

THE WAYS OF REFLECTION: HEIDEGGER, SCIENCE, REFLECTION,
AND CRITICAL INTERDISCIPLINARITY

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This thesis argues that there is a philosophical attempt directed at combating the fragmentation of the sciences that starts with Heidegger and continues today through Trish Glazebrook's interpretations of the former's concept of "reflection," and Carl Mitcham and Robert Frodeman's concept of "critical interdisciplinarity" (CID). This is important as the sciences are both more implicated in our lives and more fragmented than ever. While scientific knowledge is pursued for its own sake, the pertinent facts, meaning, and application of the science is ignored. By linking Heidegger's views on the fragmentation of the sciences to Glazebrook's interpretations of reflection and Mitcham and Frodeman's CID, I show that CID is a concrete realization of Heidegger's reflection.

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PREFACE

This thesis argues that there is a philosophical attempt directed at combating the fragmentation of the sciences that starts with Heidegger and continues today through Trish Glazebrook's interpretations of the former's concept of "reflection," and Robert Frodeman and Carl Mitcham's concept of "critical interdisciplinarity." This is important as we now live at a time when the sciences are both more implicated in our lives than ever before, while simultaneously the sciences are more fragmented than at any time. While scientific knowledge is pursued for its own sake, the pertinent facts, meaning, and application of the science is ignored. As Frodeman has written, "Science concerns itself with facts rather than meanings; and (despite the libertarian biases of our culture) democratic debate must be tempered by the wisdom embodied within the humanities" (2003:7). Interdisciplinarity (hereafter, ID) has attempted to address these problems, but with mixed results. Far too often, ID spawns growth of more disparate sciences; instead of disciplinization being transcended, it is re-reified and expanded. Mitcham and Frodeman's work has sought to understand and combat this, through the concept of "critical interdisciplinarity," (hereafter, CID) in their essay "New Directions in Interdisciplinarity: Broad, Deep, and Critical." This concept, they explain, has its roots in Heidegger's work "Science and Reflection"; both texts are key to this thesis (Mitcham, Frodeman 2007:506-7).

This rapid expansion of scientific fragmentation was a concern of Heidegger's as early as 1933 when he gave his *Rektoratsrede* (Rector's address). In that speech he sought to bring the sciences back to their origin of ancient Greek philosophy, an origin that had long since been forgotten by the sciences. "All of science is, in essence, philosophy, regardless of whether

science acknowledges this historical fact," he declared from the podium (Heidegger 1991:30-31). As Glazebrook shows however, this concern continued to expand into his later writings, the most important one of which (at least for this thesis) is "Science and Reflection," written in 1955. She asserts that reflection is an "alternative to modern scientific theory," one that it would appear "must entail the unity of knowledge over against its fragmentation" (Glazebrook 2000: 103). This interpretation is most important to this thesis because it binds together reflection and interdisciplinarity (i.e. "unity of knowledge").

In "Science and Reflection," Heidegger goes to great hermeneutical lengths to demonstrate that even though it is said that "Science is the theory of the real," there is an even older meaning of "theory" that reigns. He does this to show that just because theory's origin in careful attentiveness has been forgotten, it has not vanished. By reflecting on what matters most, he asserts, we can find our way back from the modern scientific definition of truth, to the ancient Greek one. In so doing, we (including the scientist) can combat the fragmentation of the sciences. However, Heidegger is not very clear on what reflection is, only what it is not. This raises justifiable concerns about how to make it concrete and effective, as Glazebrook herself mentions (Glazebrook 2000:103). Further, would it be going against Heidegger's wishes to even attempt such a thing? I argue that there is no problem with trying to make reflection concrete as CID, so long as it is Heidegger's fairly clear admonitions on what reflection is *not* are kept in mind. "Reflection is of a different essence from the making conscious and the knowing that belong to science" (Heidegger 1977:180).

By linking Heidegger's views on the fragmentation of the sciences to Glazebrook's interpretations of reflection and Mitcham and Frodeman's CID, I show that CID is a concrete

realization of Heidegger's reflection. Making it perfect is not an option, however, but making reflection possible is. Only by a shared, critical, and interdisciplinary focus on That which is worthy of questioning, whether by scientists, philosophers, or the public and private sectors, can we hope to get anywhere near that elusive concretization.

Heidegger's Nazism is not a focus of the thesis. I don't find any evidence (never mind any accusation) that the concept of reflection or his views on the sciences have any intrinsic relationship to Nazism. I find his Nazism repugnant and ignorant and his infamous silence baffling and tragic. This doesn't mean, however, that philosophers and other thinkers can't go into his work and find interesting concepts with which to forge useful approaches. It is especially important, nonetheless, to mention his Nazism since his *Rektoratsrede* is a crucial text for this thesis, and was written and spoken when he himself was a Nazi.*

In the short introductory chapter 1, I unpack Glazebrook's interpretation that "reflection must entail the unity of knowledge" (Glazebrook 2000:103). I highlight the work of Mitcham and Frodeman and their approach called "critical interdisciplinarity" (CID) as a way of combating the continuing fragmentation of the sciences.

In chapter 2 I rely on Heidegger's *Being and Time* to provide the framework of his basic views on Being, humans, human understanding, and science. Without this background there would be no understanding of just how science arises from everyday existence, let alone the possibilities Heidegger thinks that understanding creates for all of us, scientists included.

* There are many books addressing the question of the relation of Heidegger's philosophy to the views and aims of the Nazis. I'd suggest Iain D. Thomson's wonderful *Heidegger and Ontotheology: Education and the Politics of Technology*; Charles R. Bambach's closely argued and engrossing *Heidegger's Roots: Nietzsche, National Socialism, and the Greeks*, (especially the chapter on the *Rektoratsrede*); Richard Wolin's anthology which features several key primary texts, *The Heidegger Controversy: A Critical Reader*; Hugo Ott's *Martin Heidegger: A Political Life*; and Hans Sluga's *Heidegger's Crisis: Philosophy and Politics in Nazi Germany*.

In chapter 3 (the longest chapter of the thesis) the focus is on Heidegger's concern regarding the status and interrelationships of the sciences, the university, and the community. He is troubled that as specialization in the sciences grows the questioning search for meaningful knowledge is lost. I examine the "Nothing" from "What is Metaphysics?"; the criticism of specialization in the *Rektoratsrede*; as well as the tricky hermeneutics of "Science and Reflection." Luckily, Glazebrook's text is there to provide clarity into just why it really matters that "Science wants to know nothing of the Nothing," and what role reflection has to play in addressing this crucial problem of our times.

CHAPTER 1

CRITICAL INDISCIPLINARITY

In this short introductory chapter, I first unpack Glazebrook's interpretation that "reflection must entail the unity of knowledge" (Glazebrook 2000:103). Second, I highlight the work of philosophers Carl Mitcham and Robert Frodeman in ID, as a way of combating the continuing fragmentation of the sciences. Next, I argue that, following the conceptual pathway through the work of Heidegger, Glazebrook, Frodeman, and Mitcham, reflection *can* be made concrete *as* CID.

Glazebrook's key references regarding her interpretation of Heidegger's concept of reflection are few, three basically. However, they provide us with a clear picture of her thoughts, not in spite of their brevity but because of it. She writes, regarding "Science and Reflection," that

[In 1933 and 1937] Heidegger spoke of breaking down departmental barriers and bringing to the sciences a meaningful unity. In 1955, in "Science and Reflection" he does not make this idea more concrete. Yet it seems that the alternative to modern scientific theory – that is, reflection – must entail the unity of knowledge over and against its fragmentation, since his tracing of the history of "theory" points explicitly to the dividing of knowledge into specialized disciplines. (Glazebrook 2000:103)

Firstly, she positions reflection as "an alternative to modern scientific theory," and secondly she asserts reflection "must entail the unity of knowledge over and against its fragmentation" (2000:103). I read "unity of knowledge" as ID, then adding reflection to arrive at reflective interdisciplinarity; thus, what is needed is a reflective ID. (As is shown below, the work of Mitcham and Frodeman is already doing much the same thing with their concept of CID.) In this quote and the two others to follow, I see this possibility being grafted onto the work of Heidegger by Glazebrook; later, as the work of Mitcham and Frodeman is examined, it is shown

how these philosophers have interpreted and applied Heidegger's views to combating the fragmentation of the sciences. It is not, however, a matter of finding a quote from Heidegger that will say that reflection *is* interdisciplinarity; to my knowledge there isn't one.

Further, to Glazebrook's knowledge (and I'd concur) it just isn't totally clear *what* he meant by reflection. I address some of his mystico-poetic language, and make a bit of a stab at interpreting it, perhaps sounding just as vague in the attempt. It is nearly impossible to interpret anything "properly," if by that term one means what Heidegger would have meant; many Heideggerians, unintentionally or otherwise, prove this very point with endless debates over every micro-shift of his labyrinthine taxonomy. Instead, the point is to identify a path in the philosophies of Heidegger, Glazebrook, and Frodeman that takes us from reflection as a concept to reflection as an approach, in order to combat the fragmentation of the sciences. As philosopher Graham Harman has written regarding Heidegger, "The historical greatness of explorers or inventors or philosophers does not guarantee that they have exhausted their own subject matter" (Harman 2002: 17). Heidegger could be surprisingly clear regarding reflection, however this clarity is always negative, i.e. what *not* to do, or what reflection *isn't*. When telling us what reflection *is*, his language is almost always mystico-poetic, or just plain vague.

Here are two examples:

Negative clarity:

Reflection is of a different essence from the making conscious and the knowing that belong to science. It is of a different essence also from intellectual cultivation. (Heidegger 1977:180)

Positive vagueness:

The ways of reflection constantly change, ever according to the place on the way at which a path begins, ever according to the portion of the way that it traverses,

ever according to the distant view that opens along the way into that which is worthy of questioning. (1977:181)

Interpretation of any of the relevant passages in Heidegger's canon, at least in my experience, quickly exposes bedrock through which one can go no further; this bedrock is the absence of any clear positive prescription. It is the argument of this thesis, however, that positing CID as an effective way to make reflection more concrete is in no way beyond the pale of reasonableness, especially in the light of Heidegger's lifelong excoriation of specialization, and his work as rector to combat it. Further, this absence of any clear positive prescription is not solely my view of things, but is also seen in the close qualifications Glazebrook herself uses when she posits her interpretation of reflection.

In her second key quote regarding reflection and combating the fragmentation of the sciences, she writes,

I conclude [this chapter] by arguing that an alternative possibility to the nihilism of representationalism thinking - an alternative that grows in Heidegger's work to an explicit call for thinking and reflection, and which is recognized by his readers as the possibility of thinking beyond the confines of the history of metaphysics - is for Heidegger, insofar as he explains it at all, possible only through and as reflection on the sciences. (Glazebrook 2000:121)

"[I]nsofar as he explains it at all," she adds here; in the first quote she wrote that "he does not make this idea more concrete" (2000:103).

It is plain to see that she does not find a clear, positive answer regarding how to make reflection applicable in Heidegger's canon. Yet she still has a position of what she thinks that would be: reflection on the sciences in order to unify them and, in so doing, combat the continued fragmentation. The only word I want to add to her position Mitcham and Frodeman's keyword: interdisciplinarity. In her final key quote she writes that

[The question what is worth knowing] will remain for [Heidegger] always the question of reflection upon the sciences, and will be taken as one of his most thought-provoking and significant contributions to philosophy: that there is something for thinking at the end of modernity that is radical in the sense of going to the root of both thinking and human being. This possibility is a new thinking, a deep reflection beyond science and beyond metaphysics. Heidegger will call it both thinking (*Denken*) and reflection (*Besinnung*). (2000:161-62)

The way to focus on what is worth knowing is via reflection on the sciences, one that moves "beyond science and beyond metaphysics."

