of apparently unrelated factors whose interaction could not be foreseen. Self-regulating systems such as ecosystems, markets or societies can, over long periods of time and despite all crisis-like tendencies, repeatedly bring themselves into provisional equilibrium – until they reach that dangerous point of sudden change. Reaching a tipping point means that the system is "saturated" (to use a term from chemistry) or that a "critical mass" has been reached (in the terminology of physics). While a negative feedback mechanism had previously stabilized a given system, at a certain threshold the negative feedback tips over into a self-reinforcing cycle of positive feedback leading to escalation.

There is nothing new about rapid and radical breaks in social or economic trends – they are called revolutions or economic crises. Yet, the volatility of human culture has long been contrasted with the stability of nature. We long held the belief that while human life changes in leaps and bounds, nature does so only gradually, step by step and in scales of time so vast that they are hardly perceptible. Recent findings in climate research and Earth System science, however, make this image of a largely "inert" nature seem obsolete. The impression of a "stable nature" is a deception of the Holocene – that anomaly in the history of the earth that was characterized by extremely few climatic fluctuations. As recent research has shown, climate does in fact experience rapid and profound change (Warde, Robin and Sörlin 2018). According to Earth System scientist Tim Lenton, such change can dramatically transform the state of the entire earth system within decades:

> Whilst much of the behaviour of the Earth system can be described as "linear" and predictable with our current models, there is a class of "non-linear" change that is much harder to predict and potentially much more dangerous. It involves "tipping points" – where a small

> perturbation triggers a large response from a part of the Earth system – leading to abrupt and often irreversible changes. Tipping points can occur when there is strong positive feedback within a system, which creates alternative stable states for a range of boundary conditions. When changes in the boundary conditions cause the current state of a system to lose its stability, a tipping point occurs, triggering a transition into the alternative stable state. (Lenton 2016: 100)

Perhaps the most important and threatening of these tipping points are the polar ice caps. These large white ice sheets increase the earth's albedo, counteracting the warming of the atmosphere by reflecting sunlight. As they melt away as a result of global warming, they expose the dark surface of sea water – which in turn further increases the warming of the climate. What was previously a stabilizing negative feedback against global warming, now becomes a dangerous positive feedback: the more the ice melts, the faster the atmosphere warms. This dynamic makes particularly clear the non-linear behavior of processes with tipping points. Everything changes when a single threshold is reached: the melting point of ice. In the range of a tiny temperature difference of a few degrees, the role of water in the system changes – and thus becomes a factor that severely affects the entire Earth System.

Unfortunately, tipping points rarely occur alone. They can influence each other and lead to convergences of complex escalating processes that are difficult to predict. This gives rise to domino effects in which several tipping points trigger or reinforce each other. It is precisely the combination of melting polar ice caps, rising sea levels and global warming that could trigger a dynamic which will accelerate climate change to a much greater degree than we can currently anticipate. Even the slight difference between 1.5 and 2 degrees Celsius could bring about serious and destabilizing changes to the habitability of coastal regions, the global water cycles, or ocean ecosystems.

Understanding the interaction of nature as a self-regulating system and the effective power of humans within this system thus provides insight into the *inherent instability* of the system. Climate, with its rapid and radical upheavals, is only one dimension of this volatility. Others relate to changes in the biosphere on land with the loss of habitats, migration and extinction of species, the loss of ecosystem services (through the disappearance of insects, for example) or even the changing world of microbes. If the Anthropocene is concerned with the geophysical power of humans, then the anthropogenic transformation of nature must be linked to its volatility: "Humans are more powerful; nature is more powerful," writes the Australian philosopher Clive Hamilton. "Taken together, there is more power at work on Earth" (Hamilton 2017: 45). An ever more irritable nature encounters increasing intervention from humans.

Processes with inherent tipping points thus connect two opposing types of events on different time scales. On the one hand, there are slow, continuous and gradual processes – latency periods. On the other hand, there are sudden, erratic upheavals that appear difficult to predict; they occur rapidly and bring about irreversible – often catastrophic – changes. The problem is that even this suddenness is barely perceptible, as long as one remains caught up within its dynamics. The concept of the Great Acceleration says nothing else. It ought to be understood less as a review of the recent past than as a prognosis: we are in the midst of an open-ended transformation that is progressing ever faster and only a small part of it seems to be foreseeable, shapeable or avoidable.

