SHORT, BRENDEN, M.A., MAY 2024 PHILOSOPHY

THE CRISIS OF THE GEOSCIENCES: A HUSSERLIAN AND LATOURIAN ANALYSIS OF THE LACK OF FAITH IN CLIMATE SCIENCE AND OUR RESPONSES TO CLIMATE CHANGE (121 pp.)

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Amid the current climate crisis and the scientific consensus on its anthropogenic causes, one task left to the humanities and social sciences is to understand why we humans have failed to effectively act on addressing the issue. I intend to show how the work of Edmund Husserl and Bruno Latour is especially relevant to this topic, bringing their ideas to bear on questions of the climate crisis and the lack of faith in science seen in certain populations in America. I will argue that the crisis of the sciences which Husserl identifies in his last work highlights the Modernist roots of our situation where we separate ourselves from nature, which sheds light on our lack of action. I will augment this analysis with Latour's studies of science and climate change, as well as work done on the phenomenon of lack of faith in science in America, to help furnish a better understanding of the global predicament we are in.

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A thesis submitted

To Kent State University in partial

Fulfillment of the requirements for

Degree of Master of Arts

By

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May 2024

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B.A., California State University, Chico, 2021

M.A., Kent State University, 2024

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Acknowledgements

I would like to thank my advisor, Dr. Gina Zavota, for all of her comments and critiques while I was writing this thesis. All of the emails, conversations, and office hours visits have helped to make this thesis what it became, and without a doubt, it is in much better shape due to her astute expertise. I would also like to thank my other committee members, Dr. Matthew Coate and Dr. Deborah R. Barnbaum, for offering their time and support to me in this process. Special thanks are due to my external reader, Dr. David H. Kaplan, for being willing to brave my philosophical prose.

Finally, I do not know if this thesis would have been possible without the love and support of my partner, IvyAna Cerin. She has been there for me through every step of this project, from the move from California, to the doubt about what to write, to the long, uninterrupted hours I needed to put words on the page. Thank you for all that you do, and I love you from the moon and back.

Introduction: A Bit of Context, and a Roadmap

Increasingly, the modern day feels like a time of crisis. Amid the global climate crisis wreaking havoc on our weather patterns, ecosystems, and biodiversity, there seems to also be a crisis in culture. As if the science itself were not complex enough, many people do not 'believe' in climate change, or do not think it a big enough threat to be worried about.[1] Meanwhile, some high profile politicians deny the reality or severity of climate change, and attack those trying to save us from disaster. Deeper than this, however, even people who ostensibly believe in climate change are often "quietist" in their opinions of what to do about it, to use the words of Bruno Latour. "We'll wait and see," we can imagine them saying, "The climate has always varied. Humanity has always come through. We have other things to worry about. The important thing is to wait, and above all not to panic."[2] Given the deteriorating stability of our climate, the guiding question for this thesis is: "Why have we failed to take meaningful action to prevent the worst of climate change?"

Does the fault lie with our scientists? This cannot be it, since our scientists have been sounding the alarm for *decades*. Since the 1990s, our scientists have been telling us that *we humans* have been changing the climate, that our rampant consumption of fossil fuels is the culprit, and that soon we will have to foot the bill. The Intergovernmental Panel on Climate

[1] Naomi Oreskes and Erik M. Conway, "From Anti-Government to Anti-Science: Why Conservatives Have Turned Against Science" (*Daedalus* 151, no. 4: 2022), 3.

[2] Bruno Latour, *Facing Gaia* (Cambridge: Polity Press, 2017), 11.

Change has been publishing reports on climate change since the early 1990s, and there has been scientific consensus that climate change has been caused by humans since 1995.[3] Rather, something seems to be going wrong in the reception of this science. Upon examination, it becomes clear that something is deeply wrong with our *culture* which is preventing us from taking the science seriously, or at least from acting as we should if we understood it.

In this matter, we can learn from Edmund Husserl, a philosopher who founded the phenomenological method of analysis in the early 20th century. Towards the end of his life, Husserl became gravely concerned with what he saw as a crisis, an illness of European culture. He asked, in what has come to be called his "Vienna Lecture," "Now, clearly there exists the distinction between energetic thriving and atrophy, that is, one can also say, between health and sickness, even in communities, peoples, states. Accordingly the question is not far removed: How does it happen that no scientific medicine has ever developed in this sphere, a medicine for nations and supranational communities? The European nations are sick; Europe itself, it is said, is in crisis."[4] In the years since the Vienna Lecture, we still have no clear 'cure for sick cultures,' and our culture in America, descended from the same modern, Western, European culture as Husserl's, is likewise in crisis.

Husserl spent the rest of his life writing on this matter, and it culminated in the (unfinished) work, *The Crisis of the European Sciences and Transcendental Phenomenology*. In it, he sought to use his philosophy—phenomenology—to begin to cure the ills of European culture. Whether or not he would have succeeded, however, is unclear, as he died before he could

[3] IPCC, *SAR Climate Change 1995: The Science of Climate Change* (IPCC, 1995), 18.

[4] Edmund Husserl, *The Crisis of the European Sciences and Transcendental Phenomenology*, trans. David Carr (Evanston: Northwestern University Press, 1970), 270.

finish this project. Chapter one of this thesis will attempt to use some of the tools Husserl has given us to begin a diagnosis of our own cultural ills, and it will become clear that modern American culture suffers from many of the same issues as Europe in Husserl's time, if in altered and reified form. Today, we face what I call the Crisis of the Geosciences: a cultural failure to learn from the results of the geosciences coupled with the realities of the climate crisis itself. This new dual Crisis (of culture and of climate) spells untold destruction wrought by our own hands. To attempt to shed some light on this new Crisis, I will use a concept that Husserl developed only in passing: a cultural phenomenology, which will help to reveal some of the unspoken assumptions of modern, American culture—what I will call cultural *a prioris*[5], as they are taken for granted in our cultural existence. These assumptions include our tendency to abstract from our actual experiences in our understanding of the world, our drive to master/conquer nature, the effects of the concept of infinity on our culture and our imaginations, and the subject/object distinction (which ultimately gives birth to the fact/value divide in scientific practice, exerting pressure to keep scientists from telling us what *should be done* in light of scientific findings). The bulk of the first chapter will deal with identifying the origins of these assumptions and how they became solidified in our culture, starting with Galileo and early modern science, in order to begin a diagnosis.

Chapter two will turn to the work of Bruno Latour and his studies of science in order to deepen our cultural analysis, and to expand on the work of Husserl. Although Latour was not working within Husserl's phenomenological project, he was an explicitly anti-/nonmodern

[5] I am choosing to use the improper plural of '*a prioris*' here rather than the proper plural '*a priori*,' which is indistinguishable from the singular. This will hopefully add some clarity to the following, and emphasize that I am speaking of multiple unquestioned assumptions, rather than just one.

philosopher, even characterizing his practice of science studies as a nonmodern discipline.[6] For our purposes, this means that his work will be helpful to us in trying to shed our modernist cultural assumptions; and, in this way, we can use his work to expand on Husserl's analysis in the *Crisis* by helping to reveal the ways our modernist cultural *a prioris* have developed over time, and especially how they begin to break down in the face of the climate crisis. Whereas the first chapter will outline what the cultural *a prioris* are and how they developed, this second chapter will, in part, show what they look like today. Important to this analysis will be the idea of the Anthropocene—a new proposed geological epoch which would mark the end of the Holocene. This new epoch is currently under consideration by the international geological community[7], and if officially accepted, would be an important symbolic gesture in that the effects of human activity on the geological processes of Earth would be recognized as a definitive event that changes the way that we understand the history of the Earth. For the humanities and social sciences, moreover, the Anthropocene is important in that it represents a drastic change in the ways that we understand the world, and reveals a need to change our

[6] Bruno Latour, *Pandora's Hope* (Cambridge: Harvard University Press, 1999), 22 for instance.

[7] As of March 2024, a proposal to mark the Anthropocene as beginning in the mid-1900s, when the first atomic weapons were detonated, has been rejected by the international geological community. But this does not necessarily mean that the Anthropocene will not be accepted by the geological community in the future: many of the committee members rejected this proposal because it seemed, in the words of New York Times reporter Raymond Zhong, "too limited, too awkwardly recent, to be a fitting signpost of Homo sapiens's reshaping of planet Earth," and not because they did not believe that humans have had a significant enough impact on the Earth to warrant a new epoch. See Raymond Zhong, "Are We in the 'Anthropocene,' the Human Age? Nope, Scientists Say." (The New York Times, March 5, 2024), https://www.nytimes.com/2024/03/05/climate/anthropocene-epoch-vote-rejected.html for more detail. Future proposals marking different beginnings of the Anthropocene will likely be brought forward. For example, there might be greater evidence of a distinct change in the geological record stemming from the beginnings of industrialization in the 18th and 19th centuries.

assumptions about the ways that the world works.[8] Accordingly, a large part of chapter two will be a discussion of how the cultural *a prioris* we have inherited from our modernist ancestors break down in the Anthropocene. All of this will help to further our cultural diagnosis, so that we can begin to understand what, exactly, needs curing.

Chapter three will then turn to the work of Naomi Oreskes and Erik M. Conway in their landmark book *Merchants of Doubt*, historians of science who have meticulously catalogued the many ways in which rich and powerful corporations have intentionally misled the American public and seeded doubt in science. No analysis of our inaction would be complete without covering this point, and addressing the new cultural assumption which these industry leaders seem to be following in the fight of money against science and regulation—a fear of regulation as the road to communism in right-wing circles. Following the completion of our cultural diagnosis with Oreskes' and Conway's work, I will attempt to give a brief prognosis drawing from the predictions of the IPCC in chapter three. This will make clear what the symptoms of our cultural illness are: mass death in human and animal populations and worsening climate change, among many others.

Lastly, I will give some thoughts towards a cure in the second half of chapter three, which will involve changing the ways we understand and teach science. Insofar as the problematic cultural assumptions we are working with were borne in the beginnings of modern science, changing the ways we conceptualize and teach science to make them more realistic should begin to weaken these assumptions. First, I will argue that we need to understand science as essentially political, in its very nature, and to stop trying to separate the political from the scientific

[8] Latour spends a large portion of *Facing Gaia* exploring the impact and importance of the Anthropocene. See Latour, *Facing Gaia*, Fourth Lecture (111-145) for a more in-depth discussion of this term and its significance.

arbitrarily. In many of their scientific activities, scientists are *also* engaged with politics of various forms. Second, I will argue that we need to disseminate a clearer understanding of what scientific knowledge is and how it is formed. Science does not produce 'facts' in the epistemological sense, and so claiming that it does will not help our case here. But, this does not mean that scientific knowledge is weak or should be easily dismissed: my argument here will discuss how the institution of science itself *gives us reason* to believe in scientific knowledge. Third, and building off of the second point, I will argue that we need to help people understand that science does not give us objective knowledge or 'facts' about the outside world, in what amounts to an epistemological-ontological point. Rather, while science is great at producing *theories* of the outside world, it has no mechanism to *ensure the absolute truth* of these theories—as evidenced by the history of science where our understanding of the outside world has periodically changed in drastic ways. Altogether, these changes in science education and the ways that we understand science should put the final nail in the coffin of the fact/value divide in scientific practice, and should begin to weaken our tendency to abstract from the actual world of experience, our drive to master nature, and our habit of projecting the subject/object divide upon the natural world.

The importance and novelty of these arguments is grounded in the fact that they are derived from a cultural phenomenological method. What this means is that, by tracing the origins and development of the problematic, modernist cultural *a prioris* we will be focusing on in this thesis, the method of cultural analysis that I will develop and employ reveals at the same time some ways to begin to address these problematic assumptions. This is the value of the tools of cultural phenomenology that Husserl imagined, but did not exploit. That said, the method I will develop here does not give definitive solutions or cures for all of these problematic cultural *a*

prioris—namely, it does not immediately offer solutions to the more deep-seated assumptions, such as the effects of the concept of infinity on our culture, the fear of regulation in right-wing circles, and to some extent our drive to master nature. But even in these cases, the value of the method I will employ here is that it helps to *direct our attention towards the right things*, so that we are not proceeding blindly. Even where this cultural analysis does not give us clear answers, then, it points the way for future inquiry, and for future answers to be discovered. Accordingly, I will close chapter three with some thoughts about how to address these other problematic assumptions revealed by our cultural phenomenology.

In any case, the situation should be clear. Our culture is sick, staggering numbers of species are going extinct, and climates around the globe are changing in destructive and powerful ways. Let us try to find out what is wrong with our culture, and hopefully find a way to fix it before it is too late.

Chapter 1: Husserl's Analysis of the Birth of Modernity: Introduction and Identification of the Cultural *A Prioris*

1.1 The Prospect of a Cultural Phenomenology

An impressive and important work, *The Crisis of the European Sciences and Transcendental Phenomenology* includes Husserl's attempt to delve back into the beginning of European modernity and the birth of science as we know it today. He wants to inquire into how it is that scientific knowledge becomes grounded, because he thinks that science has proceeded along a dangerous path of not questioning its own presuppositions. But, more importantly to our investigation here, Husserl thinks that this period of time in the history of Europe was extremely consequential for modern European culture in general and helped to define the modernist spirit.[9] While the inquiry into the grounding of scientific knowledge is important in its own right, the tools of cultural analysis which Husserl develops in pursuing his end will be our focus here, since they prove invaluable for understanding modernity and how it has affected the West. In light of the climate crisis, understanding the nature of our predicament via this cultural analysis will be our project, rather than tracing the assumptions of science as was Husserl's explicit aim.

One of the motivating forces for Husserl in writing the *Crisis* was what he saw as a flaw or an illness in European culture. As he writes in the Vienna Lecture (which came before the

[9] See Edmund Husserl, *The Crisis of the European Sciences and Transcendental Phenomenology*, trans. David Carr (Evanston: Northwestern University Press, 1970), 12 for one of many characterizations of Husserl's task in the Crisis.

Crisis and was its thematic predecessor), "Now clearly there exists the distinction between energetic thriving and atrophy, that is, one can also say, between health and sickness, even in communities, peoples, states. Accordingly, the question is not far removed: How does it happen that no scientific medicine has ever developed in this sphere, a medicine for nations and supranational communities? The European nations are sick; Europe itself, it is said, is in crisis."[10] Husserl saw an issue at the heart of European culture, growing out of modernism and its effects. And, while he could not have known in his time, many of the aspects of modernism which he discusses in the history of the West are still present and active behind the climate crisis today. In following part of Husserl's analysis in the *Crisis*, then, we will be focusing on what he says about the heart of modernism and pulling out some key elements therein—what I will call cultural *a prioris*,[11] or unexamined cultural assumptions.

To conduct his investigation in the *Crisis*, Husserl employs a historical-teleological method to trace the overall meaning of the history of modern philosophy. As he puts it, "Our task is to make comprehensible the *teleology* in the historical becoming of philosophy," and continuing, "This [is a] manner of clarifying history by inquiring back into the primal establishment of the goals which bind together the chain of future generations, insofar as these goals live on in sedimented forms yet can be reawakened…"[12] Here, Husserl is pointing out that, through the establishment and development of modernity in philosophy and Western life more

[10] Husserl, *Crisis*, 270.

[11] I am choosing to use the improper plural of '*a prioris*' here rather than the proper '*a priori*' which is indistinguishable from the singular. This will hopefully add some clarity to the following, and emphasize that I am speaking of multiple unquestioned assumptions, rather than just one.

[12] Husserl, *Crisis*, 70 & 71.

generally, certain goals and assumptions have become embedded into our culture, into what he calls a "sedimented conceptual system which [is] taken for granted."[13] Sedimentation, for Husserl, is the process whereby something that was initially understood explicitly has become so basic to one's life (or one's culture, in this case) that it has become routine to take it for granted. A simple example of this is the process of learning to play the piano. A new pianist will often start with a strong and specific awareness of where each of their fingers is on the piano keys when learning the proper postures and forms. But, after they have become practiced, this explicit awareness often disappears, replaced by a knowing, sedimented muscle memory of where their fingers should be. In the context of cultural assumptions, as well, this process of sedimentation can continue until people are no longer aware of taking an assumption for granted, and it just becomes a matter of course, embedded in their natural attitude or stance towards the world. Husserl explains that this is precisely what has happened to Western/European culture in the wake of modernity, and hence he is trying to uncover these sedimented goals—or 'cultural *a priori*'—to better understand modern philosophy, and to better understand the whole of European culture. To do this, he ends up building the tools for a cultural phenomenology, although he never calls it this explicitly. In fact, the prospect of a cultural phenomenology is left underdeveloped in the text of the *Crisis*, so we will be relying in part on the work of David Carr (the scholar who translated the *Crisis* into English) in his essay "Husserl's Problematic Concept of the Life-World" to help flesh out this idea.

A cultural phenomenology is different from a phenomenology of subjective internal experience, which is the usual practice of phenomenology seen in Husserl's work. To clarify our analysis here, it will help to be specific about the differences. When Husserl makes his

[13] Husserl, *Crisis*, 71.

statements about the cultural sediments of Europe, he often mentions that he is inquiring into the "life-world." Unfortunately for those of us reading Husserl, he also uses this concept in at least two other senses: to refer to the world of 'immediate experiences' and to refer to the scientifically constructed world of theories and equations (which maps onto the world of immediate experience—a point we will return to later). As Carr explains, the cultural world is founded on the life-world of immediate experience, meaning that it is secondary to the more primary life-world in the nature of our experience. As he puts it, "the cultural world is precisely *dependent* for its sense upon the perceived world and is not *identical* with it."[14] In yet another way, we could say that given the same perceived world (of immediate experience), we could have multiple cultural worlds. Husserl expresses this idea when he writes, "when we are thrown into an alien social sphere, that of the [Africans, Chinese, &c.—cultures which were foreign to Husserl], we discover that their truths, the facts that for them are fixed, generally verified or verifiable, are by no means the same as ours."[15] In common parlance, we might say that different cultures have different expectations, values, and beliefs. For an example apropos of the climate crisis, although we in the Western world seem to have no trouble with conceptualizing the land as something that can be privately owned and exploited, Native American cultures often see this as a foreign idea.[16]

[14] David Carr, "Husserl's Problematic Concept of the Life-World" (*American Philosophical Quarterly 7*, no. 4: 1970), 337.

[15] Husserl, *Crisis*, 139.

[16] See, for example, Roy C. Dudgeon, *Common Ground: Eco-Holism and Native American Philosophy* (Manitoba, Canada: Pitch Black Publications, 2008), 124-126 for a discussion of this and related points.

The important thing to note, here, is the presence of a 'founding' relationship which Husserl seems to believe holds between these different senses of the life-world, and which Carr makes explicit and analyzes in "Husserl's Problematic Conception of the Life-World." That is, the life-world of immediate experience *founds* the cultural world, since the cultural world relies on the life-world in order to exist. Husserl expresses this when he writes how, "in our experience and in the social group united with us in the community of life, we arrive at 'secure' facts."[17] These 'secure facts,' in other words, come out of our experience of the life-world, *through* our interactions with others, thus forming a shared set of cultural assumptions. Further, the scientific world (of equations and formulas) is itself founded upon the *cultural* world (and ultimately the life-world through the cultural world). As Carr puts it, "the scientific level constitutes a *tertiary* stratum built on the second or cultural level."[18] Thus, in order for a scientist to practice their trade, they are reliant on both the world of immediate perception and the world of the culture which they live in: both of these represent grounds for their practice of science, and both of these *found* their work (see figure 1 on the next page for a graphical representation of this three-tiered structure of founding). Said differently, scientific discoveries are interpreted through a *cultural* lens, and take on meaning through the scientist's culture. This is why Husserl is so concerned about tracing the roots of modernism in early science, because, as he puts it, there is "a hidden, presupposed meaning"[19] in early modern science which needs to be made explicit. Early modern thinkers, as much as ourselves, were the inheritors of sedimented cultural goals, or as Husserl

[17] Husserl, *Crisis*, 138. See the discussion of establishing secure cultural facts, here.

[18] Carr, "Husserl's Problematic Concept," 338.

[19] Husserl, *Crisis*, 25.

puts it, "the bearers of this [historical-cultural] teleology"[20] which influenced how they thought and how they conducted science. Carr puts it another way, "In conscious life, man may be without scientific upbringing and thus lack the scientific interpretation of the world. But he is never, Husserl means to say, without culture…"[21]

Figure 1, representing the three-tiered structure of our experience, and of Husserl's use of the term 'life-world.' The world of immediate perception founds the cultural world, and both the cultural world and the world of immediate perception found the scientific world. (Diagram created by me.)

It is important to note that this statement—that we, too, can never be free of culture—applies to any activity in our lives. While Husserl focuses on science and scientific practice in this part of the *Crisis*, the statement has much broader implications. "The cultural world," as Carr advises, "is a necessary ground."[22] Whether we are engaging in political debate or taking a class at university, Husserl wants us to understand that everything we do in our lives is informed and influenced in some way by our culture. And it is precisely for this reason that a cultural phenomenology is so important to the task of understanding the climate crisis today: our society,

[20] Husserl, *Crisis*, 70. See 70-73 for a more complete discussion of this point.

[21] Carr, "Husserl's Problematic Concept," 339.

[22] Carr, "Husserl's Problematic Concept," 339.

an inheritor of modernism, is still in the throes of modernist cultural assumptions, those sedimented goals and ideals of our ancestors that we take for granted without even realizing it. Doing a cultural phenomenology will help reveal these sediments and some of the reasons why listening to climate scientists and acting on their findings has been so difficult for us Americans: these findings often go against the grain of our modernist cultural *a prioris*.

How should we understand a cultural phenomenology, then? Just as Husserl tries to uncover the "general or *a priori* structures"[23] of the life-world[24] in the *Crisis*, we can undertake the task of trying to uncover the general *a priori* structures of the cultural world which we inhabit. There are three key areas of investigation which Carr thinks are unique to a cultural phenomenology, and not present in a phenomenology of perception (which is concerned, primarily, with our experiences of the life-world as such). First, a cultural phenomenology will deal with the "constitution of. . .cultural entities" such as institutions, political organizations, religions, ethics, and so on.[25] Second, since cultures can change over time, a cultural phenomenology will concern itself with these changes and how they can take place. Thirdly, a cultural phenomenology will concern itself with how language structures our communication and our thoughts.[26] This is precisely the kind of investigation we want to be engaged in, since we are

[23] This phrase taken from Carr, "Husserl's Problematic Concept," 337.

[24] Note: now that the distinction has been made between the world of immediate perception, the cultural world, and the scientific world, I will be using the term 'life-world' exclusively to refer the world of immediate perception in the remainder of this thesis.

[25] Carr, "Husserl's Problematic Concept," 337.

[26] Carr, "Husserl's Problematic Concept," 337. Carr outlines all three elements on this page.

inquiring into some of the key cultural elements of modernism, how they formed, and how they have changed over time.[27]

With all of this preparatory work out of the way (to use the Husserlian turn of phrase), we are now ready to see what Husserl uncovers in the heart of modernism, and to clarify what the cultural *a prioris* we are concerned with are.

1.2 Husserl's Analysis of Galilean Science and the Identification of the Cultural A Prioris

Galileo, for Husserl, is a central figure in the birth of modernity. Perhaps more than anyone else on Husserl's account, Galileo is responsible for instilling modernist assumptions into our science, and thereby into our culture more broadly. Husserl notes that, in ancient times, there was no concept of a universal mathematics which could apply to all of nature, as we now take our physics to be. With Galileo comes such a mathematics, however, and "the idea that the infinite totality of what is in general is intrinsically a rational all-encompassing unity that can be mastered, without anything left over, by a corresponding universal science."[28] To elucidate Husserl's dense prose somewhat, this is the idea that nature is a rational thing and thus follows rational laws which can be discovered, mapped out, and exploited. Husserl calls this "Galilean science" and explains how, once it started becoming successful, "the idea of philosophy in general (as the science of the universe, of all that is) is transformed."[29] It is in this way that

[27] Interesting though it might be, I fear I will not be able to spend much time on the linguistic elements of a cultural phenomenology in this thesis, since doing so would likely extend the length of this project greatly. Where applicable, I will mention the role that language plays in our analysis, but I will leave a full fleshing-out of this linguistic element of a cultural phenomenology for future projects.

