



Article

How Anthropocene Might Save the World: Metamorphosis

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Abstract: The Anthropocene has created a new cartography. It moves between the rejection of scientific disciplines, overcoming dualism and a change of coordinates with which to interpret the world. The Anthropocene unites two fields of knowledge: geology and anthropology. The “Axial Age” divides daily practices (the World of life) and the objective view of nature (the World of science). The Anthropocene by Paul J. Crutzen and Eugene Stoermer has two distinct parts; the first establishes “a period of time”, and the second establishes an “epistemic tool”. This paper is intended to illustrate the epistemological dimension of the Anthropocene. Eduard Suess, Antonio Stopani, Pierre Teilhard de Chardin, Vladimir Vernadsky, etc., anticipated the concept of the Anthropocene a century ago. The hypothesis of the earth as a “living organism” is inspired by the Goethean Science or *Naturwissenschaft* of Johann Wolfgang von Goethe. It reinforces the character of “rupture” that the Anthropocene has. The Gaia Hypothesis, which is built from elements of Earth science systems, sees the pressing need for a global system and to overcome the barriers between disciplines. The Anthropocene allows both ancient quarrels and the roots of philosophical thought to be reviewed. The metamorphosis linked to the Anthropocene represents the interplay between “collapse” and “awakening”. Focus on the objectivity of the “primary effects”—the “public bads”—leads to the imminent ecological apocalypse. If we focus on “secondary effects”, we observe the metamorphosis of “public bads” into “public goods”. The “good” hides behind the “evil”. We are not at the end of Civilization; we are before new beginnings, new rules, new structures. The Anthropocene could save the world thanks to the metamorphosis of our consciousness of the world.

Keywords: Anthropocene; Noosphere; biosphere; morphology; metamorphosis; geophysiology



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1. Introduction

The term Anthropocene was introduced in 2000 by Paul J. Crutzen. It is no coincidence that the term was introduced by an atmospheric chemist who won the Nobel Prize in 1995 with research into the chemical composition of the atmosphere. At a conference in Cuernavaca (Mexico) he heard “we are in the age of the Holocene” and exclaimed: “No! We are no longer in the Holocene, but in the Anthropocene!” (Arias-Maldonado 2018a).

“Social change” is a social theory concept. If what changes are the certainties on which social theory is based, we are not dealing with change but with “metamorphosis”. Social theory explains the reproduction of the social order (Beck 2016). For this reason, the Anthropocene, exposed by Paul J. Crutzen and Eugene Stoermer, makes a distinction between two parts: it establishes a “period of time” and an “epistemic tool” (Arias-Maldonado 2015, p. 126).

The term Anthropocene initially emerged from the Earth System science community. The Anthropocene is not a geological category; it constitutes a stimulus for a categorical change that allows politics to break ties and free itself from existing (“descriptive” and “normative”) rules (Beck 2016). The reconceptualization of the Anthropocene from the social sciences is not an unprecedented perspective. Jeremy Baskin (2015) criticizes the Anthropocene as a “paradigm dressed as epoch”. The Anthropocene as a scientific concept at its radical core loses its potential. The Anthropocene opens up old disputes: its referents

are authors who, in the 19th century, had holistic perspectives that questioned Cartesian rationalism. The Anthropocene is not delimited by Earth systems science and has become a metanarrative. The central project of the Frankfurt School criticizes the one-sided forms of rationality that lead to positivism, scientism and other reductionist conceptions (Forst 2021).

The scientific approach might be overly narrow and restrictive; for that reason the perspectives and insights of the humanities and social sciences should be at the forefront of analysis (Zalasiewicz et al. 2021). The Anthropocene needs to be complemented by an understanding of how it captures “human interaction, culture, institutions, and societies—indeed, the meaning of being human” (Palsson et al. 2013, p. 10). Clive Hamilton (2016, p. 103) points to a “rupture”; many ecologists and scientists find it difficult to recognize that a “scientific revolution” has taken place and believe in a “cumulative addition” of knowledge within their disciplines. The Anthropocene would not have taken place without the emergence of Earth System science in the 1980s and 1990s and ecological thinking that emerged in the 1960s and 1970s (Hamilton 2016, p. 98). The long-ignored work of Vladimir V. Vernadsky (Hamilton 2016, p. 94) is present in the Gaia hypothesis, Earth systems science and the Anthropocene. It is a scientific model that dates back to the work of Alexander Humboldt and Johann Wolfgang Goethe.

1.1. From “Empirical Certainties” to “Normative Certainties”

We have two approaches to tackling the Anthropocene problem: an empirical description of a problem as “something given” and therefore as a “problem to be solved” and a metanarrative. We see the “descriptive” and “normative” dimension, but we cannot experience the metamorphosis of “being in the world”. “*The metamorphosis of the World*” by Ulrich Beck expresses this idea: climate change becomes the agent of the metamorphosis of the world; it focuses on the secondary consequences of chaotic anthropogenic environmental change from which a new world emerges: “*how climate change is transforming our concept of the world*” (Beck 2016).

The reflections on the Anthropocene, in which it is affirmed that the human being has become a geological force, are dominated by the natural sciences (chemistry, physics, geology, etc.). This paper displaces the study from the natural sciences to the social sciences (anthropology, sociology, philosophy). Hannah Arendt suggested that humans “*being-in-the-world*” had been “*disrupted*” in the modern age (Arendt 1958). This poses a challenge for the social sciences and humanity: we do not focus on whether man is changing planet earth, but on how the “human condition” is changing (Palsson et al. 2013, p. 8). The Anthropocene is presented, from a social science perspective, as an anthropological problem. Martin Heidegger points out that man loses his roots; he uses the term “*unheimlich*” (the root “*heimlich*” names the foundation where man takes root). He expresses a correlation and an enigmatic game between “demand for the establishment of the foundation” and “withdrawal from the native soil” (Heidegger [1957] 1997, p. 60).

Gísli Pálsson urges the social sciences and humanities to engage with the challenges of our time. The natural sciences have had a leading role in addressing climate change, ecological collapse, etc.; there has been no scientific influence in the philosophical approaches of Hannah Arendt, nor in the sociological approaches of Norbert Elias (Welzer 2008, p. 35). There is a division of roles, as if the “ecological crisis” were not in turn a “civilizational crisis”. Several works agree that the distinction between natural history and human history becomes less and less tenable (Palsson et al. 2013, p. 8). The impact of man on nature captured by the Anthropocene concept is not new, as evidenced by Antonio Stoppani’s “*anthropozoic era*” in 1873, Edward Suess’s “*Biophere*” in 1875, Pierre Teilhard de Chardin’s “*noösphere*” in 1922, Vladimir Vernadsky’s Noosphere in 1924, etc. In the 21st century we reuse the concept Noösphere from an anthropologic perspective (Palsson et al. 2013, p. 5).

In the face of social collapses, environmental threats, conflicts over resources, etc., Harald Welzer (2008, p. 45) states that “silence reigns” in the social sciences. He considers that to speak of “natural catastrophes” is a “semantic negligence” (Welzer 2008, p. 45). Nature cannot be understood “outside” of society (Beck 2016). He explains that the

“contributions to global change research by the social sciences and the humanities have been relatively marginal” (Palsson et al. 2013, p. 5). Given this, the natural sciences have, because of the disinterest of the social sciences, borne the responsibility (Welzer 2008, p. 46). Global risk has two faces: on the one hand, social collapse and environmental threats; on the other hand, the break with the dominant metaphysics of the reproduction of the social order (Beck 2016). A perspective of the Anthropocene from social theory has limitations: Karl Marx, Max Weber or Pierre Bourdieu focus on the production and distribution of goods, without bads (Beck 2014).

A sociology that seeks to conceptualize the metamorphosis of the world must cut with the metaphysics of the reproduction of the social order and also with the methodology of the social sciences and their conceptual frameworks. There is a metamorphosis of theorizing that can save the world (Beck 2016). Global risks have two faces: the traumatic ecological collapse and, as an effect of this collapse, a change in referential horizons. There is a shift from the theorization of the metamorphosis of the world to the metamorphosis of theorization (Beck 2016). The “transvaluation of values” (*Umwertung der Wert*) does not mean that instead of some values different ones are established. Martin Heidegger ([1936–1946] 1961, vol. II, p. 35) points out that the place disappears. The objection to systems theory from Jürgen Habermas is that it preserves universalism (Habermas 1963). This is the objectivist illusion (Habermas 1968a, 2019); this is true for earth systems science. The schizophrenic structure of the *Zeitgeist* emerges. Rather, for postmetaphysical thought it means that reason accepts no higher authority than itself (Forst 2021). It can diagnose the metamorphosis of the world as if it lacked theory (Beck 2016). It is not as simple as combining “empirical certainties” with “normative certainties”.

1.2. From Ananthropological Point of View

Vladimir Vernadsky’s ideas have given rise to various scientific theories, which have self-regulating processes as a common denominator, with varying degrees of acceptance and rejection. He is a bridge between the ideas of A. Humboldt and J. W. Goethe in the 19th century and the hypothesis that the earth is a huge “living organism” of the 21st century. Bruno Latour (2015) has opened a fruitful dialogue between the Anthropocene, the Gaia hypothesis and models based on homeostasis. Fritjof Capra (1996) finds it intriguing that, of all the models and theories of self-organization, the Gaia hypothesis encounters the greatest opposition. Bruno Latour (2015) considers James Lovelock “a somewhat eccentric engineer qua physiologist”. Toby Tyrrell (2013) concludes that “Gaia is a fascinating but a flawed hypothesis”. We face a paradox: the molecules necessary for life are, inexplicably, products of life (Piulats 2018, p. 110).

“Biosphere” by Vladimir Vernadsky offers us an image of the world as a functionally integrated, global phenomenon (Vernadsky [1926] 1998). Biosphere or Noosphere are concepts going back to J.W. Goethe that take divergent paths. Timothy M. Lenton, (Lenton et al. 2020) point out that “climatologists missed it because Life is hard to see in the Earth’s energy balance” and the “scientists were repelled by teleological arguments”. Toby Tyrrell, in spite of the discrepancies he expresses with the Gaia theory, accepts that it is a problem, and that this presents a puzzle (Tyrrell 2020). Science is not only evolution, it is also rupture, mutation. The net result of the scientific disciplines, for Bruno Latour (2015), is their capacity to animate the agencies making up the world. Two ideas are controversial in James Lovelock: self-regulation (which he draws from various theories of the 1960s popular in official science) and a global science (as opposed to the disjointed series of disciplines). Bruno Latour (2015, 2021) claims this unification will be able to mobilize science, politics and theology in a new way.

Toby Tyrrell (2020) criticizes the concept of “change” in the Gaia Hypothesis: “the Gaia hypothesis lacks a clear mechanistic basis”, i.e., it happens sometimes by chance. The concept of the “cosmic miracle” is controversial for science. Prigogine and Stengers (1984) express that chaos generates order. The critical sociology of Jürgen Habermas (1963) is also a “self-regulatory system”, for “social integration” would not be possible if “system

integration" did not, in turn, satisfy the needs of its members. In perfect cybernetics, Hans-Georg Gadamer (1993) warns us, any difference between man and machine would be erased. Bruno Latour (2015) criticizes the Gaia Hypothesis for stating that "seven out of eight humans will soon be annihilated by Gaia." He considers this claim to be a pseudoscientific walk through Malthus's theories. Harald Welzer (2008, p. 93) describes the idea of "a people without space" (*ein Volk ohne Raum*) as fantasy and ideology.

The Gaia hypothesis or theory of terrestrial systems dispenses in its analysis of human substance. The acuity of Niklas Luhman's theory is that, thanks to the human vacuum, the system develops perfectly (Beck 1988). The Anthropocene rehabilitates humanity. Without the cosmic spectacle seen by man there is no metamorphosis of theorizing. The universalism of social theory allows a diagnosis of the metamorphosis of the world, but it prevents a metamorphosis of theorization falling into "false universalism" (Beck 2016). The Anthropocene rehabilitates anthropocentrism. The concept of the Anthropocene was born in the Earth science system, itself a relatively new development in the field of natural science research. It is much more inclusive and transdisciplinary (Zalasiewicz et al. 2021). The Anthropocene and the Earth science system operate on the premise that "the Earth System behaves as a single, self-regulating system composed of physical, chemical, biological and human components" (Steffen et al. 2007; Zalasiewicz et al. 2021). Gaia by James Lovelock, for Bruno Latour (2015), is not nature; it is a jealous goddess who does not hesitate to take revenge. The critical theory (Habermas 1968b, 2019) vindicates that human dignity against the system theory, claiming the secularized translation of religious content (Forst 2021).

On the one hand, the Anthropocene is approached neither from geology nor from anthropology, but from a conception of nature as a living organism (suppresses the division of disciplines). On the other hand, there is the frame of reference or the horizon from which scientific models operate. The progress of science conceptualized as the destruction of prejudices and liberation from the repression of dogmas about nature and society is ambivalent. Ernst Haeckel (1882), in the face of metaphysical dualism, reconciles the progress of natural science and philosophical research through the coherent and radical development of Darwin's theory of evolution. The development of comparative anatomy and paleontology leads him to write in "Anthropogenie" (1874) that the human being retains the form that the animals leave behind to specialize. Man retains the "formative forces" that are exhausted in animals (Piulats 2017, p. 166). Man, whether he wants to or not, has to make himself (Ortega y Gasset [1939] 2014, p. 91). Ernst Haeckel's (1882) paleontology shows that every individual goes through all the stages of development that he attributes to genetic heritage, while J.W. Goethe attributes it to an archetype contained in him (Steiner [1884–1897] 1987, p. 77).

The metamorphosis of theorization (Beck 2016) is not to be sought in the experience of the world as the metamorphosis of the world; it is to be sought within ourselves. Aldo Schiavono, in What is Progress, does not anticipate the apocalypse, but he does perceive future perils and disasters slowing down scientific and technological progress. He does not think it a good idea to slow down scientific and technical progress, not even to reduce damage; it is an illusion. The only answer is an adjustment of our civilization (Schiavone 2021). Ulrich Beck (2016) proposes an innovative change of horizons that universalist theories are not able to recognize. Pessimism is driven by meanness of spirit; he contemplates how civilizations are collapsing one after the other. Pierre Teilhard de Chardin (1961) observes a spiral of life that rises irreversibly; this relay of civilizations is evolution. We find that same contraposition between decaying and rising in Ulrich Beck (2016). Only the worm, wrapped in its own closed cosmovision, clings to the cocoon, not seeing its imminent metamorphosis (Beck 2011). That ascending process is "leading to the 'Noosphere', in which spirit and its understanding embrace the whole and are blended into a kind of living organism", writes Benedict XVI (Joseph Ratzinger 2000, pp. 23–24); he goes on to say that Teilhard de Chardin went on to give a new meaning to Christian worship: the transubstantiated Host is the anticipation of the transformation and divinization of matter in the Christological "fullness".

The question of why the world fails in the face of overwhelming scientific evidence compels us to an exercise in self-reflection. Here is the frivolity, to which Ulrich Beck (2016) points, of the academic world claiming self-referential self-reflection (autopoiesis). That explosive force that in the twelfth century confronted “science” and “belief” has maximum actuality (Fidora and Lutz-Bachmann 2008). In the change of worldview of the Axial Age it involved a confrontation between spiritual elites—the “transcendental order”—and intellectual elites—the “temporal order” (Beck 2016). Scientific discourse has focused on the concept of “world”. Social theory, for decades, has focused on reconstructing the genesis of and criticizing one-sided forms of rationality (Forst 2021, p. 17). Ecologists, scientists and politicians focus on solving the problem with the question: what to do in the face of climate change? The question posed by sociology is: how does climate change affect the social and political order? In the first question we get an exclusive answer: apocalypse or salvation. In the second question we give an opportunity to get out of the dispute and exclusion that blocks our capacity for political and social imagination (Beck 2016). In one case we follow the dominant rationality, in another we reconstruct the genesis of rationality.

1.3. Transvaluation of Values” (*Umwertung der Wert*)

Instead of focusing on how humanity endangers its own existence, Ulrich Beck (2016) proposes a Copernican turn: consciousness is not the fixed point around which the world revolves. Metamorphosis modifies our image of the world. A new power structure is embedded within the logic of global climate risk; we focus, Ulrich Beck (2014) points out, on “fundamental distinction between those who generate risk and those who are affected by it. It’s an imperialistic structure.” What Ulrich Beck (2016) proposes is to turn this structure around by means of what Friedrich Nietzsche defines as “transvaluation of values” (*Umwertung der Wert*). What happens in the 19th century, for Friedrich Nietzsche, is not the victory of science but the victory of the scientific method over science (Habermas 1968a). His proposal is to break with the straitjacket of scientific methodology and to conceive knowledge from its previous link with praxis. Hans-Georg Gadamer (1993) elevates us from phronesis to nous; in the seventeenth century, “intelligence” loses all relationship with principles.

Friedrich Nietzsche does not limit himself to a passive nihilism: skepticism that clings to indifference in the face of plurality. The “transvaluation of values” (*Umwertung der Wert*), for Martin Heidegger ([1936–1946] 1961, p. 35), does not mean that some values expire and in their place others appear. Rather, the place where we had values disappears. That is why the metamorphosis of the world is not intended to replace the current topology, qualifies Ulrich Beck (2016). We discover that inequality is social, not natural; ecological catastrophe is social, not natural; etc. (Beck 2016). It is a “Copernican 2.0” turn: the world stops revolving around our consciousness; the metamorphosis of the world becomes the agent of cosmological change. The world itself has not changed

The Anthropocene, from the perspective of metamorphosis, connects with Faust: the positive side effects of “public evils” into “public goods”. Climate change is the prelude, Ulrich Beck points out, to a renaissance. We find this in “*The Catastrophe of Liberation*” by Herbert Marcuse (1954) and in “Emancipatory Catastrophism” by Ulrich Beck (2016): it is a moment of “social catharsis” that refers to Walter Benjamin’s “messianic” potential to save us from a path of historical catastrophe (Forst 2021). The Anthropocene incorporates concepts and narratives from the humanities and social sciences that attempt to articulate the “new human condition” (Palsson et al. 2013, p. 8). The Western counterculture looked East in the search for alternative social values (Arias-Maldonado 2015, p. 29). Paganism is present in the deep ecologist (Castells [1997] 2009). It has a vision of evil opposed to the Manichean tradition of the Faust of J.W. Goethe. “*To do great right do a little wrong*” wrote William Shakespeare.

