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Can a Computer Understand?

Hermeneutics in Computer Science (thinking through Habermas, Heidegger and Dilthey)

Bill Maurer

The hermeneutic tradition in Germany though arose, with Wilhelm Dilthey, as a critique of positivist science. Drawing on the tradition of legal and literary interpretation, Dilthey generalized the process of understanding texts to the experience of living in the world with other meaning-creating human beings. To understand is not just to understand a text; rather, understanding is a central attitude for any person situated in the world who creates meaningful expressions out of her own lived experience and who, because of her participation in a cultural and historical context, must engage in understanding as a discursive enterprise with other meaning-creating, expressing participants. Dilthey's hermeneutics thus saw scientific knowledge not as founded in 'objective facts,' but as produced in the human interactions of everyday life and as grounded in practical experience. The 'facts' themselves only become facts in the context of scientific, historical and cultural practice out of which they arise.

The critique of science put forth by Dilthey at the turn of the century, and subsequent discussions of technology by members of the Frankfurt School and in the phenomenological tradition, may appear to have had little effect within the scientific tradition itself. Positivist science 'works' – that is, it permits a technical mastery of the world it presupposes and simultaneously constructs. In effect, it makes a world after its own image such that it takes on the character of a self-fulfilling prophesy.¹

Recently, two computer scientists have questioned whether the efficacy of 'science' is more apparent than real. Terry Winograd and Fernando Flores' *Understanding Computers and Cognition* (1986) attempts to provide a charter for new directions in computer science by breaking with rationalist models of language and cognition. They explore the potential usefulness of hermeneutics for reorienting ideas about efficacy, and for remodelling computer design in accordance with this changed perspective. In this paper, I will explore Winograd and Flores' use of the hermeneutic tradition – notably, Heidegger and Habermas. I do this with two ends in mind: first, I will show that Winograd and Flores, while trying to root out rationalist assumptions in their own theories through recourse to hermeneutics, unintentionally demonstrate the rationalist assumptions lurking in Heidegger and Habermas, the two theorists they rely on most. Second, I will use the occasion of Winograd and Flores' forays into hermeneutics to reflect on the hermeneutic tradition in general, and on its value for providing reorientations to 'scientific' thinking.

The paper is divided into five parts. In the first part, I will attempt to convey Winograd and Flores' understanding of 'understanding' in the context of artificial intelligence. Then I will discuss briefly the direction in which Winograd and Flores hope to take computer

design. Next, I will point out the rationalist assumptions Winograd and Flores rearticulate in their rethinking of computer design, and I will argue that these also implicitly ground the philosophies of Heidegger and Habermas. I will then take a brief detour into the work of Alan Turing, another computer scientist concerned with artificial intelligence. I find Turing useful for exposing some of the 'pre-understandings' that are pervasive in Heidegger and Habermas, and that reemerge in Winograd and Flores. I end this essay by contrasting Heidegger and Habermas' hermeneutics with Dilthey's, to suggest future directions for the kind of project Winograd and Flores have initiated.

I should add here that I am sympathetic to Winograd and Flores' project, and that my criticisms are not meant to undermine their work, but rather to build on it. *Understanding Computers and Cognition* has received mixed reviews in the field of artificial intelligence. Most, however, have been unfavorable and some have been downright hostile.² In being attentive to the tenor of these reviews, I intend to avoid misunderstandings of my own position on Winograd and Flores' book. When I mentioned to a friend – whose spouse is a computer scientist – that I was writing this paper, she expressed dismay at my being critical of "the only people in computer science doing any good for the world." I think it will become clear in the course of this essay that I agree with my friend's assessment of Winograd and Flores' work. But taking their book as an occasion to reflect on the hermeneutic tradition and its great value and challenge for 'science' leads me to reject parts of Heidegger and Habermas on which Winograd and Flores rest, and more fully to embrace Dilthey. Ultimately, my reflections bring me to the hope that Winograd and Flores will continue to delve into hermeneutics in their project of reshaping science.

