



Hermeneutic of performing cultures

Arun Kumar Tripathi¹

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Philosophers of technologies should develop the clarity and precision in their language that *would allow the public to speak about the cultural and political entanglements of technology clearly in the public sphere.* –Albert Borgmann (Based on our email communication)

“Hermeneutics has only in the past few decades been applied to the natural sciences. Patrick Heelan (1983) and Don Ihde (1998) are two American philosophers who have engaged in this task “(p. 73). Quoted in *Philosophy of Technology: An Introduction*, Val Dusek, Blackwell Publishing, 2006.

The main reason to work on this current special issue on “Material Hermeneutics, Technoculture and Technoscience” (this volume) is to bring Don Ihde’s postphenomenology and expanding hermeneutics into foreground for future perspectives and also to bring two great philosophers Don Ihde and Patrick Heelan in the picture and the *significance of their work on hermeneutic perception & readable technologies* (Heelan 1983) and *perception has a hermeneutics dimension for philosophy of technology* (Ihde 1998). One can’t understand Ihde’s expanding hermeneutics (material hermeneutics) without understanding his postphenomenology. So for my special issue, besides material hermeneutics, understanding of Ihde’s postphenomenology and multistability are much needed. In fact, *Expanding Hermeneutics* (1998) is a sequel to *Ihde’s postphenomenology* (cited on p. 2 of Ihde’s *Expanding Hermeneutics*). My special issue is also about expanding hermeneutics of embodiments. The special issue brings two thinkers Patrick Heelan and Don Ihde in a dialogue on hermeneutics and sciences, perception is a hermeneutical act and perceptual reasoning.

Hermeneutics is an experience (embodied cognition), which is an embodied phenomenon. When a person is reading and interpreting the texts, the person is using his/her

whole body in the process. In fact, reading texts is a whole body perception and experience. We don’t read texts simply with eyes (eyes are the extension of human body) but with ‘whole body’ or better with ‘embodied mind’ (mit der leibliche geist). Perception is an embodied mode of seeing and ‘is to see’ has a hermeneutic dimension. Material hermeneutics is an embodied interpretation. Material hermeneutics also deals with whole body perception and perceptual gestalten. Interpretation is existentially embodied in perceiving human beings. Our experience is technologically mediated when, for example, we view the world through glasses, talk on a telephone, tell time on a watch, or read a speedometer. This shows how devices that are read exhibit the hermeneutic character of a technology particularly well.

In a hermeneutic relation the user experiences transformed encounters with the world via the direct experience and interpretation of the technology itself. The transparency of the relation will depend on the interpreter’s familiarity with the device. Hermeneutic relations involve reading technology and device (cf. Heelan’s ‘readable technologies’ (Heelan 1983)). Patrick Heelan talks about ‘Readable technologies’ which are technologies capable of transforming perception. Such technologies, according to Heelan are readable technologies and confer perceptability on the scientific entity in question). The materiality of the technology—in this case the time—is being “read” and the world is being referenced. The relations are characterized by a “semi-opaque” connection between the technology and the referent. There is a transformation of perception and hermeneutics through instrumentation. A thermometer, for instance, establishes a relationship between humans and reality in terms of temperature. Reading off a thermometer does not result in a direct sensation of heat or cold but gives a value that requires *interpretation* to tell about reality.

According to Heelan, these are new perceptual entities, discovered through the invention of new forms of embodiment, which serve as signs manifesting objects present in and to perception in accord with the hermeneutical analysis of perception. Heelan (1983) elaborates that human culture has developed the ability to upgrade the functions of the

✉ Arun Kumar Tripathi
tirelessarun@gmail.com

¹ Central University of Tibetan Studies, Sarnath, Varanasi, Uttar Pradesh 221007, India

human perceptual system by incorporating new technologies into its cognitive functioning and to enlarge in this way the scope of that reality that is immediately and directly accessible to us—for whatever uses ‘we choose to apply them to’ (Tripathi 2016a, pp. 239–240).

1 Contributions to the special issue

Contributions to this special issue articulate a new paradigm for material hermeneutics, technoculture and technoscience. The special issue expands Heelan hermeneutical phenomenology and sciences. Contributions to the special issue discuss the questions: how perceptions can be transformed the hermeneutics in a material culture? How an instrument can transform the human perceptual experience? What does it mean for perception to have a hermeneutic dimension in actual world? And how do various kinds of artifacts mediate our everyday perception?

