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Babette Babich

*Fordham University*, [babich@fordham.edu](mailto:babich@fordham.edu)

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## ***“The Problem of Science” in Nietzsche and Heidegger***

**BABETTE E. BABICH \***

**ABSTRACT:** *Nietzsche and Heidegger pose important philosophical questions to science and its technological projects. The resultant contributes to what may be called a continental philosophy of science and I argue that only such a rigorously critical approach to the question of science permits a genuinely philosophical reflection on science. More than a thoughtful reflection on science, however, the heart of philosophy is also at stake in such reflections. The author argues that if Nietzsche proposes the resources of art to defend us against truth and the deadly insights of tragic knowledge, then Nietzsche's more arresting claim turns is his equation of science and art, just as Heidegger aligns techne and poiesis. For Nietzsche, science and art draw upon the same creative powers and both science and art are directed to the purpose of life.*

**KEY WORDS:** *Analytic Philosophy; Art; Biotechnology; Causality; Computer Age; Experience; Genome Project; Gestell; Heidegger, Martin; Human Genome; Internet; Kuhn, Thomas S.; Machination; Measuring; Mechanization; Natural Science; Nature; Nietzsche, Friedrich; Passion in Science; Philosophy of Science; Philosophy of Philosophy; Representation; Research; Science in Practice; Science; Stem Cell Research; Technology; Theory; Truth; Virtuality; Wissenschaft.*

**RESUMO:** O ponto de partida deste artigo é o reconhecimento de que Friedrich Nietzsche e Martin Heidegger são dois filósofos que colocam questões profundamente relevantes acerca da Ciência e dos seus projectos tecnológicos. Neste sentido, o plano da autora consiste em demonstrar a viabilidade e a importância do modo não-analítico, ou continental, de fazer Filosofia da Ciência, argumentando que uma reflexão genuinamente filosófica acerca da Ciência não se pode dispensar de um confronto com o modo crítico de fazer filosofia representado tanto por Nietzsche como por Heidegger. Para a autora, os pensamentos críticos destes pensadores acerca da Ciência são bem mais do que uma mera reflexão filosófica acerca da Ciência; na verdade, o que aqui está em causa é propriamente saber de que se trata quando a questão é a da própria Filosofia. Assim, e na medida em que Nietzsche propõe os recursos da arte para nos defender contra as invectivas da verdade e as intuições fatais do conhecimento trágico, a autora do artigo defende que o mais interessante na posição nietzscheana tem a ver com o seu modo de equacionar a relação entre Ciência e Arte, tal como Heidegger acabará por alinhar techne e poiesis. O fundo da questão está em que para Nietzsche tanto a Ciência como a Arte recorrem aos mesmos poderes criativos, para além de que a Ciência e a Arte estão orientadas para a defesa do mesmo propósito: a Vida.

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\* *Fordham University* (New York, USA).

**PALAVRAS-CHAVE:** *Arte; Biotecnologia; Causalidade; Células Estaminais; Ciência natural; Ciência; Computador; Experiência; Filosofia Analítica; Filosofia da Ciência; Filosofia da Filosofia; Genoma Humano; Gestell; Heidegger, Martin; Internet; Investigação; Kuhn, Thomas S.; Maquinismo; Mecanização; Mensuração; Natureza; Nietzsche, Friedrich; Paixão na Ciência; Prática científica; Representação; Tecnologia; Teoria; Verdade; Virtualidade; Wissenschaft.*

## Prelude

To write about science in a philosophical context including the names of Nietzsche and Heidegger is to engage “a problem with horns”<sup>1</sup> in Nietzsche’s ruefully provocative expression. The dilemma is that of continental philosophy of science inasmuch as it conflicts with analytic philosophy of science, a robustly well financed and well-established and ergo redoubtable discipline, one indeed that pretends to be the whole of “philosophy of science.” Nietzsche’s approach, perceived from this perspective, seems not to support a philosophy of science<sup>2</sup> and what he named “the problem of science,” i.e., science regarded conceived as questionable, likewise seems to have nothing to do with the philosophy of science proper. Similarly, Heidegger’s concerns with modern science and its technology can seem alien to the philosophy of science. This alienating quality can and should be granted. Nevertheless there is indeed a continental tradition of reflection on the sciences, including Nietzsche as well as Husserl, Heidegger, Merleau-Ponty, and many, many

<sup>1</sup> Friedrich Nietzsche, *Die Geburt der Tragödie*, “Versuch einer Selbst-Kritik” §2, in Nietzsche, *Kritische Studienausgabe*, ed. G. Colli and M. Montinari (Berlin: de Gruyter, 1980), Vol. 1. I use my own translations here, but wherever possible I attempt to approximate standard translations such as Walter Kaufmann’s 1967 Random House edition of this text. Cited hereafter as BT by section rather than page number (the preface will be cited using lower case roman numerals).

<sup>2</sup> The existence of several books on the topic, including my own effort, Babette E. Babich, *Nietzsche’s Philosophy of Science* (Albany: State University of New York Press, 1994, in Italian as *Nietzsche e la scienza. Arte, vita, conoscenza*, trans. Fulvia Vimercati [Milan: Rafello Cortina, 1994]) in addition to the two volume collection edited by Babette Babich with the collaboration of Robert S. Cohen in the series Boston Studies in the History and Philosophy of Science: including the plainly titled, *Nietzsche’s Epistemology and Philosophy of Science: Nietzsche and the Sciences II* (Dordrecht: Kluwer, 1999), as well as a collection resulting from a meeting of the Friedrich Nietzsche Society of the UK held at Cambridge University in 2001 and edited by Greg Moore and Thomas Brobjer, entitled, *Nietzsche and the Sciences* in addition to reflections by Milič Čapek, Rüdiger Grimm, Hans Seigfried, Reinhard Löw, Alwin Mittasch, Alistair Moles, Klaus Spiekermann, Walter Zimmerli, and indeed in connection with Nietzsche’s critique of logic, Heidegger himself. The same can be said for Heidegger given Trish Glazebrook’s *Heidegger’s Philosophy of Science* and authors in addition to myself who have engaged Heidegger’s philosophical reflections on science, such as Joseph Kockelmans, Patrick A. Heelan, Dmitri Ginev also represent leading continental philosophers of science.

others.<sup>3</sup> What characterizes such perspectives on science is nothing less than what Heidegger called questioning, a Cartesian reflection on the foundational force of questioning which is especially clearly articulated at the start of *Being and Time* (Int. I. 2), a reflection that bears the marks of Nietzsche's influence in his own critical reflections on questioning, a provenance also to be heard in Heidegger's *Introduction to Metaphysics* where he writes that questions "are not given like shoes, clothes, or books. Questions *are* as they are actually asked, and this is the only way that they are."<sup>4</sup>

Although both Nietzsche's and Heidegger's perspectives continue to make for an odd fit with and on the terms of traditional analytic philosophy of science,<sup>5</sup> and this remains true despite recent analytic efforts to colonize continental philosophy, their questions add exactly philosophical if also critical reflection to the philosophy of science as such.

### 'The Problem of Science Itself' and Alexandrine Science

Regarded as a "symptom of life," Nietzsche contends that science can be seen as a "subtle form of self-defense against the truth." (BT §1) For Nietzsche assumes that the truth can *compel* such defensive action: some truths as he tells us in his essay on "Truth and Lie in an Extramoral Sense," are dangerous and hostile to life, others are bitter or hateful or repellent, etc. (GM I: 1) Thus we have need of art, as Heidegger like to quote Nietzsche as saying, so that we are not done to ground by the truth: "Wir haben die *Kunst*, damit wir *nicht an der Wahrheit zu Grunde gehen*" (Heidegger cites Nietzsche's Will to Power, §822, cf. WM §853). If science is a kind of "self-defense against the truth," to raise the question of the problem of science is to engage in a similarly dangerous prospect. By reason of this danger, the task Nietzsche sees as his own from the very beginning of his reflections, may be expressed as the task of presenting "*the problem of science itself*, science considered for

<sup>3</sup> See Babich, "Continental Philosophy of Science" in Constantin Boundas, *The Edinburgh Companion to Twentieth Century Philosophies* (Edinburgh: Edinburgh University Press, 2007), pp. 545-558 and Babich, "Philosophies of Science: Mach, Duhem, Bachelard," in Richard Kearney, ed., *Continental Philosophy in the 20<sup>th</sup> Century*, Vol. 8 (London/New York: Routledge, 1994/2003), pp. 175-221.

<sup>4</sup> Heidegger, *Introduction to Metaphysics*, trans. Gregory Fried and Richard Polt (New Haven: Yale University Press, 2000) p. 21, [*Einführung in die Metaphysik* (Tübingen: Niemeyer, 1976 ), p. 15.] IM. German page numbers are hereafter cited in brackets.

<sup>5</sup> Michael Friedman's *Parting of the Ways: Carnap, Cassirer and Heidegger* (La Salle: Open Court, 2000) has not altered this but Friedman, who for his part an analytically formed scholar, is often set in place of other commentators who have written on Heidegger in the continental tradition. See James Luchte's forthcoming essay, "Martin Heidegger and Rudolf Carnap: Radical Phenomenology, Logical Positivism and the Roots of the Continental/Analytic Divide," *Philosophy Today*, 51/3 (Fall 2007).

the first time as problematic, as questionable.” (BT §ii) Quite apart from the separate question of understanding this problem in terms of the science in question (in Nietzsche’s case this was the scientific field of classical philology as a science), the project of questioning science (whether philology or physics) locates the thinker in the no-man’s land beyond the dominion of received truth, vulnerable to confusion, misunderstanding, and on the question of science and logic in Nietzsche’s and Heidegger’s case, not a little mockery.

Failing to raise the question of science – and most philosophy of science fails to raise anything like Nietzsche’s question – one follows blindly after science, and not only Heidegger would suggest that this is a poor course for philosophy, supposed queen of the sciences. The project of science unchallenged, set into the place of philosophy as we are wont to do in the current world circumstance, develops into the destruction of critical and philosophical thinking which not only upends the original relation between philosophy and science but tends ultimately to destroy philosophy altogether. This is what Heidegger names “the end of philosophy,” an end that is to say *in* science, reduced to science and on science’s terms, a reduction whereby “philosophy is dissolved into the technological sciences”<sup>6</sup> and can, so one supposes, finally be put to practical ‘cognitive’ use.

Nietzsche offers us the resources of art as a defense against truth and antidote to the deadly insights of tragic knowledge. Yet the promise of such redemption seems trivial for who among us does not believe in the saving power of art? I will argue that Nietzsche’s most arresting claim is his equation of science and art, similar to Heidegger’s alliance of *techne* and *poiesis* which I take to be a non-attributed Nietzschean echo in Heidegger’s thought. For Nietzsche, science and art draw upon the same creative powers and both science and art are directed to life.