I. Understanding Computers

Artificial intelligence is that branch of computer science which is devoted to modelling 'intelligence' on machines. The term 'artificial intelligence' was coined at a conference of scientists held at Dartmouth College in 1956 which brought together a group of ten computer scientists from government, academia and industry to discuss the possibilities for designing computer programs that would display behaviors which one could call 'intelligent.' Since that initial conference, the field of artificial intelligence has expanded, and has had a strong impact on linguistics, cognitive science and philosophy.

The initial question of whether computers could exhibit 'intelligence' has led to reflection on the nature of intelligence itself, and on the claims made by artificial intelligence to model the workings of the mind. Two general paradigms have resulted: in the 'weak' view, the prospect of making intelligent machines is really an occasion to understand how humans think; modelling apparently intelligent behavior on a computer serves a heuristic function for sciences of the mind more generally. In the 'strong' view, computer models of intelligence are taken to be instantiations of cognition itself; the computer 'thinks' and really is a mind.³

Terry Winograd and Fernando Flores situate their project at the center of debate in artificial intelligence. In it, they take an unflinching – but unpopular – position: "one cannot program computers to be intelligent" (Winograd and Flores 1986: 93). But Winograd and Flores are not merely concerned with the technical problems of modelling 'intelligence;' they intend to bring to light the conditions of possibility for the question of whether

computers can be intelligent. How is it, Winograd and Flores wonder, that the question "Can a computer think" can be asked? They write:

We address these questions not so much to solve them as to *dissolve* them. They arise in a background of understanding about human thought and language, a background that itself needs to be re-examined and revised. In the end, we are not concerned with providing new answers to questions about technology as they have traditionally been posed. We look towards new questions that can lead to the design and use of machines that are suited to human purposes (p. xiii).

The background they wish to re-examine has to do with what they term the 'rationalistic tradition.' This tradition relies on the belief that real objects exist in the world, independent of their discursive mediation by human agents. Human agents solve problems by figuring out the sets of rules governing the formal logic of objects in the world. Language and cognition proceed according to fixed procedures which map onto this logic. Thus, "sentences say things about the world, and can be either true or false; what a sentence says about the world is a function of the words it contains and the structures into which these are combined; the words of a sentence can be taken as denoting in the world objects, properties, relationships, or sets of these" (paraphrased from p. 17). Thought becomes "the manipulation of representation structures in the mind" (p. 20). The orientation is formalistic and reductive.

Artificial intelligence relies on the rationalist tradition to build models of the mind. If a program can be developed that manipulates representation structures to solve problems in the object world, it can be said to 'think.' All that is necessary is to develop sets of correspondence rules mapping the formal structure of the object world into the computer.⁴

Winograd and Flores argue that the rationalist tradition fails utterly to capture what it is that makes human beings thinking beings. To argue against the rationalistic tradition, Winograd and Flores pay careful attention to the language in which it is couched. Language is of central importance, "since it constitutes the background of the beliefs and assumptions that determine the nature of our being" (p. 29). Uncovering the language of the rationalistic tradition helps us to see the taken-for-granted assumptions that constitute it.

At its core, the rationalistic tradition presupposes that things in the world exist independent of any interpretation or mediation. Perception, thus, "is the process by which facts in the world are registered in our thoughts and feelings;" thoughts and feelings, in turn, can cause our bodies to move and thus instantiate our feelings in the object world (p. 31).

Here Winograd and Flores introduce Heidegger.⁵ Heidegger found the persistence of argument about the status of the material and ideal domains to be the "scandal of philosophy" (quoted in Winograd and Flores, p. 31). The scandal relies on a fundamental blindness to the nature of being and consciousness. This blindness arises in western metaphysics with the constitution of the subject as sovereign over the world as object.⁶ Once the separation between subject and world-as-object is made, the true nature of being-in-the-world (*Dasein*) as *unity* is hidden.

The unity of *Dasein* has to do with its position in the flow of time. Here Heidegger echoes Dilthey: Being is only Being in temporality. We move through time unreflectively. We do not contemplate in order to make our actions; we are simply 'thrown' into the flow of time and Being. Only when our practical consciousness is interrupted and we supersede it with philosophical speculation do we contemplate the world as object. The beginning of

metaphysics is the beginning of the false separation of contemplation from temporality.⁷ Winograd and Flores nicely paraphrase: "By drawing the distinction that I (the subject) am perceiving something else (the object), I have stepped back from the primacy of experience [that is, its temporality] and understanding that operates without reflection" (p. 31).

