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A Phenomenology of Technics

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The task of a phenomenology of human-technology relations is to discover the various structural features of those ambiguous relations. In taking up this task, I shall begin with a focus upon experientially recognizable features that are centered upon the ways we are bodily engaged with technologies. The beginning will be within the various ways in which I-as-body interact with my environment by means of technologies.

A Technics Embodied

If much of early modern science gained its new vision of the world through optical technologies, the process of embodiment itself is both much older and more pervasive. To embody one's praxis *through* technologies is ultimately an *existential* relation with the world. It is something humans have always – since they left the naked perceptions of the Garden – done.

I have previously and in a more suggestive fashion already noted some features of the visual embodiment of optical technologies. Vision is technologically transformed through such optics. But while the fact *that* optics transform vision may be clear, the variants and invariants of such a transformation are not yet precise. That becomes the task for a more rigorous and structural phenomenology of embodiment. I shall begin by drawing from some of the previous features mentioned in the preliminary phenomenology of visual technics.

Within the framework of phenomenological relativity, visual technics first may be located within the intentionality of seeing.

I see–through the optical artifact–the world

This seeing is, in however small a degree, at least minimally distinct from a direct or naked seeing.

I see–the world

I call this first set of existential technological relations with the world *embodiment relations*, because in this use context I take the technologies *into* my experiencing in a particular way by way of perceiving *through* such technologies and through the reflexive transformation of my perceptual and body sense.

In Galileo's use of the telescope, he embodies his seeing through the telescope thusly:

Galileo–telescope–Moon

Equivalently, the wearer of eyeglasses embodies eyeglass technology:

I–glasses–world

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The technology is actually *between* the seer and the seen, in a *position of mediation*. But the referent of the seeing, that towards which sight is directed, is "on the other side" of the optics. One sees *through the* optics. This, however, is not enough to specify this relation as an embodiment one. This is because one first has to determine *where* and *how*, along what will be described as a continuum of relations, the technology is experienced.

There is an initial sense in which this positioning is doubly ambiguous. First, the technology must be *technically* capable of being seen through; it must be transparent. I shall use the term *technical* to refer to the physical characteristics of the technology. Such characteristics may be designed or they may be discovered. Here the disciplines that deal with such characteristics are informative, although indirectly so for the philosophical analysis per se. If the glass is not transparent enough, seeing-through is not possible. If it is transparent enough, approximating whatever "pure" transparency could be empirically attainable, then it becomes possible to embody the technology. This is a material condition for embodiment.

Embodying as an activity, too, has an initial ambiguity. It must be learned or, in phenomenological terms, constituted. If the technology is good, this is usually easy. The very first time I put on my glasses, I see the now-corrected world. The adjustments I have to make are not usually focal irritations but fringe ones (such as the adjustment to backglare and the slight changes in spatial motility). But once learned, the embodiment relation can be more precisely described as one in which the technology becomes maximally "transparent." It is, as it were, taken into my own perceptual-bodily self experience thus:

(I–glasses)–world

My glasses become part of the way I ordinarily experience my surroundings; they "withdraw" and are barely noticed, if at all. I have then actively embodied the technics of vision. Technics is the symbiosis of artifact and user within a human action.

Embodiment relations, however, are not at all restricted to visual relations. They may occur for any sensory or microperceptual dimension. A hearing aid does this for hearing, and the blind man's cane for tactile motility. Note that in these corrective technologies *the same structural features of embodiment* obtain as with the visual example. Once learned, cane and hearing aid "withdraw" (if the technology is good – and here we have an experiential clue for the perfecting of technologies). I hear the world through the hearing aid and feel (and hear) it through the cane. The juncture (I-artifact)-world is through the technology and brought close by it.

Such relations *through* technologies are not limited to either simple or complex technologies. Glasses, insofar as they are engineered systems, are much simpler than hearing aids. More complex than either of these monosensory devices are those that entail whole-body motility. One such common technology is automobile driving. Although driving an automobile encompasses more than embodiment relations, its pleasurability is frequently that associated with embodiment relations.

One experiences the road and surroundings *through* driving the car, and motion is the focal activity. In a finely engineered sports car, for example, one has a more precise feeling of the road and of the traction upon it than in the older, softer-riding, large cars of the fifties. One embodies the car, too, in such activities as parallel parking: when well embodied, one feels rather than sees the distance between car and curb – one's bodily sense is "extended" to the parameters of the driver-car "body." And although these embodiment relations entail larger, more complex artifacts and entail a somewhat longer, more complex learning process, the bodily tacit knowledge that is acquired is perceptual-bodily.

Here is a first clue to the polymorphous sense of bodily extension. The experience of one's "body image" is not fixed but malleably extendable and/or reducible in terms of the material or technological mediations that may be embodied. I shall restrict the term embodiment, however, to those types of mediation that can be so experienced. The same dynamic polymorphousness can also be located in non-mediational or direct experience. Persons trained in the martial arts, such as karate, learn to feel the vectors and trajectories of the opponent's moves within the space of the combat. The near space around one's material body is charged.

Embodiment relations are a particular kind of use-context. They are technologically relative in a double sense. First, the technology must "fit" the use. Indeed, within the realm of embodiment relations one can develop a quite specific set of qualities for design relating to attaining the requisite technological "withdrawal." For example, in handling highly radioactive materials at a distance, the mechanical arms and hands which are designed to pick up and pour glass tubes inside the shielded enclosure have to "feed back" a delicate sense of touch to the operator.

The closer to invisibility, transparency, and the extension of one's own bodily sense this technology allows, the better. Note that the design perfection is not one related to the machine alone but to the combination of machine and human. The machine is perfected along a bodily vector, molded to the perceptions and actions of humans.

And when such developments are most successful, there may arise a certain romanticizing of technology. In much anti-technological literature there are nostalgic calls for returns to simple tool technologies. In part, this may be because long-developed tools are excellent examples of bodily expressivity. They are both direct in actional terms and immediately experienced; but what is missed is that such embodiment relations may take any number of directions. Both the sports car driver within the constraints of the racing route and the bulldozer driver destroying a rainforest may have the satisfactions of powerful embodiment relations.

There is also a deeper desire which can arise from the experience of embodiment relations. It is the doubled desire that, on one side, is a wish for *total transparency*, total embodiment, for the technology to truly "become me." Were this possible, it would be equivalent to there being no technology, for total transparency would *be* my body and senses; I desire the face-to-face that I would experience without the technology. But that is only one side of the desire. The other side is the desire to have the power, the transformation that the technology makes available. Only by using the technology is my bodily power enhanced and magnified by speed, through distance, or by any of the other ways in which technologies change my capacities. These capacities are always *different* from my naked capacities. The desire is, at best, contradictory. I want the transformation that the technology allows, but I want it in such a way that I am basically unaware of its presence. I want it in such a way that it becomes me. Such a desire both secretly *rejects* what technologies are and overlooks the transformational effects which are necessarily tied to human-technology relations. This illusory desire belongs equally to pro- and anti-technology interpretations of technology.

The desire is the source of both utopian and dystopian dreams. The actual, or material, technology always carries with it only a partial or quasi-transparency, which is the price for the extension of magnification that technologies give. In extending bodily capacities, the technology also transforms them. In that sense, all technologies in use are non-neutral. They change the basic situation, however subtly, however minimally; but this is the other side of the desire. The desire is simultaneously a desire for a change in situation – to inhabit the earth, or even to go beyond the earth – while sometimes inconsistently and secretly wishing that this movement could be without the mediation of the technology.

The direction of desire opened by embodied technologies also has its positive and negative thrusts. Instrumentation in the knowledge activities, notably science, is the gradual extension of perception into new realms. The desire is to see, but seeing is seeing through instrumentation. Negatively, the desire for pure transparency is the wish to escape the limitations of the material technology. It is a platonism returned in a new form, the desire to escape the newly extended body of technological engagement. In the wish there remains the contradiction: the user both wants and does not want the technology. The user wants what the technology gives but does not want the limits, the transformations that a technologically extended body implies. There is a fundamental ambivalence toward the very human creation of our own earthly tools.

The ambivalence that can arise concerning technics is a reflection of one kind upon the *essential ambiguity* that belongs to technologies in use. But this ambiguity, I shall argue, has its own distinctive shape. Embodiment relations display an essential magnification/reduction structure which has been suggested in the instrumentation examples. Embodiment relations simultaneously magnify or amplify and reduce or place aside what is experienced through them.

The sight of the mountains of the moon, through all the transformational power of the telescope, removes the moon from its setting in the expanse of the heavens. But if our technologies were only to replicate our immediate and bodily experience, they would be of little use and ultimately of little interest. A few absurd examples might show this:

In a humorous story, a professor bursts into his club with the announcement that he has just invented a reading machine. The machine scans the pages, reads them, and perfectly reproduces them. (The story apparently was written before the invention of photocopying. Such machines might be said to be "perfect reading machines" in actuality.) The problem, as the innocent could see, was that this machine leaves us with precisely the problem we had prior to its invention. To have reproduced through mechanical "reading" all the books in the world leaves us merely in the library.

A variant upon the emperor's invisible clothing might work as well. Imagine the invention of perfectly transparent clothing through which we might technologically experience the world. We could see through it, breathe through it, smell and hear through it, touch through it. Indeed, it effects no changes of any kind, since it is *perfectly* invisible. Who would bother to pick up such clothing (even if the presumptive wearer could find it)? Only by losing some invisibility – say, with translucent coloring – would the garment begin to be usable and interesting. For here, at least, fashion would have been invented – but at the price of losing total transparency – by becoming that through which we relate to an environment.

Such stories belong to the extrapolated imagination of fiction, which stands in contrast to even the most minimal actual embodiment relations, which in their material dimensions simultaneously extend and reduce, reveal and conceal.

In actual human-technology relations of the embodiment sort, the transformational structures may also be exemplified by variations: In optical technologies, I have already pointed out how spatial significations change in observations through lenses. The entire gestalt changes. When the apparent size of the moon changes, along with it the apparent position of the observer changes. Relativistically, the moon is brought "close"; and equivalently, this optical near-distance applies to both the moon's appearance and my bodily sense of position. More subtly, every dimension of spatial signification also changes. For example, with higher and higher magnification, the well-known phenomenon of depth, instrumentally mediated as a "focal plane," also changes. Depth diminishes in optical near-distance.

A related phenomenon in the use of an optical instrument is that it transforms the spatial significations of vision in an instrumentally focal way. But my seeing without instrumentation is a full bodily seeing – I see not just with my eyes but with my whole body in a unified sensory experience of things. In part, this is why there is a noticeable irreality to the apparent position of the observer, which only diminishes with the habits acquired through practice with the instrument. But the optical instrument cannot so easily transform the entire sensory gestalt. The focal sense that is magnified through the instrument is mono-dimensioned.

Here may be the occasion (although I am not claiming a cause) for a certain interpretation of the senses. Historians of perception have noted that, in medieval times, not only was vision not the supreme sense but sound and smell may have had greatly enhanced roles so far as the interpretation of the senses went. Yet in the Renaissance and even more exaggeratedly in the Enlightenment, there occurred the reduction to sight as the favored sense, and within sight, a certain reduction *of* sight. This favoritism, however, also carried implications for the other senses.

One of these implications was that each of the senses was interpreted to be clear and distinct from the others, with only certain features recognizable through a given sense. Such an interpretation impeded early studies in echo location.

In 1799 Lazzaro Spallanzani was experimenting with bats. He noticed not only that they could locate food targets in the dark but also that they could do so blindfolded. Spallanzani wondered if bats could guide themselves by their ears rather than by their eyes. Further experimentation, in which the bats' ears were filled with wax, showed that indeed they could not guide themselves without their ears. Spallanzani surmised that either bats locate objects through hearing or they had some sense of which humans knew nothing. Given the doctrine of separate senses and the identification of shapes and objects through vision alone, George Montagu and Georges Cuvier virtually laughed Spallanzani out of the profession.

This is not to suggest that such an interpretation of sensory distinction was due simply to familiarity with optical technologies, but the common experience of enhanced vision through such technologies was at least the standard practice of the time. Auditory technologies were to come later. When auditory technologies did become common, it was possible to detect the same amplification/reduction structure of the human-technology experience.

The telephone in use falls into an auditory embodiment relation. If the technology is good, I hear *you* through the telephone and the apparatus "withdraws" into the enabling background:

(I–telephone)–you

But as a monosensory instrument, your phenomenal presence is that of a voice. The ordinary multi-dimensioned presence of a face-to-face encounter does not occur, and I must at best imagine those dimensions through your vocal gestures. Also, as with the telescope, the spatial significations are changed. There is here an

auditory version of visual near-distance. It makes little difference whether you are geographically near or far, none at all whether you are north or south, and none with respect to anything but your bodily relation to the instrument. Your voice retains its partly irreal near-distance, reduced from the full dimensionality of direct perceptual situations. This telephonic distance is different both from immediate face-to-face encounters and from visual or geographical distance as normally taken. Its distance is a mediated distance with its own identifiable significations.

While my primary set of variations is to locate and demonstrate the invariance of a magnification/reduction structure to any embodiment relation, there are also secondary and important effects noted in the histories of technology. In the very first use of the telephone, the users were fascinated and intrigued by its auditory transparency. Watson heard and recognized Bell's *voice*, even though the instrument had a high ratio of noise to message. In short, the fascination attaches to magnification, amplification, enhancement. But, contrarily, there can be a kind of forgetfulness that equally attaches to the reduction. What is *revealed* is what excites; what is concealed may be forgotten. Here lies one secret for technological trajectories with respect to development. There are *latent telics* that occur through inventions.

Such telics are clear enough in the history of optics. Magnification provided the fascination. Although there were stretches of time with little technical progress, this fascination emerged from time to time to have led to compound lenses by Galileo's day. If some magnification shows the new, opens to what was poorly or not at all previously detected, what can greater magnification do? In our own time, the explosion of such variants upon magnification is dramatic. Electron enhancement, computer image enhancement, CAT and NMR internal scanning, "big-eye" telescopes – the list of contemporary magnificational and visual instruments is very long.

I am here restricting myself to what may be called a *horizontal* trajectory, that is, optical technologies that bring various micro- or macro-phenomena to vision through embodiment relations. By restricting examples to such phenomena, one structural aspect of embodiment relations may be pointed to concerning the relation to microperception and its Adamic context. While *what* can be seen has changed dramatically – Galileo's New World has now been enhanced by astronomical phenomena never suspected and by micro-phenomena still being discovered – there remains a strong phenomenological constant in *how* things are seen. All lenses and optical technologies of the sort being described bring what is to be seen into a normal bodily space and distance. Both the macroscopic and the microscopic appear within the same near-distance. The "image size" of galaxy or amoeba is the *same*. Such is the existential condition for visibility, the counterpart to the technical condition, that the instrument makes things visually present.

The mediated presence, however, must fit, be made close to my actual bodily position and sight. Thus there is a reference within the instrumental context to my face-to-face capacities. These remain primitive and central within the new mediational context. Phenomenological theory claims that for every change in what is seen (the object correlate), there is a noticeable change in how (the experiential correlate) the thing is seen.

In embodiment relations, such changes retain both an equivalence and a difference from non-mediated situations. What remains constant is the bodily focus, the reflexive reference back to my bodily capacities. What is seen must be seen from or within my visual field, from the apparent distance in which discrimination can occur regarding depth, etc., just as in face-to-face relations. But the range of what can be brought into this proximity is transformed by means of the instrument.

Let us imagine for a moment what was never in fact a problem for the history of instrumentation: If the "image size" of both a galaxy and an amoeba is the "same" for the observer using the instrument, how can we tell that one is macrocosmic and the other microcosmic? The "distance" between us and these two magnitudes, Pascal noted, was the same in that humans were interpreted to be between the infinitely large and the infinitely small.

What occurs through the mediation is not a problem *because our construction of the observation presupposes ordinary praxical spatiality*. We handle the Paramecium, placing it on the slide and then under the microscope. We aim the telescope at the indicated place in the sky and, before looking through it, note that the distance is at least that of the heavenly dome. But in our imagination experiment, what if our human were *totally immersed* in a technologically mediated world? What if, from birth, all vision occurred only through lens systems? Here the problem would become more difficult. But in our distance from Adam, it is precisely the presumed difference that makes it possible for us to see both nakedly *and* mediately – and thus to be able to locate the difference – that places us even more distantly from any Garden.

It is because we retain this ordinary spatiality that we have a reflexive point of reference from which to make our judgments.

The noetic or bodily reflexivity implied in all vision also may be noticed in a magnified way in the learning period of embodiment. Galileo's telescope had a small field, which, combined with early hand-held positioning, made it very difficult to locate any particular phenomenon. What must have been noted, however, even if not commented upon, was the exaggerated sense of bodily motion experienced through trying to fix upon a heavenly body – and more, one quickly learns something about the earth's very motion in the attempt to use such primitive telescopes. Despite the apparent fixity of the stars, the hand-held telescope shows the earth-sky motion dramatically. This magnification effect is within the experience of one's own bodily viewing.

This bodily and actional point of reference retains a certain privilege. All experience refers to it in a taken-for-granted and recoverable way. The bodily condition of the possibility for seeing is now twice indicated by the very situation in which mediated experience occurs. Embodiment relations continue to locate that privilege of my being here. The partial symbiosis that occurs in well-designed embodied technologies retains that motility which can be called expressive. Embodiment relations constitute one existential form of the full range of the human-technology field.