Nietzsche’s first book, *The Birth of Tragedy out of the Spirit of Music*, took its departure from and was articulated in terms of the “science of aesthetics.” (BT §1) Nietzsche’s project in the wake of the death of tragedy at the hand of science was the articulation of a possible “rebirth” of tragic culture, a rebirth requiring that “the man of theory” recognize the fatal limitations of his own enterprise (including science) apart from the foundations that it itself claims as necessary and which it itself has undermined as such (see BT §19). Note that on logical grounds alone, empirical science cannot be regarded as self-grounding (Nietzsche challenges the idea that anything can be self-grounded or self-caused – a straightforward challenge for an atheist or anti-metaphysical thinker). For Nietzsche, a critical philosophy merely takes the culture of scientific reason to its utmost but still fully logical consequences. Using “the

<sup>6</sup> Martin Heidegger, “The End of Philosophy” in *Time and Being*, trans. J. Stambaugh (New York: Harper and Row, 1972), p. 59.

paraphernalia of science itself," the critique of scientific reason effectively outlines "the limits and the relativity of knowledge generally" – ultimately denying "decisively the claims of science to universal validity and universal aims" (BT §18). In this way, for Nietzsche, Kant's philosophic legacy signalled the *logical* destruction of "scientific Socratism's complacent delight in existence by establishing its boundaries" (BT §19).

"Socratic culture" which Nietzsche discovers at the heart of Kant's critical philosophy, so called, is also the Alexandrine (or, to use, Nietzsche's terminology in his later critical studies of morality: the *slavish*) culmination of the logico-scientific vision of the same modern confidence that is still the characteristic of scientific, especially techno-scientific culture. This Nietzsche called "the delusion of limitless power" (BT §18), a focus Heidegger repeats in both *The Introduction to Metaphysics* and the *Beiträge* as he discusses the representation of quantity as quality. The ideal of limitless power describes modern culture on the millenarian basis of "the belief in the earthly happiness of all" (ibid.) and offers a first genealogy of the modern technological and *consumerist* "demand for such an Alexandrine earthly happiness," still expressed today as "the conjuring up of a Euripidean *deus ex machina*." (Ibid.)<sup>7</sup>

Today's networked and mediatized world (internet, mobile phone, etc.) has transformed the ideal metaphoricity of Nietzsche's invocation of such a conjuring and it is seemingly consummate, if we leave the question of "reality" to one side (considering what phenomenology has taught us about ourselves, it is the power of conscious intentionality that we can and we do project ourselves, our passions, our inmost personal being onto a screen that is nothing like the tragic *skene*. This Baudrillardian unreal or hyperreal world is adumbrated in economic terms: advertisement and profit. A virtual place of displacement for texting engagements on a mobile phone, or a gaming life for players in internet gaming communities, or just cybersex in working practice and profit, this is the dot.com business in still elusive theory. More must be written on this, but our lives today, in whatever part of the world, for the rich and for the poor, are mediated more and more by technology. We take this "connectedness" to be the "gift" of science.<sup>8</sup>

<sup>7</sup> Note that Kaufmann's translation has 'Alexandrian' rather than 'Alexandrine'. See also the reference here in the context of an 'irdische Consonanz' in the place of metaphysical comfort: 'den Gott der Maschinen und Schmelztiegel', an image that recurs in the third essay of the *Genealogy of Morals* (III: 9) and indeed, much more refinedly, ironically in GM III: 18.

<sup>8</sup> This is a metonymic association with the title if not to be sure the subject of Roger Berkowitz's insightful book on Leibniz, *The Gift of Science* (Cambridge: Harvard University, 2005).

### On Science and *Wissenschaft*<sup>9</sup>

For contemporary readers who are not inclined to speak of ‘scientific Socratism’ and who do not think in terms of the categories of Alexandrine culture or Euripidean machinations (that is, apart from Nietzsche’s Socratism or his Alexandrine vision or critical understanding of Euripides), the question of the meaning of science for Nietzsche but also for Heidegger and for Kant, as well as Hegel, and even Goethe, can be troublesome.<sup>10</sup> Here, as a further preliminary to Nietzsche’s and to Heidegger’s critical philosophy of science, it is helpful to ask what Nietzsche and other Germans, both of his era and the current day, mean when they speak of *Wissenschaft*. This inquiry is more than merely etymological and, if we take Heidegger at his word when he reminds us that translation is always already interpretation, the same inquiry adumbrates a hermeneutic reflection.

Intriguingly, although the German term *Wissenschaft* is routinely remarked upon as different from the English term for *science*, the specific difference between the two is not in fact commonly discussed. From a philosophical perspective, what is more significant is that (apart from my own earlier reflections on this question) we lack any reflection upon the difference between *Wissenschaft* and *science* might make for (Anglophone) philosophy of science and the studies proper to the German discipline usually thought to render the former, i.e., *Wissenschaftstheorie* or *Wissenschaftsphilosophie*.<sup>11</sup> This is not the occasion to do more than emphasize the importance of pursuing this substantive question further but in what follows, I briefly note the differences between *Wissenschaft* and science. Every word carries within its own linguistic sphere its own penumbra of derivations and its own set of associa-

<sup>9</sup> I draw for this upon parts of my chapter “Nietzsche’s ‘Gay Science’” in *Words in Blood, Like Flowers: Philosophy and Poetry, Music and Eros in Hölderlin, Nietzsche, and Heidegger* (Albany: State University of New York Press, 2006), pp. 67-68

<sup>10</sup> These authors wrote, differently indeed, to be sure, on *Wissenschaft*, and in the case of Hegel and Goethe on nature.

<sup>11</sup> See however, in this direction, Gerhard Budin, “Wissen(schaft)stheorie und Wissensorganisation” in Peter Ohly, G. Rahmstorf and A. Sigel, Alexander (eds.), *Globalisierung und Wissensorganisation: Neue Aspekte für Wissen, Wissenschaft und Informationssysteme* (Ergon: Würzburg, 2000), pp. 41-48 as well as Budin’s *Wissensorganisation und Terminologie: Die Komplexität und Dynamik Wissenschaftlicher Informations und Kommunikationsprozesse* (Tübingen, Gunter Narr, 1996) and, with Erhard Oser, eds., *Terminologie und Wissenschaftstheorie* (Vienna: TermNet, 1997). Budin’s points are purely technical in these reflections but exactly relevant to the logical operating principles of analytic philosophy of science. Thus Budin can cite Richard Boyd on the importance of univocity (Boyd, “On the Current Status of Scientific Realism,” *Erkenntnis* 19 (1983): 45-90). See also Harald Weinreich, “Wissenschaftssprache, Sprachkultur und die Einheit der Wissenschaften” in H. L. Kretzenbecher and Weinreich, eds., *Linguistik der Wissenschaftssprache* (Berlin: de Gruyter, 1994), pp. 55-74.



tions, metaphoric as well as metonymic. For this reasons, I would argue that it is significant that the philosophy of science is increasingly written only in English, be its practitioners in the US or the UK or be they in Germany or in France, etc. Thus one can hear scholarly papers at meetings of German social and natural scientists presented exclusively in English rather than in German and even when not a single native speaker of English is present to hear those papers.

Testifying, albeit indirectly to this linguistic colonialization, Lorraine Daston writes with some chagrin of the difficulty of anything like a reverse translation for *Wissenschaft*, noting that the German word *Wissenschaft* always presents a problem for a native English speaker. Of particular painfulness for Daston is to find herself in non-German speaking locales with the word *Geschichtswissenschaft* on her business card, as it were, thereby seeming to lay a claim to being a practitioner of the "science" of the history of science.<sup>12</sup> Ulrike Felt likewise emphasizes that *Wissenschaft*, is not unambiguously

<sup>12</sup> Daston writes in German translation here: „Das deutsche Wort Wissenschaft stellt für jemanden, dessen Muttersprache Englisch ist (oder in diesem Fall auch Französisch oder Italienisch), immer wieder eine Herausforderung dar. Denn Wissenschaft umfasst im Deutschen sämtliche Arten des systematischen Wissens, über alle möglichen Gegenstände, und kommt damit dem lateinischen *scientia* am nächsten – wogegen die leichter erkennbaren Abkömmlinge von *scientia* in anderen europäischen Sprachen – *science* (frz.), *scienza*, *science* (engl.) – ihr Bedeutungsfeld verengt haben. Sie beziehen sich hauptsächlich, teilweise oder sogar ausschließlich auf die Naturwissenschaften oder, wie in einem aktuellen französischen Wörterbuch nachzulesen ist, auf ‚Corps de connaissance constituées, articulées par déduction logique et susceptibles d’être vérifiées par l’expérience. Les mathématiques, la physique sont des sciences‘. In der angloamerikanischen Philosophie beschäftigt sich ein ganzer Zweig der Wissenschaftstheorie mit der Festlegung und Verteidigung der Grenzen zwischen den Naturwissenschaften und anderen Wissensgebieten (nicht nur Astrologie, sondern beispielsweise auch Soziologie); das Stichwort dafür lautet: ‚Demarcation Criterion‘ –, Abgrenzungskriterium‘. Man braucht in Oxford, Berkeley oder Paris nur das Wort *Geschichtswissenschaft* in den Mund zu nehmen, um den Damen und Herren Professoren ein skeptisches Lächeln zu entlocken, eine Mischung aus Erheiterung – über die Leichtigkeit, mit im Deutschen alle möglichen Zusammensetzungen gebildet werden – und Verwirrung über die Fabelwesen, die sie daraus hervorstechen sehen: eine Chimäre mit Löwenhaupt und Schlangenschwanz und dazwischen etwas, was wie eine Ziege aussieht.“ Daston, „Die Kultur der wissenschaftlichen Objektivität,“ In: Michael Hagner, ed., *Ansichten der Wissenschaftsgeschichte*, Frankfurt/Main: Fischer, 2001, pp. 137-158, here pp. 137ff. Cf. Ulrike Felt who writes that as a concept, „Wissenschaft“ is not unambiguously defined and cannot indeed be set as identical to the English term *science*. Nevertheless, Felt argues that in German the reverse influence of the Anglo-American science is increasingly evident. „Bereits der Begriff *Wissenschaft* ist über die verschiedenen Sprach- und Kulturkreise hinweg nicht eindeutig definiert und sicherlich weder formal noch in seinen inhaltlichen Nuancierungen dem englischen Begriff *Science* gleichzusetzen. Daher ist es auch klar, dass in der anglo-amerikanischen Diskussion tatsächlich nur die Naturwissenschaften im Fokus des Interesses stehen, im deutschsprachigen Raum dies aber zum Teil anders gesehen wird.“ Ulrike Felt, „Scientific Citizenship: Schlaglichter einer Diskussion,“ in *Gegenwörter: Hefte für den Disput über Wissen*, 15 (2003), pp. 12-15.



defined as a concept and hence cannot be equated with or set identical to the English term *science*. At the same time, Felt argues that the reverse influence of Anglo-American science is increasingly evident in German.<sup>13</sup>

Dating from the fourteenth century, the word *Wissenschaft* was coined for the needs of a theological and mystical context in order to translate *sciens*, *scientia* which is likewise rendered by the English word *science*, with its further roots in the Latin, *scire*, to know, and related to *scindere*, to cut, divide (here we should note Heidegger's associated reflection on the translation from Greek *theoria* to the Latin *contemplatio*, just where Heidegger attends to its defining focus on "precinct" as sundering, as divide or cutting: *templum*).<sup>14</sup> Key to an understanding of the German *Wissenschaft* are the complex set of associations of the root terms, in particular the powerful array of etymological connections via *wissen* linked to the Old High German *wizzan* and Old Saxon *wita* but also the English *wit* and *wot* as well as to the Sanskrit *vēda* and the ancient Greek *οἶδα* (Aeolian: *ōīda*, which is the perfect of *εἶδω*, I have seen, and is used as present, I know. Liddell gives the root as *FIΔ*, cognate with the Latin *vid-eo*, to see), as well as the Latin, *videre*. As a philologist, Nietzsche was characteristically conscious of this root connection between vision and scientific knowledge – hence his focus on the ocular tendency of science in general – but especially natural science.<sup>15</sup> And it might be worth investigating the degree to which this ocular conception inspired both his focus on what he called the 'science of aesthetics' in his first book, his emphasis upon the importance of the haptic sense in the physical sciences (cf. *Twilight of the Idols*, "Reason" in Philosophy' §3), and his special attention to taste, a focus he earlier played back to its etymological association with wisdom as such: "The Greek word, which signifies the 'wise,' belongs etymologically to *sapio*, I taste, *sapiens*, the tasting one, *sisyphos*, the man of the sharpest taste; a keen bringing forth and recognition, a foremost discernment thus constitutes, according to folk consciousness, the authentic art of the philosopher." (KSA 1, 813).