Evil, through an “anthropological shock”, triggers what Ulrich Beck (2016) defines as a triple metamorphosis: categorical (it changes our vision of the world), institutional (it changes our being in the world) and political-normative (it changes our acting in the

world). This does not mean that we need a catastrophe of cosmic dimensions to be reborn; nor, on the other hand, do we need a technological optimism with a redeeming power. The metamorphosis is happening right under our noses. We have to focus, Gisli Palsson et al. (2013, p. 8) points out, on the changing character of politics, science, freedom and thought. This is the real challenge for the humanities and social sciences. A complex issue is who is the agent of change (Latour 2011). The thesis of Ulrich Beck (1988), formulated three decades ago, is that the refutation of science does not come from the Critical Theory, nor from ecologists, etc., but from the ignorant specialization and fragmentation of scientific evolution. Nor does it stop at the demystification of its own products. Doubt defeats a knowledge born of doubt. Today, Ulrich Beck (2016) perceives the naivety of considering that an inflation of announced catastrophes metamorphoses into political action. The feeling is that we are in a dead end.

Several authors are intrigued: on the one hand, we have a saturation of discourses on the imminent planetary danger (Welzer 2008) as well as reports explaining how terrible the future will be (Hamilton 2011). Climate change has become a supermarket of apocalyptic hypotheses (Beck 2016). On the other hand, we ignore the warnings; it is too late to act. Clive Hamilton (2011) from the Anthropocene analyzes “frailties of the human species”. As Clive Hamilton argued in *Requiem for a Species*: we are all climate deniers. The Anthropocene describes the breakdown in the functioning of the Earth system, not just the modification of ecosystems. Harald Welzer (2008, p. 27) describes it, from the perspective of social theory, as a change in perception of the problem, not an adaptive change in behavior. Focusing on “causes” (*descriptive*) and “solutions” (*normative*) prevents seeing the difference between consciousness and world, system and society, etc. (Beck 2016). Here there is a schizophrenic relationship between the world (*Welt*), which provides us with the social and natural sciences, and the world picture (*Weltbild*), which does not lead us to “another” science but to the structure of the *Zeitgeist*.

This paper will be divided into the following sections: (1 showing that atmospheric stability cannot be explained apart from life; the earth possesses, following Lovelock, a homeostatic capacity; (2) the hypothesis of a living cosmos and its relationship with humanity (so that it “dwells” in it); (3) philosophical anthropology, biological anthropology and cosmological anthropology in relation to the Anthropocene; (4) utopias and dystopias in the Anthropocene.

2. Anthropocene: Geological Era Changes and Epistemological Change

Eugene F. Stoermer used the term Anthropocene in the 1980s. He studied ecological changes in the great lakes resulting from human activity (Stoermer 1984). The term Anthropocene is popularized from the year 2000 onwards, after the aforementioned conference in Cuernavaca in which Paul J. Crutzen proclaimed a change of era. Together with Eugene F. Stoermer, he published an article in which the two authors consider that the homo sapiens is no longer just a historical actor, but is a geological actor.

The term Anthropocene is not accepted by the community of geologists. For their acceptance they created “*The Anthropocene Working Group*” (AWG). The group seeks “*evidence*” of man’s transformation of the biosphere and atmosphere. The magazine *Nature* (Jones 2011) claimed recognition of the Anthropocene by “*The International Commission on Stratigraphy (ICS)*”. The Anthropocene highlights two aspects: chaotic anthropogenic environmental change (which, on the one hand, undermines our response capacity, and, on the other, allows us to proclaim human dominance and control) and a social, political and normative change for sustainability (the ability of states to govern has been significantly reduced, especially in the environmental context).

Bruno Latour (2015), Ulrich Beck (2016), Bonneuil and Fressoz (2016), Andrew S. Mathew (2020), Clive Hamilton (2016) and other authors agree that what is in jeopardy is the well-informed and ambitious diagnosis. What is happening is an innovative change of horizons and frames of reference. We are moving from the theory of change to the change of theory. It requires stepping out of the comfort zone and crossing the threshold. We have

to ask uncomfortable questions about our certainties. We have to address a metamorphosis of theoretical interpretation. For (Beck 2016) this turns the hierarchy between universal theory and diagnosis upside down. It is illuminating how Ulrich Beck splits the question of climate change in two: the one that seeks to solve the problem, and the one that questions how to approach the problem. One focuses on the “evil”, the other on the positive side effects of metamorphosing into the good.

These are urgent problems that cannot always find an answer within the dominant political institutions and scientific disciplines (Palsson et al. 2013, p. 9). Let us examine it in parts: (developed in Section 2.1) a new geological epoch and (developed in Section 2.2) the new scientific paradigm or epistemological change.

2.1. A New Geological Era

Crutzen and Stoermer (2000, pp. 17–18) first describe something very specific: how human activity alters the nitrogen cycle: *“the earth’s surface has been transformed by human action; more synthetic nitrogen (applied as fertilizer in agriculture) is now fixed synthetically and applied as fertilizers in agriculture than fixed naturally in all terrestrial ecosystems”*.

It has been pointed out that with the emergence of agriculture, man began to alter the biosphere. The capacity for alteration of the gatherer and hunter societies was insignificant. Cities, with their increasing populations, intensified agricultural production. It is not an evolutionary path: there is an abrupt, qualitative change with the “green revolution”.

The challenges of agriculture focus on the use of inorganic nitrogen fertilizers and the development of agrochemicals that interfere with the nitrogen, carbon and phosphorus cycles (developed in Section 2.1.1). The IAASTD report *“Agricultures at a Crossroad”* (IAASTD 2009) is relevant and is supported by six UN agendas and representatives of governments and civil society; it is unequivocal: the current model of food production is unsustainable. Agrochemicals are based on standardized monocultures (developed in Section 2.1.2). Agroecology makes an early critique of the “Green Revolution” that differentiates organic from inorganic nitrogen (developed in Section 2.1.3). What promised to end hunger on the planet has not only been a huge failure, which shakes the conventional discourses of science, but also generates new problems that require new paradigms (developed in Section 2.2).

2.1.1. Challenge in Agriculture

Agriculture is presented as a human activity that impoverishes the fertility of the soil. We consider that all plant activity “depletes” the nutrients in the soil. As for minerals, they have experienced great growth: phosphate rock mainly used in the food sector (Valero et al. 2021). We have had agriculture for more than 7000 years, and plant life for hundreds of thousands of years. We have created a big problem in the 20th century by altering the “cycle of life” and interrupting the cooperation between “the Five-Kingdoms” (Margulis 1974). Today, we have 821 million people suffering from hunger, and another 2.2 billion suffering from malnutrition, mainly diabetes, obesity, vitamin and trace element deficiencies.

Between 1961 and 2019, “the use of nitrogen fertilizers” has increased by 800% (IPCC 2019, p. 439). Annually, 128 million tons of nitrogen from the atmosphere (FAO data from 2008) are transformed into synthetic fertilizers to produce food. To produce this inorganic nitrogen, 5% of the yearly total of natural gas is spent (EU Agricultural 2019). The nutritional problem, the energy problem, the climate problem and the problem of scarcity of materials for the agricultural model are consequences also of the nitrogen situation and need to be added (López Ortega 2021). One calorie of food requires 10 calories of fossil energy, not counting machinery, transportation, etc. (Valero 2019). A century ago, the relationship was the inverse: 10 food calories for one energy calorie. Another problem: this nitrogen pollutes the atmosphere and the rivers, and 15.2 million tons of nitrogen have already ended up in the oceans (Rockström et al. 2009). It causes hypoxia and aggravates eutrophication: excess nitrogen, phosphorus and organic matter leads to a loss of oxygen (Duarte et al. 2006, p. 95).

The causes of the problem are distributed thus: human activity, agricultural activity, economic activity, demography (López Ortega 2021). There is no shortage of those who, faced with this, defend an “ecological apartheid”. This paper examines agriculture based on standardized monocultures and genetic homogeneity (von Weizsäcker and Wijkman 2018). This paradigm was harshly criticized by IAASTD (2009). The notion of “*carrying capacity*” advanced by Paul Ehrlich, despite its shortcomings, allows a quantifying of the anthropogenic impact on the environment. The environmental services provided by pollinators or microorganisms that make the land fertile have been systematically ignored.

In the last century, the use of synthetic nitrogen fertilizers has interfered with the organic nitrogen cycle (Mulvaney et al. 2009). 1.310 million people are trapped in degraded agricultural land; it is estimated that 75,000 tons of fertile soil are lost annually. “It is a” global pandemic “of chemical pollution, acidity of the soil (and oceans), a microbial loss of the soil” (OECD/FAO 2020). Nitrosamine, which is transformed in mineral nitrogen, is a carcinogenic compound. Modern agriculture methods add nitrogen and mineral phosphorus to the soil, interfere in the oxygen and carbon cycle and reduce the microbiological capacity, with effects on the nutritive capacity and an increase in parasites (López Ortega 2021).

The answer is polarized between those who see the solution in spraying the land with synthetic nitrogen (developed in Section 2.1.2) and those who bet on stimulating, with agroecology, the organic nitrogen cycle (developed in Section 2.1.3). We cannot ignore the fact that phosphorus mines suffer a progressive depletion that leads to the collapse of the current global agricultural model (Valero 2019, p. 131).

2.1.2. Scientific Agriculture

Justus von Liebig wrote “*Die organische Chemie*” in 1840. He is the father of agrochemicals. In the *external inputs* in agriculture, it is applied in knowledge of agricultural chemistry. The story begins when Alexander von Humboldt took samples of Peruvian guano to Europe to be analyzed (Meinhardt 2019). This guano has a high proportion of nitrogen and phosphorus. In 1840, this resource began to be exploited, with large imports for European agriculture. According to Malthusian calculations, the mountains of guano could be exhausted in 50 years. Justus von Liebig advocated the “scientific” method for agriculture: the replacement (*Ersatzes*) of guano by an alternative produced by synthetic chemistry (Ceroni Galloso 2012).

Justus von Liebig criticizes agriculture for its “*crop alignment*”. He considers that it is based on an “irrational method” (Foster and Clark 2018). For J. von Liebig, every plant, without exception, depletes the soil. Karl Marx in *Das Kapital* saw in J. von Liebig’s theses a criticism of capitalist agriculture for squandering the “forces of the soil” (*die Bodenkraft verschleutert*). Karl Marx equates it to his criticism of the de-lapping of “labor power” (Marx [1894] 1985, p. 821). Justus von Liebig has sown discord between agroecology and eco-socialism (Foster 2000). The “*carrying capacity*” of the sum of all the territories would be greater than the sum of the carrying capacity of each territory. We have Darwinian social ecologists who predict a “*lifeboat*” ethic. Leopold Pfaudler believes that if an element is missing in one territory that abounds in another, it can be removed. Justus von Liebig proposes a “minimal exchange”. For James Lovelock, the best thing is that we completely abandon agriculture and produce food synthetically (Gray 2006).

The exponential use of inorganic nitrogen in agriculture has increased over the last century. Chemist Fritz Haber discovered how to narrow the synthetic nitrogen cycle to create fertilizers that could be added directly to the soil (Duarte et al. 2006, p. 53). The German chemical industry, after the First World War, had a surplus of nitrogen that had been used to make explosives. Following Justus von Liebig’s theory, it was used in agriculture. In 1918, Fritz Haber won the Nobel Prize in Chemistry. It was a controversial decision; the committee recognized that gaseous chlorine killed and maimed hundreds of thousands of soldiers (against the declaration of the 1907 Hague Convention). However, the

Nobel tribunal considered chemicals to be an achievement in intensifying food production. The impact on health in the food chain led to a ban on organochlorines.

2.1.3. Criticism from Agroecology

In the 1920s, the chemist and naturalist Ragnar Berg (Berg and Vogel 1930) considered that foods produced with synthetic fertilizers are organoleptically inferior to those produced with organic fertilizers. Fresh but harvested foods, following the postulates of J. von Liebig, are negative foods for health (Piulats 2017, pp. 222–23). Climate Change, Agriculture and Food Security (CCAFS) research on “climate-smart technologies and practices” a century later promotes synthetically produced food. Bill Gates (2021) addresses the challenge of how to transition to “climate-smart agriculture” (CSA). For Rudolf Steiner ([1924] 2010, p. 135), food production offers “mere stomach fillers” (*bloßen Magenaußfüllungen*) without “nourishing force” (*Nährkraft*). These are not very precise concepts. Farmers a century ago were concerned about the sharp turn in agricultural practices and about the development and consequences of agrochemicals. Rudolf Steiner was asked to give a series of lectures in 1924. In them, he lamented the farmer’s indifference to how nitrogen is prepared: it is nitrogen from the air (dead) or organic nitrogen (living) (Steiner [1924] 2010, p. 16).

There is a symbiosis between plants and animals; we breathe in nitrogen from the air that we excrete in the form of ammonia. What is toxic for us is nutrition to plants. One solution would be to improve the design of plants so that they ingest nitrogen from the air (Good 2018). The agroecological approach considers that the organic fertilizers improve nutritional quality (Kirchfeld and Boyle 1994, p. 148). We still do not understand this balance between animals, plants and mediating microorganisms (Prigogine and Stengers 1984). The fixation of fertilizers in the soil is no more than a century old. The use of synthetic nitrogen fractures the metabolism of life. This is expressed by the Anthropocene. The massive introduction of synthetic nitrogen is altering the cycle of life (nitrogen, oxygen and carbon). We see the disappearance of pollinators; it is more difficult for us to see the disappearance of fertility, or the life of the soil (von Weizsäcker and Wijkman 2018). The biological community interacts in a biotic and abiotic way in the soil; without these microorganisms, we cannot feed ourselves (Lehman et al. 2015). Soil fertility is the most important intergenerational resource on which our survival as a species depends and it turns out to be the most underestimated resource (von Weizsäcker and Wijkman 2018). It is up to us to develop agriculture that improves soil fertility in the long term.

2.2. The New Scientific Paradigm (New Epistemological Paradigm)

Crutzen and Stoermer (2000) mention pioneers who anticipate the concept of the Anthropocene. They are long-silenced authors. Georg Perkins Marsch affirms, in his work *“Man and Nature”*, published in 1864, that human activities have a transforming power on the morphology of the earth’s surface. Antonio Stoppani, priest, geologist and paleontologist, describes human activity as a “new telluric force which in power and universality may be compared to the greater forces of earth”; in 1873 he used *“the Anthropozoic era”*.

2.2.1. Noosphere and Biosphere

The Russian geologist Vladimir I. Vernadsky who published *The Biosphere* in 1926, should be highlighted (Vernadsky [1926] 1998). This term biosphere is inspired by Johann Wolfgang Goethe, Jean-Baptiste Lamarck, Alexander Humboldt, etc.

More than *The Biosphere*, V.I. Vernadsky is known for the Noosphere. Aristotle uses the term *νοῦς* or *νόος* (“mind”). V. I. Vernadsky realizes that the chemical composition of the Earth’s crust presents alterations in composition that are not explained according to the laws of physics, nor chemistry. Living matter arises from the processes of transforming the sun’s radiant energy into organic matter through photosynthesis. It is a unique mechanism compared to that of terrestrial bodies. The distinction between living matter and inert matter begins, although they include each other, and an intelligence is incorporated (*noós*).

“The noosphere is the third in a succession of phases of development of the Earth, after the geosphere (inanimate matter) and the biosphere (*biological life*)”. Geosphere (inanimate matter) and the Biosphere (*biological life*) (Möller 2020, p. 354). The crust is the region of the biosphere, its epidermis, where life sits; this makes it possible to affirm that no living organism has been engendered by inorganic matter. If life disappeared from the Earth’s crust, so would the cosmic processes.

The hundreds of minerals resulting from chemical processes that occur in life, without it, would disappear. Mineral elements would be grouped differently. In 1875 the Austrian geologist Eduard Suess (1875, p. 159), in “*Die Entstehung der Alpen*”, establishes that the speed of the Earth’s rotation is the same—33,100 cm/s—at which the energy of the bacteria circulates. It is not about properties of organisms, but also reflects planetary and cosmic phenomena. Eduard Suess thus extends the boundaries of the descriptive natural sciences and creates theoretical systems that encompass the whole. The philosopher, Jesuit, paleontologist and professor at the Catholic University of Paris Pierre Teilhard de Chardin had already developed, shortly before, the notion of “*noosphere*” taken by Vladimir Vernadsky.

The “*Gaia Hypothesis*” of James Lovelock and Lynn Margulis considers that physical and chemical conditions have been and are still being adapted to the needs of life itself. This is similar to what Vladimir Vernadsky maintains. Here we point out that oxygen and other biogenic gases (CO₂, NH₃, and H₂S) involved in life are products of life itself (Piulats 2018, p. 110), a postulate in contradiction with the official paradigm of science.

2.2.2. The Composition of the Atmosphere

Atmospheric chemists have discovered that the Earth’s atmosphere is not the result of geological processes, but of biological processes. Of the molecules involved in life—carbon, nitrogen, oxygen and hydrogen—none can be found inert (Piulats 2018, p. 110). Broecker and Barker (2007) find in the atmospheric a “mysterious interval” in ice cores in which the fall cannot be explained. The constant balance for billions of years of 78.089% nitrogen and 20.946% oxygen makes the atmosphere a mystery (Piulats 2017, p. 67). The researchers found that in the Cretaceous there was 35% more oxygen in the atmosphere. If the percentage of oxygen fell, nothing would burn; if it increased by 2%, the fires would be devastating. The surprise for Andrew G. Thomas was to discover that in the Cretaceous there was more nitrogen: the balance was maintained (Lovelock 2006).

The Gaia self-regulation hypothesis offers a controversial explanation. For Toby Tyrrell (2020), change played a role in determining whether Earth stayed habitable. Vladimir Vernadsky ([1926] 1998) launches from a hypothesis of the biosphere as a mechanism at the same time terrestrial and cosmic. The sun transmutes the face of the earth. Living matter transforms the radiant energy of the sun into chemical energy; therefore, living matter creates the biosphere. Those unstable compounds become stable equilibrium modalities. Prigogine and Stengers (1984), a physical chemist who won the Nobel prize in 1977, saw the development of “*order out of chaos*”, which looked to be “*self-organizing*”. Wally Broecker ([1985] 2002), in *How to build a habitable planet*, intertwines physics, astronomy, chemistry, geology and biology, in an account in which he tells the complete history of the Earth.