The interpreted and the interpreter are both in Dasein. Interpretation is thus the true essence of all being-in-the-world. Interpretation and being arise from a 'background' of Being, of Dasein. Dasein cannot be rendered up for 'objective' observation, since objective observation itself denies the essence of Dasein. For this reason, the background of pre-understandings constituting Dasein can never fully be made explicit. It is only under conditions of 'breakdown' when some background assumptions come to the fore. Winograd and Flores explicate this with reference to the act of hammering a nail. When I hammer a nail into a piece of wood, I do not reflect on the object-ness of the hammer; it is 'ready-to-hand,' it has no existence as such to me. If I slip and hit my thumb, the hammer comes into being with the full force of its 'hammeriness.' It has moved from the background of the temporal flow of Dasein into consciousness. Its *presence* has been revealed to me; it becomes 'present-at-hand' (see Winograd and Flores, pp. 32-33, 36-37).

How does Heidegger help us understand computers? Winograd and Flores argue that the notion of Dasein reveals to us two things: first, it reveals the background of assumption that allows the question "can a computer be intelligent" to be asked:

In applying a predicate to an entity, one is implicitly committed to the belief that the entity is a kind of thing to which the predicate properly applies. In uttering a sentence containing mental terms ('intelligent,' 'perceive,' 'learn'), we are adopting an orientation towards the thing referred to by the subject of the sentence as an autonomous agent. The issue is not whether it really is autonomous ... Rather, in using mental terms we commit ourselves to an orientation towards it as an autonomous agent (p. 105).

Second, the notion of Dasein points up the fundamental problem with accepting the background of assumption constituting the question "can a computer be intelligent:" a computer is *not* an autonomous agent, any more than a human being is. Both exist in worlds constituted by meaningful actions and expressions which in turn permit such actions and expressions. The difference between a computer and a person, however, is that the person can interpret and understand; the machine – like a text – can only act as a *medium* for understanding in the realm of human interaction. It is the commitments and understandings of the computer's designer which are conveyed in the computer to another meaning-creating, meaning-infused being. We know this because computers – however great their technical sophistication – are readily made present-at-hand: breakdown is a basic characteristic of computer technology. Artificial intelligence merely hides or denies this breakdown.

II. Directions for computer design

Given that computers are mediums for human understanding, Winograd and Flores argue for a new foundation for computer science based on the nature of the human interactions

which generate meanings to be interpreted and understood by others. Here they invoke the work of Habermas.⁸

Habermas holds that human understandings are generated in a field of communicative interaction wherein a speaker conveys meaning to a listener always with reference to a given world-structure.⁹ Understanding only occurs in the context of *dialogue*, and of a *consensus* among participants in dialogue. Meaning is communicative.¹⁰ Language is social. It "cannot be traced back to the meaning-giving activity of individual subjects" (Winograd and Flores, p. 62).

Based on Habermas' insights, Winograd and Flores propose a new basis for computer design, one that explicitly acknowledges that computers are tools for human communicative interaction, not thinking agents in their own right. A computer can never operate with reference to the background of human interaction on its own; but it can be used to help people become aware of this background structure and thereby engage in more meaningful conversations with other people.

Winograd and Flores introduce a program called 'The Coordinator,' which they have developed based on these Habermasian principles. The Coordinator is for use in office settings where people engage in recurrent conversations in order to accomplish management tasks. Confusion sometimes results in such settings, because people sometimes are not aware of other people's intentions or the implicit references underlying their discussions. The role of the Coordinator in such situations "is to make the interactions transparent – to provide a ready-to-hand tool that operates in the domain of conversations for action" (p. 159).

The Coordinator allows people to choose from a limited number of kinds of statements – requests, promises, and so forth – and conveys these to other people (like a sophisticated voice-mail system). "It is not the same as a face-to-face conversation ... [But] [b]ecause the illocutionary forces and temporality are specified explicitly, it is necessary to be conscious of them and to have a mutually visible manifestation of them" (p. 161). In an organizational setting, this will prevent miscommunications, or 'breakdown.' The Coordinator, founded in the consensus of people engaged in communicative interaction, helps maintain that interaction by letting people make explicit their commitments in the dialogue, thus maintaining consensus.