[28] Husserl, *Crisis*, 22.

[29] Husserl, *Crisis*, 23.

Husserl understood the importance of Galileo "as one of the founders of modern *philosophy* through his abstract theorization of nature," as Dermot Moran writes, which "transformed forever the way modern humanity thinks about the physical 'world of bodies,' about 'nature,' and indeed about the very meaning of rationality as such."[30] Galileo will thus play a large role in this section of our analysis, as we explore how his mathematization of nature baked the cultural *a prioris* we are looking for into modernity.

Before we go much further, though, I should make clear that Husserl uses the term 'Galilean science' in a somewhat general way. Although Galileo himself is the most important figure in Galilean science, for Husserl, the term applies to a *period* in modern science rather than just the historical Galileo himself.[31] As Moran puts it, the term 'Galileo' refers to "a crucial stage in modern scientific development: the moment nature becomes manifest as the idealized, mathematical complex."[32] I will follow similar usage patterns as Husserl: when I mention Galilean science or Galilean math, it should be understood that I am referring to a period of scientific development, rather than exclusively the work done by Galileo.

Continuing, then, Husserl is interested in how this period of science represented a monumental shift for modernity. He wants to know "how a new 'attitude' gets installed in human culture" and "how a transformed concept of nature comes to replace the traditional intuited one,"[33] in Moran's words. Although this period of time is important for science and philosophy

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[30] Dermot Moran, *Husserl's Crisis of the European Sciences and Transcendental Phenomenology: An Introduction* (Cambridge: Cambridge University Press, 2012), 68 & 69 respectively.

[31] See Husserl, *Crisis*, 57 for a brief discussion of this point.

[32] Moran, *Husserl's Crisis*, 67.

[33] Moran, *Husserl's Crisis*, 86.

especially, we will be focusing here precisely on this cultural question: how did Galilean science result in a new cultural attitude and a new conception of nature? We will be following Husserl's analysis in trying to pull out some of the hidden assumptions in Galilean math. To do this, Husserl employs a method of analyzing not only what amounted to conscious motivations for Galileo and his successors, but also what they might not have been aware of in their work. Husserl puts it like this, "we must accordingly reconstruct not only what consciously motivated [Galileo]. It will also be instructive to bring to light what was implicitly included in his guiding model of mathematics, even though, because of the direction of his interest, it was kept from his view: as a hidden, presupposed meaning it naturally had to enter into his physics along with everything else."[34] In other words, Husserl does not want us to understand Galileo and his contemporaries as intentionally embedding assumptions into their work so that those that came after would unwittingly fall victim to them. Rather, he thinks that they themselves were likely not aware of many of the assumptions in their work—as they came from a deeper level of experience than the scientific, namely the cultural.

With that in mind, I want to pull a few specific cultural *a prioris* out of Husserl's analysis. Husserl himself never makes an explicit list of assumptions, but doing so here will be helpful for our exploration of some of the most important issues within modernism in the face of the climate crisis, here and in later chapters. Thus, in the following, I will be drawing four key themes or *a prioris* out of Husserl's work: [1] the disconnection between the life-world and the world of science which ultimately becomes what Husserl calls the 'garb of ideas,' [2] the drive to master the world/all of nature, [3] the concept of infinity and how it becomes embedded in our thought and our practices, and [4] the subjective/objective distinction which develops into the

[34] Husserl, *Crisis*, 24-25.

fact/value distinction.[35] These are all related to each other, and they interact in interesting ways. Importantly, in addition, they all cause significant issues in our responses to climate change—a topic we will return to later in this chapter and others. With that in mind, let us dive into Husserl's analysis.

1.2.1 The Cultural *A Prioris* in Galilean Science

Husserl begins by noting a fact about our experience of the world. Each of us perceives the world a bit differently—for example, by seeing one side of a chair versus another—but we do not conclude from these differences of experience that each of us is experiencing a different world. Rather, we take it that there is one, shared world which simply presents itself differently to different people.[36] For Galileo, however, this presented an interesting question. As Husserl formulates it, "have we nothing more than the empty, necessary idea of things which exist objectively in themselves? Is there not in the appearances themselves a content we must ascribe to true nature?"[37] According to Husserl, Galileo must have concluded, "Surely this includes everything which pure geometry, and in general the mathematics of the pure form of space-time, teaches us, with the self-evidence of absolute, universal validity…"[38] In other words, Galileo thought that, if it is true that there are things—objective objects—existing in the world

[35] I want to make explicit that none of these elements are necessarily bad in themselves. But, in the ways that they have influenced our culture, they have had destructive effects vis a vis climate change. I do not propose that we abandon any useful concepts indefinitely, but that we become aware that they are there, underlying our thinking, and aware of how they affect us and our culture.

[36] Husserl, *Crisis*, 23.

[37] Husserl, *Crisis*, 23.

[38] Husserl, *Crisis*, 24.

independent of our experience of them, we can infer from this experience that these objects must be mathematical—i.e., they must follow the rules and rationality of mathematics, since mathematics is objective. Husserl thinks that this must have been obvious to Galileo, and must have inspired his thinking to mathematize nature, the beginning of the roots of mastering the world—*a priori* [2].

From here, if the world follows mathematical rules, Galileo figured that geometry must apply to it as well. But, as Husserl explains, the world tends not to conform to perfect, geometrical shapes: instead, it changes and shifts. Thus the practice of continually improving one's geometrical characterization of the world arises. Within this process of continual, *infinite* perfection come about what Husserl calls ideal "*limit-shapes,*" which represent a never attainable, ideal form of the geometrical shapes we are working with (note the beginnings of *a priori* [3] here).[39] Further, the art of measurement becomes involved in trying to apply geometry to our world of experience, so that a sort of objectivity can be used in our geometry.[40] If I measure the table I am writing on, for instance, I can find the exact, 'objective' width and length, and then mentally map a rectangle onto this table representing its dimensions. If we then imagine that the entire world can be measured as such, we can begin to conceptually apply these limit shapes to the entire world (*a priori* [2]).

It is important to understand that this process of using geometry to describe the world is not the same as describing the world as such. Using a rectangle to represent the surface of the table I am writing on, for instance, is fundamentally an *abstraction* from my experience of the table (e.g., rectangles are abstract shapes without a texture while this table has the roughness of

[39] Husserl, *Crisis*, 25-26.

[40] Husserl, *Crisis*, 25-27.

of woodgrain). Carr describes this process as an abstraction-interpretation. As he explains, "First [science] focuses upon the shape-aspect of the world, to the exclusion of so-called secondary qualities; then it interprets these shapes as pure geometrical shapes in order to deal with them in geometrical terms. But it forgets that its first move is an abstraction *from* something and its second an interpretation *of* something."[41] In other words, the world involves much more than can be represented in pure geometry. So, in abstracting from all of the secondary qualities of the world, we have already moved away from the life-world as such. Further, once these abstractions of the life-world are taken as ideally geometrical, instead of the messy, real-world shapes that they actually are, we have completely moved into another realm of inquiry. As Carr explains, "the real shape-aspect of the world, no matter how accurately measured, can never present us with anything but approximations to these ideal relationships."[42] Thus, even though it might seem like these ideal geometries are explaining the real world, they are fundamentally removed from it in subtle ways. Husserl writes that, "However, all this *pure* mathematics has to do with bodies and the bodily world only through an abstraction, i.e., it has to do only with *abstract shapes* within space-time…"[43] The world as understood through geometry is the scientific world, but fundamentally not the life-world which it is founded upon. This is so not because of some trivial aspect of the practice of science but is built into the very method which Galilean science put forward. Thus, this is the root of the abstraction from nature and the divergence of the scientific world from the life-world (*a priori* [1]).

[41] Carr, "Husserl's Problematic Concept," 333.

[42] Carr, "Husserl's Problematic Concept," 333.

[43] Husserl, *Crisis*, 29.

Also entangled in this process is the birth of a supposedly 'objective' ideal. Husserl writes, "Wherever such a methodology is developed [such as Galilean math], there we have also overcome the relativity of subjective interpretations. . .For in this manner we attain identical, nonrelative truth of which everyone who can understand and use this method can convince himself. Here, then, we recognize something that truly is—though only in the form of a constantly increasing approximation…"[44] In other words, this Galilean scientific method gives us the tools to begin constructing an objective standard that everyone can agree on and to leave behind mere subjective opinions and views on the world. This, coupled with the fact that nature is increasingly being identified with inanimate, geometrical shapes, leads also to the beginnings of the subject/object distinction: subjects theorizing objects, and transcending their subjectivities into objectivity—*a priori* [4].

Husserl continues, noting that, once the process of mathematizing the world has begun, Galilean scientists began to recognize patterns or 'habits' in the world. "The things of the intuited surrounding world. . .have, so to speak, their 'habits'—they behave similarly under typically similar circumstances. If we take the intuitable world as a whole. . .it has even as a whole its 'habit'. . .[it has] an *empirical over-all style*."[45] One might realize, for instance, that every time an object is dropped, it seems to start accelerating towards the ground, or that water always starts to freeze at a specific temperature. In the process of mathematizing everything they saw in nature, Galilean scientists also started to develop formulas to explain and handle these patterns—

[44] Husserl, *Crisis*, 29.

[45] Husserl, *Crisis*, 31.

to mathematize the "*universal causal regulation*" of the world.[46] This leads, naturally, to a series of hypotheses which try to capture these regularities of the world.

But, as is natural in the practice of science, no single hypothesis ever fully maps onto the world, leading to a process of continual revision. Thus, in this developing scientific method "is embedded the *in infinitum*" in that hypotheses continue to get better and more perfect with time, never quite reaching the ideal, in "an infinite historical process of approximation."[47] As Moran succinctly puts it, "Husserl offers an interesting characterization of the specific idea of a science of nature as progressing infinitely…"[48] The scientists practicing and developing this method understand that they will never arrive at the perfect theory, and the total understanding of the world which this promises; but, perfection and omniscience suddenly become attainable, albeit in an infinitely distant future—one need only follow the method.[49] This is because, once enough of the world is mathematized, one can actually begin to predict events in the experienced world by means of the scientific world of formulas. Husserl explains this step thus: "one can outline the empirical regularities of the practical life-world which are to be expected. In other words, if one has the formulae, one already possesses, in advance, the practically desired prediction of what is to be expected. . .in the intuitively given world of concretely actual life."[50] Husserl considers this a 'decisive accomplishment' of natural science, because it means that this science begins to take

[46] Husserl, *Crisis*, 31.

[47] Husserl, *Crisis*, 42.

[48] Moran, *Husserl's Crisis*, 81.

[49] Husserl, *Crisis*, 65.

[50] Husserl, *Crisis*, 43.

on a practical dimension—to become a sort of *praxis*.[51] If one understands only how to mathematize each aspect of the world, and how these formulas fit together, they can reach omniscience (this involves *a prioris* [1] and [2], further abstraction from the life-world and increasing mastery over it).

For a while, one aspect of the world resisted mathematization: our sensory experiences, or 'plena,' to use the term Husserl employs. These do not seem to map onto a geometrical schema, and so they eluded Galileo for a little while. As Husserl explains, "The difficulty here lies in the fact that the material plena—the 'specific' sense-qualities—which concretely fill out the spatio-temporal shape-aspects of the world of bodies *cannot*, in their own gradations, be *directly* treated as are the shapes themselves."[52] In other words, geometry and math do not seem to apply to these plena in the way they apply to the so-called primary qualities of the world. But this difficulty was soon overcome by Galilean science, in that the method was adapted to mathematize the plena *indirectly*. As Husserl explains the insight, "everything which manifests itself as real through the specific sense-qualities must have its *mathematical index* in events belonging to the sphere of shapes—which is, of course, already thought of as idealized—and that there must arise from this the possibility of an *indirect* mathematization, in the fullest sense, i.e., it must be possible. . .to construct *ex datis*, and thus to determine objectively, *all* events in the sphere of the plena."[53] In other words, Galileo realized that there are certain correspondences between the experienced plena and the idealized primary qualities of the world to which math applied. In this way, if these correspondences could be traced, and themselves mathematized and

[51] Husserl, *Crisis*, 43.

[52] Husserl, *Crisis*, 33.

[53] Husserl, *Crisis*, 37.

idealized, then these new formulas can be used to make an indirect mathematization of our plena/sensory experiences. After this, nothing was left to stop the mathematization, and "The whole of infinite nature, taken as a concrete universe of causality—for this was inherent in that strange conception—became [the object of] a *peculiarly applied mathematics*."[54] The entirety of the experienced world, then, primary and secondary qualities, began to fall under the scope of the new mathematical science, and mastery of the world found itself unfettered. Moran quotes a passage from Galileo which expresses this new conviction. Galileo writes, "Philosophy is written in this grand book, the universe. . .It is written in the language of mathematics, and its characters are triangles, circles, and other geometric figures."[55] The very language of the universe, then, was taken to be written in math and geometry, and the complete mastery of the world was underway (*a priori* [2]).

Although this universally applicable math—what Leibniz would later theorize as the *mathesis universalis*[56]—was a great accomplishment for the science of the time, it also came with a grave and unrecognized danger. The more universal and applicable the world of scientific formulas became, the easier it was to mistake it for the real world, the life-world. As this abstraction and formalization of the world continued, it became what Husserl called the 'garb of ideas,' which came to resemble the world in key ways. He explains that, "In geometrical and natural-scientific mathematization, in the open infinity of possible experiences, we measure the life-world—the world constantly given to us as actual in our concrete world-life—for a well-fitting *garb of ideas*, that of the so-called objectively scientific truths. . .[Mathematical science]

[54] Husserl, *Crisis*, 37. Brackets added by Carr.

[55] From Galileo's *The Assayer* as quoted in Moran, *Husserl's Crisis*, 76.

[56] Husserl, *Crisis*, 45.

represents the life-world, *dresses it up* as 'objectively actual and true' nature."[57] This garb of ideas, then, is fundamentally not the real-world, or the life-world as such. Rather, it is a well-fitted complex of formulas and mathematical entities which *corresponds with* the world, but remains different from it. In our time, this garb has been gone over by many tailors, and it fits better and better with time through the infinite process of science. But, Husserl reminds and cautions us that this garb of ideas *is not* true nature, not the actual world—it is, to use Carr's term again, an abstraction-interpretation of the world. Husserl warns us of this danger because this is exactly the mistake that Galilean scientists made: they began to identify the garb of ideas, the scientific world, as the *real* world, and to replace the real world as such (*a prioris* [1] and [2]).

Even Galileo himself began to make the mistake of substituting the world of scientific formulas for the real world, and brought about all the consequences that followed. Husserl writes, "But now we must note something of the highest importance that occurred as early as Galileo: the surreptitious substitution of the mathematically substructed world of idealities for the only real world, the one that is actually given through perception, that is ever experienced and experienceable—our everyday life-world. This substitution was promptly passed on to his successors..."[58] Once the mathematization became functionally complete, able to cover both primary and secondary qualities of our experience, those working on this universal mathematics began to favor the mathematical world. When working with these formulas, one could manipulate and predict what would happen with accuracy and control. Compared to this, the real world was simply not manipulable and understandable in the same way as the world of formulas. As Moran explains it, "Modern mathematical science imposes a particular kind of technical grid

[57] Husserl, *Crisis*, 51.

[58] Husserl, *Crisis*, 49.

on everything that it seeks to explain. . .and the greatest danger is to substitute this ideal entity for the concrete experiential world."[59] What Husserl could not see, however, is how consequential this move becomes for us in the face of the climate crisis. Once this substitution of the natural world took root in modernist culture, we lost an important sensitivity to the real world itself, unable to fully see how we have been affecting it since we are too focused on the world of ideas and formulas. And, it is in this substitution that all four *a prioris* really begin to come together and reinforce each other.

Thus, mastery of the world (*a priori* [2]) through an infinite scientific-mathematical method of hypotheses (*a priori* [3]) led to a final abstraction and separation from the real, life-world of experience (*a priori* [1]). Once all of nature had been objectified in this way, moreover, it provided the perfect contrast to the subjectivity of inner perspectives. Whereas internal impressions and experiences are variable, changing, and cannot be verified from the outside, the objective scientific world was solid, unchanging, and anyone with the proper knowledge could understand it. Husserl writes that this became "Galileo's famous doctrine of the merely subjective character of the specific sense-qualities,"[60] but it had ramifications far beyond this, in that it amounted to the subjectification of lived-experience. Thus, the subjective/objective dichotomy was solidified (*a priori* [4], the roots of the fact/value distinction), and these four key assumptions of modernism became embedded in the heart of scientific Western culture.

[59] Moran, *Husserl's Crisis*, 69.

[60] Husserl, *Crisis*, 54.

1.2.2 Evolution and Importance of the Cultural *A Prioris*

All of these elements are important because, as Husserl put it, they are part of the "*origin of the modern spirit*"[61] or the birth of modernity, as I have previously explained. But, they take on an additional importance in the face of climate change, as they begin to break down and reveal a dysfunction in our way of living. With time, all of these cultural *a prioris* became more entangled with each other, and became further reified into our Western culture in America and elsewhere. In the present day, although we are aware of some of these elements, many of their effects go unnoticed. So it will be helpful here to move beyond Husserl so as to illustrate the ways that these *a prioris* have taken root over the years, and to explain how they become relevant to the climate crisis. Once we understand how these key assumptions have settled into place in our culture over time, we will be prepared to examine how they fall apart in the face of the climate crisis, which will be our task in the next chapter.

First, the abstraction from the life-world [1] and the subjective/objective split [4] combined into a final separation of the physical/objective world from the psychic/subjective world. This was clear even in Husserl's time, although it is much more solidified in our own. He writes, "we must realize that the conception of the new idea of 'nature' as an encapsulated, really and theoretically self-enclosed world of bodies soon brings about a complete transformation of the idea of the world in general. The world splits, so to speak, into two worlds: nature and the psychic world…"[62] These two spheres of existence were separated off from each other and seen as unable to interact with or influence each other. Nature becomes a permanent, objective state of affairs, whereas culture becomes a subjective, changing, progressing entity that uses nature at its

[61] Husserl, *Crisis*, 57.

[62] Husserl, *Crisis*, 60.

whim, with no consequences (since culture cannot affect nature). Nature becomes a passive set of resources with no agency, simply waiting to be conquered and plundered, and culture and society become the active agents primed to do this plundering. In this way, abstraction from the life-world helped to blind us to the consequences of our 'mastering of nature.' How could we know to look for the environmental consequences of our actions if we did not think there could be any? After all, the mathematical world, the garb of ideas, is solid, logical, and predictable. And, once this world was substituted for the actual life-world, we expected the actual world to be the same.

It is important not to understate the power of this belief in a stable, unchanging nature. This expectation of solidity and stagnation grew into an unquestioned fact in the scientific community. As Spencer R. Weart puts it—a physicist and historian of science—the climate, for instance, was "stable *by definition*," and this much was written into scientific textbooks at the time (the early 1900s).[63] Scientists thought that they could depend on the climate as a constant, no matter what humans did. It was all the more surprising, then, when environmental science really began to catch onto the issue in the 1970s.[64] Suddenly, the terrible power of humanity started becoming apparent. Although this much became clearer and clearer to scientists until a consensus was reached on anthropogenic climate change in the 1990s,[65] politicians and everyday citizens in America have lagged far behind. In the next chapters, we will note some more reasons

[63] Spencer R. Weart, *The Discovery of Global Warming: Revised and Expanded Edition* (Cambridge: Harvard University Press, 2008), 10.

[64] Weart, *The Discovery of Global Warming*, 85. See chapter 4 in general for a breakdown of the slow process of coming to understand that the climate was indeed changing.

[65] Weart, *The Discovery of Global Warming*, 211. Here, Weart is presenting a useful timeline of milestone events in the history of climate science.

for this failure to understand the fragility of nature, and how this mindset leads to issues with dealing with the climate crisis.

The abstraction from the life-world and blindness to the ill-effects of our actions also fed into the mastering of nature through industry. As industry expanded and the demand for fossil fuels expanded alongside it, so did our vicious extraction techniques. Moran explains, "Inbuilt in [the idea that the world must be mathematical/rational] is the notion of *infinite* progress in knowledge (and also control of nature)."[66] The modernist attitude was that nature, and all of its resources, were there for human consumption, for now and ever—consequences be damned. Today, the effects of this mindset are all too apparent. The Amazon rainforest is being clear-cut, overfishing threatens the health of our ocean ecosystems, and the consequences for humans are beginning to get severe. Although the idea of infinity "shapes modernity" and the modernist mindset[67]—infinite revision in scientific hypotheses, infinite growth in our economies, infinite consumption in our markets—in reality, the planet we live on is finite. The Earth has finite resources and finite species, and there is an ever-smaller amount of time to change our actions if we want to avoid the worst of the consequences, as we will explore in the coming chapters.

The subjective/objective dichotomy, moreover, combined with the growing abstraction from the life-world and birthed the fact/value distinction. The world of science and formulas is taken as the objective world of facts, whereas the world of culture and thought is taken as the subjective world of values. In time, this gets codified into scientific practice. Although this divide is much stronger and more complicated today with its entanglements in politics (as we will cover in the following chapters) it, too, was visible even in Husserl's time. He says of the

[66] Moran, *Husserl's Crisis,* 97. My italics.

[67] Moran, *Husserl's Crisis*, 97.

attitude of scientists, "their rigorous scientific character requires, we are told, that the scholar carefully exclude all valuative positions, all questions of the reason or unreason of their human subject matter and its cultural configurations."[68] At the time, Husserl saw this as a dire problem for European culture, in that it was failing to question the meaning of its own existence. Again, he could not have known that this same issue would become of dire importance to the means and very possibility of our existence on this planet. As we will cover later in this thesis, if scientists cannot speak out about what should be done in the face of climate change, who can?

1.3 On the Relativity of the Cultural A Prioris and the Prospect of a Cultural Epoché

Before continuing, it will be important to include a quick discussion of how cultures can differ. Husserl was very aware that the aspects of Galilean science he was discussing in the *Crisis* were not universally held. If we recall Carr's clarification of Husserl's three-tiered structure of unquestioned experience (see figure 1 again), whereas Husserl thought that the life-world was shared among all humans, everything above it in the structure (cultural and scientific worlds) could change and differ from culture to culture. All of the aspects he highlights in the modernist tradition, then, are precisely that: part of the modernist tradition, and inherited by the descendants of modernism (Western cultures, generally). To revisit an earlier quote about the differences between cultures, Husserl noted: "in our experience and in [our social group], we arrive at 'secure' facts. . .But when we are thrown into an alien social sphere [he cites Africa and China], we discover that their truths, the facts that for them are fixed, generally verified or verifiable, are by no means the same as ours."[69] What we say here, then, will not necessarily be

[68] Husserl, *Crisis*, 6.

[69] Husserl, *Crisis*, 139.

applicable to humanity in general. But, insofar as Western countries have together been the largest contributors to anthropogenic climate change, putting an amount of CO_2 into the atmosphere far outsizing our territory and populations, it is precisely Western countries which will most have to change. While climate change is by no means our problem alone, we are the ones most responsible for the coming death and destruction. And thus, an examination of our Western culture with an eye for what proves dysfunctional in the face of the climate crisis is much needed.