Catastrophe without Event

To situate oneself in the Anthropocene means to plunge "blindly," as it were, into a future that is arriving ever more rapidly and that is less and less predictable. What marks the consciousness of the present is the feeling of being at a tipping point, at the very moment a long latency period turns into quick disaster. "The idea of a tipping point introduces a perspective that the 'past' that led up to the current crisis is *only partially understood*, and that the *current transformation is a state of flux* where we have departed from past conditions, but have not yet arrived at a 'new normal'" (Veland and Lynch 2016: 4, my emphasis). The present is characterized by the opacity of the future; it consists above all in anticipating catastrophic upheavals – but without knowing exactly which ones. Thus, in the last twenty years, a wealth of non-fiction books, consulting literature, novels and cinema blockbusters exploring possible catastrophe scenarios have been produced – not a few of them under a title that sums up the sense of time in the 2000s and 2010s: "The end of the world as we knew it."

My diagnosis of this feeling was that the present felt the world was heading towards disaster, yet without having an idea of its concrete form (Horn 2018). There was a sense of foreboding that everything was driving towards tipping points, in ecosystems, climate, financial markets, the welfare states. One such tipping point was illustrated by the financial crisis of 2008/2009, both in its magnitude and the failure to predict it. While one might have foreseen the crash, no one could have anticipated nor prevented its consequences across the global network of financial markets, private credit and public finances. In the past decade, we were hypnotized by a diffuse set of possible worst-case scenarios – from climate collapse in a growing number of cli-fi thrillers to the total extinction of humanity, as in Alan Weisman's 2007 bestseller *The World Without Us* or Jan Zalasiewicz's enormously successful book *The Earth After Us* (2008), which takes up

the concept of the Anthropocene from a geological perspective after the end of humankind.

These imaginaries appear to me to be symptoms of a deeper unease. The unease is a complicated mix of two fears: one referring to potential disasters, the other to the outlook that everything continues as before. Or, to put it differently, the prospects of growth and progress that we are constantly confronted with, are, in fact, the real catastrophe. We secretly dream of the big bang, the breaking out of the latency period into the manifest disaster. This conflation of a disruptive collapse and an eery, unhealthy continuity is most clearly embodied in the ecological crisis of the Anthropocene. The Anthropocene is a *catastrophe without event* (Horn 2018: 8 – 9, 55 – 88), both a disruption and (paradoxically) a continuity. It consists of gradual, yet profound changes. It does not take place in spectacular disasters, but in creeping environmental destruction, inconspicuous changes to biotopes, gradual transformations of water cycles and climate patterns. In the two decades since 2000, the present felt like the latency period before a looming collapse, the exact form of which, however, could only be imagined. This is why disaster movies had their heyday, and it is also why *Fridays for Future*, the only social movement that succeeded in putting climate change on the political agenda, relied heavily on apocalyptic rhetoric – even if this rhetoric is hardly appropriate to the structure of the problem. In order to counter the *catastrophe without event*, it was necessary to conjure up the ultimate event: the end of the world.

Today, with Covid-19, things look different. The arbitrariness of disaster scenarios has suddenly given way to something all too real: the pandemic. Not that there haven't been repeated warnings of precisely this scenario, including an eerily prophetic TED talk by Bill Gates in 2015 and repeated warnings by the WHO after the SARS, H5N1, and Ebola outbreaks. The question is how the *catastrophe without event* relates to the *catastrophe as event* that we experience with Covid-19. Is it a disaster movie come true? (The similarities to Soderbergh's *Contagion* (2011) seem uncanny.) Is the earth striking back? Quite a few commentators have tried to construct such a causal link: Increasing habit destruction and the consumption of "bushmeat" inevitably leads to zoonoses (Pascale and Roger 2020). Seen this way, the coronavirus would therefore present the revenge of the earth in the Anthropocene. But even if the disappearance of natural habitats does indeed increase the probability of zoonoses, assuming an immediate causality between the Anthropocene and Covid-19 oversimplifies the matter (cf. Ali 2020).