B Hermeneutic Technics

Heidegger's hammer in use displays an embodiment relation. Bodily action through it occurs within the environment. But broken, missing, or malfunctioning, it ceases to be the means of praxis and becomes an obtruding *object* defeating the work project. Unfortunately, that negative derivation of objectness by Heidegger carries with it a block against understanding a second existential human-technology relation, the type of relation I shall term *hermeneutic*.

The term hermeneutic has a long history. In its broadest and simplest sense it means "interpretation," but in a more specialized sense it refers to *textual* interpretation and thus entails *reading*. I shall retain both these senses and take hermeneutic to mean a special interpretive action within the technological context. That kind of activity calls for special modes of action and perception, modes analogous to the reading process.

Reading is, of course, a reading of____; and in its ordinary context, what fills the intentional blank is a text, something *written*. But all writing entails technologies. Writing has a product. Historically, and more ancient than the revolution brought about by such crucial technologies as the clock or the compass, the invention and development of writing was surely even more revolutionary than clock or compass with respect to human experience. Writing transformed the very perception and understanding we have of language. Writing is a technologically embedded form of language.

There is a currently fashionable debate about the relationship between speech and writing, particularly within current Continental philosophy. The one side argues that speech is primary, both historically and ontologically, and the other – the French School – inverts this relation and argues for the primacy of writing. I need not enter this debate here in order to note the *technological difference* that obtains between oral speech and the materially connected process of writing, at least in its ancient forms.

Writing is inscription and calls for both a process of writing itself, employing a wide range of technologies (from stylus for cuneiform to word processors for the contemporary academic), and other material entities upon which the writing is recorded (from clay tablet to computer printout). Writing is technologically mediated language. From it, several features of hermeneutic technics may be highlighted. I shall take what may at first appear as a detour into a distinctive set of human-technology relations by way of a phenomenology of reading and writing.

Reading is a specialized perceptual activity and praxis. It implicates my body, but in certain distinctive ways. In an ordinary act of reading, particularly of the extended sort, what is read is placed before or somewhat under one's eyes. We read in the immediate context from some miniaturized bird's-eye perspective. What is read occupies an expanse within the focal center of vision, and I am ordinarily in a somewhat rested position. If the object-correlate, the "text" in the broadest sense, is a chart, as in the navigational examples, what is represented retains a representational isomorphism with the natural features of the landscape. The chart represents the land- (or sea)scape and insofar as the features are isomorphic, there is a kind of representational "transparency." The chart in a peculiar way "refers" beyond itself to what it represents.

Now, with respect to the embodiment relations previously traced, such an isomorphic representation is both

similar and dissimilar to what would be seen on a larger scale from some observation position (at bird's-eye level). It is similar in that the shapes on the chart are reduced representations of distinctive features that can be directly or technologically mediated in face-to-face or embodied perceptions. The reader can compare these similarities. But chart reading is also different in that, during the act of reading, the perceptual focus is the chart itself, a substitute for the landscape.

I have deliberately used the chart-reading example for several purposes. First, the "textual" isomorphism of a representation allows this first example of hermeneutic technics to remain close to yet differentiated from the perceptual isomorphism that occurs in the optical examples. The difference is at least perceptual in that one sees *through* the optical technology, but now one sees the chart as the visual terminus, the "textual" artifact itself.

Something much more dramatic occurs, however, when the representational isomorphism disappears in a printed text. There is no isomorphism between the printed word and what it "represents," although there is some kind of *referential* "transparency" that belongs to this new technologically embodied form of language. It is apparent from the chart example that the chart itself becomes the *object of perception* while simultaneously referring beyond itself to what is not immediately seen. In the case of the printed text, however, the referential transparency is distinctively different from technologically embodied perceptions. *Textual transparency is hermeneutic transparency, not perceptual transparency*.

Historically, textual transparency was neither immediate nor attained at a stroke. The "technology" of phonetic writing, which now is increasingly a world-wide standard, became what it is through a series of variants and a process of experimentation. One early form of writing was pictographic. The writing was still somewhat like the chart example; the pictograph retained a certain representational isomorphism with what was represented. Later, more complex ideographic writing (such as Chinese) was, in effect, a more abstract form of pictography.

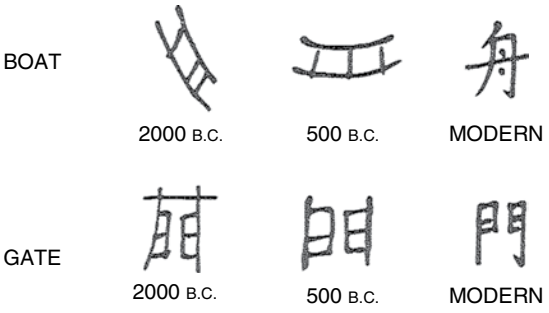
Calligraphers have shown that even early phonetic writing followed a gradual process of formalizing and abstracting from a pictographic base (see figure). Letters often depicted a certain animal, the first syllable of whose name provided the sound for the letter in a simultaneous sound and letter. Built into such early phonetic writing was thus something like the way the alphabet is still taught to children: "C is for Cow." Most educated persons are familiar with the mixed form of writing, hieroglyphics. Although the writing is pictographic, not all pictographs stood for the entity depicted; some represented sounds (phonemes).

Egyptian Apis | Phoenician Aleph | Ionian Greek Alpha | Roman A

An interesting cross-cultural example of this movement from a very pictographic to a formalized and transformed ideographic writing occurs with Chinese writing. The same movement from relatively concrete representations in pictographs occurs through abbreviated abstractions – but in a different direction, non-phonetic and ideographic. Thus, for phonetic writing there is a double abstraction (from pictograph to letter and then reconstituting a small finite alphabet into represented spoken words), whereas the doubled abstraction of ideographic writing does not reconstitute to words as such, but to concepts.

In the most ancient Chinese writing in the period of the "Tortoise Shell Language" (prior to 2000 B.C.) and even in some cases through the later "Metal Language" period (2000–500 B.C.), if one is familiar with the objects as they occur within Chinese culture, one can easily detect the pictographic representation involved. For example, one can see in the figure below that the ideograph for boat actually abstractly represents the sampan-type boats of the riverways (still in use). Similarly, in the ideograph for gate one can still recognize the uniquely Oriental-type gate in the drawing. The modern variants – related but more abstracted – have clearly lost that instant representational isomorphism.

Implied in these transformations are changes of both technique and related technologies. Sergei Eisenstein,



the film maker and one sensitive to such image technologies, has pointed to just such a transformation which arose out of the invention of the brush and India ink:

> But then, by the end of the third century, the brush is invented. In the first century after the "joyous event" (A.D.) – paper. And, lastly, in the year 220 – India ink.
>
> A complete upheaval. A revolution in draughtmanship. And, after having undergone in the course of history no fewer than fourteen different styles of handwriting, the hieroglyph crystallized in its present form. The means of production (brush and India ink) determined the form.
>
> The fourteen reforms had their way. As a result:

> In the fierily cavorting hieroglyph *ma* (a horse) it is already impossible to recognize the features of the dear little horse sagging pathetically in its hindquarters, in the writing style of Ts'ang Chiech, so well-known from ancient Chinese bronzes.[1]

If this is an accurate portrayal of the evolution of writing, it follows something like a Husserlian origin-of-geometry trajectory. The trajectory was from the more concrete to the greater degrees of abstraction, until virtually all "likeness" to origins disappeared. In this respect, writing only slowly approximated speech.

Once attained, like any other acquisition of the lifeworld, writing could be read and understood in terms of its unique linguistic transparency. Writing becomes an embodied hermeneutic technics. Now the descriptions may take a different shape. What is referred to is referred by the text and is referred to *through* the text. What now presents itself is the "world" of the text.

This is not to deny that all language has its unique kind of transparency. Reference beyond itself, the capacity to let something become present through language, belongs to speech as well. But here the phenomenon being centered upon is the new embodiment of language in writing. Even more thematically, the concern is for the ways in which writing as a "technology" transforms experiential structures.

Linguistic transparency is what makes present the *world* of the text. Thus, when I read Plato, Plato's "world" is made present. But this presence is a *hermeneutic* presence. Not only does it occur *through* reading, but it takes its shape in the interpretative context of my language abilities. His world is linguistically mediated, and while the words may elicit all sorts of imaginative and perceptual phenomena, it is through language that such phenomena occur. And while such phenomena may be strikingly rich, they do not appear *as* word-like.

We take this phenomenon of reading for granted. It is a sedimented acquisition of the literate lifeworld and thus goes unnoticed until critical reflection isolates its salient features. It is the same with the wide variety of hermeneutic technics we employ.

The movement from embodiment relations to hermeneutic ones can be very gradual, as in the history of writing, with little-noticed differentiations along the human-technology continuum. A series of wide-ranging variants upon readable technologies will establish the point. First, a fairly explicit example of a readable technology: Imagine sitting inside on a cold day. You look out the window and notice that the snow is blowing, but you are toasty warm in front of the fire. You can clearly "see" the cold in Merleau-Ponty's pregnant sense of perception – but you do not actually *feel* it. Of course, you could, were you to go outside. You would then have a full face-to-face verification of what you had seen.

But you might also see the thermometer nailed to the grape arbor post and *read* that it is 28°F. You would now "know" how cold it was, but you still would not feel it. To retain the full sense of an embodiment relation, there must also be retained some isomorphism with the felt sense of the cold – in this case, tactile – that one would get through face-to-face experience. One could invent such a technology; for example, some conductive material could be placed through the wall so that the negative "heat," which is cold, could be felt by hand. But this is not what the thermometer does.

Instead, you read the thermometer, and in the immediacy of your reading you *hermeneutically* know that it is cold. There is an instantaneity to such reading, as it is an already constituted intuition (in phenomenological terms). But you should not fail to note that *perceptually* what you have seen is the dial and the numbers, the thermometer "text." And that text has hermeneutically delivered its "world" reference, the cold.[2]

Such constituted immediacy is not always available. For instance, although I have often enough lived in countries where Centigrade replaces Fahrenheit, I still must translate from my intuitive familiar language to the

less familiar one in a deliberate and self-conscious hermeneutic act. Immediacy, however, is not the test for whether the relation is hermeneutic. A hermeneutic relation mimics sensory perception insofar as it is also a kind of seeing as____; but it is a referential seeing, which has as its immediate perceptual focus seeing the thermometer.

Now let us make the case more complex. In the example cited, the experiencer had both embodiment (seeing the cold) and hermeneutic access to the phenomenon (reading the thermometer). Suppose the house were hermetically sealed, with no windows, and the only access to the weather were through the thermometer (and any other instruments we might include). The hermeneutic character of the relation becomes more obvious. I now clearly have to know how to read the instrumentation and from this reading knowledge get hold of the "world" being referred to.

This example has taken actual shape in nuclear power plants. In the Three Mile Island incident, the nuclear power system was observed only through instrumentation. Part of the delay that caused a near meltdown was *misreadings* of the instruments. There was no face-to-face, independent access to the pile or to much of the machinery involved, nor could there be.

An intentionality analysis of this situation retains the mediational position of the technology:

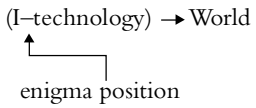
I–technology–world
(engineer–instruments–pile)

The operator has instruments between him or her and the nuclear pile. But – and here, an essential difference emerges between embodiment and hermeneutic relations – what is immediately perceived is the instrument panel itself. It becomes the object of my microperception, although in the special sense of a hermeneutic transparency, I *read* the pile through it. This situation calls for a different formalization:

I–(technology–world)

The parenthesis now indicates that the immediate *perceptual* focus of my experience *is* the control panel. I read through it, but this reading is now dependent upon the semi-opaque connection between the instruments and the referent object (the pile). This *connection* may now become enigmatic.

In embodiment relations, what allows the partial symbiosis of myself and the technology is the capacity of the technology to become perceptually transparent. In the optical examples, the glassmaker's and lens-grinder's arts must have accomplished this end if the embodied use is to become possible. Enigmas which may occur regarding em bodiment-use transparency thus may occur within the parenthesis of the embodiment relation:

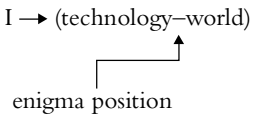


(This is not to deny that once the transparency is established, thus making microperception clear, the observer may still fail, particularly at the macroperceptual level. For the moment, however, I shall postpone this type of interpretive problem.) It would be an oversimplification of the history of lens-making were not problems of this sort recognized. Galileo's instrument not only was hard to look through but was good only for certain "middle range" sightings in astronomical terms (it did deliver the planets and even some of their satellites). As telescopes became more powerful, levels, problems with chromatic effects, diffraction effects, etc., occurred. As Ian Hacking has noted,

> Magnification is worthless if it magnifies two distinct dots into one big blur. One needs to resolve the dots into two distinct images. … It is a matter of diffraction. The most familiar example of diffraction is the fact that shadows of objects with sharp boundaries are fuzzy. This is a consequence of the wave character of light.[3]

Many such examples may be found in the history of optics, technical problems that had to be solved before there could be any extended reach within embodiment relations. Indeed, many of the barriers in the development of experimental science can be located in just such limitations in instrumental capacity.

Here, however, the task is to locate a parallel difficulty in the emerging new human-technology relation, hermeneutic relations. The location of the technical problem in hermeneutic relations lies in the *connector* between the instrument and the referent. Perceptually, the user's visual (or other) terminus is *upon* the instrumentation itself. To read an instrument is an analogue to reading a text. But if the text does not correctly refer, its reference object or its world cannot be present. Here is a new location for an enigma:



While breakdown may occur at any part of the relation, in order to bring out the graded distinction emerging between embodiment and hermeneutic relations, a short pathology of connectors might be noted.

If there is nothing that impedes my direct perceptual situation with respect to the instrumentation (in the Three Mile Island example, the lights remain on, etc.), interpretive problems in reading a strangely behaving "text" at least occur in the open; but the technical enigma may also occur within the text-referent relation. How could the operator tell if the instrument was malfunctioning or that to which the instrument refers? Some form of *opacity* can occur within the technology-referent pole of the relation. If there is some independent way of verifying which aspect is malfunctioning (a return to unmediated face-to-face relations), such a breakdown can be easily detected. Both such occurrences are reasons for instrumental redundancy. But in examples where such independent verification is not possible or untimely, the opacity would remain.

Let us take a simple mechanical connection as a borderline case. In shifting gears on my boat, there is a lever in the cockpit that, when pushed forward, engages the forward gear; upward, neutral; and backwards, reverse. Through it, I can ordinarily feel the gear change in the transmission (embodiment) and recognize the simple hermeneutic signification (forward for forward) as immediately intuitive. Once, however, on coming in to the dock at the end of the season, I disengaged the forward gear – and the propeller continued to drive the boat forward. I quickly reversed – and again the boat continued. The hermeneutic significance had failed; and while I also felt a difference in the way the gear lever felt, I did not discover until later that the clasp that retained the lever itself had corroded, thus preventing any actual shifting at all. But even at this level there can be opacity within the technology-object relation.

The purpose of this somewhat premature pathology of human-technology relations is not to cast a negative light upon hermeneutic relations in contrast to embodiment ones but rather to indicate that there are different locations where perceptual and human-technology relations interact. Normally, when the technologies work, the technology-world relation would retain its unique hermeneutic transparency. But if the I-(technology-world) relation is far enough along the continuum to identify the relation as a hermeneutic one, the intersection of perceptual-bodily relations with the technology changes.

Readable technologies call for the extension of my hermeneutic and "linguistic" capacities *through* the instruments, while the reading itself retains its bodily perceptual location as a relation *with* or *towards* the technology. What is emerging here is the first suggestion of an emergence of the technology as "object" but without its negative Heideg gerian connotation. Indeed, the type of special capacity as a "text" is a condition for hermeneutic transparency.

The transformation made possible by the hermeneutic relation is a transformation that occurs precisely through *differences* between the text and what is referred to. What is needed is a particular set of textually clear perceptions that "reduce" to that which is immediately readable. To return to the Three Mile Island example, one problem uncovered was that the instrument panel design was itself faulty. It did not incorporate its dials and gauges in an easily readable way. For example, in airplane instrument panel design, much thought has been given to pattern recognition, which occurs as a perceptual gestalt. Thus, in a four-engined aircraft, the four dials indicating r.p.m. will be coordinated so that a single glance will indicate which, if any, engine is out of synchronization. Such technical design accounts for perceptual structures.

There is a second caution concerning the focus upon connectors and pathology. In all the examples I have used to this point, the hermeneutic technics have involved material connections. (The thermometer employs a physical property of a bimetallic spring or mercury in a column; the instrument panel at TMI employs mechanical, electrical, or other material connections; the shift lever, a simple mechanical connection.) If reading does not employ any such material connections, it might seem that its referentiality is essentially different, yet not even all technological connections are strictly material. Photography retains representational isomorphism with the object, yet does not "materially" connect with its object, it is a minimal beginning of action at a distance.

I have been using contemporary or post-scientific examples, but non-material hermeneutic relations do not obtain only for contemporary humans. As existential relations, they are as "old" as post-Garden humanity. Anthropology and the history of religions have long

been familiar with a wide variety of shamanistic praxes which fall into the pattern of hermeneutic technics. In what may at first seem a somewhat outrageous set of examples, note the various "reading" techniques employed in shamanism. The reading of animal entrails, of thrown bones, of bodily marks – all are hermeneutic techniques. The patterns of the entrails, bones, or whatever are taken to *refer* to some state of affairs, instrumentally or textually.