It is in this way that Husserl's thought is instructive and useful to us today: using his tools of cultural analysis, we can bring out some key, problematic aspects of our culture, and then subject them to an examination to see what is not working, and some of what needs to change. Husserl thought that the crisis he was writing about was caused by the abstraction of the life-world from the scientific world of formulas, and that phenomenology—in the form of the *epoché*—would be the solution to this crisis.[70] I hope to show that this separation, and the many effects following on it, is also the cause of the Crisis of the Geosciences today—and although phenomenology may not solve our problem, a new kind of *epoché* may yet help to reveal the nature of this new Crisis, and some potential next steps.

It will be important, then, to try to attempt something like a cultural *epoché*, to reveal our modernist cultural assumptions. Husserl explains how the *epoché*, adapted from Descartes' method of radical doubt, is imperative in revealing the assumptions underlying our philosophy and the grounding truths beneath it.[71] In attempting something like a cultural *epoché*, on the other hand, our suspension of belief will have to be a bit different. If we remember Carr's three-

[70] Moran, *Husserl's Crisis*, 97.

[71] Husserl, *Crisis*, 78.

tiered model, the cultural world lies between the scientific world and the life-world. Thus, if we are to successfully bracket culture—which means suspending all of our assumptions about it—we will, for a time at least, have to suspend our belief in scientific findings and ideas as well, on top of any culturally specific ideas we might hold. Whereas Descartes' *epoché* stopped at the fundaments of certain experience itself, ours will stop at the life-world, before it is interpreted by culture and science. Practicing this *epoché*—and Husserl saw it precisely like this, an activity one could engage in and practice, just like any other activity or vocation, rather than some permanent state of doubt[72]—will help to further reveal the nature of the cultural *a prioris* we have identified here, by showing what experience would look like without them. The nature of nonhumans, of the human experience of climate change, and of the finitude of our experience, among other things, will become clearer as we suspend our modernist cultural assumptions about the world.

Husserl proposed two of his own *epochés* in the *Crisis*—one of the scientific world, and one universal *epoché* of the life-world itself—and tried to be a guide to practicing these *epochés* through his writing. But, in our practice of a cultural *epoché* of our modernist assumptions, who better to be our guide than a self-proclaimed 'nonmodernist,' who has been trying to sound the alarm about the many problems of modernism for decades? It is for this reason that we turn to Bruno Latour in the next chapter, to expand upon Husserl's analysis, and to deepen our cultural *epoché*.

[72] Husserl, *Crisis*, 136-37.

Chapter 2: How Latour Expands on Husserl's Analysis, and the Breakdown of Modernity in the Face of the Climate Crisis

2.1 How Latour's Work Expands on Husserl's Analysis

Latour's work will be important for our analysis for two main reasons. First, Latour explicitly engages in his science studies project to unseat modernism and its many effects on our culture. As he puts it in *Pandora's Hope*, contrasting science studies with postmodernism, "Science studies, as I see it, has been engaged in a very different nonmodern task. For us, modernity has never been the order of the day."[73] Whereas postmodernism is descended from modernism and thus carries with it many of the same flaws, according to Latour, science studies attempts to trace the history of thought backwards, to before modernism became established, so that we can avoid it and its consequences altogether.[74] In other words, similar to the aims of this current project, Latour seeks to show where modernism has gone wrong, as well as to offer alternative ways of thinking about the world that avoid these issues before they begin.[75] Second, in *Facing Gaia*, Latour shows us the many ways that the ongoing climate crisis upsets the very same aspects of

[73] Bruno Latour, *Pandora's Hope* (Cambridge: Harvard University Press, 1999), 22.

[74] Latour, *Pandora's Hope*, 10. This page marks the end of a section where Latour is commenting on the successes and failures of many philosophical projects at addressing questions of skepticism, such as Kantianism and phenomenology. He concludes that the solution is not to again try to correct the mistakes of modernism by coming up with a new, modernist informed project, but to eschew modernism altogether by 'retracing our steps.'

[75] The introduction to *Pandora's Hope*, "Do You Believe in Reality" as a whole offers a good framing and summary of these ideas (see pages 1-23).

modernism which we identified in Husserl's analysis of Galilean science. As I will attempt to show, the cultural *a prioris* of abstracting from the natural world, mastering nature, infinity, the subject/object divide, and its cognate the fact/value distinction all play a role in Latour's analysis of the breakdown of modernism in the face of Gaia.[76] More specifically, though, Latour shows us how the findings of contemporary science *vis a vis* the climate crisis tend to conflict with these same modernist *a prioris*, and how this creates a tension within moderns (Latour's term for those who embody modernist culture) which makes it harder for them to take the science seriously or to react accordingly.

As Latour writes, he makes clear that he is trying to get to the heart of modernist cultural assumptions, or what lies beneath them. For instance, when writing about the Nature/Culture divide (another way of expressing the subject/object division), he proposes, "Let us now try to dig down a little deeper, *beneath* the ever so-equivocal notion of 'nature,' and thus *before* or *just short of*, the paired concepts that I have termed Nature/Culture."[77] Or again, when proposing an alternate worldview to the one that supports a Nature/Culture divide, "What would happen, for example, if we were to give entirely different answers to the questions that serve to define our relation to the world? Who would we be?. . .Where would we find ourselves?"[78] In these cases, Latour himself is practicing a sort of cultural *epoché*—although he does not call it by this

[76] I am using John Lovelock's term here, as Latour does. Latour thinks Lovelock's idea of 'Gaia' has been severely misunderstood: it does not represent some collective super-entity or some god of old, but rather the amalgamation of the many actions and reactions of living things on Earth. See Bruno Latour, *Facing Gaia* (Cambridge: Polity Press, 2017), 75-110 for Latour's breakdown and analysis of Lovelock's work.

[77] Latour, *Facing Gaia*, 35.

[78] Latour, *Facing Gaia*, 38. See also pages 58, 143, and 183 for other statements of the desire to get at what lies behind/before modernist cultural assumptions.

name—specifically aimed at unseating modernism. He is suspending modernist cultural beliefs to see what lies beneath, and to be able to see more clearly the *a priori* assumptions that come with modernism.

Importantly, Latour shares with myself (and to an extent Husserl) the sense that modernism is defective—and even dangerous—especially in the context of global climate change. He expresses this succinctly in *Pandora's Hope* when he discusses how moderns often ignore the consequences of their actions. As he writes, "the other cultures cannot decide when the moderns are at their most terrifying:. . .Is it when they innovate freely in their laboratories without the slightest worry about the consequences?"[79] Latour's sentiment in this passage applies very well to our global predicament today. We moderns have continually produced technology to better extract fossil fuels from the Earth, for instance, with no care for the carbon emissions these very machines would be responsible for. Now, the consequences of these activities threaten to be incredibly destructive, affecting nearly every living thing on Earth.

In these ways, Latour will help us expand our analysis and guide our cultural *epoché*. He understands the danger of modernist cultural assumptions and recognizes the need to move past them. Thus, with Latour, we will try to recognize the ways our cultural ancestors have discouraged us from taking meaningful action in the face of climate change, and how this has made it harder for many to truly have faith in climate science.

Before we move on, a quick note about method and terminology. Firstly, just as I have done with Husserl, I will be drawing our four cultural *a prioris* out of Latour's work here. Although he does not frame his work as an analysis of these assumptions, they are all implicit in his writing about climate change. Moreover, at various points throughout *Facing Gaia* and

[79] Latour, *Pandora's Hope*, 279.

Pandora's Hope, Latour ends up naming all four of our *a prioris* while analyzing modernism: [1] abstraction from the real world of experience (what I have been calling the life-world in line with Husserl), [2] the drive to master nature, [3] the concept of infinity, and [4] the subject/object distinction (including its cognate the fact/value distinction). My task in this chapter will be to show how Latour's analysis of modernism in the face of the climate crisis complements Husserl's analysis of modernism from the *Crisis*. To do this, I will center my own work around these four shared themes—the cultural *a prioris*. In this reframing of Latour's work, moreover, I will aim to exhibit how he can carry Husserl's analysis forward into the present day by showing how these *a prioris* interact with and break down in the Anthropocene.

Which brings us to a terminological note. I will be using the term 'Anthropocene' throughout this and the next chapter to refer to the present day and our present predicament of the climate crisis. This term is significant because it has been proposed as a new geological epoch which would replace and mark the ending of the Holocene, recognizing that there is a distinct change in the geological record which can be traced directly back to human activity. Although this term has been accepted and popularized by scholars in various academic fields, the arguments for making this change are currently under review by the global geological community. If the geologists choose to accept this term as an official epoch, it would codify the fact that human activities over time have had effects on the Earth on similar scales as other geological events such as erosion, plate tectonics, and volcanic eruptions.[80] Since we are analyzing our modernist culture and its interactions with climate change, here, this term is especially appropriate to this project.

[80] See Latour, *Facing Gaia*, Fourth Lecture (111-145) for a more in-depth discussion of this term and its significance.

With these clarifications out of the way, let continue our cultural *epoché*.

2.2 Expanding the Cultural Epoché: How Modernism Breaks Down in the Face of Gaia

2.2.1 *A Priori* [1.1]: Scientific Abstraction from Reality/the Life-World

One of Latour's key methods in science studies is a sociological/anthropological study of scientific practice. In *Pandora's Hope*, he follows a group of scientists to a section of the Amazon rainforest in Brazil, where it butts up against a savannah. The scientists wanted to know whether the forest was expanding into the savannah, or if the savannah was absorbing the forest. Latour recorded how, as they answered this question, the land became a laboratory. As he puts it, "the land has become a proto-laboratory—a Euclidean world where all phenomena can be registered by a collection of coordinates."[81] Importantly, Latour does not see this as a bad thing: it is simply necessary for scientific practice. Without making the land a lab, the scientists would not have been able to conduct their study and to find the answer to their question (the forest was encroaching on the savannah, with the help of worms to enrich the soil ahead of it). Baked into the practice of science, then, is the drive towards "More Cartesian coordinates, more columns, more rows,"[82] more mathematization of nature.

This becomes a problem for Latour, however—and for us, as we have already seen in the previous chapter—when this abstract, mathematized version of the world, this garb of ideas, is mistakenly severed from its connections or chains of reference to the real world and taken for the real thing. This involves a breaking of what Latour calls 'circulating reference,' or the idea that reference to reality circulates through multiple steps in scientific work like "electricity through a

[81] Latour, *Pandora's Hope*, 43.

[82] Latour, *Pandora's Hope*, 47.

wire"—but only if all of the 'transformations' or steps are preserved.[83] In scientific practice, this highlights the importance of citing your sources, properly preserving samples in storage, documenting the methodology you used, and so on. Latour gives a good example of this in recounting the meticulous work of one of the scientists on the trip to Brazil, Edileusa. Latour describes how Edileusa carefully collects, labels, and stores samples of plants from the forest/savannah border, so that she can document exactly where they came from and exactly what she found by examining them.[84] This careful documentation allows reference to circulate through Edileusa's work, and although "The forest cannot directly give its credit to Edileusa's text," Latour explains, "she can be credited *indirectly* through the extraction of a representative guarantor [the sample], neatly preserved and tagged…"[85] If all of these steps are properly taken and properly documented, then an inquiring mind could find a *diagram* of the Amazon rainforest, for instance, and trace it back to the *actual* forest step by step, thus verifying that it is a faithful representation of the real thing. It is this careful layering of steps which ensures that "the reality we had lost [by abstracting from the real world] is replaced"[86] and which ensures that the work of science still represents the real world. What Latour finds in scientific practice, then, is a careful, situated building of knowledge that takes one's standpoint and limitations into account.

Latour notes that this contrasts with how scientists often think—and how the public often thinks of scientists. As he explains, "But a minute later, these same scientists," in this case, physicists who understand the deeply situated nature of their practice,

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[83] Latour, *Pandora's Hope*, 69.

[84] Latour, *Pandora's Hope*, 32-34.

[85] Latour, *Pandora's Hope*, 34. My italics.

[86] Latour, *Pandora's Hope*, 66.

> will have no qualms about explaining to you how the mind of Stephen Hawking wanders through the cosmos in intimate dialogue with the Creator, naively ignoring the fact that Hawking's mind benefits not only from a brain but also from a 'collective body' composed of a huge network of computers, chairs, instruments, nurses, aides, and voice synthesizers that are necessary for the progressive unfolding of his equations.[87]

In other words, these scientists hold two contradictory ideas about the nature of science. On the one hand, they give a true account of how scientific practice occurs—situated in a specific place, with specific people, using specific tools: a very embodied and grounded process. But, on the other hand, these same scientists see science and scientific knowledge as objective, global in scope, and not tethered to the Earth or its specific circumstances in any way.[88] This is problematic for Latour in the way already outlined: if we sever the many chains of reference that connect scientific work—like diagrams, theories, and so on—to the actual situations and parts of the world that it refers to, then "it would have no further meaning."[89] The circulation of reference would be broken, and the work would no longer refer to the world. There is, however, another reason why this tendency to seek such a global understanding is dangerous for Latour.

In short, Latour holds that a global, disconnected perspective is impossible and obscures the processes behind the creation of knowledge. There is no such thing as the "view from nowhere," as people are always somewhere. Latour expresses this idea like so: "the Earth itself can no longer be grasped globally by anyone. This is precisely the lesson of the Anthropocene. As soon as one unifies it in a terraqueous sphere, one reduces geohistory to the limits of the old format of

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[87] Latour, *Facing Gaia*, 127.

[88] See Latour, *Facing Gaia*, 127 for a fuller discussion of this point.

[89] Latour, *Pandora's Hope*, 67.

medieval theology, transported into the nineteenth-century epistemology of Nature, then again poured back into the mold of the twentieth-century. . .”[90] He is arguing that conceiving of the Earth in this abstract, global way—as a sphere that we can fully grasp in our minds, and yet as a ‘blue planet’ in the void of space—is a sort of bifocalism, trying to keep in mind two unrelated and incompatible notions of the world and what we know about it. The complexity of the Anthropocene reveals this to us, according to Latour, because for the first time in human history, we are beginning to understand the Earth’s systems in a deep way, and this deep understanding cannot be simplified or reduced to an abstract understanding. Latour thinks that this “bifocal conception of science does not allow the ‘view from nowhere’ to be reconciled with these very particular places. . .where scientists have to place themselves when they actually have to *obtain* data or really *write* their articles.”[91] In other words, thinking of the world as a globe hides the actual practice of science, and the actual production of scientific knowledge, which is more important now than ever before.[92] Especially in the case of the geosciences, it is important today to make explicit how science functions so that people understand the trials a theory has to go through before it becomes a scientific consensus. Latour thinks that applying this ‘global’ idea of Earth to the real world “masks the extraordinarily difficult task of assembling the data points coming from all instruments and all disciplines.[93]” Revealing this complexity and difficulty, on

[90] Latour, *Facing Gaia*, 136.

[91] Latour, *Facing Gaia*, 127.

[92] It is more important now for two key reasons: first, we are facing a global climate crisis that threatens the stability of our lives and societies; second, because simply telling people that ‘science is true’ does not work if you want them to believe it and act accordingly—a topic we will come back to in the next chapter.

[93] Latour, *Facing Gaia*, 136.

the other hand, makes it clear how much care and effort goes into the practice of science—which will be a topic in the next chapter. This deep-seated modernist practice of abstracting from the world, then, breaks down in the Anthropocene, as the world turns out to be more complex than we previously thought.

Importantly, though, this tendency of abstraction extends far beyond the scientific community alone. Wendy Farley, drawing from Husserl and other continental philosophers who warn us of the dangers of abstraction, discusses how this modernist *a priori* of abstracting from the real world applies to everyday citizens as well in her article "Truth, Beauty, and Climate Change: A Dialogue with Continental Philosophy about Living With Denial." Farley thinks that many of the philosophical analyses of denial that were written around the world wars have much to teach us when they are applied to our current predicament of the global climate crisis. For instance, she notes how societal beliefs and assumptions can prevent people from seeing the reality of their situation, and that "One way of translating this kind of analysis to our time is to consider how our ideals and practices function to bar us from thinking seriously about environmental degradation."[94] In America, for example, although there has been progress in recent years towards recognizing our role in changing the climate—causing more severe storms, droughts, and fire seasons, just to name a few factors—the norm in our institutions is still to do little to nothing to actually make a difference, and there are many in our country who still deny that climate change is an issue at all. Farley, like Latour, sees this largely as the fault of our collective culture, and that "Resistance to the language of environmental responsibility may reflect less an anxiety about sacrifice *than a refusal to allow our collective fantasies to be*

[94] Wendy Farley, "Truth, Beauty, and Climate Change: A Dialogue with Continental Philosophy about Living With Denial," (*Environmental Philosophy* 12, no. 2: 2015), 263.

challenged."[95] Although Latour's discussion of mathematical-scientific abstraction draws primarily from an analysis of the practice of science itself, then, it is important to note that the effects of this abstraction have leaked into modernist culture at large, becoming the 'collective fantasies' which Farley notes.

Still, the abstraction runs deeper. Latour thinks this issue extends to our very concept of 'nature' itself. As he puts it, "we notice the existence of yet another instability, this time in *the very notion of 'nature.*"[96] The modernist ideal of a perfect, unchanging, mathematical nature no longer describes the real world, a world where the Earth is changing rapidly and *reacting* to our actions.[97] In the Anthropocene, Latour thinks that "to believe that [the term Nature] describes anything at all about the real world amounts to taking an abstraction for a description,"[98] which, as we will remember from Husserl, is why the abstract garb of ideas is so dangerous in the first place.[99] Our modernist ways of thinking about the world are thus breaking down and falling apart on the shores of our actual experiences. They are no longer useful for navigating the real world, and in fact obscure much of importance to our understanding of science and the climate crisis.

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[95] Farley, "Living With Denial," 266. My italics.

[96] Latour, *Facing Gaia*, 35. Latour's italics.

[97] Latour, *Facing Gaia*, 3.

[98] Latour, *Facing Gaia*, 58.

[99] See Edmund Husserl, *Crisis of the European Sciences and Transcendental Phenomenology*, trans. David Carr (Evanston: Northwestern University Press, 1970), 48-49, for instance.

2.2.2 *A Priori* [1.2]: Immanentization as Abstraction, and a Bit about Faith in Science

It needs mentioning again at this point that it is false to say there is a widespread crisis in faith in science in America today. In fact, as Naomi Oreskes and Erik M. Conway point out in their article, "From Anti-Government to Anti-Science: Why Conservatives Have Turned Against Science," most Americans in 2022 said that they had "a great deal of confidence" in scientific institutions.[100] Although there *is* a crisis in faith in science in politically conservative circles—a topic that will play a large role in our discussion in chapter 3[101]—what Husserl and Latour show us is that the problem is more complicated than a simple lack of faith in science. One can believe in the science, understand the results, and yet *still* act as if nothing important is happening, as if the world as we know it is not changing at an astounding pace, threatening to destroy our ways of life.[102] The question becomes, then, what is stopping people from acting? If this is truly the biggest ethical and existential crisis to face modern humanity, then why do so many of us act as if nothing is wrong? Latour asks these same questions, and concludes that, in addition to scientific abstraction, another form of abstraction from the real world is embedded in modernism, and tends to prevent moderns from taking the threats of climate change seriously. He calls this second form "immanentization."

Immanentization, according to Latour, derives from the Christian history of modernism and involves identifying the present world with the world of the beyond. He borrows this idea

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[100] Naomi Oreskes and Erik M. Conway, "From Anti-Government to Anti-Science: Why Conservatives Have Turned Against Science" (*Daedalus* 151, no. 4: 2022), 3.

[101] Oreskes and Conway, "From Anti-Government to Anti-Science," 3. Oreskes and Conway report how a 2020 poll showed that only 31% of Republicans thought that climate change was a major threat.

[102] This kind of reaction is only one of seven that Latour discusses in his First Lecture. See Latour, *Facing Gaia*, 11-13.

from the work of Eric Voegelin in "Ersatz Religion: The Gnostic Mass Movements of Our Time," where Voegelin writes: "The best course will be to recognize. . .the essence of modernity as the growth of Gnosticism,"[103] where Gnosticism represents the movement from uncertainty to surety of knowledge.[104] In order to really understand what Latour means here, we have to keep in mind a couple of things. First, as can be seen in Newton's reliance on the concept of angels to develop his theory of action at a distance,[105] for instance, Christianity is deeply entangled with the birth of modernism as we know it.[106] Second, it is important to understand that "*Uncertainty is the very essence of Christianity*," as Voegelin puts it.[107] Whereas for pagan religions, the gods are often right here on Earth, interacting with humans and other life, and having a direct, discernible effect on the world, "The feeling of security in a 'world full of gods' is lost with the gods themselves; when the world is de-divinized, communication with the world-transcendent God is reduced to the *tenuous bond* of faith."[108] In other words, since Christianity in its dominant forms believes in an *other-worldly* God, the question of uncertainty becomes part of the question

[103] Voegelin, "Ersatz Religion: The Gnostic Mass Movements of Our Time," 190 as quoted in Latour, *Facing Gaia*, 205.

[104] Latour, *Facing Gaia*, 203.

[105] See Simon Schaffer, "Newtonian Angels," in *Conversations with Angels*, ed. Joad Raymond. (London: Palgrave Macmillan, 2011). Insofar as our everyday beliefs about the world and about physics are based on Newton, then, they are intimately connected to the religious idea of angels.

[106] See, also, Husserl, *Crisis*, 78-81 for Husserl's discussion of the error implicit in Descartes identifying the thinking ego with the 'soul.' In short, a 'soul' has no meaning in Descartes' *epoché*, since there is no way to get to the idea of a 'pure soul' from a state of radical doubt. For our purposes here, this is also another example of how a Christian idea—that of the soul—becomes embedded in modernism, showing the importance of Christianity to modernist thought.

[107] Voegelin, "Ersatz Religion," 187 as quoted in Latour, *Facing Gaia*, 201. Latour's italics.

[108] Voegelin, "Ersatz Religion," 187 as quoted in Latour, *Facing Gaia*, 201. Latour's italics.

of faith. Whereas a pagan might see an event and *know* that it is the work of their god, Christians do not necessarily get it so easy: their task is to retain faith in the face of a God that does not overtly change their surroundings, and thus uncertainty and doubt become entangled with their belief.[109]

At the same time as certainty was becoming established in the modern sciences, however, this uncertainty in religious belief was becoming problematic. Voegelin argues that believers of the time thus began to take up a form of Gnosticism, or certain belief, rather than grapple with the uncertainty that characterized Christianity up to that point. The result is, as Latour puts it, that "From this moment on, religion presents itself as nothing but an effort—obviously futile—to resemble assured and indisputable knowledge," like that found in the sciences.[110] Moderns at the time sought out certainty in all areas of their life, encouraged by the success of reason, so it is no surprise that this want of certainty extended to religion, too. But, Latour continues, "[Voegelin] tells us that we have passed from a situation in which immanence and transcendence. . .were in a relation of mutual *revelation*. . .to an entirely different situation, in which we believe we can grasp, realized here on earth, the promised presence of the world beyond."[111] In other words, the distinction between the immanent and the transcendent collapsed for moderns of the time, and for us as their cultural heirs. Instead of these occupying two different planes of existence, they

[109] This question of doubt, as well, is historically important and influential to Christianity. See Kierkegaard's treatment of the binding of Isaac in *Fear and Trembling*, for instance, where Abraham has to doubt his views on morality and rationality in order to maintain faith. Or, for a contemporary example apropos to our discussion, see *First Reformed*, directed by Paul Schrader (2018, New York; A24, 2018), Blueray, where a pastor questions their beliefs about morality and faith in the face of the climate crisis.