In order to move in this manner it is necessary for scientists and philosophers to work reflectively in concert; a reflective interdisciplinarity, in other words. Let's now examine the work of Mitcham and Frodeman. Early on in their essay "New Directions in Interdisciplinarity: Broad, Deep, and Critical," they relate the pioneering importance of Heidegger's "Science and Reflection," quoting from it twice. They write,

The complementarity of disciplinarity and interdisciplinarity was adumbrated by Martin Heidegger in a mid-1950s essay ["Science and Reflection"], where he noted the mysterious way that science depends on both disciplinarity and interdisciplinarity: 'Specialization is...a necessary consequence...of the coming to be of modern science.' Nevertheless, disciplinary compartmentalization does not just 'split one science off from one another'; it also 'yields a border traffic between them'. (Mitcham, Frodeman 2007: 507)

Mitcham and Frodeman credit Heidegger with also seeing that this 'border traffic' gives rise to "new disciplinary formations" (2007: 507). Furthermore, they point out that ID often ends up creating more disciplines (2007:507). They write,

Indeed, in the way that interdisciplinarity usually functions, it does not so much counter disciplinarity as advance it. But note that this form of interdisciplinarity, rather than promoting global views, creates additional and ever more regional ontologies. It has become apparent, however, that the complexity of many problems — from social anomie to climate change — calls for global views, even at the cost of more nuanced epistemological analysis. (2007:507)

Mitcham and Frodeman seek to combat this problem because "a need exists for some kind of discipline-transcending reflection - a reflection that nevertheless struggles for realization" (2007:513). This "discipline-transcending reflection" which Mitcham and Frodeman call "critical interdisciplinarity" [CID], would seek to avoid the insistence on extreme vertical slices of knowledge in only one area, and the creation of yet another new discipline. Instead, CID would apply a horizontal approach

moving beyond the academy into dialogue with the public sector, the private sector, and community and stakeholders including religious groups. Our academic research portfolio must include an account of how to effectively integrate knowledge within the decision-making context faced by governments, business people, and citizens. Critical interdisciplinarity requires a horizontal and vertical axis. The contemporary knowledge society represents a multi-dimensional challenge, involving not only the horizontal axis that stretches across the physical sciences, social sciences, and humanities, but also a vertical axis where academic research is self-consciously integrated into the multiple contexts of contemporary life. (2007:513)

They stress that CID would also focus on assessing the values in society and the role these values play in ID, instead of merely describing them. In this way, CID would be "working with society as it struggles to address questions of social and environmental justice, human freedom, and responsibility, and the proper roles of the public and private sectors" (2007:513). In so doing a new dialogue would be constructed between the sciences and the humanities, integrating knowledge for the crucial problems of today and tomorrow, and eschewing the "iconic status of scientific curiosity," and knowledge for its own sake (2007:513).

If, as Glazebrook wrote, reflection is the "alternative to modern scientific theory" and something that "must entail the unity of the sciences," then CID would doubtlessly make reflection more concrete. It addresses the fragmentation of the sciences, it rejects obsessive pursuit of knowledge and facts for their own sake, it refuses to ignore the crucial role of the

humanities, and it refuses to ignore society. But would Heidegger approve? It has already been examined above that there are tremendous difficulties of adequately answering such a question. As I have argued and shown, he is fairly clear when describing what reflection is *not*, but very unclear and mystico-poetic when describing what reflection *is*. I think a *very* reasonable interpretation about this fact is simply that he thought it much more important that it was understood what reflection *wasn't*, than he did that it was understood what reflection *was*. In other words: in the absence of a clear description of how to make reflection concrete, it is then, in my view, acceptable to presume that such a necessary and crucial task is left for those concerned to decide how to follow the ways of reflection.

CHAPTER 2

HUMAN UNDERSTANDING AND THE SCIENCES IN BEING AND TIME

In order to adequately address the problem of the fragmentation of the sciences and its solution in reflection made concrete as CID, it must first be explicated *how* and *why* Heidegger asserts that, like all human beings, all scientists throughout the history of science began life as humans, thrown into an existence where they had being-in-the-world and a concomitant understanding of being. With the goal of explaining all of the above, Section 1 examines Heidegger's concept "understanding of Being" [*Seinsverständnis*] which means that all humans always already have some kind of naïve understanding of their existence. Scientists are no different in this respect naturally, which leads to section 2 where Heidegger's views on the sciences and their use of what he called "basic concepts" will be examined. Heidegger's "Fore-Structure of Understanding," which is the manner in which human understanding must operate according to its necessary prior commitments if it is to accomplish anything, is unpacked in section 3. Lastly sections 4 and 5 examine Heidegger's crucial concepts of readiness-to-hand [*Zuhandenheit*] and presence-at-hand [*Vorhandenheit*] as well as their place leading up to Heidegger's thoughts on the existential origin of the sciences.

Section 1: The Understanding of Being

In order to clearly see how Heidegger's concept of reflection can assist the sciences to recover their forgotten origin in the ancient Greek experience of knowledge's essence, we have to start at the very possibility of human understanding. This is vitally important because life as discovered, analyzed, and codified by the sciences is not all the life there is. The earth is not

solely a lab, but also a home, *our* home, *before* the sciences began their crucial work.

Philosophy—the Humanities in general—via Interdisciplinarity, can provide the sciences with the relevant yet necessarily missing components that their data sets cannot; namely, the ethical, philosophical, social, political, legal, artistic, and religious components that make up essential parts of human life on earth. It is the primary position of this thesis that Heidegger's concept of reflection can play an important role in facilitating that Interdisciplinarity. In order to do this we must start with an examination of Heidegger's concept of the understanding of Being, or *Seinsverständnis*.

As daunting as these words may sound it's not too difficult to get a basic view of what he's trying to describe. This is because, even as children, we know we exist, others exist, and things exist, and, in order to do anything as important as science when we grow up, we will still *have to first* have had this prior understanding. Every human being Heidegger calls "Dasein"; this German word literally means "there-being." Wherever there is Dasein there is Being. Further, every Dasein has some kind of understanding of its existence; that is, that they exist, others exist, there is a world, and it is filled with objects, etc. This understanding is what must be there in order for human beings to pose any question, let alone the question of being itself, which is always Heidegger's guiding concern. So I am never *literally* unaware as to whether I exist, because it is not open to doubt. Even if I were to doubt my existence I would still end up right back where I started from: my existence. I am aware of my existence, and, as such, I have an understanding of Being. It is not wholly shocking to me that there is a world with objects and other people, etc., because it is part of my understanding of Being that my existence is *not* shocking to me. Even if I am clueless as to the nature of being, the 'why' of existence, I *still*

have my understanding of Being. I am, so to speak, 'stuck' with it. This earliest of stages for Dasein, where I am aware of my existence but unaware of its meaning or significance Heidegger calls 'vague', writing "[b]ut this vague average understanding of Being is still a Fact" (Heidegger 1962:25).

The average understanding of Being is then the foundation; yet it is not enough if we are to ask the question of the meaning of Being. This is because, Heidegger writes,

this vague average understanding of Being may be so infiltrated with traditional theories and opinions about Being that these remain hidden as sources of the way in which it is prevalently understood. What we seek when we inquire into Being is not something entirely unfamiliar, even if at first we cannot grasp it at all. (1962:25)

So it is this inheritance or infiltration that makes asking the question of the meaning of Being so difficult. If I want to ask "What is Being?" there is always already this inheritance to provide me with numerous answers. These, however, only make my search more difficult once I discover that those who have bequeathed me these theories have *not* asked the question of the meaning of Being in the right way. What is the 'right way'?

In the question which we are to work out, *what is asked about* is Being—that which determines entities as entities, that on the basis of which entities are already understood, however we may discuss them in detail. (1962:25-6)

What is it that makes it plain or intelligible, and in a manner that I can never deny, that I exist? That is what Heidegger means by 'Being'. What makes anything appear for anyone (including scientists) cannot itself appear or be demonstrated. If the sciences continue to focus *solely* on facts, they will necessarily be at a loss when asked what those facts mean for human life. If the sciences actually supply our picture of reality then reality is a very impoverished place. Further, individual scientists are in danger of believing that all reality is a mere codification of facts, changing only when new data are discovered and collated, as they continue soldering on like

cogs in a machine. However, by including and reflecting upon the understanding of Being and other insights of Heidegger explained below, the sciences can profoundly shift their understanding of themselves and their work by seeing that before science, the earth was here, and before humans, there were and continue to be beings. Thus all facts must be interpreted, not just presented. Facts devoid of interpretation are no better than interpretation devoid of facts.

Because Being is that which makes existence intelligible to us in the first place, things themselves are what Heidegger wants to investigate. Things exist alongside human beings, and our being aware of life is necessarily concomitant with things. As a phenomenologist Heidegger agrees wholeheartedly with his mentor Edmund Husserl's famous dictum, "To the things themselves!" It is crucial to keep in mind, however, that Being is not an entity itself; Being is essentially different from those entities that have Being (1962:26). For this reason Heidegger insists that we must not resort to 'storytelling' when trying to explain Being, nor, as we already mentioned, should we rely on inherited concepts. Instead, Being

must be exhibited in a way of its own, essentially different from the way entities are discovered. Accordingly, *what is to be found out by the asking* – the meaning of Being – also demands that it be conceived in a way of its own, essentially contrasting with the concepts in which entities acquire their determinate signification. In so far as Being constitutes what is asked about, and "Being" means the Being of entities, then entities themselves turn out to be *what is interrogated*. These are, so to speak, questioned as regards their Being. (1962:26)

So things are to be interrogated as regards their existence, but in a manner essentially different from merely re-telling the usual conceptual story. What is this story and how does it come to be the arbiter of how "entities acquire their determinate signification"?

Section 2: The Sciences, Basic Concepts, and Regional Ontologies

In answering these questions Heidegger makes his first description of science in ¶13 titled “The Ontological Priority of the Question of Being.” He does this because for Heidegger, science is the “theory of the real” in the modern age (1977:157). Further, unless we know how the sciences project their understanding of being, we will have no idea what they have actually accomplished versus what they have not; we will, instead, potentially just go along with what they dub as real without closely examining the necessary methods and axioms that marked the incipient moments of their subject areas. As such, ¶13 of *Being and Time* plays a crucial role in paving the way to “reflection” (*Besinnung*) and “thinking” (*Denken*) in Heidegger’s later writings.

In an important and dense paragraph Heidegger unpacks the fundamental way in which scientists are able to *do* science in the first place, by examining how they lay the groundwork for their inquiry. In order to lay that groundwork, naturally, there had to be Being, humans, and entities. The totality of these entities (and their Being) can be demarcated in any number of ways by human beings:

Being is always the Being of an entity. The totality of entities can, in accordance with its various domains, become a field for laying bare and delimiting certain definite areas of subject-matter. These areas, on their part (for instance, history, Nature, space, life, Dasein, language, and the like), can serve as objects which corresponding scientific investigations may take as their respective themes. (1962:29)

Such “definite areas of subject matter” are, to use a term from Heidegger’s teacher Edmund Husserl, “regional ontologies.” So, for example, imagine that thousands of years ago, the world’s first meteorologist demarcates a section of existence (or region of being) wherein all that is collected and studied is snow. This can seem rather obvious, but Heidegger wants to

show just how surreptitious and beguiling these incipient moments are for science. Without them science could not make its first and most crucial decision: namely, deciding what counts for real and what does not.

Once the proto-meteorologist has made the decision to study only snow, this domain will now “become a field for laying bare and delimiting certain definite areas of subject-matter” (1962:29). So within that broad category of snow, the proto-meteorologist can also demarcate various sub-categories like texture, so that there is now a new category for soft, wet snow and another for sandy, dry snow. Further, the proto-meteorologist can also chose to study the impact of snowfall on various surfaces, be it mud, grass, dirt, etc.; and the study can specialize even further to examine how the addition of snow upon surfaces such as these affects how humans walk upon them. The possibilities are endless of course, but only because of the, so to speak, *pre-existing* crucial facts of Being, humans, and entities. Without that, no knowledge can be gained by anyone, let alone science. Once the “basic concepts” are determined, the regional ontology is inaugurated.

Scientific research accomplishes, roughly and naively, the demarcation and initial fixing of the areas of subject-matter. The basic structures of any such area have already been worked out after a fashion in our pre-scientific ways of experiencing and interpreting that domain of Being in which the area of subject-matter is itself confined. The ‘basic concepts’ which thus arise remain our proximal clues for disclosing this area concretely for the first time. (1962:29)

Science uses basic concepts to study, analyze, and collate information by introducing the correct terminology vital for scientists to do the work. So in the example above, without the basic concepts of ‘snow,’ or ‘texture,’ no work could be done. Basic concepts are axiomatic to whatever particular scientific work is about to be undertaken; without them, nothing happens. As such, it is vital to understand their place in science.