Not only are we here close to a familiar association between magic and the origins of technology suggested by many writers, but we are, in fact, closer to a wider hermeneutic praxis in an intercultural setting. For that reason, the very strangeness of the practice must be critically examined. If the throwing of bones is taken as a "primitive" form of medical diagnosis – which does play a role in shamanism – we might conclude that it is indeed a poor form of hermeneutic relations. What we might miss, however, is that the entire gestalt of what is being diagnosed may differ radically from the other culture and ours.

It may well be that as a focused form of diagnosis upon some particular bodily ailment (appendicitis, for example), the diagnosis will fail. But since one important element in shamanism is a wider diagnosis, used particularly as the occasion of locating certain communal or social problems, it may work better. The sometimes socially contextless emphasis of Western medicine upon a presumably "mechanical" body may overlook precisely the context which the shaman so clearly recognizes. The entire gestalt is different and differently focused, but in both cases there are examples of hermeneutic relations.

In our case, the very success of Western medicine in certain diseases is due to the introduction of technologies into the hermeneutic relation (fever/thermometer; blood pressure/manometer, etc.) The point is that hermeneutic relations are as commonplace in traditional and ancient social groups as in ours, even if they are differently arranged and practiced.

By continuing the intentionality analysis I have been following, one can now see that hermeneutic relations vary the continuum of human-technology-world relations. Hermeneutic relations maintain the general mediation position of technologies within the context of human praxis towards a world, but they also change the variables within the human-technology-world relation. A comparative formalism may be suggestive:

General intentionality relations
Human–technology–world

Variant A: embodiment relations
(I–technology) → world

Variant B: hermeneutic relations
I → (technology world)

While each component of the relation changes within the correlation, the overall shapes of the variants are distinguishable. Nor are these matters of simply how technologies are experienced.

Another set of examples from the set of optical instruments may illustrate yet another way in which instrumental intentionalities can follow new trajectories. Strictly embodiment relations can be said to work best when there is both a transparency and an isomorphism between perceptual and bodily action within the relation. I have suggested that a trajectory for development in such cases may often be a horizontal one. Such a trajectory not only follows greater and greater degrees of magnification but also entails all the difficulties of a technical nature that go into allowing what is to be seen as though by direct vision. But not all optical technologies follow this strategy. The introduction of hermeneutic possibilities opens the trajectory into what I shall call *vertical* directions, possibilities that rely upon quite deliberate hermeneutic transformations.

It might be said that the telescope and microscope, by extending vision while transforming it, remained *analogue* technologies. The enhancement and magnification made possible by such technologies remain visual and transparent to ordinary vision. The moon remains recognizably the moon, and the microbe – even if its existence was not previously suspected – remains under the microscope a beastie recognized as belonging to the animate continuum. Here, just as the capacity to magnify becomes the foreground phenomenon to the background phenomenon of the reduction necessarily accompanying the magnification, so the similitude of what is seen with ordinary vision remains central to embodiment relations.

Not all optical technologies mediate such perceptions. In gradually moving towards the visual "alphabet" of a hermeneutic relation, deliberate variations may occur which enhance previously undiscernible *differences*:

(1) Imagine using spectacles to correct vision, as previously noted. What is wanted is to *return* vision as closely as possible to ordinary perception, not to distort or modify it in any extreme micro- or macro- perceptual direction. But now, for snowscapes

or sun on the water or desert, we modify the lenses by coloring or polarizing them to cut glare. Such a variation transforms *what* is seen in some degree. Whether we say the polarized lens removes glare or "darkens" the landscape, what is seen is now clearly different from what may be seen through untinted glasses. This difference is a clue which may open a new *telic direction* for development.

(2) Now say that somewhere, sometime, someone notes that certain kinds of tinting reveal unexpected results. Such is a much more complex technique now used in infrared satellite photos. (For the moment, I shall ignore the fact that part of this process is a combined embodiment and hermeneutic relation.) If the photo is of the peninsula of Baja California, it will remain recognizable in shape. Geography, whatever depth and height representations, etc., remain but vary in a direction different from any ordinary vision. The infrared photo enhances the difference between vegetation and non-vegetation beyond the limits of any isomorphic color photography. This difference corresponds, in the analogue example, to something like a pictograph. It simultaneously leaves certain analogical structures there and begins to modify the representation into a different, non-perceived "representation."

(3) Very sophisticated versions of still representative but non-ordinary forms of visual recognition occur in the new heat-sensitive and light-enhanced technologies employed by the military and police. Night scopes which enhance a person's heat radiation still look like a person but with entirely different regions of what stands out and what recedes. In high-altitude observations, "heat shadows" on the ground can indicate an airplane that has recently had its engines running compared to others which have not. Here visual technologies bring into visibility what was not visible, but in a distinctly now perceivable way.

(4) If now one takes a much larger step to spectrographic astronomy, one can see the acceleration of this development. The spectrographic picture of a star no longer "resembles" the star at all. There is no point of light, no disk size, no spatial isomorphism at all – merely a band of differently colored rainbow stripes. The naive reader would not know that this was a picture of a star at all – the reader would have to know the language, the alphabet, that has coded the star. The astronomer-hermeneut does know the language and "reads" the visual "ABCs" in such a way that he knows the chemical composition of the star, its internal makeup, rather than its shape or external configuration. We are here in the presence of a more fully hermeneutic relation, the star mediated not only instrumentally but in a transformation such that we must now thematically *read* the result. And only the informed reader can do the reading.

There remains, of course, the *reference* to the star. The spectograph is *of* Rigel or *of* Polaris, but the individuality of the star is now made present hermeneutically. Here we have a beginning of a special transformation of perception, a transformation which deliberately enhances differences rather than similarities in order to get at what was previously unperceived.

(5) Yet even the spectrograph is but a more radical transformation of perception. It, too, can be transformed by a yet more radical *hermeneutic* analogue to the *digital* transformation which lies embedded in the preferred quantitative praxis of science. The "alphabet" of science is, of course, mathematics, a mathematics that separates itself by yet another hermeneutic step from perception embodied.

There are many ways in which this transformation can and does occur, most of them interestingly involving a particular act of *translation* that often goes unnoticed. To keep the example as simple as possible, let us assume *mechanical* or *electronic* "translation." Suppose our spectrograph is read by a machine that yields not a rainbow spectrum but a set of numbers. Here we would arrive at the final hermeneutic accomplishment, the transformation of even the analogue to a digit. But in the process of hermeneuticization, the "transparency" to the object referred to becomes itself enigmatic. Here more explicit and thematic interpretation must occur.

Hermeneutic relations, particularly those utilizing technologies that permit vertical transformations, move away from perceptual isomorphism. It is the *difference* between what is shown and how something is shown which is informative. In a hermeneutic relation, the world is first transformed into a text, which in turn is read. There is potentially as much flexibility within hermeneutic relations as there are in the various uses of language. Emmanuel Mournier early recognized just this analogical relationship with language:

> The machine as implement is not a simple material extension of our members. It is of another order, an annex to our

> language, an auxiliary language to mathematics, a means of penetrating, dissecting and revealing the secret of things, their implicit intentions, their unemployed capacities.[4]

Through hermeneutic relations we can, as it were, *read* ourselves into any possible situation without being there. In science, in contrast to literature, what is important is that the reading retain *some* kind of reference or hermeneutic transparency to what is there. Perhaps that is one reason for the constant desire to reverse what is read back towards what may be perceived. In this reversal, contemporary technologically embodied science has frequently derived what might be called *translation technologies*. I mention two in passing:

(a) Digital processes have become *de rigueur* within the perceptual domain. The development of pictures from space probes is such a *double translation* process. The photograph of the surface of Venus is a technological analogue to human vision. It at least is a field display of the surface, incorporating the various possible figures and contrasts that would be seen instantaneously in a visual gestalt – but this holistic result cannot be transmitted in this way by the current technologies. Thus it is "translated" into a digital code, which can be transmitted. The "seeing" of the instrument is broken down into a series of digits that are radiographically transmitted to a receiver; then they are reassembled into a spatter pattern and enhanced to reproduce the photograph taken millions of miles away. It would be virtually impossible for anyone to read the digits and tell what was to be seen; only when the linear text of the digits has been retranslated back into the span of an instantaneous visual gestalt can it be seen that the rocks on Venus are or are not like those on the moon. Here the analogues of perception and language are both utilized to extend vision beyond the earth.

(b) The same process is used audially in digital recordings. Once again, the double translation process takes place and sound is reduced to digital form, reproduced through the record, and translated back into an auditory gestalt.

Digital and analogue processes blur together in certain configurations. Photos transmitted as points of black on a white ground and reassembled within certain size limits are perceptually gestalted; we see Humphrey Bogart, not simply a mosaic of dots. (Pointillism did the same in painting, although in color. So-called concrete poetry employs the same crossover by placing the words of the poem in a visual pattern so the poem may be both read and seen as a visual pattern.)

Such translation and retranslation processes are clearly transformations from perceptually gestalted phenomena into analogues of writing (serial translation and retranslation processes are clearly transformations from perceptual gestalt phenomena into analogues of writing serial transmissions along a "line," as it were), which are then retranslatable into perceptual gestalts.

I have suggested that the movement from embodiment relations to hermeneutic ones occurs along a human-technology continuum. Just as there are complicated, borderline cases along the continuum from fully haired to bald men, there are the same less-than-dramatic differences here. I have highlighted some of this difference by accenting the bodily-perceptual distinctions that occur between embodiment and hermeneutic relations. This has allowed the difference in perceptual and hermeneutic transparencies to stand out.

There remain two possible confusions that must be clarified before moving to the next step in this phenomenology of technics. First, there is a related sense in which perception and interpretation are intertwined. Perception is primitively already interpretational, in both micro- and macrodimensions. To perceive is already "like" reading. Yet reading is also a specialized act that receives both further definition and elaboration within literate contexts. I have been claiming that one of the distinctive differences between embodiment and hermeneutic relations involves perceptual position, but in the broader sense, interpretation pervades both embodiment and hermeneutic action.

A second and closely related possible confusion entails the double sense in which a technology may be used. It may be used simultaneously both as something *through* which one experiences and as something *to* which one relates. While this is so, the doubled relation takes shapes in embodiment different from those of hermeneutic relations. Return to the simple embodiment relation illustrated in wearing eyeglasses. *Focally*, my perceptual experience finds its directional aim *through* the lenses, terminating my gaze upon the object of vision; but as a *fringe* phenomenon, I am simultaneously aware of (or can become so) the way my glasses rest upon the bridge of my nose and the tops of my ears. In this fringe sense, I am aware of the glasses, but the focal phenomenon is the perceptual transparency that the glasses allow.

In cases of hermeneutic transparency, this doubled role is subtly changed. Now I may carefully read the dials within the core of my visual field and attend to them. But my reading is simultaneously a reading through them, although now the terminus of reference is not necessarily a perceptual object, nor is it, strictly speaking, perceptually present. While the type of transparency is distinct, it remains that the purpose of the reading is to gain hermeneutic transparency.

Both relations, however, at optimum, occur within the familiar acquisitional praxes of the lifeworld. Acute perceptual seeing must be learned and, once acquired, occurs as familiarly as the act of seeing itself. For the accomplished and critical reader, the hermeneutic transparency of some set of instruments is as clear and as immediate as a visual examination of some specimen. The peculiarity of hermeneutic transparency does not lie in either any deliberate or effortful accomplishment of interpretation (although in learning any new text or language, that effort does become apparent). That is why the praxis that grows up within the hermeneutic context retains the same sense of spontaneity that occurs in simple acts of bodily motility. Nevertheless, a more distinctive presence *of* the technology appears in the example. My awareness of the instrument panel is both stronger and centered more focally than the fringe awareness of my eyeglasses frames, and this more distinct awareness is essential to the optimal use of the instrumentation.

In both embodiment and hermeneutic relations, however, the technology remains short of full objectiveness or *otherwise*. It remains the means through which something else is made present. The negative characterization that may occur in breakdown pathologies may return. When the technology in embodiment position breaks down or when the instrumentation in hermeneutic position fails, what remains is an obtruding, and thus negatively derived, object.

Both embodiment and hermeneutic relations, while now distinguished, remain basic existential relations between the human user and the world. There is the danger that my now-constant and selective use of scientific instrumentation could distort the full impact of the existential dimension. Prior to moving further along the human-technology-world continuum, I shall briefly examine a very different set of instrumental examples. The instrumentation in this case will be *musical instrumentation*.

In the most general sense, it should be easy to see that the use of musical instrumentation, in performance, falls into the same configurations as do scientific instruments:

I–musical instrument–world
I–scientific instrument–world

But the praxical context is significantly changed. If scientific or knowledge-developing praxis is constrained by the need to have a referential terminus within the world, the musical praxis is not so constrained. Indeed, if there is a terminus, it is a reference not so much to some thing or region of the environment as to the production of a musical event within that environment. The "musical, object" is whatever sound phenomenon occurs through the performance upon the instrument. Musical sounds are produced, *created*. Whereas in the development of scientific instrumentation the avoidance of phenomena that would be artifacts of the instrument rather than of its referent are to be avoided or reduced as much as possible, the very discovery and enhancement of such instrumental artifacts may be a positive phenomenon in making music. There are interesting and significant differences in these two praxical contexts, but for the moment, I shall restrict myself to a set of observations about the similarities in the intentionality structures of both scientific and musical instrumentation.

It should be obvious that a very large use of musical instrumentation falls clearly into the embodiment relation pattern. The player picks up the instrument (having learned to embody it) and expressively produces the desired music:

Player–instrument–sound

In embodiment cases, the sound-making instrument will be partially symbiotically embodied:

(Player–instrument)–sound

Second, the previously noted amplification/reduction structure also occurs here. If our player is a trombonist, the "buzz" his lip vibrations produce can be heard without any instrument but, once amplified and transformed *through* the trombone, occur as the musical sound distinctive to the human-instrument pairing. Equally immediately, at least within the complex of contemporary instrumentation, one may detect that nothing like a restriction to human sound as such belongs to the contemporary musical context. Isomorphism to human sound, while historically playing a significant cultural role, now occupies only one dimension of musical sound.

This history, however, is interesting. There have been tendencies in Western musical history to restrict to or at least to develop precisely along horizontally variant ways. The restriction of musical sound to actual human voices (certain Mennonite sects do not allow any musical instrumentation, and all hymn singing is done a cappella) is a form of this tendency. Instrumentation that mimics or actually amplifies vocal sounds and their ranges is another example: woodwinds, horns, organs (even to the organ stop titles which are usually voice analogues) – all are ancient instruments that often deliberately followed a kind of vocal isomorphism. Medieval music was often doubly constrained. Not only must the music remain within the range of human similitude, but even the normatively controlled harmonics and chant lines were religio-culturally constrained. Later, one could detect a much more vocal model to much Italian (Renaissance through Baroque) music in contrast to a more instrumental oriented model in German music.

The implicit valuational model of the human voice was also reflected in the music history of the West by the ranking of instruments by *expressivity*, with those instruments thought most expressive – the violin, for example – rated more highly than those farther from the vocal model.

The difference between embodiment and hermeneutic relations appears within this context as well. While embodiment relations in the most general existential sense need not be strictly constrained by isomorphism, hermeneutic variants occur very quickly along the musical spectrum. The piano retains little vocal isomorphism; yet when played, it falls into the embodiment relation, is expressive of the individual style and attainment of the performer, etc. Farther along the continuum, computer-produced music clearly occurs much more fully within the range of hermeneutic relations, in some cases with the emergence of random-sound generation very close to the sense of *otherness*, which will characterize the next set of relations where the technology emerges as *other*.

Instrumental music, as technics, may go in either embodiment or hermeneutic directions. It may develop its instrumentation in both vertical and horizontal trajectories. In either direction there are recognizable clear, technological transformations. If the Western "bionic" model of much early music was voice, in Andean music it was bird song (both in melody and in sound quality produced by breathy wood flutes). Contrarily, percussion instrumentation (drum music and communication) was, from the outset, a movement in a vertical and thus more hermeneutic direction. This exploration of possibility trees in horizontal and vertical directions belongs to the realm of musical praxis as much as to scientific, but is without any referentiality to a natural world.

The result of technological development in musical technics is also suggestively different from its result in scientific praxis. The "world" produced muscially through all the technical adumbrations is *not* that suggested either by the new philosophy of science or by a Heideggerian philosophy of technology. The closest analogy to the notion of standing reserve (resource well) that the musical "world" might take is that the realm of all possible sound may be taken and/or transformed musically. But the acoustical resources of musical technics are utilized through the creative sense of *play* which pervades musical praxis. The "musical object" is a created object, but its creation is not constrained by the same imperatives of scientific praxis. Yet the materialization of musical sound *through* instrumentation remains a fully human technological form of action.

What can be glimpsed in this detour into musical instrumentation is that while the human-technology structures are parallel with those found within scientific instrumentation, the "world" created does not at all imply the same reduction to what has been claimed as the unique Western view of the domination of nature. Here, then, is an opening to a different possible trajectory of development.

C Alterity Relations

Beyond hermeneutic relations there lie *alterity relations*. The first suggestions of such relations, which I shall characterize as relations *to* or *with* a technology, have already been suggested in different ways from within the embodiment and hermeneutic contexts. Within embodiment relations, were the technology to intrude upon rather than facilitate one's perceptual and bodily extension into the world, the technology's objectness would necessarily have appeared negatively. Within hermeneutic relations, however, there emerged a certain positivity to the objectness of instrumental technologies. The bodily-perceptual focus *upon* the instrumental text is a condition of its own peculiar heremeneutic transparency. But what of a positive or presentential sense of relations with technologies? In what phenomenological senses can a technology be *other?*

The analysis here may seem strange to anyone limited to the habits of objectivist accounts, for in such accounts technologies as objects usually come first rather than last. The problem for a phenomenological account is that objectivist ones are non-relativistic and thus miss or submerge what is distinctive about human-technology relations.