III. Problems with *Dasein*, Consensus, and 'the Coordinator'

Winograd and Flores' marriage of Heidegger and Habermas seems at first glance reasonable enough, despite the deep differences between these two thinkers. I would like briefly to explore these differences in this section, but show that some presuppositions of Heidegger and Habermas ease their union (as in Winograd and Flores' 'Coordinator'). The conditions of possibility for this wedding suggest, however, that Habermas and Heidegger might not be the best theorists to bring together in order to birth a non-rationalistic foundation for computer design.¹¹

The basis of the difference between Habermas and Heidegger lies in their relationship to the Enlightenment. Heidegger sees in the development of technology the completion of the Enlightenment project. Technology finishes off the Enlightenment project of thoroughly estranging subject from object. The construction of the world as 'picture' – an

object to be viewed, not engaged – made fully possible with technology, seals modernity. Metaphysics is over. One must adopt a nihilist attitude to ‘destruct’ existing totalities and recapture the true nature of being-in-the-world. To recapture the unity of Dasein, one must crash through the world picture.¹²

Habermas counters Heidegger with his belief that Dasein is never simply ‘inherited’ as a totality (or in its ‘totality’). Rather, totalities are continually constructed and reconstructed by people engaged in communicative interaction, who by engaging in conversations, create the background totality within which their utterances make sense and are understandable to others. Given the always-coming-into-being of being-in-the-world, Habermas believes we are capable of *rationaly* reconstructing the totalities with reference to which we create meanings.¹³

I think Habermas’ and Heidegger’s positions are reconcilable, however, when we examine more closely the nature of communicative interaction Habermas puts forth. To rationally reconstruct meaning and context requires a situation in which participants in dialogue agree to come together in the venture of understanding itself: Habermas implies that *consensus* must be a precondition for any meaningful activity in the world.¹⁴

That there is a metaphysics to this notion of consensus is apparent in Habermas’ explicit invocation of the Enlightenment project of social engineering. I think there are two orders to Habermas’ consensual domain. The second order is most apparent: this is the domain of communicative interaction itself. But beyond the actions of people engaged in and constituted by social exchanges, I think Habermas holds a primary, first order domain of *subjects* who are *capable* of entering into contracts with one another to form consensus and, hence, in a deep sense, ‘communicate.’ Like Heidegger’s Dasein, Habermas’ first order consensual domain contains a conception of being-in-the-world as profoundly total and totalizing. As we can ask of Heidegger, “can there be other ‘theres’ for ‘being-(there)-in-the-world’?” so we can ask of Habermas, “can there be other backgrounds to communicative interaction which do not presuppose contract and consensus?” This is an anthropological question. It moves us to consider the ‘rationalistic’ – that is, western metaphysical – bases of Habermas’ and Heidegger’s thought. It also allows us to pose a straightforward historical question to Habermas: have such consensual domains ever existed?

In a provocative article, Nancy Frazer argues that the kind of ‘public sphere’ Habermas theorizes as a consensual domain came into being only through the exclusion of certain kinds of subjects: women, non-landowners, and so forth.¹⁵ She shows how, in concrete historical situations, the public sphere of communicative, democratic interaction founded on openness and equality in fact relied on distinction and difference. Universalizing this ‘public sphere’ to be ‘the’ Public Sphere, as Frazer argues, Habermas does (and as I believe Habermas’ ‘first order’ consensual domain suggests) ultimately denies the existence of alternative ‘publics.’ Frazer thus recuperates Habermas’ project of locating the ‘counter-discourses’ to the Enlightenment, but includes among those counterdiscourses ones working to constitute publics not founded in contract and consent, but on (for example) coalition among different, sometimes incommensurable, interests. Once these alternative publics are visible, we can then grasp the exclusions and pre-understandings that constitute the background against which meaning is generated and understood.