Basic concepts determine the way in which we get an understanding beforehand of the area of subject matter underlying all the objects a science takes as its theme, and all positive investigation is guided by this understanding. (1962:30)

Once the preliminary exploration has taken place in which to tie together the concepts and the area to which they will refer, only then are the basic concepts “genuinely demonstrated and grounded” (1962:30). So, continuing with the example, once the proto-meteorologist decides to study the snow, care must be taken to have samples correspond to the proper features of snow; it would not do to have hail, or sleet, or slush contaminating the findings. Once these decisions are made a snow spectrum that corresponds to the field of study has been codified, and to it *alone*: now, the basic concepts are “genuinely demonstrated and grounded,” and the regional ontology is born. Furthermore, Heidegger argues, it is only when there is a crisis in the basic concepts that “real ‘movement’ of the sciences takes place” (1962:29). During these trials “radical revision” occurs to the basic concepts and

[i]n such immanent crises the very relationship between positively investigative inquiry and those things themselves that are under interrogation comes to a point where it begins to totter. (1962:29)

Otherwise, scientific work continues as it usually does; and there is no need, in the scientist’s view, to question the basic concepts. Thus the regional ontology and its basic concepts create for science something like a separate, enclosed “world.” Glazebrook makes just this connection between basic concepts and Heidegger’s concept of “world” in the second sense in ¶14 of *Being and Time*. He writes there that

indeed ‘world’ can become a term for any realm that encompasses a multiplicity of entities: for instance, when one talks of the ‘world’ of a mathematician, ‘world’ signifies the realm of possible objects of mathematics. (1962:93)

What is likely forgotten by the scientist or mathematician is that the “world” is not the first

world, the world from which their regional ontology was derived. This should not be terribly surprising since it is literally their job to focus solely on that (derived) world. As Glazebrook succinctly puts it; “Once a commitment to a specialized area of object is made, a science looks only to that world” (2000:217).

What Heidegger is most interested in however, is the original understanding of Being that had to be there *first* in order for science to create its domain of study, basic concepts, and correspondence between the two in the first place. Really science is not creating anything, Heidegger insists, because all of this activity is always already “an interpretation of those entities with regard to their basic mode of Being” (Heidegger 1962:30). Interpretation is important because, as we’ll see in the next section, there is a deep yet very concrete connection between interpretation, understanding, and possibility.

Section 3: The Fore-Structure of Understanding

Before we can examine the manner in which Heidegger thinks the sciences understand nature we must first see how he thinks *anyone* understands *anything*. This is because humans project their understanding of Being on possibilities, and these possibilities quickly turn into human action. Yet again we see how for Heidegger so much of life derives from a prior understanding of Being. How he thinks that prior understanding operates in each human being is key since by seeing this, we’ll have a better view of how the sciences ultimately have their origin in the very same understanding of Being that Heidegger insists all Dasein must have.

In ¶132 ‘Understanding and Interpretation’ Heidegger unpacks the details of how Dasein’s understanding works. Dasein always has an understanding of its existence as well as

the existence of a world, things, etc. This understanding itself is actually a projection of Dasein's Being. For example, my understanding how to play guitar is a projection of how I exist. Others who cannot play the guitar may see it and understand what it is and what it is used for, but they cannot see all the possibilities that I can. Due to my 25 years of experience and practice with it I can project many possibilities that are simply not there for them. So, if someone requested for me to play a "pretty-sounding" chord, I would slowly play a Cmaj9 chord in a voicing that utilized open strings. Since the guitar is part of my Being, I understand that major 9 chords are usually thought of as pretty sounding, as are open-stringed voicings, and a slow meter. As possibilities, Heidegger says, these "exert their counter-thrust" on my understanding. Another with no experience of guitar would simply have no idea what any of this was, thus it would literally not be possible for them to project via their guitar-understanding. Heidegger writes

As understanding, Dasein projects its Being upon possibilities. This *Being-towards-possibilities* which understands is itself a potentiality-for-Being, and it is so because of the way these possibilities, as disclosed, exert their counter-thrust upon Dasein. (1962:188)

Further, if I show a guitar to someone from a culture that had no guitars nor media-fueled ways of encountering one, their reaction would be even more different, because their life, when it comes to the instrument, is different. This person would have almost no understanding in any way of the guitar, and therefore no idea of what possibilities it could have: it would simply be a bare thing in the world, present but otherwise meaningless and useless. John D. Caputo writes,

...Heidegger is interested in showing how all science, natural and human, is made possible by an anticipatory, hermeneutic fore-structure. (1986:46)

Interpretation on the other hand, Heidegger writes, “is the development of the understanding” and “is grounded existentially in understanding” (1962:188). So in the act of interpreting, Dasein takes what is already given to it in its Being (and literally in its Being-*there*) and develops it, which in turn grounds it in the lived understanding of Dasein. In this way the interpretation (and its concomitant deepened understanding) is made part of Dasein’s Being. Bluntly put: for Dasein, Being *is* understanding.

What makes understanding possible at all is what Heidegger calls the Fore-Structure of understanding: fore-having, fore-sight, and fore-conception. These are not nearly as complicated as they may first appear. Fore-having (*Vorhabe*) is simply the entire area of entities (things, animals, shapes, colors, etc.) that can *be* understood, as well as their “totality of involvements” (1962:191). So if we were on a beach with the desire to build things with sand, the fore-having there would be the sand, the water, a bucket and a spade, as well as how these could work together in order to do things like build a sand castle. On the beach, however, we do not walk around literally thinking of this involvement totality; our minds may be empty of any thought, or maybe simply the thought that it is a lovely day. Dasein’s background of involvement totality is always already there, for if it were not, nothing could be done. Heidegger writes that “In every case this interpretation is grounded in *something we have in advance*—in a *fore-having*” (1962:191).

Moving now to fore-sight (*Vorsicht*), it is understandable that in order for Dasein to avail itself of a possibility from the involvement-totality the latter must withdraw into a silent background. From this background the possibility “What about a sand castle?” emerges. If this

background did not withdraw, this possibility would not appear at all due to the fact that nothing *but* possibilities via the involvement totality would be present.

When something is understood but is still veiled, it becomes unveiled by an act of appropriation, and this is always done under the guidance of a point of view which fixes that with regard to which what is understood is to be interpreted. In every case interpretation is grounded in *something we have in advance*—in a *fore-sight*.” (1962:191)

This emergence of the possibility to build a sand castle is what Heidegger calls an act of appropriation; after the act of appropriation it is understood that interpretation, ‘honing’ that understanding so to speak, is now possible for Dasein. Now we can not only build our sand castle, but interpret it as we go along, then improving it based on those interpretations, which in turn were based on the prior understanding.

Lastly, with fore-conception (*Vorgriff*) we see that what we have gained by fore-having and fore-sight can *also* be placed into concepts by way of our interpretation. Bluntly put, interpretation allows for conceptualization. Heidegger points out that we can then choose between basing our conceptualization “on the entity itself, or the interpretation can force the entity to which it is opposed in its manner of Being” (1962:191). This means that I am free to choose between either trying to be true to the entity itself which provoked my conceptualization or “forc[ing]” it where it wouldn’t normally belong. Regardless of which one of them I choose, a foundation upon which to build additional conceptions will be made.

Heidegger writes

In either case the interpretation has already decided for a definite way of conceiving it either with finality or reservations; it is grounded in *something we grasp in advance*—in a *fore-conception*. (1962:191)

In all three instances of the fore-structure Heidegger underlines that this is something had in

advance. He wants it to be understood that objects, life, the world, decisions, interpretations, anything really, always already comes to us from a totality of involvements; because of this there are no bare or atomized facts. Every object tells a story, so to speak, because it necessarily comes from a 'prior' contextual world; for if it did not, it would simply not register to Dasein as anything. As such, any time someone claims to say what a particular thing is, that person must reduce *all* prior chains of involvement in the involvement totality in order to make such a claim. This concerns Heidegger greatly because 1) it is literally impossible to actually do this, and 2) as stated, such interpretations, which have forced the entity in a manner contrary to its normal way of Being, can *still* be used to construct further interpretations which will also be contrary to the entity's Being. Thus he wants this to be understood in order to keep one from rushing into an area of Being and declaring reductively to have the *only* aspect of any entity; all entities necessarily have an enormous amount of involvements. He writes plainly that

Whenever something is interpreted as something, the interpretation will be founded essentially upon fore-having, fore-sight, and fore-conception. An interpretation is never a presuppositionless apprehending of something presented to us. (1962:191-92)

This assertion that there is no presuppositionless interpretation dovetails nicely with the argument above that science must rely on basic concepts in order to construct a regional ontology and do any work. Presuppositionlessness is an impossibility precisely because of foundational Heideggerian concepts like Being-in-the-world and the understanding of being (*Seinverstandnis*). At all times, I both exist in a world and understand that I exist in that world; this being the case for Dasein, how can there ever be any notion of achieving presuppositionlessness? Similarly, all interpretation must rely upon the fore-structure of

understanding that was always already given in advance. Without fore-having, I would be unaware of the totality of equipment and its interrelations; without fore-sight, I would be incapable of availing myself of the possibilities that I can bring into relief as the totality temporarily withdraws from my view; and without fore-grasping, I wouldn't be able to place said possibilities into conceptual discourse. These are at work in any science not just in its "origin," but also in day-to-day operations. *Something* was always already there from which all other endeavors were derived, and it is being ignored or dismissed, Heidegger insists. That something, of course, is Dasein's understanding of being.

Section 4: Readiness-to-hand and Presence-at-hand

Before examining ¶169b for insights on the changeover from Dasein's involvement with things via use to one of theoretical remove, we should see what his terms readiness-to-hand and presence-at-hand mean. This is because they play a large role in his philosophy generally, as well as being crucial to fully grasping what he thinks is occurring when science does its work. Heidegger's primary focus is not so much presence-at-hand, as it is the forgetting that allows humans to assume automatically that the thing (regardless of what it is) is fully present, an atomized object devoid of context or history or potential. The expression "It is what it is" succinctly describes the mindset he attacks. Simply put, what is present is never *totally* so. Science (all theory in general really) however, continually regards what it studies in this atomized manner; *that* is his target here. Moreover, it is just this mistaken (if well-intentioned) atomism by science, that Heidegger's concept of reflection can specifically address.

The totality of all things is called “equipment,” and equipment’s Being is called ready-to-hand (*Zuhandenheit*). By this Heidegger means that all things without exception exist in such a manner that can be potentially used by Dasein. Further, they exist always in a mode of belonging with all other things in this totality of equipment, so that one thing can never exist in isolation from any other. Thus Heidegger writes, “[t]o the Being of any equipment there always belongs a totality of equipment” (1962:97). For example, we can imagine a dictionary that contained every word in human history, regardless of time or specific language, etc. Outside of this dictionary there simply are no other words. As such, not only would each word depend on every other for its existence as a word, it would literally not exist if it wasn’t *for* every other word, since every word necessarily refers to other words in its being itself; also, only Daseins could potentially use and speak these words, no other organism. In this same way, Heidegger insists, all things exist, and they exist, for Dasein, *ready-to-hand*. He writes

These ‘Things’ never show themselves proximally as they are for themselves, so as to add up to a sum of *realia* and fill up a room. [And yet] [o]ut of this the ‘arrangement’ emerges and it is in this that any ‘individual’ item of equipment shows itself. *Before* it does so, a totality of equipment has already been discovered. (1962:97-98)

Things have to be potentially useable, or, so to speak, ‘encounterable’ by Dasein in order to exist for Dasein, as an essential part of Dasein’s existence in his or her’s “concernful dealings.” What the particular thing in question would or could be devoid of the equipment totality is simply not knowable; what *is* knowable is that any specific thing is necessarily always already derived from a prior totality, a “world,” for if it weren’t it would not have been useable by Dasein to begin with: it would simply not register to us. In effect, it would be a blind spot that was impossible to notice even *as* a blind spot. As such, there simply are no isolated or atomized things; all things derive from the prior totality of equipment.

