What Would Heidegger Say About Geoengineering?

Clive Hamilton, September 2013

Abstract

Proposals to respond to climate change by geoengineering the Earth's climate system, such as by regulating the amount of sunlight reaching the planet, may be seen as a radical fulfillment of Heidegger's understanding of technology as destiny. Before geoengineering was conceivable, the Earth as a whole had to be representable as a total object, an object captured in climate models that form the epistemological basis for climate engineering. Geoengineering is thinkable because of the ever-tightening grip of Enframing, Heidegger's term for the modern epoch of Being.

Yet, by objectifying the world as a whole, geoengineering goes beyond the mere representation of nature as 'standing reserve'; it requires us to think Heidegger further, to see technology as a response to disorder breaking through. If in the climate crisis nature reveals itself to be a sovereign force then we need a phenomenology from nature's point of view. If 'world grounds itself on earth, and earth juts through world', then the climate crisis is the jutting through, and geoengineering is a last attempt to deny it, a vain attempt to take control of destiny rather than enter a free relation with technology. In that lies the danger.

I. Introduction

The question of technology dominated Heidegger's thinking after his 'turn' in the 1930s, although it has been argued that the sequence of his works can be read as 'the gradual emergence of the problem of technology'.[1] Grasping the role of technology in the history of Being was the path to his most penetrating insights into the modern condition. For him, the modern world *is* technological, but not in the way commonly imagined. Technology does not simply transform the physical world; it reveals the world in a particular way, and thereby defines what is. So technologization is the key to Heidegger's ontology, at least the later development of it.

I would like to suggest that geoengineering or climate engineering represents a radical fulfillment of Heidegger's understanding of technology as destiny and that, because it takes technological thinking to its most extreme point, climate engineering also contains the seeds of a rupture with that destiny and so represents what might be called 'the last technology'.

Geoengineering is a catch-all term for technologies aimed at countering or offsetting the effects of global warming.[2] They are being developed because, for a number of reasons, the world has failed to respond to scientific warnings by reducing greenhouse gas emissions.[3] Here I focus on those geoengineering technologies that seek to regulate the amount of solar radiation reaching the Earth. The cheapest and most likely intervention is a proposal to shroud the Earth with a layer of sulphate aerosols in the upper atmosphere. A fleet of high-flying aircraft or a 20 kilometre hose held aloft by balloons could be used to inject the aerosols to achieve more-or-less permanent dimming of the globe.

Sulphate aerosol spraying aims to regulate the climate of the planet as a whole by manipulating the chemical composition of the atmosphere. It would require elaborate control mechanisms operated from some kind of central office for climate management. Heidegger would probably view geoengineering as the final surge of the will-to-power and a desperate gambit to defend modern subjectivity. 'The will to mastery', he wrote, 'becomes all the more urgent the more technology threatens to slip from human control.'[4] To foreshadow a later discussion, he would perhaps also see within the extreme danger of climate engineering and the peril it seeks to forestall, the gleam of a saving power.

In the spirit of Heidegger my focus is not on the technologies themselves but on what their proposed deployment reveals about the world and human destiny. Echoing Heidegger, we might say: The essence of geoengineering is nothing technological. Geoengineering represents a qualitative leap in human use of technology not because it reaches a new level of sophistication (indeed, spraying sulphuric acid into the upper atmosphere or spreading iron filings on the oceans are crude methods), but because it comprises the first technology of intentional planetary control. It may be viewed as a desperate response to human failing or as monstrous hubris, but beneath all emotional and ethical judgments lies an unexamined conception of the Earth that makes geoengineering imaginable.

II. World-as-picture

The obvious place to begin is with Heidegger's seminal 1953 essay 'The Question Concerning Technology', the fullest treatment of his views on the subject. But to come to

grips with his argument some prior ground must be traversed. We can best prepare by considering Heidegger's 1938 lecture titled 'The Age of the World Picture'.[5]

Heidegger began by asserting: 'Metaphysics grounds an age, in that through a specific interpretation of what is and through a specific comprehension of truth it gives to that age the basis upon which it is essentially formed.'[6] Epochs are underwritten by often-hidden understandings of what the Earth is, of existence. Heidegger declares that what is most in need of deeper contemplation, that which most defines the modern age, is science and technology, for it is in science and technology that Being manifests in the modern epoch. The argument here and in subsequent works is, in Hans Ruin's words, 'that machine technology is not a consequence of science, but that both science and machine technology are rooted in a more fundamental sense of technology … [in which] being is understood as something represented and visualized so as to be made available for manipulation and domination by a subjective will'.[7] Before technology can be developed, being, that which is, must be represented in a certain way. This alerts us to common misconceptions in thinking about technology.

When we attempt to understand the technological age we must be vigilant that we do not do so from within the metaphysics of science and technology, for then we will be unable to see what we are seeking, the *essence* of technology.[8] So we seek to understand our age—including the paramount fact of global warming—by exposing the metaphysics implicated in science and technology.[9] This is the metaphysics that today secures objects for study. As Hans Ruin, one of the most interesting interpreters of Heidegger, writes:

> Technology is inextricably tied to the metaphysical impulse to determine the being of beings, as something representable, as substance, force, or as will. … We cannot escape technology, but neither should we hope to become its masters, because in the very ambition to achieve mastery, we are still thinking and operating within the reach and scope of technology.[10]

No technological project renders this claim more true than geoengineering's goal of mastery, no less than to take control of the Earth's climate.

Descartes was the pivotal figure in establishing the independent consciousness removed from nature that uses the intellect to define nature. The world-shaking implications of the Cartesian conception are well-worked territory.[11] The 'death of nature' allowed nature to be reshaped. 'The conceptual elimination of ends from nature prepares for their technological appropriation, for nature rendered purposeless is available for human ends and purposes.'[12] But, as always with scientific and philosophical break-throughs, the ground had been well-prepared by figures soon forgotten. In recent years scholars have established that it is more accurate to view Descartes' intervention (and that of Kant) as the culmination of a philosophical-theological discontinuity within Scholasticism that occurred some centuries earlier. Most attention has been devoted to the thirteenth century Scottish Franciscan priest Duns Scotus.[13] Against Thomism, Scotus denied that there is a qualitative distinction between the divine and the mundane, including divine truth and natural truth; the difference between God and the rest of creation is one of degree only. Catherine Pickstock observes that it was this decision to privilege 'clarity and distinctness as the most fundamental criteria for the existence of a thing' that made possible Descartes' reduction of the physical world to matter and motion.[14] The young Heidegger

became familiar with the works of Duns Scotus where, Kisiel argues, he found that 'even the "order of being" has an active mode'.[15]