On the cultural dimension of material hermeneutics, Tripathi (2017, p. 137) defines technology as a “fundamental cultural force”. He appropriately stresses that postphenomenologists should give more importance to “cultural variability”, and they should address the meaning of “socio-cultural activity” (ibid.: 140). The main point of an expanded hermeneutics is that what the natural sciences teach us is that there are ways, through instruments—technologies by which things can show themselves. Hermeneutics in natural sciences can best be demonstrated by the imaging practices, called as visual hermeneutics, says Don Ihde (1998). The objects of the visual hermeneutics are not texts nor linguistic phenomena, but things which come into vision through instrumental magnifications, allowing perception to go where it has not gone before. In this sense, one can say that visual hermeneutics is a perceptual hermeneutics with perception which while including texts, goes beyond texts. Don Ihde writes “The shift to perceptual observation from textuality has often been remarked upon in different ways, for example, best illustrated by Michael Foucault and Catherine Wilson” (ibid. 1998).

Culturally interpreted hermeneutics of technologies is called material hermeneutics. Material hermeneutics is dealing with the art of embodied interpretation of material culture and technologies. In other sense, material hermeneutics comprise of sensorimotor experience. A hermeneutic relation is the one in which the user interfaces with the technology by reading off it and interpreting that read-out. Technological mediation takes place, where technologies can mediate between humans and reality, by establishing specific relations between both. This phenomenon of technological mediation has two dimensions, each of them pertaining to one aspect of the relations between humans and reality (Tripathi 2016a, b). Philosophers, usually

expected to play applied ethics roles, often come to the scene after these effects are known. But others who participate at the research and development stages find even more difficulties with prognosis (Ihde 1999). *Technologies are products of human ingenuity and designed to give us images of a reality hidden from us, either in the form of being too small or too far away and/or being inside something else, these technological outputs or images we can see* (Friis 2015, 2017). Patrick Heelan (1983) comments, *readable technologies are technologies capable of transforming perception*.

Newer approaches claim that hermeneutics applies to the very praxis of science and to the constitution of scientific objects. Ihde sides with the latter perspective and argues that a tendency to retain vestigial positivist interpretations of science keeps the older tradition from seeing hermeneutics as deeply embedded in science praxis.

Jan Kyrre Berg Olsen Friis in his paper “Enactive hermeneutics and smart medical technologies” (this volume) argues that embodied cognition is an interpretative—or hermeneutical—cognition inherent in motor-sensory perception intrinsically informed by biological and sociocultural memory, a cognition embedded in the organism as well as the socio-cultural environment interacting with it, of which technologies are a part.

In another contribution “A hermeneutics of scientific practices and the concept of “text”” Dimitri Ginev (this volume) discusses a version of the hermeneutic philosophy of science. Special focus is placed on the ways of reading theoretical objects in scientific inquiry. In implementing readable technologies, this reading succeeds in contextually visualizing the theoretical objects by means of various sorts of signs. A configuration of readable technology accomplishes a further step. Ginev’s paper explores the importance of “material hermeneutics” for the contextual reading of theoretical objects. The conclusion is drawn that the hermeneutic study of the entanglement of technological artifacts with the outcomes from reading-as-textualizing requires the introduction of ontic-ontological difference.

Catherine Hasse in her paper “Material hermeneutics as cultural learning: from relations to processes of relations” (this volume) asks about the relation between material hermeneutics, bodies, perception and materials. In this article, Hasse argues that cultural learning processes tie them together. Three aspects of learning can be identified in cultural learning processes. First, all learning is tied to cultural practices. Second, all learning in cultural practice entangle humans’ ability to recognize material world conceptually, and finally the boundaries of objects, the object we perceive, are set by shifting material-conceptual entanglements. All these aspects are important for material hermeneutics in a techno-culture. In this paper, Hasse introduces notions of cultural practices.

In the contribution “The datafication of the worldview”, Alberto Romele (this volume) sketches the outlines of material hermeneutics as a three-level analysis of technological artefacts. In the first section, Romele introduces Erwin Panofsky’s three levels of interpretation of an artwork, and proposes to import this approach in the field of philosophy of technology. The thesis is that these new technologies are not only radically transforming our interactions with the world, or our modes of production and consumption, but also our worldview.