Only because equipment has *this* 'Being-in-itself' [i.e. readiness-to-hand] and does not merely occur, is it manipulable in the broadest sense and at our disposal. (1962:98)

If this is so, however, and if "'Things' never show themselves" then how is it that individual things are perceived and used by Dasein at all? They are discovered in our dealings with them, like "hammering with a hammer," Heidegger writes, in his famous example (1962:98). By using the thing Dasein's concern becomes more and more in-tune with the pre-existing purpose of the thing itself, which he calls its "in order to." Because of this my

[d]ealings with equipment subordinate themselves to the manifold assignments of the 'in-order-to'. And the sight with which they thus accommodate themselves is *circumspection*. (1962:98)

To see things as merely present-at-hand (*Vorhandenheit*) is to see them completely without this prior totality of equipment, a neutral object devoid of context or history; this view he calls the "theoretical attitude." Heidegger writes that when one is concerned with a certain task, equipment may appear to us as wrong for that task, broken, or missing. This occurs once we evaluate it from the perspective of those dealings the equipment in question is used for. At such moments, the equipment is still ready-to-hand, only less so, and this change brings with it a new way of seeing it called "conspicuousness" (1962:102). Seen conspicuously the broken thing now looks as if it has always been just present-at-hand, a bare thing lying around, useless and without a world. However, it is not the case that in such moments that readiness-to-hand is totally gone, merely withdrawn. In this and similar circumstances, Heidegger writes,

the presence-at-hand of the ready-to-hand makes itself known in a new way as the Being of that which still lies before us and calls for our attending to it. (1962:103-04)

So presence-at-hand is derived from readiness-to-hand; further, one is never completely present at any time without the other potentially re-appearing. Yet for one to think and see

only presence-at-hand is wrong for, as examined above, that would be to see something as existing totally without a context of equipment, and that is *literally impossible*. For example, while a computer may have been a brand new thing at one time in history, no one would have suggested that it was *completely new*, i.e. *ex nihilo*. This is because the computer had to be made from some prior existing materials. These materials each would have their own history which, in turn, would bring the brand new computer ‘back’ into the equipmental totality. It is just for this reason that Heidegger wants to warn not to forget the priority, in both the sense of importance as well as chronology, of the equipment totality and its readiness-to-hand.

Section 5: The Existential Origin of Scientific Theory

In ¶169b, Heidegger expounds on the revelations of ¶15 and ¶16. He describes a “change-over” (*Umschlag*), from an attitude of practical concern to a “theoretical” attitude where concern stops, and is transformed. In effect, ¶15 and ¶16 form a diptych with this subsection in which Heidegger provides us a detailed sketch of nothing less than “the *ontological genesis* of the theoretical attitude” (1962:408). He does this in order to formulate “an *existential conception of science*” which “understands science as a way of existence and thus as a mode of Being-in-the-world which discovers or discloses either entities or Being” (1962:408; original emphasis).

As we just encountered, in readiness-to-hand there are moments when presence-at-hand arises, be they due to a broken piece of equipment, etc. Heidegger then takes this notion and combines it with his key assertion of the prior understanding of Being (*Seinverständnis*). This is what allows him to insist that science must follow its *own* prior understanding of Being

which in turn will wholly determine the manner in which Science projects its understanding onto Nature. This realm or survey of things now reflects the new light of the theoretical attitude they are viewed through.

This survey is not just one in which things that are present-at-hand are subsequently scraped together. What is essential to it is that one should have a primary understanding of the totality of involvements within which factual concern always takes its start. Such a survey illumines one's concern, and receives its light from that potentiality-for-Being on the part of Dasein *for the sake of which* concern exists as care (1962:410).

Continuing with his hammer example, he explains that when I use the hammer circumspensively, it can be too heavy or too light, depending on the concerned dealings I am planning to use it for. To flesh-out his example, if I needed to drive 4 inch nails into a very hard wood, a light hammer would not be adequately useful. So I might say "this hammer is too light." But, Heidegger points out, such an observation could also be scientifically interpreted as "this hammer does not have enough mass." Then I could look at the hammer simply as a thing with no kind of use, instead of as a tool for specific uses; I could say that, scientifically speaking, the hammer is prone to the law of gravity if it is dropped, etc. What is crucial to understand is that the kind of Being that I see the hammer as having has *changed-over* from the kind of Being I saw it as having when I was concernfully involved with it as a useful tool. The change-over has occurred, and, without noticing it, I've gone from seeing the thing as ready-to-hand to present-at-hand; from the prior understanding of Being where I am involved with things from an equipment totality, to a derivative theoretical attitude where my understanding is one of actual atomized objects devoid of world or use. Because of this

[t]he understanding of Being by which our concerned dealings with entities within-the-world have been guided has changed over. (1962:412; original emphasis)
Further, the place of the tool—something that belongs to all tools—when viewed in the

theoretical attitude becomes totally unimportant.

This does not mean that what is present-at-hand loses its 'location' altogether. But its place becomes a spatio-temporal position, a 'world-point' which is in no way distinguished from any other. (1962:413)

Thus the homogeneity of space reigns once the change-over has occurred, with one point being just like any other. The unique connection in the equipmental totality from tool to location has been rubbed away by the theoretical attitude. The laws of physics rule everywhere and always, for that is their nature; thus the special uniqueness of a place is, by necessity, impossible.

In *What is a Thing?* Heidegger elaborates this theme by examining Galileo's writings on his famous free fall experiments. Galileo writes that "*Mobile...mente concipio omni secluso impedimento*" that is, "I think in my mind of something movable that is left entirely to itself" (1992:290). Galileo has, Heidegger asserts, used his mental conception or picture to set up nature in advance *before* the actual experiment. This method is *mathesis* (mathematical) in the sense that Plato in his dialogue *Meno* once described it, namely: "*analabon autos ex autou ten epistemen*" (85d); that is, "bringing up and taking up—above and beyond the other—taking the knowledge itself from out of itself" (1992:290-1). From Galileo's mental picture and this picture's in advance set-up of nature originates spatial homogeneity. Heidegger writes

There is a prior grasping together in this *mente concipere* of what should be uniformly determinative of each body as such, i.e., for being bodily. All bodies are alike. No motion is special. Every place is like every other, each moment is like any other. (1992:290-1)

This is what matters most to Heidegger, "*the way in which Nature herself is mathematically projected*" (1962:413-14; original emphasis). Because of this projection "matter" can be presumed by physics to be always present-at-hand; concomitantly then, quantitatively determinable aspects of matter like force, motion, location, etc. can then be

discovered by physics (1962:414). Heidegger insists this is the *only* way ‘facts’ can be discovered, experimented upon, etc.

The ‘grounding’ of factual science was possible only because the researchers understood that in principle there are no bare facts...[W]hat is decisive is that [the mathematical projection of Nature] *discloses something that is a priori*. Thus the paradigmatic character of mathematical natural science does not lie in its exactitude or in the fact that it is binding for ‘Everyman’; it consists rather in the fact that the entities which it takes as its theme are discovered in it in the only way in which entities can be discovered—by the prior projection of their state of Being. (1962:414)

The derivative nature of presence-at-hand, however, should not be considered as wrong or a flaw to be avoided. Presence-at-hand is a necessary part of Dasein’s Being-in-the-world alongside things, or simply put: human existence and involvement. Heidegger is not attempting to extirpate presence-at-hand since doing so would be impossible. Instead he wants us to understand *both* its necessity *and* its derivative origins. His concern is that scientists have quite literally forgotten that the theoretical attitude that *is* necessary for their work originates in a prior understanding of Being. But why and how is presence-at-hand necessary? Heidegger explains:

To lay bare what is just present-at-hand and no more, cognition must first penetrate *beyond* what is ready-to-hand in our concern. *Readiness-to-hand is the way in which entities as they are ‘in themselves’ are defined ontologico-categorially*. Yet only by reason of something present-at-hand, ‘is there’ anything ready-to-hand. (1962:101; original emphasis)

And 3 pages later he writes

The modes of conspicuousness, obtrusiveness, and obstinacy all have the function of bringing to the fore the characteristic of presence-at-hand in what is ready-to-hand. But the ready-to-hand is not thereby just *observed* and stared at as something present-at-hand; the presence-at-hand which makes itself known is still bound up in the readiness-to-hand of equipment. Such equipment still does not veil itself in the guise of mere Things. (1962:104)

The hammer is not originally an object with a mass, etc.; it is a tool that is always already part of

a network of possible uses for Dasein, *first*. The hammer as tool is not theoretical; the mass of an object is not practical.

Just as *praxis* has its own kind of sight ('theory'), theoretical research is not without a *praxis* of its own. Reading off the measurements which result from an experiment often requires a complicated 'technical' set-up for the experimental design...The explicit suggestion that scientific behavior as a way of Being-in-the-world, is not just a 'purely intellectual activity', may seem petty and superfluous. If only it were not plain from this triviality that it is by no means patent where the ontological boundary between 'theoretical' and 'atheoretical' behavior really runs! (1962:409)

Life is not lived theoretically, it is lived in the world, stuffed with equipmental involvements, and this is always already understood by Dasein. The theoretical attitude's proper place is what Heidegger seeks, not its eradication. For these reasons he explains that each relies on the other; but where the ontological line is, admittedly, unclear.

Summary

The relevance of this chapter to the problem of the fragmentation of the sciences and the solution of reflection made concrete in CID, is one of crucial conceptual context. Without a proper understanding of just why Heidegger asserts that specialization is essential to modern science, there will be no way of either interpreting his concept of reflection, or Mitcham and Frodeman's CID. Devoid of an understanding of how humans must exist and understand, must inaugurate sciences and interpret knowledge, must live and work with things, and project an attitude towards them, the purpose of reflection made concrete as CID will not be comprehended. Thus as Glazebrook writes,

The purpose of overcoming the division of knowledge into fragmentary specialties and disciplines is to bind the sciences together into a science that is an authentic knowing rather than simply a directionless gathering of information. (2000:143)

CHAPTER 3

THE ESSENCE OF MODERN SCIENCE, SPECIALIZATION, AND REFLECTION

The focus of this long concluding chapter is on Heidegger's concern regarding the status and inter-relationships of the sciences, the university, and the community. He is worried that as specialization in the sciences grows, the questioning search for meaningful knowledge is lost. Science has its origin in ancient Greek philosophy, and with specialization the sciences are dooming themselves to pointless accumulation of facts and details, a meaningless knowledge. The sciences, having their essence in ancient Greek philosophy, literally are philosophy, he says, whether they acknowledge this or not (Heidegger 1991:31). But this shared origin has been forgotten by the sciences, something only philosophy can help them regain. He desires to reverse the rampant specialization in the sciences; to bring them together by "bringing down disciplinary barriers and overcoming the musty and false character of higher education as superficial professional training" (1991:37). The texts of Heidegger I examine are "What is Metaphysics?" (1929) the *Rektoratsrede* [translated as "The Self-Assertion of the German University"] (1933), and "Science and Reflection" (1954). In the *Rektoratsrede* (1933) I unpack Heidegger's concerns regarding the specialization of the sciences, the essence of science found in ancient Greek philosophy, an authentic questioning that will become the highest form of knowledge itself, and how this questioning leads to reunification of the sciences. Heidegger's Nazism is in no way the focus of this argument. Instead I want to show how Critical Interdisciplinarity (CID) manifests the reflection Heidegger argues can unify the sciences.

Section 1: "What is Metaphysics?"

"What is Metaphysics?" from 1929 addresses topics as concrete as the university and the sciences, and as abstract as the "nothing." The essay also contains an early reference to the dangers of specialization in the sciences. Heidegger begins by declaring that every specific metaphysical question always already carries within it a spectrum of metaphysical problems (1998: 82). Before this declaration he curiously states that, the title's appearance to the contrary, a discussion of metaphysics will be passed over; the essay is about science. However, by posing the metaphysical question of science, metaphysics (and its whole range of problems) is instantly brought to the surface. This is his point: metaphysical questions and problems can never be avoided, and yet the insistence that they can is precisely what he accuses science of believing. He makes no bones about the fact that "we are questioning right here and now for ourselves," because "[o]ur existence - in the community of researchers, teachers, and students - is determined by science" (1998:82). Glazebrook notes that this mention of a community of scientists marks a shift from Heidegger's writing on the individual scientist i.e. the existential conception of science, in *Being and Time's* ¶169b (2000:121). There, as seen above, he outlines the change that Being undergoes when the scientist shifts from everyday concern to the theoretical attitude. Now, Heidegger shifts his critical focus to the community and academy within which those individual scientists do their work. This is because his overriding concern is with what may become of humanity when "science is our passion" (Heidegger 1998:82).