It is more plausible to understand the Anthropocene (and its structures, such as globalized travel, production and supply networks) as a framework facilitating the course of the crisis. As a worldwide pandemic, Covid-19 is clearly a phe-

nomenon of the Great Acceleration. In 1950, the infection would not have travelled around the globe so quickly, nor would the shortages and global economic consequences have been so widespread. Yet most interesting to me are the epistemic parallels between the pandemic and the Anthropocene. Like the Anthropocene, the Covid-crisis is neither a purely natural disaster nor a purely social one. Bruno Latour welcomed the affirmation of the inseparability of nature and society in modern times (Latour 1993, Latour 2017) by Covid-19, and called the pandemic, not without a certain *Schadenfreude*, a "dress rehearsal" for the catastrophes that the Anthropocene still holds in store (Latour 2020). The pandemic exposes the vulnerability of the globalized world in the Anthropocene, but it also exposes the massive inequalities of this vulnerability. The point of intersection between Covid-19 and the Anthropocene is clearest from the viewpoint of statistics, which has become the main epistemic field of the pandemic. Following Foucault, Latour assigns this kind of knowledge to the nineteenth century as the epistemic field of biopolitics. Such a biopolitical interpretation of Covid-19 may be true for the interplay between political measures and the statistical recording of the population, as we have experienced in lockdowns, curfews, mass testing, and daily infection rates. etc. The curves themselves, however, are clearly not those of the biopolitical nineteenth century. They are the hockey sticks of the Great Acceleartion, visualizing global processes with sudden escalations.

It is no coincidence that the German climate scientist John Schellnhuber sees a parallel between the developments of Covid-19 and global warming: "[T]he ominous curve of the worldwide cumulative Covid-19 cases has an iconic counterpart, namely, the famous Mauna-Loa curve of the increase in atmospheric CO_2 concentration" (Schellnhuber 2020). Schellnhuber here points to the famous "Keeling curve", named after the chemist Charles D. Keeling who started documenting the increase in CO_2 at the Mauna Loa Observatory (Hawai) in 1958. While the Keeling curve starts only "after" a tipping point (which would have to be placed in the 1930s) and has since recorded an unstoppable rise in CO_2 levels in the atmosphere, in the Covid-19 curves we clearly see a long, flat latency period and then – in mid-March 2020 – a sudden upward turn and, since April, a weekly fluctuation in the daily cases, while the total number of infections worldwide is steadily increasing. In Europe, the curve slowly flattened in May (rising again for the "second wave" which started in August), while in the USA, Brazil, and India the number of infections continued to rise steadily, impressively documented on the website of Johns Hopkins University's Coronavirus Resource Center.

The epistemic similarity between Covid-19 and the Anthropocene lies in the type of event that characterizes both developments. Both are escalations following a long latency period and suddenly surging upwards. In the case of Covid-19

this escalation took place at a breakneck speed. Not years, but days decided the course of the curve – leading to rising infection rates and deaths, overburdened health care systems, stress on vital infrastructure and brutal economic consequences. The combination of tipping points, the domino effects of collapsing systems, to which climate scientists keep alerting us, are confirmed by the pandemic in a textbook manner. Covid-19 demonstrates how everything is connected: infection rates affect the world of work, consumption and health care, which in turn affect national budgets, global supply chains, production processes and labor markets. These linkages recognize neither the boundaries of nature versus society nor national or continental divides within a globally networked world.

Covid-19 is the Anthropocene in fast-forward – a model and an example. The pandemic can thus teach us a lesson about the dangers of ill-preparedness as well as about the risks of taking decisions in a state of highly incomplete and uncertain information. When the virus struck, even modern industrialized countries were not equipped in terms of their health systems and infrastructures, nor did decisions on lockdowns and/or social distancing always come at the right time or get implemented in a consistent way – some moved earlier and more efficiently, others more half-heartedly, others not at all. The failure to be prepared for something that had actually long been known to be a possible scenario once again reflects the structure of disaster thinking in the Anthropocene. While we have quite precise scientific knowledge of possible future threats we face so many options and conflicts of priority that governments and societies are incapable of carrying out concrete precautionary measures. What eventually prevails in the cacophony of disaster scenarios is precisely the principle of business as usual, an attempt to extend the present endlessly into the future. When things then all of a sudden tip, one has at once a feeling of complete unpreparedness and an uncanny sense of déjà-vu.