Galit Wellner in her paper “Material hermeneutic of digital technologies in the age of AI” (this volume) argues that digital technologies are frequently considered as lacking material aspects. Postphenomenology has theorized the relations to material things as embodiment relations. Taking into account that technologies can also have hermeneutic aspects, this theory defines hermeneutic relations as those in which we read the world through technologies. Wellner’s article opens with a review of some theoretical developments to hermeneutic relations with a special focus on digital technologies. The article suggests that in the digital world, material hermeneutics needs to be updated as it shifts from a scientific to an everyday technological context.

Robert Rosenberger in his paper “On variational cross-examination: a method for postphenomenological multistability” (this volume) asks an outstanding question “How should we understand postphenomenological methodology?” Postphenomenology is a research perspective which builds on phenomenological and pragmatist philosophy to explore human–technology relations, but one with open methodological questions. Here, Rosenberger offers some thoughts on the epistemological processes that should be (and often implicitly may be) at work in this research. In particular, Rosenberger is concerned with postphenomenological research on technological “multistability,” i.e., a device’s ever-present capacity to be used for a variety of purposes, and to always be meaningful in multiple ways. As a set of instructive examples, Rosenberger draws on my own line of research on the politics of public spaces, and especially the critique of anti-homeless design. In the end, Rosenberger asks a significant question “When we consider the multistability of technologies, should we follow those considerations with the question: stable for whom?”

In the essay, “Expanding hermeneutics to the world of technology” Zovko (this volume) first analyzes the extension of hermeneutical interpretation in the Heideggerian sense to products of contemporary technology which are components of our “lifeworld”. Products of technology, such as airplanes, laptops, cellular phones, washing machines, or vacuum cleaners might be compared with what Heidegger calls the ‘Ready-to-hand’ (*das Zuhandene*) with regard to utilitarian objects such as a hammer, planer, needle and door handle in *Being and Time*. In the second part of his paper,

Zovko explores the positive achievement of material hermeneutics (Don Ihde 1998) with regard to its extension to technoscience and the discussion of how such hermeneutics can contribute to the preservation of our threatened lifeworld, but also to explore the possibilities of how technical inventions, medical innovations could improve our way of life.

Emphasizing the importance of Patrick Heelan’s philosophy of technoscience for material hermeneutics, Babette Babich in her original essay “Material hermeneutics and Heelan’s philosophy of technoscience” (this volume) raises the question of material hermeneutics in Heelan’s philosophy of techno-science. For Heelan, Babich argues a continental philosophy of technoscience, referring to Husserl and Heidegger and especially to Merleau-Ponty, features hermeneutic contexts of mathematics and measurement as well as laboratory observation, including what the later Heelan spoke of as ‘portable laboratories,’ for the sake of objectivity and ‘meaning making.’ Babich’s essay includes a discussion of Heidegger on mathematics and Bruno Latour on pasteurization.

Kåre Stokholm Poulsen and Lambros Malafouris in their joint article “Understanding the hermeneutics of digital materiality in contemporary architectural modelling: a material engagement perspective” (this volume) develops a framework for analysing how digital software and models become mediums for creative imagination in architectural design. To understand the hermeneutics of these relationships, authors develop key concepts from Material Engagement Theory (MET) and Postphenomenology (PP). To push these frameworks into the realm of digital design, they develop the concept of Digital Materiality. Digital Materiality describes the way successive layers of mathematics, code, and software come to mediate enactive perception, and the possibilities of creative material engagement actualised in work with software.

Tailer G. Ransom and Shaun Gallagher in their essay “Institutions and other things: critical hermeneutics, postphenomenology and material engagement theory” (this volume) acknowledge Don Ihde and Lambros Malafouris who argued that “we are homo faber not just because we make things but also because we are made by them.” The emphasis falls on the idea that the things that we create, use, rely on—that is, those things with which we engage—have a recursive effect on human existence. An original idea.