[110] Latour, *Facing Gaia*, 203.

[111] Latour, *Facing Gaia*, 204.

became the same: the world, Nature, the here and now. Instead of the real life-world of our experience being a mundane and mortal plane, it suddenly became the seat of the divine itself. Instead of the Christian God occupying some other plane of existence (but certainly not the sinful, sublunar Earth), this separation collapsed, leaving the very world which we inhabit to be host to the *immanentized* presence of the divine. Now, the uncertainty of a distant God can fade, and be replaced by the religious certainty of a God whose being is here *with* us. But, as Latour tells us, "The inevitable result [for these believers]: *they have no sort of possible contact with the terrestrial.*"[112] By identifying the world of the beyond with the here and now, Latour thinks that we have lost the ability to properly understand the here and now, to understand precisely what makes it terrestrial and real. Instead of seeing the *real* world, we instead see an *ideal* world—much like Husserl explained about the dangers of mathematization, but from a different angle this time. To put Latour's point in other words, rather than just experiencing the life-world, a modernist cultural filter of immanentization and present divinity colors the modern's experience, and puts us out of touch with the life-world as such. Instead of seeing our environment as Earthly, fragile, and in decline, we now see it as a physical manifestation of the beyond.

This is especially important for Latour because this means that moderns are "increasingly indifferent to the fate of the cosmos,"[113] in that they take the present day to be post-Apocalyptic. Insofar as the Apocalypse means the end of the immanent world, the world of everyday experience, this has already happened for moderns: they now take themselves to live in the world of the beyond, having transcended mere immanence in the collapse of the separation of the mundane and the divine. As Latour explains, "Telling Westerners—or those who have recently

[112] Latour, *Facing Gaia*, 204.

[113] Latour, *Facing Gaia*, 210.

become Westernized. . .that the time has come, that their world has ended, that they have to change their way of life, can only produce a feeling of total incomprehension, because, for them, the Apocalypse *has already taken place*. They have already gone over to the other side."[114] The collapse of the immanent and the divine, then, causes a conceptual change in the modern psyche where it seems like the Apocalypse has already come to pass, and that the present is thus post-Apocalyptic.

Latour's argument here also finds support when you look at the events of the past. Considering historical events like world wars and genocides, food shortages, early death from preventable and curable diseases, and so on, it is easy to look at the wealthy, Western world today, free from so many of these concerns, and think that the 'problems' are in the 'past,' that we have 'progressed' past having to worry about the necessities of life or existential threats to our existence, or even that 'science will save us.' Something fundamentally rooted in the modernist consciousness, according to Latour, is that the 'hard times are behind us, so we do not have to worry so much anymore.' The Apocalypse has already come and passed, and so any new calls of "Apocalypse now!" fall on deaf ears. This is what explains the lack of action seen in Western countries, for Latour, far and above any problems with faith in scientific findings. "They know, they hear," he explains, "but deep down *they do not believe it*. Here is where we have to seek the fundamental source of climate skepticism, I believe. It is not skepticism bearing on the solidity of one's knowledge, but skepticism about the skeptics' own position in existence."[115] Latour is suggesting that, fundamentally, our lack of action in the face of the climate crisis is *not* primarily due to a lack of faith in climate science—although this certainly has a role to play, as

[114] Latour, *Facing Gaia*, 206.

[115] Latour, *Facing Gaia*, 206.

we will address in chapter 3—but in the belief that the 'end of times' has already passed, and that the world we are living in now is the stable world of the beyond, not due for any great upsets, and ruled by Reason and Progress. In other words, our modernist abstraction from the real world, deeply rooted in our culture, prohibits belief that the end of times could be coming yet again, as nowhere is it written that the apocalypse will come *twice*.[116]

This tendency towards abstraction from the real world, the life-world, however—taken for granted in modernist, Western culture—is very dangerous in the face of Gaia. Whereas moderns might believe that the worst of times are behind them, and that they are thus safe, the *true* Apocalypse seems to be knocking at our door all the same. World wars, mass death, food shortages, increasing spread of disease—all of these and more are all but certain unless we act soon to change our ways of life, and our ways of thinking about the world.[117]

2.2.3 *A Priori* [2]: The Drive to 'Master' the World

Another modernist cultural *a priori* which breaks down in the Anthropocene is the drive to master and conquer the world. As we saw with Galilean science and the quest to mathematize everything in the last chapter, it is part of the modernist spirit to want to cover the world with one's reason, and to strive for a god-like omniscience.[118] But part of this idea is the assumption of a passive, conquerable nature—the slave counterpart to the master, Reason. In part this

[116] Latour, *Facing Gaia*, 207.

[117] IPCC, *Climate Change 2023 Synthesis Report: Summary for Policymakers* (IPCC, 2023), 21. Reading accounts like this, from the most recent IPCC report, about the effects of worsening climate change reminds one of the climate disaster movies, so popular in the 2000s and 2010s. The terrifying part, however, is that this time it *is* coming.

[118] Husserl, *Crisis*, 65.

derives from the practice of abstracting from the real world, in that a mathematized or immanentized world is naturally stable, predictable, and controllable. But, as the Anthropocene shows us, this is not true of the *real* world. Gaia—that amalgam of actions and feedback loops that is becoming ever more visible in the form of the climate crisis—suddenly *reacts* to us.[119] Or, as Latour puts it, "Through a complete reversal of the favorite trope of Western philosophy, human societies seem to be resigning themselves to playing the role of witless object, while it is nature that is unexpectedly taking on the role of active subject!"[120] While human societies seem to sit on their hands, avoiding taking meaningful action to combat CO_2 emissions or to transition away from fossil fuels, the climate crisis, on the other hand, has taken the initiative.

Importantly, Latour thought that there were issues with the drive to master objects even before he wrote about modernism in the Anthropocene. In *Pandora's Hope,* he argued that, rather than trading masters from God, to Nature, and finally to Humanity, we should try "*to have no master at all*," since, "To be in command, or to master, is a property of neither humans nor nonhumans, nor even of God."[121] His point in 1999 was that a study of scientific practice does not support a narrative of masterhood. Rather, the interaction of humans with the nonhumans of their world is one of *collaboration* and *interaction*[122]—not one of humans forcing the nonhumans into submission. But his words take on a whole new meaning in the Anthropocene.

[119] Latour, *Facing Gaia*, 3.

[120] Latour, *Facing Gaia*, 73.

[121] Latour, *Pandora's Hope*, 298.

[122] See, for instance, Latour's discussion of Louis Pasteur and the ferment in Chapter Four of *Pandora's Hope*, or later in this chapter where we discuss it.

Dipesh Chakrabarty offers a useful perspective on this issue in his paper "The Climate of History: Four Theses." In this paper he explains how the Anthropocene presents an unprecedented collapse of the divide between the history of the natural world and the history of humanity.[123] Drawing from Latour, Oreskes (a historian of science who we will meet later in this chapter), and others, Chakrabarty explains how "Humans now wield a geological force."[124] In sum, the effects of our actions on the climate are potentially so vast and influential that we have an effect on the world comparable to that of plate tectonics, volcanic eruptions, and other geological forces, and it might no longer be appropriate to separate the history of the natural world from the history of humanity. This is one of the lessons of the Anthropocene: that our actions are so deeply entangled with Earth's natural processes that they can no longer be separated.

Speaking of this same newfound geological agency from a scientific angle, Latour notes that it is an incredible proposition. He writes, "I find it enticing that this oxymoron linking geology and humanity should be the product of the cogitations of serious geologists who, until recently, had been totally indifferent to the ins and outs of research in the human and social sciences. No postmodern philosopher, no anthropologist, no liberal theologian, no political thinker would have dared measure the influence of humans *on the same scale* as rivers, volcanos, erosion, and biochemistry."[125] And yet, the term 'Anthropocene' is under serious review by geologists internationally. If this term is accepted by the geological community, this would mean that they

[123] Dipesh Chakrabarty, "The Climate of History: Four Theses," (*Critical Inquiry* 35, no. 2: 2009), 206

[124] Chakrabarty, "Four Theses," 206.

[125] Latour, *Facing Gaia*, 117. Latour's italics.

think humans do exert an influence on the geological processes of the earth just as powerful as rivers and volcanos. While this might seem to reinforce the modernist 'mastery over nature' trope, the truth is that it is only one side of the story. To present the other side of the story, and to reveal one aspect of this newfound entanglement with the Earth, Chakrabarty asks a question. In societies built upon fossil fuels, "Is the geological agency of humans the price we pay for the pursuit of freedom?"[126] Presenting the issue this way flips the script, to so speak. Rather than looking at the issue as a matter of increasing mastery, what if geological agency is actually a bad thing? Truly, as we increasingly realize, geological agency is a costly power.

One way to measure this cost, albeit in an abstract way, is to track the parts per million (ppm) of CO_2 in the atmosphere. As Nicola Jones wrote for the Yale School of the Environment back in 2017, "At the current rate of growth in CO_2, levels will hit 500 ppm within 50 years [of 2017], putting us on track to reach temperature boosts of perhaps more than 3 degrees C (5.4°F)."[127] It is easy to see a sentence like this and simply treat it as inconsequential scientific jargon. It feels a little more serious when we understand that CO_2 is a 'greenhouse gas,' meaning that it traps heat in the atmosphere of Earth much like the glass panes in a greenhouse, and that the more CO_2 in the atmosphere, the more heat becomes trapped. But, when you read something like the IPCC report on climate change, this sentence starts sounding very serious indeed.

[126] Chakrabarty, "Four Theses," 210.

[127] Nicola Jones, "How the World Passed a Carbon Threshold and Why It Matters," Yale School of the Environment, Jan. 26 2017, https://e360.yale.edu/features/how-the-world-passed-a-carbon-threshold-400ppm-and-why-it-matters. It is important to note, though, that according to the most recent (2023) report from the IPCC, the range of temperatures they are considering as possible given our emissions actually caps at 4.4°C, much worse than Jones thought in 2017. See IPCC, *Climate Change 2023 Synthesis Report: Summary for Policymakers* (IPCC, 2023), 18.

In truth, what we humans have lost by becoming a geological force is a stable climate that supports the current distribution and concentration of life on Earth, both human and nonhuman. The documented effects of anthropogenic climate change easily boggle the mind. As the IPCC summary report reads, "Human-caused climate change is already affecting many weather and climate extremes in *every region across the globe*. This has led to widespread adverse impacts and related losses and damages to nature and people."[128] More extreme droughts and storms, food shortages, increased spread of disease, mass mortality events in nonhuman populations, deadly heat waves, irreversible ecosystem damage, rising sea levels, and worsening mental health are just some of the 'adverse impacts' which the IPCC mentions in their report.[129] It is important to remember that these are not *predictions*, they are *reports* of events that have already happened, and will continue to happen, day after day, year after year, for thousands of years, unless drastic action is taken soon.[130] The actual *predictions* only get worse as more carbon is added to the atmosphere. The IPCC report words it like this, "With further warming, climate change risks will become *increasingly complex and more difficult to manage*. Multiple climatic and non-climatic risk drivers will interact, resulting in compounding overall risk and risks cascading across sectors and regions."[131] Specifically, they predict flooding of coastal cities,

[128] IPCC, *Synthesis Report Summary*, 11. My italics.

[129] IPCC, *Synthesis Report Summary*, 11-12.

[130] See IPCC, *Synthesis Report Summary*, 24 & 30 for brief discussions of the timescale of anthropogenic climate change.

[131] IPCC, *Synthesis Report Summary*, 21.

worsening disease and mental health issues in humans, increasing risk of extinction to nonhuman species, worsening deadly heatwaves, decrease in food production, and many other things.[132]

In addition, many of these changes are already outside of our control. Some of the effects of climate change will persist even if we were to transition to a carbon neutral society by next year. As an example, "Sea level rise," the IPCC reports, "is *unavoidable* for centuries to millennia due to continuing deep ocean warming and ice sheet melt, and sea levels will remain elevated for thousands of years (high confidence)."[133] Clearly, then, humans are no master over nature. We have *influence* over the climate, yes—this much is demonstrably certain—but we do not have *control*. We cannot stop the impending rising of the seas, for instance, or the already rampant heat waves and spread of disease that are happening all around the world. The climate is acting *upon us*, and yet our societies idle about, ignoring the scientific consensus of impending catastrophe. Surely, then, we humans are no master over nature when tens of millions of us will die due to factors related to anthropogenic climate change by 2100.[134]

Whereas before we humans were free to roam and try to dominate the Earth, this trend is reversing. As Latour puts the point, whereas before 'land-appropriation' meant humans taking the land, now it is beginning to mean "'*appropriation by the land*'—that is, by the Earth."[135] Whereas before we humans colonized and settled all over the Earth, now the Earth is taking its land back. And, as we saw from the IPCC report, this will only increase with time. Coastal cities

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[132] IPCC, *Synthesis Report Summary*, 21.

[133] IPCC, *Synthesis Report Summary*, 24. My italics.

[134] John Nolt, "The Long-Term Non-anthropocentric Ethics of Climate Change and Biodiversity Loss" (keynote presentation, 30th Annual Kent State Philosophy Graduate Student Conference in Remembrance of May 4th, Kent, Ohio, March 18, 2023).

[135] Latour, *Facing Gaia*, 251.

will flood with sea level rise driving millions of people inland, lack of food production will force many to flee their homes,[136] wildfires will wipe out whole towns forcing people to flee and rebuild,[137] and drought will make human civilization in certain regions impossible. Notions of mastery over nature in the face of this reality are simply untenable. As Latour artfully puts it referring to some of the many geological effects of anthropogenic climate change,

> Each item on the list, and this is what is most fascinating, could have been found throughout the nineteenth and twentieth centuries in narratives boasting of the fabulous exploits of Mankind transforming the Earth to better master it. With just one difference: the tone is no longer triumphal; there is no longer any question of "mastering' nature. Instead, the focus is on searching the sedimentary ruins for traces of earlier humans who had been *turned to stone*.[138]

Put in different words, whereas moderns previously might have celebrated these same geological effects, some of which have been taking place since the nineteenth century, we now understand that these effects are not something to be celebrated. The question is no longer one of demonstrating our power and control over nature. Instead, the question is now one of tracing what it cost to make humanity a truly geological force—one capable of changing the course of natural history—whose effects have, literally, turned to stone in the geological record.

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[136] This is, in fact, already happening in areas like Cameroon. See Willem Marx, "A new kind of climate refugee is emerging," NPR Goats and Soda (NPR, Dec. 22, 2022), https://www.npr.org/sections/goatsandsoda/2022/12/02/1140278088/climate-change-is-making-vulnerable-countries-more-so.

[137] This is already happening in parts of the Pacific Northwest. Weed, CA, for instance—the town I grew up in—has been ravaged by multiple wildfires just in the last 10 years.

[138] Latour, *Facing Gaia*, 115.

2.2.4 *A Priori* [3]: Infinity in Modernist Culture

Another realization that the Anthropocene brings is a strong awareness of our *limits*. Like we saw in the previous chapter with Galilean science, infinity became baked into the modernist spirit: unlimited pursuit of knowledge, unlimited mathematization of nature, and more recently, unlimited population growth and consumption. As Latour puts it, following the invention and mathematization of abstract 'space,' "The infinite extension of the world, like that of knowledge of the world, became possible, since every place was literally the same as every other, except for its coordinates. . .Galileo and his successors made it possible to pass from a closed world to an infinite universe."[139] Before this embedding of infinity in the modernist spirit, we were stuck here, on Earth, both in reality and in our imaginations. But with this newfound removal of our limits, moderns experienced a thrilling expansion of their imaginations, too. Around the same time as Galileo was infinitizing science, Western nations were expanding their borders in colonial land grabs. And, in the late 20th century, this became a race to *outer space*, because the planet was no longer big enough to contain the modern human. The prospect of space travel and exploring the galaxy—or even the universe—has taken strong root in Western culture in the form of TV shows like *Star Trek* (1966), books like *Hitchhiker's Guide to the Galaxy* (1979), and even—more recently—movies like *Interstellar* (2014), where humanity flees the planet Earth that is increasingly unable to support human life due to rampant climate change, finding a new safe haven among the stars.

As Latour tells us, though, the climate crisis makes us ever more aware of humanity's limits. As he puts it, "we're alone with our terrible terrestrial history,"[140] and we are trapped with

[139] Latour, *Facing Gaia*, 77.

[140] Latour, *Facing Gaia*, 80.

the consequences of our actions. After generations of humans focused on increasing material wealth for themselves and their children, extracting this material from the Earth that they lived on, we now "find ourselves totally unequipped to approach the *material conditions* of our atmospheric existence!. . .[W]e now find ourselves taken aback by the notion that there can be *limits* to our objectives…"[141] We have found that there are limits to the amounts of fossil fuels that we can burn without consequences, for instance, and to the level of consumption that we can realistically keep up in Western societies.[142] Considering all of this, we might even start to become suspicious of our basic economic practices, which are based on infinite growth, infinite consumption, and unlimited profit. As Oreskes and Conway put it, "Environmental deterioration is driven by economic activity, so we must consider if there is a fundamental flaw in our economic system."[143] Maybe infinite growth is a fraught concept when dealing with finite resources.

Chakrabarty likewise thinks that the Anthropocene prompts us to reconsider the limits of our institutions, and the need to reconsider them. As he writes, "the industrial way of life has acted much like the rabbit hole in Alice's story; we have slid into a state of things that forces on us a recognition of some of the parametric (that is, boundary) conditions for the existence of

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[141] Latour, *Facing Gaia*, 244.

[142] In a striking figure in the World Wildlife Fund's 2014 *Living Planet Report*, for instance, they calculated that if everyone on Earth had a lifestyle like those in the USA, "we would need 3.9 planets" to sustain this level of consumption. See World Wildlife Fund, *Living Planet Report 2014*, ed. Richard McLellan (WWF, 2014), https://www.worldwildlife.org/pages/living-planet-report-2014.

[143] Oreskes, Naomi and Erik M. Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Climate Change* (2010;, reis., New York: Bloomsbury Publishing, 2019), 255.

institutions central to our idea of modernity and the meanings we derive from them."[144] For perhaps the first time, moderns are being faced with hard limits that won't seem to budge no matter how long they are ignored or how much brute force is used to break them. And these limits involve more than just the carbon carrying capacity of the atmosphere or the space on which humans can live: there are now temporal limits as well.

The IPCC does not mince words on this point: our time is running out. As they put it, "There is a rapidly closing window of opportunity to secure a liveable and sustainable future for all (very high confidence)."[145] If we do not act soon, and act well, life as we know it on Earth will be impossible. This is a hard and fast time-limit on our indecision so far. There is only so much time for governments to idle and avoid the issue before they are endangering life as we know it, human and nonhuman—not just for those alive now, but for those thousands of years in the future.[146] This is not some hypothetical scenario or the plot of one of those aforementioned disaster movies, but a statement given with high scientific confidence by one of the largest and most meticulous scientific organizations on Earth. We ignore their words at our own peril.

It is for these reasons that Latour says we are stuck here, on Earth, with a newfound realization of the limits we face. In contrast to the infinity embedded in the spirit of modernity, the Anthropocene reveals to us that we are stuck in what Latour calls the "Great Enclosure,"[147] the limits placed upon us by our very planetary existence. Latour's words here recall to mind the

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[144] Chakrabarty, "Four Theses," 217.

[145] IPCC, *Synthesis Report Summary*, 30.

[146] IPCC, *Synthesis Report Summary*, 30. In an interesting reversal, the time-limit on action right now corresponds with an amount of time hard to fathom where the consequences of our actions will wreak havoc on life on Earth.

[147] Latour, *Facing Gaia*, 233.

"overview effect," a term coined by Frank White to describe the change in perspective that astronauts have upon seeing the Earth from space for the first time.[148] Although the specifics of the effect differ from person to person, seeing our tiny, fragile planet in its proper scale against the universe often invokes feelings of sadness, and a disdain for petty, worldly conflicts.[149] We are all stuck here on this rock, floating through the void—we are so much more connected down here than anything else we know of out in the cold, vast, expanse of space. Even William Shatner, famous for playing the intrepid Captain Kirk in the original *Star Trek* series (1966), found himself experiencing intense grief after his trip to space in 2021. He later said of his experience, "I wept for the Earth because I realized it's dying. . . It's a little tiny rock with an onion skin air around it. That's how fragile it all is. It's so fragile. We hang by a thread. . .we're just dangling."[150] It is unrealistic to expect everyone to have such an intense shift of attitude in such a short amount of time, but we can learn from the astronauts that have seen the immense scale of the universe, and our tiny home of Earth compared to it. We should heed the experience of these space-travelers when they tell us how precious our little space rock is, that it is all we have, and that we need to do all we can to protect it. In the Anthropocene, the forms infinity has taken in our modernist culture are tantamount to mass death and extinction, and it is more important now than ever before to realize our limits.

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[148] Enrique Rivera, "William Shatner experienced profound grief in space. It was the 'overview effect,'" (NPR, Oct. 23 2022), https://www.npr.org/2022/10/23/1130482740/william-shatner-jeff-bezos-space-travel-overview-effect.

[149] Rivera, "overview effect," https://www.npr.org/2022/10/23/1130482740/william-shatner-jeff-bezos-space-travel-overview-effect.

[150] Rivera, "overview effect," https://www.npr.org/2022/10/23/1130482740/william-shatner-jeff-bezos-space-travel-overview-effect.

2.2.5 *A Priori* [4.1]: the Divide Between Subject and Object

As we saw in the previous chapter, one of the modernist cultural assumptions that became embedded in Western culture was the divide between the subjective and the objective. Traditionally in this divide, the subjective is seen as the active force that acts upon the object—this is reflected in the very grammar of contemporary English, for instance, wherein the 'subject' of the sentence carries the actions, and the 'object' of the sentence receives them.[151] The objective in the broader sense is considered to be unchanging, unbiased, and understandable by anyone with sufficient training, whereas the subjective is prone to change, biased, and accessible only to those who have experienced it.

What a surprise, then, when the supposedly objective realm of 'nature' began to become contaminated by the subjective actions of humanity—when we began seeing traces of our own agency left on the supposedly stable world. How could the 'garb of ideas' be soiled so? Latour expresses this idea in the following, "Since the time of the 'scientific revolution,' the objectivity of a world without humans had offered solid ground for a sort of uncontested natural law. . .In the era of [the Anthropocene], when we turn toward the old solid ground of natural law, what do we find? The traces of our action, visible everywhere!"[152] We are increasingly finding that nature is not 'objective,' either in its ability to proffer an 'objective' standard, or in the idea that it is a merely passive environment to act upon. When we take a close look at nonhumans,[153] we see that

[151] This is not to say that grammar always follows this pattern, but that it is an interesting parallel.

[152] Latour, *Facing Gaia*, 62.

[153] By 'nonhumans,' Latour refers to not just animals, but other entities which seem to express a form of agency when closely inspected. Thus, bacteria, rivers, mountains, even rocks are included in this term, not just what we tend to consider 'living things.' See the explanation later

they, too, *act*—they are not the passive objects we thought them to be. To introduce this idea, Latour discusses an example from John McPhee's 1989 book, *The Control of Nature*, wherein the US Army Corps of Engineers is set the task of preventing the Mississippi river from being "captured insidiously by the course of a much smaller and much less well-known river," the Atchafalaya, which runs below the Mississippi.[154] Latour points out how it is clear from the situation that the river, a "force of nature," cannot be considered inert or passive: "A force of nature is obviously just the opposite of an inert actor. . .If the Mississippi possesses anything at all, it is *agency*—such powerful agency that it imposes itself on the agency of all the bureaucrats [who ordered the Corps to try to tame the river]."[155] This example alone might not be convincing to people who have been raised to see the natural world as without agency, or as passive, but Latour's comments here are more persuasive when we understand that they are drawing from the methodology of Actor-Network Theory (ANT).