Sustainability in the Anthropocene

What could "sustainability" mean in a world of tipping points and escalations? Epistemically, the most interesting phase in tipping points is the latency period. It is a matter of both recognizing barely perceptible signs of an impending disaster and of acknowledging the global network of dependencies in which we are entangled. In the Covid-19 crisis we undoubtedly find ourselves beyond the decisive tipping point – maybe with more surprises to come. But where exactly do we stand in the slowly unfolding crisis of the Anthropocene? The *catastrophe without event* confronts every attempt to manage the future with the impossible

task of including an unpredictable future in its precautionary calculations. If "sustainability" focuses on long-term strategies that can be extended into a foreseeable future, then it is definitely not the right keyword for the Anthropocene (cf. Horn 2017). Rather, the aim must be not only to anticipate radical changes, but to actively shape them. It is not about seeking to prolong the present but being ready to leave it behind consciously and in a controlled manner. It involves a different way of dealing with the future, which will in any case be different from and more volatile than the present. It is no coincidence that the politicization of climate change has not been carried out by adults, but by the next generation of politically silenced children and adolescents. They are looking into a fragile, radically different future that they cannot simply stand by and let happen. The question is how to give voice – and concrete power – to time horizons beyond the usual election cycles, ten year programs etc. Dealing with problems in the Anthropocene has to deal with much vaster time scales and much more unpredictable futures.

The Anthropocene thus needs a self-reflexive future management that is not only aware of the range of possible worst-case scenarios, but also of its incomplete knowledge of them. It requires a permanent reflection on those "unknown unknowns" (Horn 2018: 177), once famously ruminated by Donald Rumsfeld. On the one hand, this means an imperative of "preparedness," of being prepared for many different eventualities – Only a few months ago, this attitude would have been dismissed as alarmism. On the other hand, it also means being constantly alert and ready to revise one's hypotheses, which is the essence of scientific research – being aware of one's incomplete knowledge. It is extremely odd that these two attitudes – the gesture of being prepared and the admission of incomplete knowledge – have repeatedly given rise to the ridicule and biting criticism of the scientists consulted in response to the Covid-19 crisis. Anyone who appeared in March 2020 wearing a protective mask was derided as hysterical; anyone who laid down a few essential supplies was accused of being a toilet paper hoarder. Scientists who revised their knowledge based on more recent research findings were berated as being inconsistent. And any hospital chief or health minister who, concerned about a possible epidemic, purchased surplus medical equipment or set up intensive care beds beyond immediate requirements, would have been chased out of office for economic mismanagement.

But sustainability in the Anthropocene requires these two highly unpopular attitudes: Firstly, we need to accept "alarmism" as vigilance towards the possibilities and signs of future escalations. We need to etablish a precautionary principle not just towards technical and social innovations but towards the possibility of rapid changes to the very ground we stand on: nature. Secondly, we need to admit our incomplete knowledge about many non-linear processes. We have to

de forms of knowledge and awareness that constantly reflect on their own elements of blindness and ignorance. Alarmism and the awareness of ignorance, however, do not mean scepticism towards established science such as the IPCC reports or the findings of epidemiology. The difficulty of precisely anticipating non-linear processes applies to climate as well as to social systems, to economics as well as to contagions. But these two attitudes – vigilance and epistemic self-reflection – require a significant degree of imagination. For this reason, the philosopher Hans Jonas advocated an "ethics of the future" based on what he called the "heuristics of fear." As a "compass" or inspiration for such an ethics of the future, he proposed imagining the anticipated danger as precisely as possible: "What can serve us as a compass? The envisioned threat itself! It is only in its *lightning flash from the future* – in the recognition of its planetary scope and profound implications for mankind – that it is possible to discover the ethical principles from which we can derive the obligations that our newfound power demands" (Jonas 1984: 7–8, my translation). Jonas' advice is both complicated and simple: the idea is to assume a standpoint in the future and to look back from that future onto the present as its prehistory, its latency period. Such a glance from the future onto the present cannot be done without imagination. Possible future developments, to the extent that they are now visible at best in small indicators or unspectacular curves, must be extrapolated, fleshed out and highlighted into full-blown scenarios of a world, as it were, *beyond* the tipping point.