In the paper “Interpreting fitness: self-tracking with fitness apps through a postphenomenology lens” author Elise Li Zheng (this volume) argues for fitness apps on mobile devices are gaining popularity, as more people are engaging in self-tracking activities to record their status of fitness and exercise routines. These technologies also evolved from simply recording steps and offering exercise suggestions to an integrated lifestyle guide for physical well-being, thus exemplify a new era of “quantified self” in the

context of health as individual responsibility. This paper approaches from the postphenomenological perspective, in combination with empirical studies of design analysis and interviews of fitness apps, to reveal the human-technology link between the design elements and people's perception through the direct experiences and interpretations of technology. It argues that the intentionality of self-tracking fitness app designs mediates the human-technology relations by "guiding" people into a quantified knowledge regime. It shapes the perceptions of fitness and health with representations of meanings about a "good life" of individual success and management.

Samantha Jo Fried in her paper "Satellites, war, climate change, and the environment: are we at risk for environmental deskilling?" (this volume) argues that we find ourselves in a paradigm in which we believe that accepting climate change data will lead to a kind of automatic action toward the preservation of our environment. Fried has argued elsewhere that this lack of civic action on climate data is significant when placed in the historical, military context of the technologies that collect this data—Earth remote sensing technologies. Samantha Jo Fried opens a discussion on the environmental skills in the paper. Jo Fried in her paper "wonders how else these phenomenological theories could enter into the political realm" (cited in this paper). What would it look like for phenomenologists to bring their thinking into community organizing and local politics, for instance? Further Jo Fried concludes "clarification is needed on what environmental reskilling might look like in practice."

"On the hermeneutics of screen time: A qualitative case study of phubbing" Jesper Aagaard, Emma Steninge and Yibin Zhang (this volume) argue that screen time has become a hot button issue in psychology with researchers fiercely debating its mental effects. If we want to understand the psychological dynamics of technology use, however, a numerical conceptualization of screen time will lead us to gloss over crucial distinctions. To make this point, their article takes a hermeneutic approach to a negative form of screen time known as 'phubbing', which is the practice of snubbing conversational partners in favor of one's phone. The findings in the paper demonstrate that not all screen time is created equal: what is harmful and inappropriate in one context is benign in another, and vice versa.

The essay on "Patrick Heelan's phenomenology and hermeneutics of observation in quantum mechanics" by Val Dusek (this volume) investigates not only the hermeneutical philosophy of science but also the parallels between quantum mechanics and human experience in general and the logic of changes of worldview. Heelan's closeness to Aristotle and Lonergan, often neglected, is discussed, and issues concerning Heelan's treatment of the social context of science are raised. Patrick Heelan's work on observation and quantum theory is highly original and, unfortunately,

not sufficiently appreciated, in contrast to his conception of two relations of the observer to her instruments in general, the technologically extended observer observing the scientific object versus the observer observing the combination of the observational technology with the scientific object. However, Heelan's work specifically on quantum theory approached phenomenologically has in general not been developed and/or criticized even compared to his work on non-Euclidean visual space. Heelan has not only produced an account of hermeneutic perception of the objects of quantum mechanics but has developed numerous parallels between the structure of quantum theory and the structure of experience in general. These deserve to be much more widely known and elaborated. Heelan's general account of the embeddedness of the trained scientist in the cultural and historical context is capable of wide application as a deep philosophical foundation for the history and philosophy of science, though this application has not so far been extensively pursued. With increasing interest in the phenomenology of quantum mechanics, as exemplified by several recent conferences on that topic such as those at Graz, Austria and at the State University of New York at Stonybrook, it is hoped that Heelan's work will be more widely recognized and developed by others.

The article "Transformative power of technologies: cultural transfer and globalization" (this volume) by Mrinmoy Majumder & Arun Kumar Tripathi argue that in the last three decades, a cultural perspective has been used to understand scientific knowledge and technology. This relatively new perspective has introduced literature on the ethical dimension to the development of technology, which are embedded in techniques, tools and artifacts. Today, we can see that more than ever, there is an urgent need to comprehend the global ramifications of modernization. In this paper, we make an attempt to look at science and technology based on culture, wisdom, ecology and ethical values.