ANT is a way of thinking about agency and actors that comes out of the work of Latour and others, wherein they work against the general, passive picture of the nonhuman world. A social-scientific method of examination, ANT seeks to unseat the subject/object dichotomy in our understanding of the world and its entities, and to enumerate the many ways that nonhumans play a big part in our daily lives. Rather than offering a strong, ideological opposition to traditional ways of thinking about the world, however, ANT is designed to be more of a shell or a blank canvas, to later be filled out by empirical investigation. Thus, on its own ANT is a weak objection to the subject/object dichotomy, and nearly all of its strength must come after the fact

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in this section about Actor-Network Theory for an overview of what Latour means by 'agency' and 'nonhuman' here.

[154] Latour, *Facing Gaia*¸ 52.

[155] Latour, *Facing Gaia*, 52.

from empirical studies. To understand exactly what this means, however, we will first have to be clear about the meaning of two terms within ANT: 'nonhuman' and 'agency.' First, in his article "Actor-Network Theory and Methodology: Just What Does It Mean to Say That Nonhumans Have Agency," Edwin Sayes explains that "the term 'nonhuman' is intended to signal dissatisfaction with the philosophical tradition in which an object is automatically placed opposite a subject, and the two are treated as radically different."[156] This new term, then, is intended to force us to rethink various things in our environment: rather than passive objects, nonhumans can *act* and have a form of *agency*, as we will see below. In this way, they may not be so unlike us humans. Thus, from the outset, ANT is set up in opposition to the subject/object divide, thinking that it fails to accurately describe the world (and especially fails to accurately describe scientific practice[157]). Importantly, though, ANT refuses to make any *a priori* or final divisions between the capabilities of humans and those of nonhumans[158]—any divide or difference that they do accept must first be shown to be the case in investigation. Latour is very clear on this point, "To reach an understanding of what the idea of an Earth that would react, retroactively, to our actions can mean, it becomes clear that one must not simplify in advance the distribution of agency between so-called human and non-human actors."[159] In other words, he is convinced that, in order to have a proper understanding of the climate crisis and our role in it, we

[156] Edwin Sayes, "Actor-Network Theory and Methodology: Just What Does It Mean to Say That Nonhumans Have Agency?" (*Social Studies of Science* 44, no. 1 2014), 136.

[157] Latour remarks as much in *Pandora's Hope,* "It does not matter how much we modify the notion of reference, if we are not also able to modify our understanding of what the entities of the world do when they come into contact with the scientific community…" See Latour, *Pandora's Hope*, 114.

[158] Sayes, "Actor-Network Theory," 1.

[159] Latour, *Facing Gaia*, 63.

cannot foreclose in advance the idea of nonhuman actors. We must allow the course of investigation to decide what this distribution is.[160]

Secondly, 'agency' in ANT means something slightly different from the causal sort of agency that we tend to speak about in philosophy and elsewhere. As Sayes puts it, "ANT invokes not causal agency in the strictest of senses, but something 'more.'"[161] To express what this 'more' is, Sayes turns to Latour himself, quoting, "there might exist many metaphysical shades between full causality and sheer in-existence: things might authorize, allow, afford, encourage, permit, suggest, influence, block, render possible, forbid, and so on."[162] If an entity, human or nonhuman, does one of these things, it *potentially* qualifies as an agent according to ANT. Agency, then, becomes a term to describe the many ways in which actions can be changed, rerouted, hampered, translated, negated, amplified, &c..[163] Agency in ANT is a way of labeling the many ways that we interact with the world, and the many ways that the world interacts *with us*. It is important to highlight again, though, the reliance on empirical investigation in the methodology of ANT. As Sayes puts it, "the terms 'nonhuman' and 'agency'. . .are not intended to add anything substantive to an explanation. Insofar as they are largely blank and indeterminate [by design in ANT methodology], their function is to allow an account, an empirical description, to be assembled."[164]

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[160] Sayes echoes this point on "Actor-Network Theory," 142.

[161] Sayes, "Actor-Network Theory," 141.

[162] Bruno Latour, "Nonhumans," in *Patterned Ground : Entanglements of Nature and Culture*, eds. Stephan Harrison, Steve Pile, and Nigel Thrift (London: Reakiton Books), 226 as quoted in Sayes, "Actor-Network Theory," 141.

[163] See Sayes, "Actor-Network Theory," 141 for a similar point.

[164] Sayes, "Actor-Network Theory," 142.

Rather than being some definitive, *a priori* ruling-out of the subject/object distinction, then, as mentioned before ANT actually runs the risk of being a *weak* and inconsequential challenge to this division, at least before empirical investigation comes into play. All of the force of ANT must come from scientific investigation, not from the theory itself: it stands or falls with the results of investigating the world, without drawing a subject/object division ahead of time. What Sayes, Latour, and other proponents of ANT argue, however, is that "We are faced with a series of nonhumans that have become visible actors in our moral and political situations."[165] There is no room here to do an in-depth survey of the ANT literature on these points,[166] but one particular example should show how the subject/object division is fraught. Latour offers an especially potent example of how nonhumans act, and how this is revealed by scientific practice: the story of Louis Pasteur and his ferment. Drawing from this, it will be easier to understand Latour's claim that scientific practice, at heart, multiplies rather than reduces agency.[167]

To begin, let us set the scene. Pasteur is a scientist working in nineteenth-century France. The scientific community he is working in has recently moved away from vitalist interpretations of chemistry—which relied on the role of life in chemical reactions—towards a purely chemical, mechanical theory of degradation and chemical reactions. Pasteur has the dual task, then, of explaining how it is that a form of *life* (the yeast in fermentation reactions—or 'the ferment,' as Latour calls it) can be responsible for a certain chemical reaction, and of convincing his

[165] Sayes, "Actor-Network Theory," 138.

[166] Aside from Latour's work in *Pandora's Hope* and *Facing Gaia* which are both steeped in ANT methodology, see, for example, Bruno Latour, "Reassembling the Social – An Introduction to Actor-Network-Theory," (Oxford University Press, 2005), for an introduction to the literature.

[167] See Latour, *Facing Gaia*, 163, for just one statement of this point.

colleagues that they are all wrong in the way that they currently think about chemistry.[168] Pasteur's strategy, then, has to be one of *removing himself* from the results of his experiments and clearly showing his colleagues that the yeast is acting of its own accord. If his colleagues suspect that it is Pasteur's actions, rather than the yeast itself, which is determining the results of his experiments, then they will not believe him.[169] As Latour explains, using the metaphor of a stage play, "The director withdraws from the scene, and the reader, merging her eyes with those of the stage manager, *sees* a fermentation that takes form at center stage *independently* of any work or construction."[170] Again, if the yeast did not act on its own and instead the results of the experiment were entirely the result of Pasteur's agency, his colleagues would not be convinced, and "Pasteur" would not now be a household name. In this way, Latour shows that the *agency of the yeast itself* —the ways that it acted and interacted with Pasteur's laboratory environment— was imperative to the success of Pasteur's theory of fermentation. Latour sees the process as a collaboration between actors: both the yeast and Pasteur contribute to the success of the experiment. Or, put another way, "*Pasteur authorizes the yeast to authorize him to speak in its name*."[171] Through empirical investigation, then, the ferment is shown to have *agency*, to not be a mere object, but to actively engage in and interact with the world.

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[168] Much of this detail is drawn from Latour's account of the situation in *Pandora's Hope*, 116.

[169] This is precisely the tension that played out between Pasteur and Pouchet, a contemporary of Pasteur's and a proponent of spontaneous generation theory. Pouchet initially could not replicate Pasteur's results in his experiments and so thought that Pasteur's theory was incorrect. Pasteur had to convince him and the rest of the scientific community that this was because *Pouchet* had contaminated his own experiment. See Latour, *Pandora's Hope*, 154, and chapter five more broadly.

[170] Latour, *Pandora's Hope*, 132.

[171] Latour, *Pandora's Hope*, 132. Latour's italics.

This is but one example of how scientific practice, upon examination, multiplies agency in the world. As Latour explains of science in general, "The clear result of the scientific disciplines is an immense *increase* in what moves, acts, heats up, boils over, and becomes complicated—in sum, in what actually *animates* the agents that constitute the world…"[172] Rather than being a problem in the methodology of science, however, Latour sees this as an asset to us if we hope to understand the Anthropocene, if we hope to understand "Gaia, considered as the secular aggregation of all the agents that can be recognized thanks to the tracing of *feedback loops*."[173] This concept of 'feedback loops' is very important to Latour's work in *Facing Gaia*. In short, Latour uses this term to describe the many ways that science—with all of its delicate, expensive, and spread out instruments—makes us aware of the actions of nonhumans and the state of the climate. Without this vast network of scientists and instruments which makes visible to us the ways that nature/the climate is acting and reacting to us (in feedback loops), we would be blind to the state of the climate crisis. Not only this, but we would also be unaware of the many impending threats that this crisis brings with it and of the extent of the damage we have done to the climatic stability that initially allowed human civilization to thrive.

It is thus a key part of science in the Anthropocene, according to Latour, to 'sensitize' us humans to the natural world around us and to the various dangers we have brought upon this world—and us within it. As he puts it, "Understanding the entanglements of the contradictory and conflictual connections [which characterize Gaia] is not a job that can be accomplished by leaping up to a higher 'global' level to see them act like a single whole; one can only make their potential paths cross with as many instruments as possible in order to have a chance to detect the

[172] Latour, *Facing Gaia*, 163.

[173] Latour, *Facing Gaia*, 283. My italics.

ways in which these agencies are connected among themselves."[174] In other words, it is only because science *does* tend to identify the many agencies in the nonhuman world that we have any hope of understanding the chaotic amalgam that is Gaia and that is the climate crisis. Without this feature of science—without being able to trace the many ways in which the agents of the world act and interact—we would be blind to our plight, unable to see the colossus rearing up in front of us. In order to understand and survive the Anthropocene, then, we have to let go of the subject/object division. Thus, another of our cultural *a prioris* proves outmoded in the face of the climate crisis.

2.2.6 *A Priori* [4.2]: The Fact/Value Distinction Derived from the Subject/Object Divide

In contemporary times, the fact/value distinction that we pulled out of Husserl's work—and that he himself was aware of—has become a full-blown professional standard in the practice of science. To recap, this distinction grew out of the final separation of the psychic, subjective world and the physical, objective world. In contrast to the 'facts' of nature, for instance, there were also human and cultural 'values.' And, for scientists who wanted to present themselves as objective observers by simply reporting the 'facts,' speaking of values became verboten. This is an issue in the Anthropocene, however, because it means that many of the scientific experts on climate change do not speak on what we *should do* with their findings (which would be a value judgement), leaving non-experts to fill in this role. In reality, this void has been filled by so-called 'experts' who are bankrolled by the fossil fuel industry to protect their interests and downplay the severity of climate change, as we will cover in the next chapter. And for the few

[174] Latour, *Facing Gaia*, 141.

actual experts that do try to speak of values and the right course of action, there are various pressures keeping them from spreading the message.

Let us cover some of these factors bolstering the standard of separating facts and values in scientific practice, drawing from the work of Oreskes and Conway. As they put it, these factors include: the complexity and communal nature of scientific work, lack of training and interest in spreading knowledge from the academic journals to the people, and the fear of being accused of 'politicizing' scientific matters.[175] First, scientific work is seldom the result of a single individual: even if one person had the initial idea, in order for an idea to be accepted, it has to be tested and retested multiple times by many different people. In their estimation, Oreskes and Conway think that "In the modern world, any scientific breakthrough is likely to be the result of the collective effort of several dozen, scores, or hundreds of researchers."[176] This means that someone who speaks about scientific ideas directly to the public is looked upon with suspicion by their fellow scientists, as they might be trying to steal the credit for themselves. Secondly, scientists, while highly trained in generating scientific knowledge, are not generally trained in how to disseminate this knowledge to the public. Oreskes and Conway explain that "They consider their 'real' work to be the production of knowledge, not its dissemination, and they often view these two activities as mutually exclusive," some scientists even going so far as to look down upon colleagues that try to 'popularize' the science.[177] While the first two of these reasons are 'internal' to the scientific community, so to speak, the third is an external pressure: scientists often do not want to be seen as taking sides on sensitive matters, because they do not

[175] Oreskes and Conway, *Merchants of Doubt*, 263-264.

[176] Oreskes and Conway, *Merchants of Doubt*, 263.

[177] Oreskes and Conway, *Merchants of Doubt*, 264.

want to have to fend off accusations of politicizing the science. But, at the same time, they are the ones best qualified to speak on the issue. Oreskes and Conway put it like this, "This places scientists in a double bind: the demands of objectivity suggest that they should keep aloof from contested issues, but if they don't get involved, no one will know what an objective view of the matter looks like."[178] The dangers go far beyond other scientists accusing them, though: the main thesis of Oreskes' and Conway's book is that those with a lot of money and with something to lose when the science does not go their way have repeatedly launched anti-science campaigns against scientists who promote ideas the rich and powerful do not like. We will cover this in a bit more depth in the next chapter, but for our purposes right now, it is important to understand that the fact/value division is alive and well in the scientific community and in the public's expectations of scientists today (we expect scientists to be 'objective,' which is why the charge of politicization holds any weight—it challenges their objectivity). Latour emphasizes why this is a problem when we are facing anthropogenic climate change.

Latour starts off his Second Lecture in *Facing Gaia* with a discussion of a newspaper article talking about us passing the "symbolic threshold" of 400ppm of CO_2 in the atmosphere.[179] Commenting on this, he adds, "when a newspaper article mentions lines about to be crossed, symbolic thresholds, and a principle warming agent, the reader can't help but suppose that this piece of news is intended as a *warning*."[180] But what has happened here? It seems as if the

[178] Oreskes and Conway, *Merchants of Doubt*, 264.

[179] Stéphane Foucart, "Le taux de CO2 dans l'air au plus haut depuis plus de 2,5 millions d'années" (Le Monde, May 7, 2013), https://www.lemonde.fr/planete/article/2013/05/06/le-taux-de-co2-dans-l-air-au-plus-haut-depuis-plus-de-2-5-millions-d-annees_3171507_3244.html, as quoted in Latour, *Facing Gaia*, 41.

[180] Latour, *Facing Gaia*, 42. Latour's italics.

journalist is simply reporting the facts. For another example, in 2023 the IPCC reported that we had reached 410ppm in 2019, which is higher than CO_2 concentrations have been in the past 2 million years.[181] What is it about a purely descriptive sentence like this last one that has us interpret it as a *warning*? As Latour explains, a sentence like this, when one understands what it means, contains within it a *moral prescription*. Even if the author meant only description, and included only descriptive words, the 'ought' is implied.

Latour illustrates this with an example involving some of those rich and powerful folks I mentioned above—in this case, those with stakes in fossil fuels. As he phrases it, "If there were general agreement that CO_2 and thus coal as well as gasoline, was the *cause* of climate change, the industrialists and the financiers have understood perfectly that the description of the facts could never again be kept apart from their moral implications. . .the public [would] hold them responsible."[182] In other words, fossil fuel companies and their stakeholders have long understood that, if the science got out that CO_2 was causing global warming, they would face political pressure and regulation that would hurt their business. There is something about a statement of this kind, in its proper context, then, which breaks down the fact/value distinction, and wherein a mere *description* of the facts leads obviously to a moral *prescription*.

Farley recognizes the fact/value distinction in Western culture as well. As she puts it, "Converting a conversation about ecology, nature, or responsibility into a normative one challenges the dominant values of neo-liberalism. Abstraction and ideology continue to shield thought from reality, history from ethics."[183] In other words, she recognizes the tension we are

[181] IPCC, *Synthesis Report Summary*, 10.

[182] Latour, *Facing Gaia*, 26.

[183] Farley, "Living With Denial," 264.

discussing: we tend to have a cultural expectation that describing a situation and prescribing action are two different roles and cannot be done by the same person at the same time. To reiterate from above, we expect our scientists, for instance, to tell us how *it is* not how *it should be*. But Farley's point about abstraction 'shielding' us from the real world is right on target.

As we discussed above, it is the role of science in the Anthropocene to reveal to us the many consequences of our actions. As Latour puts it, we need to 'sensitize' ourselves by tracing the many 'feedback loops' found on Earth that we are interacting with daily.[184] It is this kind of science—the grounded, situated kind—which fights against the tendency of scientific and mathematical abstraction, of thinking 'globally.' It is also this kind of science which puts us back in touch with *reality*. When we are able to see clearly what we are doing to the world with our culture of rampant consumption and carbon pollution, thanks to the many scientists and scientific instruments which reveal this to us, there is no more distinction between fact and value. Understanding the situation *means* understanding what must be done—in one way or another—to prevent the coming destruction and havoc that will be brought on by increasing concentrations of greenhouse gasses in our atmosphere. Chakrabarty says similarly, "the very science of global warming produces *of necessity* political imperatives."[185] Understanding the scale of the climate crisis, and the enormity of the coming tragedies, reveals a new *necessity* of action. We *must* act, lest the worst come to pass. Although there might be issues with the fact/value distinction even in daily life,[186] the very scale of the climate crisis cracks these issues wide open. Anthropogenic

[184] Latour, *Facing Gaia*, 139.

[185] Chakrabarty, "Four Theses," 211. My italics.

[186] See Latour, *Facing Gaia*, 47-48. Latour gives the example of a plausible everyday situation wherein you are about to sit down on the bus and someone tells you, "There's a baby on the

climate change is the biggest moral and political issue that modern humanity has yet faced, if for no other reason than that it literally affects *everyone on Earth* (though, it must be said, not everyone will be affected *equally*).[187] In this way, coming to understand the situation means coming to understand the horrible things that will come to pass if we do nothing—and thus it means coming to understand that we *must* do *something*. As Latour puts it, referring to the hockey-stick like graphs showing the rise of global temperature over the years, "The only originality in these *data* is that they concern us so directly that their mere expression sounds like an alarm to those who have to attend to them, a bit like the sound of instruments that track a patient's heartrate and breathing…"[188] The fact/value distinction clearly fails to describe our reaction to data like these, and this shows how it breaks down in the Anthropocene—that epoch of destruction that we have brought upon ourselves. Another of the *a prioris* of modernism thus falls in the face of Gaia.

2.3 Evaluating the Epoché so Far

So, what have we learned? As Latour and others have shown us, key assumptions of modernism break down in the climate crisis. Our cultural *epoché* has revealed to us many ways in which our modern, Western culture cannot handle the coming chaos, and cannot function in the Anthropocene. This much, then, is clear: we need to do much work on our culture if we hope

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seat." He argues that this, too, clearly comes with a moral imperative—'don't sit on the baby!'—although it is merely a descriptive sentence.

[187] It is a sad consequence of the coming climate catastrophe that those least responsible for carbon pollution—the global south, generally—will be hit hardest by the effects of climate change. See footnote 136 and the NPR article by Willem, for an example of this already happening.

[188] Latour, *Facing Gaia*, 47. Latour's italics.

to survive the coming calamity, and if we hope to prevent some of the damage (as preventing *all* of the damage is already out of the question). In this regard, one of Latour's lines sticks with me: contrasting the Western response to the Cold War to the Western response to the climate crisis, he wrote, "A *panic attack* in the first case, resulting in a general mobilization; in the second case, demobilization—and yet we are dealing with the great god Pan in person!"[189] Whereas the Cold War undeniably brought with it certain risks, these risks were *hypothetical*. The possibility of nuclear winter, for instance, would only be actualized if nuclear war ensued. But our situation today is much different. The question is no longer *if* chaos and destruction will come—this much is certain, or as close to certain as can be expected of scientific knowledge—but *if* we will actually act in time to make a difference. Whereas great sectors of the American government were put into action in the face of nuclear war, we, again, seem to be just idling, sitting on our hands, and waiting for Pan to descend upon us when looking into the face of Gaia.

I hope, though, that this chapter has been able to make some the reasons behind this inaction at least bit more clear. The problem, again, is not primarily one of distrust in scientific practice, or a lack of faith in scientists themselves—although these certainly play a role, as we will discuss in the next chapter—but a resistance to the reality of the climate crisis that stems from the very assumptions of our modernist, Western culture. Put simply, the Anthropocene is hard to swallow—it disagrees with much of what our culture has taught us to expect from the world—stability, controllability, infinite horizons of opportunity and growth, and so on. To quote Farley again, we are faced with "the strange phenomenon that massive, large-scale illusions shred human minds, making access to reality difficult. We are deluded about our situation and we are deeply, passionately attached to our delusions," wherein "our attitude towards the natural

[189] Latour, *Facing Gaia*, 46.

world is [such a] comprehensive illusion, write large in society and around the globe."[190] Our assumptions about the ways that the world works are an abstraction from reality—an illusion, in Farley's words. In addition, the fact that these assumptions are breaking down goes to show that we did not heed Husserl's warning, and that we have come to *identify the garb of ideas with the life-world*, and with reality as such.[191] In doing so, moreover, we have lost part of our connection to reality. We have severed the chain of steps that allows reference to circulate from our ideas of the world back to the world itself by forgetting that the real world was there at all. In our hubris, we have seen the garb of ideas, that garment that our modern ancestors created, and forgotten that it was covering up anything at all—we have lost the world that this garb was created to fit.

This, then, is the Crisis of the Geosciences: how can geoscientists communicate the urgency of their findings, and translate these findings into action, when they are working against the very *fabric* of the modernist culture they are working in? The crisis which Husserl identified in the 1900s has grown, changed, and solidified—it has not gone away or been solved. We are still left asking, where do we turn when culture itself is ill, where is the cure for a sick culture?[192] To quote Latour, "the question is no longer—and hasn't been for a long time—a question of knowledge."[193] In truth, the Crisis of the Geosciences is not one of knowledge—for the science has been settled for decades.[194] The Crisis, as Husserl identified, is one of *culture*—specifically

[190] Farley, "Living With Denial," 257 & 256, respectively.

[191] Husserl, *Crisis*, 49.

[192] Husserl, *Crisis*, 270.

[193] Latour, *Facing Gaia*, 28 footnote 49.

[194] Naomi Oreskes, "The Scientific Consensus on Climate Change" (*Science* 306, no. 5702: 2004), 1686.

our modernist culture, and the many ways it fails to properly conceptualize and interact with the world. For these reasons, we should heed the words of Latour and learn from the lesson of the Anthropocene. "What makes the Anthropocene an excellent marker," he writes, "is that the name of this geohistorical period may become the most pertinent philosophical, religious, anthropological, and—as we shall soon see—political concept for beginning to turn away for good from the notions of 'Modern' and 'modernity.'"[195]

We have seen, thus far, how the Anthropocene touches philosophy, religion, and anthropology, but we have not yet covered the political implications, except in passing. This will be necessary if we are to get a complete diagnosis of the ills of our culture, and if we will have any hope of finding a cure that will take us away from modernity. For these reasons, we will turn, in the next chapter, to a more complete treatment of those rich and powerful folks with a stake in the fossil fuel industry—the "Merchants of Doubt" as Oreskes and Conway have named them—and to a more complete discussion of the ways in which their actions overlap with our concerns here while bringing in contemporary politics. Along the way, we will also cover Latour's notion of what it means to bring nonhumans into the political fold. Our goal in the next chapter will be to finish fleshing out our cultural *epoché* and the diagnosis of our cultural ills. Only then will we fully understand what needs curing.

[195] Latour, *Facing Gaia*, 116.