Turning back to Winograd and Flores for a moment, we can intuit how the problem of totality and rationalism lurking in Habermas and Heidegger gets unproblematically inscribed into their computer science. The Coordinator takes as transparent that communi-

cative interactions will take the character of 'promises' or 'requests' and so forth. These kinds of illocutionary acts only become an issue in 'breakdown.' The role of the Coordinator is to make things like 'promises' transparent. But this leaves unquestioned the constitution of 'promises' in the first place. How *do* we understand 'promises,' for instance? Do we place them into our ideas about 'contracts,' since one can renege on both? If so, what goes into the constitution of contracts?

The political philosopher Carole Pateman argues that the notion of contract as it arose in the Enlightenment political philosophy of Locke, Hobbes and Rousseau is grounded in assumptions about gender. Contracts can only be made between rational and autonomous persons, otherwise they are nonbinding. Women, according to the contract theorists, can never be autonomous because they must contract to marry men; in so doing they subordinate themselves, and thereby demonstrate their fundamental irrationality. This disqualifies them from being contractual individuals. Women provide the counterpoint against which men's autonomy and rationality as contractual individuals is measured.¹⁶

In assuming contractual individuals, the Coordinator reinscribes the gendered presuppositions constructing such individuals. This is particularly ironic, given that the contexts in which the Coordinator might be put to use include offices where mainly women work under part-time or temporary conditions (which color the schedule of 'promises' and the extent of their 'commitments').

IV. An Alternative: Alan Turing

Alan Turing, a mid-century computer scientist, wrote a seminal essay on the possibility of artificial intelligence which he opened with the question, "Can a machine think?"¹⁷ I do not wish to dwell here on his conclusions and the argument he made to reach them (for I do not share the conclusions and am unconvinced by the argument).¹⁸ Rather, I wish to discuss briefly the 'test' Turing contrived to determine whether or not a machine 'thinks.' I think the so-called 'Turing test' demonstrates nicely a kind of understanding Habermas and Heidegger do not consider.

The Turing test is an imitation game. Turing imagined a game played between three people: an interrogator, a man and a woman. Each is placed in a separate room so that none can see or hear the others. They can communicate by teletype. It is the interrogator's job to put questions to the man and woman in order to determine their gender. It is the man's task to attempt to deceive the interrogator, and the woman's task to help the interrogator. Turing asked "What will happen when the machine takes the part of [the man] in this game? Will the interrogator decide wrongly as often when the game is played like this as he does when the game is played between a man and a woman?" (Turing 1950: 43-4).

Essentially, the Turing test asks "Can a machine successfully deceive?" More specifically, the test asks "Can a machine gendered male successfully enact being a woman?" or "Can a 'male' machine be a convincing transvestite?" If it can, for Turing, it can be said to be 'intelligent.'¹⁹

The Turing test, I submit, challenges the kind of understanding posited by Habermas in a fundamental way. It relies on deception, not consensus. Furthermore, it relies on a deception that some might hold touches an essential aspect of being. This aspect – gender – whether or not it is a core of being, is certainly a core of contract theory and of Habermas'

communicative, consensual interaction. The Turing test thus calls for a deeper notion of understanding, one that can account for the constitutive pre-understandings of consensual domains.

V. Conclusions

In looking at the rationalistic assumptions of Habermas and Heidegger, I think we are led to a reconsideration of Dilthey. Dilthey argued that 'living through' one's cultural and historical position gave one's life expressions their particular character. To understand those expressions, the hermeneutician – really anyone attempting to understand another – must develop a rich sense of the different practical worlds in which people 'live through' their experiences. Simultaneously, the hermeneutician's acts of understanding must themselves be understood as historically and culturally located life expressions, for, as Dilthey put it, "the consciousness of [an] experience and its constitution are the same" (GS VII, 139).²⁰

Dilthey was particularly attentive to the diverse ways being has been constituted in different cultural and historical settings. He also kept in view the kinds of being assumed by different modes of understanding employed in different times and by different cultures. He writes that "man as a fact prior to human history and society is a fiction of genetic explanation" (GS I, 31), and that, for example, "the historical thinking of the Greeks and Romans mainly presupposes a definite human species equipped with definite characteristics" (GS VIII, 76).²¹ Dilthey saw in the process of attempting to understand different people an occasion to reflect upon the conditions giving rise to one's own effort at understanding. In commenting on the discipline of psychology, for example, he writes:

... apprehension ... arises out of lived experience and remains bound up with it. ... This ... determines the nature of the understanding of ourselves and others. ... The theoretical reconstruction of human nature in general by psychology must adhere to [this] original procedure of understanding if it is to remain sound, vital, life revealing and fruitful for the understanding of life. ... Psychological investigation [thus] ... grows out of lived experience itself and must always retain its firm roots in this (GS V, 172-173).²²

Understanding, for Dilthey, is a methodological device, but also a primary aspect of life. As Mueller-Vollmer puts it:

... what we understand as humanists or scientists is always a manifestation of human life, a 'life expression' (*Lebensäußerung*). But understanding itself is a manifestation of life; acts of understanding are lived by us; they constitute 'lived experience' (*Erlebnis*) (Mueller-Vollmer 1985: 25).

One's *Weltanschauung*, or the context of one's lived experience, secures an epistemology for the study and understanding of other people, for *Geisteswissenschaften*. Attending to the nature of the *Weltanschauung* permitting our inquiries helps us to understand the inception of those inquiries and the kinds of human natures that allow such inquiries to be fabricated (see Young 1970 and GS VIII, 75-87).²³

Knowledge of the mind-constructed world originates from the interaction between lived experience, understanding of other people, the historical comprehension of communities as the subject of historical activity and insight into objective mind (GS VII, 196).²⁴

I think Turing's imitation game allows us to see the constitution of lived experience in a way Winograd and Flores' Coordinator does not. The Turing test posits a machine that calls into question the conditions of possibility for living in the world as a gendered being engaged in – sometimes deceitful – dialogue with others. The Coordinator merely takes such conditions for granted, in making transparent requests and promises but not inquiring into their *constitution*.

My statements here, however, betray a paradox. Of all the computers we could imagine, only a machine of the kind Turing envisions could help us further understanding. Such a machine, however, is an impossibility – for it to exist it would have to be a thinking agent, and for it to think it would have to participate in the unformalizable, unspecifiable background of pre-understandings, the pre-predicative knowledge that arises in human interactions and that makes humans into conscious beings. Perhaps this paradox should lead us, not to redesign computers, but to attempt to further understanding and lay bare pre-understandings. Like Dilthey, and with Winograd and Flores, we must ask “what we can do and what we can be,” and “how we continue becoming the beings that we are” (Winograd and Flores 1986: 179).

Notes

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- 1 Max Horkheimer and Theodor Adorno (1947) *The Dialectic of Enlightenment*, translated by John Cumming. New York: Continuum, 1989.
- 2 See Andre Vellino's (1988) and Mark Stefik and Daniel Bobrow's (1988) reviews in *Artificial Intelligence* 31(2): 213-220; 220-226.
- 3 For introductions to the history of artificial intelligence, see Howard Gardener's (1985) *The Mind's New Science* and Pamela McCorduck's (1979) *Machines Who Think*. For a critique of artificial intelligence, see Hubert Dreyfus' (1972) *What Computers Can't Do: A critique of artificial reason*. See also Terry Winograd's (1990) “Thinking Machines: Can There Be? Are We?” and Joseph Weizenbaum's (1976) *Computer Power and Human Reason*.
- 4 In a recent article, Sherry Turkle (1990) discusses new movements in artificial intelligence that attempt to go beyond the limitations of the rationalist tradition by coming up with simple rules from which ‘emerge’ complex behaviors like ‘intelligence.’ The idea in this branch of artificial intelligence – called ‘emergent AI’ – is to avoid the rule-based approach of the rationalist tradition. Turkle terms this movement a ‘romantic reaction.’ Stefan Helmreich (1991) shows how the ‘romantic reaction’ in fact retrenches the rationalist tradition by naturalizing it.
- 5 For another discussion integrating hermeneutics and phenomenology into artificial intelligence, see Hubert Dreyfus and Stuart Dreyfus (1988) “Making a mind versus modelling the brain: artificial intelligence back at a branchpoint,” *Daedalus* 117(1): 15-43.