It is surprising how little or no interest in life has influenced the study of geology (Lenton et al. 2020), when life is omnipresent in the biosphere and its balances depend on life. Suggestive, provocative and controversial hypotheses arise around the Anthropocene concept. Margulis and Sagan (1986, p. 108) understands life in terms of information and order. John Wheeler affirms: “it is not the human being that only adapts to the universe, the universe adapts to the human being”. Another scientist, Paul Davies notes that “the entropic principle proclaims that the universe is designed to be habited” (Piulats 2018, p. 113). The Anthropocene brings us closer to understanding the world as an integrated functional whole, and as a global phenomenon (Guillaume 2014).

J.W. Goethe, when studying the atmosphere, realized that mechanistic thinking cannot explain barometric oscillations. The atmosphere compresses (the pressure increases) and

expands (the pressure decreases); this gives rise to air currents that regulate the temperature (increasing or decreasing the amount of humidity). His hypothesis is that of a living Earth. He likens it “to the inspiration and exhalation of an organism” (*mit dem Ein- und Ausatmen eines Organismus*) (Steiner [1897] 1990, p. 201).

It is problematic if you want to study the evolution of the earth and the evolution of life as a holistic whole. These ideas from J.W. Goethe have inspired important scientists of the twentieth century V. Vernadsky ([1926] 1998) does not understand the insurmountable gulf between living matter and inert matter when they influence each other—see the feedback loop theory of Ludwig Bertalanffy; the homeostasis of Walter Cannon; the procedural philosophy of Alfred North Whitehead; the complexity of the life of Manfred Eigen; the cybernetics of Heinz Foerster; the autopoietic theory of Humberto Maturana, etc.

2.2.3. Symbiogenesis between Animals and Plants

Humans (and other animals) inhale oxygen and nitrogen and exhale carbon dioxide (CO₂), but excrete nitrogen as urea. It is these residual products (metabolic waste) that make plant life possible (Lovelock 2006). The theory of evolution, which tends to optimize resources, would have endowed us with a more efficient physiology. If uric acid were exhaled, as we do with CO₂ in the breath, we would avoid a high consumption of water (4 L/100 g of urea) and energy expenditure (379 kilojoules/100 g of urea). Plants need organic nitrogen to live (Good 2018). James Lovelock (2008a) suggests considering the Earth as a physiological system. He is opposed to soil improvement techniques (geoengineering), as we would be making the same mistake when addressing diseases through medicine in the 19th century (Lovelock 2008a).

Bill Gates (2021) defends “emergency” solutions. Pierre Teilhard de Chardin (1961) teaches us how easy it is to see civilizations collapse one after another and not to recognize that under these oscillations there is a master line of evolution. The “we” does this or that to save “our world” (Welzer 2008, p. 47), and that “we” acts in cultural contexts, within political communities, that is, it is part of the same history. It is not a question of knowledge of the past and its repercussions in the present, but of the tasks in progress (Heidegger [1936–1946] 1961, vol. II, pp. 81–82). Pierre Teilhard de Chardin (1961) opposes pagan naturalism that recalls the laws of biogenesis.

The theory of evolution in some respects seems incompatible with the Gaia hypothesis (Lovelock 2006). A “selfish gene” would have favored a mutant gene that excretes urea to save water and energy. The teleological answer of the biochemist is that we excrete urea because it is toxic. James Lovelock (2006) responds: “Explain it to the bacteria”. Bacteria that break down nitrogen would have been as good or better a solution than metabolizing urea. If we were more efficient and exhaled inorganic nitrogen, the plants would have nothing with which to nourish themselves or to feed us (Lovelock 2006).

We breathe in oxygen and nitrogen. Nitrogen carries oxygen to meet the carbon that we expel as carbon dioxide (Steiner [1924] 2010, p. 69). Plants do not have the ability to remove carbon. Avoid stiffness of the sole (Steiner [1924] 2010, p. 65). A geo-physiological model is built on this physiological model (Lovelock and Kump 1994). Rudolf Virchow (1861) integrates the work of J. W. Goethe, a “natural scientist” (*Naturforscher*), in the *medina*. Paul Henry Gerber (1900) recounts the medical studies of J.W Goethe in Leipzig. The morphological composition of plants studied by J. W. Goethe is not dominated by the “physical fields”, but by projective geometry (following the laws of the organic world). Here we go back to Hans Driesch, who discovered a pattern of self-organization. Its composition and shape are not determined by chance; because of its chemical structure, it obeys “an order and structure” (Margulis and Sagan 1986, p. 51). We have more controversial theories, from complex catalytic networks to feedback loops. Rupert Scheldrake attributes the development and maintenance of life to “morphogenetic” fields (Capra 1996).

The geometry of minerals is centrifugal: it fills the space subjected to gravity. We find polarity, both centrifugal and centripetal, in living organisms. The Nobel laureate Francis Crick used the term “*panspermia*”: the hypothesis that the origin of life is in Extremophilic

organisms (Peinado Lorca 2019). NASA found RNA components in meteorites (Furukawa et al. 2019). Oxygen, discovered by Lovelock and Margulis (1974a, 1974b), is a molecule involved in life produced by life itself.

3. Towards a Physiology of Geology: A Living Cosmos

Various perspectives point to a living cosmos: the Gaia hypothesis, symbiogenesis, homeostasis, etc. They face the mechanistic, dualistic, Cartesian and reductionist models. Life did not conquer the planet with combat, Margulis and Sagan (1986, p. 15) point out, but with alliances and cooperation. James Lovelock (2006) does not question Darwin: “he does not contradict the Gaia hypothesis, he is part of it”. Eduard von Hartmann seeks the unity of ideas in nature and rejects the merely mechanical conception (*bloß mechanische Naturauffassung*) of nature and external hyper-Darwinism (Steiner [1884–1897] 1987, p. 96).

We do not question Darwin. In Goethe’s concepts we obtain an ideal explanation of what was discovered by Darwin and Haeckel. There is no opposition. A repetition of tribal history is captured in the history of the development of the individual (Haeckel 1882). Haeckel and his followers explain this from the law of inheritance. The form is the determining factor (Steiner [1924] 2010, p. 77). Biography is what defines life (*bios*). The way of thinking that the biosphere captures as an expression of life is what we call biological. Martin (Heidegger ([1936–1946] 1961, vol. I, p. 517) opposes the idea that F. Nietzsche’s image of the world (*Weltbild*) is biological, nor does it constitute “biological” thinking (“*biologistische*” *Denkenweise*).

The Anthropocene escapes the limitations of the Earth’s systems sciences. It raises a counter-question: the discontinuity and metamorphosis of the “image of the world” (*Weltbild*). We have, on the one hand, a “descriptive model” (of inequity, climate change, COVID-19, etc., as something given, problem to be solved, etc.); on the other hand, we distinguish between physical destruction and global risks (the social, political and institutional consequences) and a “reflective model” (a radical change of horizon that concerns the discourse). In the story there is only one character: the spirit. G.W.F. Hegel distinguishes objective spirit and subjective spirit. The end of the world (*Welt*) has, for social theory, a different meaning than the end of our image of the world (*Weltbild*).

3.1. Mechanical Vision and Organic Vision

Verifying chemical reactions makes us blind to the collaboration that the five kingdoms of nature enter into (Margulis 1974). Natural processes based on collaboration are syntropic (negative entropy). Ilya Prigogine questioned the mechanistic dogma and the second law of thermodynamics. This creates a problem for the ecology penetrated in the limits and entropy. Chaos Theory, dissipative structures, homeostasis, etc. contribute to a paradigm shift that allows addressing the current unsustainability (Naredo and Valero 1999, p. 163). Yet ecological economics is reluctant to go against the second law of thermodynamics by weakening awareness of environmental limits.

3.1.1. Organic Vision: World, Plant, Animal, Person

J.W. Goethe ([1793] 1982, p. 24) considers nature to be a sensible person (*eine verständige Person*). “We are in the realm of organic nature” (*der organischen Natur*) (Steiner [1884–1897] 1987, p. 147). There is a possibility of erroneous interpretation by pure empiricists. They have to correct some of Goethe’s claims, notes Rudolf Steiner ([1884–1897] 1987, p. 90): “in fact he was sometimes wrong; here, of course, not even genius can overcome the barriers of his time”. James Lovelock, on the other hand, takes it as something metaphorical: an “*aide pensée*”, notes Gary Lachman (2013). James Lovelock (2006, p. 11) rejects the idea that symbiogenesis, homeostasis or self-regulation are endowed with a purpose. The hypothesis of a “plant intelligence” developed by Stefano Mancuso (2019) continues the work of some 19th century physiologists. They had not worked with each other. Although it is hypotheses that have not been without controversy, it allows us to develop theories of networks in which plants interact in the same way as our neural networks.

The Anthropocene would put in value some ideas of G.W.F. Hegel. The first act in which the Spirit does not suspect itself has ended: “it is beside itself” and it seems to be pure Nature (Ortega y Gasset [1940] 2019, p. 81). Man is the frontier reality. What is proposed is not “a knowledge about the entity” (*Wissen über das Seiende*), but how a certainty is conquered and founded (about man and the world). The Middle Ages are fixed by “doctrina”; in the modern age, man is preparing to achieve, by himself, ensured certainty. The decisive thing is to seek new paths (*neuen Wegen entscheidend*) (Heidegger [1936–1946] 1961, vol. II, pp. 132–33).

G.W.F. Hegel, in his youth, opted for life in the spirit. Science is the story to walk between things (Ortega y Gasset [1940] 2019, p. 56). In autumn, the leaves of the trees provide energy and nutrients to the fungi and microorganisms that nourish the soil, and this passes to the trees. We describe the interactions between the five kingdoms of nature that have smart grids in which some learn from each other, inspired to improve resilience. Do not forget that this description is incomplete without an observer. The man, for the moment, neglected the real world and believed the story of him was the world.

3.1.2. The Place of Man in the Cosmos

The Anthropocene has an ambivalent relationship with science. It is paradoxical that an era such as the Anthropocene is characterized thus, and, in turn, there is an opposition on behalf of environmentalism to anthropocentrism (Arias-Maldonado 2015, 2018a, 2018b). The recovery of certain works is provocative. “*Elementer des Psychophysik*” in 1860 by Gustav T. Fechner represents a living cosmos. We find in the last paragraphs of “*On the movements and habits of climbing plants*” (1875) by Charles Darwin that analogy between the brain of man and the roots of plants, proposing a “*plant neurobiology*”. Another plant physiologist, Anthony J. Trewavas of the University of Edinburgh, points out that these ideas allow us to make connections that we would not otherwise make.

“Metaphysics” is supplanted by “anthropology” (Heidegger [1957] 1997, p. 129). How is man different from chimpanzees? Studies reveal that they share the ability to direct symbolic signals to their peers. But man does something that chimpanzees cannot do. Michael Tomasello (2002, pp. 23–26) observes that they establish communication through intersubjective semantic processes that allow man to enter into dynamics of cognitive innovation. There are no physiological or anatomical differences between man and higher animals. Pierre Teilhard de Chardin discovered another distinctive feature: each species has its habitat; man lives wherever (Ortega y Gasset [1939] 2014, p. 209). What makes man an ontological centaur, points out José Ortega y Gasset ([1939] 2014, p. 209), is that “the Earth is uninhabitable for man-*inbewohnbar*” (2014, p. 209). Man is a soul in a body, but he is neither the one nor the other; it is a drama: a struggle to become what I have to be (Ortega y Gasset [1939] 2014, p. 87).

Unlike animals, who exhaust their “formative forces” by specializing, man retains them and uses them in cultural capacities (Piulats 2018, p. 166). This cognitive innovation has made possible an accelerated technological disruption. Not only have we altered the geological system causing an ecological collapse, it also gives us the power to reshape our inner world, endangering our very essence as human beings (Harari 2018). The Anthropocene becomes a new talisman of human consciousness.

The emancipation of man in the Anthropocene would endanger the habitability of the earth: an apocalypse. Man is more than just an animal endowed with technical talent. The key lies, for Manuel Arias-Maldonado (2021), in planetary subjectivities. Dana Meadows points out that the “*psychic void*” is a force towards an insatiable appetite for material growth rather than seeking further inner development (von Weizsäcker and Wijkman 2018). There are those who accuse Christianity of evil and, as a result of it, science and humanism are also doomed.

Two centuries ago, James Lovelock (2006) points out, we were in time to establish “sustainable development” guidelines. It leads us to a question: at what point, for example, did the inhabitants of Easter Island miss the time to act? Harald Welzer (2008, p. 211)

considers that it is a problem of a badly posed question. The scientific answer tells us when the forest could no longer regenerate itself. Today, in the face of the climate emergency, geoengineering is proposed instead of geo-physiology (Lovelock 2008b). Harald Welzer poses a sociological question: “social catastrophe” occurs before the last tree is cut down. The catastrophe begins with a decision being made in the wrong direction. What makes us change cultural frames of reference are not threats, but opportunities. Felipe III, King of Spain, died because of not breaking protocol: he remained next to the brazier waiting the person in charge of it. After high fever, an erysipelas occurred that caused his death. But he had alternative options (Welzer 2008, p. 82). Societies that hold fast to the protocols or rules become ‘extinction societies’ (*Verlebensmeinschaft*), while the ones that are able to learn become ‘surviving societies’ (*Überlebensmeinschaft*) (Welzer 2008, p. 274).

3.2. Epistemological Promiscuity between Anthropology and Geology

There is no doubt that the Anthropocene has strong empirical data on human influence behind it. This paper, however, focuses on the relationship discovered by Norbert Elias between sociogenesis and psychogenesis: the empirical data of the outer world and the interpretive frameworks of the inner world (Welzer 2013). From the relationship between “communication” and “world” arises the concept of “*Weltkommunikation*”, a concept by Karl Jaspers that is central to the sociological theories of Niklas Luhmann, Jürgen Habermas and Ulrich Beck.

We cannot distinguish between metamorphosis of the world and communication of metamorphosis (Beck 2016). This means that nature is not understood “from outside” of society. The destruction of nature, beyond its anthropogenic or natural origin, is not a “simple” destruction of nature; it is an agent of the metamorphosis of the world or of social and political dynamics. The Anthropocene, beyond proclaiming the interdisciplinarity between geology and anthropology, supposes a provocative “*epistemological promiscuity*” (2018, p. 4).

Aristotle would say that interdisciplinarity can be said in many ways. Merging natural sciences and spiritual sciences can go beyond the fields and competences of the different disciplines. There is no single point of collision. Cybernetics is at the height of complex systems, but a degree of cognitive perfection can erase the difference between machine and man (Gadamer 1993). Jürgen Habermas (2001) shows the conflicts between the autonomy of scientific research and the normative limits; certain gene therapies can alter our understanding as a species. Modern science has created “*The Castle*” by Franz Kafka emancipated from its inhabitants: it is where the ladder of abstractions of Niklas Luhmann’s theory leads. We are before a self-sufficient and autopoietic castle, without subject and supra-subjective: a “return of metaphysics” after “the end of metaphysics” (Beck 1988). The ecological discourse is structured on the basis of the scientific discourse and develops a political action against established science (Arias-Maldonado 2018a, p. 17). We will analyze the need to unite anthropology and geology and overcome the division of disciplines (Section 3.2.1), its consequences in the understanding of life and the cosmos (developed in Section 3.2.2) and the consequences of the Anthropocene for social theory (developed in Section 3.2.3).

3.2.1. Interdisciplinarity between Anthropology and Geology

The Anthropocene is an invitation to interdisciplinarity. The natural sciences are competent to treat physical problems: they reach extreme acuity; but they tend to dimension social problems with enormous political and sociological naivety. Sociologists, philosophers and anthropologists find it irritating that together with a sharp scientific analysis superficial normative arguments are found (Welzer 2008, p. 46). The descriptive “objectivity” of a problem does not produce a metamorphosis of political action (Beck 2014). It is an old debate. Remember the fallacy many sociologists fell into when from “revolutionary objective conditions” derived a “*revolutionary subjective consciousness*”.

Edward O. Wilson unifies, in his own way, the natural sciences and the social sciences. He proposes an evolutionary ethic based on biology and temporarily marginalizes philosophers (Wilson 2016). Climate change turned into a supermarket of apocalyptic hypotheses (Beck 2016) does not provoke an institutional metamorphosis, nor does it generate a technocratic consensus imposed from above. These are mergers between disciplines that are on the antipodes of uniting society and the biosphere under the concept of “coevolution” (Duarte et al. 2006, p. 128). For James Lovelock (2006), science tries to be global, more than a series of unconnected disciplines.

The Anthropocene links a series of scientific theories from which to contemplate the evolution of geology and living beings, not as separate sciences, but as a holistic whole (Piulats 2018, p. 111). The emergence of global ecological problems attracted renewed attention, at the end of the 20th century, towards interdisciplinarity, to study the interdependencies of the parts with the whole. A good answer was “environmental impact studies”. Academia is debating particularism under the acronym “STEM” (science, technology, engineering and mathematics) and universalism of the “four Cs” (creativity, critical thinking, communication and collaboration) (von Weizsäcker and Wijkman 2018).

Academia differs from the higher training schools. It does not teach trades. In its beginnings it was divided into four faculties: medicine, theology, law and philosophy. The University of Salerno, medicine; Bologna, law; Paris, theology and philosophy. They do not transmit “specialized” knowledge; the knowledge they give to their students is universal. Nor do they handle in the instruction geared towards the occupation of public positions as does the oriental academia (“*mandarinate*”). Nowadays, science with the sole criterion of quality in measurability is losing its reputation.

The 12th century has something explosive (Fidora and Lutz-Bachmann 2008). Religion is currently absent from the conversation over ‘derailed modernity’ (*entgleisende Moderne*) (Forst 2021, p. 17). The conflict in the twelfth century between theological power and political power weakens them both. Man frees himself from the suffocating pressure of the ecclesiastical authorities and the absolutist state. This gives rise to freedom of thought and autonomy of conscience (von Weizsäcker and Wijkman 2018). A public sphere of free citizens was created; but it generated a dual thought. Today the Anthropocene has something explosive: it rejects dualism—the separation between scientific disciplines—seeking a new totality. It is a political and epistemological threat embedded in the reproduction of the socio-political order. Today it is not so easy to colonize the future from the past through linear extensions (Beck 2016).