In the essay "When is a phenomenologist being hermeneutical?" (this volume) philosopher Robert Scharff compares the philosophy of Don Ihde and Patrick Heelan (their similarities and differences) and argues that many philosophers of science and technology claim that their phenomenology is hermeneutical. Yet they neither practice the same sort of phenomenology, nor do they all have the same understanding of hermeneutics. Moreover, their differences often seem to be more a function of different pre-selected substantive commitments—say, to take a "material" turn or to be resolutely "empirical"—than the product of any serious effort to clarify what it is to be hermeneutical. In this essay, after some discussion of Dilthey's reception among post-Husserlians (especially Patrick Heelan and Don Ihde), Scharff considers how aspiring hermeneutists might make their own pre-possession of substantive and methodological commitments a hermeneutical topic. This is, of course, is not

just a scholarly question of how post-Husserlian phenomenologists might make themselves more phenomenological. Comparing Ihde with Heelan, Robert Scharff argues that with respect to Dilthey's idea of "interpretation" for the sake of enhancing one's "understanding," they arrive at roughly the same general conclusion. Enacting a revised and/or expanded version of Dilthey's hermeneutics promises us the possibility of characterizing all the phenomena of experienced life in their own terms, rather than in terms of what some favored epistemic or ontological source (e.g., faith, political and religious ideology, Reason, neo-Aristotelian metaphysics) already anticipates All Reality.

The article "Machine hermeneutics, postphenomenology, and facial recognition technology" by Soraj Hongladarom (this volume) introduces the notion of machine hermeneutics in this paper. The notion refers to hermeneutical activity performed by machines. Machines are now capable of making the very interpretive tasks, using artificial intelligence algorithms based on the technology of machine learning that used to be the exclusive domain of human beings. With facial recognition algorithms, for example, machines are now performing routinely what must be regarded as hermeneutical analyses with astounding accuracy and power. Thus, machine hermeneutics supplements Don Ihde's notion of material hermeneutics. Hongladarom's article discusses the problem of how to justify the kind of perception that undergoes this process. In what sense can it be said that the algorithm is performing the right action, i.e., one such that the process comes up with a right picture of the world? The two cannot be considered one apart from the other. Hongladarom's contribution adds another dimension to Ihde's material hermeneutics, which occurs when machines are capable of doing their own interpretation with the help of advanced AI algorithm. Soraj Hongladarom's article has an innovative approach and is helpfully applied to cure the cybercrime. Soraj's article does not merely tell us about technical excellence for the technology involved, but also about ethical excellence.

The paper "Digital hermeneutics for the new age of cinema" by Stacey Irwin (this volume) has a renewed focus that makes sense because human–technology–world experiences need to be interpreted. And many of these are more complicated to study, precisely because technology is at the root of the experiences. One interesting subset of technologies is media technologies, also called digital media, which intertwines the device and the content to mediate together in the world. Visual media technologies and media content, together, through what is called moving image technologies, create virtual role-playing, virtual and augmented reality, video games, and social media focused worlds that have become central experiences in contemporary culture. Irwin argues that philosophical and technoculture studies surrounding the existential understanding of the

human–technology–world experience have seen a slow but steady increase that makes a turn to material hermeneutics in the second decade of the twenty-first century.

The paper "Explaining multistability: postphenomenology and affordances of technologies" by Bas de Boer (this volume) explains the multistability of technologies: how can it be that specific technologies can be used for a wide variety of purposes (the "multi"), while not for all purposes (the "stability")? For example, de Boer tells us that a table can be used for the purpose of sleeping, having dinner at, or even for staging a fencing match, but not for baking a cake. One explanation offered in the literature is that the (material) design of a technology puts constraints on the purposes for which technologies can be used. In this paper, de Boer argues that such an explanation—while partly correct—fails to address the role of the environment in which human beings operate in putting constraints on technology use.

The article "Weaving science and digital media: postphenomenology's expanding hermeneutics" (this volume) by William A. Hanff Jr. argues that postphenomenology is not a critique of phenomenology, but a practical interpretive epistemology where technological artifacts and practices are studied. Over the past 25 years, the expanding hermeneutics of postphenomenology has been undertaken by classical phenomenologists, cultural anthropologists, media/communications writers and performance artists.