To the modern mind the presumption that existence can only be conceived as clear and intelligible seems obvious, almost banal, yet Scotus' argument that existence or being must be graspable by the human mind was a momentous shift. It turned being into an object, so that reality became understood simply as that which is given to the perceiving subject, without any transcendent quality. The new conception of reality, of the nature of existence, redefined knowledge too, because if knowledge is knowing about what is, then the objectification of being confines knowledge to that which is certain and distinct. So knowledge becomes that which is thinkable. Being itself became subordinated to the knowing human subject. Thus there is no deeper quality to reality, nothing that might transcend the objectivity of things, nothing mysterious that might fall outside of the subject-object relation. As Pickstock writes, 'a new model of truth as transparently available and immanent began to emerge', one that contrasted with Aquinas's notion of being as 'something with unknowable and unanalysable depth'.[16] With the human subject as master, the unknowable becomes merely that which is not yet known. The mysterious is simply a gap, a negative to be filled, whereas for Aquinas the mystery was a positive category, a necessary and eternal feature of the world, indeed, its source. For Aquinas, argues Pickstock, the mysterious 'is not that which belies actuality, but that from which actuality derives its fulfillment'.[17]

In short, the new idea of existence made possible the modern scientific conviction that nature is intrinsically knowable. Without this conviction, thinking geoengineering would not be possible. This background helps us comprehend Heidegger's understanding of the

modern metaphysics in which science and technology operate, as set out in 'The Age of the World Picture'. To get to the essence of modern science, he considers the research process. Research does not begin with method. Before research is possible the object of research, its realm, must be posited in some way. This is done by projecting onto nature a 'fixed ground plan' or picture of what is, of what is a valid object of study.[18] Knowledge generation then occurs within this sphere, and the more tightly bound it is to the ground plan the more rigorous it is.

Heidegger characterises the essence of science and technology as the recreation of the world as picture.[19] By picture we do not mean a certain image of the world, or a worldview, but the way the world appears as picture. With the emergence of modern science in the 17th century, and the philosophies that were built on it, the world emerged not as a new picture but as picture for the first time. World-as-picture replaced what might be called world-as-meaning or world-as-context. The emergence of the subject and the simultaneous advent of the world-as-picture was the 'grounding event of modern history',[20] and from it followed humanism and the conception of history as the history of humans and, ultimately, geoengineering's final assertion of subjectivity over the Earth as object.

It is essential to understand that, for Heidegger, 'world-as-picture' is not a human invention. The 'presencing' of the world in this way must be found in Being itself, so that humans occupy 'a domain given over to measuring and executing, for the purpose of gaining mastery over the whole'.[21]

III. Enframing: the essence of technology

With this background we are better able to appreciate the distinction between technology and the essence of technology that is at the core of 'The Question Concerning Technology'. Instead of accepting the customary idea of technology as a tool or instrument, Heidegger explores the origin of the instrumental itself and asks what it means to think of technology as an instrument. He challenges the givenness of instrumental thinking by asking in which realm do 'means and ends' belong. At this point in the essay Heidegger presents several pages expounding on the Greek understanding of causality, a conception within which the kind of causality that is awarded validity today, *causa efficiens*, is but one type. Heidegger's idea of technology is grounded in the larger conception of 'revealing', behind which is a notion of *telos* or the wider context in which things in our world are brought about. This is not the place to elaborate on causality, but a clearer idea of Heidegger's understanding of causality should emerge as we proceed.

The groundwork had been laid many years earlier, not least in his famous Davos debate with Ernst Cassirer in 1929.[22] Both Cassirer, the leading neo-Kantian, and Heidegger were to dismiss the naïve view of technology as a mere tool that extends man's capacity to control the environment.[23] Building on Kant's notion that our perceptual and conceptual apparatus provides the 'legislation for nature', Cassirer argued that through the application of technology we transform our representation and experience, our way of making sense of the world and so the meaning of nature. This was a historicization of Kant's transcendental conditions of experience.[24] As it had for Marx, and would for Marcuse, for Cassirer technology becomes a means of self-knowledge, wherein lies the

danger that man becomes estranged from the external world because technology objectifies nature. Yet he also believed that it was possible for humans to use their reason to understand the danger and take back a free relation to technology, thereby affirming the autonomy of the subject.

Heidegger shared the view that our most fundamental experience of the world is historically conditioned rather than fixed and given, a natural development of the Kantian subject as self-conscious world-creator. But from there he diverged sharply from the Kantian world. Heidegger affirms that viewing technology as an instrument is 'correct' within technological thinking, but insists that, as causality is context-dependent, the 'correct' cannot deliver us the true.[25] It follows from the conception of technology as a kind of revealing that it cannot be neutral.

> 'Everywhere we remain unfree and chained to technology, whether we passionately affirm or deny it. But we are delivered over to it in the worst possible way when we regard it as something neutral …'[26]

And therein lies the peril of geoengineering in the hands of scientists, and subsequently economists and technocrats, who understand the Earth as a complex system available for manipulation.

When Heidegger says technology is nothing neutral he is not making the standard observation that technology serves social interests. Such a view arises out of the conception of technology as instrument, which is correct as far as it goes but covers over the deeper truth about technology. Heidegger is making a more radical point. If technology is not a mere instrument of human will but is a way of revealing the world,

then it cannot reveal the world in any way. It shows up or presents the world as 'standing reserve', that is, as a repository of resources, of materials and energy for human benefit.[27] This is the *essence* of technology. Technology imposes a kind of ordering on the world in which things are always on call. The revelation of nature as standing reserve Heidegger calls 'Enframing'. Enframing should not be interpreted as a mode of intelligibility or set of cognitive parameters or a 'frame' through which the world is seen. Rather, it is how the world shows up, as 'the way in which the real reveals itself …'.[28]

So Enframing is the essence of technology. For Heidegger, who rejected all substance ontologies and all 'metaphysics' that locate the essence of things in something outside or beyond the way they are actually present in the world, the word 'essence' does not connote the inner, unchangeable substance or essential meaning of a thing; it means 'the way in which something pursues its course, the way in which it remains through time as what it is'.[29] Elsewhere Heidegger says it means 'enduring as presence', often rendered 'coming to presence'. The idea of the world coming to presence within the unfolding of Being reflects the Heideggerian understanding of causation that is so alien to modern thinking.[30]

That technology should show up the world in this way is inscribed in the history of Being. For Heidegger, the essence of technology is not the product of human thinking, nor even a mode of thinking, like that of the engineer or scientist. Technology, in its essence, is prior to science and emerges in the origins of the modern era as an objectifying urge that renders all entities inert and precisely definable. In response to the claim of modern science and analytical philosophy that science is subordinate to nature, because it works to reveal nature's secrets and is often surprised by what it finds,

Heidegger would say that science and technology—now in its most sublime form as geoengineering—go to nature having already conquered it with Enframing, a thinking that deprives nature of its 'moral and poetical force'.[31] This is the essence of technology, and I think the presentiment that geoengineering would overwhelm all vestiges of nature's moral and poetical force emerges in the anxiety that solar radiation management would be akin to 'playing God'.