Nietzsche, a classical philologist first and foremost as he was, alludes to the etymological stem of *wissen* in Greek (*οἶδα*, *εἶδω*) and in Latin (*videre*).

<sup>13</sup> "Bereits der Begriff Wissenschaft ist über die verschiedenen Sprach- und Kulturkreise hinweg nicht eindeutig definiert und sicherlich weder formal noch in seinen inhaltlichen Nuancierungen dem englischen Begriff Science gleichzusetzen. Daher ist es auch klar, dass in der anglo-amerikanischen Diskussion tatsächlich nur die Naturwissenschaften im Fokus des Interesses stehen, im deutschsprachigen Raum dies aber zum Teil anders gesehen wird." Ibid.

<sup>14</sup> Heidegger attends to the change from the Greek conception of theory, *theōrein* to Latin contemplation with its not evident shift in divisive meaning. "Science and Reflection," p. 165.

<sup>15</sup> 'Die Wissenschaft ist darauf aus, dieselben Phänomene durch verschiedene Sinne zu interpretieren und alles auf den deutlichsten Sinn, den optischen, zu reduzieren. So lernen wir die Sinne kennen – der dunklere wird durch den helleren erleuchtet' (KSA 11, 25 [389]).

Additionally, Nietzsche emphasizes the consequences of the limitation to a single sense (notably ocular) characteristic of the tradition of science since the Greeks.<sup>16</sup> Thus Nietzsche asks after the difference for a possible science 'of the future' if we were to include the broader sensible range of the human body beyond the visual?<sup>17</sup> Regarding the body as a complexly knowing *instrumentarium*, widely keyed to all its senses rather than merely reduced to the single privileged primacy of vision, permits an understanding of the body on the order of mind, not as a Cartesian or Lockean adjunct, but larger than what we represent to ourselves as mind. Thus Nietzsche famously defines the mind as the little reason and the body as a "grand reason, a plurality with one sensibility, a war and a peace"<sup>18</sup> – the last invocation of "a war and a peace" being Nietzsche's word for the homeostasis so important in the biological sciences of his day.

As contrasted with *wisdom*, the word *science* is not an Anglo-Saxon word. Yet the Latin and Roman origin of *science* does not entirely exhaust what is at work in the word. Indeed it is only since the eighteenth century that science has its current meaning in contrast to the arts, such that terms that had been substitutable one for the other, art and science are now opposed.<sup>19</sup> Although

<sup>16</sup> Cf. Nietzsche's discussion of Thales and ocularity in his *Die Philosophie im tragischen Zeitalter der Griechen*, cited above. (PTG §3, KSA 1, 816.) But even more, see Nietzsche's foreword (§ 4) to *The Gay Science* and his discussion of the visual pursuit of wisdom – and truth, woman, characterised as – to speak Greek (as he says there,) – 'Baubo.' In *The Birth of Tragedy* Nietzsche's reference is to the received aim of scientific researches as so many efforts to gain access to "a naked goddess," stripping truth itself bare, a goal Nietzsche also characterized by the Greek aspect of the goddess representing female genitalia and hence a literally pornographic reference, as Nietzsche himself makes all too plain, speaking as a little girl and alternately taking the part of an old woman to do so. Sarah Kofman and many others have taken up this theme.

<sup>17</sup> Yet it is not clear that our latest instruments, rightly regarded as extensions of our senses, would fulfill Nietzsche's dreams (in addition to the sense of sight, Nietzsche speaks of hearing but most particularly of taste and smell, as well as touch). Heidegger as we shall see claims that the very instruments that extend our senses in a technological era are also the tools for their condensation into or ultimate substitution in the place of the same senses.

<sup>18</sup> 'Der Leib ist eine grosse Vernunft, eine Vielheit mit Einem Sinne, ein Krieg und ein Frieden.' Nietzsche, *Also Sprach Zarathustra* (KSA 4, 39). To render *Vernunft*, Thomas Common has recourse to 'sagacity', R. J. Hollingdale speaks of 'intelligence', and Walter Kaufmann, correctly in this case, renders the term as 'reason' in its exactly philosophical sense, where Nietzsche continues: 'Werkzeug deines Leibes ist auch deine kleine Vernunft, mein Bruder, die du "Geist" nennst, ein kleines Werk- und Spielzeug deiner grossen Vernunft'. For even more Kantian clarity, see also: 'Es ist mehr Vernunft in deinem Leibe als in deiner Vernunft' (KSA 10, 4[240]). Nietzsche thus sets the body in contrast to the intellect, our 'four-square little human reason' [*viereckigen kleinen Menschenvernunft*] in the materialist context of empirical science (GS §373).

<sup>19</sup> In the *Zollikon Seminars*, Heidegger emphasized that "for the most part, science today is understood exclusively as natural science" and invokes, for clarification, the English language opposition "*science* vs. *arts*." (p. 20/S.24) It is instructive if the implications are yet to be fully considered that Heidegger plays on this paradox, confounding English readers, in his "The Question Concerning Technology," as he speaks of *technē* and art in connection with making and *poiesis*, and calls for *Dichtung* or poetry.

scholars remind us that the two terms, science and *Wissenschaft* are increasingly identical, it remains essential to recall the play of meanings and usage I referred to above as a word's penumbra.

The *Wildhagen-Héraucourt German-English Dictionary* refers first to natural science before listing the extended definition of *Wissenschaft* as 'learning, scholarship, erudition, and knowledge'. Although as first coined, *Wissenschaft* originally referred only to simple knowledge – as *Die kleine Pauly* notes Goethe's '*davon hab' ich kein Wissenschaft*' – today it typically corresponds to the collective pursuit of knowledge kinds. The collectivity is in turn the meaning of *-schaft*, analogous to the *-ship* in scholarship. In distinguishing between science and *Wissenschaft* in English and German usage, with important consequences for the philosophical discipline of the philosophy of science in particular, this complex difference continues to make all the difference, as it were. The *Wahrig* dictionary thus defines *Wissenschaft* as '*geordnetes, folgerichtig aufgebautes, zusammenhängendes Gebiet von Erkenntnissen*', while by contrast the shorter *Oxford English Dictionary* defines *science* as 'the state or fact of knowing; knowledge or cognizance of something specified or implied' and features a separate definition, explicitly citing "*Wissenschaft*" as '(The systematic pursuit of) knowledge, science, learning, scholarship'. *Wissenschaft* defined in terms of an ordered, systematic and coherent disciplinary arena of knowledge corresponds only to the last sub-entry in the OED: 'The kind of organized knowledge or intellectual activity of which the various branches of learning are examples'. As the noun corresponding to *wissen*, *Wissenschaft* thus retains the connotations of the 'ways' or conduits of knowing, ways that can still be heard in English with the archaic *wis* (to show the way, to instruct) or *wist*, (know), and is not limited to "knowledge" [*Erkenntnis*] alone.

More relevant than etymology and definitions is the applicable scope of disciplines that can be called *Wissenschaften* as compared with "science" and this is especially relevant for philosophizing on science be it Nietzsche's aesthetic science, Kuhn's sociology of science, or history or gene or rocket science. Hence it is important to underscore the breadth of professional *Wissenschaften*,<sup>20</sup> just to the degree that these are more numerous than those

<sup>20</sup> German academic fields can generally be expressed as so many *Wissenschaften*, along the Diltheyan axis of *Geistes-* and *Naturwissenschaften*: thus we can list *Musikwissenschaft*, *Literaturwissenschaft*, *Museumswissenschaft*, etc. Thus one can speak of *Kunstwissenschaft* – a term difficult to render in English as the disciplinary subdivision for us shakes down, at least at the university level, to art history, *Kunstgeschichte* – or of *Literaturwissenschaft* (literary studies or theory) in addition to *Naturwissenschaften* such as physics [*Physik*], chemistry [*Chemie*], biology [*Biologie*], etc. The equalizing denomination of seemingly all disciplines is a bit conflating for the English-speaking scholar, especially because the Germans, in the person of Wilhelm Dilthey, were responsible for inaugurating a key interpretive distinction between the *Geisteswissenschaften* and the *Naturwissenschaften*, terms routinely translated with more convenience than accuracy as

gathered under the rubric of science.<sup>21</sup> This means, in part, that although Nietzsche's identification of himself as a 'scientific' practitioner strikes a contemporary English speaker as eccentric (an impression which routinely elicits a footnote from analytic philosophers anxious to depict Nietzsche as science-friendly rather than science critical), calling himself a scientist wouldn't have been out of place in his day and his identification of his interests as scientific remains accurate – and that means *unremarkable* – in contemporary German.

But, as with all equivocations, the subtle problem of 'what things are called' (in Nietzsche's words) persists when this convention is shifted into idiomatic and academic English. Despite all the well-known exigency of the classicist, classical philology or classics is not currently thought to be a "science." Similarly, one does not refer to the study of religion as 'religious science' (one speaks instead of 'religious studies'), unless (but that is something else again) one is a practitioner of a cult (such as Christian Science or Scientology), nor does one refer to 'art science' but rather to 'art history' where – and this makes a not inconsiderable difference for the discipline, German academic usage and corresponding disciplinary practice is able to distinguish both *Kunstgeschichte* and *Kunstwissenschaft*. Yet in the middle ages, the study of music was called (albeit in Latin), a *scientia bene modulandi*, using a meaning of science (a usage still current but 'now rare' as we are reminded by the OED) that can still be heard in the turns of the word still in current use, arch but not archaic, meaning skill or technique in the musical sense in which jazz can still be a 'sweet science' and in which Minnesota Fats could have his game of pool down to a 'science', and a league of English football players carry the sobriquet, the 'school of science,' etc.<sup>22</sup>

### The Resonance of *Wissenschaft* and *Leidenschaft*: Science as Passion

Heidegger calls our attention to both the title of Nietzsche's book *Die fröhliche Wissenschaft*, which has been fatefully (and capriciously if accurately

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the 'human sciences' (but including art and literature as well as theology along with history and other social sciences) and the 'natural sciences'. However such an equivocation is only apparent, for even here, and obviously enough, Dilthey consistently refers to kinds of 'science' or *Wissenschaften*.

