

Article

The Anthropocene, Technology and Fictional Literature

Reinhold Münster

Fakultät Angewandte Natur- und Geisteswissenschaften, Hochschule für Angewandte
Wissenschaften Würzburg-Schweinfurt, 97421 Schweinfurt, Germany

Abstract: In the Geosciences, the new concept of the Anthropocene has been well established. Today, in the Humanities, it is increasingly also accepted as centrally relevant because it allows us to describe our present world in a more accurate fashion. The critical question of this study is what opportunities result from literature and literary studies in order to increase our understanding of the Anthropocene. This essay argues in favor of promoting the study of literature and of the Humanities in the search for necessary impulses that might free us from unilateral-instrumental concepts employed by the Natural Sciences as the only academic field that might be able to solve problems using exclusively technological strategies. We live in the Anthropocene now and must engage with it critically by drawing from both the Natural Sciences and the Humanities if we want to hope for a livable future here on earth.

Keywords: Anthropocene; transhumanism; nature writing; physical reductionism

Human beings emerged, as Max Frisch explained in his novella *Der Mensch erscheint im Holozän* (1979; *Homo Sapiens Appears in the Holocene*), during the period of the Holocene. In this text, a parable, the author draws a parallel between the individual life of the protagonist and the development of the planet Earth. When individual memory disappears, as Frisch's central thesis goes, cosmic knowledge will disappear as well. Increasingly, our world is fragmented into natural and human components. In this process, the human being, as the sole authority bestowing meaning to history, loses its relevance and then even also its own existence. Individuals live, as Frisch claims, in the Holocene, in a period determined by rocks and an unconscious nature, which existed already before people and will also exist without them later:

Die Ameisen, die Herr Geiser neulich unter einer tropfenden Tanne beobachtet hat, legen keinen Wert darauf, dass man Bescheid weiß über sie, so wenig wie die Saurier, die ausgestorben sind, bevor ein Mensch sie gesehen hat. Alle die Zettel, ob an der Wand oder auf dem Teppich, können verschwinden. Was heißt Holozän! Die Natur braucht keine Namen. Das weiß Herr Geiser. Die Gesteine brauchen sein Gedächtnis nicht. (Frisch 1979, p. 138)

[The ants, which Mr. Geiser recently observed under a dripping fir tree, do not care whether we know something about them, just as the dinosaurs which became extinct before any human being ever saw them. All the pieces of paper, whether on the wall or on the carpet, can disappear. What does that mean, Holocene? Nature does not need a name. Mr. Geiser knows that. The rocks do not need his memory.]

This sounds like a reminiscence from old times. The Holocene constitutes, as a majority of scientists assumes, roughly the cultural-historical period from the Neolithic until today, that is, in geological terms, the phase of the last post-glacial warming period until today. Currently, however, there is a new term. The traces that humanity currently leaves on nature all over the globe are now so deep that they will stay for a very long time. These strong effects by people conquering the earth entirely require a different concept to explain and comprehend the consequences. The notion of the Holocene is no longer good enough for this phenomenon.

Some geological hypotheses today expand the range of questions for the natural scientists, and by now also for scholars in the Humanities. Increasingly, the fundamental and critical questions pertain to the understanding of space and time (physics, "Lebenswelt"/living space), but also to a changed definition of nature and culture. We need to reflect anew on the traditional notions of nature—nature as the opposite to culture, technology, history, society, or even metaphysics.

Paul J. Crutzen, in a conference paper delivered in 2000, identified the latest period in the history of humankind and the earth as the "Anthropocene" and thus initiated a paradigm shift (turn) in some areas of the Natural Sciences and, which was new, somewhat later also in the Humanities. This shift, as Crutzen observed, began in the time of the late European Enlightenment and the period of the early industrialization:

Den Beginn des Anthropozäns kann man auf das späte 18. Jahrhundert datieren, da Untersuchungen der in Eisbohrkernen eingeschlossenen Leitbläschen ergaben, dass die Konzentration von CO² und Methan in der Atmosphäre in dieser Zeit weltweit zuzunehmen begann. Dieses Datum fällt überdies mit James Watts Erfindung des sogenannten Watt'schen Parallelogramms im Jahr 1784 zusammen, einer entscheidenden Verbesserung der Dampfmaschine (Crutzen 2019, p. 171).

[The beginning of the Anthropocene can be dated to the late eighteenth century, since investigations of air bubbles within the ice core drillings revealed that the concentration of carbon dioxide and methane within the atmosphere began to grow at that time all over the world. This date coincides with James Watt's invention of the parallelogram in the year 1784, together with a decisive improvement of the steam engine.]

Some scientists wanted to locate the beginning of the Anthropocene in the late Middle Ages, others at the moment when nuclear technology emerged. There are good arguments for each one of these different approaches. More importantly, however, Crutzen also emphasized that the notion of the Anthropocene does not only matter for the study of the past, but would also have to be applied to the prediction of our future here on earth. Crutzen transgressed with his idea the narrow limits of the Natural Sciences. He demanded that scientists do not only focus on empirical investigations, but also take into consideration the development of normative components as relevant for their analysis, such as value judgments that are embraced by society as a whole. The strict separation between the Natural Sciences and Humanities as two separate academic cultures, as conceived by Charles P. Snow in 1960, no longer proves to be helpful in this context.