Enframing is a dynamic process that summons forth nature into an ordering; as such it is a mode or moment in the coming to presence of Being. Such language sounds strange to the uninitiated, and even to the initiated, for it hints at some force or phenomenon that encompasses all of human beings, technology and nature, and within which each must be understood. The phenomenon in question is Being, that which transcends all categories and so eludes definition. Being remains the enigma that humans, the being that questions Being, must search to know. The search is a challenge because Enframing itself works to conceal the 'more primal truth'.[32] Nevertheless, humans are the agents through whom nature is challenged to present itself in this way, as Enframing. Once again, the process of 'unconcealment' is never the work of humans themselves, in the same way that humans do not choose to occupy the realm defined by subjects and objects.[33] Modern technology is 'no mere human doing'.[34] In this view, geoengineering should not be read merely as a human project, conceived as a response to a desperate situation, but as a stage, perhaps the last stage, of the epoch of Enframing.

As this suggests, for Heidegger technology was not merely a new way for humans to relate to nature; it provided the fundamental condition of modernity because it names the innermost character of modern reality as it is manifested in human culture and society.

Technology makes modernity, and so it is essential to being human; it is the expression of our creative aspect, the emergence of which is inscribed in the history of Being. Arising out of this understanding, Heidegger can make his oft-quoted declaration that the essence of modern technology is nothing technological.[35] In the case of geoengineering, the pieces of equipment that would be used to regulate the amount of solar radiation reaching Earth (aircraft, nozzles, tanks, jet fuel, containers of sulphuric acid) may be referred to as 'technology' and the assembly of the various pieces of equipment into a workable system may be described as 'technological activity'; but the essence of geoengineering lies in the fulfillment of the world revealed as Enframing. Instead of the world presenting simply as a collection of resources available for exploitation, with geoengineering the globe as a whole becomes integrated and presented as a total resource. The significance of this should not be overlooked. To date, the transformation of aspects of nature into standing reserve has had the effect of rendering them meaningless. Yet it remained possible, for those who retained a residual sense of 'enchantment', to cling to the idea that meaningless resources were embedded in a world of incalculable and infinite meaning. With solar radiation management this pre-modern remnant is finally swept away.

Nevertheless, here we come up against something new and distinctive about geoengineering that seems to sit awkwardly with Heidegger's description of the essence of technology. As technologies of planetary control, geoengineering projects (of the sort mentioned) do not set out to mobilise nature as standing reserve, as energy or materials to enhance human welfare. Instead, they seek to exert human control over the total living environment as a defense against the harm being caused by other technologies. Yet Enframing is a totalizing ontology within which humans are constrained to order and

control. So while geoengineering is ostensibly about protecting our welfare from the effects of technology, in fact it is a radical continuation of the urge to control, one made necessary by the chaos brought about by our desire to control.

So geoengineering is the completion of the Enframing project, because it represents the culmination of the summoning forth of nature first as standing reserve, in which its entities appear as materials and energy, then opening out into a system for ordering the whole. Whereas previously the elements called up as standing reserve formed distinct objects (minerals mined, crops cultivated, rivers dammed, coal dug up), now the Earth as a whole is objectified, the object of all objects. The scientific thinking on which geoengineering is built has expanded its horizons so that it completes the task of modern science which 'pursues and entraps nature as a calculable coherence of forces'.[36]

The advent of geoengineering represents something conspicuously new. Total planetary control has become imaginable because, after three centuries of modern technology, nature is breaking out of the bounds imposed by systematic thinking, revealing itself to be something more, as an autonomous force. So here is the contradiction of solar radiation management: it is conceivable because of Enframing, yet it becomes 'necessary' only because of the failure of the Enframing project, which in turn arose because Enframing created the kind of human being who could not stand outside the will to control and was compelled to push it too far. This is why, as a radical extension of the urge to control, geoengineering is made necessary by the chaos caused by previous attempts to exert control. This new fact has implications, considered later, for Heidegger's ontology.

Understood psychologically, geoengineering is a kind of covering-over. Beyond attempts to protect the fossil fuel industries and the lifestyles built on them, by bringing to its full realisation the program of Enframing the geoengineers seek to shore up the modern way of seeing the world and thereby keep hidden the 'more primal truth'[37] that science and technology have always concealed. And the technological cover-up is taking place just as the pressure for the more primal truth to burst forth becomes most intense.

IV. Models and systems thinking

Some authors have attempted to 'update' Heidegger's analysis by arguing that technology has changed in some fundamental way since his death in the 1970s.[38] The results have been unconvincing because they slip back into thinking about technology as an instrument for affecting human welfare. They forget Heidegger's injunction: 'All that is merely technical never arrives at the essence of technology.'[39] Yet if information technology, biotechnology, nanotechnology and so on do not represent anything fundamental, more recent developments in the conception of the world-as-picture do call for further thinking about the evolution of Enframing.

Today we would call Heidegger's fixed ground plan a model. All models, which may take a form more or less mathematical, simplify 'reality', with the simplification justified by the usefulness of the model. But what is overlooked is the way in which 'reality' is pictured before it is modeled. Selection of those aspects of reality to be captured in a model presupposes a type of world that can be so captured. While scientists make judgments about which models are more or less *useful* (for understanding 'reality') they cannot stand outside the mode of representation. A model is a picture, a mental image of

an otherwise impenetrable complexity that comes into clearer view as a set of well-defined relationships. This is not the world as it is but a representation formed by humans. It defines what is, not in the sense that it emphasises some relations and ignores others, but in the act of representing in picture-model form. From that point on, any anomaly is understood as a failure in the picture itself and not in the failure of picturing.

This applies with equal force to models of the Earth's climate and the Earth-as-system thinking that grounds geoengineering. The Earth itself is first represented as a system of physical components, at the broadest level comprising the atmosphere, the biosphere, the hydrosphere, the cryosphere (the frozen parts of the Earth), and the lithosphere (the Earth's crust). These components are linked and set in motion by various processes, such as the water cycle that takes moisture from oceans to the atmosphere to land and back again, and the carbon cycle that describes the circulation of carbon through the various components of the system. Before the model can be constructed the Earth must first be conceived as a system, after which 'anomalies' can be made to conform to the system being modeled.[40] This systematization must itself presuppose that what is available for study consists of objects governed in their relation to other objects in ways definable by mathematical rules.

This does not mean that climate models are 'wrong'; on the contrary, they are all-too-revealing. But if one can step outside of technological understanding, they reveal more than the functioning of the technological world they set out to study; they reveal the limits to that understanding, and the partiality of picture-thinking, which is to say, technological thinking.