He writes that even though the sciences themselves differ greatly they are kept in a "meaningful unity" by way of the university's implementation of goals (1998:82-83).

Regardless, this practical unity continues to leave the *essential rootedness* of the sciences to

atrophy (1998:83). The sciences, as already seen in chapter one regarding basic concepts and regional ontologies, relate to the world and to things in order to "make them objects of investigation and determine their grounds" (1998:83). This is similar to how everyone, scientist or not, carry on in their daily lives; but with science there is a difference. This difference is that science "gives the matter itself explicitly and solely the first and the last word"(1998:83). (This assertion is reformulated later in "Science and Reflection," when he declares that "Science is the theory of the real" (1977:157)). Scientists are capable of doing science, in part and essentially, because they explicitly ignore the nothing, focusing solely on beings. The human being - one being among others - "pursues science." In this "pursuit" nothing

less transpires than the irruption by one being called "the human being" into the whole of beings, indeed in such a way that in and through this irruption beings break open and show what they are and how they are (1998:82).

The scientist is capable of doing this because, as Dasein, the scientist has an inherent capacity for doing it; but scientists are also capable of doing science because, as Dasein, they are "being held out into the nothing" (1998:91). By being held out into the nothing Dasein understands its existence as one of being-in-the-world, a world filled with other beings. If Dasein were not held out in this manner, he writes, nothing would be manifest. Instead, beings, a world, etc., *are* manifest to Dasein (be they scientists or not) because of nothing (1998:91). Thus, after stating that Dasein simply means "being held out into the nothing," he writes

Holding itself out into the nothing, Dasein is in each case already beyond beings as a whole. Such being beyond beings we call *transcendence*. If in the ground of its essence Dasein were not transcending, which now means, if it were not in advance holding itself out into the nothing, then it could never adopt a stance towards beings nor even toward itself. Without the original manifestness of the nothing, no selfhood and no freedom. (1998:82)

Not a being, nor an object, the nothing makes the intelligibility of beings, of being-in-the-world possible in the first place. Without the nothing, *no-thing* would appear. The hammer would not appear, for example, either for the carpenter, the carpenter's 3 year old child, or the curious scientist desiring to assess the hammer's mass. Science is based in nothing because no world, no context of intelligibility, is prior to Dasein. Thus science is literally ignoring Being in order to chase after beings and, as Heidegger repeatedly puts it, nothing besides.

For human Dasein, the nothing makes possible the manifestness of beings as such. The nothing does not merely serve as the counterconcept of beings; rather, it originally belongs to their essential unfolding as such. In the being of beings the nihilation of the nothing occurs. (1998:82)

Science achieves much by ignoring the nothing. This ignorance gives science the right of determining the reality of the real. This ignorance is a dismissal, Heidegger writes, indicated by a "lordly wave of the hand" (1998:95). But if the being of beings was not existent, if the nothing had not been nihilated in the form of existence, if Dasein was not held out into the nothing, science would be incapable of studying anything. Science desires the knowledge such study doubtlessly brings, without paying heed to the nothing.

Invoking Hegel's assertion that "Pure Being and Pure Nothing are the same" and calling it "correct," Heidegger explains that the former's blunt expression is true "because being itself is essentially finite and manifests itself only in the transcendence of a Dasein that is held out into the nothing" (1998: 94-95). When science pursues beings and ignores the nothing it does so not only on the basis of the nothing it ignores, but it does so all the while unaware of its own essence as science. The essence of science is being, is the nothing, from which the human being, before he or she is a scientist, is always already held out into *as* Dasein (1998:95).

"Never forget where you come from" is a well-known truism, and it sums up, albeit crudely, much of what guides Heidegger's philosophy. He writes

Only if science exists on the basis of metaphysics can it fulfill in ever-renewed ways its essential task, which is not to amass and classify bits of knowledge, but to disclose in ever-renewed fashion the entire expanse of truth in nature and history. (1998:95)

Beginning the essay with the declaration that "Our existence...is determined by science" he returns at the end to declare how: "Only because we can question and ground things is our destiny placed in the hands of the researcher" (1998:81, 95-96). Dasein as transcendence, as that being which is held out into the nothing can, therefore, question and ground things. Dasein can also, however, go "beyond beings," this part of Dasein's essential nature. By going beyond things, beyond beings in the present, Dasein can establish metaphysics, or literally "beyond physics" (1998:96). In other words, Dasein doesn't have to be chained to beings, enslaved by present sense impressions, forced to run hither and yon for the latest empirical manifestation. Dasein *is* metaphysics itself, Heidegger writes, because of this capacity to unlock itself from the empirical (1998:96). This capacity of Dasein is "neither a division of academic philosophy nor a field of arbitrary notions" (1998:96). He concedes that this "abyssal ground" - that is, Dasein's being held out into the nothing "where the truth of metaphysics dwells" - is as close as possible to the potential for "deepest error" (1998:96). However

For this reason no amount of scientific rigor attains to the seriousness of metaphysics. Philosophy can never be measured by the standard of the idea of science. (1998:96).

This is because, as shown above, science ignores the nothing, while philosophy (or, a philosophy concerned with its essence, like Heidegger's) doesn't. Philosophy goes beyond beings, and therefore cannot be challenged by science. Such statements are reminiscent of *Being and Time* where Heidegger argues that the sciences generally never question their own

essence (1962:31). They cannot do so because they insist on being positive, that is, on focusing on beings and not on the nothing. So he writes that

Ontological inquiry is indeed more primordial, as over against the ontical inquiry of the positive sciences (1962:31). *Basically all ontology, no matter how rich and firmly compacted a system of categories it has at its disposal, remains blind and perverted from its ownmost aim, if it has not first adequately clarified the meaning of Being, and conceived this clarification as its fundamental task.* (1962:31; original emphasis)

It is just this clarification that he has in mind for science in "What is Metaphysics?"; a clarification that begins when ignorance of the nothing ends. Glazebrook writes that when Heidegger declares that science cannot reflect upon itself, what follows is that: "Ontology is therefore precluded by the sciences in their exclusion of the question of the nothing" (2000: 130). Ontology cannot be done by science, because ontology asks about the being of beings, not just beings - that is, the ontic realm. If science is to engage in ontology it must be willing to let go of the ontic and grab hold of the ontological. A "way" (if not to say "method") is what is called for, however, to assist those in science who are willing to try to think the nothing. This way, I argue, is "reflection."

Heidegger began the essay insisting that every particular metaphysical question "always encompasses the whole range of metaphysical problems" (1998:82). Science assumes it is free from metaphysical questions by staying within the confines of beings, regional ontologies, etc. But no human being can be free from any metaphysical question because, Heidegger insists, "[m]etaphysics is the fundamental occurrence in our Dasein. It is that Dasein itself" (1998:96).

Commenting on "What is Metaphysics?" Glazebrook underlines this connection, writing

Heidegger's interest in science in 1929 is accounted for by the fact that he sees reflection on the sciences as the route to the question of being. [...] The route to ontology is the thoughtful recognition of its preclusion by the sciences. (2000:131)

Heidegger makes this call not just to the sciences but to the university as well, both of which make their home in the community. It is to the latter community that he refers to when he asks "What is happening to us, essentially, when science has become our passion?" (1998:82). The service that the sciences provide to the community, he writes, is an evolving one. That evolution "become[s] the ground of the possibility of a proper though limited leadership in the whole of human existence" (1998:83). Clearly, Heidegger thinks the sciences play an enormous role in the lives of all humans. But the danger is that by ignoring the nothing, by not asking anything regarding the being of the beings the scientists analyze, that they put not only themselves in grave peril, but all human beings. Glazebrook writes that Heidegger

holds that knowledge has become fragmentary and meaningless insofar as the individual disciplines have lost any goal that would tie them together meaningfully. His call in 1929 is to reestablish that unity of purpose such that the university can guide human destiny. (2000:139)

Again, "[t]he route to ontology is the thoughtful recognition of its preclusion by the sciences" (2000:131). This route, this way, continues in the Rectoral Address, given four years later.

Section 2: *Rektoratsrede*

Given as a lecture in 1933 when he assumed Rectorship of the University of Freiberg, "The Self-Assertion of the German University" is a crucial text concerning Heidegger's views on the specialization of the sciences and the role of the university in the community. In this comparatively dense and provocative work Heidegger declares that the true essence of science is Greek philosophy (1991:30-31). But more exactly his concern is how to make science authentic, that is, to make it "exist *truly*" (1991:31). All of science is, in essence, philosophy, regardless of whether or not science acknowledges this historical fact (1991:31). Without this

origin in philosophy, science would have no place from which to draw strength (1991:31). He then explains two key aspects of this original philosophical origin.

The first is the essence of knowledge as stated by Prometheus: "But knowledge is far less powerful than necessity" (1991:31). Heidegger explains that this means "[A]ll knowledge of things remains beforehand at the mercy of overpowering fate and fails before it" (1991:31). There is nothing knowledge can do when the unknown arises from its (previously) hidden place. Truth is a pure appearance, and truth is always before knowledge, something knowledge (all knowledge, be it scientific or otherwise) consistently forgets. Admittedly, this is spooky and vague sounding; I will try to unpack it concretely. For example, *before* water can be scientifically *known* to freeze at 32 degrees Fahrenheit, the water just *is*; the water is just sitting there, in a puddle on the ground in the backyard, say. That is a bare fact, a truth.

Heidegger's view of truth is that truth is uncovered or revealed by Dasein. This is because Dasein is essentially always already open to being and beings. In *Being and Time* he writes

[O]nly with Dasein's *disclosedness* is the *most primordial* phenomenon of truth attained. [...] Insofar as Dasein *is* its disclosedness essentially, and discloses and uncovers as something disclosed to this extent it is essentially 'true'. *Dasein is 'in the truth.'* (1962:263)

Thus any and all knowledge regarding its capacity to freeze (or boil for that matter) is necessarily always already *derived* from that original appearance in the backyard. That's what he means when he writes in *What is Called Thinking?* "The tree faces us" (1968:41). The more knowledgeable humanity becomes in the in the modern era by way of modern science, Heidegger is convinced, the more derivative knowledge will be accepted unquestioningly as original truth. These are his concerns when writes, "Thus what is reveals itself in its

unfathomable inalterability and confers its truth on knowledge." (1991:30-31). Knowledge is derived from the truth of existence. The knowledgeable view is a theoretical view, he says. This, as seen above, is exactly what he said in *Being and Time's* ¶69b; the theoretical perspective is derivative from the everyday perspective.

But how did the ancient Greeks think of theory? For them the theoretical view had nothing to do with knowledge and the latter's insistence on more knowledge for its own sake, devoid of meaning or purpose. Instead, a theoretical view for the ancient Greeks was a perspective based in

pure contemplation, which remains bound only to its object in its fullness and in its demands.[...] "[T]heory" does not happen for its own sake; it happens only as a result of the passion to remain close to what is as such and to be beset by it. (Heidegger 1991:31)

This pure contemplation Heidegger says, this ancient Greek view of theory, was a crucial part of their attempt to make theory match with practical work (1991:32). This "contemplative questioning" was "the highest mode of man's *energeia*, of man's 'being at work'" (1991:32). *Energeia*, which is usually translated as actuality or reality, means "to understand theory as the supreme realization of genuine practice," Heidegger asserts (1991:32).