How can we define the concept of the Anthropocene? The overarching consensus is that the human being dangerously exerts a force that unstoppably changes the earth and, in the near future, also other planets within the solar system (Kaku 2019, pp. 81–90). Already in 2012, the company Planetary Resources was founded for the purpose of economic exploitation of that space. The exploration of space, the economically driven flights to the moon and the asteroids, of which some consist of pure gold, and to comets, across the solar system and by now also beyond the limits of the heliosphere, but then also the mining of the deep layers of the earth's crust and the depth of the oceans, all indicate that today human beings transform the earth in its essential components more than ever before. Human society shapes the earth according to its own concepts; see, for instance, geo-engineering and terraforming. People now model the entire globe as their own possession, and this is in competition with the natural forces that have been at work so far all by themselves. Humans achieve this by adapting it to their own way of living. As Horn now observes, "Weltweit werden durch menschliche Aktivitäten mehr Erde, Sand und Stein bewegt als durch alle natürlichen Prozesse (Horn and Bergthaller 2019, p. 9. Globally, more soil, sand, and rocks are moved through human activity than through all entirely natural processes). As we can notice, people irretrievably change the earth and push the small remains of

wilderness to the margins. True wilderness, as explained by [Schama \(1995\)](#), today has become limited to the few parts of the frozen icy world at the globe's poles, barren mountains, desert landscapes and the deep sea.

There are many geological indicators to confirm this observation. With the help of the example of water we can illustrate a few aspects, chosen at random and yet generalizable: many water dams all over the world were built in rivers in order to create reservoirs and to produce hydroelectric power. Through these new dams the transport of sediments is slowed down, the surrounding natural spaces are flooded, and the living creatures are mostly eliminated ([Spoonner 2016](#), pp. 355–65). Even the plate tectonics of the earth are changing. Let us take the example of the building of large river dams. The Aswan Dam in Egypt created a lake with the length of ca. 340 miles, which is now one of the largest artificial lakes of the world. Ecological and hydrological changes were the consequences, such as the salinification of the soil, migration of animals, especially of mice and rats, overfishing, and the erosion of the Nile estuary. Since 1992, there have been an increased number of earthquakes in that region as the result of the new water pressure on the earth plate. The same applies to the Three-Gorges Dam in China, which has also triggered unusually numerous and strong quakes since 2008. In a very concrete way, human beings contribute to the massive extinction of species or to the migration of species. Gigantic container ships, but also cruise ships, pollute the environment. Tourists are constantly looking for beach paradises and untouched nature, and thus they themselves change those locations irretrievably by building their vacation homes (in this way, large sections of Spanish beaches were complete built up).

Global industry and trade also exert a massive influence on the environment: roads, bridges and tunnels in the mountains accelerate the traffic, but they also destabilize the natural environment. Landslides and avalanches are then often the consequences of such human impacts. Hydraulic fracking contaminates the ground water and causes earthquakes. Gigantic machines for mining mineral resources destroy the environment on a large scale; and often entire forests have to be cut down for the purpose of mining. The changes brought about by people become apparent also in areas subject to desertification, which can be triggered through an intensive form of agriculture. Some natural processes, but today to a much larger extent the consequences of human actions, cause rapid climate change (including chemical erosion, dying of coral reefs, melting of glaciers and the ice at the earth's poles, melting of the permafrost, changes in the weather patterns, poisoning of the air, burning down of the forests in the Amazonas, etc.). Human actions radically impact the globe: there are garbage dumps all over the world, and many parts of the earth's land are destroyed through toxic pollution brought about by excessive use of fertilizers or as a consequence of the production of medications and subsequent dumping of dangerous chemicals as waste products. Our air quality suffers massively from pollution worldwide.

People consume ever more of the earth's products per year. The limits of our ecological sustainability have long been reached and left behind. Humankind moves toward an ecological disaster and uses, on average, all the resources available per year already within half a year, as reported by the Global Footprint Network ([Lesch and Kamphausen 2018](#)). This can only mean we live on a badly damaged earth and are in the process of making our own home planet unlivable ([Schmelzer and Vetter 2019](#); [Atlas der Globalisierung 2009, 2012, 2015, 2019](#)). People have created an environment that is now determined by an uncontrollable dynamic of its own, as Horn has underscored most recently:

Das Anthropozän ist also nicht einfach eine Krise, die irgendwann wieder vorbeigeht, sondern ein Bruch; ein Bruch mit den ungewöhnlich stabilen ökologischen Verhältnissen des Holozäns: Umweltbedingungen, in denen alles entstanden ist, was wir als menschliche Zivilisation kennen, Sesshaftigkeit, Ackerbau, Städte, Handel, komplexe soziale Institutionen, Werkzeuge und Maschinen, aber auch die Schriftkultur und alle anderen Medien zur Speicherung, Weitergabe und Vernetzung von Wissen. War das Holozän die Wiege der Zivilisation, so fragt sich, was der Bruch mit diesen Bedingungen für den Menschen—seine soziale Organisation, seine Technologien, sein Verhältnis zu sich selbst und zur Welt—bedeuten wird. Das

Anthropozän steht für eine Zukunft, deren Konturen wir gerade erst zu erahnen beginnen
([Horn and Bergthaller 2019](#), p. 11).

[The Anthropocene is not simply a crisis that will pass some day in the future; instead, it is an absolute fracture; a breaking down, if not collapse, of the previously stable ecological conditions of the Holocene, which include: Environmental conditions under which everything came into being what we know as human civilization, such as settlements, agriculture, cities, trade, complex social institutions, tools and machines, but also the written culture and all other media serving to record, pass on, and interconnect knowledge. If the Holocene was the cradle of civilization, the question arises what the destruction of those conditions—the social organization, technology, and the relationship of people with themselves and the world—will mean. The Anthropocene stands for a future the outlines of which we are only beginning to grasp.]