So model-thinking systematizes nature, and the system defines the legitimate object of study. The system's boundaries can be expanded, and the elements within elaborated, but in doing so every event is made subject to the process of model-building. The essence of a system is representation, definability and calculability, and these features impose constraints on being itself. Heidegger referred to this totalising process, an encompassing quantitativeness, as the 'gigantic', and it is the 'quality' of the gigantic that gives the modern epoch its greatness,[41] although the incalculable remains an 'invisible shadow' cast around all things.[42] Through the picture character of the world 'whatever is comes to a stand as object and in that way alone receives the seal of Being'.[43] All of this flows out of Descartes' original positing of the modern subject; man as subject becomes the 'relational center of that which is as such.'[44]

Climate models are developed out of the emerging discipline of Earth system science, which draws together various fields of scientific study within a conception of the Earth as a total system (comprised of the atmosphere, the hydrosphere, the lithosphere and the biosphere). 'Earth system science', runs a typical definition, 'embraces chemistry, physics, biology, mathematics and applied sciences in transcending disciplinary boundaries to treat the Earth as an integrated system …'.[45] The conception of the Earth as a cybernetic system projected onto the Earth is consistent with the Gaia theory.[46]

The Heideggerian understanding of world-as-picture casts new light on the universally recognised photograph of the Earth taken in 1972 by the Apollo 17 spacecraft. It is often said that the first full image of the 'blue planet' revealed it to be precious, fragile and protected only by a wafer-thin atmospheric layer, and reinforced the imperative for better stewardship of our 'only home'. In contrast to these numinous readings, the NASA

photograph entrenched the apprehension of the Earth as picture, as total object, and thus reinforced the instrumentalist conception of the Earth. In this way, the image was not a break from technological thinking but its affirmation, even among those who used it to mobilize ecological concern using phrases such as 'our responsibility for the planet'.

NASA itself writes: 'From space we can view the Earth as a whole system, observe the net results of complex interactions, and begin to understand how the planet is changing in response to natural and human influences.'[47] Behind the photograph itself was the mode of its production, made possible by the mammoth technological feat of projecting humans into space equipped with sophisticated image-making devices. The image therefore represents a triumph of humanity's ability to free itself from the constraints of the Earth. Moreover, it provided pictorial corroboration of the *distancing* of humans from the Earth and validated the conception of the planet as an independent entity 'seen' by humans.

In this way, the Apollo 17 photograph authenticated and authorized the understanding of the world as object and thus the legitimate domain of technological manipulation. For those disinclined to question the mastery project, by entrenching the image of the world as a conceivable, visible total object the photograph prompts the idea that it could be subject to planetary technology, a potentiality now being realised in plans for geoengineering.

V. The history of Being

We now need to engage directly with the deepest ideas underlying Heidegger's philosophy, those of the nature of Being, how Being unfolds and its relation to human destiny. First it must be said that Heidegger nowhere defines Being, because to do so

would require the deployment of concepts, which would immediately deprive Being of its truth.[48] For Being must transcend all conceptualization; a sense of it can emerge only through its use in context. Moreover, because Being is that which lights up what exists it must remain open and cannot be frozen into a form available for our scrutiny.

In a way that proves valuable in grasping the meaning of geoengineering, an understanding of Heidegger's sense of Being can be gained from the distinction he drew between 'world' and 'earth',[49] introduced in his important 1935 essay 'The Origin of the Work of Art'.[50] Our existence is never abstract; our being is always being-in-the-world, where world is a structure of meaningful experience.[51] Humans create worlds out of earth, worlds that are 'setting[s] for meaningful action'.[52] In its nature earth always remains unfathomable and unknowable, yet it imparts to the world meaning. 'Earth thus shatters every attempt to penetrate it'[53] and lies beyond human measuring and appropriating. It always holds something back from our probing and investigation. Attempts to master earth with technical-scientific instruments will always fail, for earth resists worlding or ordering; indeed that which resists all rationalizing and totalising is earth.[54] At the risk of confusing the ontic with the ontological, perhaps a physical analogue of earth's resistance to ordering lies in the entropy law, the process of constant decay and dissipation that characterises energy and matter in the universe. It is a fundamental law of nature describing 'the inevitable and irreversible trend from ordered to disordered forms of energy'.[55] The unique characteristic of living things is that they resist the process of decay and disorder for a time; technology can be thought of as a temporary enhancement of this resistance but always with a greater long-term entropic

cost. The climate crisis is a reminder that entropy must always win out over attempts to hold it back.

Yet it is upon the earth that worlds are built, where 'historical man grounds his dwelling.'[56] World is the openness in which history plays itself out, in which culture develops. World and earth complete each other. In the same way that the coming to presence of humans and the coming to presence of Being depend on each other,[57] '[t]he world grounds itself on the earth, and earth juts through world'.[58] Earth will always irrupt into the order of world, so between the two there is constant tension. 'The world, in resting upon the earth, strives to surmount it. As self-opening it cannot endure anything closed.'[59] Earth, always self-secluding, retreats under the onslaught of technological thinking; but the climate crisis now teaches us that the retreat is only temporary. The creative tension between earth and world Heidegger names 'strife', probably echoing Heraclitus's maxim 'all things come to be through strife',[60] and it stands in direct contradiction to Kant's a priori ordering principles. The 'legislation for nature' now appears to be only the historically limited 'fixed ground plan' of modernity.

So between world and earth is strife, and in the struggle lies destiny and the possibility of meaning. Nihilism, the denial of all higher values, is the denial of this struggle—recognizing only world and suppressing earth.[61] All worlds are grounded on earth, understood this way, so that attempts to suppress earth are always attempts to make worlds float on air. In this light, geoengineering is an attempt to assert world and deny earth. Yet earth forever breaks through all attempts to order and control, which points to the ontological meaning of climate change. Plans to engineer the climate—through the creation of a planetary command centre—are bound to come to grief on the rock of earth

because, through all attempts by humans to understand and control the earth, disorder irrupts. Humans can master world but they cannot master earth. I am suggesting that disruption to the climate from human-induced global warming can be understood as earth breaking through into world, chaos breaking through the order, the unknowable imposing itself on all scientific knowledge.

Given the closeness of earth to Heidegger's Being, instead of the history of Being we may speak of the 'history of earth' not in a cosmological or geological sense but as the destiny from which worlds spring and which always remains out of reach. It is worth noting that Heidegger's conception implies a rejection of all ethical naturalism, such as that captured in Aldo Leopold's maxim: 'A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise.'[62] Heidegger did not see humans as deviating from some natural state to which they must return but as the being burdened with the task of giving meaning to existence, travelling on a path along which Being realises itself through humans. So environmental ethics based on an ideal of the good arising out of some conception of a harmonious natural state are alien; there is no place for nostalgia in the history of Being, for ecocentric ethical perfectionism or for any notion of intrinsic value in nature.[63] For these demand a conception of the natural from which humans have been purged, a state of being that is unimaginable.

Here we return to the implications of the climate crisis for Heidegger's ontology. The essence of technology is Enframing, which shows up reality in a particular way, as instrument over which humans exercise control. So for Heidegger the essence of technology structures being itself. Enframing is an epoch that belongs not in the first

instance to the history of humans but to the history of Being. It is here that we collide with the problem of destiny and whether the destiny of Being determines the fate of humans in a way that leaves no room for agency. For Heidegger, destiny is never a determinism. The question for him is whether we are controlled by destiny or whether we can find a free relation to it, a question that today is expressed in our relation to technology, and nowhere more acutely than in geoengineering's aim to control destiny.