- 6 This is the point Heidegger (1952) makes in "The Age of the World Picture," in *The Question Concerning Technology, and other essays*, translated by William Lovitt. New York: Harper Torchbooks.
- 7 See Heidegger's (1952) "The Word of Nietzsche: God is Dead," in *The Question Concerning Technology*.
- 8 They also rely on speech-act theory of Austin and Searle, which I will not be discussing. However, I think the critique of Habermas I sketch out further on is also applicable to Austin and Searle.
- 9 This is similar to Humboldt's conception of linguistic activity. For Humboldt, the world-structure is bound up in adverbs of place (Mueller-Vollmer 1992).
- 10 See Jürgen Habermas (1985) "An alternative way out of the philosophy of the subject: communicative versus subject-centered reason," in *The Philosophical Discourse of Modernity*. MIT Press. See also Habermas (1968) *Towards a Rational Society*. London: Heinemann.
- 11 As the next section of this paper will make clear, my use of these metaphors of heterosexual marriage and birth is fully intentional.
- 12 See "The Age of the World Picture," and "The Word of Nietzsche," respectively. This is where Heidegger's Nazism seems to enter into his philosophy: what is the basis for Dasein after metaphysics, if not in total destruction of all to reassert the self in Dasein, that is, in a totalitarian project? Winograd and Flores make no mention of Heidegger's connection to Nazism, nor do they point out the connections between Heidegger's philosophy and his politics.
- 13 This is most clear in his *Towards a Rational Society*.
- 14 I think his position here is similar to Gadamer's (1989) idea of a 'good will' governing understanding. See his "Text and Interpretation" and his response to Derrida in *Dialogue and Deconstruction: The Gadamer-Derrida Encounter*. SUNY Press. While I do not wish to engage in the debate over whether Gadamer in fact holds a metaphysical notion of good will (as 'Good Will,' e.g., and as Derrida maintains he does), I do wish to contend such a metaphysics is present in Habermas' notion of consensus. Whether or not this casts doubt on Gadamer's position is not an issue I will pursue here.
- 15 Nancy Frazer (1989) "Rethinking the Public Sphere: A contribution to the critique of actually-existing democracy," *Social Text* 25&26: 56-80.
- 16 Carole Pateman (1988) *The Sexual Contract*. Stanford University Press.
- 17 Alan Turing (1950) "Computing Machinery and Intelligence," *Mind* 59(236): 433-460.
- 18 Turing argued, in short, that intelligent machines were possible.
- 19 It is telling that histories of artificial intelligence invariably fail to mention the gendered dimension of the Turing test. Generally, works in artificial intelligence merely state that the Turing test is a test of whether a machine can fool a human by exhibiting behaviors the human interprets as intelligent (see, e.g. McCorduck 1979 and Gardener 1985). It is significant that Turing was gay and spent a good deal of time in prison (where he finally committed suicide) for his 'crimes against nature;' his punishment for such 'crimes' probably led him to reflect on the socially constituted nature of 'nature' itself.
- 20 This translation is from Young 1970. The abbreviation GS refers to Dilthey's *Gesammelte Schriften*. Stuttgart: B.G. Teubner and Göttingen: Vandenhoeck and Ruprecht. In working through this section, I have been aided by Makkreel 1975, Hodges 1944, and Mueller-Vollmer 1985.
- 21 These translations are from, respectively, Hodges 1944: 129 and Rickman 1976: 134.
- 22 Translated in Hodges 1944: 135.
- 23 I read Dilthey's reflection on method in the human studies as parallel to Pierre Bourdieu's (1977) in chapter one of *Outline of a Theory of Practice*.
- 24 Translated in Mueller-Vollmer 1985: 151-152.