A naive objectivist account would likely begin with some attempt to circumscribe or define technologies by object characteristics. Then, what I have called the technical properties of technologies would become focal. Some combination of physical and material properties would be taken to be definitional. (This is an inherent tendency of the standard nomological positions such as those of Bunge and Hacking). The definition will often serve a secondary purpose by being stipulative: only those technologies that are obviously dependent upon or strongly related to contemporary scientific and industrial productive practices will count.

This is not to deny that objectivist accounts have their own distinctive strengths. For example, many such accounts recognize that technological or "artificial" products are different from the simply found object or the natural object. But the submergence of the human-technology relation remains hidden, since either object may enter into praxis and both will have their material, and thus limited, range of technical usability within the relation. Nor is this to deny that the objectivist accounts of types of technologies, types of organization, or types of designed purposes should be considered. But the focus in this first program remains the phenomenological derivation of the set of human-technology relations.

There is a tactic behind my placing alterity relations last in the order of focal human-technology relations. The tactic is designed, on the one side, to circumvent the tendency succumbed to by Heidegger and his more orthodox followers to see the otherness of technology only in negative terms or through negative derivations. The hammer example, which remains paradigmatic for this approach, is one that derives objectness from breakdown. The broken or missing or malfunctioning technology could be *discarded*. From being an obtrusion it could become *junk*. Its objectness would be clear – but only partly so. Junk is not a focal object of use relations (except in certain limited situations). It is more ordinarily a background phenomenon, that which has been put out of use.

Nor, on the other side, do I wish to fall into a naively objectivist account that would simply concentrate upon the material properties of the technology as an object of knowledge. Such an account would submerge the relativity of the intentionality analysis, which I wish to preserve here. What is needed is an analysis of the positive or presentential senses in which humans relate to technologies as relations *to* or with technologies, to technology-as-other. It is this sense which is included in the term "alterity."

Philosophically, the term "alterity" is borrowed from Emmanuel Levinas. Although Levinas stands within the traditions of phenomenology and hermeneutics, his distinctive work, *Totality and Infinity*, was "anti-Heideggerian." In that work, the term "alterity" came to mean the radical difference posed to any human by another human, an *other* (and by the ultimately other, God). Extrapolating radically from within the tradition's emphasis upon the non-reducibility of the human to either objectness (in epistemology) or as a means (in ethics), Levinas poses the otherness of humans as a kind of *infinite* difference that is concretely expressed in an ethical, face-to-face encounter.

I shall retain but modify this radical Levinasian sense of human otherness in returning to an analysis of human-technology relations. How and to what extent do technologies become other or, at least, *quasi-other*? At the heart of this question lie a whole series of well-recognized but problematic interpretations of technologies. On the one side lies the familiar problem of anthropomorphism, the personalization of artifacts. This range of anthropomorphism can reach from serious artifact-human analogues to trivial and harmless affections for artifacts.

An instance of the former lies embedded in much AI research. To characterize computer "intelligence" as human-like is to fall into a peculiarly contemporary species of anthropomorphism, however sophisticated. An instance of the latter is to find oneself "fond" of some particular technofact as, for instance, a long-cared-for automobile which one wishes to keep going and which may be characterized by quite deliberate anthropomorphic terms. Similarly, in ancient or non-Western cultures, the role of sacredness attributed to artifacts exemplifies another form of this phenomenon.

The religious object (idol) does not simply "represent" some absent power but is endowed with the sacred. Its aura of sacredness is spatially and temporally present within the range of its efficacy. The tribal devotee will defend, sacrifice to, and care for the sacred artifact. Each of these illustrations contains the seeds of an alterity relation.

A less direct approach to what is distinctive in human-technology alterity relations may perhaps better open the way to a phenomenologically relativistic analysis. My first example comes from a comparison to a technology and to an animal "used" in some practical (although possibly sporting) context: the spirited horse and the spirited sports car.

To ride a spirited horse is to encounter a lively-animal *other*. In its pre- or nonhuman context, the horse has a life of its own within the environment that allowed this form of life. Once domesticated, the horse can be "used" as an "instrument" of human praxis – but only to a degree and in a way different from counterpart technologies; in this case, the "spirited" sports car.

There are, of course, analogues which may at first stand out. Both horse and car give the rider/driver a magnified sense of power. The speed and the experience of speed attained in riding/driving are dramatic extensions of my own capacities. Some prominent features of embodiment relations can be found analogously in riding/driving. I experience the trail/road through horse/car and guide/steer the mediating entity under way. But there are equally prominent differences. No matter how well trained, no horse displays the same "obedience" as the car. Take malfunction: in the car, a malfunction "resists" my command – I push the accelerator, and because of a clogged gas line, there is not the response I expected. But the animate resistance of a spirited horse is more than such a mechanical lack of response – the response is more than malfunction, it is disobedience. (Most experienced riders, in fact, prefer spirited horses over the more passive ones, which might more nearly approximate a mechanical obedience.) This life of the other in a horse may be carried much further – it may live without me in the proper environment; it does not need the *deistic* intervention of turning the starter to be "animated." The car will not shy at the rabbit springing up in the path any more than most horses will obey the "command" of the driver to hit the stone wall when he is too drunk to notice. The horse, while approximating some features of a mediated embodiment situation, never fully enters such a relation in the way a technology does. Nor does the car ever attain the sense of animation to be found in horseback riding. Yet the analogy is so deeply embedded in our contemporary consciousness (and perhaps the lack of sufficient experience with horses helps) that we might be tempted to emphasize the similarities rather than the differences.

Anthropomorphism regarding the technology on the one side and the contrast with horseback riding on the other point to a first approximation to the unique type of otherness that relations to technologies hold. Technological otherness is a *quasi-otherness*, stronger than mere objectness but weaker than the otherness found within the animal kingdom or the human one; but the phenomenological derivation must center upon the positive experiential aspects outlining this relation.

In yet another familiar phenomenon, we experience technologies as *toys* from childhood. A widely cross-cultural example is the spinning top. Prior to being put into use, the top may appear as a top-heavy object with a certain symmetry of design (even early tops approximate the more purely functional designs of streamlining, etc.), but once "deistically" animated through either stick motion or a string spring, the now spinning top appears to take on a life of its own. On its tip (or "foot") the top appears to defy its top-heaviness and gravity itself. It traces unpredictable patterns along its pathway. It is an object of *fascination*.

Note that once the top has been set to spinning, what was imparted through an embodiment relation now exceeds it. What makes it fascinating is this property of quasi-animation, the life of its own. Also, of course, once "automatic" in its motion, the top's movements may be entered into a whole series of possible contexts. I might enter a game of warring tops in which mine (suitably marked) represents me. If I-as-top am successful in knocking down the other tops, then this game of hermeneutics has the top winning for me. Similarly, if I take its quasi-autonomous motion to be a hermeneutic predictor, I may enter a divination context in which the path traced or the eventual point of stoppage indicates some fortune. Or, entering the region of scientific instrumentation, I may transform the top into a gyroscope, using its constancy of direction within its now-controlled confines as a better-than-magnetic compass. But in each of these cases, the top may become the focal center of attention as a quasi-other to which I may relate. Nor need the object of fascination carry either an embodiment or hermeneutic referential transparency.

To the ancient and contemporary top, compare briefly the fascination that occurs around video games. In the actual use of video games, of course, the embodiment and hermeneutic relational dimensions are present. The joystick that embodies hand and eye coordination skills extends the player into the displayed field. The field itself displays some hermeneutic context (usually either some

"invader" mini-world or some sports analogue), but this context does not refer beyond itself into a worldly reference.

In addition to these dimensions, however, there is the sense of *interacting with* something other than me, the technological *competitor*. In competition there is a kind of dialogue or exchange. It is the quasi-animation, the quasi-otherness of the technology that fascinates and challenges. I must beat the machine or it will beat me.

In each of the cases mentioned, features of technological alterity have shown themselves. The quasi-otherness, the quasi-autonomy which appears in the toy or the game is a variant upon the technologies that have fascinated Western thinkers for centuries, the *automaton*.

The most sophisticated Greek (and similarly, Chinese) technologies did not appear in practical or scientific contexts so often as in game or theatrical ones. (War contexts, of course, have always employed advanced technologies.) Within these contexts, automatons were devised. From rediscovered treatises by Hero of Alexandria on pneumatics and hydraulics (which had in the second century B.C. already been used for humorous applications), the Renaissance builders began to construct various automata. The applications of Hero had been things like automatically opening temple doors and artificial birds that sang through steam whistles. In the Renaissance reconstructions, automata became more complex, particularly in fountain systems:

> The water garden of the Villa d'Este, built in 1550 at Tivoli, outside Rome, for the son of Lucrezia Borgia [was the best known]. The slope of the hill was used to supply fountains and dozens of grottos where water-powered figures moved and played and spouted … . The Chateau Merveilleux of Helbrun … is full of performing figures of men and women where fountains turn on and off unexpectedly or, operating in the intricate and quite amazing theatre of puppets, run by water power.[5]

The rage for automata was later to develop in a number of directions from music machines, of which the Deutsches Museum in Munich has a grand collection, to Vaucanson's automated duck which quacked, ate, drank, and excreted.[6] Much later, automation techniques were used in more practical contexts, although versions of partially automated looms for textiles did begin to appear in the eighteenth century (Vaucanson, the maker of the automated duck, invented the holed cylinder that preceded the punch-card system of the Jacquard loom).

Nor should the clock be exempted from this glance at automata fascination. The movements of the heavens, of the march of life and death, and of the animated figures on the clocks of Europe were other objects of fascination that seemed to move "autonomously." The superficial aspects of automation, the semblance of the animate and the similitude of the human and animal, remained the focus for even more serious concerns with automatons. That which is more "like" us seemed to center the fascination and make the alterity more quasi-animate.

Fascination may hide what is reductive in technological selectivities. But it may also hide, doubly, a second dimension of an instrumental intentionality, its possible dissimilarity direction, which may often prove in the longer run the more interesting trajectory of development. Yet semblance usually appears to be the first focus.

It was this *semblance* which became a worry for Modern (seventeenth and eighteenth century) Philosophy. Descartes's famous doubts also utilize the popular penchant for automata. In seeking to prove that it is the mind alone and not the eyes that know things, he argues:

> I should forthwith be disposed to conclude that the wax is known by the act of sight and not by the intuition of the mind alone were it not for the analogous instance of human beings passing on in the street below, as observed from a window. In this case, I do not fail to say that I see the men themselves, just as I say that I see the wax; and yet, what do I see from the window beyond hats and cloaks that might cover artificial machines, whose motions might be determined by springs?[7]

This can-I-be-fooled-by-a-cleverly-conceived-robot argument was to have an exceedingly long history, even into the precincts of contemporary analytic philosophies.

Were Descartes to become a contemporary of current developments in the attempt to mimic animal and human motions by automata, he might well rethink his illustration. Not only spring-run automata but also the most sophisticated computer-run automata look mechanical. These most sophisticated computer-run automata have difficulty maneuvering in anything like a lifelike motion. As Dreyfus has pointed out and as would be confirmed by many current researchers, bodily motion is perhaps harder to imitate than certain "mental" activities such as calculating.

To follow only the inclination towards similitude, however, is to reduce what may be learned from our relations with technologies. The current state of the art in AI

research, for example, while having been partially freed from its earlier fundamentalistic state, remains primarily within the aim of creating similarities with human intelligence or modeling what are believed to be analogues to our intelligence. Yet it might well be that the *differences* that emerge from computer experimentation may be more informative or, at least, as informative as the similitudes.

There are what I shall call technological *intentionalities* that emerge from many technologies. Let us engage in a pseudo-Cartesian, imaginative construction of a humanoid robot, within the limits of easily combinable and available technologies, to take account of the similarity/difference structures which may be displayed. I shall begin with the technology's "perceptions" of sensory equipment: What if the robot were to hear? The inventor, perhaps limited by a humanist's budget, could install an omnidirectional microphone for ears. We could check upon what our robot would "hear" by adding a cassette player for a recorded "memory" of its "hearing." What is heard would turn out to be very differently structured, to have a very different form of intentionality than what any human listener would hear.

Assume that our robot is attending a university lecture in a large hall and is seated, as a shy student might be, near the rear. Given the limits of the mentioned technology, what would be heard would fail to have either the foreground/background pattern of human listening or the selective elimination of noise that even ordinary listening displays. The robot's auditory memory, played back, would reveal something much more like a sense-data auditory world than the one we are familiar with. The lecturer's voice, though recorded and within low limits perhaps detectable, would often be buried under the noise and background sounds that are selectively masked by human listening. For other purposes, precisely this differently structured technological intentionality could well be useful and informative. Such a different auditory selectivity could perhaps give clues to better architectural dampening of sounds precisely because what is repressed in human listening here stands out. In short, there is "truth" to be found in both the similarity and the difference that technological intentionalities reveal.

A similar effect could be noted with respect to the robot's vision. Were its eyes to be made of television equipment and the record or memory of what it has seen displayed on a screen, we would once again note the flatness of its visual field. Depth phenomena would be greatly reduced or would disappear. Although we have become accustomed to this flat field in watching television, it is easy to become reaware of the lack of depth between the baseball pitcher and the batter upon the screen. The technological shape of intentionality differs significantly from its human counterpart.

The fascination with human or animate similitude within the realm of alterity relations is but another instance of the types of fascination pervading our relations with technologies. The astonishment of Galileo at what he saw through the telescope was, in effect, the location of similitude within embodiment use. The magnification was the magnification *of* human visual capacity and remained within the range of what was familiarly visible. The horizontal trajectory of magnification that can more and more enhance vision is a trajectory along an already familiar praxis.

With the examples of fascination with automata, the fascination also remains within the realm of the familiar, now in a kind of mirror phenomenon for humans and the technology. Of all the animals in the earth's realm, it seems that the human ones are those who can prolong this fascination the most intensely. Paul Levinson, in an examination of the history of media technologies, has argued that there are three stages through which technologies pass. The first is that of technology as toy or novelty. The history of film technology is instructive:

> The first film makers were not artists but tinkers … . "Their goal in making a movie was not to create beauty but to display a scientific curiosity." A survey of the early "talkies" like *The Jazz Singer*, first efforts in animation such as Disney's "Laugh-O-Gram" cartoons, and indeed the supposed debut of the motion picture in *Fred Ott's Sneeze* supports [this thesis] itself.[8]

The same observation could be made about much invention. But once taken more seriously, novelty can be transformed into a second stage, according to Levinson: that of technology as mirror of reality. This too happened in the history of film. Following the early curiosities at the onset of the film industry, the introduction of the Lumieres' presentation of "actualities" were, in part, fascinating precisely through the magnification/reduction selectivities that film technologies produce through unique film intentionalities. Examples could be as mundane as "workers leaving a factory, a baby's meal, and the famous train entering the station." What made such cinemas vérités dramatic were "in this case, a real train

chugging into a real station, at an angle such that the audience could almost believe the train was chugging at *them*."[9]

This mirror of life, like the automaton, is not isomorphic with non-technological experience but is technologically transformed with the various effects that exaggerate or enhance some effects while simultaneously reducing others. Levinson is quite explicit in his analysis concerning the ways newly introduced technologies also enhance this development:

> The growth of film from gimmick to replicator was apparently in large part dependent upon a new technological component … . The "toy" film played to individuals who peeked into individual kinetoscopes; but the "reality" film reached out to mass audiences, who viewed the reality-surrogate in group theatres. The connection between mass audiences and reality simulation, moreover, was no accident. Unlike the perception of novelties, which is inherently subjective and individualized, reality perception is a fundamentally objective, group process.[10]

Although the progression of the analysis here moves from embodiment and hermeneutic relations to alterity ones, the interjection of film or cinema examples is of suggestive interest. Such technologies are transitional between hermeneutic and alterity phenomena. When I first introduced the notion of hermeneutic relations, I employed what could be called a "static" technology: writing. The long and now ancient technologies of writing result in fixed texts (books, manuscripts, etc., all of which, barring decay or destruction, remain stable in themselves). With film, the "text" remains fixed only in the sense that one can repeat, as with a written text, the seeing and hearing of the cinema text. But the mode of presentation is dramatically different. The "characters" are now animate and theatrical, unlike the fixed alphabetical characters of the written text. The dynamic "world" of the cinema-text, while retaining many of the functional features of writing, also now captures the semblance of real-time, action, etc. It remains to be "read" (viewed and heard), but the object-correlate necessarily appears more "life-like" than its analogue – written text. This factor, naively experienced by the current generations of television addicts, is doubtless one aspect in the problems that emerge between television watching habits and the state of reading skills. James Burke has pointed out that "the majority of the people in the advanced industrialized nations spend more time watching television than doing anything else beside work."[11] The same balance of time use also has shown up in surveys regarding students. The hours spent watching television among college and university students, nationally, are equal to or exceed those spent in doing homework or out-of-class preparation.