Heidegger understood history in a unique way, as, in Zimmerman's words, an 'ontological happening conditioned by the way in which human Dasein responds to destiny'.[64] So he could argue that technological progress may go on indefinitely, raising material living standards to ever-greater heights, while insisting that the real problem lies in the essence of technology, in the way that reality is instrumentalised and objectified. For then the world is deprived of meaning, and this loss is reflected in all kinds of social pathologies associated with a lack of authenticity, an obliviousness to the earth as such, the externalization of ourselves, and distress in the form of boredom and anxiety.

It is apparent that the analytical path from social pathologies to the history of Being and back is strewn with obstacles. While Heidegger, more than any other philosopher, understood the relationship between the history of humans and the emergence of technology built on the essence of technology, it is now becoming clear that that which was the object of pacification and ordering, the earth, did not simply retreat under the onslaught. Heidegger did not foresee the impact of technology on its object, the natural world. Today, that impact is starkly before us. His argument about technological culture grasped nature as standing reserve without asking what it meant for nature to be characterised as standing reserve, as a site of violation. He had no phenomenology from

nature's standpoint. The implication for Heidegger's ontology are substantial, for it means discarding the idea that Enframing defines completely what is as an epoch in the history of Being. Instead, we may say that Enframing reveals Being in a certain light, the light of meaninglessness, but that does not signify Being in its entirety. This is not to revert to any idealism or the superimposition of worldviews or legislation for nature, and certainly not to any kind of naïve realism; it is not to say that there is a world, fixed and given and various human interpretations of that world. Humans are more than humanisms allow for;[65] we matter to Being because it is only through humans that Being can acquire what it most 'wants', meaning. Through us Being shines forth or recedes into the shadows.[66] Geoengineering schemes aim to confine Being to the shadows.

VI. Destiny and fate

Resorting to geoengineering treats human-induced climate change as an anomaly, as a process that has escaped the ordering of the world, an outbreak of disorder that calls for more rigorous application of technology. So we use our models to find the weak spots in the system that may be targeted with control interventions. From within Enframing the thought that the recalcitrance of the climate may be signalling the limits of systematising and the perils of appropriating the world as picture cannot occur. We hear this refusal frequently in declaration such as 'We can decide on our future' and 'It's up to us'—the slogans of mastery that sound more desperate as each year passes

Geoengineering itself is proof that the future is not in our hands, for if it were we would not have the crisis that geoengineering wants to solve. If we could control our destiny we would not be planning emergency measures because the emergency is brought on by us.

And when humans think about responding to climate change, all we can think is technology—renewable energy, nuclear energy, hydrogen energy, carbon capture and storage and now geoengineering. Only instrumental thinking is permitted. To repeat Heidegger: 'The will to mastery becomes all the more urgent the more technology threatens to slip from human control.'[67] That we have only technological answers to technology shows how much we live in the realm of Enframing, of the world-as-picture.

The problem of technology is not so much the destruction it can wreak but the ontological condition that founds it, and that condition is our misunderstanding of the nature of Being, our mistaking of world for earth. All of this points to the idea that we moderns are subject to much larger forces than we can imagine because our technology and drive to control are expressions of the history of Being itself. The history of Western science, technology and industrialisation must be rethought not as the creation of Cartesian agents but as destined in the great universal drama. Escaping the world of technological thinking cannot occur by an act of will; the essence of technology is not a social phenomenon but an ontological condition. Thus: 'No single man, no group of men, no commission of prominent statesmen, scientists, and technicians, no conference of leaders of commerce and industry, can brake or direct the progress of history …'[68]

Heidegger does not speak of destiny in the sense of some pre-ordained order that is compelled to unfold in a given way, including the epoch of Enframing. It is always the unfolding of the encounter between *Dasein* and Being, so that Enframing as a way of encountering nature is a necessary manifestation of the progress of human freedom. Free will must oppose Being before it can be reconciled with it, and it is towards this

reconciliation that the history of Being presses. The danger lies in becoming mired in the opposition, the objectification of nature.[69]

Enframing may be destined but, Heidegger insists, it is 'no blind destiny in the sense of a completely ordained fate.'[70] The accusation of determinism is more justifiably laid at the feet of the philosophies of progress built on the inevitability of science, Enlightenment, and growth. I am thinking of Kant, Hegel and Marx in early modern times and Habermas, Sen, Rorty and Rawls more recently.[71] So destiny should not be confused with fate. For Heidegger, Enframing is our destiny, an evolution written into the history of metaphysics from Plato onwards and now reaching its zenith. Yet a new beginning always remains possible. The gap between fate and destiny lies in us, for it is only through *Dasein* that the destiny of Being can play out.[72] The truth that humans and Being are inseparable provides the starting point for Heidegger's masterwork, *Being and Time*, where he declares his intention of reviving the question of the meaning of Being. It is captured in the term *Dasein,* the being that questions the meaning of Being.[73]

Yet it is not within our power to escape our fate through any act of will. When we understand technology as arising out of Enframing then we are open to being freed from its grip and entering into a free relation to it. In a crucial passage, Heidegger describes 'the open space of destining, a destining that in no way confines us to a stultifying compulsion to push on blindly with technology or, what comes to the same thing, to rebel hopelessly against it and curse it as the work of the devil. Quite the contrary, when we once open ourselves expressly to the *essence* of technology, we find ourselves unexpectedly taken into a freeing claim.'[74]

We cannot use thought to free ourselves from technology because that would mean technology is not the product of Enframing but solely our invention.[75] Philosophy is powerless, and so is science. The best we can hope for is that through 'thinking' we can open ourselves to this state of affairs and make ourselves ready. By 'thinking' we mean more than mere cognition; we mean a kind of orientation (like turning to the light in Plato's cave) that makes us receptive to the unfolding, a special kind of reflection that may allow us to transcend instrumental thinking, positivism, analytical philosophy and all forms of 'cybernetics'.[76]

The calling up of this kind of receptivity contrasts with the Kantian Enlightenment emphasis on human spontaneity, the creative urge that has metastasicized into the compulsion to turn the Earth as a whole into a resource. It might be asked, to what must we be receptive? The answer is the destiny of Being, surely a vague injunction but only in the same way that all calls for humility invoke a recognition that there are things greater than the human will that must be respected. Is not every environmentalism a recognition that the natural world has its own integrity and volition? Still, for those adhering to a Kantian conception of the autonomous subject Heidegger is guilty of what Marcuse described as a 'hopeless heteronomism'.[77] There is no middle path—either humans are entirely autonomous or they are at times responding to outside influences, within the boundaries of which they exercise free will. Humans are both much less and much more than humanisms allow.

From this view, if the geoengineering program is the culmination of the technological age, the final playing out of Enframing, then it should be understood both as a manifestation of the desire to control and our inability to control the desire to control. Yet

from this insight we can begin to cultivate receptivity, or what Heidegger calls a 'releasement to Being', so that Being can (once again) be entrusted to us.