References

- Bourdieu, Pierre 1977 *Outline of a Theory of Practice*. Translated by Richard Nice. Cambridge: Cambridge University Press.
- Dilthey, Wilhelm 1914-1974 *Gesammelte Schriften*. Stuttgart: B.G. Teubner and Göttingen: Vandenhoeck and Ruprecht.
- Dreyfus, Hubert 1972 *What Computers Can't Do: A critique of artificial reason*. New York: Harper and Row.
- Dreyfus, Hubert and Stuart Dreyfus 1988 "Making a Mind versus Modelling the Brain: Artificial Intelligence Back at a Branchpoint." *Daedalus: Journal of the American Academy of Arts and Sciences* 117 (1): 15-43. Winter, 1988.
- Frazer, Nancy 1989 "Rethinking the Public Sphere: A contribution to the critique of actually-existing democracy." *Social Text* 25&26: 56-80.
- Gadamer, Hans-Georg 1989 *Dialogue and Deconstruction: The Gadamer-Derrida Encounter*. Diane Michelfelder and Richard Palmer, eds. Albany, NY: State University of New York Press.
- Gardener, Howard 1985 *The Mind's New Science: A history of the cognitive revolution*. New York: Basic Books.
- Habermas, Jürgen 1968 *Towards a Rational Society*. London: Heinemann, 1970.
- Habermas, Jürgen 1985 "An Alternative Way out of the Philosophy of the Subject: communicative versus subject-centered reason," in *The Philosophical Discourse of Modernity*, translated by Frederick Lawrence. Cambridge, MA: MIT Press, 1987. Pp. 294-326.
- Heidegger, Martin 1952 "The Word of Nietzsche: 'God is Dead'," in *The Question Concerning Technology, and other essays*, translated by William Lovitt. New York: Harper Torchbooks, 1977. Pp. 53-112.
- Heidegger, Martin 1952 "The Age of the World Picture," in *The Question Concerning Technology, and other essays*, translated by William Lovitt. New York: Harper Torchbooks, 1977. Pp. 115-154.
- Helmreich, Stefan 1991 *Rationalizing nature and naturalizing rationality: culture, computers and the genetic algorithm*. Master's paper, Dept. of Anthropology, Stanford University, Stanford, CA.
- Hodges, H.A. 1944 *Wilhelm Dilthey: An Introduction*. London: Routledge and Kegan Paul.
- Horkheimer, Max and Theodor Adorno 1947 *The Dialectic of Enlightenment*, translated by John Cumming. New York: Continuum, 1989.
- Makkreel, Rudolf A. 1975 *Dilthey: Philosopher of the Human Studies*. Princeton University Press.
- McCorduck, Pamela 1979 *Machines Who Think: A personal inquiry into the history and prospects of Artificial Intelligence*. San Francisco: W.H. Freeman and Company.
- Mueller-Vollmer, Kurt 1985 "Introduction: Language, Mind, and Artifact: An outline of hermeneutic theory since the Enlightenment," in *The Hermeneutics Reader*. New York: Continuum, pp. 1-53.
- Mueller-Vollmer, Kurt 1985 *The Hermeneutics Reader: Texts of the German Tradition from the Enlightenment to the Present*. New York: Continuum.
- Mueller-Vollmer, Kurt 1992 Lectures, Deutsche Geistesgeschichte III, Department of German Studies, Stanford University, Stanford, California.
- Pateman, Carole 1988 *The Sexual Contract*. Stanford: Stanford University Press.
- Rickman, H.P. (ed.) 1976 *W. Dilthey: Selected Writings*. Cambridge: Cambridge University Press.
- Stefik, Mark and Daniel Bobrow 1987 "Review of Understanding Computers and Cognition." *Artificial Intelligence* 31 (2): 220-226.
- Turing, Alan 1950 "Computing machinery and intelligence." *Mind*, October 1950, 59(236): 433-460.
- Turkle, Sherry 1990 "Romantic Reactions: Paradoxical responses to the computer presence," in *The Boundaries of Humanity: Humans, Animals, Machines*, edited by James J. Sheehan and Morton Sosna. Berkeley: University of California Press, pp. 224-252.
- Velino, Andre 1987 "Review of Understanding Computers and Cognition." *Artificial Intelligence* 31(2): 213-220.
- Weizenbaum, Joseph 1976 *Computer Power and Human Reason*. San Francisco: W.H. Freeman.

- Winograd, Terry 1990 "Thinking Machines: Can There Be? Are We?" in *The Boundaries of Humanity: Humans, Animals, Machines*, edited by James J. Sheehan and Morton Sosna. Berkeley: University of California Press, pp. 198-223.
- Winograd, Terry and Fernando Flores 1986 *Understanding Computers and Cognition: A New Foundation for Design*. Redwood City, CA: Addison-Wesley.
- Young, Tom 1970 *The Hermeneutical Significance of Dilthey's Theory of World Views*. Ph.D. dissertation, Bryn Mawr College.