<sup>21</sup> For example, a recent book on the 'sciences' offers a first chapter on Philosophy, followed by Theology, Justice, Literature, etc., with essays on Mathematics, Physics, etc., making an appearance only in the last 100 pages (out of 240) cf. *Wissenschaften 2001: Diagnosen und Prognosen* (Göttingen: Wallstein, 2002).

<sup>22</sup> I thank Gregory M. Moore for this helpful addition. Moore comments that the Everton Football Club (in Liverpool) used to be known as the 'School of Science', such, he explained to me, 'was the technical brilliance of their soccer'. [E-mail communication.]

enough)<sup>23</sup> translated as *The Gay Science*: it could also be translated as *The Joyful Wisdom* or even the *Merry Art*, which last rendering I am inclined to prefer just because it is stilted in the direction of Nietzsche's own very romantically medieval subject matter (we are, after all, talking about a handbook for Provençal troubadours). What is important is that the word *fröhliche* – happy or gay, merry or joyful – effects a metonymic attunement of *Wissenschaft*.<sup>24</sup> What Nietzsche names science has more affinities with passion [*Leidenschaft*] than the usually dusty scholarship of his peers, in his day or our own.

Heidegger explains that what he speaks of as “Echo” – and which also not accidentally names one of the major sections of the *Beiträge* – the reflective call of the reflection that says the same (and in such repetition differentiates, this is its appeal for Derrida who reflects on the myth of Narcissus) is “the suffering of thinking [*Leiden des Denkens*].” Heidegger emphasizes that this “passion is ... infinitely more difficult because more dangerous than the much named substantiality [*Sachlichkeit*] of scientific research. To be an echo, namely that of the claim of Being, calls for a solicitude for language, of which to be sure the technical-technological language style of science can know nothing.”<sup>25</sup>

Undertaking to raise the question in his lecture courses on Nietzsche, “What does *gay science* mean?” Heidegger invokes the inherently collective character of the German *Wissenschaft*, a collective connotation so non-evident in the word science that sociologists of science have all they can do to emphasize the *institutional* research nature of the scientific enterprise.<sup>26</sup> Thus Heidegger delimits Nietzsche's project from today's usage. “Here” Heidegger writes, “science [*Wissenschaft*] is not a collective noun for the sciences as we find them today, with all their paraphernalia in the shape they assumed during the course of the last century.”<sup>27</sup> *Leidenschaft* in as passion is opposed to the usual conception of science or scholarship, perhaps especially in philosophy, the discipline named for passion (or love).

<sup>23</sup> The combination of caprice and intentionality can be related only by Walter Kaufmann's then-assistants.

<sup>24</sup> This metonymic tuning accords with Nietzsche's emphasis on laughter as a complete and engaged enterprise in the very first section of *The Gay Science*, where Nietzsche invites us to inquire into the force of laughter; and even into the chance of laughing at ourselves as radically we ought to laugh, out of the whole truth, and ultimately in order that laughter might form an alliance with wisdom.

<sup>25</sup> “Die Gefahr,” Heidegger, GA 79, 66.

<sup>26</sup> This same collective dimension also goes some way to explain the otherwise incomprehensible, from an Anglo-Saxon point of view, materialist convictions of socialist theory as scientifically confirmable. Scholars have argued about the logic and the coherence of this conviction, some inverting the problem to blame the *habitus* on Engels as representative of an English-language deformation of Marx's original theory.

<sup>27</sup> Heidegger, *Nietzsche, Volume II*, p. 20.

Nietzsche's merry art or joyful science is to be understood in opposition to the nineteenth century ideal of the positive, measuring or technologically defined sciences.<sup>28</sup> Thus Heidegger continues, "the word *Wissenschaft* [science] resounds like *Leidenschaft* [passion], namely, the passion of a well grounded mastery over the things that confront us and over our own way of responding to what confronts us, positing all these things in magnificent and essential goals."<sup>29</sup> The throes of such a passionate science would not reflect the kind of "knowledge attained by the natural sciences."<sup>30</sup> Passionately joyful science is more rigorous than science heretofore. If Heidegger can claim that "science is only scientific, that is to say partaking of genuine knowledge... to the extent that it is philosophical,"<sup>31</sup> this philosophically rigorous knowledge is joyful to the extent that it exemplifies the kind of cheerfulness that is not undone "even in the face of the hardest and most terrifying things."<sup>32</sup> The passion of such a joyful science is invigorated by challenge, affirming "the necessity of these very questionable things."<sup>33</sup>

Having invoked Heidegger reflection on science in Nietzsche's *The Gay Science*, it is relevant in Heidegger's own spirit to ask: what is science? What makes science science? Is the "essence" of science nothing scientific, in the same way that Heidegger claimed that the "essence" of technology is nothing technological?

Science is routinely presumed to be a matter of method and quantifying analysis. Both Nietzsche and Heidegger (speaking of truth and of the theory of the real) take their point of departure from the same measure-directed and calculating methodic assumption in their reflections on science. Thus in the *Beiträge*, Heidegger invokes Nietzsche's claim of the victory of the scientific method over science itself (KSA 13, 15[51]). This hegemonic ideal further inspires what Heidegger regards as the coordinate relation between science and "calculation." This same calculating force of method drives modern science and technology, almost presaging a reference to contemporary analytic philosophy, especially in its more cognitive and neurophysiological expressions. For Heidegger, "it suffices to refer to the independence of psychology, sociology, anthropology as cultural anthropology, to the role of logic as logistics and semantics. Philosophy turns into the empirical science of man, of

<sup>28</sup> And still further from the collective ideal of a unified coordinate science of everything as German ears can hear it, we note, at least in English but increasingly in all languages, the singularizing paradigm, as it were, of the natural sciences, particularly physics, as prototypical for the meaning of science as such.

<sup>29</sup> *Ibid.*

<sup>30</sup> *Ibid.*

<sup>31</sup> Heidegger, *Nietzsche, Volume II*, p. 112.

<sup>32</sup> *Ibid.*, p. 21.

<sup>33</sup> *Ibid.*, p. 21.



all that can become the experiential object of his technology for man, the technology by which he establishes himself in the world by working on it in the various modes of making and shaping.”<sup>34</sup> But this amounts to the scientization of philosophy: if science has its origins in philosophy, this will only mean that philosophy turns into science. And Heidegger famously ranges this transformation under the rubric of cybernetics. Heidegger’s insight here and his assessment of its effects remains uncannily accurate, the rule of modern information science effectively transforms “language into an exchange of news. The arts become regulated-regulating instruments of information.”<sup>35</sup> In this way, Heidegger’s vision of the “end of philosophy” dissolved into “the technologized sciences” corresponds to “the triumph of the manipulable arrangement of a scientific-technological world and of the social order proper to this world.” This is for Heidegger the literal meaning of what we understand as globalism today: “The end of philosophy means: the beginning of the world civilization based on Western European thinking.”<sup>36</sup>

This is why when our colleagues in philosophy who inhabit exotic lands, even China and India, invite us to their conferences we are able to understand them – more or less but in defiance of every presumption of hermeneutics and anthropology: apart from language, and sometimes not even that. We find no difference between the subjects they write and speak about and what we write and speak about. In just the measure suggested by Heidegger, analytic philosophy has long ceased to be limited to the English-speaking world. And where Heidegger suggests that this increasing hegemony may be traced to what he calls its full “dissolution into” the sciences, the global dominance of analytic philosophy is no accident.

### Science in the Wake of the Question Concerning Technology

The published version of “Science and Reflection” which appears in *Vorträge und Aufsätze*, was first presented as a lecture in 1954 to a small group in Munich. The orienting theme of the lecture is reflection [*Besinnung*] and Heidegger begins by pointing to the distinguishing features of science. Not merely a human or cultural activity, not only as distinguished from art, science increasingly defines what is real and dominates the globe in a singularly irresistible fashion. And here, as always, Heidegger attends to the question of essence. Is science only what it appears to be, the mere desire to know, in an Aristotelian sense, characteristic of humanity and so global for this characteristic reason? Just as Heidegger is able to uncover the heart of

<sup>34</sup> Heidegger, “The End of Philosophy,” p. 57.

<sup>35</sup> *Ibid.*, p. 58.

<sup>36</sup> *Ibid.*, p. 59.



modern technology as revelatory truth – an equally counter-intuitive claim for Luddite and non-Luddite alike – he argues that "something else reigns" in science, a "something other" that prevails "throughout all the sciences, but that remains hidden to the sciences themselves."<sup>37</sup> Hence Heidegger reflects on this self-obscuring but prevailing essence in science as something specific to modern science and which he draws out of a hermeneutic reflection on the formula: "*Science is the theory of the real.*"<sup>38</sup> This formulaic definition distinguishes modern science from ancient and medieval science. This distinction is not a matter of development or progress and is accordingly more than merely historical.<sup>39</sup> A manifestly paradigmatic shift characterizes the exactly incommensurable differences between modern, medieval, and ancient Greek science and inspires recent readings of Heidegger together with Kuhn on the nature of research science.<sup>40</sup> Heidegger here articulates many of the same distinctions made by Peter Dear in his reflections in *Discipline and Experience* on the difference between experiential recourse to the empirical and modern scientific experimental research procedure.<sup>41</sup>

For Heidegger, an observation that aims at empirical reports, or experience, "remains essentially different from the observation that belongs to science as research."<sup>42</sup> For the experiment requires a preestablished rule, a stipulated law, and this is the basis of calculability and thus of calculation: "To set up an experiment means to represent or conceive [*vorstellen*] the conditions under which a specific series of motions can be made susceptible of being followed in its necessary progression, i.e., of being controlled in advance by calculation."<sup>43</sup> And because such an experiment is the expression of a projected law, one has both a criterion for as well as a limitation upon possible results. This is of course the possibility of measurement and this is essentially not observation *per se*. "Only because modern physics is a physics that is essentially mathematical can it be experimental."<sup>44</sup> Beginning from a preliminary "ground plan of nature and sketched into it," built into it, Heidegger observes that "experiment is that methodology which in its plan-

<sup>37</sup> Heidegger, "Science and Reflection" in *The Question Concerning Technology*, p. 156.

<sup>38</sup> *Ibid.*, p. 157.

<sup>39</sup> Expressed in such terms, we are not speaking of the "science of the middle ages nor that of antiquity." *Ibid.*, p. 157.

<sup>40</sup> Steve Fuller is the most informed source of this reading on the side of Kuhn; from the side of Heidegger, see Patricia Glazebrook *Heidegger's Philosophy of Science* (New York: Fordham University Press, 2000). See also Brent Dean Robbins, "A Reading of Kuhn in Light of Heidegger as a Response to Hoeller's Critique of Giorgi," *Janus Head* Summer 1998. Web-journal publication.

<sup>41</sup> See Peter Dear, *Discipline and Experience* (Chicago: University of Chicago Press, 1995). Heidegger offers a useful philosopher's gloss on the subtle, historian's point Dear seeks to make.

<sup>42</sup> Heidegger, "The Age of World Picture" in *The Question Concerning Technology*, p. 121.

<sup>43</sup> *Ibid.*

<sup>44</sup> *Ibid.*

ning and execution, is supported and guided on the basis of the fundamental law laid down, in order to adduce the facts that either verify and confirm the law or deny its confirmation.”<sup>45</sup> This same methodological rule generates the necessary specialization of modern science, which is in turn for Heidegger less a result of the proliferation of results and progressive discoveries of modern science, than the presupposition for those cumulative results as such.