What to do so that climate change does not affect the social and political order? The latter type of question often has disappointing answers. Instead of a re-emerging public sphere we find apocalyptic imaginaries that only arouse sympathy or indignation; incomprehension does nothing, instead of encouraging the re-emergence of the public sphere through socio-political approaches. “*The new paradigm of Earth System science is erroneously understood as no more than a variation or development of established ecological sciences*” exposes Clive Hamilton (2016). This confusion is due to the radical novelty of this new paradigm (Arias-Maldonado 2018b, p. 5). Some approaches are based on the scientific method. For this reason, it is not easy for an “*emerging body*” to develop that merges the different disciplines (Arias-Maldonado 2015, p. 125). Debates at the beginning of the 21st century can learn from debates that took place at the beginning of the 20th century: it was clear that knowledge was fragmented, and an integration of this fragmented knowledge into an “interconnected totality” was urgent (Arias-Maldonado 2018b, p. 11). This integration has several dimensions: (i) there is no knowledge without interest, as Edmund Husserl pointed out; (ii) there is no knowledge without interpretive coordinates or historical-cultural parameters, points out Harald Welzer; (iii) there is no global catastrophe without communication or “*Weltkommunikation*”, a concept that takes divergent paths in Jürgen Habermas, Niklas Luhmann and Ulrich Beck.

3.2.2. From the Theory of Metamorphosis to the Metamorphosis of Theorization

J.W. Goethe does not understand nature “from the outside” of society; he is not empiricist, for the experience of nature does not rest in itself; it is a mediation between subject and object (*Gegenstände*) (Goethe [1793] 1982, p. 6). Nature, at the end of the 20th century, is the “immobilized interior of the civilized world” (Beck 2016). Nineteenth-century social theory understood nature as something given or assigned that can be dominated: an opponent and something alien to society. Scientific thought before the appearance of the term Anthropocene, relying on the ideas of J. W. Goethe and A. Humboldt and developed by Eduard Suess, Gustav Fechner, Le Roy, Teilhard de Chardin and Vladimir Vernadsky (Palsson et al. 2013), enriches systemic thinking (Capra 1996). Gisli Palsson et al. (2013, p. 5) point out that these developments have expressions in: cultural ecology (1950s), ecological anthropology (1960s) and historical ecology (1990s). Walter Cannon’s idea of homeostasis, James Lovelock’s (2008b) Geophysiology, etc., have received a variety of critiques (Hamilton 2016, p. 94). Toby Tyrrell (2013) considers that propositions that feedback on Earth lack a solid scientific basis. Although James Lovelock is a heterodox scientist, Bruno Latour (2011, p. 74) points out that the interest of the Gaia concept is based on contributions from various scientific disciplines. He reproaches Gaia for not having the ancient role of a *goddess: she pursues her own objectives, ready to take revenge on us.

The Anthropocene is a synthesis of two processes: an event that historians can mark as a beginning (a physical and social fact) and a coordinated change of reference. “It is unclear whether it is actually a new science or the repackaging of old scientific ideas. But the ecological crisis”, notes Ulrich Beck (2014), “does not represent a destroyed or threatened nature, since its socialization (*Vergesellschaftung*) transforms it into an essential element of the political, social and cultural dynamics.” The social and natural sciences allow the theorizing of the metamorphosis of the world from two areas of knowledge. While the “doomsday society” is dominated by “we are too late”, doom and gloom and panic and despair, the “risk society” is the opposite of the “end of history”: it becomes an agent of the metamorphosis of the world (Beck 2016).

Neither the natural nor the social sciences conceptualize the secondary effects of the conflictive dynamics of risk. Ulrich Beck (1988), after Chernobyl in 1986, understands it as a “revolution” against the will, a revolution without revolution that is impossible to stop. Three decades later, Ulrich Beck (2016) argues that metamorphosis is neither voluntary, nor ideological, and is alien to revolutionary consciousness, nor can it be stopped. He establishes a difference between crumbling of the world and its resurgence. The preachers of catastrophe do not see that the world does not crumble; only their image of the world does (*Weltbild*). The error of the worm is that it clings to the cocoon and does not see that it transforms into a butterfly (Beck 2011).

The twin perils of a pandemic and a climate emergency are not a crisis; they are a metamorphosis. Bruno Latour (2021), one of the most acute contemporary observers of the relation between science and society, suggests that the intersection between the twin dangers of a pandemic and an environmental emergency “is not a crisis, but a mutation: you no longer have the same body and you no longer move around in the same world”, he writes in *After Lockdown: A Metamorphosis* (Latour 2021).

There is a distance between crumbling and resurgence. The society at risk is the one whose existential horizons fade away due to climate change; political and academic institutions are questioned and a change of reference horizons arises. The metamorphosis of theorization is the secondary consequence of the metamorphosis of the world. We move from the theory of the metamorphosis of the world to the metamorphosis of theorization. The important thing in the metamorphosis of the world is that it endangers the theoretical framework. Jürgen Habermas (1968a) finds in the works of Alfred Schmidt a knowledge theory of Nietzsche’s with surprising parallels with the analytical philosophy of the latest Wittgenstein. Friedrich Nietzsche observes in the positivist procedure of the sciences of the spirit a danger: historicism; for it dissolves the link of knowledge and interest, science and praxis. Positivist consciousness abolishes the separation of the system of rational

action (*oriented to ends*) and technical action (*oriented to means*) (Habermas 1968b). What Immanuel Kant calls “*ideas*” then escapes. This is a theme to which Jürgen Habermas (2019, vol. II, p. 803) returns after half a century: the “shame that the abstract lacks a motivational embedding” (*Verlegenheit der fehlenden motivieren-den Einbettung des abstrakten Sollens*).

These are ideas that go back to the original project of the Frankfurt School: the criticism of unilateral forms of rationality (Forst 2021, p. 17). We find that they are problems that rise to the origin of German idealism (López Ortega 2015, p. 313). J.W. Goethe will have a role in the revolution of science when classical physics abandons Euclidean geometry; physics frees itself from the Euclidean space imposed from outside. Albert Einstein, points out José Ortega y Gasset (1938, p. 145), reveals that Galileo’s “*nouva ciencia*” suffered from an acute “provincialism”.

The risk society, Ulrich Beck (2016) points out, is based on rational choice theories: it focuses on how political and social systems are reproduced. Social theory theorizes the metamorphosis of the world; society does not stop producing risks. Social theory has too many blind spots. The Anthropocene does not mean the end of the world; risks change our modern view of the world. Michel Foucault (1969) distinguishes “primary (*real*) relations” and “secondary (*reflexive*) relations”. The morphing does not take place at the level of the contents of the discourse, but in the discursive practices. In the Anthropocene, more than a “Great Acceleration” (Steffen et al. 2007), we must imagine what Karl Polanyi calls *The Great Transformation*: the mutation of economic structures. The metamorphosis of plants in J.W. Goethe is not a process in which flowering is not accelerated; the flowers metamorphose into fruits.

It is not the modern faith in progress, nor is it the redemptive power of technoscience that comes to save the world. There the dangers are greater. Philosophy long ago renounced a way of salvation that metamorphosis offers us today. The risk society enters into conflictive dynamics that are the driving forces of innovation and social change. Silicon Valley’s optimism seeks to free the world from all evils through technology; they don’t sell products, they promote “revolutions”. They make the mistake of the worm that will cling to the cocoon if it perceives its conversion into a butterfly (Beck 2011).

The environmental movement, Harald Welzer (2013) points out, lacks historical consciousness: it is not needed to be aware of physical destruction and global risks. The conflict does not occur outside of society, in nature, but within society. The Anthropocene sets a new epoch and, on the other hand, does not set a radical change of horizons. What is endangered now is the diagnosis, not the diagnosed: the consciousness of the world, not the world itself (Beck 2016).

It takes Max Weber’s “value relations” (*Wertbeziehungen*) of value as its starting point. Jürgen Habermas (1968b) develops this argument; the self-understanding of society and the categories of rational action have been dissociated. Jürgen Habermas, by opposing the universalism of the general theory of systems, removes the dust of centuries to the “*Systemprogramm*” in 1796–1797 (López Ortega 2015, p. 279). It is a critique of “self-regulating systems”: integration into the system is only possible with the self-destruction of the in-individual. Critical Theory does not refute the ideal of (positivist) science, but is rather the evolution, as Ulrich Beck (1988) points out, of atomized science that advances along the path of ignorant specialization. Teleological determinations inevitably arise from Niklas Luhmann’s functionalist strategy (Habermas 1963). The teleological critique is not exhausted in the lack of a regulatory mechanism (Lenton et al. 2020, p. 16). While Niklas Luhmann depopulates the system of men and purifies it of all subjectivity (Beck 1988), James Lovelock fails to make the geophysiology of Gaia put an end to the plague of humanity that it suffers (Latour 2015). Biology advanced by detaching itself from teleological conceptions and finding an answer in comparative anatomy (Haeckel 1882).

If we take climate change unilaterally, we will consider its origin unequivocally anthropogenic and with social consequences, but we are blind both to the “*anthropological shock*” and to its ability to modify our worldview of the world by triggering a metamorphosis (Beck 2016). J.W. Goethe, with the metamorphosis, avoids one-sidedness through the

“morphological thinking” (*morphologische Gedanken*) contained in the Satyro; Rudolf Steiner ([1884–1897] 1987) points out that this way of “looking at the world” (*Weltbetrachtung*) “borders on the mystical” (*Mystische streifende*). G.W.F. Hegel seeks a metamorphosis of ideas (Steiner [1897] 1990, p. 206). In this context, G.W.F. Hegel introduces a new level to the “objective spirit”: that which rejects the “subjective spirit” (Habermas 1963). James Lovelock considers the earth to be a gigantic “living” organism, although it does not coincide with what we understand as “intelligent life” (Piulats 2018, p. 111).

Climatologists reside in finding depressing answers to the problem; politics has never been so saturated with knowledge that feeds an apocalyptic imaginary. Their political and social imagination blocks the ability to perceive when this task prevents them from imagining, so they close themselves off from the “humans” to an extent, despite these narratives. The claim to universality of the theorization of the metamorphosis of the world rules out the metamorphosis of theorization. The Anthropocene is not analysed from the “descriptive” natural sciences, as opposed to the “normative” social sciences, but for its secondary effects: a change of worldview. Earth-System Science is already a paradigm shift, not an increase of knowledge in established disciplines (Hamilton 2016, p. 94). Ulrich Beck (2016) proposes a twist: not to understand metamorphosis as the answer to: what world are we living in? He invites us to risk a metamorphosis of the worldview.

The concept of *Weltkommunikation*, a contribution of the philosopher Karl Jaspers, was developed in different ways in the works of Niklas Luhmann, Jürgen Habermas and Ulrich Beck. The social consequences of climate change are not determined by how many degrees the earth’s temperature will increase on average in the coming decades, etc.; what has changed in the last thirty years is the awareness of the problem, not the problem itself, as Harald Welzer (2008, p. 30) points out. We may doubt whether the right question is: what should we do? Strategies based on Business as Usual are considered rational; we should confront the problem not from the reason of survival, but by questioning identity; therefore it can be defined as a cultural question (Welzer 2008, p. 212).

The Anthropocene has several dimensions: the physical process described by the sciences, the paradigms from which scientific disciplines describe reality and the power relations hidden in the relations of definition (Beck 2016). The social sciences distinguish, in all their diversity, between theory—of universal validity—and diagnosis, which means that the Anthropocene, which defines a new era, lacks theories. The theorization of metamorphosis, for Ulrich Beck (2016), implies a metamorphosis of theorization. James Lovelock’s (2006) The Gaia Hypothesis advances a new look at life on Earth. Clive Hamilton (2016, p. 95) notes: “The distinctiveness of Earth System science as a paradigm-shifting meta-science is becoming apparent only now with the debate over the Anthropocene”. The notion that the earth functions as a living organism with its own physiological system (Lovelock 2006) has been widely criticized, although the underlying conception of the Earth as a dynamic, unified, functioning totality has been accepted by the Earth System science community (Hamilton et al. 2015, p. 94). However, scientists see Earth System science as neither a paradigm shift nor a scientific revolution. That only the Gaia Hypothesis receives criticism is intriguing (Capra 1996).

What is at risk is the diagnosis of the metamorphosis of the world. For Ulrich Beck (2016), it is the hierarchical relationship between diagnosis and theory that is turned upside down: social theory fails to observe its own metamorphosis by focusing on finding solutions for the metamorphosis of the world. The discussion focuses on whether or not the Anthropocene is taking place, climate change, etc.; whether or not it has human origins, etc. and what solutions to offer to stop it, slow it down, etc.; this prevents us from focusing on seeing what has changed about our way of being in the world (Beck 2014). Social theory considers consciousness to be a ‘fixed point’ (around which the metamorphosis of the world revolves); the collective political and social imagination is blocked from focusing on stopping, containing or resolving change in the world. For Ulrich Beck (2016), the theorization of metamorphosis implies a metamorphosis of theorization that opens up new horizons for action.

Some climatologists, Ulrich Beck (2016) points out, fall into political and sociological naivety: from the “objectivity” of the metamorphosis of the world they pretend that a metamorphosis in behavior emerges. Natural technology and science, Harald Welzer (2008, pp. 46–47) points out, have no idea how rational, action-oriented intentions are related; they are competent to address the physical problem, but not the cultural problem. Biologists and earth scientists criticize the Gaia Hypothesis, not in an empirical dissent, but because of the teleological language used by James Lovelock (critique of Lovelock’s teleological language). Timothy M. Lenton, Sébastien Dutreuil and Bruno Latour (2021, p. 19) point out that: “Earth system scientists, having granted that living beings are part of the Earth system, largely missed the theoretical and philosophical challenges raised by the centrality of Life in Gaia”.

The Gaia Hypothesis, Bruno Latour (2015) points out, detects the most difficult thing: moving from geochemistry to geophysiology. He compares it to the battle between the chemist Justus von Liebig and the microbiologist Louis Pasteur. A later debate is between “germ disease” (Louis Pasteur’s) and modern physiology (Claude Bernard’s) (López Ortega et al. 2021). It is a current debate when Richard Hurton, Sébastien Dutreuil, and Bruno Latour (2021) defines COVID-19 not as a pandemic (virus-centered) but as a *syndemic* (interacting biological, ecological and social). If Louis Pasteur finds the cause of disease in microbes, for James Lovelock (2006) we humans are the bacilli that cause the Gaia disease (Latour 2015). Bruno Latour (2011, p. 74) distances himself from James Lovelock’s use of Gaia: she flirts with metaphors of the divine, she is a goddess “sensitive” to our actions, her objectives are “not” aimed at our well-being and she may well “take revenge”. The contrast is not between “descriptive” natural sciences and “normative” social sciences; it is the replacement of one frame of reference by another, that is, the generation of an *Umwertung aller Werte* (Friedrich Nietzsche), or a transvaluation of values (Beck 2014).

It is a critique of knowledge as contemplation and truth as correspondence: a proposition is true if it corresponds to the thing (Habermas 1968a). The naturalist physician Christian Wilhelm Hufeland was in tune with the scientific revolution proposed by J.W. Goethe. This was the subject of interest for Rudolf Virchow (1861). It recalls the dispute between Pasteur’s microbiology and Bernard’s physiology. James Lovelock behaves more like a microbiologist than a physiologist. He deserves a serious discussion of Gaia’s teleology, linking the theoretical efforts developed by the Gaian scientific community (Lenton et al. 2020).

3.2.3. The Cosmos Takes Care of Life

Metamorphosis comprises those changes that happen right under our noses and yet we are unable to conceptualize them. J.W. Goethe’s ([1793] 1982, p. 115) “*Metamorphoses der Pflanzen*”. Goethe’s ([1793] 1982, p. 115) “*Metamorphoses der Pflanzen*” establishes polarity in plants. Ulrich Beck uses the term metamorphosis to describe ecological challenges.

Science, at the beginning of the 20th century, emancipated itself from “Euclidean geometry” and launched a revolution. It accepted that the act of measuring can alter the results of measurement: the inability to measure—accurately—two properties at the same time. The “complementarity principle” of Niels Bohr and the “uncertainty principle” of Werner Heisenberg rehabilitate the observer. José Ortega y Gasset (1938, p. 149) would say that in the cosmic spectacle there is no observer without a specific location. J.W. Goethe anticipates this scientific revolution. He influences Vernadsky, Suess, etc. Sociology does not understand nature “from outside” of society. Nature, at the end of the 20th century, is the “immobilized interior of the civilized world” (Beck 2016). The ecological crisis does not represent a destroyed or threatened nature, since its socialization (*Vergesellschaftung*) becomes an essential element of the political, social and cultural dynamics (Beck 2016).

Charles Darwin considers that biology is conditioned by the fluctuating external environment. In the nineteenth century novel (“*experimental roman*”), the man ceases to be the protagonist. The “medium” is the protagonist. Charles Darwin takes the landscape as the protagonist by not finding anything constant inside the organisms that adapt to the environment. His theory of evolution develops a part of the ideas of J.W. Goethe:

he does not develop on what external forces act (Steiner [1884–1897] 1987, p. 18). This offers an incomplete picture of the interaction between the organism and nature. Ernst Haeckel's "law of inheritance" finds that "inner archetype" on which external forces act, in such a way that it stimulates the deployment of "internal creative forces" (Steiner [1884–1897] 1987, p. 77). The primary effects of climate change address this in a unilateral way: the unequivocally anthropogenic origin. The social consequences show us the secondary effects; the "anthropological shock" has the capacity to modify our worldview of the world (Beck 2016).

The same type of polarity can be found in J.W. Goethe and Immanuel Kant: Kant distinguishes the critique of pure reason (a mathematical physical model that offers an unfinished knowledge) and practical reason (which is a decisive knowledge that cannot wait for an unattainable universality). Medicine is an art of healing, a practical, decisive knowledge (Gadamer 1993). Medicine forms art (practical knowledge), that is, *tékhné latriké*. It does not mean that the knowledge is not applied in medical practice; there is a good collaboration between knowledge and practice. The doctor has the last word: the "clinical eye", the "therapeutic intuition", and so on. In medicine, theory and practice go hand in hand.