Film, cinema, or television can, in its hermeneutic dimension, refer in its unique way to a "world." The strong negative response to the Vietnam War was clearly due in part to the virtually unavoidable "presence" of the war in virtually everyone's living room. But films, like readable technologies, are also *presentations*, the focal terminus of a perceptual situation. In that emergent sense, they are more dramatic forms of perceptual immediacy in which the presented display has its own characteristics conveying quasi-altrerity. Yet the engagement with the film normally remains short of an engagement with an *other*. Even in the anger that comes through in outrage about civilian atrocities or the pathos experienced in seeing starvation epidemics in Africa, the emotions are not directed to the screen but, indirectly, through it, in more appropriate forms of political or charitable action. To this extent there is retained a hermeneutic reference elsewhere than at the technological instrument. Its quasi-alterity, which is also present, is not fully focal in the case of such media technologies.

A high-technology example of breakdown, however, provides yet another hint at the emergence of alterity phenomena. Word processors have become familiar technologies, often strongly liked by their users (including many philosophers who fondly defend their choices, profess knowledge about the relative abilities of their machines and programs, etc.). Yet in breakdown, this quasi-love relationship reveals its quasi-hate underside as well. Whatever form of "crash" may occur, particularly if some fairly large section of text is involved, it occasions frustration and even rage. Then, too, the programs have their idiosyncracies, which allow or do not allow certain movements; and another form of human-technology competition may emerge. (Mastery in the highest sense most likely comes from learning to program and thus overwhelm the machine's previous brainpower. "Hacking" becomes the game-like competition in which an entire system is the alterity correlate.) Alterity relations may be noted to emerge in a wide range of computer technologies that, while failing quite strongly to mimic bodily incarnations, nevertheless display a quasi-otherness within the limits of linguistics and, more particularly, of logical behaviors. Ultimately, of course,

whatever contest emerges, its sources lie opaquely with other humans as well but also with the transformed technofact, which itself now plays a more obvious role within the overall relational net.

I have suggested that the computer is one of the stronger examples of a technology which may be positioned within alterity relations. But its otherness remains a quasi-otherness, and its genuine usefulness still belongs to the borders of its hermeneutic capacities. Yet in spite of this, the tendency to fantasize its quasi-otherness into an authentic otherness is pervasive. Romanticizations such as the portrayal of the emotive, speaking "Hal" of the movie *2001: A Space Odyssey*, early fears that the "brain power" of computers would soon replace human thinking, fears that political or military decisions will not only be informed by but also made by computers – all are symptoms revolving around the positing of otherness to the technology.

These romanticizations are the alterity counterparts to the previously noted dreams that wish for total embodiment. Were the technofact to be genuinely an other, it would both be and not be a *technology*. But even as quasi-other, the technology falls short of such totalization. It retains its unique role in the human-technology continuum of relations as the medium of transformation, but as a recognizable medium.

The wish-fulfillment desire occasioned by embodiment relations – the desire for a fully transparent technology that would *be* me while at the same time giving me the powers that the use of the technology makes available – here has its counterpart fantasy, and this new fantasy has the same internal contradiction: It both reduces or, here, extrapolates the technology into that which is not a technology (in the first case, the magical transformation is *into me*; in this case, *into the other)*, and at the same time, it desires what is not identical with me or the other. The fantasy is for the transformational effects. Both fantasies, in effect, deny technologies playing the roles they do in the human-technology continuum of relations; yet it is only on the condition that there be some detectable differentiation within the relativity that the unique ways in which technologies transform human experience can emerge.

In spite of the temptation to accept the fantasy, what the quasi-otherness of alterity relations does show is that humans may relate positively or presententially *to* technologies. In that respect and to that degree, technologies emerge as focal entities that may receive the multiple attentions humans give the different forms of the other. For this reason, a third formalization may be employed to distinguish this set of relations:

$$1 \rightarrow \text{technology}-(-\text{world})$$

I have placed the parentheses thusly to indicate that in alterity relations there may be, but need not be, a relation through the technology to the world (although it might well be expected that the *usefulness* of any technology will necessarily entail just such a referentiality). The world, in this case, may remain context and background, and the technology may emerge as the foreground and focal quasi-other with which I momentarily engage.

This disengagement of the technology from its ordinary-use context is also what allows the technology to fall into the various disengaged engagements which constitute such activities as play, art, or sport.

A first phenomenological itinerary through direct and focal human-technology relations may now be considered complete. I have argued that the three sets of distinguishable relations occupy a continuum. At the one extreme lie those relations that approximate technologies to a quasi-me (embodiment relations). Those technologies that I can so take into my experience that through their semi-transparency they allow the world to be made immediate thus enter into the existential relation which constitutes my self. At the other extreme of the continuum lie alterity relations in which the technology becomes quasi-other, or technology "as" other *to* which I relate. Between lies the relation with technologies that both mediate and yet also fulfill my perceptual and bodily relation with technologies, hermeneutic relations. The variants may be formalized thus:

Human-technology–World Relations
- Variant 1, Embodiment Relations
- (Human-technology) → World
- Variant 2, Hermeneutic Relations
- Human → (technology–World)
- Variant 3, Alterity Relations
- Human → technology–(–World)

Although I have characterized the three types of human-technology relations as belonging to a continuum, there is also a sense in which the elements within each type of relation are differently distributed. There is a *ratio* between the objectness of the technology and

its transparency in use. At the extreme height of embodiment, a background presence of the technology may still be detected. Similarly but with a different ratio, once the technology has emerged as a quasi-other, its alterity remains within the domain of human invention through which the world is reached. Within all the types of relations, technology remains artifactual, but it is also its very artifactual formation which allows the transformations affecting the earth and ourselves.

All the relations examined heretofore have also been focal ones. That is, each of the forms of action that occur through these relations have been marked by an implicated self-awareness. The engagements through, with, and to technologies stand within the very core of praxis. Such an emphasis, while necessary, does not exhaust the role of technologies nor the experiences of them. If focal activities are central and foreground, there are also fringe and background phenomena that are no more neutral than those of the foreground.

[…]

Notes

1 Sergei Eisenstein, *Film Form: Essays in Film Theory*, ed. and trans. Jay Leyda (New York: Harcourt, Brace and World, 1949), p. 29.

2 This illustration is my version of a similar one developed by Patrick Heelan in his more totally hermeneuticized notion of perception in *Space Perception and the Philosophy of Science* (Berkeley: University of California Press, 1983), p. 193.

3 Ian Hacking, *Representing and Intervening* (Cambridge: Cambridge University Press, 1983), p. 195, Hacking develops a very excellent and suggestive history of the use of microscopes. His focus, however, is upon the technical properties that were resolved before microscopes could be useful in the sciences. He and Heelan, however, along with Robert Ackermann, have been among the pioneers dealing with perception and instrumentation in instruments. Cf. also un *Technics and Praxis* (Dordrecht: Reidel Publishers, 1979).

4 Emmanuel Mournier, *Be Not Afraid*, trans. Cynthia Rowland (London: Rockcliffe, 1951), p. 195.

5 James Burke, *Connections* (Boston: Little, Brown, 1978), p. 106.

6 Ibid., p. 107.

7 René Descartes, *A Discourse on Method*, trans. John Veitch (London: J. M. Dent, 1953), p. 92.

8 Paul Levinson, "Toy, Mirror and Art: The Metamorphosis of Technological Culture," in *Philosophy, Technology and Human Affairs*, ed. Larry Hickman (College Station: Ibis Press, 1985), p. 163.

9 Ibid., p. 165.

10 Ibid., p. 167.

11 Burke, *Connections*, p. 5.

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Postphenomenology of Technology

Peter-Paul Verbeek

Introduction

How, then, to overcome the limitations of classical philosophy of technology? These limitations, as we have seen, are all too clear in the philosophies of Jaspers and Heidegger. Technology is primarily conceived as a form of alienation: it alienates human beings from themselves in preventing them from achieving authentic existence, and it alienates human beings from the world in denying them a meaningful place to exist. This negative judgment can, in part at least, be related to the historical situation in which Jaspers and Heidegger formulated their thought. In the first half of the twentieth century, society was undergoing rapid changes thanks to the influence of industrialization. The repetitive, monotonous character of assembly-line work appeared to herald a new kind of mass society and homogenized existence; cold, anonymous industrial complexes seemed to indicate the onset of a reduced relation to the world. But the classical diagnosis appeared to be premature, and failed to foresee the ways in which technological society and culture would develop. Today, over half a century later, we see that humanity has not been entirely swallowed up inside the production apparatus, and is able to approach reality not exclusively as a storehouse of raw materials.

Close inspection revealed that Jaspers and Heidegger failed to support their analysis of technology adequately. They reduced technology to its conditions of possibility and then proceeded as if what they said about these conditions applied to technology itself. Heidegger's hermeneutical approach attempted to understand technology as an alienating way of disclosing reality, reducing concrete technological artifacts to the fruits of such disclosing. Jaspers's existential philosophy of technology attempted to understand technology in terms of bureaucracy, mass production, and the "limits of technology," and then likewise reduced it to what this made possible or to what imposed limits on it. Both philosophies appear to be governed by what one might call a "transcendental fix." In the style of transcendental philosophy, they tried to apprehend technology one-sidedly from its conditions of possibility. They thought "backward," reducing concrete technologies to nontechnological things such as "technological thinking" or "the system of mass production," with technology itself, in the end, falling out of the picture.

One of the most important counters to the standard classical picture of technology has come from empirical research into the development and use of technologies, which has revealed that this classical picture fails to match technological reality. The advance of technology does not follow a single dynamic but is rather the contingent outcome of a set of complex and interactive processes. But however much the empirical approach, contrary to Jaspers and Heidegger, gives concrete technologies the

Peter-Paul Verbeek, "Postphenomenology of Technology," from *What Things Do: Philosophical Reflections on Technology, Agency and Design*, trans. Robert P. Crease (University Park, PA: Pennsylvania State University Press, 2005), pp. 99–119.

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attention they deserve, it does not by itself present an adequate alternative to the classical philosophy of technology. For in empirical technology studies the hermeneutic and existential questions posed by the classical philosophers of technology fall out of the picture: What is the role that technology plays in human existence and in the relation between human beings and reality?

A full-fledged philosophy of technology would have to do justice to the concrete empirical reality of technology without giving up on the philosophical issues posed by the classical approach. In this chapter I shall show how to do so by shifting the philosophical attention from the conditions of technology to technology itself – to the technological devices and objects that are virtually ubiquitous in our daily lives – thereby seeking to understand them via the role that they play in our society and culture.[1] But how is it possible to think about technology from the perspective of artifacts? […]

In order to sketch out the principles of such a philosophy, I shall begin by taking up a new interpretation of the phenomenological tradition from which Jaspers and Heidegger developed their positions. Following Don Ihde, I shall characterize this interpretation as "postphenomenology," but I shall give it a broader definition than he himself does. I shall sketch out the contours of a postphenomenological perspective on technology that is able to do justice to concrete technologies without abandoning the hermeneutical and existential questions that inspire it.

Empirical Research into Technology

The classical philosophical image of technology has received severe criticism from empirical research into technology. The chief weaknesses that this empirical research exposed were the overgeneralizations and false determinismin the image of technology offered by the classical philosophy of technology. Technology was supposed to develop autonomously, with society adapting in its wake – an image to which Jaspers and Heidegger could indeed subscribe. According to Jaspers, technology has become an end in itself, demonically holding society in its grip; according to Heidegger technology is a sending of being and our only hope is to await expectantly a new configuration of being to take shape.

Empirical research into the evolution of specific technologies and the reciprocal interactions that they have with society have undermined these deterministic approaches. This research took place initially under the social constructivist flag. Technology was conceived as the result of human activity instead of as something autonomous, paralleling an earlier development in science studies. Its evolution was viewed as an outcome of choices made by human beings in the specific circumstances in which they find themselves. The development of technologies was regarded as socially constructed, rather than following any innate pattern: each technology comes into being via a contingent process of social interaction.

This approach to technology became known via the acronym SCOT: the Social Construction of Technology. One of its important proponents was Wiebe Bijker, one of whose well-known studies concerned the coming about of the design of the modern bicycle as we now know it. Bijker examined other, past bicycle designs and how the interaction between these and the social context gave birth to the contemporary design. He thereby demonstrated that this cannot be viewed as the "one best solution," but rather as the outcome of a complex power struggle between a multiplicity of "relevant social groups" who wanted to use bicycles for specific ends, found particular models too dangerous, and so forth.[2]

But limitations were soon found in the SCOT approach as it became clear that the technologies themselves also played an active role in "social" interaction processes. The example of the microwave oven mentioned in the introduction is a beautiful illustration: the factors that determine whether human beings take their meals together include not just human beings but also the microwave itself. Reducing technology to social interactions therefore fails to do justice to the active role played by technologies themselves. Phrased in terms of my criticism of Jaspers and Heidegger [elsewhere], it can also be stated that the empirical approach came to the conclusion that it could not do justice to technology by reducing it to its conditions.

The successor to social constructivism named itself simply "constructivism." The most, influential framework for a constructivist approach to technology is supplied by the "actor-network" theory proposed by French philosopher and anthropologist Bruno Latour. Latour describes reality in terms of actors who link and interact with each other via networks. He calls his descriptions "symmetric," inasmuch as they do not make any a priori distinction between human and nonhuman actors. Things and artifacts, too, can become actors and thus deserve to be studied on a par with

humans. Technologies do not merely arise from an interaction, but also play an active role in it. The speed with which we drive our cars, to use one of Latour's examples, is not only a function of our own choices and desires, but can also be affected by the existence of things like speed bumps on the road. The term "actor," in fact, misleads to the extent that it connotes human behavior; Latour therefore prefers to speak of "actants" rather than "actors."

Latour sees all phenomena that can possibly be encountered in the world – and especially technologies and scientific theories – as parts of networks of relations between actants. Some networks are vast, others small. The computer with which I write this book, for example, is part of an extensive network that includes software manufacturers, hardware manufacturers, the university where I work, which has given me access to the computer, the university's systems manager, and the automobile of my colleague with which the computer was delivered to my home. Without that network my computer would not be available for me as a functioning device in my study. This network is usually hidden: the only thing that matters when I work is that the computer is in front of me and functional. To use Latour's language, the computer is through and through a black box; it is viewed as an independent, self-standing object with both its internal engineering and the relations with other things that make it work hidden from view. But if we want to understand how the computer came to be in my study, or if we want to fix it when it breaks, then the network of which it is a part suddenly comes to light – or at any rate a part of that network.

Latour's actor-network theory arose from his research into the coming about of scientific knowledge. According to him, scientific knowledge cannot be understood as "the truth" about "reality itself," but is a product of the interaction between humans and nonhumans in a network involving definitions, problem-setting, experiments, and observations. That network consists of relations between researchers and the phenomena into which they are inquiring, and everything that plays a role in those relations. Generally the outcome of this interaction is black-boxed, just as is my computer in the above example: human beings take the theory as obviously "true" and forget about all the efforts that the scientists had to take in piecing it together. But when the black box of such a theory is opened, its obviousness becomes far less obvious – for this brings to light the enormous amount of activity that was required in order to make the theory seem "true." A scientific theory must not be seen as a mirroring of reality, but as the product of a network of relations that link researchers with the phenomenon in question. Scientific knowledge is thus not discovered but constructed; it is an edifice that, up to a point, could have been otherwise.

This constructivist conception of reality can be used to investigate not only scientific knowledge but technology as well. Its advantage is that it does not simply reduce technologies to networks of social interactions, as did the social constructivist conception, but also analyzes the ways in which technologies themselves coshape the interactions. In [short,] … actor-network theory offers more than a "backward" approach to technology, but pays attention to what technology actually does in its context, without reducing its role solely to its origins.

Latour's empirical approach to technology, however, does not offer a true alternative to the classical philosophy of technology. The questions that classical philosophy of technology posed play hardly any role in Latour's work – neither the existential question of the role technology plays in human existence nor the hermeneutical question of how technology coshapes the access human beings have to reality. In order to provide the necessary answers to such phenomenological questions, a new interpretation of the phenomenological perspective itself needs to be worked out.

Beyond Classical Phenomenology

Someone who uses a phenomenological approach to technology in the twenty-first century still has some explaining to do. Phenomenology was an important tradition in Continental philosophy in the first half of the twentieth century, but its influence has waned. Its fundaments have been challenged as problematic due to a number of philosophical developments in the second half of the twentieth century, such as the linguistic turn and the subsequent appearance of postmodernism.[3] Phenomenology was thrust on the defensive in its response to these challenges, thanks to the suspicion that it requires recourse to an "authentic" or "original" access to reality. Its suppositions seem to mesh poorly with the contemporary emphasis on locality and context-dependence, according to which human access to reality is never direct but always mediated. In light of postmodernism and the linguistic turn, phenomenology seems to

be obsolete, a romantic throwback. What could such a tradition still have to offer?

Yet phenomenology can be reinterpreted without the alienation thesis. It can be productively applied in a way that provides the framework for a "philosophy of artifacts." The suspicion that classical phenomenology misunderstands the locality and context-dependence of human knowledge is understandable when the context in which it developed itself is taken into account. Phenomenology presented itself – wrongly, as I shall make clear – as a philosophical method that sought to describe "reality itself." It had good reasons for so doing, which reveal how closely allied phenomenology is with postmodernism. For phenomenology opposes itself to the absolutization of the positivistic view of the world arising from modern natural science, which claims to describe reality as it actually is. Phenomenology sees this absolutization as going too far, inasmuch as it fails to disclose other aspects of reality that are not amenable to scientific analysis. In phenomenological terms, science reveals, not "reality itself," but a reduced reality.