Almost more fundamental for the character of modern science than mathematics and measurement or what Nietzsche and so many of us would take to be the methodology of modern science, is the very institutional nature of science – its *-shaft* character remade in the on-track image of calculation which simultaneously, so Heidegger argues, engenders its own isolation or field, that is its disciplinary specialization. Here too we see an innocently simple connection with Thomas Kuhn: everyday busyness as the business of science as usual, understood as the degradation of “ordinary science,” describing a possible danger always inherent in modern research programmes.<sup>46</sup> Science in practice can betray the open spirit of research science. Hence Heidegger tells us that the danger of regularized, conventionalized science “has to be combated at all times, precisely because research is, in its essence, ongoing activity.”<sup>47</sup> This is one of Heidegger’s more powerful insights.

Scientific research is necessarily institutional and consequently, so Heidegger argues, it is fundamentally systematic.<sup>48</sup> For Heidegger, the institution that is also the instrumentarium of modern science (its technological being in the world) exemplifies modern science: “Within the complex of machinery that is necessary to physics in order to carry out the smashing

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<sup>45</sup> Precise, scientific measurement is not “precise” observation because it reflects “a methodology essentially different in kind, related to the verification of law in the framework, and at the service of an exact plan of nature.” Ibid., p. 122.

<sup>46</sup> And here Heidegger’s observation is in the spirit of Herbert Dingle as much as Rom Harré or Peter Medawar. See Herbert Dingle, *Science at the Crossroads* (London: Martin, Brian and O’Keefe, 1972) and for a discussion of the ideological concerns or ‘alternatives’ at stake see the letters section of *Physics Today* December 2003, especially noting Dingle’s “Modern Aristotelianism,” *Nature* 139 (1937), p. 784. It is important to take this Aristotelianism in its proper context. Articulating a quasi-Kuhnian notion of revolutionary science, albeit far in advance of Kuhn, Dingle had earlier observed that transformative advance “in scientific theory is won, not by rigid adherence to the rules of logic, but by bold speculation which dares even to break those rules if by that means new regions of interest may be opened up.” *Through Science to Philosophy* (Oxford: Oxford University Press, 1937), p. 346.

<sup>47</sup> Heidegger, “The Age of World Picture,” p. 138.

<sup>48</sup> Interestingly enough, one can also draw parallels to Weber here, on managerial expertise, where Heidegger writes: “Ongoing activity in research is a specific bodying-forth and ordering of the systematic, in which, at the same time, the latter reciprocally determines the ordering. Where the world becomes picture, the system, and not only in thinking, comes to dominance.” Ibid., p. 141.

of the atom lies hidden the whole of physics up to now."<sup>49</sup> This technological framework corresponds to the current array of scientific laboratory equipment, including linguistic and logical analysis as well as computer simulations or models. This means exactly that predictable or confirmable results are possible and that they are possible because they are literally built into the project of research science from the start. And in 1938, Heidegger could point to the extension of this ground plan from the natural to the social sciences, using the specific example of historiography. Presciently describing the life of the modern academic in any field, indeed especially the academic researcher equipped with wireless technology or internet access, Heidegger remarks that in place of the traditionally polymathic scholar, we now have, "the research man engaged in research projects."<sup>50</sup> Given the new "information" technology – always a more a matter of potential information than knowledge per se, the life of such a new-age research academician is all about being at the cutting edge as opposed to Heidegger's deliberately "old-fashioned" picture of "erudition." For Heidegger and for how many graduate students in philosophy and other theoretical disciplines could this not be said and it has long been true of the natural *and* the social scientists: "The research man no longer needs a library at home. Moreover he is constantly on the move. He negotiates at meetings and collects information at conferences. He contracts for commissions with publishers."<sup>51</sup> And so on and on. We are often told that there is simply too much to know today for anyone to know very much – that the scholarly ideal of past ages is very like the ideal of neighborliness in a small town, an ideal impossible to sustain with the explosion of information. But Heidegger can be read as arguing that it is technology rather than the supposed excess of information has transformed the character and therefore with the quality of scholarship (and one imagines scientific research as well).

Noting that modern science is neither medieval *doctrina* nor ancient *epistēmē*, Heidegger focuses on what he names "the essence of modern science" understood in its metaphysical ground. The nature of modern scientific research knowledge is what Heidegger calls calculation and this depends upon its determinative prescription of "whatever is called to account with regard to the way in which and the extent to which it lets itself be put at the disposal of representation."<sup>52</sup> Heidegger names this *Gestell* arguing that this "objectifying of whatever is, is accomplished in a setting before, a representing, that aims at bringing each particular being before it in such a way that the human being who calculates can be sure, and that means, certain, of

<sup>49</sup> Ibid., p. 124.

<sup>50</sup> Ibid., p. 125.

<sup>51</sup> Ibid., p. 125.

<sup>52</sup> Ibid., p. 126.

that being.”<sup>53</sup> This corresponds in turn to the absolute centrality of the human being as the measure of all that is, less in a Protagorean sense, which for Heidegger retains a fundamentally reticent character of measure or balance – *Maß* – than in an egregiously, violently, humanistically perspectival sense: “Man becomes the relational center of that which is as such.”<sup>54</sup> This central role is the pendant to Heidegger’s reading of Nietzsche’s analysis of the same relative centrality of the human being as “the lord of the earth” exactly in a National Socialist context. “Man as a rational being in the age of Enlightenment is no less subject than is man who grasps himself as a nation, wills himself as a people, fosters himself as a race, and, finally empowers himself as lord of the earth.”<sup>55</sup>

It is from the perspective of such lordship that the world becomes and can become a picture for the first time. And we have to reflect on this notion of *Weltbild* for it otherwise plays on a philoteutonic allure (there is such a thing, especially in letters) as *Weltanschauung*, itself an untranslatable and irrefutable image of the world: “Wherever we have the world picture, an essential decision takes place regarding what is in its entirety. The Being of whatever is, is sought and found in the representedness of the latter.”<sup>56</sup> This focus is very like looking for, because it is the *reason* one looks for, one’s lost keys under the street-lamp.

This hegemony of representative thought for Heidegger highlights an event utterly new on the earth: not a transformation or an evolution of the ancient or the medieval world picture (for the essential reason, from the medieval point of view, that the world was not a picture but exactly something ordered in a very different and precise way than as the factum as “*ens creatum*” (specifically defined as “that which is created by the personal Creator-God as the highest cause.”)<sup>57</sup> Just this non-objective, non-relational understanding of the material world (and of God) was Descartes’ starting point when he began the process that would change this same scholastic conceptual relation of the human being to the world and to God. But if it differs from the medieval order of creation and its hierarchical chain of being, the modern scientific representation of the world is even further from the ancient Greek interpretation. For the Greek, as Heidegger reads Parmenides’s coordination of thinking/knowning and being, *to gar auto noein estin te kai einai*, the relationship to what is is almost perfectly reversed (that is, at least as regarded from the modern perspective or point of view): “That which is, is that which arises and opens itself, which as what presences comes upon the one who himself opens

<sup>53</sup> Ibid., p. 127.

<sup>54</sup> Ibid., p. 128.

<sup>55</sup> Ibid., p. 152.

<sup>56</sup> Ibid., p. 130.

<sup>57</sup> Ibid., p. 130.

himself to what presences in that he apprehends it."<sup>58</sup> This more surrendered, dispositional and available orientation to that which is lost to our modern sensibilities, but it is for Heidegger, as it was to Nietzsche, the key to the Greek world. Beyond objective representation, subjective viewpoints, or scientific measurement, in antiquity, for the ancient Greek mind, "the human being is the one who is looked upon by that which is; he is the one who is – in company with itself – gathered toward that presencing, by that which opens itself."<sup>59</sup> For Heidegger, the nature of this insight is also Greek destiny: "To be beheld by what is, to be included and maintained within its openness and in that way to be borne along by it, to be driven about by its oppositions and marked by its discord."<sup>60</sup> The tragic insight here is part and parcel of the realization that man is exactly not the center, which is what we learn from the story of even such an exemplary hero as Oedipus was, a king's son, who nobly fought every promise of violation and doom, who took on destiny, consulting himself and relying upon his own resources to oppose it.

Offering a dense summary of the uncannily different world that is Greece and so Western thought at its inception, Heidegger describes the trajectory of Greek thinking/being in the world: "in order to fulfill his essence, Greek man must gather [*legein*] and save [*sōzein*], catch up and preserve, what opens itself in its openness, and he must remain exposed [*alēthuein*] to all its sundering confusions. Greek man is as the one who apprehends that which is, and this is why in the age of the Greeks the world cannot be a picture."<sup>61</sup> Heidegger moves right into his own complexity by adding that precisely this vulnerable exposition to what is is also what sets up the possibility of the modern perspective on the world as picture. And this turns the world in turn into an objective correlate for a representing subject.<sup>62</sup>

<sup>58</sup> Ibid., p. 130.

<sup>59</sup> Ibid., p. 131.

<sup>60</sup> Ibid., p. 131.

<sup>61</sup> Ibid., p. 131.

<sup>62</sup> Intriguingly, we note, the insurgence of the human as measure and reference point, the coordinate role of objective representation and subjective relevance or individual importance is also the era of increasingly leveled uniformity. Thus Heidegger describes the trajectory of the insurgence of technology as a humanism: "In the planetary imperialism of technologically organized man, the subjectivism of man attains its acme, from which point it will descend to the level of organized uniformity and there firmly establish itself. This uniformity becomes the surest instrument of the total, i.e., technological, rule over the earth." Paradoxically this means that the "modern freedom of subjectivity vanishes totally in the objectivity commensurate with it." Heidegger, Id., pp. 152-153. We note that the way from Heidegger's 1938 essay here to his 1954 lecture is clear at this juncture. The watchword here as everywhere for Heidegger on science and technology turns out to be questioning, albeit and to be sure, questioning of a particular kind of exigency: "Humanity will know, that is, carefully safeguard into its truth, that which is incalculable, only in creative questioning and in shaping man of the future into that 'between' in which he belongs to Being and yet remains a stranger amid that which is." Ibid., p. 136.

We have already noted that the Real understood as what works belongs to the essence of modern science.<sup>63</sup> Scientific truth for Heidegger, as for the rest of us too, proves itself via its efficacy, that is “the efficiency of its own effects.”<sup>64</sup> As the theory of what works, science is the theory of the real [*Wirkliche*] as “the working, the worked [*Wirkende, Gewirkte*]; that which brings hither and brings forth into presencing, and this which has been brought hither and brought into presencing. 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.”<sup>65</sup> This is the heart of Greek *physis* and this is *energeia*. And the Greek here makes all the difference for Heidegger because translating *ergon* in terms of *operatio* as *actio*, instead of *energeia*, *actus*, everything is changed. For with this “totally different word,” we have for Heidegger, “a totally different realm of meaning. That which is brought hither and brought forth now appears as that which results from an *operatio*.”<sup>66</sup> And the result here is nothing less momentous for the very possibility of modern science than the very ideal of causal thinking. Henceforth, in its modern aspect, for modern science, what is “real now appears in the light of the causality of the *causa efficiens*.” And this effective or efficient causality is a matter of order and time and Heidegger can invoke Heisenberg here to point to the latest culmination of this transformation in a seemingly neutral and mathematical form: “the problem of the causal is the purely mathematical problem of the measuring of time.” This would seem to be a matter of counter-intuitive urgency: reversibility is not a problem in a mathematical world, but we resist the idea in the context of clock-time. But such reflections overspring the strength of this very transformation of what is: the *real* becomes thereby a matter of fact, and that Heidegger reminds us is the essence of certainty and we are back again to the point of measurement and calculation but for Heidegger this is possible because we are speaking objectively of the object.