He continues

It was not their wish to bring practice into line with theory, but the other way around: to understand theory as the supreme realization of genuine practice. For the Greeks science is not a "cultural treasure," but the innermost determining center of their entire existence as a Volk and a State. (1991:32)

The power of this approach was an enormous one because of its determinative role in the lives of the people and the State itself, he writes. His concern here, as in "What is Metaphysics?", is in this huge power that science has and will continue to have. The point here is not to forbid or extirpate this power, for that is impossible. Instead, Heidegger - as he did throughout his career

- wants to show the other ways that things can be; and his origin for these ways, at least in my readings, is usually to be found in his interpretations of the ancient Greeks. Grafting the meaning of his previous words "what is reveals itself...and confers its truth" onto a definition of science he states that

Science is the questioning standing firm in the midst of the totality of being as it continually conceals itself. This active perseverance knows of its impotence in the face of Fate. That is the essence of science in its beginning. (1991:33)

This is inarguably tricky language as a working definition for the origin of the essence of science.

It would be almost laughable to try to explain his recondite statement with my own cryptic one: "what appears came from a hidden place and to a hidden place it must return." I think it works, however, because all of being *is* always already concealing itself; and yet science *will* continue. For example, if I look at the second hand of my watch I can plainly see that there is a movement from one place to another, that is: an unconcealing (the present second), and a concealing (the absent second left behind and replaced by the present second). This movement between concealment and unconcealment in no way impedes my usage of the watch. Yet, I *should* be aware that the watch can stop, the watch can be misplaced, it can be damaged, or stolen. Its consistent nature is bewitching to me, thus I'm likely to think it'll always be there when I need it, functioning normally. It always has been, I might think defensively, why wouldn't it always be there? And in that question lies the problem: because to think and act as if it'll always be there goes against the very lesson taught me by the unconcealing/concealing movement of the second hand. So, while such notions and language are admittedly poetical and perhaps even mystical, I for one, cannot see them as nonsensical, and neither does Heidegger. If I say "all things shall pass, but we must go on" everyone will agree (presumably

most would anyway); but if I say, "Science is the questioning standing firm the midst of the totality of being as it continually conceals itself" I'd probably receive many quizzical expressions. It's as if Heidegger is saying to scientists "never forget where you come from: you come from ancient thinkers who insisted you remain bound only to the object in its fullness and in its demands!"

This perseverance, he continues, while originally based in awe and admiration will be transformed once it is recognized that science's essential origin is still here today. "The beginning *exists* still" (1991:33). Life is possibilities and this possibility is still here for modern science, the university, and the community to seize upon. If it is not seized, he warns, science will remain either leisure activity or pointless knowledge accumulation (1991:33). The transformation will go from awe to "being completely exposed to and at the mercy of what is concealed and uncertain, that is, *what is worthy of questioning*" (1991:33; my emphasis). The pursuit of knowledge once driven by questioning, he declares, will be supplanted by questioning itself. This then leads him to declare that when this transformation occurs, then the end of the specialization of the sciences that he criticized in 1929's "What is Metaphysics?" will also occur.

[Q]uestioning will itself become the highest form of knowledge. Questioning will then unfold its ownmost power for disclosing the essence of all things. Then questioning will compel us to simplify our gaze to the extreme in order to focus on what is inescapable. Such questioning will shatter the encapsulation of the various fields of knowledge into separate disciplines. It will return them from the isolated fields and corners into which they have been scattered, without bounds and goals; and it will ground science once again directly in the fruitfulness and blessing of all the world-shaping forces of man's historical existence, such as nature, history, language...(1991:33)

The nothing of existence is what is inescapable, and compels questioning, not merely "knowing." The more specialization creates new divisions, the less anyone involved has any

hope of seeing what matters most, "*what is worthy of questioning*" (1991:33). Instead of everyone being on the same page and working together, each new specialized science thinks and acts only according to the dictates of its particular object area. In the name of greater focus, it would seem that specialized sciences pursue a curious type of willful blindness. Further there is the role of the community. Glazebrook points out that Heidegger "sees the sciences as obligated not only to objectivity but also to the larger spiritual-historical world of the community outside the university" (2000:143). He defines spirit as "the determined resolve to the essence of Being, a resolve that is attuned to origins and knowing" (Heidegger 1991:33). This is why he wanted a faculty of the formerly fragmented disciplines to work together as a *spiritual* faculty, that is: a faculty who have "the determined resolve to the essence of Being," the will to be "at the mercy of what is concealed and uncertain...*what is worthy of questioning*" (1991:33). Perhaps "reflective" faculty would be a less loaded way of putting it; but Heidegger does not use the word "reflection" (*Besinnung*, sometimes translated as "mindfulness") until 21 years later, in 1954's "Science and Reflection."

Section 3: "Science and Reflection"

Heidegger states that the essence of science is that "*Science is the theory of the real*," (1977:157). He means modern science, not medieval or ancient. Still, as will be familiar by now, he insists that the true origin of science lies in ancient Greek philosophy (1977:157). Further, it is in this ancient origin that there lies "another kind of knowing" than the one modern science has taken up whereupon facts and figures multiply meaninglessly. This other kind of knowing is reflection, which is the only way to get modern science back to its ancient philosophical roots in

questioning what is worthy of questioning. An essential step on the way towards that goal is removing the specialization of the sciences that has proliferated in this modern era. He writes

Whoever today dares, questioningly, reflectingly, and in this way already as actively involved, to respond to the profundity of the world shock that we experience every hour, must not only pay heed to the fact that our present-day world is completely dominated by the desire to know of modern science; he must consider also, and above all else, that every reflection upon that which now is can take its place and rise and thrive only if, through a dialogue with the Greek thinkers and their language, it strikes root into the ground of our historical existence. That dialogue still awaits its beginning. (1977:157-58)

To help that dialogue begin, Heidegger declares his intention to examine hermeneutically the words "theory" and "real" in his assertion "*Science is the theory of the real.*" What matters for Heidegger is that we discover the essential meaning of the word, since, without a word no dialogue can begin. He writes

What counts is to ponder that essential realm as the one in which the matter named through the word moves. Only in this way does the word speak, and speak in the complex of meanings into which the matter that is named by it unfolds throughout the history of poetry and thought. (1977:159)

He starts with the word "real": "[t]he real [*das Wirkliche*] brings to fulfillment the realm of working [*des Wirkenden*], of that which works [*wirkt*]" (1977:159). Naturally the next question is: What does "work" mean? "To do [*tun*]." However, before simply explaining what "to do" means, Heidegger delves into etymology. Sharing the same Indo-German root, *ahe*, with the Greek word *thesis*. "Thesis" in the Greek sense means a "setting, place, position" (1977:159). What Heidegger wants to stress here is that this ancient Greek sense of place (as a verb) is something that was *not solely via human intention*; in other words, "thesis" meant a placing that happened on its own, naturally. It is nature, that is *physis* (in the ancient Greek) that

Heidegger is now going to underline, via a transition from "to do" to nature's doing as growth.

He writes

This doing, however, does not mean human activity only, above all it does not mean activity in the sense of activity or agency. Growth also, the holding-sway of nature (*physis*), is a doing, and that in the strict sense of *thesis*. Only at a later time do the words *physis* and *thesis* come into opposition, something which in turn only becomes possible because a sameness determines them. (1977:159)

When we say "*Science is the theory of the real*" the subtext is one of human agency, i.e. human scientists doing theory, and discovering reality. And indeed, scientists *are* doing that. But there is another facet of doing theory, and discovering reality, and this facet is *not* human, but nature. Nature "does" also; and, even if to most ears today all this may sound quite mystical and far-fetched, Heidegger demonstrates that it didn't always sound that way. It is only now, in the modern scientific era, that such a notion provokes dismissiveness and befuddlement. It is just these very kind of reactions that Heidegger would see as another example of the forgetting of being; a reaction from someone who merely unquestioningly accepts that "*Science is the theory of the real.*" He continues

Physis is thesis: from out of itself to lay something before, to place it here, to bring it hither and forth, that is, into presencing. That which "does" in such a sense is that which works; it is that which presences, in its presencing. (1977:159)

Nature places things from within to without; for example, sunlight is always already set before us, naturally. There is neither agency, nor activity here Heidegger insists, but merely a spontaneous event unfolding in time. Whatever agency or activity humans employ is necessarily *derivative* of this prior setting or placement by nature. Heidegger's point is *that* derivation; and, most importantly, that it is in the ubiquity of modern science's influence on humans and human institutions that the danger of overlooking this derivation is best seen. The

sequence from nature to human, is being displaced and repackaged as a sequence of human to nature. Yet in order to do any science the holding-sway of nature, its prior placement, has to have already been the case, or no science could even get started.

Heidegger's thinking of *physis* as being, Glazebrook explains, first occurred decades before in 1935's *Introduction to Metaphysics*, as well as in his 1940 lectures on the concept of *physis* in Aristotle's *Physics*. She points out that the latter is the "clearest statement of Heidegger's claim that for the Greeks, *physis* presences, that is, *is*, more fundamentally than anything else" (2000:234).

In *Introduction to Metaphysics*, Heidegger states plainly that

Being as a whole reveals itself as *physis*, "nature," which here does not yet mean a particular sphere of beings but rather beings as such as a whole, specifically in the sense of emerging presence. (1992:126; quoted in Glazebrook 2000:177-8)

It will be important to keep in mind Heidegger's view that nature places something before humans from out of itself into presence; it's an idea in this work (and others of Heidegger) that quickly becomes a motif. Heidegger transitions from *physis* and *thesis* back to the question of the meaning of "work" in the light of this hermeneutical analysis. Working is not merely some mindless activity, as the tired formula "effort + time = work," would have it. Work is creative, and to work is to make something arrive on the scene. Work is real, he says, because "to work is to bring hither and forth" and

The real [*Wirkliche*] is the working, the worked [*Wirkende, Gewirkte*]; that which brings hither and brings forth in presencing, and that which has been brought hither and brought forth. Reality [*Wirklichkeit*] means then, when thought sufficiently broadly: that which, brought forth hither into presencing, lies before; it means the presencing, consummated in itself, of self-bringing-forth. (1977:160)

To sum up: the basis of this identification of "the real" with "the working" is that *physis*

(nature) and *thesis* (placing) are essentially *one*. This “which brings hither and brings forth in presencing” is not meant to *solely* define natural occurrences, but human ones as well (Ibid.). Originally, all of this was understood; only relatively recently have *physis* and *thesis* been thought of oppositionally (Heidegger 1977:159).

Heidegger continues to unpack the German word that unites reality with working, *Wirken*. He wants to show how the Romanization of Aristotle's original Greek texts obscures not only a deep truth, but the very experience Aristotle was trying to bring to light. He traces *Wirken* back to the Indo-German root *uerg*, and this word is the origin of both the German word *Werk* (work) and the Greek *ergon* [ἔργον] (160). He writes:

That which consummates itself in *ergon* is a self-bringing-forth into full presencing; *ergon* is that which in the genuine and highest sense presences [*an-west*]. For this reason and only for this reason does Aristotle name the presence of that which actually presences *energeia* [ἐνέργεια, *ας, ἡ*] and also *entelecheia*: a self-holding in consummation (i.e. consummation of presencing). [...] Aristotle's fundamental word for presencing, *energeia*, is properly translated by our word *Wirklichkeit* [reality] only if we, for our part, think the word *wirken* [to work] as the Greeks thought it, in the sense of bringing *hither--*into unconcealment, *forth--*into presencing. (1977:160-61)

Thus the proper meaning of *energeia*, Heidegger writes, would be "enduring-in-work," since what appears or presences came from unconcealment, and then endures (1977:161). But this definition has been suppressed by Roman translators after Aristotle's death. *Ergon* is then seen as *operatio* and *actio*; *energeia* is supplanted by *actus*. So the original meaning of *energeia* is buried by a new meaning that states that whatever presences "result[ed] from an *operatio*" (1977:161). Ultimately, Heidegger asserts, this ends with everyone speaking of the real only in terms of cause and effect or consequence. Long forgotten is the original meaning of the *ergon* as a "self-bringing-forth into full presencing." This changeover from the ancient Greek to the Roman, from "self-bringing-forth" to consequence, will eventually find its way into Theology,

where God is now denoted as a First Cause. Philosophy and science haven't been immune from the "cause and effect" -speak either, he adds: Kant sees "causality as a principle of temporal succession," and the physics of Heisenberg explore causation as a "purely mathematical problem of the measuring of time" (1977:161). Glazebrook makes the crucial point that Heidegger doesn't explain just "how the notion of cause belongs in the Greek experience" (2000:235). She quotes, however, from "The Origin of the Work of Art," to help shed light on this question. Heidegger writes