Dutch psychiatrist-phenomenologist J. H. Van den Berg, for instance, speaks of a lived reality as opposed to the dismantled world provided by sciences:

> Have you ever drunk H_2O? Me neither. Nor do I want to. Real humans drink water. Have you ever gone swimming in $H_2O + NaCl$? What a shame! I've swum in the North Sea, the Atlantic Ocean, the Pacific, the Mississippi, the Po, and the Adriatic. That's an experience – a genuine experience … . Phenomenology attempts, once again, to bring to center stage this original and meaningful world, which, of course is always there, and, to some extent, to deny as well that the natural sciences are right. The natural sciences work with the mere skeletons of things. Better: the natural sciences work with the conditions of things.[4]

Phenomenology's protest against the absolutization of the scientific perspective is still timely, but its claim to provide access to genuine reality and its full significance is not. It correctly pointed out that the scientific disclosure of reality is not a disclosure of "reality itself" but always that of a quite specific kind – but from this fact it failed to draw the conclusion that no final contact with "true reality" is possible at all, and that therefore even "lived reality" is always lived in a specific way. This is the crucial step that needs to be made in light of postmodernism and the linguistic turn. The tree that I climb is real for me in a different way than the one whose cells and sap I study, but so is the tree that I photograph, chop down to use for firewood, or cut up to build a table. None of these disclosures can claim to reveal the "true" tree: they are each equally true.

Phenomenology's claim to regain access to an original, meaning-rich world, one lost by the natural sciences, makes its position difficult and open to challenge. It claimed to take its point of departure from an original position, one from which real human beings have become alienated, whereas among philosophers the insight grew that the human experience of reality is always mediated. The "original world, rich in meaning" of which Van den Berg speaks is thus just as mediated as the scientific world – by language, frameworks of interpretation, and social and behavioral contexts. Science, therefore, does not involve an exclusion of the meaning of the world, but a new and different kind of disclosure of it.[5]

Against method

Phenomenology, however, docs not need to take shape as a philosophy of alienation. It originally took this direction in part in reaction to the positivistic world-view, but the ideas that lie at its foundation can be worked out in an entirely different manner. To see this, we need only direct our attention to these key ideas. Consider, for instance, the following passages from the famous preface to Maurice Merleau-Ponty's *Phenomenology of Perception*, which reveal not only the problematic aspects of classical phenomenology mentioned above but also the possibility of overcoming them.

> [P]henomenology can be practiced and identified as a manner or style of thinking … . It is a manner of describing, not of explaining or analyzing. Husserl's first directive to phenomenology, in its early stages, to be a "descriptive psychology," or to return to the "things themselves." is from the start a rejection of science … . All my knowledge of the world, even my scientific knowledge, is gained from my own particular point of view, or from some experience of the world without which the symbols of science would be meaningless. The whole universe of science is built upon the world as directly experienced … .
>
> Science has not and never will have, by its nature, the same significance qua form of being as the world which we perceive, for the simple reason that it is a rationale or explanation of that world … . Scientific points of view, according to which my existence is a moment of the world's, are always both naive and at the same time dishonest, because they take for granted, without explicitly mentioning it, the

> other point of view, namely that of consciousness, through which from the outset a world forms itself round me and begins to exist for me. To return to the things themselves is to return to that world which precedes knowledge, of which knowledge always *speaks*, and in relation to which every scientific schematization is an abstract and derivative sign-language, as is geography in relation to the countryside in which we have learnt beforehand what a forest, a prairie or a river is …
>
> The real has to be described, not constructed or formed. Which means that I cannot put perception into the same category as the syntheses represented by judgments, acts or predications … . The world is not an object such that I have in my possession the law of its making; it is the natural setting of, and field for, all my thoughts and all my explicit perceptions … . When I return to myself from an excursion into the realm of dogmatic common sense or of science, I find, not a source of intrinsic truth, but a subject destined to be in the world. (Merleau-Ponty 1962, viii–xi)

At first glance these passages seem to address the same issues, while being affected by the same problems, as the more informal passage from Van den Berg. Merleau-Ponty introduces phenomenology as a method, as a way of describing the world that is an alternative, even *the* alternative, to the scientific method. From the phenomenological point of view, the scientific approach is a "rationale or explanation" of a more original world. Phenomenology returns to something more original – "To the things themselves!" (*Zu den Sachen selbst*), in Husserl's famous slogan. This is precisely the conception of phenomenology as method that is brought into question by the problems cited above. Certainly we must have "learnt beforehand what a forest, a prairie or a river is" before we can undertake scientific analysis and clarification of these things, but to say that phenomenology is in a position to describe these "things themselves" goes too far. Of necessity, any description of reality cannot avoid being a rationale, explanation, or constitution. That is not to say that the world is only a construction, just that we can never know the world as it is in itself, but only as we disclose it. An uninterpreted world, a world in itself, cannot be experienced; an untouched world cannot be lived in. Human beings never encounter a world in itself, only and always a world for them.

At the same time, however, it would be a mistake to dismiss phenomenology by virtue of this claim to make possible an originary encounter with the world. For something strange is at work in the above passages by Merleau-Ponty. While he claims again and again that phenomenology *describes* reality – and contrasts it with the sciences, which *analyze* it – he nowhere sets himself to producing such a description. What he actually does in the *Phenomenology of Perception* is to develop an analysis of the *relations* between human beings and their world, and he localizes this relation primarily in perception. Merleau-Ponty does not, then, describe the world, but rather the way in which human beings comport themselves to it. The "things themselves" that he addresses appear to be not the things of the world but rather the *relations between human beings and the world*. And in fact we find the same to be true of Husserl, the "founding father" of phenomenology, as well as of Heidegger, Husserl's least faithful but most influential student. Husserl tried, at least in his early work, to understand how human consciousness relates itself to the world. For him the "things themselves" were not objects in the world, but rather phenomena in consciousness, which form the way in which the world appears to us. And Heidegger, in *Being and Time*, did not describe the world itself, but rather inquired into the structures of the ways in which humans are engaged with the world in their actions and experiences.

It is, therefore, more in keeping with actual phenomenological practice to treat phenomenology as a philosophical movement whose principal task is to analyze the relation between human beings and their world rather than as a method of describing reality.[6] Thus I shall define "world" as "reality as disclosed by human beings"; the world-for-humans that arises when they act and experience it. Interpreted in this way, phenomenology sheds its claim to describe reality as it "authentically" is – and at the same time loses its vulnerability to contemporary philosophical criticism. Finally, this alternative interpretation of phenomenology opens up a new way to think about things.

Intentionality and human-world relations

How, then, does phenomenological analysis view the structure of the relations between human beings and their world? Although no single phenomenological method has been applied by all phenomenologists, a pattern can be discerned in the different approaches that phenomenologists take, a pattern that naturally does not do justice to the subtleties of the different philosophical positions, but that does indicate what they have in common.

The most important concept with which phenomenology works, and which should be preserved in a reformulation of phenomenology, is intentionality. In order to fully understand this concept, it is important to describe it in the context in which it arose. In the epistemology of the nineteenth century, two movements developed – realism and idealism – with different perspectives on the relation between knowing subject and known reality.[7] Idealism awarded primacy to consciousness: all the knowledge that we have of reality was viewed as a product of consciousness. There can only be a reality when it is present in consciousness; reality appears as consciousness determines it. Realism, by contrast, assigns primacy to reality: all knowledge that we have of reality is a mirroring of the world itself. Consciousness then has genuine access to the world itself.

Phenomenology arose as an attempt to overcome the tension between idealism and realism. In this attempt, the concept of intentionality played the leading role. Husserl asked himself what is really given to human beings when they address themselves to the world. In answering this question, he found first of all that he had to suspend the "natural" attitude in which human beings assume that what is given to them corresponds to a world outside of them, or to an order fully articulated by reason. All presuppositions with respect to what is given must be put between brackets. This method of "putting things between brackets" Husserl called the *epochè*, or phenomenological reduction.

What remains left over of what is given to human beings, when the existence of a world outside of consciousness is put between brackets? First of all, it can no longer be characterized as a representation of a world, for the existence of a world can no longer be taken for granted. What remains left over are appearances, "phenomena" – whence the name phenomenology. But if this is the case, something else is given at the same time, namely, consciousness itself as the place where phenomena appear. But what more can profitably be said about this, at least without smuggling in new presuppositions? The following: that consciousness is directed to the phenomena that announce themselves in it. Human consciousness never exists in itself, but only as consciousness-of-something. It never exists as something isolated, but is always directed toward phenomena. This other-directedness is what Husserl calls intentionality. Intentionality is an essential characteristic of consciousness; a nonintentional consciousness is thus a contradiction in terms.

Phenomenology, however, did not remain a philosophy of consciousness. Husserl's followers, and even the later Husserl himself, came to believe that phenomenology needed to be more fully extended and worked out than a philosophy of consciousness.[8] Consciousness, consisting of knowledge about the world, came to be viewed as only one aspect of the relation between human beings and their world, and not necessarily the most relevant. Moreover, the world cannot be treated as an assemblage of objects for knowledge, but must be viewed as something in which human beings live: a lifeworld, Husserl's philosophy of consciousness broadened out into an analysis of the relation between humans and their world in the largest sense. In place of consciousness, for instance, Heidegger and Merleau-Ponty spoke about "being-in-the-world." Heidegger characterizes the intentional directedness to the world as having the structure of "care" (*Sorge*) – shaping one's own existence in the careful dealings with everyday things – while Merleau-Ponty views perception as a form of "being destined to the world." Husserl's followers refuse to restrict themselves to thinking only about knowledge, for this is only one of the forms of contact between human beings and world.

Phenomenology thus overcomes the dichotomy between subject and object, humans and world, by replacing it with a mutual interrelation. Human beings are unthinkable apart from a relation to the world, which they continually experience and in which they realize their own existence. This interrelation is not a fact that could have been otherwise. That was the point Merleau-Ponty was making in the above passage when he states that human beings "cannot put perception into the same category as the syntheses represented by judgments, acts or predications" and speaks of "a subject destined to the world." The focus on alienation so characteristic of classical phenomenology is absent from such phrases, and phenomenology is regarded as the analysis of the relation between human beings and their world. In order for a subject to render a judgment about reality, according to Merleau-Ponty, it must already be alongside and engaged with reality – which involves much more than judging, since it is the field in which judgments can take place. Human beings are continually engaged with their world, and this engagement precedes any judgment they may have of it. Put another way, it is impossible to speak about the world in the absence of human involvement with it. Reality-in-itself is unknowable, for as soon as we experience or encounter it, it becomes reality-for-us: a world.

There exists neither human beings in themselves nor world-in-itself.

Phenomenology developed in this way not only by weakening its ties to the philosophy of consciousness, but also by establishing connections with existential philosophy. … [E]xistential philosophy, initiated by Kierkegaard, also consisted of an attempt to elucidate the relation between human beings and their world. It directed its attention not so much to the experiential aspects of this relation, but rather to the way in which humans realized their existence. One of its central insights was that human beings do not simply "exist" but have a relation to their own existence. Humans know that they exist and that they themselves need to shape their own existence. They can only do so in a world. The human way of existing is as "being there"; this existence always takes place somewhere. Existential philosophy, too, conceives human beings, therefore, via being-in-the-world, though in its efforts to elucidate being-in-the-world it emphasizes not the human experience of the world but rather the realization of human existence in it – human praxis or action.

The alliance between phenomenology and existential philosophy proved so fruitful that two perspectives on the relation between humans and world have crystallized out of it, one that approaches this relation from the perspective or "pole" of the world, and the other that takes as its point of departure the human "pole." The first analyzes the human-world relation in terms of the way in which the world can present itself to human beings and become meaningful; the second looks at the way in which humans are able to realize themselves in the world. The first perspective can be called hermeneutic-phenomenological, inasmuch as it concerns interpretation and meaning – put most broadly, world-disclosure – and hermeneutics is the classical philosophical discipline that concerns itself with the disclosure of meaning. The second perspective, which concerns the way in which human existence takes shape, can be called existential-phenomenological.

Each of these two perspectives generates different philosophical questions about technology. In the hermeneutic perspective, the key question is the role technology plays in the way in which the world presents itself to human beings; in the existential perspective technology is described principally in terms of the role it plays in the way in which human existence takes shape. In my analysis [elsewhere] of classical philosophy of technology […] I used the difference between these two phenomenological tasks as an implicit starting point, for Jaspers and Heidegger each occupy a different pole in the classical phenomenological approach to technology, with Jaspers representing the existential and Heidegger the hermeneutic pole.

Toward a Postphenomenology of Things

The above reinterpretation of phenomenology as the analysis of human-world relations makes it possible to overcome the dichotomy between idealism and realism in a more radical way than did classical phenomenology. While the latter bridged the gap between subject and object by stressing that, in fact, these two are always already intertwined thanks to the intentional engagement of human beings and world, a new interpretation of phenomenology can take this a step further by emphasizing that subject and object *constitute* each other. Not only are they intertwined, but they coshape one another. Human beings can only experience reality by relating to it, which does not involve any reality-in-itself but rather reality-for-them. As consciousness (perception, experience) can only exist as consciousness of something, reality is always reality for someone; in their engagement with reality, human beings always disclose it in a specific way. At the same time, humans themselves are constituted in this relation. The environment with which they are involved always codetermines in which ways they can be present to the world and each other. In the encounter between humans and world, each manifests itself in a particular way. In the mutual relation of humans and world there arises, therefore, a specific "objectivity" of world and a specific "subjectivity" of human beings.

Neither of these two poles can be absolutized. Human beings can not arbitrarily disclose any world, for there is always "something" that is disclosed – even if this "something" is inaccessible, just as was the case with Heidegger's dimension of "concealment." […] Were that not so, one could not speak of a relation between human beings and world, for the world would be a mere product of human beings. But neither are human beings arbitrarily constituted in this relation, for if "no one" manifests herself or himself in this relation it would be impossible to speak of a relation either – even if that "someone" cannot be present

"in himself" or "in herself" but only in relation to a world. The fact that humans are what they are on the basis of their relation to the world does not imply that they are entirely determined by it.

This more radical phenomenological perspective, in which subject and object are not merely intertwined with each other but constitute each other, does justice to the contextualism of contemporary philosophy as it is expressed in the linguistic turn, in postmodernism, and also, for instance, in Latour's actor-network theory. I shall call this reinterpretation of phenomenology "postphenomenology." Ihde uses this term for his praxis-perception model of phenomenology, which revolves around the analysis of the perceptual aspects of the relation between human beings and their world.[9] In the introduction to *Postphenomenology*, he says that his philosophical orientation includes a strong sense of "proliferating pluralism" and of the loss of centers and foundations (Ihde 1993b, 1), but he does not then go about showing what a reformulated phenomenology might look like under those conditions. This is the aim of the more radical interpretation of phenomenology that I am proposing, in which subject and object, or human beings and world, constitute each other. This interpretation can be called "postphenomenological" in that it overcomes both the essentialism and the fascination with alienation that characterized classical phenomenology.

Postphenomenology can be viewed as an offshoot of phenomenology that is motivated by the postmodern aversion to context-independent truths and the desire to overcome the radical separation of subject and object, but that does not result in relativism. From the postphenomenological perspective, reality cannot be entirely reduced to interpretations, language games, or contexts. To do so would amount to affirming the dichotomy between subject and object, with the weight merely being shoved to the side of the subject. Reality arises in relations, as do the human beings who encounter it. Only in this sense is postphenomenology a relativistic philosophy – it finds its foundation in relations.

Technological intentionality

Postphenomenology offers a suitable framework for formulating a philosophy of technological artifacts that can resist the "Orphic temptation" to which the classical phenomenological philosophy of technology fell victim. Its perspective on artifacts, however, also needs to avoid the contrary of transcendentalism, namely, realism. For now that it is evident how problematic was the ambition of classical phenomenology to describe "the world itself," and now that it is clear that subjectivity and objectivity are constituted in the relation between human beings and their world, a turn "to the things themselves" runs the risk of landing the philosophy of technology back where it started. The ambition to think from the "things themselves" suggests the existence of an unmediated access to them.

But this suggestion is false. The facts that technological artifacts can be conceived as constructions, always exist in a context, and are interpreted by human beings in terms of their specific frameworks of reference do not erase the fact that systematic reflection can be undertaken of the role that these contextual and interpreted constructions play concretely in the experience and behavior of human beings. That "the things themselves" are accessible only in mediated ways does not interfere with our ability to say something about the roles that they play, thanks to their mediated identities, in their environment. And it is precisely the postphenomenological perspective that offers a new way of so doing.

In order to articulate the contours of a postphenomenology of things one can begin with the early work of Heidegger. … [T]his work conducts an analysis of technology that stands in sharp contrast to his later philosophy of technology. In *Being and Time* Heidegger saw the relations between human beings and equipment as occupying center stage – or rather, he saw the role of tools and equipment as occupying center stage in the relation between human beings and their world (Heidegger 1996, section 16). Heidegger showed that tools and equipment give shape to the encounter between humans and their world. Things make daily practices possible while withdrawing from the explicit field of attention. Only when human beings occupy themselves not with their tools proper, but rather with what they set themselves to do with the help of these tools, are these tools present *as tools*. The tools are then, in Heidegger's words, "ready-to-hand."

This concept of readiness-to-hand directs our attention to the way in which objects are present in the relation between human beings and their world, and brings such things into precisely the domain that phenomenology investigates. The crucial question now concerns the various ways in which things, on the basis of their readiness-to-hand, play a role in the human-world relation. For such things shape this relation from their withdrawn or ingrown position, as has been shown by

the examples already given. A train coshapes the way in which a landscape is present to human beings, a telephone coshapes the way human beings relate to each other. Things, therefore, are not neutral "intermediaries" between humans and world, but *mediators;* they actively mediate this relation.