Affirming that “science is the theory of the real” we are already in the sphere of the transformation of the Greek meaning of theory into the Roman precinct of contemplation.<sup>67</sup> In particular we have gone from an attentive regard for what presences to “observation [*Betrachtung*].” We now have to do with an encroachment upon the real, an ensnaring, a challenging forth, “specifically

<sup>63</sup> Thus science is the “theory of the real” in Heidegger, “Science and Reflection” in *The Question Concerning Technology*, p. 159.

<sup>64</sup> Heidegger, “Time and Being,” p. 58.

<sup>65</sup> Heidegger, “Science and Reflection,” p. 160.

<sup>66</sup> *Ibid.*, p. 161.

<sup>67</sup> “The Romans translate *theōrein* by *contemplari*, *theōria* by *contemplatio*. This translation, which issues from the spirit of the Roman language, that is, from Roman existence, makes that which is essential in what the Greek words say vanish at a stroke.” *Ibid.*, p. 165.



through aiming at its objectness. Science sets upon the real."<sup>68</sup> This objective, effective setting upon is the essence of modern science, this is where science gets its working power.<sup>69</sup> Thus Heidegger can explain that "Because modern science is theory ... therefore in all its observing [*Be-trachten*] the manner of its striving after [*Trachtens*], i.e., the manner of entrapping-securing procedure, i.e., its method, has decisive security." In this context, Heidegger cites Max Planck, "The real is that which can be measured." Planck's dictum means that "the decision about what may pass in science, in this case in physics, for assured knowledge rests with the measurability supplied in the objectness of nature and in keeping with that measurability, in the possibilities inherent in the measuring process."<sup>70</sup> It is important that such measuring is of the essence of modern science as such and not just physics or the supposedly, putatively mathematical sciences.<sup>71</sup> Disciplinary specialization is a consequence of the nature of modern science as the theory of the real, delimited in each case, in terms of object areas. Hence mathematics "is not a reckoning in the sense of performing operations with numbers for the purpose of establishing quantitative results; but, on the contrary, mathematics is the reckoning that, everywhere by means of equations, has set up as the goal of its expectation the harmonizing of all relations of order, and that therefore 'reckons' in advance with one fundamental equation for all merely possible ordering."<sup>72</sup>

Specialization results not from the need to delimit and so to manage the sheer accumulated bulk of knowledge today, as we may tend to assume, in contrast say with the "amount" of knowledge to be had a century ago. This is on the face of it a strange notion, as if one knew less about grammatical rules a century ago than one does today (this is not to say that emphases have not changed, and old grammar books belabor things we dispense with today and elide things that absorb today's scholar), as if, in other words, there were *less* to know in superceded knowledge schemes than in those that now rule. Calling instead for a revolution in thought and in teaching in *Introduction to Metaphysics*, Heidegger reminds us, using the same example of grammar and speaking in recognizably Nietzschean language, that "It simply no longer occurs to us that everything we have all known for so long, and all too well,

<sup>68</sup> Heidegger, "Science and Reflection," p. 167.

<sup>69</sup> Heidegger explains, "modern science as theory in the sense of an observing that strives after is a refining of the real that does encroach uncannily upon it. Precisely through this refining it corresponds to a fundamental characteristic of the real. The real is what presences as self-exhibiting." "Science and Reflection," p. 167.

<sup>70</sup> Heidegger, "Science and Reflection," p. 169.

<sup>71</sup> In an odd way, this means that the modern academic endeavor to which Kant seemingly gave voice as the effort to put whatever discipline, (metaphysics or linguistics or sociology), on the secure path of a science, is far further along its way than we are usually inclined to think.

<sup>72</sup> Heidegger, "Science and Reflection," p. 170.



could be otherwise – that these grammatical forms have not dissected and regulated language as such since eternity like an absolute, that instead they grew out of a very definite interpretation of the Greek and Latin languages.” (IM 56/41)

Rather than serving as a means of compartmentalizing and so dividing an otherwise un surveyable mass of information, specialization is a “consequence of the coming to presence of modern science.”<sup>73</sup> This delimitation of a specific domain proper to each science is what makes modern science possible in its comprehensiveness and its capacity for novelty. It also means that the most obscure consequences of science, the paradoxes of quantum mechanics are not matters of mystery as much as they are reflections of the essence of modern science as measurement. Whether we are speaking of classical physics or of quantum physics, Heidegger can say that “nature has in advance to set itself in place for the entrapping securing that science, as theory, accomplishes.”<sup>74</sup> This entrapping-securing is measurement which one often calls calculation, trading upon a certain economically based resentment in the process. It can be helpful in the context of science to avoid that for a bit. For Heidegger, everything including the subject-object relation, becomes “sucked up as standing-reserves” and an issue of “standing-reserve to be commanded and set in order.”<sup>75</sup>

Heidegger began the four lectures to the Club of Bremen, lectures that would develop into his “Question Concerning Technology” and other essays, by talking about ordinary *things*, as these are eclipsed by the definitions of science.<sup>76</sup> Nature becomes the real, nature becomes what can be worked, what can be measured or calculated, used or reserved. But the ambiguity of nature, the inherent ambiguity of that which arises itself from out of itself as the Greeks understood *physis*, although utterly accessible to the refinements of modern physics, is not reducible to the same set of refinements. And this is not because physics fails to be clever enough to do this. Rather it is because physics, *per impossibile*, cannot ask the question concerning *physis*, much less even raise the question concerning physics from its own basis.

<sup>73</sup> Ibid., pp. 172-173.

<sup>74</sup> Ibid.

<sup>75</sup> Ibid., p. 173.

<sup>76</sup> We note that this distances Heidegger’s 1949 presentation from the call to Husserlian phenomenological exigence, while by the time of the Zollikon Seminars he has recourse to precisely Husserlian phenomenology as a methodology of science ideally suited to his interlocutors there: medical scientists interested in the workings of the mind, as psychiatrists, psychoanalysts, and psychologists. I explore this in “Die Wissenschaftsbegriff bei Martin Heidegger und Medard Boss: Philosophisches Denken und Daseinsanalyse.” In: Harald Seubert, ed., *Heidegger und Daseinsanalyse*. (Cologne: Böhlau, 2003), pp. 249-268.

This once again is the Nietzschean problem of science with which we began: a double-horned problem or dilemma as conceived on the ground of science: a conceptual project which inherently and necessarily remains impossible for science. Thus Heidegger explains, "Physics can make no assertions about physics. All the assertions about physics speak after the manner of physics. Physics itself is not a possible object of a physical experiment."<sup>77</sup> Although Heidegger thinks it patent that this is always true of any science (we recall for example, that "Anthropology is that interpretation of the human that already knows fundamentally what the human is and hence can never ask who he might be"<sup>78</sup>), he takes care to be precise. Even where he immediately draws a parallel to philology (as that which itself is not a "possible object of philological observation"<sup>79</sup>), he is careful to make the exactly Diltheyan point contra what can appear to be the hermeneutic excellence of the interpretive, particularly human sciences. Thus we have seen that Heidegger takes historiography as a reflexive case in point, noting that it has "a history as do the rest of the sciences," and thus should be able to apply, *qua* science of history, "its own method and thematic procedure to itself." The problem however is not resolved by such a reflexive hermeneutic recourse to the subjective or human sciences because all the science of history can grasp in reflecting on its own history is a *historiographical* account and not its own "essence as historiography, i.e., as a science."<sup>80</sup>

In this same way, Heidegger reminds us that "if we want to assert something about mathematics as a theory, we must leave behind the object area of mathematics, together with mathematics' own way of representing. We can never discover through mathematical reckoning what mathematics itself is."<sup>81</sup> The reason for this limitation is logical reflexivity and, in this case, the clear order of and distinction between subject-discursive reference, not Heideggerian fiat. In this way, Heidegger notes that "the sciences are not in a position at any time to represent themselves to themselves, to set themselves before themselves, by means of their theory and through the modes of procedure belonging to theory."<sup>82</sup> But this means that the essence of science, now in a nicely obvious form, will have to be "nothing scientific."

<sup>77</sup> Heidegger, "Science and Reflection," p. 176.

<sup>78</sup> Heidegger, "The Age of World Picture," p. 153.

<sup>79</sup> Heidegger, "Science and Reflection," p. 176.

<sup>80</sup> Heidegger, "Science and Reflection," p. 177.

<sup>81</sup> Ibid.

<sup>82</sup> Ibid.

### Heidegger and Nietzsche: From the *Beiträge* to The Question Concerning Technology

Read through the express invocation of Nietzsche's history of nihilism and in tacit correspondence with both Cassirer and Carnap, Heidegger's *Beiträge* reflects the concentrated specificity of his engagement with what was then called positivism but which continues today not only as analytic philosophy but also as the veritably working efficacy of modern science and/as technology as *Machenschaft*, that is: the *dealings* of technology. Heidegger by contrast sets authentic or genuine questioning in opposition to the kind of questioning that corresponds to "curiosity" and investigative research.<sup>83</sup> A reflection on questioning runs throughout Heidegger's thought from *Being and Time* to *Introduction to Metaphysics* which is a sustained reflection on questioning, to his very latest thought – he even writes a letter to the American Heidegger Conference shortly before his death in 1976, with the epistolary pleasantries that thoughtful human beings exchange greetings by posing questions to one another: he goes on not to inquire after the well-being of his friends at that conference, such as Joan Stambaugh or Manfred Frings, but to ask the question concerning science and technology as a question that might be framed and asked anew at the conference.

For Heidegger, answer-bound or problem-directed inquiry stops short of genuine questioning. Contra received logic, Heidegger proposes the radical poverty of reflective thinking: *thought*, in all its modesty. This received logic would not merely be that of the logical positivists (the logic that was to become Carnap's intellectual capital) but would have more generic proponents of another less rigorous kind in the journalistic self-importance and correspondingly cavalier self-confidence of the critics of *Being and Time* that would take Heidegger's musing to more bitter reflections in other contexts, I refer here to Heidegger's comments on death and what he called the "journalistic" (and "philistine") interpretations of his *Being and Time* which, when it was not presented as an anthropology (evolving into the terms of existentialism) or indeed as a philosophy of death.<sup>84</sup> The minimal achievement that was for Heidegger the modesty of open reflection, or reticent questioning more than we are used to regard as thinking, if only because as renunciation or as releasement and letting be, it promises to lead us out of calculative thought: "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."<sup>85</sup>

<sup>83</sup> Ibid, p. 142; cf. *Beiträge* § 5.

<sup>84</sup> See Heidegger's *Beiträge*, § 162, 163.

<sup>85</sup> Heidegger, "Science and Reflection," p. 181.