[T]his translation of Greek names into Latin is in no way the innocent process it is considered to this day. Beneath the seemingly literal and thus faithful translation there is concealed, rather, a *trans*-lation of Greek experience into a different way of thinking. *Roman thought takes over the Greek words without a corresponding, equally authentic experience of what they say, without the Greek word.* The rootlessness of Western thought begins with this translation. (1971: 23; quoted in Glazebrook 2000: 235; italics in original)

This is how the meaning of "the reality of the real" has been changed; but there is more. Now Heidegger develops this change further by examining what it means when something is called a "fact" or "factual." After the real is set up as simple cause and effect, what follows after an action is a fact of the matter; this is what is real (now): a fact derived by the consequences of cause and effect. And yet, the older meaning of the real as "self-bringing-forth" still remains beneath these changes (1977:162). He writes

The consequence demonstrates that that which presences has, through it, come to a secured stand, and that it encounters as such a stand [*Stand*]. The real now shows itself as object, that which stands over against [*Gegen-Stand*]. (1977:162)

After what is real is defined via the process of cause and effect, what *is* remains as a consequence. What this process and its consequence makes apparent to all is the object. This is how the real can now be seen in the object; because the process of cause and effect has

made it so. Once what counts as real is *solely* what can be demonstrated via cause and effect, and once "*physis is thesis*" (i.e. the nature's placement as the "self-bringing-forth") is lost in translation, then the object is indubitably what is real. Under such a view, what presences is not nature's placement, but the object's "secured stand"; as Glazebrook puts it: "In modern science, the real is what has been secured as object" (2000:236).

Having answered his first question regarding what the word "real" meant in the assertion "Science is the theory of the real?", Heidegger next shifts his focus from *physis, thesis, and das Wirkliche* to *theoria*, asking "what does the word 'theory' mean" in the assertion "Science is the theory of the real?" (1977:163). Here Heidegger wants to show that theory has a hidden layer of meaning originating in the lives and thoughts of the ancient Greeks. There was another way of thinking and living "theoretically" than that described today in the modern scientific age. Deriving from the Greek root word *theorein* (*theoria* is the noun version), Heidegger explains that *theorein* is actually the merging of two separate words, *theo* and *horao*. *Theo* means "the outward look, the aspect in which something shows itself"; *horao*, means: to look at something attentively, to look it over, to view it closely (1977:163). Combined "*theorein* is *thean horan*, to look attentively on the outward appearance wherein what presences becomes visible and, through such sight--seeing--to linger with it" (1977:163).

He explains that for the Greeks, *bios theoretikos*, or theoretical life was a "life of beholding" where one established a "pure relationship to the outward appearances belonging to whatever presences" (1977:164). This was not a mindset based solely on utility; *theoria* was an end in itself (1977:164). The Greeks, for Heidegger, were "unique" in the manner they "thought out of their language, i.e. received from it their human existence" (1977:164).

Moreover, being that an essential part of human existence is speaking, the Greeks also noticed that when pronouncing the word *theoria* but "differently stressed, the two root words *thea* and *ora* can read *thea'* and *ora''*" (1977:163). Because of this, he interprets that

Thea is goddess. It is as a goddess that *Aletheia*, the unconcealment from out of which and in which that which presences presences, appears to the early thinker Parmenides. [...] The Greek word *ora* signifies the respect we have, the honor and esteem we bestow. If now we think the word *theoria* in the context of the meanings just cited, then *theoria* is the reverent paying heed to the unconcealment of what presences. Theory in the old...sense is the *beholding that watches over truth*. (1977:164-5).

This truth is simply that the thing comes into existence (unconcealment) from non-existence (the Nothing), endures for a while, then returns to non-existence (the Nothing). What is true is never simply present, devoid of a past or a future. Watching over this truth, not as a bare fact derived from cause and effect, but as an existent entity with a past and future beyond the consequentialist set-up of causal modeling, is the point. As the Chinese proverb advises, "When you drink the water, remember the well." Glazebrook, after comparing these passages with those in Heidegger's *Moira*, asserts

If this account is brought to bear on "Science and Reflection," then Heidegger's reference there to *Ora* and *Aletheia* can be read against the claim that truth has a veiled origin: being. Heidegger is suggesting, then, that theory takes its truth from an obscure source, a source that remains veiled to science. That source is being. (2000:237)

When biologists speak of 'the theory of evolution', or physicists of 'the theory of relativity', the ancient "essence of theory" that the Greeks thought and lived is "buried." And yet, that essence still remains to be uncovered and awakened (Glazebrook 2000:237). Truth in the modern scientific era is defined by the real being set-up by science as an object (2000:237; Heidegger 1977: 167). *Theoria*, the hidden essence of modern science, and modern scientific 'theory,' are "essentially different" from one another, he asserts (1977:166). Glazebrook writes:

Theoria is not representational thinking... [...] It is the activity of standing in the truth, of holding back action to allow what is revealed to show itself. It is a relation to being that does not simply grasp being by way of a concept. (2000:237)

Heidegger now begins to bring the problem of compartmentalization to the fore. He asks, "In distinction from the early *theoria*, what is 'the theory' that is named in the statement 'Modern science is the theory of the real'?" (1977:165). With this question he hermeneutically examines what was lost when the Romans translated *theorein* into *contemplari*, and *theoria* with the word *contemplatio*. "*Contemplari* means: to partition something off into a separate sector, and enclose it therein," and "*Templum* means originally a sector carved out from the heavens and the earth, the cardinal point..." (1977:165). *Theoria*, asserted Heidegger above, originally meant to alertly look at what presences and remain with it; nowhere is there any mention of partitioning or dividing. But with the Roman translation, compartmentalization arises as the basic meaning of the word. The German translation is *Betrachtung*, meaning to consider or observe; the original intent of "look[ing] attentively upon the aspect of what presences" is gone (1977:166). Observation is all that is required in order to be 'theory.' Heidegger admits this is partly in line with the original meaning, so long as one uses *Betrachtung* in the manner of looking at a picture (Ibid.). How does the original meaning of *Betrachtung* (striving, manipulating, refining) change its current meaning (observation) when both are grafted onto 'theory'? His answer is: "[T]heory as observation [*Betrachtung*] would be an entrapping and securing refining of the real" (1977:167).

Compartmentalization in science necessarily arises because the real will be made manifest and secure as an object, and because this will occur in a "surveyable" sequence (1977:168). Once the object has been made secure, object areas are demarcated through basic

concepts in regional ontologies as discussed in chapter 1 (1977:168). These areas are kept separate because without separation the real as object could never be made useful. For example, a library will have separate sections for theology and for autobiography (among many others). If the library had no sections, it would make finding a book of either category incredibly difficult. The sections are there to be useful for the reader. But these sections have to be kept strictly separate, or else uselessness will arise. So if one was looking for St. Augustine's (a theologian) autobiography *Confessions*, a librarian would have to make a decision regarding whether to place the book in 'autobiography' or in 'theology'. Arguments could be made either way, doubtless; but the point is that a decision must be made or uselessness will arise. This uselessness is at the core of just *why* compartmentalization *must* arise; the attentive viewing of the self-bringing-forth will not an object make. What nails down the many sections and subsections of the library is the Dewey Decimal System; it 'saves the day', as it were, for book compartmentalization, and the inquiring reader. What nails down the many sciences of 'Science' with all their individual object-areas is, Heidegger argues, theory (1977:169).

But theory can only do this via a method of reckoning in advance those objects within the object-areas. He summarizes nicely:

Because modern science as the theory of the real depends on the precedence that attached to its method, therefore it must, as a securing of object areas, delimit these areas over against one another and localize them, as thus delimited within compartments, i.e. compartmentalize them. The theory of the real is necessarily compartmentalized science. (1977:170)

Specialization is necessary to modern science because whenever scientific investigation occurs, it *must* coincide with the strictures of the object-area. If there is disagreement, the

work will be gone. For example, if a primate was discovered that gave birth via eggs instead of live birth, an adjustment to primatology would be called for, and 'Ovoprimatology,' the new science dedicated to the study of egg-laying primates, would be born. It too would have its object-area, theory, methods, etc. So, what may at first appear to be a disagreement (an egg-laying primate) that would surely destroy the object-area of primatology, instead simply gives birth, so to speak, to a new even more specialized science: ovoprimatology. One could continue this example to include discoveries like ovoprimates with wings, etc. But the original object-area of primatology is only re-reified by this new offspring, not in spite of the connection between the old and the new object-areas, but because of it; 'border traffic' is how Heidegger describes it (1977:170). Biology and chemistry did not vanish because of the arrival of biochemistry; the reason is because the new bio-chemical objects discovered by the proto-biochemists had to be explained by the prior existing framework of objectness. This why Heidegger paints the picture so starkly as one of inevitability; once science decides the real is the object via cause and effect, and not the self-bringing-forth of presence that should be viewed attentively, the rest follows logically. Thus:

Specialization, therefore, is in no way either a deterioration due to some blindness or a manifestation of the decline of modern science. Specialization is also not merely an unavoidable evil. It is a necessary consequence, and indeed the positive consequence, of the coming to presence [*Wesen*] of modern science. The delimiting of object-areas, the compartmentalizing of these into special provinces, does not split the sciences off from one another, but rather it first yields a border traffic between them by means of which boundary areas are marked out. Those areas are a source of a special impetus that produces new formulations of questions that are often decisive. We know this fact. The reason for it remains enigmatic, as enigmatic as the entire essence of modern science. (1977:170-71)

Heidegger now shifts his focus, from the compartmentalization of the sciences, to the relation of science (specifically physics) to nature (*physis*). The manner in which nature is set-

up by physics, as something 'inanimate' for example, is merely one way of viewing nature; it is not the only way, a simple yet powerful point by Heidegger (1977:173). Nature as 'self-bringing-forth,' as *physis* in the original ancient Greek sense, cannot be fully represented, be it mathematically, or in scientific taxonomies (1977:174). This overflow cannot be managed by science's essential need to set-up beings as representable objects within object areas, defined by taxonomy and theory, measured and calculated, all in order to 'do' science. He writes

Scientific representation, for its part, can never decide whether nature through its objectness, does not rather withdraw itself than bring to appearance the hidden fullness of its coming to presence. Science cannot even ask this question, for, as theory, it has already undertaken to deal with the area circumscribed by objectness. (1977:174)

In effect, this is a restating of his earlier declaration from "What is Metaphysics?" in 1929, "Science wants to know nothing about the Nothing" (1998: 84). Condemning itself to a blinkered focus on beings (i.e. existent entities, or things), science necessarily blinds itself to the Nothing as the source for the "hidden fullness of [the object's] coming to presence." This Nothing, this blindspot (so to speak) is essential to science as "that which cannot be gotten around" [*das Unumgängliche*] (1977:177). It is crucial to understand that Heidegger is *not* saying that there are no objects, or that science denies presence. Instead, he's insisting that *there are objects*, and that for science *there is presence*. The problem with science (or 'history', or 'language' etc.) from Heidegger's point-of-view could be summed up crudely as this: science puts all of its eggs in *one* basket not in spite of "that which cannot be gotten around," but because of it (1977:176). He writes

This impotence of the sciences is not grounded in the fact that their entrapping securing never comes to an end; it is grounded rather in the fact that in principle the objectness in which at any given time nature, man, history, language, exhibit themselves always itself remains *one* kind of presencing, in which indeed that which presences can appear, but never absolutely must appear. (1977:176; original emphasis)

Science is essentially incapable of getting around *das Unumgängliche* because no science can ever discover its own essence via itself. If any science could have, he asserts, that science would have done it by now. But no science (without exception, he notes) can self-conceive and self-represent its own essence. For example, he writes, physics can never use itself to explain what physics essentially is; neither can mathematics via mathematics, or history via history (1977:177-78). Thus, as examined above, their origin lies in the nothing; their original essence is "intractable and inaccessible" to them (1977:177). Heidegger acknowledges that there is (during that time) much talk and argument regarding the sciences and the so-called "crisis" at their "foundations"; however, such efforts never address the essence of science itself, merely the foundations of individual sciences (1977:178). He writes

Only when we pay heed to this inaccessibility of that which is not to be gotten around does that state of affairs come into view which holds complete sway throughout the essence of science. (1977:177)

Further, that which cannot be gotten around by science is not discussed because it is *itself* "inconspicuous". *Das Unumgängliche* is passed over because it cannot be approached by a discipline whose first axiom is something like "beings themselves - and nothing besides" (1998:84). This is precisely why Heidegger has gone through such enormous efforts to unpack and demonstrate the essence of science; in order to understand that *physis* presences, that *theoria* is placing before, and that *this* real is nature's self-bringing-forth that *can* be viewed attentively by human beings. In other words, being blind to the passing of the nothing is no excuse. The case has been made by Heidegger in order to indicate this nothing at the heart of science and philosophy, in order to open "a way that brings us before that which is worthy of

questioning" (1977:179). This way is not an adventure, he writes, but a "homecoming"; this way is reflection [*Besinnung*] (1977:179).