Rudolf Makkreel (1939–2021): Hermeneutics extends the meaning of texts. Makkreel's way of doing hermeneutics was one step ahead, which means he asked us to *orient ourselves to an ever-changing multicultural world*. We live in a pluri-cultural world, so Makkreel's style of hermeneutics is much needed. The ultimate goal of the hermeneutic process is to understand an author better than he understood himself. Makkreel's style of hermeneutics described in his book *Orientation and Judgment in Hermeneutics* (University of Chicago Press, 2015) might give the answer to the important question: How does the phenomenological point of view deal with the reality of social systems? For example, people have different lived experiences, and yet they must co-exist in a common social structure with rules and economic constraints that may require a 'shared situatedness' that can act as a bridge between them.

North American phenomenologist philosopher Don Ihde (1998) has coined the term "pluriculture" to "describe a form of multiculturalism whose reach is global and whose artifacts are the technocultural instruments of today." There Ihde also referred to the "cross-cultural" exchange. Ihde elsewhere also wrote: "The rise of Pluriculture is the post-modern form of cross-culturalism, but is more chaotic than previous forms... pluriculture is intense two way multi-cultural exposure..." Ihde (see his *Technology and Lifeworld*, 1990) acknowledges an inevitable overwhelming of near "monocultural lifeworlds"—that is, in

grown German or Italian cultures, and especially indigenous cultures—but argues that independent of political efforts to limit the damage, such lifeworlds will become “pluricultural” through selective adoptions and incorporations.

The hermeneutics of technology is understood as a hermeneutics of practice in the understanding of technologies, which is culturally and socially embedded. This cannot be done with semantics; rather this digital hermeneutics as a material hermeneutics can be explored with human embodiment (Tripathi 2016c). As a transition from the above: Rudolf Makkreel characterizes hermeneutics as an orientational discipline in which perception at the same time embodies our feelings. At several places in which he applies this to the way in which aesthetic experience can reorient us to the world. . . . There are some parts in the texts (Chapter 9 from *Orientation and Judgment in Hermeneutics*, Rudolf Makkreel, University of Chicago Press, 2015).

2 Epilogue

2.1 Albert Borgmann on “Heidegger on Science”

2.1.1 Letter to Arun Tripathi, August 21, 2019

[NOTE: The Epilogue is an email letter from Albert Borgmann to me on August 21, 2019 which clarifies several points on “Heidegger on Science” related to the current special issue “Material Hermeneutics, Technoculture and Technoscience” (this volume). In the following letter Albert Borgmann has gathered some material from Heidegger, parts of which are little-known if known at all, and which together shed important light on “Heidegger and on science and its history, on Quantum mechanics, technology, physics, and on Heisenberg” are relevant to my special issue. –Arun Kumar Tripathi, Guest Editor].

Martin Heidegger (1889–1976) is often thought to have identified science with technology. In “The Question Concerning Technology” he says:

According to the chronology of history, the beginning of modern natural science lies in the 17th century. However, the motorized technology of machines does not develop until the second half of the 18th century. And yet what is later from the point of view of historical statement--modern technology--is historically earlier as regards its predominant essence.

This view is sometimes associated with the fundamental change in the humanity-reality or subject–object relation that was brought about by quantum mechanics and is represented by the following remarks of Heisenberg’s who with Niels Bohr formulated the Copenhagen interpretation of quantum mechanics.

Nuclear physicists have had to come to terms with the fact that their science is merely a link in the endless chain of the dispute between humans and nature and *that their science can therefore not simply talk of nature ‘in itself’* (Heisenberg’s italics).

This is from “Das Naturbild der heutigen Physik,” a lecture Heisenberg presented 1953 in Munich at a conference titled “The Arts in the Age of Technology,” and that was published in 1955 in *Das Naturbild der heutigen Physik*. Heidegger was a presenter at that same conference. The title of his contribution was “Die Frage nach der Technik,” first published in 1954 in *Vorträge und Aufsätze* and later published separately.

It’s important to see these circumstances because they show the deep impression Heisenberg’s presentation left on Heidegger’s published version of his Munich lecture. There Heidegger says:

Presumably causality is shrinking into mandatory reports of resources that are secured simultaneously or sequentially. This would correspond to the process of the growing coming to terms that Heisenberg’s lecture has admirably described.

Both Heisenberg and Heidegger seem to allow for, if they don’t endorse, the views of science and technology as social constructions that are congenial with a fundamentally variable conception of the world and a rejection of scientific realism.