Ihde has, from a phenomenological perspective, characterized this mediating role of artifacts in terms of what he calls *technological intentionality* (Ihde 1990, 141). By this he means that technologies – like consciousness for Husserl – have a certain directionality, an inclination or trajectory that shapes the ways in which they are used.[10] As an example, Ihde mentions the difference in writing style that arises when one writes with a fountain pen, typewriter, or word processor. One writes slowly with a fountain pen, with the result that it allows one to think over the sentence several times while composing it. The compositional speed is much faster with a typewriter, which tends to promote a style much closer to that of spoken language. And a word processor, in contrast to pen and typewriter, vastly expands the ability to compose a text; for instance, sentences can be moved around and footnotes inserted at will. These writing technologies are therefore not neutral means, but rather play an active role in the relation between author and text. They have an intentionality, a trajectory that promotes a specific kind of use (140–43). They do not have a determining influence, for one can indeed write a slowly composed and carefully thought out text on a word processor, and write conversationally with a pen. But the technologies in question *promote* or *evoke* a distinct way of writing. Technologies, as it were, contain an "implicit user's manual" (Procee 1997,159). A constructivist perspective on technology refers to this phenomenon as the "script" of technologies.

In the case of the fountain pen, this intentionality or innate trajectory became explicitly visible at the time of the introduction of the ballpoint pen. As the historian of technology Henri Baudet has pointed out, loud protests were made against the ballpoint pen when it first appeared. It was charged with having a negative influence on children's hand position and writing, and therefore on the quality of their work, the "neatness and care of their straight lines." Ballpoint pens were therefore viewed as "undermining instructional and pedagogical traditions." The classical way of writing with a fountain pen "represented a general social discipline," and this discipline was suddenly shattered by a faddish disposable product (Baudet 1986, 9–13).

Another example of the intentionality or trajectory of things is provided by an episode that happened in 1996 in the Romanian city of Cluj.[11] The mayor of this city proposed to shorten the shafts of the rakes used by the employees of the public gardens. These rakes, according to him, made possible an undesirable practice, allowing the employees to lean on them excessively. By shortening their shafts, the mayor thought, he could discourage laziness and encourage harder work. If the rake were merely a neutral means for the end of raking, this intervention would not have been necessary. Action had to be taken because the rake, en passant, made possible an entirely different practice, one that was not anticipated but that arose only in the practice of raking. The rake *mediates* the relation between the workers and the public gardens; it is not merely a means but plays an active role in the way this relation takes shape.

Ihde, to be sure, is not the only one to argue for the active role that things can play in their contexts. In the above brief sketch of Latour's actor-network theory it was clear that for him things are active and can play full-fledged roles as "actors." The first philosopher of technology to devote extensive attention to the active role of artifacts was Langdon Winner. In his essay "Do Artifacts Have Politics?" (Winner 1986a), Winner described what has become a famous illustration of this principle, concerning the low-hanging overpasses on Long Island in New York.[12] These overpasses, designed by regional planner Robert Moses, were deliberately built low to prevent busses from using the roads and allowing only automobiles to pass underneath. The roads along which these overpasses were built lead to Long Island's beaches, meaning that these were now accessible only by car. At the time these bridges were built, this meant that racial minorities and the poor, who could not afford cars and generally relied on public transportation, were effectively prevented from reaching the beaches. Winner characterizes the role played here by the overpasses as "the politics of artifacts."[13]

The postphenomenological perspective described above allows a more radical extension of Ihde's concept of "technological intentionality." The "intentionality of artifacts" consists of the fact that they mediate the intentional relation between humans and world in which each is constituted. When human beings use an object, there arises a "technologically mediated intentionality," a relation between human beings and world mediated by a technological artifact.

Two different meanings of "intentionality" are therefore intertwined here, a first referring (in Ihde's sense of

"technological intentionality") to the "intentions" of the technology itself, the second (in the more general phenomenological sense of "technologically mediated intentionality") to the relations between human beings and world that are mediated by the technology.[14] Both meanings are relevant for a phenomenological understanding of the role of technologies in human-world relations. When technologies mediate the intentional relation between humans and world, this always means from a phenomenological perspective that they codetermine how subjectivity and objectivity are constituted. Their "intentionalities," in Ihde's sense, consist of the fact that they coshape the contact between human beings and their world; they determine how human beings can be present in the world, and the world to them.

Multistability

There is, however, one pitfall that needs to be avoided in this analysis of the ability of artifacts to coshape the relation between human beings and world: this ability must not be conceived as an intrinsic property of the artifact itself. The effect of this misconception would be to smuggle back in again via the back door the old subject-object dichotomy – which it was precisely the triumph of phenomenology to have overcome. It would give rise to a kind of realism in which properties would be assigned to objects independently of the subjects for whom these objects exist. Winner's example of Robert Moses's overpasses makes clear, however, the shortcomings of such an approach. For the politics of these overpasses has considerably diminished with time. In a role reversal, the poor, too, now own automobiles, while many wealthy families take their vacations in campers big enough to be barred from traveling on the parkways in question (Achterhuis 1998, 386).

The thought that technological artifacts possess intrinsic properties and can themselves influence the relation between human beings and world supposes that technology can be spoken about independently of the humans that engage with it. But from the phenomenological perspective this is untenable. Artifacts can only be understood in terms of the relation that human beings have to them. Here one can make the same phenomenological move that others in that tradition make with respect to "consciousness" and "perception." Just as "perception-in-itself" and "consciousness-in-itself" do not exist, neither does "technology-in-itself." Just as perception can be understood intentionally only as perception-of, and consciousness only as consciousness-of, so technology can only be understood as technology-in-order-to. The "in order to" indicates that technologies always and only function in concrete, practical contexts and cannot be technologies apart from such contexts. In Ihde's words, "Were technologies merely objects totally divorced from human praxis, they would be so much 'junk' lying about. Once taken into praxis one can speak not of technologies 'in themselves,' but as the active relational pair, human-technology" (Ihde 1993b, 34).

The insight that technologies cannot be separated from their use contexts implies that they have no "essence"; they are what they are only in their use. A technology can receive an identity only within a concrete context of use, and this identity is determined not only by the technology in question but also by the way in which it becomes interpreted – as shown by Robert Moses's overpasses. Another example illustrating the context dependence of technologies is to be found in the early development of the typewriter, driven as it was by the desire to design equipment for the blind and partially sighted. But it quickly took on another identity, as a writing technology that is useful for nearly everyone (Ihde 1993a, 116).

Ihde calls such context dependence "multistability," and to clarify what he means he makes use of a perceptual example, the so-called Necker cube (Figure 1). When we look at this figure, we can see more than one thing. Sometimes we see a three-dimensional cube with

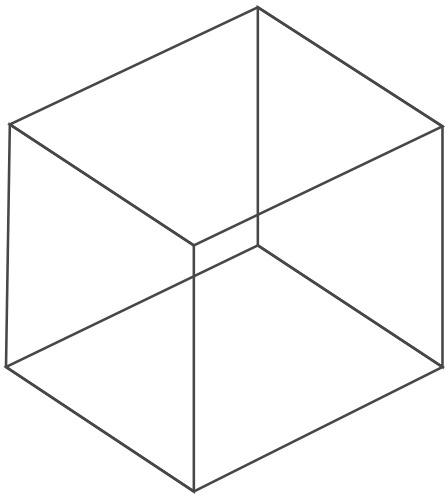

Figure 1 The Necker cube.

the bottom surface and two side surfaces turned toward us. If we try, we can switch between the two manifestations of the cube. We can also interpret the figure two-dimensionally and see it as an insect with six legs sitting in a six-sided cell of its web. Ihde uses this example to illustrate that different ways of seeing produce different figures. The figure allows multiple interpretations. What it "really" is remains undetermined. It is many things at once; it is "stable" in multiple ways. Something similar, according to Ihde, is at work in connection with technology. Just as the Necker cube has no "essence," neither do technologies. They are only technologies in their concrete uses, and this means that one and the same artifact can have different identities in different use contexts.

Two dimensions

A postphenomenological "turn toward things" in the philosophy of technology, as indicated above, needs to consist of the analysis of the mediating role of technological artifacts in the relation between human beings and reality. Such an analysis can be carried out in the phenomenological territory just described – hermeneutical and existential. In both dimensions of the intentional relation between human beings and world artifacts play a role. […]

In hermeneutical terms, things can mediate the ways in which human beings have access to their world by the roles that such things play in human experience. Questions such as the following arise: In what way do telescopes and electron microscopes, automobiles and airplanes shape our access to the world? In what way are others present to us when we contact them via telephone or email? An analysis of the technological mediation of our experience produces a new interpretation of hermeneutics. In place of the traditional emphasis on language and text, in this "material hermeneutics" things take center stage. […]

In existential terms, things mediate human existence. Here a different set of questions arises: How does the television set affect the way we divide up our day? What implications do automobiles and airplanes have for the way in which we organize our social relations? In seeking the answers to such questions, the existential-phenomenological perspective can acquire a more material interpretation. In this interpretation, concepts such as authenticity become less central, and more attention is paid to the way in which the material environment of human beings shapes the way in which they realize their existence.

Notes

1 In *Thinking Through Technology*, Carl Mitcham distinguishes among four different manifestations through which technology can be analyzed: as knowledge, as activity, as "will," and as object. The word "technology" can indicate a form of *knowledge*, such as sensory-motor skills, rules of thumb, and technological theories. But it can also indicate the *activity* of design, manufacture, and use of new technologies; the (Heideggerian) technological *will to power;* or technological *artifacts*. My concern here is with technology in the latter sense: concrete technological objects or artifacts (Mitcham 1994, 137–60).

2 See Bijker (1995), chapter 2: "King of the Road: The Social Construction of the Safety Bicycle."

3 Even Latour's actor-network theory can be counted among these developments, though in a somewhat headstrong way; he calls his thinking not postmodern but amodern (Latour 1993, 1999).

4 This quotation is from a lecture Van den Berg gave in 1991 at the Vrije Universiteit Amsterdam, quoted in Heij (1995).

5 A second reason why phenomenology has fallen under suspicion is due to the so-called *Wesensschau* (essential intuition) of Husserl's methodology. Contrary to what is suggested by this term, the Husserlian *Wesensschau* does not seek to intuit "true" or "authentic" reality, but is rather an instrument with which to track down the building blocks of ideas by which consciousness functions. This method consists of imaginatively transforming a phenomenon in various ways so as to determine which aspects are essential to it and which not. We can imagine dogs with stripes and spots, with short ears and long ears, with pointed and flat noses – but never with wings or gills. In this way we can arrive at a general idea of "dog." This general idea can never be found in the world itself, but is a pure idea; the *Wesensschau* is a perception of the ideas used by thinking itself. The method of *Wesensschnu* is part of the so-called eidetic reduction, a stage in Husserl's phenomenology in which a phenomenon in our consciousness is reduced to its "eidos," its form or idea. This eidos is a construction that must be presupposed in order to understand how human knowledge of reality is possible. The eidetic reduction belongs to an idealistic interpretation of phenomenology, in which Husserl had few followers.

6 Thus I join Ihde's pragmatically colored interpretation of phenomenology. See, for instance, Ihde (1979, 4–6; 1990, 3–25; 1993b, 5; 1998, 14–19).
7 See Ihde (1976, 35–36).
8 See Ihde (1983, 122–35, 141–49).
9 See Ihde (1993b. 3, 7; 1990, 30).
10 For the sake of completeness, it should be noted that Ihde uses the term "technological intentionality" in another sense as well. By "technological" or "instrumental intentionality" he indicates the directedness of technologies toward specific aspects of reality. A cassette recorder, for instance, possesses a specific intentionality with respect to sound, which strongly differs from human intentionality, since it registers not only foreground but also background sound. Ihde also indicates this form of intentionality as a "technological telos." See Ihde (1979, 77–78; 1983, 56; 1990, 102–3).
11 According to an article ("Shorter Shafts Combat Laziness") in the Dutch newspaper *Algemeen Dagblad* of 23 March 1996.
12 See Winner (1986a) and Smits (2001).
13 Winner's example has recently been challenged. It turns out, for example, that the overpasses in question probably have never been an obstacle for buses, as can be shown with the help of timetables. See Woolgar and Cooper (1999).
14 In fact, three meanings of intentionality are intertwined here, if one includes the additional meaning referred to in note 10 above.

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Technoscience Studies after Heidegger? Not Yet

Robert C. Scharff

Heidegger's account of the global hegemony of technology has often been condemned as exaggerated and dystopian. Exposing technoscientific excess is one thing, so goes the argument, but engaging in a "totalizing" condemnation of technology and science themselves is quite another.[1] Moreover, those who argue this way often add that Heidegger's later discussion of technology is a kind of betrayal of the promising but flawed analysis of everyday practices he gives in *Being and Time* [SZ].

In my view, this line of criticism is simply mistaken. Heidegger's account of the rise and current dominance of technoscience is neither abstract nor dystopian; and his later questioning of technology is not only consistent with SZ but depends on it. In fact, his idea that we live in an ontologically enframed world is much less metaphysical and totalizing than the much more familiar and acceptable idea that we are living in the so-called "developed" world. Both ideas portray technoscientific life as the practical and theoretical culmination of the Western intellectual tradition. The difference is that Heidegger does not share the happy, unreflective complacency that usually accompanies the developed-world idea. Even before SZ, he is already trying to dismantle and rethink the popular understanding that nourishes such complacency, not just socio-politically but ontologically, so that instead of letting it define a way of disclosing what is real that seems necessary, we might see it as just the now-dominant, frequently occlusive, and thus often "distressful" disclosure of sometimes all too "obvious" possibilities.

From Dilthey, Heidegger learned how to interpret his questions about what it is like to be born in the midst of this situation as an exercise in *Selbstbesinnung* – that is, as an effort at self-understanding he soon transforms into the ontological question: how it is to "be" philosophical in the present age?[2] At first, he conceives this situation quite generally and promissory note-like; it is "always already" a world of everyday affairs, but one that keeps getting metaphysically obscured whenever we try to "know" it. Eventually, Heidegger comes to articulate the character of this world more precisely as a technological one, and he distinguishes between trying to theorize this situation – which is what the Western tradition has typically done – and learning (as he says) to *think* it. He refuses to move directly to the usual questions of "what" there is and what we should "choose" to make of it. Instead he stops to ask: how "is" it to "be" in such a world? Must everything real and every way of living with it reiterate an ontology of knowable essences and instrumental choice? Like so many others in his time and ours, Heidegger does not understand technoscientific life to be an unrelievedly satisfying site of human progress.

It is at precisely this point that Heidegger's critics like to pounce. "See?" they say. Look at his romantic over-reaction! Just because we cannot celebrate our actual technoscientific present with the same incautious

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enthusiasm as the nineteenth century celebrated its then still mostly projected technoscientific future, this is no reason to throw a totalizing wet blanket over the whole age. The progressivist-scientistic utopianism of the previous era is gone; and with it goes any need for dystopian rejoinders. The age of grand narratives is over.

In my view, however, the scientistic optimism of the nineteenth century kind has not gone away. At least in North America and Western Europe, it is the widely, if silently, accepted default position – for the political economy's administrators and technocrats, mainstream epistemologists, and most philosophers of science. It is the pedagogical outlook of the "developed" world – the world one already belongs to or wants to join. It is the stance of the mature and educated human mind. And those who express doubts about this development in more than piecemeal, reformist terms, are judged as simply having failed to move beyond the theological, ideological, or romantic beliefs of earlier times. Like Heidegger, they are seen as having refused to be even late moderns – while the rest of us, in our greater maturity, are already considering how to be postmodern.

Heidegger's critics are right about one thing – his target. What "distresses" him is the way the current technoscientific world "sets up" and overshapes how we generally understand ourselves and the things we encounter as "being." Yet if his complaints about this are extensive, that does not make them regressive or Luddite; and it certainly does not justify psychologizing him away as suffering from anti-scientific pathology, or terminal pessimism, or a faulty political conscience. On the contrary, when his descriptions of technoscientific life are taken as formal indications (the way he means them) instead of as essentialist pronouncements (the way his critics take them), these descriptions bring issues into focus that have grown even more pressing than they were when he wrote the Technology-essay.[3]

In fact, I am going to argue that the usual criticisms of Heidegger may ultimately tell us more about his critics than about Heidegger. All the complaints about his alleged romanticism and essentialism strongly suggest that his opponents overestimate the degree to which the nineteenth century's scientistic understanding of the age has been surpassed – and thus also overestimate their own success in thinking after it. Viewed from this angle, Heidegger's analysis of technology may be not so much backward-looking or nostalgic, as "untimely" in Nietzsche's sense. For he seems to be saying what those who are trying most resolutely to be concrete about technoscientific life don't want to hear, at precisely the moment they most need to hear it.

Heidegger's Post-Heideggerian Critics

Critical reactions to Heidegger take several forms.[4] I shall focus on two of them here. First, there are the American and European philosophers of technology – Don Ihde and Peter-Paul Verbeek among them – who have taken what Hans Achterhuis calls the "empirical turn" toward technology (or technoscience) studies.[5] The most thorough and fair-minded elaboration of this position is probably Verbeek's *What Things Do*.[6] The technoscientific "empiricists," he explains, are perhaps best understood as post-Husserlians, aspiring to be phenomenological about "[the technological] things themselves." He agrees with their critique of Heidegger, but he admits that their actual criticisms are often too onesided in their neglect of his positive contribution to current technoscientific studies and too superficial and external to his own outlook to be really telling.[7] Verbeek is right, I think, that Heidegger's empiricist opponents tend to be just as abstract and totalizing in their portrayal of Heidegger as they accuse him of being about technology.