These facts have been known already for quite some time and have been discussed in the Natural Sciences. The theories pertaining to the Anthropocene do not only summarize them, but also place them into a new context. The comprehensive concept of the Anthropocene has been expanded during the last few years from being nothing but a geological model to a complex concept explaining the world and diagnosing our current conditions. This critical approach to our natural environment increasingly becomes acceptable by the Humanities as well. At the same time, we observe the growing criticism of the Natural Sciences, especially from the perspectives of ethics and human values because they and along with them the world of technology can no longer rely on the naïve claim that they do not pursue any agendas and are objective. Instead, they have to answer the question regarding their own value (economic and moral) and the social responsibility of their research. The insistence on complete innocence was lost at the latest when the first nuclear bomb was built, tested, and then used in the war against Japan, and also when the devastating events took place more recently in Chernobyl and Fukushima. The poisoning of the soil through the nuclear industry and the military will have an impact for many thousands of years, perhaps until the geological end of the earth.

The belief in infinite progress, as embraced by the modern industrialized nations, a belief that is primarily determined by the idea of efficiency and optimization of the production process and of human labor, reveals the forces of destruction as they emerge during the Anthropocene. Consequently, the social responsibilities of the Natural Sciences need to be redefined concerning the commonwealth and as a result of new ethics ([Felber 2017](#)). However, the very opposite is currently the case, as can be easily shown in the realm of education. In the USA and Western Europe (and probably in other parts of the world acceptable by the Humanities world), the technical disciplines have been over-emphasized, while the Humanities lost considerably in financial and political support. The Nobel Prize winner Joseph Stiglitz observed, for instance, that in the USA currently the universities have been commonly identified as the enemy of the government, which is mostly driven by authoritarian neo-liberalism ([Stiglitz 2020](#), p. 10), which goes oddly hand in hand with the growing corporatization of those institutes of higher learning, where profit ranks higher than research and learning.

Politicians worldwide prefer the applied sciences, not fundamental research. The technical answer to the questions raised by those who warn about the consequences of the radical destruction of the environment and our living space consists in the claim that geo-engineering or terraforming can limit the problems, control them, or even solve them altogether. These technologies must be used globally to function strategically, but no one knows their impacts and side effects, which can always be expected when we try, for example, to manipulate our climate. Consequently, such technologies must be implemented under extremely clean and meticulously planned conditions and are far away from being implemented globally. We also have to keep in mind that the environmental crisis can get worse despite all of those efforts. New conflicts or crises in many different countries or regions, such as mass exodus, if not flight, from war zones, or from areas that have been flooded, give us an idea of what the social and economic costs will be if we fail in our endeavors to protect our earth ([Heinrich-Böll-Stiftung](#)

2019a, Plastik-Atlas; [Heinrich-Böll-Stiftung 2017](#), Meeres-Atlas; [Heinrich-Böll-Stiftung 2019b](#), Agrar-Atlas; [Heinrich-Böll-Stiftung 2018](#), Energie-Atlas). There is certainly a consensus among all scientists that we cannot return to the pre-industrial times, but that is very little consolation for our future.

Since the seventeenth century, people have favored technology as the central method of solving grave problems, which have emerged during the Anthropocene. We find evidence for this phenomenon in the history of ideas and the history of technology (mechanization of the European society). René Descartes, above all, created a distinction with huge consequences: he introduced the concepts of the “res extensa” and the “res cogitans.” He observed that there are objects outside of our thinking, and objects that are real within the world of thinking. Hence, there is a realm within the world that can be objectively described by the rational subject. He additionally distinguished between a person’s spirit and body. This sharp distinction has had a deep impact on the subsequent debates regarding human consciousness and on the question regarding the role of our bodies.

The human body, like the animal body, does not have any consciousness, as Descartes argued. Only the spirit (“res cogitans”) can think and feel. This theory reduces animal and human bodies to the level of machines. These reflections have deeply impacted us until today, especially if we consider theories of post- and transhumanism. According to those concepts, the human body, reduced to being a non-spiritual object, is to be optimized and expanded with technical components (human capital, body capital). The distinction between brain and spirit urges us to optimize the brain as well with technological means. Let us use a simple, mundane example: an early indication for this are the many joggers in public parks who control, with the help of digital technology, their body functions and also allow that technology to control them. Those data do not only serve the jogger to improve his/her accomplishments, but also become valuable for corporations and insurances. They are also a part of the circle of economic optimization. According to the post- und transhumanistic theory, this optimization and control of the individual will automatically lead to a time of bliss ([Zons 2001](#); [Wagner 2017](#); [Demuth 2018](#)).

That was and is, now slightly modified, the promise of the liberal and neoliberal market economists since the time of Adam Smith and David Ricardo, according to whom the egoism of the individual, guided by an invisible hand, creates the happiness of the masses. Pierre [Bourdieu \(1992\)](#) even argues that central areas of human existence, such as economic, cultural, and social capital, can be translated into monetary terms. The theories of neuro-enhancement follow this direction, advocating the self-optimization of the individual, who has the power to adept to every new situation on the markets or in private life by means of competition, based on physical and cognitive improvements. Through such efforts the individual would succeed in surviving in a changing environment. This is illustrated, for instance, by attempts to overcome the aging process affecting our bodies or to even prevent death. Body cells could be reprogrammed, and thus the individual life could not only be prolonged, but we could even guarantee a kind of eternal youth. David A. Sinclair enthusiastically pronounced, for instance, “Kein biologisches Gesetz besagt, dass wir altern müssen [. . .]” ([Sinclair 2019](#), p. 351; There is no biological law that states that we must age).