VII. The danger and the saving

It is therefore not a question of mastering technology, or even of developing some ethical rules to govern its use, but of developing a free relation to it by understanding technology as an expression of a way of understanding the nature of Being and responding to the temptation put before us of using it to exert mastery.

'Enframing', wrote Heidegger, 'blocks the shining-forth and holding-sway of truth' and so hides the greatest danger. It is not technology itself that is most dangerous, but the essence of technology, that is, the way in which we forget our special status as the being through which the world finds its meaning and intelligibility[78] and instead impose on the earth as masters of destiny.[79] So we may say that it is not geoengineering itself that is most dangerous, but the ever-tightening grip of Enframing that makes geoengineering thinkable. Humans are bringing about a change in the Earth's climate that has initiated a mass extinction event, the sixth in the 3.8 billion years of life. But instead of pausing to reflect on what has led us into the perilous state—a reflection that would open up the possibility of rediscovering the most primal truth—we push on with the program. This is why Heidegger says that the danger is the epoch of Being coming to presence as Enframing, which pushes the truth of Being into the obscurity.[80] The technological answer to technology is a means of covering up the danger that lies in the way the essence of technology reveals the world as a calculable, orderable, controllable catalogue of resources for human benefit.

Heidegger was fond of quoting Hölderlin's line: 'where danger is, grows the saving power also'.[81] The saving is the safeguarding of Being. It is the human task to keep watch over all that comes to presence on this earth, and the danger arises when instead of keeping watch we are swept up into Enframing, the objectification of earth in which we lose ourselves. And yet: 'The closer we come to the danger, the more brightly do the ways into the saving power begin to shine and the more questioning we become.'[82] The truth of Being may be revealed suddenly, as in a lightening flash.[83] So it is precisely in the way technology threatens to trap us in a world of ordering, in a world of instrumental and analytical knowledge, that we may be 'saved' because it is through extreme danger that our ineradicable belonging to the 'creation' may come to light. As the Chinese proverb has it: when taken to their extreme, things revert to their opposite.

Heraclitus said: 'Every animal is driven to pasture by a blow'.[84] And perhaps the 'shepherd of Being' must be driven to the pasture by a blow. Does geoengineering represent the stretching of the instrumental to breaking point? Is it the event that moves us toward a turn that marks the beginning of another epoch in the history of Being?[85] Such a turning cannot be read from human history. We cannot predict the transcending of instrumentality from history, because history does not determine destiny. We can learn it only from Being itself, and to find Being we must find our way back to its essence. Even so, if we look clear-eyed at the science, the turning, if it comes, will come too late, at least too late to save the world we have created with technology. Earth now thrusts through all worlds and will take its own course.

Despite his sometimes Arcadian imagery and occasional Black Forest romanticizing, Heidegger was not opposed to technology. Yes, it represents the danger, but there can be

no going back to the pre-modern because Enframing must take its course. The task is not to oppose technology but to open ourselves to its ontological meaning and the power it has over us.[86] We can then free ourselves from technology without rejecting it, and until we free ourselves we cannot make a good judgment about geoengineering.

VII. What should we do?

In the *Der Spiegel* interview of 1966 (not published until 1978) Heidegger repeated his view that, because humans live in the essence of technology, they do not control technology: 'we have not yet found a way to respond to the essence of technicity'.[87] Proposals to engineer the climate system confirm that we have not yet found a way to respond to the climate crisis, except with more of the same. We can see the crisis only as a problem of technology rather than a problem of Enframing, that is, of experiencing the world as consisting of resources. Diagnosing an insufficiency of mastery, we plan to expand control over the so-far unregulated parts of the globe—the oceans whose chemical balance we would change, the chemical composition of the atmosphere, the amount of sunlight falling on the Earth.

When asked why technicity is a problem if the system is functioning well and making people prosperous, Heidegger appealed to our nature as the site for the revelation of Being: 'Everything is functioning. … [Yet] technicity increasingly dislodges man and uproots him from the earth'.[88] Today, in an era beyond the optimism of the post-war decades, we see that everything is not functioning well. The 'system'—the Earth system within which the economic and social systems subsist—only had the appearance of

functioning well, while all along it was heading for severe dysfunction, so that sooner or later earth would irrupt into world.

The condition in which humanity finds itself, where we plan to take control of the planet as a whole, was prefigured by Heidegger when he wrote that 'man, precisely as the one so threatened, exalts himself to the posture of lord of the earth. In this way the impression comes to prevail that everything man encounters exists only insofar as it is his construct … It seems as though man everywhere and always encounters only himself.'[89] Geoengineering is the realisation of this insight. Once deployed and we are under the illusion of the Earth under total control, the impression will prevail that wherever we turn we will only encounter ourselves, our own handiwork. But in truth, nowhere will we encounter ourselves for, to the extent it succeeds, the Enframing of the planet as a whole can only mean the further retreat of Being. With climate engineering *Dasein* shuns the question of Being and it is in this act of repudiation that the danger lies.[90]

Nietzsche's madman ran into the marketplace and asked in anguish: 'What were we doing when we unchained this earth from its sun?'[91] He could not have imagined that, with plans afoot to regulate sunlight, we would be confronting this question so literally. Met only with astonished stares, the madman muttered to himself: 'I have come too early. … This tremendous event is still on its way.' Now it has arrived, yet the citizens remain oblivious or when asked to give an opinion can give only technological ones.

When thought in this way, the climate crisis and the urge to engineer the Earth are 'the constellation of Being that is uttering itself to us'[92] so that by seeing into the essence of geoengineering we can become aware of that which we have forgotten, Being itself. 'Will

we see the lightning-flash of Being in the essence of [this particular world-controlling] technology?'[93] In the looming confrontation between humanity's determination to use geoengineering to take total control of the Earth and the infinite ability of earth to resist systematising will we see the 'lightening-flash of Being' beyond which lies an epoch in which humans recognise their essentially receptive nature, will we 'let beings be', and become the site in which entities come to presence? In other words, is climate engineering—the crisis that gave rise to the idea and the inherent impossibility of technological control of the earth— the 'event of appropriation' (*Ereignis*), the new beginning from the West that 'claims humanity as the site for the self-manifestation of entities'?[94] If humanity is granted the possibility of making such a transition then it would become possible to make worlds whose strife with earth is mutually creative instead of destructive. If that is not granted then surely humanity will have to live within 'the hardness of [its] fate'.[95] ■

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[1] Albert Borgmann, 'Technology' in Hubert Dreyfus and Mark Wrathall (eds), *A Companion to Heidegger*, (Oxford: Blackwell, 2005) p. 420

[2] For a description see Clive Hamilton, *Earthmasters: The Dawn of the Age of Climate Engineering* (London: Yale University Press, 2013); and Royal Society, *Geoengineering the Climate: Science, governance and uncertainty*, (London: The Royal Society, 2009).