Modest or not, this proposal still strikes us as wrong-headed. Such talk strikes us as opposed to serious attempts to cognizing science in general as well as to the cognitivist sensibilities (and analytic practice) of the philosophy of science. If today's philosophy of science is no longer dominated by scholastic philosophy or, as in Heidegger's day, by neo-Kantianism, it continues to be dominated by the still enduring analytic approach to conceiving the very scientific problem of science on the terms of the modern world view (this is what Heidegger means by speaking as he does of "science as world view," i.e., contra the idea and ethos of Heidegger's thinking of science in the *Beiträge* and beyond). Heidegger criticizes modern science in its totalizing logic or technological essence. And in Nietzsche's spirit, Heidegger later expresses the logic of scientific totalization in its subversion of any alternative: "Science is the new religion."<sup>86</sup> But to say such things is to challenge or oppose science and science, as Nietzsche had already reminded us in the third section of *On the Genealogy of Morals*, like religion, brooks no critique.

To take up a position against science, to advert to the limits of logic and language, or to clarify the respective roles of philosophy and science, seems anti-scientific and even science-incompetent. And the charge of incompetence has been raised against Heidegger, indeed, even from the start and in spite of being patently inaccurate. Heidegger's problem was not that he didn't know science much less that he did not logic (he knew both) and it was not that the science he did know wasn't up to sophisticated or academic or university standards.

For Heidegger what was at stake was a good Aristotelian sense of order. Only *ancilla* to theology, and that for unimpeachably metaphysical reasons, philosophy was hardly *ancilla* to science but prior to or above science. Thus in the first section of *Introduction to Metaphysics*, writing with an irony that continues to elude casual readers, Heidegger takes issue with the notion that can still be seen to be influential in analytic philosophy, namely that "scientific thinking alone is the authentic, rigorous thinking, that it alone can and must be made the measure even of philosophic thinking."<sup>87</sup> Heidegger can emphasize that "in the scientific attitude of the sciences, the document of their birth from philosophy still speaks."<sup>88</sup> And almost thirty years before in his Nietzsche lectures, Heidegger emphasizes that "science is only scientific, that is to say, science only partakes of genuine knowledge ... to the extent that it is philosophical."<sup>89</sup>

<sup>86</sup> Heidegger, *Zollikon Seminars*, p. 18/20. See Paul Valadier's essay on the same theme, "Science as New Religion," in Babich, ed., *Nietzsche, Epistemology, and Philosophy of Science: Nietzsche and the Sciences II*, (Dordrecht: Kluwer, 1999), pp. 241-252.

<sup>87</sup> Heidegger, *An Introduction to Metaphysics*, p. 27 [20].

<sup>88</sup> Heidegger, "The End of Philosophy," p. 59.

<sup>89</sup> Heidegger, *Nietzsche, Volume II*, p. 112.

We recall too in this context, Heidegger's argument in *Being and Time* which demands a similar distinction between and ordering of the problem of science and philosophy: "Laying the foundations of science" is what Heidegger names "a productive logic" – not limping after science, but indeed "leaping ahead" of science, thus disclosing the constitution of its subject-matter or its concern and making these structures "available to the positive sciences as transparent assignments for their inquiry."<sup>90</sup> In this same ironic fashion, in his *Introduction to Metaphysics*, Heidegger reprises and compounds his claims regarding philosophy as a "productive logic" in *Being and Time*, by way of a tactical reprise of Carnap's criticism of the illogical and unscientific character of his thought: "Talking about Nothing is illogical. Whoever talks and thinks illogically is an unscientific person."<sup>91</sup> Against Carnap's claims, and not incidentally the claims of the same logical positivism that would become the analytic philosophy that now dominates the academic philosophical world, Heidegger argues that "scientific thought is just a derivative and rigidified form of philosophical thinking. Philosophy never arises from or through science."<sup>92</sup> Michael Friedman thus rightly identifies a concern with the primacy of logic and the exact sciences as what unifies Heidegger and Carnap and distinguishes the same difference between them. For Heidegger, philosophy inherently "belongs to a higher order, and not just 'logically,' as it were, or in a table of the system of the sciences."<sup>93</sup> What Heidegger means by this is a classificatory as much as a thematically reflective rank-ordering. Yet by failing to grant to science its accustomed pride of place in the age of scientific reason – *nota bene*, then as now – whenever Heidegger attempts to reserve an orientation between philosophy and science that would require critical reflection, or thoughtfulness (recognizing that for Heidegger critical reflection is the proper province of philosophy and therefore and inevitably unavailable to science *qua* science), Heidegger is judged anti-science, a judgment he just as persistently refused as a confused one.<sup>94</sup>

In the spirit of the genuine knowing Heidegger always believed to correspond to scientific thought as such, the ascription of antagonism to science mistakes the critical point he had learnt so early in his own life from Aristotle's specification of what we may name "methodological" *phronesis*. Much of

<sup>90</sup> Heidegger, *Being and Time*, Macquarrie & Robinson trans., (New York: Harper & Row, 1962), Int. I, (BT31/SZ 11). See also § I.1, (BT 75/50); I.6, § 44 (BT 256-273/SZ 212-230).

<sup>91</sup> Heidegger, *An Introduction to Metaphysics*, p. 25 [18].

<sup>92</sup> Heidegger, *An Introduction to Metaphysics*, p. 28 [20].

<sup>93</sup> *Ibid.*

<sup>94</sup> This was a prejudice that would work to the detriment of Boss's hopes for a scientific reception of *Daseinsanalyse*. As the work (the repeated work) of Adolf Grünbaum would make clear, the bugbear of science and scientificity is not merely an elusive one for *Daseinsanalyse* but psychoanalysis in general.

Heidegger's enthusiasm for Nietzsche's claim concerning the victory of scientific method over science itself derives from just this critical distinction – and indeed the philosophical importance of *the* qualifying philosophical ability to *make* distinctions. As Heidegger cites Aristotle's account of such judgment in "The End of Philosophy and the Task of Thinking" as well as throughout the *Zollikon Seminars* (following a lifetime of such references): "For not to know of what things we may demand proof, and of what one may not, argues simply a want of education." (*Meta.* 1006a, cf., *Nic. Eth.* 1094b, etc.) Accordingly we find that in Heidegger's review of the serried propositions on science listed in the *Beiträge*, he also adverts to the same charge of being "anti-science."<sup>95</sup> For Heidegger however his summary "characterization of science doesn't arise from a hostility to science because hostility of the sort is simply impossible." (B §76)

As Heidegger explains this same simplifying disjunctive tendency, which he always identified with a tendency even in philosophy to reduce things down to level of journalistic oppositions, to speak of pros or cons, that philosophical thought is not an either/or thinking of likes or dislikes: "Philosophy is [thus] neither for nor against science." (B §76.11)<sup>96</sup>

Nietzsche polemicizes and teases us on this point where Heidegger argues with a schoolteacher's patience. But we still find it hard, just as Descartes muses, to break our old convictions or prejudices of thought. How can we come to an enlightened perspective on enlightenment? How are we to philosophize on the subject of science?

If this were an armchair problem of the classically metaphysical kind we could let it go as conundrum, a mere dilemma. But because the problem is the problem of science as the "theory of the real," we have been attempting to

<sup>95</sup> The anti-science charge dogged Heidegger since reviews of *Being and Time*, then directed to claims he makes there concerning truth and especially concerning physics itself, BT, p. 269/ S. 226-227. See also his characterization of Galileo, "als Physiker Philosoph." *Logik: Die Frage nach der Wahrheit*, (1925-26), GA 21, p. 97. Later his direct comments on science and thinking drew greater fire.

<sup>96</sup> I do not need to emphasize here that Heidegger's critics have been unpersuaded by this claim. If his critics charge that his philosophy is anti-science and therefore irrational, the judgment has proven to endure Heidegger's own efforts to answer such critique directly. In the age of science, under the rational aegis of science, any criticism of science is assumed to be irrational, and all Heidegger's training in logic and mathematics, and in spite of his painstaking references to Aristotle, the first master of scientific logic and to the development of that logic into the *organon* of precisely modern science in Descartes (and Galileo) and in Kant (and Leibniz), does nothing to abrogate the charge of irrationality. I attempt to oppose this reading here as elsewhere. On Heidegger and logic, see Michael Friedman (cited above) and on Aristotle see Patricia Glazebrook's *Heidegger's Philosophy of Science* (New York: Fordham University Press, 2000) and for a still more precise and sustained reading, William McNeill, *The Glance of the Eye* (Albany: State University of New York Press, 1999).



take it by the veritable horns and this not because we wish to revive the lost Cretan art of bull dancing – in the spirit of Nietzsche’s identification of the “problem of science” as a “problem with horns,” whereby with the mention of “horns,” we philosophers, as failed suitors of the truth, are crowned with all the allusions to the liar that are inevitable with reference to Nietzsche or even, thinking of Ariadne, to Theseus himself. Here, our ambition is more sober than matters of scholarly pride. In the modern age of science, it is now life itself that is at stake. An unquestioning inattention to modern science and technology rules in modern confidence, that is, in our convictions, as Nietzsche named what Gadamer called our prejudices. Taking a word from Nietzsche and from Hölderlin, Heidegger names this our needfulness [*Nöte*] and Heidegger plays on the German to explicate this in terms of our modern technological resourcefulness (indeed our being of ourselves our own resources for ourselves, which is the watchword of the future technology that is ourselves, the design of the human: cloning as human engineering) as our needlessness [*Notlösigkeit*]. The needfulness of our needlessness, our ultimate resourcefulness, is also our abandonment – of Being, gods, even the world we have made. We increasingly approximate the time in which, as we note Heisenberg’s expression, humanity seemingly encounters nothing but its own face where ever it turns to look on the earth, and we can add: however deeply it gazes into the depths of the universe.<sup>97</sup> For Heidegger who turns presumed intimacy into the reigning absence of reticent regard, this humanistic globalization means that humanity has never been more alien to itself.

For the essence of the machine, the “deal” of the service offered by machine technology (and electronic technology is no different), can only correspond to a literal deracination.<sup>98</sup> This unsettling displacement or derangement can be effected via industrialization in the modern technological sense or via wireless and otherwise mobile communications in the now postmodern, increasingly “cellular” or atomizing sense of connectivity in a condition of totalizing dispersal that is globalization. Today indeed we know that one can remain in one’s home and manage to be deranged in this sense by nothing more egregious than an internet connection: the result is not an alienation in a traditional sense: indeed one is projected upon, one can “surf” – note the word! – a virtual ether (pictures and projects of personal interests do worlds of good in this measure, but ultimately what matters most is that one presses a key and

<sup>97</sup> Heidegger’s reference is to Heisenberg’s declaration: “for the first time in the course of history modern man on this earth now confronts himself alone.” in Heisenberg, *The Physicist’s Conception of Nature*, trans. Arnold J. Pomerantz (London: Hutchinson and Company, 1958), p. 23.

<sup>98</sup> In this way, in the historical context of the *Beiträge*, industrial workers are torn from home and history [*herausgerissen aus Heimat und Geschichte*], and put to use (“mobilized” in Jünger’s and not only his words, or in more economically neutral terms, engaged and made productive, “wired” or brought into the loop).



is absorbed by the sense of magical power granted by nothing more fantastic than an immediate response, however virtual and indeed if only from the key itself: with every click of a key or a mouse, something – anything – happens and that something is enough for us). What is volatilized, what in Marx's words, "melts into thin air," is increasingly substanceless modernity itself.