The concepts by the transhumanistic theories, which have gained in influence since the beginning of the twentieth century, have strongly contributed to this notion ([Loh 2018](#); [Spreen et al. 2018](#)). These concepts have been primarily developed by Julian S. Huxley, J. Desmond Bernal ([Bernal \[1929\] 1969](#)), and Fereidun M. [Esfandiary \(1973\)](#). These thinkers also projected the idea of a new eugenics, considering the growth of the human population—certainly another critical component of the Anthropocene. The early authors did not shy away from discussing ideas pertaining to human races and racism ([Huxley 1965](#), pp. 250–80; more critically, [Weingart et al. 1988](#), pp. 562–630). Within the context of a post-structural approach, Michel Foucault pronounced the end of the human being in the traditional sense, identifying it instead as a discursive and social construct—undoubtedly an effort to widen the framework of the scholarly debate ([Foucault 1971](#), p. 462). He drew from Friedrich Nietzsche’s concept of the need to overcome the conditions of people in the present stage, but also from Martin Heidegger’s *Brief über den Humanismus* (1946). Peter Sloterdijk announced in his *Elmau* speech: “[. . .]

die Menschenhaltung in Parks oder Städten erscheint von jetzt an als eine zoo-politische Aufgabe" (Sloterdijk 1999, p. 48; the breeding of human beings in parks or cities from now on appears to be primarily a zoo-political task). According to him, the newly formulated question addressing Humanism focuses on nothing less but "eine Anthropodizee" (Sloterdijk 1999, p. 19; an Anthropodicy).

These kinds of technologically oriented reflections do not only aim at the improvement of the body and the brain, but also at the control of feelings and passions, of thinking, and ultimately of the human spirit (Ehrenberg 2019). The employment of artificial intelligence is supposed to achieve that goal, which might make possible the transformation of the human being into a cyborg. For those advocating such ideas, the human being appears to be nothing but malleable raw material, the natural and intellectual limitations of which could be expanded limitlessly.

In this context we have to consider an additional aspect. The emphasis here rests on the quantification (and optimization) of the social life, that is, on the metrification of all people. Stefan Mau was able to demonstrate that the new social order with scoring and screening, ranking, and rating defines what conditions of the earth and of human society are regarded as valuable and desirable. In its wake, the fight over the determination and control of values broke out globally, leading to a kind of "Bewertungsgesellschaft" (Mau 2017, p. 17; evaluating society).

Concrete consequences already become visible. Some pedagogues in Germany and in Switzerland have recently demanded insistently that we introduce a life-score, a figure that would make it possible to measure the life achievements of the individual at any point in time (Bildung neu denken, Vereinigung der Bayerischen Wirtschaft 2003). The applications of those concepts have now become implemented and are no longer in the stage of theory, such as in kindergartens (obligatory documentation of all accomplishments of the children), schools, universities (European Credit Transfer System—ECTS), and in companies. Dong Song (University of Southern California), for instance, implanted computer chips into the brains of a small number of people in the year 2017, which allegedly achieved an improved thinking capacity in the short-term memory by 25 percent. The goal was the creation of a super-artificial intelligence (mind child). Technically, this is made possible through brain-computer interfaces (Jäger 2017; Kaku 2014; Lenzen 2018; as to criticism, see Spiekermann 2019). The transformations of people's living spaces and of people themselves have already left the level of fantasy and visions.

James Lovelock has recently developed a radical posthuman theory in which he wants to replace the term "Anthropocene" with the term "Novocene." His hypotheses highlight the close connection between the transformation of the earth as a material object and the transformation of people. Already in the 1960s, Lovelock had developed the Gaia-Theory. Today the domination of people over the organism of "Gaia" is currently coming to an end; new living creatures would assume the power in the cosmos:

Das Revolutionäre an diesem Moment ist, dass die Versteher der Zukunft keine Menschen sein werden, sondern ‚Cyborgs‘, [. . .] die sich aus den Systemen künstlicher Intelligenz, die wir bereits entwickelt haben, selbst entwerfen und erschaffen werden. Diese Wesen werden bald tausend und schließlich Millionen Mal intelligenter sein als wir. (Lovelock 2020, p. 46).

[The revolutionary aspect of this moment consists in the fact that those who understand the future will not be human beings, but 'cyborgs' which will design and create themselves out of the systems of artificial intelligence, which we have already developed. Those beings will be a thousand, eventually a million times more intelligent than us.]

Lovelock believes that engineering brilliance could optimize the old human life into a form of cyborgs, and also reproduce and correct that previous life and thus overcome it by means of a natural selection. No longer the life code of DNA/RNA, but the Bit would determine future human existence. The cyborgs transform nature and environment according to the conditions of their needs (terraforming). In the course of time, antiquated human life forms would disappear and the new living creatures would have, on the one hand, adapted to the conditions on the planet earth, and on the other, would have reformed them.

These ideas met with some opposition. Especially the notion of nature being inexhaustible has been criticized already for some time (cf. [Meadows et al. 1972](#), *Die Grenzen des Wachstums*). Some anthropologists and cultural historians predicted in this context the end of nature as we know it; others relate problems of speeding up cultural processes in society ([Rosa 2012](#)), and others again viewed the technological-industrial hubris of the global players as effective in the economy. We often encounter in this context a narrative of catastrophe or apocalypse ([Dürbeck 2018](#)). Warnings were formulated and scenarios of the end of humankind were projected already much earlier, especially by Karl [Jaspers \(1931\)](#), Carl Friedrich von [Weizsäcker \(1977\)](#), and Hans [Jonas \(1979\)](#). They called for a change in our thinking regarding the ongoing destruction of the environment and the possible end of humankind as they perceived it. Especially the term “Epochenbewusstseins” (consciousness of the epoch), with which Jaspers formulated the need to change our thinking about the world, is accepted today in the debates about the Anthropocene ([Chakrabarty 2015](#)). These three thinkers established a discourse structured by specific demands, which can be summarized in one sentence: We need a new Enlightenment ([Weizsäcker 2018](#)).