In J.W. Goethe's "*Dichtung und Wahrheit*" (Poetry and Truth), written between 1811 and 1830, the search goes beyond dualistic thinking: it establishes a rhythmic point. Kant established a third criticism: *Urteilkraft* (judgment). The philosopher Johann Gottlieb Fichte has the brilliant idea of grounding the world on the circular (self-referential) movement of consciousness, but he creates enormous confusion: "The Ego postulates itself". G.W.F. Hegel recognizes the impasse: a circle without beginning and without end. This tremendous confusion between consciousness and world, system and society, etc., fascinates sociologists (Beck 2016). It is one of the causes of the crisis of civilization, as Edmund Husserl (1935) points out. He proposes a rebirth, in Europe, in the face of the danger of "fatigue"—a new spirituality like a Phoenix. Atmospheric chemists have found that the balance of gases in the atmosphere is not explicable without some "intentionality". Edmund Husserl proposed to recover Aristotle's ontology that considers that nature has a teleological purpose (Habermas 2012). Geology, as a "gigantic living organism" (although it does not coincide with what we understand by intelligent life), would be endowed with a certain "intentionality". Quantum physics has paved the way to stop seeing the world as something "outside of us". And yet, we continue to think that the world is something that existed before and will exist later (Lachman 2017, p. 42).

3.2.4. From Social Classes to the Anthropogenic Class

Sociology has detached itself from nineteenth-century visions to understand that nature does not exist "outside" of society. Sustainability policies, however, continue to invoke "the natural" as something "outside of us" (Arias-Maldonado 2016). Social theory has been articulated in the conflict between "knowledge" and "intention", or between "work" and "interaction" (Habermas 1968b), or, in Marxist terms, the conflict between the "productive forces" and the "relations of production." Today, more than "production relations", it would be more appropriate to speak of "defining relations" (Beck 2016). The "social class" and the "anthropogenic class" can be interchangeable concepts, but they belong to different worlds (Beck 2016).

The concepts of "class society" and "social classes" designed to explain the distribution of goods are unfit to explain the new social inequalities of the Anthropocene. Climate violence is written by climatologists, geologists, etc., as an increase in the acidity of the oceans, an increase in temperatures, a loss of biodiversity, etc.; the new perspective of inequality in the Anthropocene does not exclude the "observer"; the focus is on the metamorphosis of politics and society. The Anthropocene, more than a new geological era, is a profound epistemological and normative horizon change that modifies our relationship as human beings with ourselves and with the rest of nature (Steffen et al. 2007, p. 614).

The social theory does not explain the distribution of evils; this is done by the risk theory. Evil, as a secondary consequence, causes an “anthropological shock” that transforms society, politics and culture. Well beyond the current supermarket of apocalyptic hypotheses that is climate change, we start to pay attention to the new norms, structures and beginnings (Beck 2016). There is a hidden relationship between “*climate catastrophe*” and “*emancipatory catastrophism*”. Climate change also causes an “anthropological shock” that initiates cultural, social and political transformations, an “emancipatory catastrophism” to the extent that it frees us from old structures and old norms.

The distribution of evils is superimposed on the distribution of goods. The theory of risk allows adding to the theory of social class that explains the distribution of goods and how evils are distributed. However, when these evils are metamorphosed into goods, due to their “secondary effects”, the discourse of “climate justice” refers to former winners and losers. Many questions are poorly posed. The question is not who wins and who loses, but what social and political processes revolve around climate change, not as a physical process, but as an agent of the metamorphosis of society. All the old cartography of social theory is useless.

We see man as a geological force causing climate change. The secondary consequences of climate change are an even more transformative force in epistemology, society and politics. The sciences, including the social sciences, give little relevance to “side effects.” We believe that the picture of the world provided by science is impartial, the result of an observation, measurement and description (observation, measurement, description). Science, however, does not have a “contemplative” attitude; rather, it is “imperative” (Ortega y Gasset 1938, p. 106). The rational spirit does not observe, it interrogates. We can interrogate by asking a scientific question: what to do about climate change? The answer is a description of climate change. We can ask an analytical and sociological question: how does climate change alter the social and political order and the interpretive coordinates and cultural frameworks? The answer will be the opposite of the first: how “public evils” are metamorphosed into “public goods” (Beck 2016).

The Axial Age leaves the world divided. For Helmuth Plessner (1981) human beings are eccentric: we are a “body” (*Körper*) endowed with “life” (*Lieb*). In the words of Ulrich Beck (2016), we have “the macro level of the world” and “the micro level of everyday life”. The Anthropocene would merge these two levels. The sociology that deals with the evolution of society and geology that deals with the evolution of the earth are now intertwined. Proposals, in the last decades, open the way for an Earth seen as a “*gigantic living organism*”. It must be taken as a hypothesis, not as a scientific statement. The Darwinian vision guided by selfishness and competition is, by a new image (Gaia), in favor of a cooperation between rocks, microorganisms, plants and other living beings.

4. A Physiology of Geology: A Cosmos as a Living Organism

There are attempts to put this integration of various hitherto separate scientific perspectives into practice by taking divergent paths. The Association for the Promotion of Scientific Research in Germany has a solid foundation, although we can go back to the beginning of the 20th century, when Albert Einstein, Lise Meitner, Fritz Haber and Otto Hahn investigated at the Kaiser Wilhelm Institutes (Costanza et al. 2007). Microbiology developed the concept of symbiogenesis from studies of bacteria networks with self-regulation capacity (Aanen and Eggleton 2017). Illustrious precursors such as Gustav T. Fechner, professor at the University of Leipzig, physician, philosopher, physicist and naturalist, understand the cosmos as an animated whole in *Ideen zur Schöpfungs- und Entwicklungsgeschichte der Organismen* in 1873. Gustav Fechner ([1873] 2011) uses the term psychophysics to also consider that the stars have life.

This opens a discussion that departs from the strictly scientific. Bruno Latour (2015) talks about “natural religion”, which connects environmentalism with the discourses of the New Age and forms of paganism to which Bruno Latour is opposed. He puts into play correct religious arguments, being translated into a secularized language without

losing their theological load (Forst 2021). Heinrich Heine ([1957] 1969–1976, vols. VI, I, p. 479) understands the philosophy of the spirit of G.W.F. Hegel as a process in which “God becomes self-aware in man”. It proposes this synthesis between flowers and nightingales to twin sensualism and spirituality, social justice and beauty and Jewish asceticism and Hellenism that Hegel, Hölderlin and Schelling had dreamed of (Habermas 2013). We will deal with the problem of evil (developed in Section 4.1), our role as repairers of the cosmos (developed in Section 4.2) and the plausibility of geophysiology.

4.1. *The Loss of Meaning of the World*

The separation between natural sciences and social sciences is a wall that prevents ecological catastrophe from becoming an agent of the metamorphosis of the world (Beck 2016). The origin of this gap between the “world of life” and the “objectified world” is located at the moment when the axial reformers allowed the building of the great coherent and transmissible systems of knowledge. It is one of the greatest cosmological revolutions. The whole, encompassing the “world of life” and the “objective world,” is separated. The Babylonian astrologers, the Egyptian geometers and mathematicians, etc., unlike our astrophysicists, mathematicians, etc., had no less knowledge; the great systems of knowledge went hand in hand with everyday practices. In Aristotle, normative arguments still went hand in hand with empirical reflections (Habermas 2006).

4.1.1. The Metamorphosis of Our Concept of the World

Ulrich Beck (2016) focuses the analysis of the Axial Age (*Achsenzeit*) on disputes between the “moral divine order” and the “social and political (earthly) order”; the spiritual elites intended to assert their yardstick of the transcendental order in the temporal order. Since then, the “homo sapiens” and the “homo ritual” took different paths.

In the 12th century, the explosive conflict between the discourse of revelation and the discourse of reason erupted. It was a conflict between two spiritual currents. Opposing concepts were sharpened: science and belief. The rabist reception of Aristotle had excluded the possibility of discovering in nature a “divine manuscript”. Christian scholasticism finds that manuscript in nature, through Aristotelian ontology (Fidora and Lutz-Bachmann 2008). Scholastic nominalism will pave the way for an empirical and impartial contemplation of nature that leads Rene Descartes to separate the “res-cogita” and the “res-extensa”: the natural sciences (the experienced) versus cosmology or sacred history (the lived). Friedrich Nietzsche warns, in a fragment entitled “Hinfall der kosmologischen Werten”, of a “devaluation of the supreme values” (der Entwertung der obersten Werte). In it he designates “den Hinfall der kosmologischen Werte” (the expiration of cosmological values) as noted by Martin Heidegger ([1936–1946] 1961, pp. 55–58).

We have contextualized the debate about the meaning of evil (Steiner [1916–1924] 1981). Jürgen Habermas (2019, pp. 361, 546) draws the consequences of the dispute in the early centuries between the Neoplatonism of Celsus (2nd century) and Plotinus versus the early Christians, Tertullian and Augustine of Hippo. It is more than just a theological or philosophical dispute. Jewish mysticism and Protestant mysticism, which have in Isaac Luria and Jakob Böhme two of their highest representatives, formulate a theogony and cosmogony in which God is exiled to the darkness of his own foundation without foundation: God becomes his other and nature extends into God (Habermas 1963). Hermetics and agnostics agree that man had descended from the spiritual world. However, while for Christians, Hermetics and kabbalists it is a “leap”, for agnostics it is a “fall”. The body, for agnostics, is a prison from which the spirit has its only salvation in escaping.

4.1.2. Manichaeism and Metamorphosis

Hermes Trismegisto, asked by Asclepius about why we possess a body, replies that the body allows the spirit to take care of creation (Lachman 2013). More than a geological time, we fix an anthropological time. But it is important for geological evolution. We have the inner gaze of Buddha (the gospel of Luke) and the look at the cosmos of Zoroaster

(the gospel of Matthew). These two currents come together in Christianity to rejuvenate themselves (Habermas 2019, p. 361).

There are two approaches to the problem of evil (Steiner [1916–1924] 1981, p. 94). Pelagianism refuses to admit that evil cannot be eliminated from the earth by human effort (Riechmann 2017, p. 160). Manichaeism, on the other hand, does not suppress evil: darkness must be redeemed by itself. Man's task is to send that "spark" into darkness so that "evil" may be metamorphosed into "good". Jorge Luis Borges, in *"The Rose of Paracelsus"*, puts in the mouth of Theophrastus Bombast von Hohenheim the following: "Do you think that divinity can create a place other than Paradise? Do you think the Fall is nothing more than ignoring that we are on Paradise?" All nature is at the service of man (an "anthropocentric" hypothesis); but, he adds: "no substance can be used without great art . . . the human being is to transform it" (Paracelsus 1965, p. 544). Celsus, famous for his attacks on Christianity, as well as on neopagans and agnostics, believes that the world was created by a kind of idiot God; we are spiritual beings trapped in a physical and evil cosmos.

The response to the planetary ecological crisis, for John Gray (2015) in *"The Soul of the Marionette"*, consists of returning to those older religions where the problem of evil did not exist; then, we lived in a world that contained light and darkness, creative and destructive forces, good and evil. Evil, for John Gray, has its origin in Zoroastrianism, Manichaeism, Rosicrucians, Cathars, etc. He finds in the scientific revolution, even if he denies Christianity, a byproduct of magic, alchemy, etc. This does not leave out Isaac Newton who believed in numerology and sought hidden meanings in the Bible. Before Bodhisattva adopted Buddha's body, there was no guilt; man, if anything, was possessed by evil. Jesus, influenced by Zoroastrian ideas, understands life as a war between light and darkness, between good and evil.

4.1.3. Agnostics against Gnosis

James Lovelock agrees with John Gray not only in his criticism of Christianity and humanism, but also in his faith in progress and in a human being who is too fragile to accept the truth. According to him, "sustainable development" is that faith to be eradicated and replaced by the inevitable "sustainable withdrawal" (Lovelock 2006). A previous step to discussing anthropological and cosmological pessimism is to let geologists, biologists, oceanographers, etc., speak; and, in a second moment, points out Jorge Riechmann (2017, p. 261), debating this pessimism from Giacomo Leopardi or Arthur Schopenhauer, etc.

It is not in scientific terms that John Gray (2003) blames humanistic and Christian mental infrastructures to add that men are ill-conceived and ill-made creatures (Gray 2015). He agrees with the sociologist Lewis Mumford, who contrasts the irrationality that runs through human history with the wisdom and rationality of the animal. In his work *The Myth of the Machine* (Mumford [1967] 1971), he reveals, in human evolution, a chronic predisposition towards error, evil, exorbitant fantasies, etc.

John Gray, says Gary Lachman (2013), does not argue, but simply asserts and takes advantage of any mention of the human being to lower its fumes. Walter Benjamin ([1940] 1980, p. 698) agrees in criticism of progress but in some points is very different from Gray. *"Über den Begriff der Geschichte"*, with the view that the SPD's *"Gotha program"* is a "secularized resurrection of Protestant labor morality", from where fascism will later develop. Walter Benjamin in 1921 acquired the *Angelus Novus* of Paul Klee. Klee described it as *The Angel of History* (*"Der Engel der Geschichte"*) that is pushed, inexorably, into the future, but, at the same time, turns its back to it: it looks to the past where ruins accumulate. Look to the past, as the hurricane, which we call progress, pushes you into the future (Benjamin [1940] 1980, p. 697). Walter Benjamin, unlike John Gray, retains the hope that man can rebuild unity in a whole after the "breaking of vessels" (*shevirat-ha-kelin*, in Hebrew). The prophets of the apocalypse and those who preach faith in technological progress look to the past. Optimists and pessimists retain a "larval worldview", that is, they are not aware of their imminent

metamorphosis, like the caterpillar, into a butterfly. They cling to the cocoon (Beck 2016). They do not experience the tremendous transformation of their referential horizon.

4.2. Guardians of the Cosmos: Buddha, Zoroaster and Christ

Isaac Luria, the great 16th century Kabbalist from Safed, and Jakob Böhme, shortly after, consider that man has a task. The common point is the “doctrine of the fall” of Adan Kadmon (Habermas 1963). In Hebrew, the term “*tikkún*” is used, which translates as “repair” (Lachman 2013). In the nineteenth century, Søren Kierkegaard considered that there was no such “fall”; it was a “leap of faith”. He recovers the idea that men are “*cosmic repairers*”.

Against this mystical movement, the idea of human insignificance makes its way; man reduced to nullity and, at the same time, turned into a geological force that is killing the Earth. Man, as we will see, is part of two worlds: the kabbalists who know that Adam (אָדָם) without the “*Elf*” means blood (*Dam* in Hebrew). Adam unites the blue sky and the red earth.

The idea of “*tikkun*” suggests that when God creates the world “*out of nothing*”, something did not work out. As Isaac Luria points out, he creates man “*of something*” and woman of man. He transmits the spirit to that something. That is why, for Isaac Luria and the Kabbalists, man can, thanks to the “*divine spark*”, stop the escalation of ecological destruction.

4.2.1. East and West: Zoroaster and Buddha

There are those who insist on seeing man as dust mops in the infinite universe, and give him the condition of a fallen angel whose only way out is “detachment”, “asceticism” and “*meditation*”—a will not to know anything about the earthly. Man, on the other hand, houses within himself the eternal and infinite, as suggested by the scientist, philosopher and mystic Emanuel Swedenborg. He anticipates an idea, previously stated, that the universe intends to harbor intelligent life. Jorge Luis Borges describes him in a story: he worked in the mines, studied anatomy, aeronautics, etc., but refused the chair of Astronomy at the University of Uppsala because it was too theoretical a dedication.

Pindar sums up man’s heroic task: “to become what he is”. Today we are not so sure of an unlikely “technocracy” as José Ortega y Gasset ([1939] 2014, p. 95) continues; he considers that the technique cannot command; it is secondary, because the main thing of man is to make himself, to self-manufacture himself (2014, p. 90). Today’s man lacks imagination to know what he wants to be. Yuval Noah Harari (2018) tells us that if we don’t know what we want, it will most likely be easy for technology to shape our lives and decide for us. Life is not just about fighting matter; it is, fundamentally, a struggle with the soul. The body and soul are things; the man, says Ortega y Gasset ([1939] 2014, p. 87), is “a drama”. He contrasts the “Bodhisattva project”—the one who is “self-absorbed” within himself—and the “Gentleman’s project”—the one who “alters” himself in a struggle for life, exercising professions, etc. The Jesus of the line of Nathan, in the gospel of St. Luke, and the Jesus of the line of Solomon (strains of David), in the gospel of St. Matthew, come to unite and renew these two spiritual currents: the eastern technique of Buddha and the western technique of Zoroaster (S. VII-VI BC), uniting West and East (Ortega y Gasset [1939] 2014, p. 138). Buddha and Zoroaster represent that polarity between believing and knowing (Habermas 2019).

Agnostics understand the “doctrine of the fall”: we fell into a world created by an idiotic god or an evil being. G. Pico della Pico della Mirandola (1994) wonders who would not want to flee quickly from this world, dominated all of it by an evil being... and be transported to the celestial Jerusalem? These are the theses defended by John Gray. That idiotic and evil god has been transformed into a secularized idiotic and evil man. Edward O. Wilson considers man to be a tribal carnivore willing to cruelly kill other men; James Lovecraft casts him as a plague on the planet. For Ernst Cassirer, “it is not the material

world, but the human, the key to a correct interpretation of the cosmic order" (Lachman 2013).

The Anthropocene refers us to effervescent anthropological proposals from the beginning of the 20th century in the field of science. We have the "cosmological anthropology" of Max Scheler, the "existential anthropology" of Martin Heidegger, the "biological anthropology" of Helmut Plessner and the "medical anthropology" of Viktor von Weizsäcker. Ernst Haeckel, a faithful disciple of Charles Darwin, far from suppressing teleology makes it a supreme principle. It is not difficult to see the link between pessimism and misanthropic reflections in John Gray. Sometimes man is the scapegoat for the ecological crisis. At other times he is capitalism (or Capitoecene) (Haraway 2016). We have "*the four horsemen of atheism*": Richard Dawkins, Daniel Dennet, Christopher Hitchens and Sam Harris.

4.2.2. Physiology of the Earth

James Lovelock (2008a), writing in The Guardian, in the face of the new optimism and technological arrogance, invites us to reflect. Geoengineering acts with the planetary climate in the same way that doctors did with diseases before the 1940s, when we had few drugs on hand—especially morphine, quinine, aspirin and insulin—and little was known about what the mechanism of action of these drugs was. The patients had two ways to deal with the disease: modern physiology (salutogenesis) or biomedicine (declaring war on germs: pathogenesis). Are we prepared, if we alter the planetary balance, to take on the permanent, onerous task of maintaining the Earth's homeostasis? If we use stratospheric aerosols launched from airplanes, as Bill Gates (2021) proposes, even if they are successful, sooner or later we would be faced with the problem of ocean acidity and more. Then we will need other medicines. And so on. Modern physiology would recommend us to rely on the ability of the planet's natural self-regulation, that is, to reinforce salutogenesis and homeostasis. In the health emergency, says Richard Horton (2020), we follow "too narrow approaches", which proposes an analysis of the interactions between biology, environment, social equalities, etc.