This is not only a problem of knowledge, but also one of agency. It is about not only *knowing* something, but also *believing* it – and acting on this conviction. The French philosopher of science Jean-Pierre Dupuy has described this attitude as "enlightened catastrophism," which helps us move beyond denial or paralysis in the face of a threat: "Let's suppose we are certain, or almost certain, that catastrophe lies ahead [...] The problem is that we do not believe it. *We do not believe what we know*" (Dupuy 2002: 141, 144 f., my translation). To believe what we know means to make it an integral part of the reality we live in, to translate it into practical measures or demands. Warnings of global pandemics had been around for a while, but nobody 'believed' in them. Today we hear Lenton or Schellnhuber and their colleagues warn us of the complex web of escalations right ahead of us. Yet the governments that Schellnhuber advises, for example, only partly believe in what they know. The point is to understand threats not as a mere hypothesis but as a *fact* – like a prophecy that says what *will* come, not what might come. For it is only by believing the prophecy, as Dupuy explains using the biblical story of Jonah, that it can become an instrument of its own prevention. This requires that a possible threat becomes credible, tangible, concretely imaginable – not as a possible future, but as the *given* one. "The future," wrote

Jorge Luis Borges, "is inevitable and exact, but it may not happen. God lurks in the intervals" (1999: 223). Humans, one might add, have no other option than to make good use of these intervals.

If the pandemic can teach us a lesson for managing the future in the Anthropocene, it is not only about the possibility of tipping points. It is also about the immense cost of dithering and of scepticism towards scientific findings. Covid-19 also teaches a lesson regarding the wealth of possibilities we are facing – for the best and for the worst. With the pandemic, we have been caught up in a global catastrophe that was considered unthinkable outside of movie theatres. We have learned that within days and week our lives and livelihoods can be uprooted. However, Covid-19 has also shaken many of the iron laws of what was deemed politically and economically feasible. It can therefore be seen as an experiment in the scope of possible action that is afforded societies and individuals in the face of global crises. It has awakened an awareness of contingency, making possible that were previously considered unthinkable. The only thing that is now no longer possible is to carry on as before.

References

Ali, S. (2020) How the Current Coronavirus Pandemic Links to Questions of Ecological Sustainability in the Anthropocene, accessed: 10.05.2020, https://sustainabilitycommunity.springernature.com/users/183121-saleem-ali/posts/63681-how-the-current-pandemic-links-to-broader-questions-of-sustainability-in-the-anthropocene.

Borges, J. L. (1999) The Creation and P.H. Gosse. In: E. Weinberger (ed.) *Selected Non-Fictions*, trans. E. Allen, S. J. Levine, and E. Weinberger, New York: Viking. 222–4.

Dupuy, J.-P. (2002) *Pour un catastrophisme éclairé. Quand l'impossible est certain,* Paris: Éditions du Seuil.

Gates, B. (2015) The Next Outbreak? We're Not Ready, accessed: 10.05.2020, https://www.ted.com/talks/bill_gates_the_next_outbreak_we_re_not_ready.

Gladwell, M. (2001) *Tipping Point. How Little Things Can Make a Big Difference*, New York: Little Brown.

Hamilton, C. (2016) The Anthropocene as Rupture. *The Anthropocene Review* 3 (2) 93–106.

Hamilton, C. (2017) *Defiant Earth. The Fate of Humans in the Anthropocene*, London: Polity Press.

Horn, E. (2018) *The Future as Catastrophe: Imagining Disaster in the Modern Age*, trans. Valentine Pakis. New York: Columbia University Press.

Horn, E. (2017) Jenseits der Kindeskinder. Nachhaltigkeit im Anthropozän. *Merkur* 71 (814), 5–17.

Horn, E., and Bergthaller, H. (2020) *The Anthropocene: Key Issues for the Humanities*, London: Routledge.