Another counter-movement against the technological world is betting on a new humanization of the environment, often even in the form of an infantilization. Its representatives combine esoteric and pseudo-sciences with elements from a life philosophy that altogether guarantees high sales numbers of their books all over the world. Similarly, politicians, following this thinking, tend to stand in the forest and hug trees in order to demonstrate their competence regarding sustainability and the protection of nature. Forest rangers, for example, describe the magical-secret life of trees. An ideological form of Romanticization or the projection of idylls characterizes this approach in many narratives (méta récits), which is predicated on the idea that we turn back in our evolution into the state of an amoeba or an amphibian. Bruno Latour, for instance, recommends to humankind: “[. . .] auf den Kompost umzuziehen, weil da sowieso schon vieles lebt” ([Klaue 2020](#); move to the compost pile because there is already so much life).

Particularly the theories concerning the Anthropocene are highly abstract in their structure. They rely on statistics, on databases, and on the results of measurements. In this process, they move far away from the sensuous narratives in literature. But particularly those theories require a concretization. How can one compose a lively text about the statistically high level of carbon dioxide in the atmosphere, which is invisible? This would represent a high demand on the poet or novelist. Daniel Falb formulated it as follows: “Wenn Unsichtbares keine Ästhetik hat, und wenn das Anthropozän unsichtbar ist, dann hat das Anthropozän keine Ästhetik. Es ist vielmehr ein rein konzeptuelles Objekt” ([Falb 2015](#), p. 34; When the invisible has no aesthetics, and when the Anthropocene is invisible, then the Anthropocene has no aesthetics). Christian Hoiß argued that the Anthropocene is a fairy tale about the future of humankind ([Hoiß 2017](#)). What would then the contribution of fictional literature be regarding the perception of the changing reality in abstract terms? Can we find in literary works an aesthetic and an approach to our new living space, the Anthropocene?

For a first step in this direction, let us consider three authors whose texts demonstrate a stimulating degree of a nity toward the Nature Writing and some relevant ideas about the dangers resulting from the conditions of the Anthropocene. The Czech author Karel Capek described in his novel *War with the Newts* (*Válka s mloky*; [Capek 1936](#)), relying on a highly modern scientific method, the aggressive conquest of the human world through a new and indescribable species of salamanders, which emerged at the end of the novel from the river Moldova near the Charles Bridge in Prague. The conquest of the world by the Europeans during the time of colonialism and then the industrialization with its imperialism led to the need for the salamanders, not only to adapt to the new world, but also to take it over. Humankind was thus presented with the threat by the salamanders, which also commanded the development of means to restructure the world.

The intelligent ocean is also a being inexplicable to human thinking and feeling, as described in Stanisław Lem’s famous novel *Solaris* (1961, Polish; made into movies three times already). This ocean

creates landscapes and living creatures that emerge and disappear again without the protagonist being able to find a sufficient explanation for these phenomena.

In Frank Schätzing's bestseller, *Der Schwarm* (The Swarm, 2004, German; translated into numerous languages), a living creature that arises from the ocean attacks humankind. These three novels share the large question of what might be the effect that the acting humankind might have, not only on the psyche and the living environment, but also on the material earth. Intriguingly, in all three cases "the other" remains completely inexplicable and yet it can claim a right on life.

These three novels are also concerned with the abyss between the Natural Science on the one hand, characterized by its trend toward reductionism and a tendency to focus on empirical questions only, and the Humanities on the other. Let me explain this with a brief consideration of the philosophy of consciousness. Tilman Nagel raises the question in his forward-looking essay pertaining to sensibilities and perceptions: "What is it like to be a bat?" Here we face the hard and the soft problem of consciousness. This can be described in terms of medical-objective processes, but physicalism does not explain what it feels like when someone is thirsty.

The natural scientists have no possibility to explain how a bat feels when it recognizes the world via its echolocation. S/he can only observe that the human being, in its own features as a species, does not have a sensory organ for this kind of world perception. Subjectivity, which is the result of this observation, cannot be identified by means of an objectifying physicalism. Especially the reductionism, applied by physical monism, proves incapable to represent the subjective side of the experiences by plants (Mancuso and Viola 2015), animals, and human beings.

Ich nehme an: wir alle glauben, dass Fledermäuse Erlebnisse haben. Schließlich sind sie Säugetiere, und es gibt keinen größeren Zweifel daran, dass sie Erlebnisse haben als daran, dass Mäuse, Tauben oder Wale Erlebnisse haben. [. . .] Obwohl das Fledermaus-Radar klarerweise eine Form von Wahrnehmung ist, ist es in seinem Funktionieren keinem der Sinne ähnlich, die wir besitzen. Auch gibt es keinen Grund zu der Annahme, dass es subjektiv so wie irgendetwas ist, das wir erleben oder das wir uns vorstellen können. (Nagel 2009, p. 64).