At risk, Heidegger argues, is the possibility (and responsibility) of *Da-sein* – both with reference to the locale and substance of the earth and the known and knowable world. In place of earth and world is only machination – that is, mechanization, i.e., global technicization, the e-business or digital ideal, where even the machine stands to lose its substantiality to a shadow, a play of light on an increasingly a-dimensional screen, like the technological projections of utter transparency elevated to the status of a movie icon of desire in *Minority Report*, or visceralized in the *Matrix*, or to be experienced at will in any home-theatre with the latest technology.<sup>99</sup>

Not a representation of Shelley's *Frankenstein*, a human made in the image not of god, but man, of cobbled together body parts; not even the robot fantasy that still charms us in the television images of Star Trek androids, today's illusions have since given way to the similarly imaginary cyborg of metonymic fantasy gaming, now appearing in the indistinct interfaces between virtual and real – avatars and second-life selves, like so much body-adornment, technological extensions in place of earrings, decoratively arranged bits of exposed electronic machinery interfaced with flawless flesh, or even better than Hollywood can do, the classic computer anime, smoothed out in flat animation measured to pixels, the resolution of 2-dimensional screens, and programming variations. Today, we find *ourselves* named in our essence in the language of DNA and, so we hope, stem cell research.<sup>100</sup> As genetically coded, we are not

<sup>99</sup> The cult film, *Minority Report*, with its parabolic indictment of fascism, represents the lineaments of the all-too-often veritably provisioned "future," as the visions of story tellers from Goethe to Mary Wollstonecraft Shelley to Jules Verne to George Orwell are so often able to do. The computer screens in *Minority Report* are projected into plain space, thin air: they are virtually there: projections of unrealized (anticipated) reality on a virtual, i.e., invisible wall.

<sup>100</sup> In the *Zollikon Seminaren*, Heidegger had argued with some ironic humor, against the reductive claim of the cybernetic definition of the human offered by Norbert Wiener. "What the human being is, is determined by the method of natural science." (p. 92/S. 119). Wiener's definition, which exists in print, describes "man" as an "information" device. For Heidegger, such a definition attains absurdity in overstepping the scientific limitations of science. Heidegger then adverts to the critical objections that we have already seen are automatic in the wake of any critique, even one so seemingly well-justified: "Customarily one labels the reference to this threatening self-destruction of the being of the human being within science (with its absolute claims) as hostility toward science. Yet, it is not a matter of hostility toward science, as such, but rather a matter of critique regarding the prevailing lack of reflection on itself by science." This sense of critique, as noted above, Marcuse has in common with Heidegger, and here Heidegger emphasizes that more than a matter of separate domains, appropriate to science on the one hand and proper to philosophy on the other, such reflective critique is essential to science *qua* science:

even the technized animal brought to life as dynamo in Fritz Lang's *Metropolis* machine, the beautifully armored, malignantly mechanical virgin. As technized animality, we imagine operators like nucleotide transcriptions, the uptake of modified genes as therapies or as remodeling transformations deliberately injected via the literally mechanical organisms ready made for the work at hand already extant, and hence not at all dependent on our not-quite-ready technologies: viruses ready made (though not due to our efforts) for just such a process of on-the-fly genetic modification. Using viruses as vectors, as today's researchers do, the technized animal becomes in turn the viral vector (and if we grow mosaics of animal and human stem cells we will be modifying this plan still further), likewise the bacterial plasmid, just so, the dream of the human clone.

Technological dealing or machination begins at the inception of the revelation of making as such, more than a merely negative manner of the presencing of being.<sup>101</sup> With or without the idea of a creator god in the Judeo-Christian tradition, "what remains essential is the being-causedness [*das Verursachtsein*] of beings." (*Ibid.*) At the height of medieval school philosophy, this fundamental cause-effect-relationship would become the ruling idea (God as *causa sui*). Thus Heidegger can say that "mechanical and biological ways of thinking are always only consequences of the hidden machinational [*machenschaftlichen*] articulation of beings." (*Ibid.*) The little that science has changed since the folk-science of "breeding" not only in 1930's Germany but internationally *en vogue* in nutrition and research still confirms this. The ideology of hygiene, including nutrition and exercise, envisioned a maximalization of potential development, raising "superior" children.<sup>102</sup> This same idea has found a new resonance but nothing like a new ambition in today's vision of genetic engineering (this is of course not just for sheep but precisely in its

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as "insight into the very method determining the character of modern science." (p. 95/S. 125) If one can do science without philosophy one cannot do so reflexively. This is not just a matter of thinking as some readers of Heidegger have supposed, but corresponds to the very essence of science proper; the same essence that finds philosophy higher, as possibility is higher, as ontological inquiry is higher, than science or ontic inquiry. (See Heidegger, *Being and Time*, Int. I, p. 31/S. 11, and *Introduction to Metaphysics*, p. 40/S. 29.)

<sup>101</sup> For Heidegger, what is as makeable, as made, whether from out of itself or else as unfolded at the hands of the craftsman, is not yet machination as such. The emergence of the machinations of modern (scientific) technology required the original conception of the causal schema of beings as such, not derived from the era of modern science and so not limited in historical time, but drawing in its roots upon the earliest beginning of philosophy, articulated in Plato who uses the term of formative manufacture or invention/creation and sets the standards for the same in his *Timaeus*.

<sup>102</sup> See, for instance I. Newton Kugelmass, *Growing Superior Children* (New York: D. Appleton Century Co., 1935), a book published in English, indeed in America, by an expatriate Austrian physician-researcher who was a practicing pediatrician on New York City's Park Avenue.

modality as *human* engineering) as Sloterdijk's incendiary tractatus "Rules for the Human Zoo" made an issue of the matter for philosophical debate (and even greater public consternation) in Germany.<sup>103</sup>

Following Nietzsche, Heidegger refers the transformational trajectory of causality from *ens creatum* to the modern working force of causal thinking.<sup>104</sup> For Nietzsche, we explain everything with reference to ourselves and our own motivational intentionality, consequently and inevitably, we fashion (or invent) the very concept of a cause and thereby misconstrue both the world *and* ourselves in a single blow.<sup>105</sup> In this Nietzschean context (it was Nietzsche who defined knowledge as the reduction, more or less illicit, of the unfamiliar to the familiar), Heidegger explains that the "cause-effect relationship is ... employed by all human calculation ... to explain something, i.e., to push it into the clarity of the ordinary and the familiar." Once again we may recall that Nietzsche has argued that we everywhere explain the unfamiliar by reduction to the familiar – an illusion which has the charm of silencing mystery and alleviating the discomfort of non-knowing. See Nietzsche, *Twilight of the Idols*, "The Four Great Errors," §5. The 'relief' of non-knowing in question is what is important in Nietzsche's argument, an emphasis also made, if for different reasons by C. S. Peirce who spoke of the "quiescent" power of belief. For Heidegger, even "the beingness of beings fades into a logical form into what is thinkable by a thinking that is itself ungrounded." (B §52)

As elements of the forgottenness of Being in the *Beiträge*, Heidegger had outlined *calculation* [*Berechnung*], *acceleration*, and *the overwhelming claim of the massive*. (B §57) In his reflections on calculation, Heidegger points to the exact opposite of the precision claimed for it as essential to the effective success of science: "from the unclear pre-conception of leading principles and rules one derives the certainty of dispositions and plans." This for Heidegger corresponds to the essence of "the *experiment* [*Versuch*]," that is as attempts, understood in an arch-Nietzschean sense but also even in a Machian sense, which always remain corrigible (this always flexible corrigibility is the problem-solving power of what Kuhn (after Popper) calls "normal science.") For Heidegger the essence of modern research techno-science abstracted from

<sup>103</sup> Peter Sloterdijk, *Regeln für den Menschenpark: Ein Antwortschreiben zum Brief über den Humanismus* (Frankfurt am Main: Suhrkamp, 1999).

<sup>104</sup> What Heidegger means by *ens creatum* when he goes on to coordinate *ens creatum* – modern nature – with technicity requires no reference to a divine creative power, and accordingly is non-theological.

<sup>105</sup> Nietzsche argues that "Die einzige Kausalität, die uns bewußt ist, ist zwischen Wollen und Thun – diese übertragen wir auf alle Dinge und deuten uns das Verhältniß von zwei immer beisammen befindlichen Veränderungen. Die Absicht oder das Wollen ergibt die Nomina, das Thun die Verba. Das Thier als wollendes – das ist sein Wesen." KSA 7, p. 482. See for references to this complex topic my several studies on Nietzsche and science, as cited above.

idealized research science or falsificational logicising, exemplifies no necessary correspondence with the real, physical world of empiricist or realist conviction but its own unquestioning logic, for science then destroys the very spirit of the possible that stands higher than actuality by making possibility all pervasive and so leveling it altogether presaging what the later Heidegger would name totalizing thoughtlessness.

What is betrayed in today's digitalized ideal is no longer the warning *threat* that humanity itself, not just the "natural" world of "natural resources," may come to be taken in the image of Heidegger's standing reserve. The past fifty years has made this danger quite real. In theory, the entire population of Iceland, but also, less a matter of civic speculation than exploitation, the Human Genome Diversity Project which has, without even the appearance of informed consent as in Iceland, sought to do the same for Middle and South American indigenous tribes.

In practice, we name only the fertility clinics as veritable banks of human beings, potential and actual. So many ova, so many vials of sperm, so many embryos, not to mention stem cells and cloned cell-lines, the basis of genetic research and cultivated in some cases now already for more than fifty years. All *already* stock on hand, so much standing reserve, and nothing at all compared with the virtual promise of the same technology. If the genome project has proven to be as anticlimactic as it has, the genetic code remains as the molecular idea of a registered and accessible essence of humanity, still alluring as a signifier we hope to take for granted in place of the lived complexities of human life.

I have elsewhere explored the implications of the conclusion to be drawn with respect to the danger to animal life and to the lived world as a whole: for the most part what horrifies us in the transformation of the world that bears the very symbolical name of "global warming" is not the destruction of that world or the concomitant devastation of animal and plant life, as we continue without cease to trawl the oceans bare of all the fishes that swim, cetaceans, cephalopods, and slow-maturing sea-tortoises who will drown in our nets before they can swim to shore to lay their eggs and bring new life again, and as we continue our breakneck pace of deforestation and road-building, which we name, with neither irony nor embarrassment, development, irremediably destroying the worlds of apes and of lions, of elephants and bears, of tigers and antelope alike but also small things, like butterflies and like frogs and other things we have not noticed.

Our problem is not frailty: the naked ape is anything but defenseless and we have lied to ourselves for millennia about our imagined weakness and thus arrogated to ourselves the right to take any advantage possible against other animals and against the earth. We have since developed those advantages

to an extraordinary pitch and we are poised to do more. In all this the only problem is that of sustainability where all want is to have no limit and no end to what we do.

Thus we use and rape the world and wish only to be able to continue in just this fashion for all time. Science and technology replace the heaven to come with heaven on earth and this is our idea of that heaven. We have not invented the lamenting to be heard in the loss of such now utterly consummate human vanity. We need more than Heidegger and Nietzsche, but as they both urged us to learn, and now for the sake of the earth, as for the sake of life itself, we need to learn to think.