Jonas, H. (1984) *The Imperative of Responsibility*, transl. H. Jonas, and D. Herr, Chicago: Chicago University Press.
Latour, B. (1993) *We Have Never been Modern*, New York: Harvester Wheatsheaf.
Latour, B. (2017) *Facing Gaia: Eight Lectures on the New Climatic Regime*. Cambridge: Polity Press.
Latour, B. (2020) Is This a Dress Rehearsal? *Critical Inquiry*, 26. 03. 2020, accessed: 10. 05. 2020, https://critinq.wordpress.com/2020/03/26/is-this-a-dress-rehearsal/.
Lenton, T. (2016) *Earth Systems Science: A Very Short Introduction*. Oxford: Oxford University Press.
Lenton, T. et al. (2019) Climate Tipping Points – Too Risky to Bet Against. *Nature* 575 (7784), 592 – 5.
Lovelock, J. E. (1991) *Gaia. The Practical Science of Planetary Medicine*, London: Gaia Books.
Lovelock, J. E. (2006) *The Revenge of Gaia. Why the Earth is Fighting Back and How We Can Still Save Humanity,* London: Allen Lane.
McNeill, J. R., and Engelke, P. (2016) *The Great Acceleration. An Environmental History of the Anthropocene since 1945*, Cambridge, Mass.: Belknap Press of Harvard University Press.
Moore, B. III et al. (2001) Amsterdam Declaration on Earth System Science 2001, accessed: 10. 05. 2020, http://www.igbp.net/about/history/2001amsterdamdeclarationonearthsystemscience.4.1-b8ae20512db692f2a680001312.html.
Pascale, F. De, and Roger, J.-C. (2020) Coronavirus: An Anthropocene's Hybrid? The Need for a Geoethic Perspective for the Future of the Earth, *AIMS Geosciences* 6 (1), 131 – 4.
Schelling, T. C. (1971) Dynamic Models of Segregation, *Journal of Mathematical Sociology* 1 (2), 143 – 86.
Schellnhuber, J. (2020) Seuchen im Anthropozän. Was uns die Krisen lehrten. *Frankfurter Allgemeine Zeitung*, 15. 04. 2020, accessed: 10. 05. 2020, https://www.faz.net/aktuell/feuilleton/debatten/seu-che-im-anthropozaen-die-lehren--der-corona-krise-16726494.html.
Scherer, B. (2020) Die Pandemie ist kein Überfall von Außerirdischen, *Frankfurter Allgemeine Zeitung*, 03. 05. 2020, accessed: 10. 05. 2020, https://www.faz.net/aktuell/wissen/geist-soziales/leben-im-anthropozaen-die-pandemie-ist-kein-ueberfall-von-ausserirdischen-16744840.html.
Steffen, W. et al. (2004) *Global Change and the Earth System. A Planet Under Pressure*, Berlin: Springer.
Steffen, W. et al. (2011) The Anthropocene. Conceptual and Historical Perspectives. *Philosophical Transactions of the Royal Society* 369 (1938), 842 – 67.
Steffen, W. et al. (2015) The Trajectory of the Anthropocene. The Great Acceleration. *Anthropocene Review* 2 (1), 81 – 98.
Veland, S., and Lynch, A. (2016) Scaling the Anthropocene. *Geoforum* 72, 1 – 5.
Warde, P., Robin, L., and Sörlin, S. (2018) *The Environment. History of an Idea*, Baltimore: Johns Hopkins University Press.
Waters, C. et al. (2016) The Anthropocene Is Functionally and Stratigraphically Distinct from the Holocene. *Science* 351 (6269), aad2622.
Weisman, A. (2007) *The World without Us*, New York: Thomas Dunne Books.
Wilkinson, B. H. (2005) Humans as Geologic Agents. *Geology* 33 (3), 161 – 4.

Zalasiewicz, J. (2008) *The Earth after Us. What Legacy Will Humans Leave in the Rocks?*, Oxford: Oxford University Press.
Zalasiewicz, J. et al. (eds.) (2019) *The Anthropocene as a Geological Time Unit. A Guide to the Scientific Evidence and Current Debate*, Cambridge: Cambridge University Press.