However, Verbeek seems less right in what he himself says about Heidegger instead. He does praise SZ for pointing the way to a phenomenology that "takes actual technologies seriously." Yet he argues that Heidegger's later work is fatally reductive because of what Verbeek calls its "transcendental" concern for technology's essence. Transcendental philosophy, he reminds us, looks for THE conditions for THE possibility of something; and taking this approach to all technologies effectively closes off any possible transformation of modern technology understood as enframing and leaves us helplessly "awaiting the arrival of a new way of being" (95). This transcendentalism forces Heidegger to conceive technology, in Verbeek's words, "backwards" instead of "forwards." By looking to technology's past in order to establish its allegedly essential conditions, Heidegger reduces all technology to its role in a "history of being," rooted in the Ancient Greeks' conception of τέχνη – and thereafter conceives everything about it as just a "consequence" of an earlier disclosure of being. The result is that Heidegger can never see technology instead as the possible "source" of future technoscientific transformations (91–94).

A second major reaction to Heidegger is represented by critical social theorists like Marcuse, Habermas, and Andrew Feenberg. Like the new empiricists, they often have positive things to say about SZ – only in their case, it is because they claim to find in this work the basis for a critique of ordinary life under capitalism that they cannot find in Marx. But they, too, regard SZ as betrayed by Heidegger's later work – and politically, they insist, not just philosophically. Habermas is of course the best known of these critics; and in addition to being politically influential, his polemics have also become a kind of *locus classicus* for any one wishing to defend the Enlightenment spirit against Heidegger's alleged attempt to "undermine … Western rationalism."[8] According to Habermas, the early Heidegger was an existentialist; he was seduced in the 1930s by the implicit decisionism of SZ into using it to justify his shameful political activity, and he thereafter retreated into a mystical and apolitical quietism that allowed him to explain away his Nazi past.[9]

As a student of Marcuse, Feenberg was of course exposed to this view, but his own reading of Heidegger's texts has always been less self-serving and ideological. In fact, in recent writings Feenberg has largely come to accept Heidegger's account of our present technoscientific condition. For him, Heidegger is not so much wrong about today's world as he is badly placed to offer an alternative. Here, Feenberg comes close to Verbeek and the technoscientific empiricists. He, too, regards Heidegger's account of current technoscientific life as a "metaphysical" over-interpretation of it.[10] He, too, construes Heidegger's claims about the "essence" of technology as claims about what is universally true and unchangeably necessary. Unlike the new empiricists, however, Feenberg's own program is not indebted primarily to SZ and to the post-Husserlian project of multiple phenomenologies. Instead, he looks to other parts of Heidegger's own work, but with a neo-Marxist eye. From Heidegger's interpretation of ancient τέχνη in the early lecture courses, Feenberg extracts a non-instrumentalist model of praxis. And in Heidegger's writings on poetry and art, he finds descriptions of a source of creative and less dehumanizing ideas about life and reality that might offer us a more democratizing vision of socio-political choice.

Now, I am entirely in favor of both Verbeek's phenomenological "turn toward things" and Feenberg's call for a humanized technology. Their mistake is thinking that Heidegger must oppose them. To start with, as others have pointed out, in Heidegger's vocabulary "essence," *Wesen*, is a verbal not a substantive noun. Hence, when Heidegger says that in the current eventuation of technoscience, there lies a pervasive "danger" more "essential" to it than its global reach and positive promise, he is characterizing how things most strongly tend to be, not how they cosmically have to be.[11] Thus he insists that "the essential unfolding of technology harbors within itself what we least expect, the possible rise of [a] saving power" (QT, 337). Indeed, if there were no potential "saving power" in our experience – that is, if we did not already have a strong sense that our relations with various technologies speak of other possible ways in which things are not just enframed and life is not just set up mostly as "one" instrumentally conceives it – we could not recognize these other possibilities as "other" at all. Things would simply "be" knowable and usable – and we would just "exist" with them – as knowers and users of stockpiled things.

We misread the Technology-essay, then, if we assume that what Heidegger says about *Gestell* and *Bestand* are the template for measuring every technology we currently encounter.[12] His point is not that all technologies are just instantiations of the universal idea of an enframed stockpile of useful things and nothing else. It is rather that, to the extent that we experience things as not being so, describing *how* they "really" are will be hard – in just the way SZ showed it is hard to give non-objectifying accounts of the stuff of everyday praxis. The central ontological fact of our age is that the "materially pervasive" presence of technology – so clearly a blessing in so many ways and so deserving of sensitive and detailed analysis in its own right – is also, and simultaneously, existentially intrusive. Hence, instead of reading him as discouraging the new phenomenological and critical accounts, we should understand how Heidegger's complaints arise at the very same time and from the very same place as these accounts. So, for example, we can love our information technologies and we can analyze their power and promise and fun just as concretely as we like – as long as we also consider how all this power and promise and fun happens in an ontological atmosphere that encourages us to *define* "knowledge" as information processing, to *define* "thought" as neural networking, and to *reduce* "intelligence" to having a big memory and an ability to manipulate symbols very fast.

Heidegger's critics are surely right – even if they do not see that Heidegger agrees with them – that we are all to some extent happy technoscientific pragmatists, and there is no going back. In a black mood, we might imagine

giving all of it up, but as he says, we cannot really "think" this. Nevertheless, there is also a whole disturbing array of experiences to be had at the margins of our happy technological practices, all of them tending to make technoscientific optimism as such feel profoundly unsatisfying. Today it is not just Heidegger who thinks that a depressing, retrograde, and dehumanizing threat seems at least somewhat more than equally constitutive of the kind of world for which the earlier modern tradition has nothing but praise. As even Feenberg now admits, when it comes to our current situation, Heidegger's account is generally telling. Are we, for example, better now at asking about the Good Life, the Just Society, or the Nature of Beauty, or even about what it would take to "know" these things, than in earlier days? Is life more spiritually satisfying, our political economy more democratic? Can we be sure that post-Heideggerians will handle such questions better than onto-theological metaphysicians?

Critique of Heidegger's Technoscientific Critics

To put this last point another way, as phenomenological or postphenomenological as Heidegger's critics may be in their accounts of particular technologies, their critique of him often seems shaped by a very pre-phenomenological traditionalism. In the early 1920s, Heidegger saw just this sort of problem in Dilthey, Husserl, and Jaspers.[13] For him, the real difficulty with, say, Dilthey's philosophy of historical life, or Husserl's phenomenology, or Jaspers' philosophy of *Existenz* does not lie in what they try to do. Their descriptions of human experience, he says, are often "phenomenological enough." The problem lies in their very traditional understanding of "who" – that is, what sort of philosopher – does the describing. A Dilthey who wants a "Critique of Historical Reason" still sees himself as a kind of anti-positivist positivist, epistemically looking down from above, reconstructing a second sort of method, for a second kind of objectivity, in a second set of sciences. The Husserl who wants a radically new beginning for philosophy still sees himself as founding a school, defending a traditional "scientific" ideal, looking for meaning in modes of "consciousness" as it intends different sorts of "objects," and teaching a method that will make phenomenology the ultimate positivism. Even Jaspers, who says he only wants to describe with the greatest possible sensitivity "what life is," still finds himself making "observations" about lived experience in the old objectivist language of subject-and-object, method-and-substance, the knowable vs. the ineffable, etc.[14]

In my view, one often sees just this sort of split between insightful description and traditional self-understanding in Heidegger's critics. On the one hand, the "empiricism" of the new American philosophers of technology is undoubtedly more phenomenological than traditional and more postphenomenological than traditionally phenomenological. Yet on the question of how our being-with various technologies is actually to be approached, they often explain themselves in very traditional terms – by saying, for example, that they are proceeding "materially" and "concretely," rather than "theoretically" and "abstractly." Verbeek and other so-called "new wave" figures now mostly reject the old idea that to be concrete means returning to an "original" sense of reality that lies beneath our scientific and technologically enhanced ones. But the real question is how to avoid this old idea in the right way. Verbeek argues that the notion of starting from a pure and uncorrupted life-world is a holdover from the embattled Husserlian era when phenomenology was preoccupied with undercutting the positivist-naturalist claim that a scientific view of the world is philosophically basic. Today, he says, we need only observe that

> the tree that I climb is real for me in a different way than the one whose cells and sap I study, but so is the tree that I photograph, chop down to use for firewood, or cut up to build a table. None of these disclosures can claim to reveal the "true" tree: they are each equally true. (105)

Verbeek claims that even today's scientists themselves accept this view. He says they realize that science does not involve "excluding" or replacing our older senses of the meaning of the world, but only offering "a new and different kind of disclosure of it" (105). Yet I seriously doubt that many scientists are this pluralistic about their "new disclosure" – and especially not when they are applying for grants, ranking the best journals, or taking sides in the Science Wars. In fact, and more importantly, when they dig in their ontological heels on the disclosure question … they still tend to win. The Real is What Is the Case; there is nothing multistable about it. On this issue, science has no competitors, only detractors.

To such familiar and self-confident scientism, anti-scientistic pluralism is no reply, and technoscience studies pays a price for characterizing itself this way. In point of

fact, an egalitarian appeal to multiple perspectives is just as abstract and contextless as the reigning philosophical claim to objectivism. It is already a mistake not to recognize that no one lives in such a way that they can actually *be* someone who says – and means it – "I *understand* that 'All the disclosures of things are *equally* true.'" Or "Let's *compare* ordinary and enhanced experience."[15] But to make this mistake in an atmosphere in which philosophical objectivism is already winning simply guarantees that it will maintain its undeserved hegemony at phenomenology's expense.

Critical social theorists, too, often seem to speak from a viewpoint that nobody lives – even when, as Feenberg clearly does, they explicitly deny that they are doing so and insist instead on attending to real and concrete socio-economic needs. Yet how, for example, does one achieve what Feenberg calls the "reflexive" outlook from which one feels justified in, first, embracing a de-essentialized version of Heidegger's account of current technoscientific life and then, second, offering a "democratically" liberalized idea for its transformation? And how does one obtain his sort of assurance that this liberalized idea – or for that matter, any idea of technoscientific life – will ever succeed in addressing *all* our concerns and activities? Should all the issues associated with democratization – among them issues of race, gender, class, and species – be treated through a critical analysis of technoscience? How can we be sure that these other phenomena, if given their full due at the outset, would not displace precisely Feenberg's own philosophical priorities? How does someone who has achieved his sort of reflexive standpoint respond to those who would appeal "concretely" to the very same experienced world as he does, but reject his technological displacement of, say, political economy, or class, or race as the basic issue?[16]

In short, stated without frills, both phenomenological and neo-Marxist critics of Heidegger, whatever they say they are doing, tend to display the following approach in their practice. Leave essentialism and bad theorizing behind, attend to the technoscientific matters at hand, and consider "normativity" whenever the occasion seems to call for us to turn to it.[17] All of this should sound very familiar. It recapitulates in the new, allegedly post-scientistic outlook a variant of precisely the same ahistorical viewpoint that Heidegger's post-Heideggerian critics claim to have surpassed. In fact, whatever may be their intention, philosophers who "reject" the abstract and "decide" on the concrete are *behaving* like inverted Cartesian subjects. Like good Cartesians, they turn to their phenomenological descriptions because they "resolve" to do so – just as they resolve to reverse Descartes original priorities. Instead of favoring his theories about nature, they ask us to return to all those everyday experiences that his *Meditations* distort and ignore (or at least view "differently") … so that we can describe and evaluate and privilege them instead.

It is this tendency toward the silent continuation of a kind of inverse traditionalism – an embrace of the old ontological dualism that now favors the side which has long been out of favour – that concerns me. Being committed to phenomenological description or democratically rationalized practice does nothing by itself to weaken the hegemony of the traditional privileging of *Wissenschaft*. Nor does it give us a world in which we have stopped playing the familiar ontological favorites. In fact, being thus committed is an expression of this hegemony. At this moment, in this world, it "is" not True, as Verbeek wants to say, that we can just decide to identify technologies in their multiple disclosures, instead of always judging them in terms of their essential utility and manipulating them according to what everyone knows and values. Our world does not contain any Understanders of Verbeek's pluralizing Truth, because some of his multiple disclosures already arrive in our experience with significantly greater ontological clout than others. In our world, the problem is not that we cannot – sometimes, here and there, in some venues – have experiences that seem ill-served by the usual metaphysical understanding of things. It is rather that we have not figured out how to properly "think" this or to actually live out the unrealized possibilities of life that such non-framable experiences suggest to us.

Conclusion: A Modest Proposal

I conclude, then, with a philosophical statement of intent. I want to think in Heidegger's wake without imagining that I think "after" him. On the grounds that it involves ontological backsliding, I refuse to "choose" between a humanizing, phenomenological interest in particular technologies, and a thoughtfully reflective self-concern for the fact that precisely this interest must work itself out in the technoscientific atmosphere of an ever more "developed" world that already sets up and "essentializes" everything. I happily acknowledge the rapid growth of technoscience studies.[18] I want its proponents to make their concrete studies an integral part of twenty-first

century life. Yet if we ask what a phenomenologist, postphenomenologist, or critical theorist of technology actually does, their answers are still too often given in the metaphysical language of essentialism vs. empiricism, of abstract and concrete, of values and choices – even when their accounts of particular technologies achieve something better. The problem is that no study of material culture – not even the most resolutely post-phenomenological or democratically-minded – can actually become what it claims to be when it rests on a loud dismissal of the Heideggerian project as merely old-fashioned, metaphysical "world-interpretation."[19] Affirming one thing while dismissing another is just the sort of move one makes *within* a technoscientifically "set up" world, under the delusion that one is doing so entirely by choice, and from Nowhere.

To explain all of this from one more angle, I close with a passage from *On the Internet*, the little book in which Hubert Dreyfus describes what he calls, "Nihilism on the Information Highway." He begins with an analogy between Kierkegaard's critique of "the Press" and his own critique of the World Wide Web. Kierkegaard, he says, would surely have regarded the Internet as a "hi-tech synthesis of the worst features of the newspaper and the coffeehouse."[20] Dreyfus then continues:

> What [Kierkegaard] envisaged as a consequence of the [Danish] press's indiscriminate and uncommitted coverage is now fully realized on the World Wide Web. Thanks to hyperlinks, [all] meaningful differences have, indeed, been leveled. Relevance and significance have disappeared. And this is an important part of the attraction of the Web. Nothing is too trivial to be included. Nothing is so important that it demands a special place … . Kierkegaard [saw] the implicit nihilism in [this] idea … . On the Web, the attraction and the danger are that everyone can take [a detached and] godlike point of view. One can view a coffee pot in Cambridge, or the latest super-nova, study the Kyoto Protocol … plough through millions of ads, all with equal ease and equal lack of any sense of what is important. The highly significant and the absolutely trivial are laid out together on the information highway. (78–79)

Dreyfus concludes that, in the world of the Press and the Web, we seem to have only two options left: conformity or nihilism. Either join in or, as Kierkegaard puts it, plunge into some activity, any activity, as long as you do so "with passionate commitment" (80).

Note carefully, however, that passages like this one can be read in two very different ways. If we take our cue from Heidegger's critics, it might be supposed that we should read it as a collection of essentialist claims about the Web with a capital "W." And, obviously, we must therefore reject what Dreyfus says as mere romanticism, expressed in one-size-fits-all statements so abstract and general that they misrepresent just as many experiences as they cover. But it seems clear that Dreyfus intends this passage quite differently. I think he wants it to be heard with a Heideggerian ear, as describing how techno-science *for the most part* already tends to "occur," to "give" reality to us – that is, to essentialize. And this gift, as Heidegger says, has a double structure: it discloses everything in a way that simultaneously makes it intelligible, fascinating, useful, fun *and also* often existentially intrusive, onto-logically oppressive, and unsatisfying.

Those of you who know Dreyfus will understand why I picked a Heideggerian-sounding passage from his work rather than someone else's. For Dreyfus is famously no dystopian about technology, and no romantic about what's wrong with it. But he is, like Heidegger, convinced that a "free relation" with technology is not already present in our world, that it cannot simply be chosen, and that it will therefore have to be "prepared" for.[21] Indeed, the point of the chapter from which I am quoting is that if we see how the Press and the Web are "the ultimate enemy" of a fulfilling life that involves unconditional commitment and genuine risk (88), this also helps disclose to us by contrast precisely what such a life would have to "be." The Press and the Web, while busy being themselves, are also the enemy of something. In other chapters, Dreyfus tells us what he thinks this something is – namely, all those aspects of human ek-sistence that are crucial to really flourishing lives, but that are now "metaphysically" subordinated in a dominant tradition that already tells us what is ontologically more fundamental. Thus, for example, *embodiment* already tends to lose out to disembodied cognition; technical and rule-governed skills are everywhere privileged over *expertise*; and propositional language and information processing are favored over what Kierkegaard is forced to call "*indirect* communication."[22]

Dreyfus's aim is not just to complain about all this but to show how, precisely by making it explicit, we can find a voice for those elements of our lives that are now being obscured and subordinated. For example, says Dreyfus, if we use the Internet with my seemingly negative vision in mind, we may "remember that our culture has already fallen twice, first for the Platonic and then for the Christian temptation to try to get rid of our