[I assume: we all believe that bats have some perceptive experiences. After all, they are mammals. After all, there is no doubt that they have experiences similarly to mice, doves, or whales [. . .] However, even though the echolocation of bats obviously produces a form of perception, this is in no way similar to the ones that we experience. Further, there is no reason to assume that it is subjectively somehow like anything what we experience or can imagine.]

How does fictional literature operate with this question? It offers the opportunity to practice new ways of seeing things and makes it possible to achieve a changed evaluation of things. Even when nature remains alien to us, there is the possibility to accept this as reality and at the same time to explain one's own position. This sense of feeling alien in this world is the fundamental position of Nature Writing.

In German-language literature, this position has so far been accepted only tentatively. Some authors do not look for a subjective identification with nature (romantic approach), but first of all identify the difference between the writing individual and perceived nature. The most appropriate literary genres for this purpose are the autobiography and the daily journal (Fischer 2019, p. 167). Additionally, some types of travel literature can be associated with this narrative approach. Richard Deakin, in his *Waterlog* (1999; German trans. 2015) developed an aesthetics of "wild swimming," which facilitated for him the encounter with alien beings in ponds, rivers, or lakes. The reduced distance creates a changed perception of nature as environment, of its material condition, and of its living beings.

Nature Writing could be conceived of, in a first step, as a poetic study of nature, but not in the way practiced by Alfred Brehm in his multi-volume and highly popular *Tierleben* (1860-; Life of Animals). The "classical" author of this new concept of creative writing, however, hailed from nineteenth-century America. Henry D. Thoreau established the foundation for this new approach with his famous *Walden*:

or, *Life in the Woods* (1854). This journal proves to be the experiment of a surveyor. Thoreau observed exactly the nature of his environment. For instance, caught in a glass of water, three insects struggle for survival. This was an experience that fascinated the author, but he did not intervene, and he also could not understand exactly what was going on in front of his eyes. Thoreau did nothing else but share his observations with the readers. By refusing to add an interpretation, he conceived of a model that was highly influential for the later development of Nature Writing, such as in the case of the British author Helen Macdonald.

Macdonald published her highly respected *H is for Hawk* in 2014. This can also be regarded as a mixture between natural study and autobiographical narrative. In this book, she reports about her relationship with the goshawk Mabel and about her attempts to tame and train the bird for hunting. But the author failed to penetrate into the psyche of the bird and to impose her own will upon it. However, in that process, Macdonald experienced not only a subjective expansion of her own living space, but also learned how to appreciate nature. The end result was a changed approach to nature, which remained alien but demanded respect.

In the meantime, a new form of writing has emerged in the age of the Anthropocene, which utilizes this environment as a new possibility to describe the world. In 2018, the young Austrian writer Philipp Weiss published the novel, *Am Weltenrand sitzen die Menschen und lachen*, in five volumes. The focus shared in each one of them is the catastrophe of Fukushima in 2011. There are diverse genres contained in this massive work: encyclopedia, journal, notes, a graphic novel drawn by Ra aela Schöbitz, and tape recordings, but also short stories. The volume entitled *Cahiers Chantal Blanchard. Siebtes Heft—November 2010 bis März 2011* offers us the most interesting information about the problems in the epoch of the Anthropocene. This is a book with notes by the fictional character Chantal Blanchard. She finds herself internally split. As a natural scientist, she is working with a skeleton from the early Stone Age in Japan, found in the fictional and yet real cave of Gyokusendo on the island of Okinawa, and she pursues at the same time the many strands of cosmology and geology. In her journal, she reflects on various new theses by recent researchers. As a physicist, Blanchard had been charged with reconstructing the climate of Southeast Asia over the last three million years:

An zwei Enden stehen wir, Kind von Gyokusendo. Ich hier, in Frankreich, am westlichen Ende des eurasischen Kontinents, du in Japan, an dessen östlichem Ende, ich hier, am Atlantik, du dort, am Pazifik. Räume trennen uns, Kind von Gyokusendo. Und Zeiten. Und doch, es gibt etwas, das uns verbindet [. . .] (Weiss 2018, p. 39).

[We are at two end points, my child of Gyokusendo. I am here in France, at the western end of the Eurasian continent, you are in Japan, at the most eastern endpoint; I am here at the Atlantic, you are there, at the Pacific Ocean. Spaces separate us, my child of Gyokusendo. And time periods. And yet, there is something that connects (. . .).]

The protagonist also learns that an early ancestor of hers, who had lived during the time of the Paris Commune and who had toured the entire world, was found as a mummy in the ice of the Mont Blanc mountain range. There are many geological sediments that accompany Blanchard's thinking, but not only that. In her book with notes she confronts herself also with the depths of her feeling and her soul. There she discovers chaos and wilderness, a Nietzschean will to live. The individual "I" proves to be just as alien to itself as is the world outside. When she glances at the historical philosophy developed by Walter Benjamin in his description of the painting by Paul Klee, the famous *Angelus Novus* (1920), the protagonist of the novel discovers an internal connection among the earth, low-level living creatures, humankind, and herself. But this chain of beings can only be described in her own perception as an infinite sequence of catastrophes:

Der Mensch ist ein kosmischer Unfall. Seit ich das verstanden habe, fühle ich Erleichterung. [. . .] Die unersättliche menschliche Hybris gefällt sich noch darin, sich etwas auf ihr Zerstörungspotential einzubilden. Der Mensch ist die Folge einer ausgedehnten Verkettung

abscheulicher Katastrophen und Zufälle. [. . .] Doch Sie können beruhigt sein. Das Universum operiert stets am äußersten Rand eines stabilen Ungleichgewichts (Weiss 2018, p. 46).