[3] See the landmark intervention by Paul Crutzen, 'Albedo Enhancement by Stratospheric Sulfur Injections: A Contribution to Resolve a Policy Dilemma?' *Climatic Change*, 77 (2006), pp. 211-220

[4] Martin Heidegger, *The Question Concerning Technology and Other Essays*, trans. W. Levitt (New York: Harper & Row, 1977), p. 5

[5] Martin Heidegger, 'The Age of the World Picture' in *The Question Concerning Technology and Other Essays*, ibid.

[6] Ibid., p. 115

[7] Hans Ruin, '*Ge-stell*: Enframing as the Essence of Technology' in Bret Davis (ed.), *Martin Heidegger: Key Concepts*, forthcoming

[8] It is important to stress that in using the world 'essence' Heidegger does not intend to invoke the idea of that which is common to all entities or a notion of pure existence; he wants to get at the idea of the essential meaning of an event.

[9] On the vexed question of how to define technology I find *The Nature of Technology* (London: Penguin, 2010) by W. Brian Arthur most helpful. He defines a technology as 'a phenomenon captured and put to

use' (p. 51), where phenomena are mostly physical effects such as the release of energy when carbon-based molecules are oxidized and heated, the way light is refracted through a lens, the way wind energy turns a propeller that can drive a turbine, and so on. These myriad phenomena—mechanical, electrical, photonic, biological, nuclear, etc— are waiting to be discovered by humans and then orchestrated to our benefit.
[10] Hans Ruin, 'Technology as Destiny in Cassirer and Heidegger: Continuing the Davos Debate', in Aud Sissel Hoel and Ingvild Folkvord (eds), *Form and Technics: Reading Ernst Cassirer from the Present* (New Haven: Yale University Press, forthcoming) p. 21
[11] For example, in Carolyn Merchant, *The Death of Nature: Women, Ecology, and the Scientific Revolution*, (San Francisco: Harper & Row, 1980).
[12] Trish Glazebrook, 'From "physis" to Nature, "techne" to Technology: Heidegger on Aristotle, Galileo, and Newton', *Southern Journal of Philosophy*, 38 (2000), 1, p. 112
[13] Here I rely largely on the work of Catherine Pickstock, acknowledging that the interpretation she gives is the subject of debate among scholars. Catherine Pickstock, *After Writing: On the Liturgical Consummation of Philosophy* (Oxford: Blackwell, 1998); Catherine Pickstock, 'Duns Scotus: His historical and contemporary significance', *Modern Theology*, 21 (2005), 4.
[14] Pickstock, *After Writing*, ibid., p. 61
[15] Theodore Kisiel, *The Genesis of Heidegger's Being and Time*, (Berkeley: University of California Press, 1995), p. 30
[16] Pickstock, *After Writing*, op. cit., pp. 62 & 63
[17] Ibid., p. 128
[18] Heidegger, 'The Age of the World Picture', op. cit., p. 118
[19] This helps resolve the debate over whether technology can be regarded merely as applied science. Heidegger would have been sympathetic to Arthur's argument as to the centrality of technology to scientific discovery, both in the form of devices and purposive constructions (theories and reasonings), so that 'science is a form of technology'. Arthur, *The Nature of Technology,* op. cit., p. 64. However, Arthur makes this claim within an instrumentalist frame.
[20] Heidegger, 'The Age of the World Picture', op. cit., p. 133
[21] Ibid., p. 132
[22] Although there was little mention of technology as such. See the thorough account in Peter Gordon, *Continental Divide: Heidegger, Cassirer, Davos* (Cambridge, MA: Harvard University Press, 2010) where 'technology' does not appear in the index.
[23] See Ruin, 'Technology as Destiny in Cassirer and Heidegger', op. cit.
[24] Ibid., p. 10
[25] Heidegger, 'The Question Concerning Technology', op. cit., p. 6
[26] Ibid., p. 4
[27] Ibid., p. 17. Heidegger adds the cryptic comment: 'Whatever stands by in the sense of standing-reserve no longer stands over against us as object.' I think he meant that, in the creation of standing reserve, the subject takes over the object and makes it part of him or herself.
[28] Ibid., p. 23
[29] Translator's footnote, ibid., p. 3.Thomson provides a definitive response to those who accuse Heidegger of the sin of essentialism—see Iain Thomson, *Heidegger on Ontotheology: Technology and the Politics of Education* (Cambridge: Cambridge University Press, 2005) Chapter 2.
[30] Heidegger, 'The Question Concerning Technology', op. cit., p. 19
[31] Borgmann, 'Technology', op. cit., p. 427
[32] Heidegger, 'The Question Concerning Technology', op. cit., p. 28
[33] Ibid., p. 18
[34] Ibid., p. 19
[35] Ibid., p. 20. The temptation to elide technology and the essence of technology explains the implausibility of those who argue that Heidegger's analysis of technology needs to be modified because computers have changed its nature. Despite their fetishisation, computers only enhance the modern metaphysics of world-as-picture.
[36] Ibid., p. 21
[37] It has to be said that when Heidegger refers to 'the primal truth' and suchlike, it is hard to avoid the impression that, like the 'metaphysicians' he criticised, he is referring to some generic quality, enduring feature or stable ground that it is our task to uncover. However, Heidegger is not arguing that there is some

true state from which we have deviated, but that the current world of modern technology and Enframing is a moment in the unfolding of the 'greater truth' of Being. 'It is technology itself [i.e. the way that, in modernity, we were expelled from 'the house of Being'] that makes the demand on us to think in another way what is usually understood by "essence"' (Ibid., p. 30). Mark Wrathall explains that, for Heidegger, 'primordial' truth is not that which somehow underpins all other truths but one that is central to 'the primary ontological function of world disclosure' ('Heidegger on Human Understanding: Rethinking the 'Pragmatic' Interpretation of Being and Time', paper presented at the Oxford Post-Kantian Seminar, University of Oxford, November 2, 2011).

[38] See, eg., Don Ihde, *Heidegger's Technologies: Postphenomenological Perspectives* (New York: Fordham University Press, 2010).

[39] Heidegger, 'The Question Concerning Technology', op. cit., p. 48

[40] Occasionally a large anomaly refuses to fit into the model, at which point a new and more comprehensive model is developed.

[41] Heidegger, 'The Age of the World Picture', op. cit., p. 135. See also Heidegger on the gigantic in *Contributions to Philosophy: On Enowning* (Bloomington: Indiana University Press, 1999) pp. 95-6, where he comments on its blindness to what is 'overflowing', that which is bursting out of the constraints that representation and calculability attempt to impose.

[42] Heidegger, 'The Age of the World Picture', op. cit., p. 135

[43] Ibid., p. 132

[44] Ibid., p. 128. 'In the planetary imperialism of technologically organized man, the subjectivism of man attains its acme, from which point it will descend to the level of organized uniformity and there firmly establish itself. This uniformity becomes the surest instrument of total, i.e., technological, rule over the earth' (p. 152).