Chapter Three: Finishing the Diagnosis, Oreskes and Conway on the Merchants of Doubt, and Some Thoughts Towards a Cure

3.1 The A Prioris *in Everyday Life and Some Methodological Notes*

Perhaps another useful way to explain the Crisis of the Geosciences is by allegory. The 2021 movie, *Don't Look Up,* has done just this, in many ways. An allegory for climate change itself,[196] it follows the story of a PhD candidate Kate Dibiasky and a professor of astronomy Dr. Mindy who begin the movie working in an astronomy lab at Michigan State University.[197] They discover that a "planet killer"[198] comet is hurtling towards Earth, due for impact in about six months, and the rest of the dark comedy follows their attempts to tell the government and the public to take action, with all of the chaos that ensues. This movie expresses the nature of the Crisis of the Geosciences in two key ways. First, it illustrates the *a prioris* we have been covering in action, and second, it shows how these *a prioris* are not merely an academic concern, but can affect our everyday lives.

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[196] Breaking Points, "DON'T LOOK UP PRODUCER: Inside the Movie," created by Krystal Ball and Saagar Enjeti (2021; YouTube), digital streaming.

[197] *Don't Look Up*, directed by Adam McKay (2021; Fall River, MA: Netflix, 2021), digital streaming.

[198] This means that the comet is big enough to cause a mass extinction event, disrupting life as we know it. In the movie, the comet would cause an even bigger destructive event than the one which wiped out the dinosaurs.

First, *Don't Look Up* illustrates the subject/object distinction through its cognate—the fact/value divide—in covering how trained scientists are often unable to effectively communicate their findings to the public in a way that spurs action: Dr. Mindy is told, for instance, that he needs 'media training.' And even when he goes on a talk show with national coverage, people dismiss his comments when he begins to talk seriously about the situation, showing some of the outside pressure that is put on scientists who try to suggest courses of action based on the data.[199] Second, it illustrates abstraction from nature, in showing how media coverage is often more concerned with the lives of celebrities than scientific findings spelling the doom of life on Earth. The constant mentions of the breakup and reunion of the pop stars Riley Bina and DJ Chello are the key example here: how could we be worried about the love lives of celebrities when our very lives are being threatened and no one seems to be doing anything meaningful about it? Because our sense of reality is skewed and fundamentally *abstracted* from the actual nature of the world. The drive to master nature is illustrated when BASH Cellular causes the president to abort a mission to deflect the comet because it has trillions of dollars of precious minerals on it. Peter Isherwell, the billionaire CEO of BASH, is confident that he can extract wealth from the comet, even though scientists around him advise against his dangerous plan. Lastly, the effects of the notion of infinity on our society are shown in how the rich and powerful people who bumble about trying to 'save' the planet from the comet have a backup plan in place: spaceships to take them somewhere else, far away from the limits of Earth.

[199] *Don't Look Up,* directed by Adam McKay. One way that the allegory of a comet fails to fully map onto our current climate crisis, however, is that it might distract from the fact that our direct mistreatment of nonhumans (using the term in the Latourian sense) is what has gotten us into this mess. Thus, there are depths of the subject/object divide that are not illustrated in the film.

While it is an allegory, and an exaggeration, it successfully captured the feelings of many climate scientists and activists because it illustrated some of the real struggles these scientists and activists have been going through, telling a tale of the seeming indifference of our societal structures to a coming apocalypse.[200] Thus, *Don't Look Up* is especially helpful for us here in that it reveals the many ways that the *a prioris* we have been focusing on manifest in our daily lives. In this thesis, I have been attempting to display and analyze a very real problem in our culture, and one that is not limited to the ivory tower of academia. When Kate Dibiasky goes home to her parents' house and is told to keep politics out of the house, because her parents "are for the jobs the comet will provide," the frustration we might feel on Kate's behalf is the very same frustration that climate activists have been feeling for decades, meeting resistance not just from politicians and wealthy oil barons, but from the populace of America itself.[201] Although we do not have such a short and stark deadline as in the movie, a mass extinction event like the one the comet would cause is already underway,[202] and the longer we wait, the worse it will get for us and for life on Earth as we know it. The movie was meant as a stirring critique of how our institutions fail to listen to science, and shows the Crisis of the Geosciences in action.

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[200] Donna Lu, "'It parodies our inaction': Don't Look Up, an allegory of the climate crisis, lauded by activists" (The Guardian, Dec. 29, 2021), https://www.theguardian.com/environment/2021/dec/30/it-parodies-our-inaction-dont-look-up-an-allegory-of-the-climate-crisis-lauded-by-activists.

[201] *Don't Look Up,* directed by Adam McKay. This scene is an obvious reference to "the jobs that fossil fuels provide," and how what would from the outside seem to be an apolitical issue—fossil fuels are destroying the Earth's capacity to support human and nonhuman life as we know it—has become thoroughly political and a point of contention in our culture.

[202] Robert H. Cowie, Philippe Bouchet, and Benoît Fontaine, "The Sixth Mass Extinction: Fact, Fiction or Speculation?" (*Biological Reviews* 97 no. 2: 2022), 656.

But there is one important area that *Don't Look Up* only begins to scrape the surface of: the role of politics in *feeding* climate skepticism. Although the movie traces the actions (and inactions) of a conservative president and her party in the face of the coming comet, and so covers political factors in a direct way, it fails to plumb the depths of the issue to show just *how entangled* politics have become in climate science. For this, we will turn to Oreskes and Conway, drawing from their landmark book *Merchants of Doubt*. This will help us to complete our diagnosis of what has gone wrong with our culture, and to begin theorizing a cure, which will take place in the last section of this chapter.

Before we begin, however, a methodological note is in order. Although *Merchants of Doubt* is not itself a philosophical work, it will help reveal many of the intricacies involved in the political aspects of the Crisis and enable us to approach them from a philosophical angle. Moreover, in the spirit of Latour's practice of science studies, *Merchants of Doubt* offers much useful information about the everyday practices and tendencies of scientists working on climate change, which will be very valuable to us here. As before, I will work to draw our cultural *a prioris* out of Oreskes' and Conway's work, here, so as to illustrate some more ways that they manifest in our culture. As we will see, the fact/value divide will be the *a priori* most strongly represented in their work, insofar as fossil fuel industries have toiled to reinforce this divide in the professional standards of scientific practice. Additionally, there is one key philosophical point that Oreskes and Conway offer which has not been given a clear statement by the other thinkers we have examined thus far: the birth of a *new cultural a priori* in the era surrounding the Cold War. Towards the end of their book, Oreskes and Conway analyze how the key motivation behind the actions of the merchants of doubt seems to be a fear of regulation and communism, and they show how this manifests in their many actions to delay and sabotage governmental

policies which would regulate industry. This fear of regulation/communism, as we will see, becomes embedded in the ideology of the political right and becomes identified with environmentalist movements, creating a ground for ideological resistance against efforts that would help to address the climate crisis. Husserl, for his part, lived too early to experience this new *a priori* in action. And, while it is not unlikely that Latour thought about the connection between a fear of communism and the anti-science attacks of the fossil fuel industry, there is no explicit statement of this connection in the body of his work we are referencing. Any diagnosis of the ills of our culture vis-à-vis the climate crisis would be incomplete without a thorough explanation of the roles of money and politics in exacerbating the issue. Thus, although it is for the most part not directly philosophical, *Merchants of Doubt* will be an invaluable resource to us as we seek to study climate science and to complete the diagnosis of our sick culture.

3.2 How Politics Plays a Role in Climate Skepticism

3.2.1 **Money against Science**

The story that Oreskes and Conway tell is one of money impeding science, and big corporations intentionally deceiving the public to protect their profit margins. This practice has become so embedded in industry culture that there is actually a playbook filled with strategies for casting doubt on scientific discoveries, published by the tobacco industry: *Bad Science: A Resource Book*.[203] I mention the tobacco industry because this is the beginning of Oreskes' and Conway's story. They chronicle how rich and powerful industries have fought the science on issues from the carcinogenic effects of smoking, to the Strategic Defense Initiative in the Cold

[203] Naomi Oreskes and Erik M. Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Climate Change* (2010;, reis., New York: Bloomsbury Publishing, 2019), 144.

War, to the issues of acid rain, the ozone hole, and finally, global warming. While initially, the tactics of these industries mostly involved funding studies to distract the public, they slowly got harsher and bolder, until industry-funded skeptics began doubting science itself, and even simply lying in order to sell doubt to the American public.[204]

Any claims of ignorance on the part of these industries are untenable. Oreskes and Conway meticulously catalogue the many ways in which these industries have sought to deceive the American people,[205] dispelling any questions of intention or simple unknowing. In the words of Richard Floyd, describing a report which Exxon Mobil released in 2014, "Exxon acknowledges both the reality of climate change and the political pressures it brings to bear, and then discounts them, saying it is 'highly unlikely' that government regulations will hinder the full exploitation of their carbon reserves."[206] This statement shows the influence of an economic mindset built on *infinite* growth, as well as revealing the subject/object divide at play in the complete disregard for the nonhumans which would be harmed in the process. Further, the most obvious reason that Exxon Mobil doubted that government regulation would hurt their business was because they had been actively working against government regulation of fossil fuels for decades.

The industry strategies which Oreskes and Conway cite go beyond merely attacking scientific results, however; they also involve attacking the *scientists themselves* in what

[204] For an example of the outright lies that the fossil fuel industry spread, see Oreskes and Conway, *Merchants of Doubt*, 206.

[205] This resulted in 72 pages of endnotes in the back of *Merchants of Doubt*.

[206] As quoted in Wendy Farley, "Truth, Beauty, and Climate Change: A Dialogue with Continental Philosophy about Living with Denial," (*Environmental Philosophy* 12, no. 2: 2015), 263.

manifests as an effort to reinforce the fact/value divide in the professional standards of science. As the authors show, the fossil fuel industry launched anti-science campaigns whenever the science might have suggested a need for *regulation*, or some action which would hurt industry. As they put it, "Throughout our story, the people involved demanded the right to be heard, insisting that we—the public—had the right to hear both sides and that the media had an obligation to present it. . . [But t]he issue was not free speech. It was the appropriate role of government in monitoring the marketplace. It was *regulation*."[207] We will come back to the skewed role of the media here, but it is important to note the lengths that the fossil fuel and other industries have gone to in order to prevent regulation from impacting their profits, and to reify the cultural expectation that scientists speak about *facts*, and that *facts* do not in themselves reveal *values*. When casting doubt on the science was not enough, these industries began to *directly* enforce the fact/value divide through attacks on scientists.

One of the key examples of scientists being attacked that Oreskes and Conway present is that of Ben Santer, a climate scientist who worked on a chapter in a 1995 IPCC report. After the release of this report, Santer was falsely accused of 'doctoring' the report to make the science seem more sound. In reality, he was simply following the scientific peer review process, and making the edits his peers had suggested.[208] The true reasons why Santer was attacked are twofold: he was the lead author of an IPCC chapter (and thus an obvious target), and this chapter presented the scientific evidence that linked greenhouse gas emissions to global warming. The fossil fuel industry took this as a threat—a threat of *regulation* if the government took the science seriously—and thus tried to discredit the main author of this chapter. In other words, the

[207] Oreskes and Conway, *Merchants of Doubt*, 248.

[208] Oreskes and Conway, *Merchants of Doubt*, 3-4.

fossil fuel industry was exerting external pressure to enforce the fact/value distinction because they recognized that the science, if taken seriously, spoke for itself—and that Santer was the easiest to blame for this transgression. Regulation, as a normative or value laden action, would be the natural consequence of listening to the science, and so the industry turned to attacking multiple factors of the situation: the facts themselves *and* the people who were responsible for disseminating them.

This is only one example of an industry standard practice, however, and you do not have to do much to get the attention of the merchants of doubt. In an endnote to the postscript of the book, Oreskes recounts how she, herself, began receiving hate mail and menacing phone calls after publishing an article discussing how there was a scientific consensus on the anthropogenic causes climate change.[209] Even just suggesting that the debate is settled is enough to provoke the ire of the fossil fuel industry, because if the science is settled, then the course of action is clear: "Reduce greenhouse gas concentrations in the atmosphere!"[210]

Here is where the media comes in. Since the fossil fuel industry, as well as other industries which Oreskes and Conway write about, have a lot of money at their disposal, they

[209] See Oreskes and Conway, *Merchants of Doubt*, 358 for the note. It was this experience which inspired Oreskes and Conway to write *Merchants of Doubt*, as they began discovering more and more links between the attacks on Oreskes herself and other attacks on scientists in the past—including the fact that many of the people doing the attacking were the *same people* in many instances.

[210] It is important to note that the implied 'ought' of climate science is not specific. The science makes it clear that *something* needs to be done, but not precisely what needs to be done. The projects most likely to result in success, though, seem to be those that involve reducing the amount of greenhouse gasses in the atmosphere—especially CO_2. Geoengineering—or, broadly, using technology to change the climate—will likely play a role if we are to be successful, but reliance on geoengineering alone is risky, as no existent technology can save us on its own. See Bruno Latour, *Facing Gaia* (Cambridge: Polity Press, 2017), 192 for a discussion of geoengineering.

have been able to payroll prominent scientists in high positions—such as the late William Nierenberg and Fredrick Seitz, who are repeat characters in the history of selling doubt.[211] In turn, this means that they have better access to the media, and more newspapers and journals read by the public will interview their spokespersons (since these spokespersons' names are more well known). But, on top of this, the fossil fuel industry (and others) have leveraged the idea of 'balanced coverage' in the media to create the *illusion* of scientific debate about key issues such as anthropogenic climate change.[212] While this point obviously speaks to a level of scientific illiteracy in the American public, one of the reasons that this strategy worked is because Americans tend to have an understanding of the world which is heavily *abstracted* from the way the world actually works. It is much easier to believe some bit of information in the news when it aligns with your existing worldview, and harder to believe it if it challenges some of your key assumptions about the world—such as a belief in a stable nature or that there cannot be any new cataclysms, since the time for Apocalypse has passed.[213] In this way, the mainstream media became *biased towards* positions like climate skepticism, because although these positions held little scientific merit, the media were coerced into giving them attention anyway (and they more closely aligned with public assumptions about the ways the world worked). As Oreskes and

[211] Other repeat characters were Robert Jastrow, and Frederick Singer. See Oreskes and Conway, *Merchants of Doubt*, 248.

[212] See Oreskes and Conway, *Merchants of Doubt*, 18-19 for a discussion of how industries did this in the case of seeding doubt about the dangers of tobacco smoke, and 214-15 for a discussion of the same as regards climate change.

[213] See Chapter 2, section 2.2.2 for the discussion on the post-apocalyptic mindset which moderns tend to have.

Conway put it, "'Balance' had become a form of bias, whereby the media coverage was biased in favor of minority—in some cases extreme minority—views."[214]

In this way, the merchants of doubt learned to use the resources at their disposal to skew the public—and political—perception on key issues like climate change, *even when the science disagreed with them*. It is a repeated story in Oreskes' and Conway's book that, while the scientists and scientific journals knew that what these industries were publishing and pushing to the masses was incorrect or misleading, they did not have a good way to get the message out to the public.[215] In some cases, when scientists tried to get their own perspective out to the public, in the spirit of 'balanced coverage,' the same journals and newspapers which published the industry articles refused to publish those from the scientists, [216] illustrating yet another external pressure reinforcing the fact/value distinction, and one which became standardized in the journalistic institution. Although it has gotten better in more recent years, it is important not to understate the effects that this biased media coverage has had on the image of the climate crisis in the general public and the force it has given the fact/value divide.

One of these effects on the public has been a growing skepticism toward science on the political right. As briefly mentioned in the last chapter, it is not correct to say that there is a 'crisis of trust in science in America,' but it is correct to say that 'there is a crisis in conservative

[214] Oreskes and Conway, *Merchants of Doubt*, 243.

[215] Oreskes and Conway, *Merchants of Doubt*, 101.

[216] See Oreskes and Conway, *Merchants of Doubt*, 212 for mention of many letters from scientists, that the *Wall Street Journal* refused to publish, which were trying to set the record straight about Santer's IPCC chapter; see also 208 for a discussion of how Santer himself sent a letter to the *Journal* which they initially refused to publish, and only gave in after the third attempt, and only with heavy edits.

trust in science in America.'[217] The merchants have succeeded, then, in turning the political right against science, and in making them doubt the legitimacy of scientific findings. In a 2020 poll that Oreskes and Conway cite, for instance, it was found that only 31% of Republicans thought that climate change would harm the well-being of the United States, compared to 88% of Democrats.[218] Clearly, the fact that a huge portion of the American public distrusts science is a problem for geoscientists who want to help us avoid climate disaster. But the issue is that it is the opposite of a problem for the *fossil fuel industry*, which now has a loyal voting base that will continue to vote for the "jobs that fossil fuels provide"—voters who believe in the myth that transitioning to renewables will necessarily mean fewer jobs, a myth the economic successes of California have proven wrong in the state's recent large-scale transition to renewable energy.[219] Ultimately, this reflects how the merchants of doubt have succeeded in politicizing a scientific issue by exerting external pressure to reinforce the professional scientific standard separating facts from values, and in (knowingly or not) exploiting the worldviews of the American public, which as we covered in the last chapter are largely out-of-touch and abstracted from the way the world actually works. Ironically, however, the situation today has developed into yet another counterexample to the fact/value distinction in general: statements about the scientific reality of anthropogenic climate change are interpreted as attacks against working class jobs, instead of merely descriptive statements. Of course, this trend is a good thing if you are a fossil fuel baron.

[217] Naomi Oreskes and Erik M. Conway, "From Anti-Government to Anti-Science: Why Conservatives Have Turned Against Science" (*Daedalus* 151, no. 4: 2022), 3.

[218] Oreskes and Conway, "From Anti-Government to Anti-Science," 3.

[219] Oreskes and Conway, *Merchants of Doubt*, 281-283.

3.1.2 A New Cultural *A Priori* Born of the Cold War

After learning all of this information, I found myself asking "why would these industries do this?" As Oreskes and Conway have told us, the issue is an ideological resistance to regulation.[220] One key fact that appeared repeatedly in their research for *Merchants* related to the scientific credentials of folks like Nierenberg and Seitz, the preferred spokespeople for industries seeking to seed doubt in science—and there was a clear pattern. These mercenaries for the merchants of doubt were all men born of the Cold War and all physicists: both Seitz and Nierenberg, for instance, worked on atomic weapons during this time, and their work helped to catapult their careers into government.[221] Being of the Cold War, these men shared the Cold War, anti-Red mentality. Behind their calls for free-markets free of regulation was a strong *fear of socialism/communism*.[222] These men thus happily offered their services to industries seeking to curb regulation, and to stall or discredit the science which would lead to it, because in their minds, regulation was the first step towards communism, and communism was, in true Cold War spirit, the enemy.[223]

From a Husserlian standpoint, this pattern shows us the birth of a *new cultural a priori*: a fear of, or ideological resistance to, communism and things associated with it—or as Oreskes and

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[220] Oreskes and Conway, *Merchants of Doubt*, 248.

[221] Oreskes and Conway, *Merchants of Doubt*, 248. This is likely also due to the fact that the general perception of physicists changed in the Cold War period. Rather than "useless" academics, physicists were revealed to be specialists of global importance, capable of bringing terrible destruction upon the world. This newfound stature is perhaps best illustrated in the figure of Robert J. Oppenheimer, so-called 'father of the atomic bomb.'

[222] Oreskes and Conway, *Merchants of Doubt*, 248-249.

[223] See Oreskes and Conway, *Merchants of Doubt*, 249 for telling quotes from Fred Singer, one of the Cold War scientists that industries relied heavily on in their attacks on science.

Conway name it, "free market fundamentalism."[224] Whereas Husserl's and Latour's work do not show us this connection, Oreskes and Conway illustrate how this ideology, or cultural assumption, has become embedded in conservative parts of the American psyche and shows no signs of leaving. Oreskes and Conway relate how this assumption has been resistant to evidence, and so is not a mere belief or economic theory—it is taken for granted as a *fact* in certain populations of the United States.[225] This is an important point to note if we are to fully understand our lack of action in the face of the climate crisis: since the United States is a politically polarized country, we must come to grips with how this political polarization has affected our cultural response to and acceptance of climate science. And, as the record shows, it has played a huge role—so much so that this fear of communism has been a driving force in misinforming the American public and delaying climate action.

Moreover, although the political right, and especially conservative industry, has repeatedly claimed that scientists and the political left have 'doctored' the evidence or simply conducted sloppy science, Oreskes and Conway show us how the opposite is true: "if anyone was meddling in the scientific assessment and peer review process, it was the political right wing, not the left."[226] This becomes especially relevant for our purposes here when you take into account that this fear of communism/regulation has been identified with environmentalism, and thus with movements trying to bring attention to the climate crisis. As Oreskes and Conway tell us, "With the collapse of the Soviet Union, Cold Warriors looked for another great threat. They

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[224] Oreskes and Conway, *Merchants of Doubt*, 249.

[225] See Oreskes and Conway, *Merchants of Doubt*, 249. I do not doubt that this *a priori* applies to other cultures who have embraced free-market capitalism, but discussing this in depth is beyond the scope of my project.

[226] Oreskes and Conway, *Merchants of Doubt*, 211.

found it in environmentalism…"[227] Part of the reason why there has been so much resistance from the American right on environmental issues, then, is because these Cold Warriors have made this identification between environmentalism and communism—and it caught on in conservative circles. Now, conservatives have frequently associated these two movements, calling environmentalists a "green tree with red roots,"[228] or evoking the image of a watermelon, "green on the outside, red on the inside."[229] What might have been a politically benign position, then—that rampant use of fossil fuels is bad for life on Earth as we know it—has become thoroughly polarized along left/right party lines.

None of this would have been possible, however, without the other key assumptions we have been tracing in this project. First, the fact/value distinction helps to silence the scientists who would speak out against the actions and beliefs of the fossil fuel industry. Second, the American public would have been more resistant to the lies and ideologies of these rich and powerful industries if they were more in touch with the ways that the natural world actually worked, reflecting the effects not only of abstraction from nature in American worldviews, but a lack of care for the nonhumans affected by our actions and thus also the role of the subject/object distinction broadly. Third, the actions of these industries falls perfectly in line with a belief in our *unlimited mastery over nature*: not only is the world simply there for us to conquer, but why should we suppose that there are any arbitrary limits to our extraction and consumption? And, why should we believe that this behavior will have any undue consequences when the only real

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[227] Oreskes and Conway, *Merchants of Doubt*, 253.

[228] See Oreskes and Conway, *Merchants of Doubt*, 252, where they present this quote from right-wing propagandist George Will. See, in general, 251-255 for a detailed account of this identification of environmentalism with communism.

[229] Oreskes and Conway, *Merchants of Doubt*, 248.

agents involved are the humans doing the consuming? Again, it becomes clearer how all of these *a prioris* tangle up with each other to create the Crisis we find ourselves in today, a true Crisis of the Geosciences, where the government and public of America do not listen to the scientists. Even those that do nonetheless often do not realize the enormity of the problem we are facing, one which is growing every day.