[Homo sapiens was a cosmic accident. Once I had understood that, I felt relieved . . . The insatiable human hubris finds pleasure in being proud of its potential to destroy. The human being is the consequence of an extended concatenation of horrible catastrophes and accidents . . . But you can stay calm. The universe always operates at the extreme limits of a stable imbalance.]

This novel works with irony, which creates distance, and with disillusion. It proves to be impossible at the moment to establish a genealogy of people and nature because no one can know the goal of this universe. The passing through the geological ages into a destructive Anthropocene must remain fragmentary. Nevertheless, Blanchard explores the opportunity to reflect on the process of how homo sapiens emerged, and she also considers the decline of that species with the help of pictures of the lower sediments of the earth. The destiny of the human being and his or her relationship with nature becomes a challenge also for the literary activities in the present time.

The modern Natural Sciences primarily pursue two intellectual positions: reductionism and the ideas of trans- and posthumanism, which could lead to the end of the notion of nature as it has been embraced up to now. A number of philosophical and social theories have accepted those ideas. The experience of an irretrievable transformation of the globe, which is described by the geological theory of the Anthropocene, makes a new type of thinking visible. In this process, a theoretical model has emerged, which seems to be useful for the description of geological and also social conditions through non-scientific modes of expression.

To conclude, as stated above, one of the central problems of the theories addressing the Anthropocene consists of their abstractness. The philosophy of consciousness already pointed out, in contrast to the modern science of cognition, the possibility of comprehending even alien living creatures and their sensory perception. And here we find the challenges for the Humanities, for modern aesthetics, and fictional literature—to which the authors mentioned last Macdonald and Weiss, who have perhaps responded best so far. Their works might facilitate the practicing of new modes of thinking in the Humanities and the Natural Sciences because they promise to open a transformed gaze at the world, in its greatest depths and far into the cosmic space. This gaze might reveal to us the path toward a more livable world, and it might also trigger a reorientation in the Natural Sciences, which have so far exclusively pursued the goals of trans- and posthumanism by way of relying on the methods of reductionism, or on the absolute focus on data, without considering ethical values, human ideals, and the responsibilities of the human species here on earth.

Funding: This research received no external funding.

Acknowledgments: I would like to express my gratitude to Albrecht Classen for translating and editing this article for me.

Conflicts of Interest: The author declares no conflict of interest.

References

- Atlas der Globalisierung. Sehen und verstehen, was die Welt bewegt. 2009. Paris and Berlin: Le Monde diplomatique.
- Atlas der Globalisierung. Die Welt von morgen. 2012. Paris and Berlin: Le Monde diplomatique.
- Atlas der Globalisierung. Weniger wird mehr. 2015. Paris and Berlin: Le Monde diplomatique.
- Atlas der Globalisierung. Welt in Bewegung. 2019. Paris and Berlin: Le Monde diplomatique.
- Bernal, John Desmond. 1969. *The World, the Flesh and the Devil. An Enquiry into the Future*. Bloomington: Indiana University Press. First published 1929.
- Bourdieu, Pierre. 1992. *Die verborgenen Mechanismen der Macht*. Hamburg: VSA.
- Capek, Karel. 1936. *Der Krieg mit den Molchen/Vlaka s mloky*. Zürich: Diogenes, Prag: Mestske knihovne.