He describes reflection as not mere consciousness of something, but the "calm self-possessed surrender to that which is worthy of questioning" (1977:180; quoted in Glazebrook 2000:238). The search for meaning is the essence of reflection (1977:180). The meaning of "What?", one should ask. The meaning of being, I think, would be the answer. Glazebrook writes that

Such reflection determines that the matter for thinking - that is, what calls for thinking - is being. 'Reflection' in 'Science and Reflection' gets at the same thing as 'thinking' in *What Is Called Thinking?* Both turn toward a matter that is constricted, confined, and closed off from the modern epoch: being (2000:238).

In the interest of clarifying what I think reflection might be, I posit the following (and very common) scenario. For example, I make an enormous mistake; I have locked my keys in my car. After I have paid the locksmith to break in and retrieve my keys I am left with a choice. I can either shrug and think "mistakes happen; nobody's perfect" or I can reflect. I choose to reflect on my mistake. As I reflect, I am searching for an answer that will resonate with me. I've experienced embarrassment and anger at my mistake, and I want to do my level-best to ensure that it never happens again. This answer will stay with me in all future car keys-based scenarios; thus not just any answer will do. Questioning myself regarding the incident is my primary approach to reflecting on my error. The image in my mind to guide me is one of never locking my keys in the car again. I retrace my steps; I offer up hypotheticals, i.e. What if I had done X, instead of Y?, etc. Finally, I have my answer and I stop reflecting. My conclusion: "I know that the most useful answer for me is: I will always have my car keys in my hand before I

close the car door." In 25 years I have yet to lock my car keys again, after the first time at age 15; this simple rule works.

What if philosophers and scientists working together tried this same approach to reflection on being? One problem with this from Heidegger's viewpoint would be that such an attempt (all good intentions aside) would still be based in scientific knowledge and making reflection useful. He writes that

Reflection is of a different essence from the making conscious and the knowing that belong to science; it is of a different essence also from intellectual cultivation [*Bildung*]. (1977:180)

Recall how in my example with car keys I always had a guiding image or goal: never to lock them in the car again. Further, I was single-minded in making sure I get the most useful answer I could muster from reflecting. This is precisely the *wrong* way to 'do' reflection, according to Heidegger. Such insistence on goals and representational thinking, as well as knowledge, usefulness, and intellectual cultivation are strictly forbidden in "Science and Reflection." He writes

Intellectual cultivation brings before man a model in the light of which he shapes and improves all that he does. Cultivating the intellect requires a guiding image rendered secure in advance, as well as a standing-ground fortified on all sides. The putting forward of a common ideal of culture and the rule of that ideal presuppose a situation and bearing of man that is not in question and that is secured in every direction. This presupposition, for its part, must be based on a belief in the invincible power of an immutable reason and its principles. (1977:180)

Heidegger seems to suggest here that such an approach to reflection would still be in lockstep with science's insistence on, as he wrote in "What is Metaphysics?", "beings themselves - and nothing besides" (1998:84). In other words, a clear image, in advance, of what would count as

success, and what would count as failure. In such an approach questioning itself is axiomatically put in chains, in the hopes of making it useful.

Further, he insists that reflection would always be mindful (another word *Besinnung* is often translated as) of our present place in the 'flow' of history (1977:181). It is history that he next writes of after critiquing "reason and its principles." Reason's "immutable power" to discover "principles" outside that flow of history are (I take it) just what Heidegger is scrutinizing here (1977:181). He is aware he's not very clear. As to what reflection would add to "our historical sojourn," he answers, "reflection can decide nothing directly" (1977:181). And admittedly, it can be hard to properly interpret a mystico-poetic sentence like, "the poverty of reflection is the promise of a wealth whose treasures glow in the resplendence of that uselessness which can never be included in any reckoning" (1977:181). Glazebrook, however, has written that

Heidegger's argument is that the poverty of the uselessness of reflection on what cannot be got around can become a rich treasure when that which is worthy of question is taken up. (2000:239)

I interpret Heidegger and Glazebrook to be saying that, "once that which is worthy of question is taken up," the reflector or reflectors reach decisions without needing to engage in advance goal-making. The decisions seemingly arise on their own, once that which is worthy of question provides the compass, so to speak. Decisions arise in everyone's life from time to time. For example, I want to finish reading a chapter before leaving for a movie with my friend; there's not enough time to do this, however. Just before I have to leave the phone rings; my friend answers it. It is a family call, and she has to take it; both of us will have to go to the movie another time, and I get to finish reading the chapter. I had a desire, but no decision was made:

it was made for me by other circumstances out of my control. But a decision, in the sense of a conclusion, *was* reached; it just was not reached by any party. Neither me, my friend, nor her family, made the decision "stay and finish your reading, and go the movie another time." Still, that event occurred; basically it appears obvious that these things happen all the time.

More specifically, what I think Heidegger has in mind is something more like my next example. If I am hungry, I have to decide what to eat. I never have to decide, however, *to* eat if I want to continue living, for needing to sustain my existence via eating is never before my mind as a question to even raise, never mind answer. That I want to sustain my life is not in question; only *how* I will sustain my life. Thus, the 'compass' of my eating - the 'That which is worthy of questioning' of my example - is: "if I want to continue to live, I *must* eat." If I *were* to question that, (a classic existential moment), I would be questioning myself about whether I wanted to continue, or to perish through starvation. To "ceaseless[ly] question away at the inexhaustibility of That which is worthy of questioning," as Heidegger puts it, I am still acting out the very answer to that question by continuing to eat, in order to continue to exist, in order to continue to question ceaselessly. Thus, *in effect*, I am living my answer to the question: simply saying "I want to eat, because I want to continue, because I want to continue to question" and so on, until I actually perish. Thus, according to my interpretation, the *questioning* of 'That which is worthy of questioning' is not so much the point for Heidegger, as much as *how we live as we question that which is worthy of questioning*. This interpretation, however, *would* seem to dovetail with the poetical language Heidegger ends "Science and Reflection" with. He writes

Reflection is not needed, however, in order that it may remove some chance perplexity or break down an antipathy to thinking. Reflection is needed as a responding that

forgets itself in the clarity of ceaseless questioning away at the inexhaustibility of That which is worthy of questioning - of That from out of which in the moment properly its own, responding loses the character of questioning and becomes simply saying. (1977:182)

Heidegger insists that the scientist has a role to play in reflection at the end of "Science and Reflection." For a philosopher as vigorously critical of science as he clearly was through his professional career, this reaching out to science is, perhaps, very surprising. He writes

Even if the sciences precisely in finding their ways and using their means, can never press forward to the essence of science, still every researcher and teacher of the sciences, every man pursuing a way through a science, can move, as a thinking being, on various levels of reflection and can keep reflection vigilant. (177:181-82)

Here, one could interpret Heidegger as offering a clear declaration that the sciences can also reflect. I think this is what he's doing as well. But it's important to notice he doesn't offer this possibility to the scientist *as* a scientist; instead, he qualifies it as a possibility for the scientist "as a thinking being." It is in the shared humanity between scientists and non-scientists that there is a possibility for reflective communication. Glazebrook states that

In "Science and Reflection" he suggests that practitioners of science can and presumably should think, that is, reflect on their science. This means not simply evaluating the science in terms of results and usefulness in practical application, but reflecting on how the science determines its object. The task for the scientist is to pause from science and raise the question of its origin and essence: the apriori determination of its object. (2000: 240)

Section 4: CID: Reflection made Concrete

So how does reflection made concrete as CID address *das Unumgängliche*? First, it does so by following Heidegger's lead in interpreting being as *physis*, i.e. being as Nature, as shown above (1992:126; quoted in Glazebrook 2000:177-8). Nature is ultimately what physics (*any* modern science) cannot get around, i.e. *das Unumgängliche*, Glazebrook writes (2000:237).

Second, CID brings philosophy to the interdisciplinary table, so to speak, and it is *only* philosophy, Heidegger insists, that has the capacity to address that which cannot be gotten around, as discussed above (1977:176). Even if the sciences could interpret being as Nature, they would still, Heidegger asserts, be incapable of reflecting on their own essence in the Nothing. Only philosophy has this capacity for reflection, because only philosophy can risk *not* positing, not being productive, not accumulating knowledge for its own sake, but instead “risking the poverty of reflection...[that]...is the promise of a wealth whose treasures glow in the resplendence of that uselessness which can never be included in any reckoning” (Heidegger 1977:181). This cannot be done by any science because, as Glazebrook puts it, “Once a commitment to a specialized area is made, a science looks only to that world” (2000: 217).

In closing I review chapter 1 on CID. As shown CID is a "discipline-transcending reflection" that will be: 1) Seeking to avoid the insistence on extreme vertical slices of knowledge in only one area, and creations of new disciplines (2007:513). 2) Applying a horizontal axis that “mov[es] beyond the academy into a dialogue with the public sector, the private sector, community and stakeholder including religious groups”; an approach “that stretches across the physical sciences, social sciences, and humanities” (2007:513). 3) Applying a “vertical axis where academic research is self-consciously integrated into the multiple contexts of contemporary life” (2007:513). 4) Assessing the values in society and the role these values play in ID, instead of merely describing them; and “working with society as it struggles to address questions of social and environmental justice, human freedom, and responsibility, and the proper roles of the public and private sectors” (2007:513). And lastly, 5) constructing a new dialogue between the sciences and the humanities, integrating knowledge for the crucial

problems of today and tomorrow, and eschewing the "iconic status of scientific curiosity," and knowledge for its own sake (2007:513).

This description of CID clearly addresses the fragmentation of the sciences, rejects the pursuit of knowledge for its own sake, and, by bringing philosophy (one of the humanities) to the table to create a dialogue with the sciences, clearly contains the potential to make reflection concrete. Further, by reaching out to non-academic centers of knowledge like government and corporate entities, religious groups, and social justice and environmental justice organizations, the unifying of knowledge takes on a different light. Perhaps Heidegger was entirely focused on universities and the sciences, but there is knowledge in other areas of human life and endeavor, knowledge that can also help in the unifying not just of the sciences, but of all human knowledge.

In this way, perhaps, reflection as CID can bring all those concerned together "in the clarity of ceaseless questioning away at the inexhaustibility of That which is worthy of questioning" (Heidegger 1977:182). Doubtless it is legitimate to ask, "But is *this* what Heidegger had in mind? He addressed the fragmentation of the sciences, yes, but *not* the fragmentation of social justice, or environmental justice, or NGOs, or corporations, or governments, etc." And this is true. But Heidegger also wrote in "Science and Reflection" that

The ways of reflection constantly change, ever according to the place on the way at which a path begins, ever according to the portion of the way that it traverses, ever according to the distant view that opens along the way into that which is worthy of questioning. (1977:181)

Thus it seems that, for Heidegger, there is not solely *one* way of reflection, but many, and these ways will constantly change as well. But what is clear is that the sciences can never have a way of reflection so long as they go it alone, perennially positing as they do. Only a conversation

with philosophy, Heidegger insists, can open that possibility. And reflection, made concrete as
CID is, I assert, that way.

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