[45] http://serc.carleton.edu/introgeo/earthsystem/nutshell/ (accessed 10 November 2011)

[46] For a critique of the Gaia theory as merely a development of systems thinking see Clive Hamilton, *Requiem for a Species* (London: Earthscan, 2010) pp. 147-52.

[47] http://science.nasa.gov/media/medialibrary/2010/03/31/ESE_Strategy2003.pdf (accessed 10 November 2011)

[48] Iain Thomson argues that the ambiguity plaguing the terms 'being as such' (which allows a historical succession of being of entities to show up) and 'the being of entities' (which implies that there is some fundamental ontology that can be recovered) led to Heidegger's dissatisfaction with the term 'Being' and his later substitution of 'the fourfold' ('Ontology and Ethics at the Intersection of Phenomenology and Environmental Philosophy', *Inquiry*, 47 (2004), pp. 380-412, p. 399).

[49] Henceforth, I use uncapitalized 'earth' to refer to Heidegger's ontological idea and capitalized 'Earth' to refer to the planet as a physical object.

[50] Martin Heidegger, 'The Origin of the Work of Art', in *Martin Heidegger: Basic Writings*, edited by David Farrell Krell (New York: Harper Perennial, 2008)

[51] Andrew Feenberg, *Heidegger and Marcuse: The Catastrophe and Redemption of History*, New York: Routledge, 2005) p. 2

[52] Wrathall, 'Heidegger on Human Understanding', op. cit., p. 2

[53] Heidegger, 'The Origin of the Work of Art, op. cit., p. 172

[54] Hubert Dreyfus, 'Heidegger on the connection between nihilism, art, technology, and politics' in Charles Guignon, *The Cambridge Companion to Heidegger*, 2nd edition, Cambridge: Cambridge University Press), esp. p. 356

[55] Paul Davies, *The Fifth Miracle* (New York: Simon & Schuster, 1999) p. 51

[56] Heidegger, 'The Origin of the Work of Art', op. cit., p. 172

[57] Martin Heidegger, 'The Turning' in *The Question Concerning Technology and Other Essays*, trans. W. Levitt (New York: Harper & Row, 1977)

[58] Heidegger, 'The Origin of the Work of Art', p. 174. Sometimes translated as 'thrusts through'.

[59] Ibid., p. 174

[60] Fragment 80 in T. M. Robinson, *Heraclitus: Fragments*, University of Toronto Press, Toronto, 1987.

[61] Dreyfus, 'Heidegger on the connection between nihilism', op. cit., p. 357

[62] Aldo Leopold, *A Sand County Almanac* (Oxford: Oxford University Press, 1968 [1949])

[63] Thomson, 'Ontology and Ethics at the Intersection of Phenomenology and Environmental Philosophy', op. cit., p. 395

[64] Michael Zimmerman, *The Eclipse of the Self: The Development of Heidegger's Concept of Authenticity* (Athens OH: Ohio University Press, 1981) p. 11
[65] In his 1947 'Letter on Humanism', Heidegger declared 'Humanism is opposed because it does not set the *humanitas* of man high enough' (in David Farrell Krell (ed.), *Martin Heidegger: Basic writings* (New York: Harper & Row, 1977) pp. 233-4.
[66] 'It is toward the great essence of man that we are thinking, inasmuch as man's essence belongs to the essence of Being and is needed by Being to keep safe the coming to presence of Being into its truth' (Heidegger, The Turning, p. 40). In his famous *Der Spiegel* interview recorded in 1966, Heidegger once again stressed the mutual dependence. 'It is not through man that the world can be what it is and how it is, but also not without man.' 'Only a God Can Save Us', *Der Spiegel*, 30 May 1976 in T. Sheehan (ed.), *Heidegger: The Man and the Thinker*, (Chicago: Precedent Press, 1981).
[67] Heidegger, 'The Question Concerning Technology', op. cit., p. 5
[68] Martin Heidegger, *Discourse of Thinking*, (New York: Harper & Row, 1975), p. 52 (quoted by Dreyfus, op. cit., 360). The quotation actually ends with 'brake or direct the progress of history in the atomic age'.
[69] Ruin (*Ge-stell*, op. cit.) argues along these lines.
[70] Heidegger, 'The Question Concerning Technology', op. cit., p. 47
[71] Iain Thomson refers to 'Kant's optimistic prognostications concerning humanity's 'essential destiny' … [and] our long-standing and amazingly resilient liberal democratic faith in the slow but steady historical progress of rational 'enlightenment'.' *Heidegger on Ontotheology: Technology and the Politics of Education* (Cambridge: Cambridge University Press, 2005), p. 46
[72] Carl Jung noted that that which remains in the unconscious becomes our destiny.
[73] That the nature of existence can be understood only through the being of humans is an unacknowledged insight due to Schopenhauer, in turn borrowed from the East.
[74] Heidegger, 'The Question Concerning Technology', op. cit., pp. 25-6
[75] And, obversely, in rejecting the Cartesian subject Heidegger 'claims only that intelligence and intelligibility do not reside *only* in cognition' (Wrathall, 'Heidegger on Human Understanding', op. cit.).
[76] Heidegger, 'Only a God Can Save Us', op. cit.
[77] Quoted in Thomson, 'Ontology and Ethics', op. cit., p. 397.
[78] Feenberg, *Heidegger and Marcuse*, op. cit., p. 2
[79] Heidegger, 'The Question Concerning Technology', op. cit., p. 28
[80] Heidegger, 'The Turning', op. cit., p. 43
[81] Ibid., p. 42
[82] Heidegger, 'The Question Concerning Technology', op. cit., p. 35
[83] Heidegger, 'The Turning', op. cit., p. 44
[84] Robinson, *Heraclitus: Fragments*, op. cit., Fragment 11
[85] Heidegger, 'The Turning', op. cit., p. 37
[86] See Dreyfus, 'Nihilism, Art, Technology, and Politics', op. cit., pp. 359, 362-3. 'We can affirm the unavoidable use of technical devices, and also deny them the right to dominate us, and so to warp, confuse, and lay waste our nature' (from *Discourse on Thinking*, quoted by Dreyfus, p. 362).
[87] Heidegger, 'Only a God Can Save Us', op. cit.. 'Technicity' is a rendering of the German word usually translated as 'technology'.
[88] Ibid.
[89] Heidegger, 'The Question Concerning Technology', op. cit., p. 27
[90] '*In truth, however, precisely nowhere does man today any longer encounter himself, i.e., his essence*' Ibid., p. 27 (italics in original).
[91] Friedrich Nietzsche, *The Gay Science* (New York: Vintage Book), 1974, p. 181
[92] Heidegger, 'The Question Concerning Technology', op. cit., p. 48
[93] Ibid., p. 49
[94] Michael Zimmerman, 'Heidegger, Buddhism, and Deep Ecology' in Charles Guignon (ed.), *The Cambridge Companion to Heidegger*, 2nd edition (Cambridge: Cambridge University Press, 2006), p. 303
[95] Heidegger at Davos, quoted by Gordon, *Continental Divide*, op. cit., p. 200