The scientific approach prefers to divide and subdivide a problem, and to attend to interactions, to interdependence; in one word, it ignores the "context". The euro crisis was treated as a highly specialized subject. Political writers, from evening to day, warn of the secondary consequences of this crisis. The euro crisis is "contextualized" as a crisis of the very process of integrating European politics (Habermas 2011). Monetary experts and elites reject these analyses as inaccurate and lacking in "scientific" rigor. Ulrich Beck (2016) pointed out how Draghi's "emergency policy" to save the euro bypassed all the monetary policy rules that the elites had imposed by accelerating the process of European disintegration. The euro crisis could also have been an opportunity of metamorphosing into options for returning to national monetary systems. We are facing a revolution without revolution, a revolution without subject, a revolution instigated by the prevailing circumstances (Beck 1988).

4.2.3. Metamorphosis and the Manichaeian Faustus

The secondary consequences of the "public bad" that metamorphose into "good" take us back to an "old quarter". It is an almost theological dispute over the meaning of evil. The Faust of J.W. Goethe is Manichaeian; it does not mean that "good" and "evil" are mixed. Good has been hidden behind evil. Here arises the antagonistic position between Mani and Pelagius, who was a British monk accusing Augustine of Hippo of, under Manichaeism influence, contaminating Christianity with pagan fatalism and "raising evil to the same level as God" (Riechmann 2017, p. 160).

Environmentalism, unlike the Anthropocene, presents the destruction of the planet as a strictly scientific issue. However, it has theological and metaphysical derivatives. Manuel Castells ([1997] 2009) identifies environmentalism with a mixture of New Age, neo-paganism, counterculture, etc. There is no shortage of eccentric figures who proclaim: "*Earth First!*". They consider that we are all animals and human life is, in itself, irrelevant

to the cosmos. Environmentalism, over and above the mass of tendencies, leads to an “apocalyptic millennialism” in Martha Lee (1995, p. 140). James Lovelock (2006) sees it as inevitable to go to the Eocene, and the quagmire in which we find ourselves is not because of stupidity and ignorance but, on the contrary, because of our intelligence and creativity. They accuse the infrastructures of Christianity and humanism, stating that man is the greatest threat to Gaia (Lovelock 2006).

This is not shared by Vladimir I. Vernadsky, Max Scheler, Edmund Husserl, etc. Colin Wilson writes that “never before in history has humanity had such a depressing view of itself” (Lachman 2017). Original sin is the excessiveness and arrogance with which man transcends animal consciousness. Jorge Riechmann (2017, p. 159) proposes, instead of “let’s celebrate what we are”, “let’s be afraid of who we are!”.

The Anthropocene is also riddled with anthropological, theological, philosophical, sociological questions. Every species has its own habitat; on the other hand, man lacks a natural habitat of his own: Earth for man is uninhabitable (*ungewohnbar*). That’s why it needs to manufacture (*bauen*) its habitat (*wohnen*). The man, for Ortega y Gasset ([1939] 2014, pp. 209–10), “is not an animal... it is an intruder in the so-called nature. It comes from outside of it, incompatible with it, essentially misfit.” Man, then, has to create an “inside”, an “inner world”, a “super naturalness”, where he can take refuge from the weather. The animal lacks, says Max Scheler, that “*chez soi*”. That “within itself” (Ortega y Gasset [1940] 2019, p. 51). That is why man has that “eccentric” position, which Helmuth Plessner (1981) points out: we are *Lieb* (life) and *Körper* (body). We are part of the earth (red) and the cosmos sky (blue). Man, for José Ortega y Gasset ([1939] 2014, p. 209), “is on Earth, but does not inhabit -*wohnt*- in it”, for, unlike other beings (mineral, vegetable and animal), “the earth is for man uninhabitable -*unbewohnbar*” (Ortega y Gasset [1939] 2014, p. 209). Jorge Riechmann (2017) proposes us to live as good orphans, that is, to accept finitude and contingency.

The West must learn from the East to look inward, to develop meditation. Buddha, who looks inward, and Zoroaster, who looks at the cosmos, are two currents that unite and are rejuvenated in Christianity (Habermas 2019, p. 361). Manichaeism seeks to inset evil gently. This does not mean that we have to resist evil. Evil becomes, as we saw in Ulrich Beck (2014), an agent of “emancipatory catastrophism”. “Public goods” are not “effects of goods but the positive side effects of bad”. It is not easy to understand. We can observe it under three lenses: (i) the anticipation of a global catastrophe that violates the sacred (unwritten) norms of human existence and civilization, (ii) an anthropological shock and (iii) a social catharsis.

5. What’s after the Anthropocene?

“Sustainable development” is gaining detractors. James Lovelock (2006) believes that we must abandon “sustainable development” in favor of “sustainable withdrawal”. The thesis of James Lovelock, John Gray and others is that the time for “sustainable development” is over. The original sin lies in not accepting our guilt, finitude, contingency, etc. We are not in the context of a scientific discussion on climate change, but of anthropological and philosophical approaches. The earth is sick of humanity; a plague is not an argument, it is an assertion of pathological pessimism.

In the same vein as James Lovelock (2006), Edward O. Wilson (2016) sees man as a tribal carnivore willing to kill on behalf of his tribe. Never before has humanity had such depressing visions of itself. It is not a question of humanity following frivolous currents of thought that deny science. What is affirmed is the great failure of what we consider the most valuable: our capacity to learn (Álvarez-Pereira 2019). We must support an orderly, planned, controlled ‘*sustainable withdrawal*’, because for ‘*sustainable development*’ there is no time. From the Anthropocene, we will not go to Holocene but to the Eocene: a planet with a temperature increase of 7 degrees (Lovelock 2008b).

5.1. Progress and the Dark Side of History

The Anthropocene refers to more than just altering the social relations of production. Technological acceleration is altering the moral foundations of modernity and our own self-understanding as a species. Jürgen Habermas points out that science and technology become technocratic consciousness, on the one hand, and, on the other hand (a century after the words of Karl Marx) science assumes the role of bourgeois ideology destroyed by the innovative dynamics themselves (Habermas 1968b).

Here we find the equivocal concept of rationality as pointed out a century ago in the *“Dialectic der Aufklärung”* of Theodor W. Adorno and Max Horkheimer (1997). We should add the radicalized criticism of Herbert Marcuse. Scientific and technical progress involves not only the destruction of social relations and institutional frameworks, but also the destruction of the planet and the human substance (Marcuse 1954).

The fusion of the biotechnology, bioengineering and infotechnology revolution will allow us to move from manipulating the *“outer world”* to manipulating the *“inner world”*. Man, from the seventeenth century, conquered an enormous power to manipulate the *“outside world”*. The result of that is the current *“ecological collapse”*, due to man not having understood the complexity of global ecology (López Ortega et al. 2021, p. 166). In the 21st century, we are gaining the power to manipulate the inner world without having the slightest idea of how it works. It opens up terrifying narratives and the coming of the moment of *“singularity”* mentioned by Ray Kurzweil (von Weizsäcker and Wijkman 2018).

5.2. The Role of the Observer

Man occupies an eccentric place. He becomes a geological force and, at the same time, is expelled from the cosmos, from knowledge and from history. The image of the modern *“world of science”* was purged from the subjective images of the *“world of life”* (Habermas 2012). There is a paradoxical situation between the social sciences and the human sciences; Carl Gustav Jung ([1954] 2011, p. 205) criticizes that the humanities prefer to avoid the audacious attempt to enter the unknown and the invisible, while physics, to enable a certain problem to be more or less fruitful, unfolds in an apparent *“contradictio in adiecto”* (contradiction in terms).

Galileo was aware that modern science is not a compendium of knowledge of the world when he asserted *“mente concipio”*, that is, *“I conceive it in my mind”* (Gadamer 1993). The theory of relativity dethrones Euclidean geometry. Galileo and Newton made the universe Euclidean because reason dictated it (Ortega y Gasset 1938, p. 153). There is a rational anthropocentrism, forcing nature to behave rationally and adopting the rational point of view: *“sub specie aeternitatis”* (in a universal perspective) (Ortega y Gasset 1938, p. 148). Albert Einstein understood that the distance of two objects belongs to the objects themselves: there is no space apart from physical objects. There is no matter without form and observation without an observer. Time becomes a fourth dimension.

It is not a thesis to be established, it is a model conceived by the observer. The meaning of a model is not to say *“this is so”* but to determine a point of view. (Jung [1954] 2011, pp. 535–36). *“In the cosmic spectacle”*, says José Ortega y Gasset ([1939] 2014, p. 149), *“there is no spectator without locality”*. In the Anthropocene, pure reason cannot walk without going hand in hand with experience.

Manuel Arias-Maldonado (2015, pp. 18, 24, 42) reminds us that natural history is also social history. Science and ecology have renounced historical consciousness and, therefore, also utopia. We are surrounded by dystopias and apocalyptic hypotheses based on reckless speculation. In opposition, we have the thesis of the end of science, or, at least, as Jeremy Baskin (2015) points out, what until now we understood by thinking in scientific terms: dualistic, binary and, therefore, exclusive. We go back to the romantic thought of J. G. Herder and J. W. Goethe, passing through Alexander Humboldt.

The bodhisattva has a negative assessment of life. In Christianity, what is wanted is to return to the spiritual world from which life has fallen; Christianity does not disdain the earthly. For the Buddhist there is no way of salvation, only of flight; for the Christian there

is the way of bliss: the immanent lacks value, only the capacity for transmutation expressed at the Last Supper has value. Life is a training for death (Ortega y Gasset 1938, p. 64). Here, man, says José Ortega y Gasset ([1939] 2014, p. 85), is “at a natural and supernatural time, a kind of ontological centaur”; body and soul are things, whereas man is neither one nor the other, but “a drama, and a struggle to become what it has to be” (2014, p. 87). The scientific revolution, with a nature that rests on the absence of human footprints, is challenged (Arias-Maldonado 2014).

5.3. *The Role of the Observer*

The Anthropocene dusts the centuries off the work of J. W. Goethe. Two centuries ago, he challenged dualistic thinking. The Metamorphosis offers us a review of the European intellectual tradition: we are not facing a revolutionary theory, we are facing a change determined by a theory; we are not facing a crisis, as Bruno Latour (2021) points out, but rather a mutation. In Greek thought (Heidegger [1936–1946] 1961), *lógos* (λόγος) and *physis* (φύσις) form a unit: being and thinking are the same thing. In the Old Testament, *logos* is translated as the “word” in its sense of order and command. G.W.F. Hegel seeks the foundation of the idea in nature, not in human individuality (Steiner [1897] 1990, p. 206). That is why G.W.F. Hegel did not set out to build a philosophy of freedom. In his writings of youth (1799/1800), he sees how Jesus opposes to the “objective commandments” something that was foreign to him: the subjective in general.

J.W. Goethe places man at the center of knowledge. He anticipates Martin Heidegger’s ([1957] 1997) grim diagnosis a century later: man loses his home and is deprived of all roots. The unitary vision of nature was lost from the seventeenth century. The Anthropocene finds, in the 21st century, in authors inspired by J. W. Goethe, the intellectual roots to challenge dualism, the dissociation of the objective and the subjective and the division between the world of science and the world of meaning. Recent anthropology has hastened to elaborate hypotheses that explain the transcendental origin of man (Piulats 2017, p. 272). Neuroscience studies the evolution of God in the human goal as an adaptive “illusion” (Riechmann 2017, p. 201).

G.W.F. Hegel introduces a new level in the objective spirit: the subjective spirit (Habermas 1963). We not only contemplate the physical world, but that contemplative activity through reflection. We are not saying that reality has a spiritual basis. We return to unite *logos* and *physis*: the word is where man lives (Heidegger [1936–1946] 1961).

J.W. Goethe can now receive a renewed understanding. The Anthropocene poses a new epistemology. This places us in an argument far from the one that insists on the natural limits of growth, to find a new emancipatory scheme (Arias-Maldonado 2021). Philosophy needs to be ashamed of the imagination not based on reason. It is a thesis exposed in the “*das älteste Systemprogramm*” in 1796/1797. It returns us to that union between the oriental technique (internal) and the western technique (external): Buddha and Zoroaster.

Environmentalism, which has a utopian origin, has developed within the imagination. However, it has evolved towards pragmatism guided by science. It leads to a fall into pessimism by giving up imagination. The various environmentalist currents give them their opposition to anthropocentrism.

6. Conclusions

The Anthropocene comes to provoke a renewal of conceptual frameworks. Manuel Arias-Maldonado (2015, 2017, 2018b, 2021), Jeremy Baskin (2015, 2019), Ulrich Beck (2014, 2016), Wallace S. Broecker ([1985] 2002), Clive Hamilton (2011, 2016), Donna Haraway (2015) and Bruno Latour (2015, 2021) renounce the dualism between nature and society. In this paper, we have presented an outline of the enormous task involved in the elaboration of a new cartography.

Anyone looking for a description of the “Great Acceleration” will be disappointed. The natural sciences lack the competence to write the social dimension of the Anthropocene

(Welzer 2008, p. 46). We do not describe the Anthropocene from the social sciences. The social sciences describe social relations, but not the metamorphosis of social theory.

The world is sinking, on the one hand; on the other hand, however, that sinking provokes an “anthropological shock” that transforms society. There is an interplay between apocalypse (or salvation, for techno-optimists) and awakening. We should not identify civilization and the world. The world will continue if “we”—who is this “we” (Welzer 2008, p. 47)?—realize that “we” are not alone in the world, that there are other rationalities and that the modernity and progress of our civilization rests on a grand fantasy (Álvarez-Pereira 2019).

6.1. *Between Collapse and Awakening, between Crisis and Metamorphosis*

The Anthropocene has, on the one hand, a “descriptive” approach: the “Great Acceleration” of our civilization in the last two centuries. On the other hand, it has a “reflexive” approach: disturbing and uncomfortable anthropological questions arise.

What does “transvaluation of values” mean? Does it mean the end of all value? Or does it mean placing the foundation of all value, not in the external nature (under dualistic scheme), but in man (overcoming dualism)? (developed in Section 6.1.1) What does it mean that “good” hides behind bad”? That much of what we call politics and the “culture war” is really an ancient theological war over the metaphysics of reality, colliding with the digital revolution? How does climate change (primary effects) become an agent of the world’s metamorphosis (secondary effects)? (developed in Section 6.1.2) What is between succumbing and awakening? Are we in crisis or a metamorphosis? (developed in Section 6.1.3) What does “dead” mean? Are we in a valley of tears? Are we in a world of suffering (which will continue to exist and we cannot escape) or are we facing a force that allows humanity to evolve? Is what many call “cultural war” nothing more than an old theological war? (developed in Section 6.1.4).

These polyhedral questions, which cross the Anthropocene, have been analyzed. G.W.F. Hegel could express it two centuries ago under the concepts of “objective spirit” and “subjective spirit”; it was the beginning of the formation of differentiated modern societies. In the 21st century, we find ourselves in a conflictive and far from uniform realization of those principles. A retrospective look at the intellectual roots of another modernity acquires relevance. Only in this way can we approach a metamorphosis of our look at the world (developed in Section 6.1.5).

6.1.1. What Is Metamorphosis?

Global risk is not global catastrophe (Beck 2014). The symbolic communication of catastrophe is not the global catastrophe itself. J.W. Goethe ([1793] 1982, p. 12) contests dualism: there is no such thing as an isolated experience of reality. Two centuries later, the dust is wiped off J.W. Goethe’s challenge: Bruno Latour (2021), Donna Haraway (2015), etc. Ulrich Beck (2016) states that there is no “metamorphosis of the world” without “communication of metamorphosis”.

J.W. Goethe searches for the relationship between phenomenon (*Phänomene*) and incident (*Begebenheiten*). J.W. Goethe observes the metamorphosis of plants; G.W.F. Hegel the metamorphosis of ideas. For Goethe, G.W.F. Hegel’s metamorphosis of ideas seeks the content of metamorphosis in the world (*Weltinhalt*), not within man (Steiner [1897] 1990, p. 206). They seek ethics in the universal order (*natural law*); they do not construct a philosophy of freedom as they do not seek ethics in the human individual (Steiner [1897] 1990, p. 206).

Climate change is not outside society. This is not only because of the “social dimension” of climate change. It becomes an agent of the metamorphosis of our worldview. It has the capacity to replace one frame of reference with another (Welzer 2008). In risk theory (Beck 1988), Beck perceives an inverted revolution: a revolution without revolutionaries, a revolutionary theory anchored in the old civilization that resists leaving the scene. The metamorphosis is neither voluntary, nor ideological, nor programmatic (Beck 2016).

Social theory explains social change. When social theory does not explain social change, we say that the world is unhinged. Metamorphosis is the corrosion of the certainties that explain the world. Metamorphosis implies a “transvaluation of values” (*Umwertung der Werten*). It does not mean nihilism with respect to values: neither indifference, nor irrationality, nor skepticism. For Jürgen Habermas (1963) it is an inner reflection; for Heidegger ([1936–1946] 1961) an awakening of self-consciousness; for Michel Foucault (1969) questioning disciplines and the organization of scientific models.

6.1.2. Transmutation of “Public Bads” into “Public Goods

The metamorphosis does not recuse itself from the “descriptive” plane (proper to the natural sciences) to give the floor to the “normative” plane (proper to the social sciences). “Public bads” are centered on the real plane; “public goods” are centered on the symbolic plane. The “good” is hidden behind the “bad”.

Ulrich Beck (2016) distinguishes “relations of production” (material production) and “relations of definition” (symbolic production). A change of normative horizons is a transformation, not a metamorphosis. The “anthropological upheaval” generates a “categorical metamorphosis”, “institutional metamorphosis” and “normative metamorphosis”. The transmutation of “public bads” into “public goods” evokes an old quarrel.

The meaning of evil is a dispute between agnosticism and Christian translations. We have the opposition between the “fall” and the “descent”. The Hermetic mystery becomes an anthropological question. Luria’s Kabbalah, through the “*Tikún*”, understands man as a cosmic repairer. This idea is contrasted with the depressing agnostic visions of a man trapped in an evil world created by an idiot god (Lachman 2013).

The Gaia hypothesis understands that the earth is a goddess and is afflicted by a plague called humanity. God ceases to be evil and idiotic; humanity is suicidal and exterminating. Eduard O. Wilson (2016), John Gray (2003, 2006, 2015), James Lovelock (2006), etc. are representatives of this depressing view of mankind. Bruno Latour (2015) opposes James Lovelock’s idea of a vengeful goddess.