Another thing we can gather from all of this is that the fossil fuel industry and these Cold Warriors value profit over truth, market freedom over safety, and personal interest over the health of the biosphere. Again, *Don't Look Up*'s portrayal of BASH Cellular is uncanny in its parallels with reality: aborting a mission to deflect the comet so that industry can profit from it crashing into the Earth.[230]

In contrast to these industries, however, the culpability of the American public is less clear. As we will get into later in this chapter, science education today has some serious pitfalls, and it is likely not fair to expect the average American to have a sufficient understanding of the scientific process to know who to trust, especially when rich and powerful industries have a history of using people with seemingly good scientific credentials to *intentionally misinform* the public. This problem is only compounded by the fact that scientists themselves could benefit from the so-called "media training" prescribed to Dr. Mindy. Scientists are the most qualified to speak of scientific issues, and yet they are often unprepared to communicate these issues effectively to the public. But this is not all the scientists' fault either. As Oreskes puts it, "Science is not simple, and neither is the natural world; therein lies the challenge of science

[230] *Don't Look Up,* directed by Adam McKay.

communication. What we do is both hard and, often, hard to explain."[231] This is yet another side of the Crisis of the Geosciences then, showing more reasons why we have not reacted as we should to climate science, and the many challenges climate scientists have faced in trying to show their work as legitimate and important. In addition to all of the cultural *a prioris* covered in the last chapter, then, we must also account for the role of this new cultural *a priori*—the fear of communism—and its many effects on the American political right. Only then can our diagnosis of our cultural ills be complete.

3.3 A (Very) Brief Prognosis, and Some Thoughts Towards a Cure

Now we have a better understanding of the nature of our cultural ills here in America—something like a diagnosis of our culture's illness. As it turns out, the *prognosis* is rather clear, and not hard to identify. If we do nothing, our symptoms will include but are not limited to: ecosystem damage and collapse, food and water insecurity, deadly heatwaves, increased spread of disease, decreases in mental health, more extreme weather events, and flooding of coastal areas and cities.[232] Moreover, these issues will only get worse the longer we delay, and the effects will be worse on indigenous people and those in rural areas, who rely more directly on healthy ecosystems for their livelihoods.[233] Some of these symptoms are already out of our hands: the IPCC *Summary for Policymakers* states that "Sea level rise is unavoidable for

[231] Naomi Oreskes, "Science Communication and Scientific Judgment : COVID-19 and Public Policy in Our Era of Vexed Politics" (*Horizons: Journal of International Relations and Sustainable Development*, no. 20: January 2022), 116.

[232] IPCC, *Climate Change 2023 Synthesis Report: Summary for Policymakers* (IPCC, 2023), 11, 12, & 21.

[233] IPCC, *Summary for Policymakers*, 21.

centuries to millennia," for instance, due to feedback loops that we have started, but which we are powerless to stop.[234] On paper, though these effects already sound bad, it is hard to convey the extent of the chaos that they will cause in conjunction with each other. Taken all together, these effects of the climate crisis will inevitably change life as we know it. Climate science today thus offers us a sort of 'natural eschatology,' wherein the end of our culture and way of life is being spelled out for us in scientific clarity. We must not mistake this for the end of the Earth, however. The Earth, as a planet, will likely be fine for billions of years. But, unless decisive action is taken to prevent the worst of climate change, *we*, as well as much of the life on Earth that we have grown so familiar with, might not be. As Chakrabarty puts it, "ultimately, what the warming of the planet threatens is not the geological planet itself but the very conditions, both biological and geological, on which the survival of human life as developed in the Holocene period depends."[235]

Clearly, then, we need to rethink our culture to address some of these issues which we have identified. And here, our analysis centering around the cultural *a prioris* will be very helpful to us. Our focus on the *a prioris* thus far helps to make it clear what kinds of things in our modernist culture need to be changed. Namely, our issues with abstracting from the real world in our ideas of it, not realizing our own limits, projecting an image of submission and inertness upon the natural world in contrast to the agency of humans, enforcing a professional standard which prevents our scientists from speaking about what should be done, and thinking that the whole of the natural world is there for us to master and is fundamentally masterable.

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[234] IPCC, *Summary for Policymakers*, 24.

[235] Dipesh Chakrabarty, "The Climate of History: Four Theses," (*Critical Inquiry* 35, no. 2: 2009), 213.

Furthermore, these older assumptions enabled a new one to spread through our political system so as to hinder and cripple action on climate: the fear of regulation (as the road to communism). These are issues that need to be changed if we are to successfully address the Crisis we find ourselves in. More than this, however, our analysis thus far also gives us insight into *how* or *in what ways* these things need to be changed, and it is my task in this section to outline these insights. In general, since we can trace all of these *a prioris* (except for the new one, fear of regulation) to the birth of modern science as we know it—since it is at this point that they began to become embedded in our culture—it stands to reason that improving science education, and thus our understanding of science and how it is practiced, would begin to eliminate some of these assumptions. Since these *a prioris* stem from a modernist scientific understanding of the world and are deeply entangled with the nature of science, replacing this modernist understanding with a more accurate one should begin to undermine them. For instance, in order to address our cultural practice of pressuring scientific experts to not speak out when it comes to what *should* be done, we need to change the way we think about science in such a way that we no longer hold this expectation—something which can be accomplished through better and more realistic science education that focuses on the role of values in the practice of science. In this way, our method thus far lends itself to revealing some concrete and practical solutions to some of these cultural assumptions and their effects.

It needs mentioning that not all of our problems are easy to address, however, as some of our modernist cultural assumptions seem to manifest in subtle ways (such as the influence of infinity on our institutions and imaginations). Nonetheless, even for these problems which do not have an easily seen concrete solution, the value of our philosophical framework in this project is that it helps us to *direct our attention towards the right things*, such that we are not blindly trying

to figure out what needs fixing. In this way, we can focus our future efforts directly at the problematic assumptions which plague us and hit the root causes, so to speak, of many of the issues we find in our culture's response to the climate crisis.

In summary, then, our method of cultural analysis vis-à-vis the cultural *a prioris* clearly shows us issues in our culture that *need fixing* if we are to properly respond to the Crisis of the Geosciences, reveals a method to address them (more realistic science education) as well as some concrete ways to apply this method, and gives us targets to direct our attention towards when developing solutions for the assumptions that the method does not offer concrete solutions for. In this section, I will outline the concrete solutions suggested by our focus on these key cultural assumptions. A common theme throughout all of them, again, will be a better understanding of science as it is actually practiced, rather than modernist assumptions of how it *should* be practiced. As mentioned before, without practicing geoscientists, we would be largely blind about the causes and effects of climate change, and so we need citizens who understand the scientific institution if we hope to effectively address our Crisis.

What does our method suggest, then? There are three key ways I believe we can correct our understanding of science so as to begin to address and eliminate our problematic cultural *a prioris*. First, from a political perspective, we need to correct our understanding of science as an apolitical practice, since there are many senses in which it is, in fact, political. The key question here is "In what ways is science political?" Without unrealistic expectations about the need for scientists to always be objective and apolitical, it should be easier to get people to listen to them when they speak about what should be done, and thus address one side of the fact/value distinction: the prohibition of values from those who are supposed to speak only facts. Second, from an epistemological perspective, true *objectivity* in the epistemological sense is not possible

for scientific knowledge, so we should embrace some of the subjective aspects of science and scientists. The key question here is "What is it about scientific knowledge that gives us reason to believe in it?" This, in turn, will help to undermine the other side of the fact/value distinction: the status of scientific 'facts' as immutably true. In turn, this will help to begin unravelling our tendencies to abstract from, to objectify, and try to master nature: the better we understand what science reveals about nature and its nonhumans, and the better we understand *why we should believe* in scientific knowledge about the world, the more we should come to understand that these are mistaken assumptions, as we discussed in chapter two. Thirdly—and building on the last point—from an epistemological/ontological perspective (relating to the interplay of scientific knowledge and our ideas of the outside world), science fundamentally does not offer an 'objective' picture of the outside world or the things in it, although it is frequently taken as doing just this. Our key question here is "What does science tell us about the world and the entities which inhabit it?" Addressing this point will help to undo some of our abstraction from the life-world so that we are more in touch with the actual world we live in.

All of these three avenues together—in addition to helping with the tendency towards mastery, abstraction, the fact/value distinction, and projecting a subject/object divide—might help to address the fear of regulation in conservative circles by hopefully increasing scientific literacy and trust in science in the political right (though it is hard to say how much of this would actually come to pass). Still, many of these issues will only be partially addressed by the suggestions above. Although these *a prioris* come out of science in the birth of modernity, they certainly affect more than just science today. This leads me to the fourth topic I will cover: I will comment a little on some of the more deeply rooted cultural issues which we face in the United States. Our key question here will be "How can we change the fabric of modernity itself?"

Although no clear answer comes to mind, I will mention one way in which the Anthropocene itself might help us with a widespread cultural *epoché*.

3.3.1 In What Ways is Science Political?

One course of action that will be useful in addressing the Crisis of the Geosciences will be to reconceptualize our understanding of the role of politics in science. Although the institution of science has strived to present itself as objective and value neutral for years, this project has inevitably failed for a few reasons. First, in a more recent turn of events, the merchants of doubt have ensured that any scientific topic which threatens to cut into their profits has become a political battleground: second-hand smoke, acid rain, the ozone hole, and global warming are all examples of this, although sometimes their efforts are less successful than other times. Thanks to the merchants, the climate crisis, for instance, is a hotly contested political debate, and no matter how loud we scream that 'the science is sound!,' we will be met with political and ideological resistance. Second, and in a much deeper sense, politics is in the very nature of scientific practice in two key ways: a) in its efforts to get funding and support, and b) in its interactions with the nonhumans of the world. These are more fundamental and older points, involving the practice of science itself. Certainly today, and likely since the beginning of modern science as we know it, scientists have a) needed resources and support from other humans in order to carry out their experiments and b) needed to interact and cooperate with the nonhumans of the world in order to get results. Since we have already covered the ways that the merchants of doubt have politicized science, let us now turn to an examination of the ways that science is fundamentally political in this other sense, in both of its permutations.

To start with point a), science often has to be deeply embroiled in political matters among humans if it wants the funding and support it needs to remain an institution. Latour's studies of scientists and scientific practice show us just this. As he characterizes it, "Science studies could be defined as the project whose aim is to do away with this division [between science and politics] altogether."[236] This is because what Latour found in his many years following scientists and examining their practices is that science and politics often become deeply entangled, such that an *a priori* division between the two simply does not make sense. To illustrate this, he gives the example of Frédéric Joliot, a French physicist who was working on nuclear fission during World War II. While some might characterize Joliot's work as primarily involving nonhumans—the neutrons he was trying to fissure, for example—it is equally true that his work involved negotiating with Raoul Dautry, the French Minister of Armaments at the time. Although much conceptual work has been done in philosophy of science to separate the so-called purely scientific work from the political or value-laden work that scientists engage in, Latour explains how, for Joliot, "The more time passed, the more these two problems became one: if too many neutrons escaped from the copper vessel [used in his experiments on fission] and lowered the output of the reaction, the minister might lose patience. For Joliot, containing the minister and the neutrons in the same project, keeping them acting and keeping them under discipline, were not really distinct tasks. *He needed them both*."[237] In this way, in order for Joliot to actually carry out his work on the neutrons, he also needed to carry out his work with the minister: politics were part of his process, and if he did not do the explicitly political work, he would not be able to do the scientific work, either.

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[236] Bruno Latour, *Pandora's Hope* (Cambridge: Harvard University Press, 1999), 85.

[237] Latour, *Pandora's Hope*, 90. Latour's italics.

It did not necessarily have to be this way, according to Latour, but this is the way it turned out for Joliot, and turns out for many scientists today. As Latour words it, "the project of science studies. . .is not to state *a priori* that there exists 'some connection' between science and society, because *the existence of this connection depends on what the actors have done or not done to establish it*. Science studies merely provides the means of tracing this connection *when it exists*."[238] In other words, it is just good practice to *not* draw a distinction between science and politics beforehand, because the scientific situation you are studying might lead you into a complex web of politics, as well—and being willing to trace these connections is what makes one a good student of science. As Latour memorably adds, "how long can one study a military man before finding oneself in a laboratory? At most a quarter of an hour if one studies postwar science, and maybe an hour if one is dealing with the previous century."[239]

A study of scientific practice reveals that today, as much as in Joliot's time, scientists are often deeply embroiled in politics. The IPCC, for instance—the Inter*governmental* Panel on Climate Change—is, in essence, a scientific body commissioned by the United Nations. As they list on their website, their mission is inherently political: "the objective of the IPCC is to provide *governments* at all levels with scientific information that they can use *to develop climate policies*."[240] And, as we saw earlier with our peek into IPCC operations, the participating governments play a role in how the IPCC presents and publishes its reports. This is not some tragedy of science now tainted with values and political motivations or some grand coincidence:

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[238] Latour, *Pandora's Hope*, 86-87. Latour's italics.

[239] Latour, *Pandora's Hope*, 111.

[240] IPCC, "About the IPCC," the Intergovernmental Panel on Climate Change website, accessed Dec. 14, 2023, https://www.ipcc.ch/about/.

this is simply how a lot of science functions when it has to rely on government funding. And, moreover, this deep embroilment of science in politics does not mean that the science itself has to suffer. The IPCC is regarded as the standard of climate information today for a reason: it has an immense amount of scientists and scientific resources at its disposal to put together its reports. Its involvement in politics, and thus values, does not prevent the IPCC from doing good science—it *enables* it.[241]

Now onto the second way that science is inherently political, point b). Especially in the case of the geosciences, scientific practice is deeply involved and embroiled with nonhumans (including scientific instruments, particles, animals, and so on). To put it simply, scientists give voice to the nonhumans which they study, and we would have no idea about how these nonhumans act and behave (in the Actor-Network Theory sense) without the work of these scientists. In sum, scientists act as the *representatives* of nonhumans, and are thus able to speak on their behalf about their interests and needs. As Latour expresses it, explaining the importance of scientific instruments to understanding nonhumans, "At the slightest weakening in the sensitivity of the instruments, the slightest reduction of bandwidth in the sensors, the [nonhuman] agent suddenly becomes less sensitive, less reactive, less responsible; it becomes incapable of defining what it belongs to; it literally begins to *lose its territory* along with its

[241] There is one critique which is rightfully levied at the IPCC, however. The immense amount of people and governments involved means that, when there is reasonable interpretation of the data, the interpretations tend to land on the conservative side. See Oreskes and Conway, *Merchants of Doubt*, 206-207 for a brief mention of this fact. This is no doubt part of the reason why the IPCC tends to have to expand the scope of the consequences of climate change with each new report: they underestimated how bad it was by virtue of the institution, and have to reevaluate when it is worse than predicted. Still, an underestimation is very useful: we have good reason to believe that it will be *at least* as bad as the IPCC says it will be, if not worse.

bearings."[242] It is only through these instruments, and the scientists that know how to use and interpret them, that we can come to understand this new political constituent: the natural world. And it is only through these same scientists that we have begun to realize that our interests, and the interests of many of the nonhumans of the world, contradict each other. Our pursuit of limitless consumption has led to a situation where species are going extinct at a rate only seen five times before in the history of the Earth, and where natural environments are becoming poisoned and polluted. In the face of this, Latour imagines a new kind of scientist, the "Earthbound scientist," who is not afraid to declare that they are taking part in a political process. As he explains, "[the Earthbound scientist's] authority is fully political, because they represent agents who have no other voice and who intervene in the lives of many other agents."[243] The geosciences today are political whether we like it or not. We could continue insisting that science is 'apolitical' and 'value neutral,' or we could encourage scientists to speak out on the politics of nature, and to speak for the nonhumans who cannot speak on their own—for the scientists are those most familiar with their interests and needs.

I am aware that this might sound like fiction to some of my readers, but giving nonhumans political representation is actually a practice that has been going on for centuries. As Latour tells us, since the 1200s the Netherlands has, in addition to choosing representatives for the people, chosen representatives for the National Water Authority, whose job it is to represent the interests and power of the water surrounding the country so that it can be properly managed and negotiated with.[244] As Latour adds, "Where it is a question of life and death"—in that if the

[242] Latour, *Facing Gaia*, 252.

[243] Latour, *Facing Gaia*, 253.

[244] Latour, *Facing Gaia*, 272.

Netherlands fails to properly control the water, Holland will be flooded—"it is normal for Water to exercise acknowledged domination, and for it thus to be represented by the intermediary of a power that is added to, opposed to, superimposed on, that of monarch and parliament."[245] Thus having recognized the gravity of the situation, the Dutch have appointed someone responsible for *representing* the water in their political assembly, so that the interests, needs, and power for destruction of the water are not ignored, lest it wreak havoc on human civilization in Holland. In comparison, although it is a more complex situation than that in the Netherlands, the climate crisis is also increasingly becoming a matter of life and death with every day that passes—not just for nonhumans, but for humans as well.[246] Our global predicament is not so different from that in the Netherlands, in this way. Respecting the interests, needs, and power of nonhumans is an important task if we want to survive the Anthropocene. It would make sense, then, to appoint someone to *represent* these wants, needs, and powers, so we do not ignore them and suffer the consequences. Indeed, the climate crisis itself is a result of ignoring the interests and needs of nonhumans, and we have already outlined the consequences. Nonhumans represent a powerful political and physical force. Why would it be strange, then, to make sure that their needs are represented and heard?

Latour cites an in-person simulation of a climate conference that tried to do just this: give nonhumans their political due. It was called the "Theater of Negotiations," and was imagined as

[245] Latour, *Facing Gaia*, 272.

[246] To mention a statistic again, tens of millions of people will die from climate change by 2100. Drawn from John Nolt, "The Long-Term Non-anthropocentric Ethics of Climate Change and Biodiversity Loss" (keynote presentation, 30th Annual Kent State Philosophy Graduate Student Conference in Remembrance of May 4th, Kent, Ohio, March 18, 2023).

a simulation of the COP21 conference, taking place in 2015 in Paris.[247] In addition to the usual nations which would attend such a conference were delegations representing oceans, forests, continents, and so on. This was to ensure that these aspects of our world were not ignored in the conference as they have been in so many conferences before. As Latour explains,

> there are other powers, possessed by other interests, which exert continual pressure on the interests of Humanity. . .The crucial point is that the delegations whose names recall ancient elements said to be "of nature" – "Land," "Oceans," "Atmosphere," "Endangered Species" – are there not to naturalize the discussion by reminding humans of what their "environment" requires but to repoliticize the negotiation, by preventing coalitions from forming too quickly at the expense of others.[248]

In other words, Latour does not think the primary motivation behind appointing representatives for various aspects of the natural world should be to remind us to 'do our environmental duty' by not littering or by polluting less, but to remind us instead that the natural world is *made up of political entities* and that we ignore their power and influence at our own peril. Thus, having representatives for the 'forests' and 'oceans,' for example, would remind us of these foreign powers in and around our borders so that any political action we take factors them into account.

It is probably unrealistic to expect this kind of radical shift in thought before the next big climate conference, but we can nonetheless learn from the example of this simulation and from the example of the Netherlands' National Water Authority. Not only is it possible to represent nonhumans politically, but it is also practical. And, again, who better to represent nonhumans than the scientists most familiar with them? Whereas some people might see it as a disaster that

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[247] See Latour, *Facing Gaia*, 256, footnote 1, for more details on this simulation.

[248] Latour, *Facing Gaia*, 262.

scientists are involved in politics, Latour thinks differently. "The fact that researchers are now engaged in geopolitics," he writes, "I take as the only tiny source of hope arriving to enlighten us in the current situation. Finally we know what we are facing and with whom we are going to have to face up to it."[249] Taking the science seriously, it seems, will involve radically rethinking our political organizations.[250]

For these reasons, I suggest—along with Latour—that we leave behind the idea of an apolitical, value-neutral science not only as a myth, but as dangerous. In the face of the Anthropocene, we need to reimagine what the proper role of our scientists is, and we should encourage them to be the political creatures that they are, instead of enforcing the defunct fact/value distinction which fails to accurately describe our experience and scientific practice itself. It should no longer be a question of *if* scientists have values which affect their work—this much is certain—but of *which* values they should have—and here, Oreskes can help us again. As she explains in "Science Communication and Scientific Judgment," value neutrality is not possible, nor is it necessary for scientists to build trust with the public.[251] In fact, knowledge of *shared* values with scientists might be more important to building trust. As Oreskes writes, "the idea of a trusted messenger implies shared values."[252] One important way for scientists to build trust with the public, then, is for them to show the public that *their political interests overlap*—or more simply, that they want many of the same things. Oreskes continues, "Studies show that U.S.

[249] Latour, *Facing Gaia*, 253.

[250] The specifics of what this change would look like, and how it would change our institutions, is unclear. But the simulation that Latour cited gives us some idea of how it *could* look.

[251] Oreskes, "Science Communication," 114.

[252] Oreskes, "Science Communication," 115.

scientists want (among other things) to use their knowledge to improve health, make life easier, strengthen the economy through innovation and discovery, and protect people from losses associated with disruptive climate change. Opinion polls suggest that most Americans want many of these things, too…"[253]

These are obviously values that the scientists have, and which (hopefully) will strongly influence their work. Moreover, all of these values are things people would presumably *want their scientists to have*. We want scientists that are passionate about making the world a better place in any way that they can—and we likely would choose such a scientist over one who is ostensibly value-neutral. In this way, insisting on apolitical and value-neutral scientists is counterproductive, and does not serve to foster trust in science. When the debate of value-neutrality in the philosophy of science is brought up, the discussion often involves the *negative* values that scientists might hold, or the values that might compromise their work. But there are many positive values, too. As I mentioned above, then, since value-neutrality in science does not seem tenable, we should instead start asking after *which* values we want our scientists to have, and which values are relevant to the science at hand.

This would involve a new skillset for scientists to master, however, as they are not necessarily used to openly taking sides on issues in their scientific work.[254] But it is not an entirely new skillset. As we covered above, the whole mission of the IPCC, for instance, *is* political—this is why they publish a *Summary for Policymakers* alongside their full reports. And, these summaries do not necessarily stick to value-neutral language, either. As one sentence in the

[253] Oreskes, "Science Communication," 115.

[254] See Latour, *Facing Gaia*, 26, footnote 43 for a brief discussion of this point, wherein climate science has brought scientists 'into the fray,' whether they like it or not.

2023 summary reads, "Rapid and far-reaching transitions across all sectors and systems *are necessary* to achieve deep and sustained emissions reductions and secure a liveable and sustainable future for all."[255] What Latour and I are proposing, then, is not necessarily radical, but it would involve embracing the parts of the sciences which are already political, and recognizing that there is no room for the fact/value distinction in climate science today. As Latour eloquently puts it, if we are to know what needs to be done, "we must be impelled to action by a particular type of utterance that touches our hearts in order to set us in motion – yes, to move us. Astonishingly, this type of utterance now comes not only from poets, lovers, politicians, and prophets, but also from geochemists, naturalists, modelers, and geologists."[256] One of the ways to cure our cultural ills, then, will be to help make this fact less *astonishing*, and more *commonplace*.

3.3.2 What is it About Scientific Knowledge that Gives Us Reason to Believe in it?

One thing that the merchants of doubt have used to their advantage is the fact that there is no such thing as settled science. They have exploited the fact that scientific opinion can always change if new information prompts it to do so.[257] The merchants want this to be seen as a weakness of scientific knowledge—but it does not have to be seen this way. As Latour explains, treating scientific knowledge as it if it were 'objective fact'—in line with the fact/value

[255] IPCC, *Climate Change 2023 Synthesis Report: Summary for Policymakers* (IPCC, 2023), 34. My italics.

[256] Latour, *Facing Gaia*, 49.

[257] This is shown throughout the book, but see in particular Oreskes and Conway, *Merchants of Doubt*, 70 for an example of this strategy being used on the topic of acid rain, for instance, and 186 for it being used on the topic of global warming, blaming the sun for anthropogenic climate change.

distinction—has failed as a strategy to address climate change, and is dangerous: "The danger of such a tactic is that it bypasses the hard work of politics by attributing to science an incontrovertible certainty that it is far from having—yet without mobilizing anyone at all."[258] In other words, not only has claiming that science is immutably true failed to spur people to action, it also tries to skip the step of actually convincing people to believe in and trust the science—of showing them the values behind the science to help them understand why they *should* trust the science. As Latour puts it, this is the work of politics: getting people to agree with you and act with you. If people do not trust the science in the first place, or understand why they *should*, claiming that it is 'objective truth!' is not likely to solve much of anything.