One might see the beginnings of Heidegger’s techno-scientific view in *Being and Time*, where he takes what we have come to call a Kuhnian view of science. What Kuhn later calls paradigms and revolutionary science, Heidegger calls “fundamental concepts” and science “that is *capable* of a crisis of its fundamental concepts.” (pp. 9–10 in the German original; the italics are Heidegger’s.) He entrusts philosophers with what he calls “a productive logic” that first opens up a region of reality “and makes the structures thus gained available to the empirical sciences as transparent instructions of research.” There is no mention of technology here, but neither is there a realist view of the sciences.

There is, however, a realist strand in Heidegger’s thought that began in 1935 when Heidegger taught a course on *The Question of the Thing* where he discussed early modern science in a different vein and in a way that supports the need to take physics seriously as a fundamental theory of reality. Heidegger says:

The greatness and superiority of natural science in the 16th and 17th centuries are based on the fact that those researchers were philosophers one and all; they understood that there are no mere facts and that, to the contrary, a fact is what it is in light of a concept

that justifies it and according to the scope of such justification. (51)

In analytic philosophy of science, this has become known as the “theory-ladenness of observation.” The expression was understood as realist in two ways. Theories, for one, are discovered rather than constructed, and for another, observation is of facts, not of results of negotiation.

We should note here that there is another reference to Heisenberg in “The Question Concerning Technology” and a reply on Heidegger’s part that disagrees with Heisenberg’s constructionism and represents an emphatically realist stance. Heidegger’s response is to the following passage in Heisenberg’s Munich lecture.

Thus the goal of research is no longer knowledge of atoms and their movements ‘in themselves,’ i.e., detached from our experimental questioning; rather we find ourselves from the very start in the middle of a disputation between nature and humans, of which natural science is after all only a part so that the common divisions of the world into subject and object, into the inner world and the outer world, into body and soul no longer want to fit and lead to difficulties. In the natural sciences too the object of research is thus no longer nature in itself, but rather nature as set out by human questioning, and in that regard too human being here again encounters merely itself.

In the relevant passage of his reply, Heidegger talks about the human domination of reality and the consequent semblance that

Everything that is encountered is real only inasmuch as it is a human fabrication. This appearance generates an ultimate semblance. According to it, it seems as though humans encounter only themselves any longer. Heisenberg was entirely right in pointing out that reality today has to present itself to humans that way.

And then Heidegger comes to the crucial point:

However, humans in truth encounter themselves today precisely nowhere any longer, i.e., they do not encounter themselves in their essence. (Heidegger’s italics).

Heidegger expands on scientific realism in “A Conversation of a Threesome on a Country Road” from the winter of 1944–45 where he acknowledges the view that science is discovery rather than invention, a view set forth by the researcher (the other members of the threesome being a sage or guide and a professor):

Nature, and nature only as it reveals itself, has the last word in physics. It is among the overwhelming experiences of a natural scientist that nature often

responds otherwise than the questions a researcher poses to it would lead one to expect. (17)

A partial resolution of these seemingly incompatible constructionist and realist views can be found in an entry in the Black Notebooks of 1946–47:

There was a time when the sciences were released from philosophy to their autonomy which they were never to reach, but rather abandoned so that in their modern shape, seemingly free, they have yet become subservient to technology whence issues the nature of the sciences as well. (p. 314)

To say that the sciences were at one time autonomous is to say that their aims were not subject to human negotiations or instructions, and that the sciences had their own goals, procedures, and lawfulness which, without human subjectivity, had to be objective and realist. Heidegger no doubt is also right in noting the surrender of science to technology. But it was not a complete surrender. No doubt the Hubble telescope and the Large Hadron Collider brought in their train useful technologies. But the billions of dollars that these research projects required would have produced more technological utility if spent on terrestrial research and development. The Hubble and the LHC were motivated primarily by scientific curiosity.

Heidegger’s qualified scientific realism agrees with the signal point of his mature philosophy that we live in an age that is shaped by the disclosure, and not just by our machinations, of technology. His thought found its center and conclusion in the presence of the slight things which not only center a hopeful world, but centered his thinking as well. How exactly humans and the emergence of technology and of the centering things concord is a question he has left for us.

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