6.1.3. What Does It Mean to Survive in the Anthropocene?

Climate change can be described, Ulrich Beck (2016) points out, as a supermarket of apocalyptic scenarios. The climate emergency, the health emergency and the social emergency is becoming a graveyard of lost opportunities. Arne Næss coined the term “deep ecology”, with which he emphasizes the interactions between life and the environment. We urgently need a profound shift in our conception of health, habitat and humanity (Horton 2022). For Bruno Latour (2021), we are not facing an ecological crisis, but a civilizational metamorphosis (2021).

The end of a civilization? Metamorphosis: new beginnings, new rules, and new beginnings? “The biggest problem we face is a philosophical one: understanding that this civilization is already dead” exposes Roy Scranton. What does “dead” mean? “The sooner we confront this problem, and the sooner we realize there’s nothing we can do to save ourselves, the sooner we can get down to the hard work of adapting, with mortal humility, to our new reality”.

We can learn, without attachment and without fear, how to die. “The rub is that now we have to learn how to die not as individuals, but as a civilization” says Roy Scranton (2015). Faced with conservative pessimism, he sees no alternative but to “adapt to the volatile reality of certain ecological and civilizational collapse”. He proposes the “work of adapting, with mortal humility, to our new reality”.

6.1.4. Collapse or Apocalypse?

Pierre Teilhard de Chardin (1961) invokes a great spiral of life; civilizations, in this spiral, succeed one another. This evolution, Jorge Riechmann (2017, p. 25) points out, is always gaining in complexity and consciousness.

For Pierre Teilhard de Chardin (1961), suffering conceals, with extreme intensity, an ascending force of the world. It is not the attitude of assuming the omnipresence of suffering—the “*Buddhist dukkha*”; instead, it seeks to liberate suffering, infusing it with consciousness (Riechmann 2017, p. 260). The meaning of suffering is very different in Alexandre Mitscherlich: consciousness is therapy. Illness is the metamorphosis of suffering, so that suffering does not annihilate illness (Habermas 1978). Illness has a biographical meaning; it is not a return to the state before the illness.

John Gray (2015) rejects that light can overcome darkness. He returns to those quarrels between dualist religions versus Zoroaster, Mani and Augustine: the ability to transform evil into good. The preachers of catastrophe assume human finitude and deny transcendence by looking for it in the wrong place. They fail to see that it is their metaphysical rationality that is crumbling. It is not the world that is crumbling, but a certain metaphysics. The sooner we realize this the better.

6.1.5. Metamorphosis without Sociological Theory

Two currents dominate sociology. The “realist” perspective emphasizes discursive content—danger—while the “constructivist” perspective emphasizes discursive politics—social perception. We have the approach to social theory that objectifies danger (advocated by “realism”) and the subjective approach to risk (advocated by “constructivism”). It is reminiscent of Walter Benjamin’s angel that looks to the past and looks to the future. We find this distinction in G.W.F. Hegel: the “*objective spirit*” and the “*subjective spirit*”. He seeks to prevent the law, which is abstracted from life, from oppressing individuality and dissociating itself from the vital context.

The Anthropocene coexists in a double vision: a “Great Acceleration” that is bringing the world to the abyss (collapse) and a metamorphosis of our way of seeing the world. Ulrich Beck (2011) criticizes the worm that clings to its larval worldview; it renounces metamorphosis into a butterfly. Instead of claiming, in a “normative” way, the “public good” in the face of climate change, etc., he focuses on how the “bads” of the “public good” can be “public good”, focusing on how “public bads” are transformed into public goods. Today it is urgent: “a radical transformation in our conception of health, habitat, and humanity”. (Horton 2022).

Tolerance is deceptive, warns Herbert Marcuse (1954): it exclusively reserves a meaning and significance for itself; it allows the other to escape from reason and sanity. For the other, the madhouse remains on that side. Public discourse has a stigmatizing tolerance. Harald Welzer (2008) identifies it with the psychology of the exterminator or the genocidal.

6.2. Anthropocene with Reconstructing Western Thought

Michel Foucault (1969) focuses on “discontinuities”, while Ulrich Beck focuses on metamorphosis (2016). Climate change becomes (Beck 2014) an agent of world metamorphosis. In it, a “public bad” has the potential to metamorphose into a “public good”. It has a common ground: a relationship between primary effects (“descriptive discourse”, from the social sciences or natural sciences) and secondary effects (“reflexive discourse”). Jürgen Habermas (1968a, 1968b) regrets that economic rationality and administrative rationality have penetrated the sphere of life.

Metamorphosis is the interplay between falling apart and waking up—the dichotomy between the worm trapped in its larval worldview (Beck 2011) and thinking beyond apocalypse or salvation. Metamorphosis allows us to alter over the abyss by changing our worldview.

6.2.1. Divergence and Convergence

Whereas Harald Welzer (2008, p. 46) saves sociology, historical and interpretative frames of reference are hidden to the natural sciences, while the social sciences analyses how they are altered. It is not the “social dimension” of climate change. Ulrich Beck does not separate catastrophe and the performative communication of catastrophe. Climate

change hits society, but those phenomena described by the natural sciences hit society. J.W. Goethe, in the morphology of plants, points out this relationship between the external environment and the internal environment. Society does not adapt; suffering, disease, climate change is that force that pushes us to evolve (Teilhard de Chardin 1961).

This social catastrophe can become emancipatory if it becomes a civilizational crisis (Marcuse 1954; Welzer 2008; Beck 2016).

Bruno Latour's (2021) *After Lockdown: A Metamorphosis* links two twin emergencies: the climate emergency and the health emergency of COVID-19. It is not a crisis; it is a metamorphosis. Most of society is looking for a way out of the harrowing experience of the pandemic. We may not emerge from the blockages, etc., without learning lessons. Narrow actions guided by epidemiological experts (Horton 2020) leave behind a graveyard of missed opportunities. The connections between various emergencies are frightening; they point to a profound crisis of civilization.

6.2.2. Methodological Change

"Social class" is a social science category that explains social inequalities; it does not explain climate inequalities (Beck 2016). When what was unthinkable yesterday is real today, what changes is not the world, but the cartographies that allowed us to orient ourselves in the world.

The Anthropocene does not express the "Great Acceleration" of the world. The trajectory towards collapse can be described in exquisite detail. When the world is unhinged, it is our certainties and rationality that go into crisis. Our attention shifts from "being in the world" to "seeing the world" (Palsson et al. 2013). The greatest challenge the Anthropocene poses may be to our sense of what it means to be human (Scranton 2015).

G.W.F. Hegel's *The Spirit of Christianity and its Destiny* describes the confrontation of punishment and the law of punishment. How can we want to change politics and leave society intact? From the negative experience of dissociated life emerges the longing for the lost life and the strength for reconciliation. Blind fate sets paralyzing fear in motion. The text published in 1907 had an impact on various anthropologies at the beginning of the 20th century: Martin Heidegger's *existential anthropology*, Helmuth Plessner's *biological anthropology*, Rudolf Steiner's *anthroposophical*, Max Scheler's *cosmological anthropology*. The Kingdom of Heaven is not, for G.W.F. Hegel, the dissolution of laws, but the indistinguishability of inclination and law. The purely objective commandment is one-sided.

6.2.3. Learning by Dying in the Anthropocene?

Paul Crutzen (2002) has argued that the long-held barriers between nature and culture are breaking down. Ulrich Beck (2016) does not distinguish between metamorphosis and metamorphosis of the world. The world is nothing other than the communication of the world (*Weltkommunikation*). The physicist knows that what his theory is not reality (Ortega y Gasset [1940] 2019, p. 54).

Michel Foucault (1969) differentiates between "descriptive relations" (real) and "reflexive relations" (secondary). We have, on the one hand, the object of discourse and, on the other hand, the practice of discourse. Ulrich Beck (2016) distinguishes "relations of production" (real or material), "relations of definition" (secondary or symbolic) and "relations of power". Transcendental subjectivity becomes unconditioned subjectivity. Martin Heidegger ([1936–1946] 1961, vol. II, p. 235) observes that a "will to power" is missing in the reinterpretation of the idea (*ιδέα*) as representing (*Vor-gestellen*).

The Anthropocene leads us to another history of thought. It recovers romantic thinkers. Richard Horton (2018) recalls that science is a product of enlightenment. He favors observation and experimentation. Maren Meinhardt (2019), in her captivating new work: *Alexander von Humboldt: A Longing for Wide and Unknown Things*, discovers a scientist who recognized the measurement between reality and mind. Romanticism placed a special value on feeling.

6.3. Saving the World

“Trust between communities was rapidly disintegrating”, notes Richard Horton (2021), “there could be no peace and security without a profound restoration of the ways of human life”. Bruno Latour (2021) suggests that, at the intersection between the twin dangers of a pandemic and an environmental emergency, emotion must exist in balance with reason. For J.W Goethe, Nature was itself a living entity within which deeper truths and principles are found (Horton 2018).

Bruno Latour (2015), a keen contemporary observer of the relationship between science and society, points out that the division between science and politics is obsolete. He compares this other Spirit of the laws of Nature to the change from the “Ancien Régime” to a “Nouveau Régime”. Bruno Latour (2021), in *After Lockdown: A Metamorphosis*, points out: “you no longer have the same body and you no longer move in the same world”. Risk society theory pays attention to the crisis, or the physical destruction of ecosystems; metamorphosis theory pays attention to the political, social and institutional consequences of that crisis (Beck 2016).

Bruno Latour (2021) questions the separation between anthropology (human agency) and nature (the material world). It allows us to stop considering nature as an inert entity. Science, for various reasons, fails to understand nature as a living being (Lenton et al. 2020). We place climate change in a space of primary or real relationships. We forget to situate it also in a system of reflexive or secondary relations. This integration of observer and observed is not intellectual speculation. “What we observe”, Werner Heisenberg points out, “is not nature itself, but nature exposed to our method of questioning” (Heisenberg 1979; Capra 1996). Alexander von Humboldt understood science as a yearning for the wide and the unknown; subject and object existed in a reciprocal and dynamic relationship (Horton 2021). Isaac Newton has sacrificed the “living, immediate understanding of nature” notes Werner Heisenberg (1979). Richard Horton (2018) notes: “Romanticism had a particular interest in the mysterious”.

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References

- Aanen, Duur R., and Paul Eggleton. 2017. Symbiogenesis: Beyond the endosymbiosis theory? *Journal of Theoretical Biology* 434: 99–103. [CrossRef] [PubMed]
- Álvarez-Pereira, Carlos. 2019. Reflexionar sobre cómo reflexionamos. In *Come on! Capitalismo, Cortoplacismo, Población y Destrucción del Planeta*. Edited by Ernst Ulrich von Weizsäcker and Anders Wijkman. Barcelona: Deusto, pp. 206–10.
- Arendt, Hannah. 1958. *The Human Condition*. Chicago: University of Chicago Press.
- Arias-Maldonado, Manuel. 2014. Antropoceno: El fin de la naturaleza. *Revista de Libros*. Available online: <https://www.revistadelibros.com/antropoceno-el-fin-de-la-naturaleza/> (accessed on 22 November 2021).
- Arias-Maldonado, Manuel. 2015. *Environment and Society. Socionatural Relations in the Anthropocene*. New York, Dordrecht and London: Springer.
- Arias-Maldonado, Manuel. 2016. El giro antropocénico. Sociedad y medio ambiente en la era global. *Política y Sociedad* 53: 795–814. [CrossRef]
- Arias-Maldonado, Manuel. 2017. Antropoceno sin Antropoceno. *Eunomía. Revista en Cultura de la Legalidad* 13: 321–26. [CrossRef]
- Arias-Maldonado, Manuel. 2018a. *Antropoceno: La Política en la era Humana*. Barcelona: Taurus/Penguin Random House.
- Arias-Maldonado, Manuel. 2018b. Science or Fiction? What the Anthropocene Means for EPT. In *Science and Environmental Political Theory*. San Francisco: WPSA, Available online: <https://core.ac.uk/download/pdf/214832968.pdf> (accessed on 22 November 2021).
- Arias-Maldonado, Manuel. 2021. Reformulating emancipation in the Anthropocene: From didactic apocalypse to planetary subjectivities. *European Journal of Social Theory* 25: 136–54. [CrossRef]
- Baskin, Jeremy. 2015. Paradigm dressed as epoch. *Environmental Values* 24: 9–29. [CrossRef]

- Baskin, Jeremy. 2019. *Geoengineering, the Anthropocene and the End of Nat Ure*. London and Cham: Palgrave Macmillan.
- Beck, Ulrich. 1988. *Gegengifte: Die organisierte Unverantwortlichkeit*. Frankfurt a M.: Suhrkamp.
- Beck, Ulrich. 2011. Der Irrtum der Raupe. *FAZ*. Available online: <https://www.faz.net/aktuell/feuilleton/atomausstieg-der-irrtum-der-raupe-1653944.html> (accessed on 22 November 2021).
- Beck, Ulrich. 2014. Emancipatory catastrophism: What does it mean to climate change and risk society? *Current Sociology* 63: 75–88. [CrossRef]
- Beck, Ulrich. 2016. *The Metamorphosis of the World. How Climate Change Is Transforming Our Concept of the World*. Cambridge: Polity Press.
- Benjamin, Walter. 1980. Über den Begriff der Geschichte. In *Gesammelte Schriften, I-2*. Frankfurt a M.: Suhrkamp, pp. 691–704. First published 1940.
- Berg, Ragnar, and Martin Vogel. 1930. *Die Grundlagen Einer Richtigen Ernährung*. Dresde: Deutscher Verlag für volkswohlfahrt.
- Bonneuil, Christophe, and Jean-Baptiste Fressoz. 2016. *L'Événement Anthropocène: La Terre, l'histoire et nous*. Paris: Points.
- Broecker, Wallace S. 2002. *How to Build a Habitable Planet*. Arizona: Eldigio Press. First published 1985.
- Broecker, Wallace, and Stephen Barker. 2007. A 190‰ drop in atmosphere's $\Delta^{14}\text{C}$ during the "Mystery Interval" (17.5 to 14.5 kyr). *Earth and Planetary Science Letters* 256: 90–99. [CrossRef]
- Capra, Fritjof. 1996. *The Web of Life. A New Synthesis of Mind and Matter*. New York: Anchor Book.
- Castells, Manuel. 2009. *The Information Age. Economy, Society and Culture: A Summary: II. The Power of Identity*. Cambridge: Blackwell Publishers Inc. First published 1997.
- Ceroni Galloso, Mario. 2012. Perú, el país de las Oportunidades perdidas en ciencia: El caso de los fertilizantes. *Revista de la Sociedad Química del Perú* 78: 144–52. Available online: http://www.scielo.org.pe/scielo.php?pid=S1810-634X2012000200009&script=sci_arttext&tlng=en (accessed on 22 November 2021).
- Costanza, Robert, Lisa Graumlich, Will Steffen, Carole Crumley, John A. Dearing, Kathy Hibbard, Rik Leemans, Charles L. Redman, and David Schimel. 2007. Sustainability or collapse: What can we learn from integrating the history of humans and the rest of nature? *Ambio* 36: 522–27. [CrossRef]
- Crutzen, Paul, and Eugene F. Stoermer. 2000. The 'Anthropocene'. *Global Change Newsletter* 41: 17–18.
- Crutzen, Paul. 2002. Nature: Geology of mankind. *Nature* 415: 23. [CrossRef] [PubMed]
- Duarte, Carlos M., Sergio Alonso, Gerardo Benito, Jordi Dachs, Carlos Montes, Mercedes Pardo Buendía, Aída F. Ríos, Rafel Simó, and Fernando Valladares. 2006. *Cambio Global. Impacto de la Actividad Humana sobre el Sistema Tierra*. Madrid: CSIC, Available online: <https://e-archivo.uc3m.es/handle/10016/8520> (accessed on 22 November 2021).
- EU Agricultural. 2019. Fertilizers in the EU. Prices, Trade and Use. *Agricultural Markets Briefs*. No. 15. Available online: https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/farming/documents/market-brief-fertilisers_june2019_en.pdf (accessed on 22 November 2021).
- Fechner, Gustav T. 2011. *Einige Ideen zur Schöpfungs- und Entwicklungsgeschichte der Organisme*. Hamburg: Tredition Clasics. First published 1873.
- Fidora, Alexander, and Matthias Lutz-Bachmann (Hgg.). 2008. *Handlung und Wissenschaft. Die Epistemology der praktischen Wissenschaften im 13. und 14. Jahrhundert. Action and Science. The Epistemology of the Practical Sciences in the 13th and 14th Centuries*; Berlin: Akademie Verlag.
- Forst, Rainer. 2021. The autonomy of autonomy: On Jürgen Habermas's Auch eine Geschichte der Philosophie. *Constellation* 28: 17–24. [CrossRef]
- Foster, John B., and B. Brett Clark. 2018. The Robbery of Nature. Capitalism and the Metabolic Rift. *Monthly Review* 70: 1–20. [CrossRef]
- Foster, John. B. 2000. *Marx's Ecology. Materialism and Nature*. New York: Monthly Review Press.
- Foucault, Michel. 1969. *L'archéologie du Savoir*. Paris: Éditions Gallimard.
- Furukawa, Yoshihiro, Yoshito Chikaraishi, Naohiko Ohkouchi, Nanako O. Ogawa, Daniel P. Glavin, Jason P. Dworkin, Chiaki Abe, and Tomoki Nakamura. 2019. Extraterrestrial ribose and other sugars in primitive meteorites. *Proceedings of the National Academy of Sciences* 111: 24440–24445. [CrossRef] [PubMed]
- Gadamer, Hans-Georg. 1993. *Über die Verborgenheit der Gesundheit. Aufsätze und Verträge*. Frankfurt a M.: Suhrkamp.
- Gates, Bill. 2021. *How to Avoid a Climate Disaster: The Solutions We Have and the Breakthroughs We Need*. New York: Alfred A. Knopf.
- Gerber, Paul H. 1900. *Goethe's Beziehungen zur Medicin: Ein populärer Vortrag*. Berlin: S. Karger.
- Goethe, Johann Wolfgang W. 1982. *Schriften zur Naturwissenschaft*. Stuttgart: Reclam. First published 1793.
- Good, Allen. 2018. Toward nitrogen-fixing plants. *Science* 359: 869–70. [CrossRef]
- Gray, John. 2003. *Straw Dogs: Thoughts on Humans and Other Animals*. London: Grata Books.
- Gray, John. 2006. The Revenge of Gaia, by James Lovelock. *Independent*. Available online: <https://www.independent.co.uk/arts-entertainment/books/reviews/the-revenge-of-gaia-by-james-lovelock-6110631.html> (accessed on 22 November 2021).
- Gray, John. 2015. *The Soul of the Marionette: A Short Inquiry into Human Freedom*. New York: Farrar, Strau and Giroux.
- Guillaume, Bertrand. 2014. Vernadsky's philosophical legacy: A perspective from the Anthropocene. *The Anthropocene Review* 1: 126–36. [CrossRef]
- Habermas, Jürgen. 1963. *Theorie und Praxis. Sozialphilosophische Studien*. Frankfurt a M.: Suhrkamp.
- Habermas, Jürgen. 1968a. "Nachwort". In *Erkenntnis-Theoretische Schriften*. Edited by F. Nietzsche. Frankfurt a M.: Suhrkamp, pp. 254–55.