- Chakrabarty, Dipesh. 2015. The Human Condition in the Anthropocene. Available online: <https://tannerlectures.utah.edu/Chakrabarty%20manuscript.pdf> (accessed on 30 June 2020).
- Crutzen, Paul J. 2019. Das Anthropozän. Munich: Oekom Verlag, pp. 171–73.
- Demuth, Volker. 2018. Der nächste Mensch. Berlin: Matthes und Seitz.
- Dürbeck, Gabriele. 2018. Narrative des Anthropozän–Systematisierung eines interdisziplinären Diskurses. *Kulturwissenschaftliche Zeitschrift* 1: 1–20. [CrossRef]
- Ehrenberg, Alain. 2019. Die Mechanik der Leidenschaften. Gehirn, Verhalten, Gesellschaft. Frankfurt am Main: Suhrkamp.
- Esfandiary, Feridun M. (FM-2030). 1973. Unwingers. A Futurist Manifesto. New York: John Day Company.
- Falb, Daniel. 2015. Anthropozän. Dichtung in der Gegenwartsgeologie. Berlin: Verlagshaus Berlin.
- Felber, Christian. 2017. Ethischer Welthandel. Alternativen zu TTIP, WTO&Co. Vienna: Deuticke.
- Fischer, Ludwig. 2019. Natur im Sinn. Naturwahrnehmung und Literatur. Berlin: Matthes & Seitz.
- Foucault, Michel. 1971. Die Ordnung der Dinge. Eine Archäologie der Humanwissenschaften. Frankfurt am Main: Suhrkamp, Originally published as 1966. *Les mots et les choses*. Paris: Gallimard.
- Frisch, Max. 1979. Der Mensch erscheint im Holozän. Frankfurt am Main: Suhrkamp.
- Heinrich-Böll-Stiftung. 2017. Meeresatlas. Berlin and Paris: Le Monde diplomatique.
- Heinrich-Böll-Stiftung. 2018. Energieatlas. Berlin and Paris: Le Monde diplomatique.
- Heinrich-Böll-Stiftung. 2019a. Plastikatlas. Berlin and Paris: Le Monde diplomatique.
- Heinrich-Böll-Stiftung. 2019b. Agraratlas. Berlin and Paris: Le Monde diplomatique.
- Hoiß, Christian. 2017. Das Anthropozän: Auf den Spuren eines Narrativs. In *Crossmediales Erzählen vom Anthropozän. Literarische Spuren in einem neuen Zeitalter*. Edited by Sabine Anselm and Christian Hoiß. Munich: oekom, pp. 13–37.
- Horn, Eva, and Hannes Bergthaller. 2019. Anthropozän. Hamburg: Junius.
- Huxley, Julian. 1965. Ich sehe den künftigen Menschen. Natur und neuer Humanismus. Munich: List.
- Jäger, Lars. 2017. Supermacht Wissenschaft. Unsere Zukunft zwischen Himmel und Hölle. Gütersloh: Gütersloher Verlagshaus.
- Jaspers, Karl. 1931. Die geistige Situation der Zeit. Berlin: Walter de Gruyter.
- Jonas, Hans. 1979. Das Prinzip Verantwortung. Versuch einer Ethik für die technische Zivilisation. Frankfurt am Main: Insel.
- Kaku, Michio. 2014. Die Physik des Bewusstseins. Über die Zukunft des Geistes. Reinbek bei Hamburg: Rowohlt.
- Kaku, Michio. 2019. Abschied von der Erde. Die Zukunft der Menschheit. Reinbek bei Hamburg: Rowohlt.
- Klaue, Magnus. 2020. Lahme Literaten. *Zs. Jungle World*. January 30. Available online: <https://jungle.world/artikel/2020/05/lahme-literaten> (accessed on 30 June 2020).
- Lenzen, Mauela. 2018. Künstliche Intelligenz. Munich: Beck.
- Lesch, Harald, and Klaus Kamphausen. 2018. Die Menschheit schaut sich ab. Die Erde im Gri des Anthropozäns, 2nd ed. Munich: Droemer-Knaur. First published 2016.
- Loh, Janina. 2018. Trans- und Posthumanismus. Hamburg: Junius.
- Lovelock, James. 2020. Novozän. Das kommende Zeitalter der Hyperintelligenz. Munich: Beck, Originally published as 2018. *Novacene. The Coming Age of Hyperintelligence*. London: Penguin Books.
- Mancuso, Stephano, and Alessandra Viola. 2015. Die Intelligenz der Pflanzen. Munich: Kunstmann.
- Mau, Ste en. 2017. Das metrische Wir. Über die Quantifizierung des Sozialen. Frankfurt am Main: Suhrkamp.
- Meadows, Dennis, Meadows Donella, Erich Zahn, and Peter Milling. 1972. Die Grenzen des Wachstums. Reinbek bei Hamburg: Rowohlt.
- Nagel, Tilman. 2009. Wie ist es, eine Fledermaus zu sein? In *Grundkurs Philosophie des Geistes*. Vol. 1. Phänomenales Bewusstsein. Edited by Thomas Metzinger. Paderborn: Mentis, pp. 62–77.
- Rosa, Hartmut. 2012. Weltbeziehungen im Zeitalter der Beschleunigung. Umrisse einer neuen Gesellschaftskritik. Frankfurt am Main: Suhrkamp.
- Schama, Simon. 1995. Der Traum von der Wildnis. Natur als Imagination. Munich: Kindler.
- Schmelzer, Matthias, and Andrea Vetter. 2019. Degrowth/Postwachstum. Hamburg: Junius.
- Sinclair, David A. 2019. Das Ende des Alterns. Die revolutionäre Medizin von morgen. Cologne: DuMont.
- Sloterdijk, Peter. 1999. Regeln für den Menschenpark. Ein Antwortschreiben zu Heideggers Brief über den Humanismus. Frankfurt am Main: Suhrkamp.
- Spiekermann, Sarah. 2019. Digitale Ethik. Ein Wertesystem für das 21. Jahrhundert. Munich: Droemer-Knaur.

- Spooner, Alecia M. 2016. *Geologie für Dummies*. Weinheim: Wiley-VCH.
- Spreen, Dierk, Hurka Flessner, M. Herbert, and Johannes Rüster. 2018. *Kritik des Transhumanismus. Über eine Ideologie der Optimierungsgesellschaft*. Bielefeld: Transcript.
- Stiglitz, Joseph. 2020. *Der Preis des Profits*. Munich: Siedler.
- Vereinigung der Bayerischen Wirtschaft, ed. 2003. *Bildung neu denken! Ein Zukunftsprojekt*. Opladen: Leske & Budrich, pp. 15–42.
- Wagner, Greta. 2017. *Selbstoptimierung. Praxis und Kritik von Neuroenhancement*. Frankfurt am Main: Campus. Weingart, Peter, Jürgen Kroll, and Kurt Bayertz. 1988. *Rasse, Blut und Gene. Geschichte der Eugenik und Rassenhygiene in Deutschland*. Frankfurt am Main: Suhrkamp.
- Weiss, Philipp. 2018. *Am Weltenrand sitzen die Menschen und lachen*. Frankfurt a. M.: Suhrkamp.
- Weizsäcker, Carl Friedrich von. 1977. *Der Garten des Menschlichen. Beiträge zur geschichtlichen Anthropologie*. Munich: Hanser.
- Weizsäcker, Ernst U. M. Freiherr von. 2018. Wir brauchen eine neue Aufklärung. In *Die Menschheit schaut sich ab. Die Erde im 21. Jahrhundert*, 2nd ed. Edited by Harald Lesch and Klaus Kamphausen. Munich: Droemer Knaur, pp. 441–54.
- Zons, Rainer. 2001. *Die Zeit des Menschen. Zur Kritik des Posthumanismus*. Frankfurt am Main: Suhrkamp.