This strategy of claiming scientific knowledge is objectively true seems to fail for two main reasons. First, it is simply untrue: scientific knowledge is not immutably true ('fact,' as we will cover, is a poor way to describe scientific knowledge). Doubt, as it were, is *built into the system*, and critique of bias is part of the method—this is the essence of the peer review process which scientific work has to go through before it can get published in professional journals.[259] Second, the public often misunderstands what this means. "If the science isn't certain, why should we trust it?" Laypeople—especially those touched by the merchants of doubt—might assume that if there is any room for doubt, then the science must be unsettled, uncertain, and not worth getting worked up over. The key, then, will be to get the public to see the process of peer review and institutional doubt that is built into science not as a weakness, but as one of its great strengths. In scientific practice, doubt brings refinement, clarity, and lack of bias. And, for our

[258] Latour, *Facing Gaia*, 46.

[259] See Oreskes, "Science Communication," 115 for a discussion of this point.

purposes, if we can understand how the so-called 'facts' of science are made, it will be easier to see how they are ultimately related to values.

To illustrate this idea, it will be instructive to take a look at an example of how the scientific process works in an institution such as the IPCC. As Oreskes and Conway explain in detailing Ben Santer's job as 'lead convening author' of the chapter he worked on, his role was to work with his team of about thirty-six top scientists in their field to set down the scope and the structure of the chapter and then to assign the job of drafting parts of it to various members of his team. After this, a subset of this thirty-six-person team had to meet to edit and revise the chapter until they reached a draft "that [was] acceptable to the *entire group*."[260] Next, the first draft was sent to a team of around twenty other scientists for its first round of peer review, as well as to all of the initial thirty-six who had helped draft it. Following this review, a second draft was crafted, and then it was sent out to all of the governments participating in the IPCC for additional review (at this point, it becomes very hard to track how many eyes ended up seeing the draft). Only after this set of revisions was the draft presented to the IPCC plenary session for further comments and review, and another drafting session following this.[261] In this process, the document underwent no fewer than five editing and revising sessions, and would have been seen by countless scientists and representatives of the IPCC and the various governments involved in it, all giving their 'subjective' opinions on what should be changed so as to make the document a better representation of the matters of 'fact.' This process in the IPCC is so specific and precise that there was even debate around the use of a single adjective. The report read, "The balance of evidence suggests that there is a [blank] human influence on global climate," and only after

[260] Oreskes and Conway, *Merchants of Doubt*, 201. My italics.

[261] See Oreskes and Conway, *Merchants of Doubt*, 203-04 for the discussion of this process.

much debate did the team decide on the adjective "discernible."[262] It is in this way that doubt and revision are *built into the institution* of science as *values* of the institution.

While it is true that this process does not yield epistemic objectivity, it yields something better, according to Latour. As he explains, a process like this produces another kind of objectivity, in that "those who have prepared [the data, report, &c.] have answered all the *objections* that could be raised against them (this is the only known way in which a statement can be transformed into a fact)."[263] In scientific practice, then, something only counts as a *fact* when every reasonable objection people have thought of has been tested against it, and defeated—a sort of fallibilism taken to the extreme. Moreover, this is better than an epistemic claim to objectivity because it carries along with it a *reason why we should care* (another value, if you will): the institution of science has tried to disprove it, and has found that it cannot. This is also why Latour proposes that we stop trying to defend scientific knowledge from the standpoint of epistemic certainty. Not only is this position false, and not only is this position weaponized by the merchants of doubt against science, but it does not carry as much weight as the entire institution of science. As he explains in a footnote, "I have described the *institution* that makes it possible to ensure [the] validity [of scientific facts] in place of the epistemology that claimed to defend them."[264] In truth, scientific knowledge does not fit neatly into the boxes of 'fact' or 'fiction,' since it is more malleable than a fact, and yet stronger than any fiction, and this makes

[262] Oreskes and Conway, *Merchants of Doubt*, 205.

[263] Latour, *Facing Gaia*, 47. Latour's italics.

[264] Latour, *Facing Gaia*, footnote 63 on page 33.

epistemology as it is classically conceived somewhat ill-equipped to handle scientific knowledge.[265]

Instead, we should take advantage of the fact that the vast institution of science is more visible today than ever before.[266] If we can get everyday people to understand the trials and tribulations that scientific ideas go through before they become accepted by the scientific institution, and to see this process unfolding in front of them in this newfound visibility (to get them to 'see it with their own eyes,' so to speak), then we have a powerful weapon against doubt in science: evidence of the weight of thousands of scientists and instruments all working on the same problem. We should learn to rely more on the strengths of this institution as tools to convince people that the science *is* sound. If we can do this, then a few consequences should follow. First, our understanding of what, exactly, a scientific 'fact' is should change—and this, coupled with a correct understanding of the political and value-laden aspects of science, should be the final nail in the coffin for the fact/value distinction as applied to scientific practice. Second, if we can make people come to truly understand climate science, this should help ameliorate some of the abstraction from the life-world which we see in the American public. If we understand what the science actually tells us, and we have reason to believe it, it will be harder to hold notions about the world that contradict the science. Thirdly, coupled with the new, political understanding of science, if we have reason to believe what scientists tell us, then it will be harder to believe both in the subject/object division as some fundamental truth about the

[265] See Latour's work "Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern" (*Critical Inquiry* 30, no. 2: 2004) for a more complete discussion of this point, and of his term 'factish' or 'fair' to describe the kind of middle ground which scientific knowledge occupies.

[266] See Latour, *Facing Gaia*, 215 for a discussion of this point.

world, and in the myth of mastery over the world. If we understand the ways that the natural world acts, reacts, and exerts a powerful force on us and our civilizations, these assumptions should, likewise, be much harder to hold as true.

3.3.3 **What Does Science Tell Us About the World and the Entities Which Inhabit it?**

To continue from the last section, another misunderstanding we moderns tend to have about science is what it actually says about the world, which leads us to adopt a mistaken ontology. Many people seem to believe, for instance, that science gives us 'objective' knowledge of the outside world which is certain, unchanging, and undeniably correct. As we just covered, though, claiming that science is objective in this way not only fails but is also untrue and dangerous. In truth, scientific ideas take maintenance and work to maintain. This is not only because new objections are constantly being raised against them (think of Thomas Kuhn's famous paradigms), but because it takes work to keep *people* believing in them. To help show what I mean, let us turn to Latour again.

One of the most striking sections in *Pandora's Hope* is chapter five, where Latour discusses Louis Pasteur and the discovery of microbes. In this chapter, he explains the fragility—and the strength—of scientific ideas: they are sustained or left to wither away by the institution of science. It is not the case that a scientific idea, once posed, is simply self-sustaining—people have to do the work of keeping it alive. As Latour phrases it, speaking of the French scientist Félix Pouchet—one of Pasteur's main opponents who was defending the standard spontaneous generation theory of the time—"Why can't we say that Pasteur was right and Pouchet was wrong? Well, we can say it, but only on the condition that we render very clearly and precisely the institutional mechanisms that are *still at work* to maintain the asymmetry between the two

positions."[267] In other words, we must account for the systems which are continually cementing Pasteur's victory over Pouchet, or we will fundamentally misunderstand the nature of science and scientific theories. A statement like this is anathema to someone who believes that science is objective knowledge of the way that the world works, but we must always remember that the garb of ideas *is not* the world itself. We must remember Husserl's words, "Mathematics and mathematical science, as a garb of ideas. . .*represents* the life-world, *dresses it up* as 'objectively actual and true' nature. It is through the garb of ideas that we take for *true being* what is actually a *method*…"[268] The mistake comes when we think that, by knowing the science, we have thus come by knowledge of *the world itself*—and that if we know the world, this knowledge must be objective, unchanging, and true. As we have pointed out before, however, this is the result of one of the cultural *a prioris* of modernism: abstraction from nature/the life-world. It makes sense, then, that the everyday American would make this assumption—it is taken for granted in their culture, and they likely have not meditated on a cultural *epoché* long enough to realize that it does not actually represent *experience itself*.

As before, this is the value of science studies to our cultural *epoché*: as a study of scientific practice (in the life-world, we might say), it reveals to us the many ways that we are mistaken about science and the way the world works, by helping to reveal to us what we take for granted. With this in mind, we must heed Husserl's warning, and teach science in such a way that *avoids* substituting the garb of ideas for the world itself. Rather than teaching science as objective knowledge about how the world really works, we should learn from Latour, and

[267] Latour, *Pandora's Hope*, 168.

[268] Edmund Husserl, *The Crisis of the European Sciences and Transcendental Phenomenology*, trans. David Carr (Evanston: Northwestern University Press, 1970), 51. Original italics.

understand that we "participate in the 'final victory of Pasteur over Pouchet, in the same way that [we] participate in the 'final' victory of republican over autocratic modes of government by voting…"[269] In other words, scientific knowledge and ideas are fundamentally historical. They have a beginning, and they might have an end, as so much scientific knowledge in the past has. To continue the example of Pasteur vs. Pouchet, Pasteur's victory is not final because it is conceivable that one day we might find new data that would overwrite his research, showing it to be mistaken in some key way, and then people would *stop believing in it*. More importantly than this, though, the scientific institution would move away from Pasteur's work: research articles, lectures, and textbooks would no longer use it as a foundation, and it would begin to fade from its once great stature.[270]

This is a key lesson of science studies: that the nature of scientific knowledge, as mentioned before, does not fit neatly into the boxes of 'fact' or 'fiction,' but lies in a third category, what Latour calls 'factish.'[271] This third category reflects the fact that scientific knowledge is constructed, much like fiction, but yet cannot be said to be merely a 'belief'—it is stronger than this. Scientific knowledge has the support of the institution of science, all of its researchers and instruments, giving us *reason to believe* in it. Yet, it still falls short of being an objective fact about the world, as it might yet change in the future. In short, the real question is much like Latour asks us, "In whose world are we now living, that of Pasteur or that of Pouchet?

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[269] Latour, *Pandora's Hope*, 168.

[270] See Latour, *Pandora's Hope*, 154-155 for a discussion of how the institution of science affects the 'reality' of a scientific theory.

[271] Latour, *Pandora's Hope*, 306. Here Latour gives a definition of 'factish,' albeit a vague one. See *Pandora's Hope*, 274-275 as well for a discussion of factishes as they apply to scientific knowledge.

I don't know about you, but for my part, I live inside the Pasteurian network, every time I eat pasteurized yogurt, drink pasteurized milk, or swallow antibiotics."[272] In our scientific education, we must explain *why* we choose to live in Pasteur's world rather than Pouchet's: we must be able to articulate to students why the support of the scientific institution gives us *reason to believe*.

Hopefully, with an education in science taking all of these suggestions into account, new students of science would be better prepared to answer the questions of credibility that we are met with every day in the age of misinformation. "Should I trust the credentialed scientist, or the politician with no background in science?" Or, perhaps more apropos, "Should I trust the geoscientists at the IPCC, or the Cold War physicist Fred Singer?" These questions may seem obvious to those in the know, but they have stumped countless Americans past and present. It is plain that believing that science gives us objective knowledge about the world itself does not give one the tools to know *which scientist* to trust. In order to prepare the coming generations to be able to navigate the minefield of misinformation about science today (which will likely only get worse as the climate crisis continues heating up), we have to teach them about the *institution* of science and how it works. We have to be able to communicate why having the institution of science behind your project *lends you credibility*. Science taught in this way can prevent students from making the error of substituting the garb of ideas for the world itself, undermine the fact/value divide, and begin to sap strength from the subject/object distinction and our drive to master to the world. And hopefully, as a correct understanding of science gains ground, the fear of regulation will lose ground. In these ways, better and more realistic science education can help us to begin to address the Crisis of the Geosciences.

[272] Latour, *Pandora's Hope*, 168.

3.3.4 **How Can We Change the Fabric of Modernity Itself? - An Open Question**

Now that we have addressed the comparatively easy questions—how to change our thinking and teaching of science—it is time for the harder one: how do we change the very fabric of modernity which has contributed to the Crisis? As we have expressed in previous chapters, there are many problematic cultural *a prioris* that will need to be addressed if we are to avert the worst of the climate crisis. And, in the proposed solutions above, although we have perhaps strongly addressed the issue of the fact/value divide as applied to scientific practice, we have only begun to start addressing our tendency to abstract from the life-world/world itself, the subject/object divide, our drive to master nature, and the fear of regulation. Moreover, none of the proposed solutions above begin to address the insidious effects that of the concept of infinity has on our culture. Although I hope I have made it clear why these only partially addressed (or unaddressed) cultural assumptions are problematic in the face of Gaia, I must admit that it is less clear how exactly to begin to eliminate or change them.

Still, one point remains very important. Although it might seem at first that climate change is primarily a scientific problem, this is not the case. While science will certainly play a *role* in solving our Crisis, if we can learn anything from Husserl, it is that the Crisis of the Geosciences is a *cultural* crisis—and that climate change is a *cultural* problem. In the mid-to-late 1900s, it was a different story. The science of climate change was still unsettled, and we were not sure exactly what was happening or why. Thus, climate change then *was* a scientific problem, and the best way to make progress on addressing it was to do more climate science. But, this is no longer the case. To quote the line from Latour again, "the question is no longer—and hasn't been for a long time—a question of knowledge."[273] The science has been settled for *decades*, and

[273] Latour, *Facing Gaia*, 28, footnote 49.

yet we have not taken meaningful, effective action to address this issue. We have covered both explicit (the merchants of doubt) and implicit (the problematic cultural *a prioris*) reasons for this, but one thing should be clear: it is due to issues in our *culture*—a cultural illness, to use the Husserlian phrase—that we have not acted. Between the laboratories and conference rooms of science and the governing halls in Washington, the message has fallen apart: people, for the reasons we have discussed here, have failed to act on and believe in climate science. It is in this way that climate change is not primarily a scientific issue, but a cultural one.

In no uncertain terms, we will need to devise new ways of inhabiting and interacting with the Earth and all of its nonhumans. If we do not, the coming destruction will only get worse until our current way of life becomes impossible. This is perhaps one small glimmer of hope in the face of disaster: the Anthropocene itself can help us in our cultural *epoché*. As we traced in chapter two, many parts of our culture are already breaking down in the Anthropocene, and this pattern can only get worse until something gives. Infinite consumption and economic growth will lead to greater pollution and warming, abstraction and insensitivity towards the world will result in greater ecosystem and species loss until it cripples our food sources, continual mastery over nature will result in our subjugation to climate catastrophe, the subject/object divide will encourage us to ignore the many agencies intertwining and making up the climate crisis (Gaia), the fact/value division will leave our scientists powerless to speak out, and the fear of regulation will push back on any effort made to address the issue. In this way, the dysfunction of these cultural assumptions will become more and more obvious until we cannot help but notice them, and until they are no longer tenable. Our current cultural way of life will then become impossible, and we will have no choice but to think of alternatives. Rather than wait around for the *epoché* to be forced on us under the pressures and threat of impending doom brought by the

climate crisis, however, it behooves us to try to imagine alternatives now. Perhaps one way to begin to change the fundamental fabric of modernity itself will be to simply show that *another way of living is possible*. Although the details remain uncertain, I hope that I have at least begun to show this much.

Conclusion: The Cultural Crisis of the Geosciences

If there is one thing I hope my readers take away from this thesis, it is the following. The Crisis of the Geosciences is not a primarily scientific problem. Rather, it is a problem with the ways we think about the world, the ways we interact with it, and the ways we expect our experts to behave. This Crisis is a cultural problem—this is the key takeaway. To overuse the quote from Latour one last time, "the question is no longer—and hasn't been for a long time—a question of knowledge."[274] If it were just a scientific issue that we were facing, our task would likely be much lighter; but we are firmly into unfamiliar territory— an area where our sciences no longer guide us. It seems like our task is to find the "cure" which Husserl sought, the treatment for cultural ailments.[275] It seems like our task is to change our culture itself.

This is precisely why the study of Husserl's phenomenological method is so important today. Husserl thought that, once sufficiently developed, his phenomenology *would be* such a cure—a new, ultimate ground for all of philosophy and science founded on obvious self-evidence and a sound method.[276] Whether or not he would have succeeded in this lofty task is, again, unclear. We only have fragments of the last part of *The Crisis of the European Sciences*, and even the parts we do have are in a somewhat unfinished state. Although Husserl put much

[274] Bruno Latour, *Facing Gaia* (Cambridge: Polity Press, 2017), 29 footnote 49.

[275] Edmund Husserl, *The Crisis of the European Sciences and Transcendental Phenomenology*, trans. David Carr (Evanston: Northwestern University Press, 1970), 270.

[276] Husserl, *Crisis*, 100.

effort into finishing the *Crisis* in his later life, he was continually interrupted by illness, and the text suffered because of this.[277] Still, we must not forget that the very same things which Husserl saw as constituting the Crisis of Europe before WWII are very much still alive and present in contemporary America, and are now contributing to the Crisis of the Geosciences today (namely, the unquestioned assumptions of our culture: our cultural *a prioris*). The Crisis which Husserl identified, and which he dedicated the last of his life to working on, was never resolved and still lives on today in changed form.

A study of Husserl's work, then, offers us valuable tools and a strong method for addressing this Crisis. Even the small portion of the work which we surveyed here contained the prospect of a cultural phenomenology to help us identify the nature of our Crisis, trace its evolution through time, and ultimately suggest some solutions. I believe that the value of this enterprise should not be understated. How are we to understand when our culture goes wrong if we are not able to see *past it*, and to see its deeply rooted assumptions in the clear light of day? This is precisely what the practice of a cultural *epoché* enables. This is not to say that all of our culture's assumptions are problematic, however, or that we should always strive to live in a cultural *epoché*. Living like this is likely impossible, and not how Husserl imagined the practice of *epoché* should be used.[278] Moreover, there is much in our culture that is useful and which betters humanity: the very development of the Modern sciences in the Western world is a testament to the fact that good can come out of this culture. Still, an investigation into our culture's unquestioned assumptions is an important task in order to identify which of these

[277] Husserl, *Crisis*, xvii-xviii. This is part of Carr's introduction to *The Crisis*, where he explains some of the circumstances surrounding the writing of the work.

[278] Husserl, *Crisis*, 136. Husserl's thoughts on the *epoché* here remind me of how some meditation teachers speak of their practice. Perhaps these two activities are not so different.

assumptions serve us and the world, and which do not. Just as individuals examine their own actions at work, for instance, to see how they could improve and how they are going wrong, we should have a similar practice for our own culture. What sets Husserl's method apart from other ways of doing this is the potential *depth* of the *epoché*. Beyond being able to decry certain actions or even patterns of actions in our culture—like social scientists often do—the *epoché* gives us a method to think *past* our culture, or *outside* of it, in such a way that what might have seemed obvious or unimposing to us in the 'natural attitude' of our cultural existence now seems strange, new, and hard to ignore. And as mentioned before, the strength of this method is precisely its ability to offer solutions—and to guide our efforts when it cannot. In this thesis, with the help of Husserl's and Latour's work, I have tried to do just this—to show key, problematic assumptions in our culture that are not obvious in our day-to-day life, but which nonetheless deeply affect how we think about the world and how we interact with it—and to offer the solutions that this method suggests.

Another reason why the Crisis we are dealing with is no longer primarily a problem for science is because science has become so complex and so deeply embedded in our culture that it is difficult to trace all of its effects and operations. As Latour puts this point, "the sciences are now and will remain from now on so intermingled with the entire culture that we need to turn to the humanities to understand how they really function. Hence a hybrid style for a hybrid subject addressed to a necessarily hybrid audience."[279] Latour has been saying this much for years,[280] but it is now truer than ever that in order to fully and completely study the sciences, one must also

[279] Latour, *Facing Gaia*, 4.

[280] See also Bruno Latour, *Pandora's Hope* (Cambridge: Harvard University Press, 1999), 86-87 for a different statement of this point.

study politics and culture. Every scientific event takes place in a *context*, and in order to truly understand the scientific event, one must truly understand this context, as well. The humanities, historically, have been our way of reflecting back on our own culture, and in the face of the Crisis of the Geosciences we are in the midst of today, the humanities are more necessary than ever to preserve life as we know it on this planet Earth. This practice of deeply examining, critiquing, and changing our own culture is not necessarily easy, but I think it is one of many necessary steps we need to take in order to properly address our Crisis.

Accordingly, this thesis marks only a beginning, and only represents one side from which we can approach this Crisis—that of phenomenological philosophy. Even within this project, I have had to leave some important elements out. As Carr mentioned when he as discussing the prospects of a cultural phenomenology, one area that would fall under this investigation is linguistics, which I did not have room here to dive into.[281] Indeed, even the areas of a cultural phenomenology that I have covered here were only covered in so much depth, and this analysis could doubtlessly be refined and revised into something much more robust. While that project would take books, however, I have only the space of a thesis to work with. Even within phenomenological philosophy, then, this project marks only the beginning.

It is also important to note the limits of the investigation we have conducted here. My project was explicitly and intentionally limited to contemporary Western society, specifically America. While some of what I have said here likely applies to other cultures in the world (especially Europe), there are no doubt cultures that do not share the same problematic assumptions I have outlined here, and perhaps have entirely different problematic assumptions. I

[281] David Carr, "Husserl's Problematic Concept of the Life-World" (*American Philosophical Quarterly 7*, no. 4: 1970), 337.

also do not intend this thesis to include an exhaustive list of the problems in our culture—it is much too short for that. Rather, I have limited my scope to addressing only what seemed like the most problematic cultural assumptions in the context of the Anthropocene—those cultural *a prioris* which seemed to be the most responsible for putting us out of touch with the world and for stopping us from acting as if we understood what our experts have been saying. Accordingly, other examinations of this problem from other viewpoints will be invaluable if we hope to have a complete understanding of the Crisis we face today.

Outside of philosophy, much work needs to be done in the other fields of the humanities and the social sciences. One of the most pressing issues of our time might be how to transition from an economy based on unsustainable, infinite growth to one based on stability and knowledge of our limits. On a finite planet, any pattern of infinite growth has its own doom built into it, yet the solution remains unclear. Likewise in the social sciences, education, and psychology, more work needs to be done tracing how people react to different ways of teaching and understanding science, as well as the most effective ways to teach it. Tied into this will need to be an investigation into how to resist the merchants of doubt, who have sought to mislead and misinform the American public for decades. This, too, is a great challenge facing us today, and one where the solution does not make itself obvious: how do we curb the extremely deleterious effects of large sums of money on our science and our society? Furthermore, the work of politics is never done. Some of the great political challenges of our time are precisely how to curb these same harmful effects of money and how to understand and reckon with the many agencies which are tangling up before us in the form of Gaia. As the climate crisis gets worse, and greater and greater numbers of people become displaced from their homes, the political pressures of keeping

peace while partitioning dwindling resources will only become more difficult, and much blood will likely be shed.

If the future sounds dark, that is because it is. As I have echoed many times in this project, the sciences have been telling us as much for many years, and we have seemingly refused to listen. This is fundamentally *our* problem, however, for two key reasons. First, as humans, *we are responsible* for the climate crisis and all of its horrible consequences. Second, since we are confined to this planet which we call home, even if we wanted to run from the consequences of our actions we are nonetheless stuck here to witness the effects of our deeds. As Latour artfully put it—because he had a knack for doing so—"There is no cure for the condition of belonging to the world."[282] Let us, then, continue seeking the cure for something we can remedy: our sick culture. There is much work to be done.

[282] Latour, *Facing Gaia*, 13.

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