- Habermas, Jürgen. 1968b. Technik und Wissenschaft als “Ideologie”? (II) Klassenkampf und Ideologie heute. *Merkur* 244: 682–93. Available online: <https://www.merkur-zeitschrift.de/juergen-habermas-technik-und-wissenschaft-als-ideologie-ii/> (accessed on 22 November 2021).
- Habermas, Jürgen. 1978. Arzt und Intellektueller. Alexander Mitscherlich zum 70. Geburtstag. *Die Zeit*. Available online: <https://www.zeit.de/1978/39/arzt-und-intellektueller/komplettansicht> (accessed on 22 November 2021).
- Habermas, Jürgen. 2001. *Die Zukunft der menschlichen Natur. Auf dem Weg zu einer Liberalen Eugenik?* Frankfurt a M.: Suhrkamp.
- Habermas, Jürgen. 2006. Political Communication in Media Society: Does Democracy Still Enjoy an Epistemic Dimension? The Impact of Normative Theory on Empirical Research. *Communication Theory* 16: 411–26. [CrossRef]
- Habermas, Jürgen. 2011. An Gründen für eine Gemeinschaft fehlt es nicht, wohl aber an einer politischen Willen -und an Verantwortg. *Sueddeutsche Zeitung*, April 7. Available online: <https://www.sueddeutsche.de/politik/europapolitik-merkels-von-demoskopie-geleiteter-opportunismus-1.1082536--7> (accessed on 22 November 2021).
- Habermas, Jürgen. 2012. *Nachmetaphysisches Denken II. Aufsätze und Repliken*. Frankfurt a M.: Suhrkamp.
- Habermas, Jürgen. 2013. *Im Sog der Technokratie. Kleine Schriften XII*. Frankfurt a M.: Suhrkamp.
- Habermas, Jürgen. 2019. *Auch eine Geschichte der Philosophie—Band 1: Die okzidentale Konstellation von Glauben und Wissen. Band 2: Vernünftige Freiheit. Spuren des Diskurses*. Frankfurt a M.: Suhrkamp.
- Haeckel, Ernst. 1882. *Die Naturanschauung von Darwin, Goethe und Lamarck*. Frankfurt a M.: Fischer.
- Hamilton, Clive. 2011. *Requiem for a Specie*. London: Routledge.
- Hamilton, Clive. 2016. The Anthropocene as rupture. *The Anthropocene Review* 2: 59–72. [CrossRef]
- Hamilton, Clive, Christopher Bonneuil, and François Gemenne. 2015. *The Anthropocene and the Global Environmental Crisis*. London: Routledge.
- Harari, Yuval Noah. 2018. *21 Lessons for the 21st Century*. London: Jonathan Cape.
- Haraway, Donna. 2015. Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin. *Environmental Humanities* 6: 159–65. [CrossRef]
- Haraway, Donna. 2016. *Staying with the Trouble: Making kin in the Chthulucene*. Duke: Duke University Press.
- Heidegger, Martin. 1961. *Nietzsche*. Stuttgart: Günter Neske. First published 1936–1946.
- Heidegger, Martin. 1997. *Der Satz vom Grund*. Pfullingen: Neske. First published 1957.
- Heine, Heinrich. 1969–1976. *Sämtlichen Schriften*. Munich and Wien: Hanser. First published 1957.
- Heisenberg, Werner. 1979. *Philosophical Problems of Quantum Physics*. Woodbridge: Ox Bow Press.
- Horkheimer, Max. 1997. *Gesammelte Schriften, Band 5. “Dialektik der Aufklärung” und Schriften 1940–1950*. Frankfurt a M.: Fischer.
- Horton, Richard. 2018. Offline: Welcome to the new Age of Romanticism. *The Lancet* 391: 522. [CrossRef]
- Horton, Richard. 2020. COVID-19 is not a pandemic. *The Lancet* 396: 874. [CrossRef]
- Horton, Richard. 2021. Offline: The generation of ghosts. *The Lancet* 398: 1391. [CrossRef]
- Horton, Richard. 2022. Offline: The origins story—towards a Deep Ecology. *The Lancet* 399: 129. [CrossRef]
- Husserl, Edmund. 1935. *Die Krisis des Europäischen Menschentums und die Philosophie*. Wien, Online Texts, Mai 7/10. Available online: http://www.hs-augsburg.de/~harsch/germanica/Chronologie/20Jh/Husserl/hus_kris.html (accessed on 22 November 2021).
- IAASTD. 2009. *Agricultures at a Crossroads*. Washington, DC: Island Press, Available online: [http://www.agassessment-watch.org/report/Global%20Report%20\(English\).pdf](http://www.agassessment-watch.org/report/Global%20Report%20(English).pdf) (accessed on 22 November 2021).
- IPCC. 2019. *Climate Change and Land. An IPCC Special Report on Climate Change, Desertification, and Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems*. Available online: <https://www.ipcc.ch/site/assets/uploads/2019/11/SRCL-Full-Report-Compiled-191128.pdf> (accessed on 22 November 2021).
- Jones, Nicola. 2011. The human epoch. *Nature* 473: 133. [CrossRef]
- Jung, Carl G. 2011. *Von den Wurzeln des Bewusstseins. Studien über den Archetypus*. Zürich: Racher-Verlag. First published 1954.
- Kirchfeld, Friedheim, and Wade Boyle. 1994. *Nature Doctors: Pioneers in Naturopathic Medicine. Medicina Biologica*. Portland: Buckeye Naturopathic Press.
- Lachman, Gary. 2013. *The Caretakers of the Cosmos: Living Responsibly in an Unfinished World*. Edinburg: Floris Book.
- Lachman, Gary. 2017. *Lost Knowledge of the Imagination*. Edinburg: Floris Books.
- Latour, Bruno. 2011. *Esperando a Gaia. Componer el mundo común mediante las artes y la política. Cuaderno de otra Parte*. Available online: <http://www.bruno-latour.fr/sites/default/files/downloads/124-GAIA-SPEAP-SPANISHpdf.pdf> (accessed on 22 November 2021).
- Latour, Bruno. 2015. *Face à Gaïa. Huit Conférences sur le Nouveau Régime Climatique*. Paris: La Découverte-Les Empêcheurs.
- Latour, Bruno. 2021. *After Lockdown: A Metamorphosis*. Oxford: Polity Press.
- Lee, Martha F. 1995. *Earth First! Environmental Apocalypse*. New York: Syracuse University Press.
- Lehman, R. Michael, Cynthia A. Cambardella, Diane E. Stott, Veronica Acosta-Martinez, Daniel K. Manter, Jeffrey S. Buyer, Jude E. Maul, Jeffrey L. Smith, Harold P. Collins, Jonathan J. Halvorson, and et al. 2015. Understanding and Enhancing Soil Biological Health: The Solution for Reversing Soil Degradation. *Sustainability* 7: 988–1027. [CrossRef]
- Lenton, Timothy M., Sebastien Dutreuil, and Bruno Latour. 2020. Life on Earth is hard to spot. *The Anthropocene Review* 7: 248–72. [CrossRef]

- López Ortega, Jordi, Carlos Álvarez-Pereira, and Baltasar Pozuelo. 2021. Economía circular: Nuevas formas de pensar y actuar en un territorio socialmente sostenible y responsable (TS2R). In *Economía circular: Fundamentos y Aplicaciones*. Edited by M. E. Fernández Izquierdo and G. López Martínez. Pamplona: Aranzadi/Civitas-Thomas Reuters, pp. 159–78.
- López Ortega, Jordi. 2015. *Problemas de Legitimidad de una Política Climática Global: Los Límites de los Tratados Internacionales y de una Política Interior Global que no Rehúya del Conflicto Implícito en la Transición Energética*. Getafe: Universidad Carlos III. Available online: <https://scholar.google.com/scholar?cluster=11995787102706097950> (accessed on 22 November 2021).
- López Ortega, Jordi. 2021. Así contribuye al cambio climático la agricultura química que intoxica el Mar Menor. *The Conversation*. Available online: <https://theconversation.com/asi-contribuye-al-cambio-climatico-la-agricultura-quimica-que-intoxica-el-mar-menor-167158> (accessed on 22 November 2021).
- Lovelock, James E., and Lee R. Kump. 1994. Failure of climate regulation in a geophysiological model. *Nature* 369: 732–34. [CrossRef]
- Lovelock, James, and Lynn Margulis. 1974a. Biological modulation of the Earth's atmosphere. *Icarus* 21: 471–89.
- Lovelock, James, and Lynn Margulis. 1974b. Atmospheric homeostasis by and for the biosphere: The gaia hypothesis. *Tellus* 26: 2–10. [CrossRef]
- Lovelock, James. 2006. *The Revenge of Gaia: Earth's Climate Crisis and the Fate of Humanity*. New York: Basic Book.
- Lovelock, James. 2008a. A geophysicologist's thoughts on geoengineering. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* 366: 3883–90. [CrossRef]
- Lovelock, James. 2008b. Medicine for a Feverish Planet: Kill or Cure? *The Guardian*, September 1. Available online: <https://www.theguardian.com/environment/2008/sep/01/climatechange.scienceofclimatechange> (accessed on 22 November 2021).
- Mancuso, Stefano. 2019. *La Nazione Delle Pianta*. Roma: Laterza.
- Marcuse, Herbert. 1954. *One-Dimensional Man*. Boston: Bacon Press.
- Margulis, Lynn, and Dorion Sagan. 1986. *Microcosmos. Four Billion Years of Evolution from Our Microbial Ancestors*. Berkeley, Los Angeles and London: University of California Press.
- Margulis, Lynn. 1974. Five-Kingdom Classification and the Origin and Evolution of Cells. In *Evolutionary Biology*. Edited by Theodosius Dobzhansky, Max K. Hecht and William C. Steere. Boston: Springer.
- Marx, Karl. 1985. *Das Kapital. Kritik der Politische Ökonomie, III*. Berlin: Dietz Verlag. First published 1894. Available online: <https://scholar.google.com/scholar?cluster=17064138271166338437> (accessed on 22 November 2021).
- Mathew, Adam. 2020. *Anthropocene Psychology: Being Human in a More-Than-Human World*. London: Routledge.
- Meinhardt, Maren. 2019. *Alexander Von Humboldt: How the Most Famous Scientist of the Romantic Age Found the Soul of Nature*. New York: BlueBridge.
- Möller, Detlev M. 2020. *Chemistry of the Climate System*. Berlin: Walter de Gruyter GmbH & Co KG.
- Mulvaney, R. L., S. A. Khan, and T. R. Ellsworth. 2009. Synthetic nitrogen fertilizers deplete soil nitrogen: A global dilemma for sustainable cereal production. *Journal of Environmental Quality* 38: 2295–314. [CrossRef] [PubMed]
- Mumford, Lewis. 1971. *The Myth of the Machine: Technics and Human Development*. New York: I. HBJ Book. First published 1967.
- Naredo, José Manuel, and Antonio Valero. 1999. *Desarrollo Económico y Deterioro Ecológico*. Madrid: Visor.
- OECD/FAO. 2020. *OECD-FAO Agricultural Outlook 2020–2029*. Paris: Rome/OCDE Publishing.
- Ortega y Gasset, José. 1938. *Temas de Nuestro Tiempo*. Madrid: Espasa Calpe.
- Ortega y Gasset, José. 2014. *Ensimismamiento y Alteración. Meditación de la Técnica y otros Ensayos*. Madrid: Alianza Editorial. First published 1939.
- Ortega y Gasset, José. 2019. *Ideas y Creencias y otros Ensayos*. Madrid: Alianza Editorial. First published 1940.
- Palsson, Gisli, Bronislaw Szerszynski, Sverker Sörlin, John Marks, Bernard Avril, Carole Crumley, Heide Hackmann, Poul Holm, John Ingram, Alan Kirman, and et al. 2013. Reconceptualizing the 'Anthropos' in the Anthropocene: Integrating the social sciences and humanities in global environmental change research. *Environmental Science & Policy* 28: 3–13.
- Paracelsus, T. 1965. *Medizinische Schriften. 1520–1570 (Will-Erich Peuckert) Werke I*. Darmstadt: Wissenschaft Buchges.
- Peinado Lorca, Manuel. 2019. Polvo de estrellas: De cómo la vida pudo caer del cielo. *The Conversation*, December 4. Available online: <https://theconversation.com/polvo-de-estrellas-de-como-la-vida-pudo-caer-del-cielo-128153> (accessed on 22 November 2021).
- Pico della Mirandola, Guiovanni. 1994. *Oratio de Hominis Dignitates*. Pordenone: Edizioni Studio Tesi.
- Piulats, Octavi. 2017. *La Ciencia Espiritual de la Naturaleza*. Barcelona: Carena.
- Piulats, Octavi. 2018. *Descubre la Oculta Naturaleza del mar*. Barcelona: Carena.
- Plessner, Helmut. 1981. *Die Stufen des Organischen. Gesammelte Schriften IV*. Frankfurt a M.: Suhrkamp.
- Prigogine, Ilya, and I. Isabelle Stengers. 1984. *Order Out of Chaos: Man's New Dialogue with Nature*. New York: Bantam Books.
- Ratzinger, Joseph C. 2000. *Der Geist der Liturgie. Eine Einführung*. Freiburg: Herder.
- Riechmann, Jorge. 2017. *¿Vivir como Buenos Huérfanos? Ensayos Sobre el Sentido de la vida en el siglo de la Gran Prueba*. Madrid: Catarata.
- Rockström, Johan, Will Steffen, Kevin Noone, Åsa Persson, F. Stuart Chapin III, Eric F. Lambin, Timothy M. Lenton, Marten Scheffer, Carl Folke, Hans Joachim Schellnhuber, and et al. 2009. A safe operating space for humanity. *Nature* 461: 472–75. [CrossRef]
- Schiavone, Aldo. 2021. *What Is Progress*. New York: Europa Editions.
- Scranton, Roy. 2015. *Learning to Die in the Anthropocene. Reflections on the End of a Civilization*. San Francisco: City Lights Books.
- Steffen, Will, Paul J. Crutzen, and John R. McNeill. 2007. The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature? *Ambio* 36: 614–21.

- Steiner, Rudolf. 1981. *Geisteswissenschaftliche Erläuterungen zu Goethes «Faust»: Faust, der strebende Mensch*. GA 273. Dornach: RSV. First published 1916–1924.
- Steiner, Rudolf. 1987. *Einleitungen zu Goethes Naturwissenschaftlichen Schriften*. GA 1. Dornach: RSV. First published 1884–1897.
- Steiner, Rudolf. 1990. *Goethes Weltanschauung*. GA 6. Dornach: RSV. First published 1897.
- Steiner, Rudolf. 2010. *Geisteswissenschaftliche Grundlagen zum Gedeihen der Landwirtschaft*. GA 327. Dornach: RSV. First published 1924.
- Stoermer, Eugene F. 1984. Research on Great Lakes Algal Communities: Problems from the Past, Lessons for the Future. *Journal of Great Lakes Research* 10: 143–55. [[CrossRef](#)]
- Suess, Eduard. 1875. *Die Entstehung der Alpen*. Wein: Wilhelm Braummüller.
- Teilhard de Chardin, Pierre. 1961. *Hymne de l'univers*. Paris: Seuil.
- Tomasello, Michel. 2002. *Die Kulturelle Entwicklung des Menschlichen Denkens: Zur Evolution der Kognition*. Frankfurt a M.: Suhrkamp.
- Tyrrell, Toby. 2013. *On Gaia: A Critical Investigation of the Relationship between Life and Earth*. Princeton: Princeton University.
- Tyrrell, Toby. 2020. Chance played a role in determining whether Earth stayed habitable. *Communications Earth & Environment* 1: 61.
- Valero, Alicia, Antonio Valero, and Guiomar Calvo. 2021. *The Material Limits of Energy Transition: Thanatia*. London: Springer.
- Valero, Antonio. 2019. Materiales: Más allá del cambio climático. In *Come on! Capitalismo, Cortoplacismo, Población y Destrucción del Planeta*. Edited by Ernst Ulrich Weizsäcker and Anders Wijkman. Barcelona: Deusto, pp. 206–10.
- Vernadsky, Vladimir I. 1998. *The Biosphere*. New York: Copernicus. First published 1926.
- Virchow, Rudolf. 1861. *Goethe als Naturforscher und in Besonderer Beziehung auf Schiller*. Darmstadt: E. Merkck AG.
- von Weizsäcker, Ernst Ulrich, and Anders Wijkman. 2018. *Come on! Capitalism, Short-Termism, Population and the Destruction of the Planet*. New York: Springer.
- Welzer, Herald. 2008. *Klimakriege. Wofür im 21. Jahrhundert Getötet Wird*. Frankfurt a M.: S. Fischer.
- Welzer, Herald. 2013. *Selbst denken: Eine Anleitung zum Widerstand*. Frankfurt a M.: S. Fischer Verlag.
- Wilson, Edward O. 2016. *Half-Earth: Our Planet's Fight for Life*. New York: Liveright.
- Zalasiewicz, Jan, Colin N. Waters, Erle C. Ellis, Martin J. Head, Davor Vidas, Will Steffen, Julia Adeney Thomas, Eva Horn, Colin P. Summerhayes, Reinhold Leinfelder, and et al. 2021. The Anthropocene: Comparing Its Meaning in Geology (Chronostratigraphy) with Conceptual Approaches Arising in Other Disciplines. *Earth's Future* 9: 1–25. [[CrossRef](#)]