I was glad that I read the book and was heartened to see philosophers of technology engaged in such rich and substantive discourse, discourse that has real-world implications. I was left with the impression that the field is far from coalescing around any solid girders of understanding but perhaps that doesn't matter.

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***New Waves In Philosophy Of Technology*, edited by Jan Kyrre Berg Olsen, Evan Selinger, and Soren Riis (Palgrave Macmillan, 2009). 384 pp. ISBN: 978-0230220003.**

Don Ihde, in his foreword to this volume, classifies the authors collected here as representing a fourth wave – the new wave – among philosophers focusing on technology, technologies, and technological culture. Ihde includes himself and myself among the third-wave philosophers, and it may not have been wise on the part of the editors of *Techne* to have invited me to comment on our next-wave successors. Presumably each wave has added, or claims to have added, something both new and different – and, one would hope, better – to the contributions of its predecessors. In doing such comparative measurements, I once, here in the pages of the predecessor version of SPT´s *Techne* (whole volume 4), summarized the types of measures typically used. Some contributions to the literature are said to be "quantitatively" better: like advances in scientific fields, what is said to be better is supposed to build explicitly on prior knowledge. Other alleged improvements are merely "qualitative": they offer allegedly better *value* judgments, better *syntheses* of prior work, or, finally, only more *originality*. What, in these terms, can be said about the work of the "new wave" philosophers collected in this volume? I run through them one by one.

Keekok Lee, "*Homo faber*: The Unity of the History and Philosophy of Technology." Lee has actually been around long enough to have joined those of us in Ihde´s third wave, though it is true that she was not prominent among philosophers of technology in our era. In this essay, she argues that – although so many changes have taken place in the history of western philosophy since the Greeks that it seems unlikely that technology, in all its forms from primitive to contemporary, could be understood within a single philosophical framework – there is a common thread in the notion of *Homo faber*. Unfortunately, to my eyes, her survey is so sweeping that it might well have been written during Ihde´s first wave.

Jan Kyrre Berg Olsen, "Becoming through Technology." This is actually an essay on science, not technology, though it does pay some attention to the technologies of time measurement. To me, it reads like a reworking of a running conflict between Milic Capek and Adolf Grunbaum as far back as the 1960s. Berg Olsen puts a novel twist on the argument. But I can´t help remembering how, when Capek retired to our philosophy department at the University of Delaware and, kind person that he was as a colleague, he wondered why I would have turned from philosophy of science (good) to philosophy of technology (at best questionable). I´m sure he would have the same doubts about Berg Olsen, at least in this essay.

Robert Rosenberger, "Quick-Freezing Philosophy: An Analysis of Imaging Technologies in Neuroscience." This is an interesting – while difficult for anyone not familiar with the neuroscience literature discussed – application of Ihde´s "postphenomenology" type of analysis to a case study in a specialized subfield of neuroscience, the nature of synaptic vesicles in

neurotransmission. A good technoscience case study, building on a third-wave predecessor in philosophy of technology.

David M. Kaplan, "How to Read Technology Critically." Kaplan has also been around for awhile, but this is a genuinely novel approach, though it relies principally on the thought of Paul Ricoeur, and Kaplan admits that Ricoeur has actually contributed little to the philosophy of technology. Ricoeur as here interpreted by Kaplan should contribute a great deal to the "fourth wave."

Graham Harman, "The McLuhans and Metaphysics." This is an original replay of Marshall and Eric McLuhan´s use of the tetrad (defined as a "fourfold") as an analytical structure in all fields, with special reference to the elder McLuhan´s "understanding media." It is largely based on *Laws of Media* (1988), in which the younger McLuhan tried to breathe new life into his father´s ideas, then in something of a decline not only among the third-wave philosophers of technology but generally. The essay, in my opinion, is decidedly original, as well as refreshingly comprehensive.

Soren Riis, "The Question Concerning Thinking"; and Iain Thomson, "Understanding Technology Ontotheologically, or: The Danger and the Promise of Heidegger, an American Perspective." Ihde refers to these essays as dealing with the specter or ghost of Heidegger that is still found wandering through the fourth wave. I would leave it to Robert Scharff, the leading Heideggerian of the third wave (leaving aside Ihde´s post-heideggerianism), to say whether or not there is even anything really original in these two essays.

Nick Bostrom, "The Future of Humanity," and Philip Brey, "Human Enhancement and Personal Identity." This paired set of essays, oddly inverted in order, reflect Bostrom´s posthumanism and Brey´s critical assessment of it. Brey actually goes out of his way to be fair to Bostrom (and his fellow posthumanists) in a long essay, saving his devastating "ethical considerations" for just the last couple of pages. There Brey argues that, "Even if new inequalities could somehow be prevented, which seems unlikely, the question would remain whether human enhancement would really improve human lives"(p. 182). Incidentally, Bostrom has been around a good while, and even contributed to an SPT meeting in 1997.

Benjamin Hale, "Technology, the Environment and the Moral Considerability of Artefacts." In this complex and difficult essay, Hale begins by recognizing three versions of a "pragmatic turn" in environmental ethics: to Peirce, James, Dewey and the American Pragmatists; to the Frankfurt school of neo-Marxists, including Marcuse and Adorno; and to "discourse theorists," where he lists Apel and Habermas, as well as himself. A good third of the essay is then devoted to Habermasian theorizing, before Hale turns to his curiously abstract argument (in an essay supposedly devoted to a "pragmatic turn") about the *lack* of "moral considerability" of artifacts in relation to environmental philosophy.

I pause here to make a point about Habermas and Ihde´s "third wave" in his foreword. Habermas, for some reason, always held back from any relationship to the Society for Philosophy and Technology (the home of this journal); and in all of this "new wave" book there are precious few references to anyone in the "third wave" except Ihde himself. Even Andrew Feenberg, an offshoot of the Frankfurt school (like Habermas himself) is rarely mentioned; and the same is true for recent proponents of Dewey as a philosopher of technology, or "technical" philosophers of technology such as Kristin Shrader-Frechette or Joe Pitt, or even Mario Bunge, who has a wide following among some European philosophers of technology. Whatever shortcomings these authors find in the "third wave" (I will get to an explicit claim, by Evan Selinger, in a moment), they seem to be shortcomings of Ihde himself and other phenomenological philosophers of

technology. (I don´t mean to say that Selinger´s critique is not valid – as I will show when I get to him.)

Peter-Paul Verbeek, "Cultivating Humanity: Towards a Non-Humanist Ethics of Technology." Verbeek´s approach is explicitly "postphenomenological," consciously building on Ihde´s approach. But "non-humanism" in the essay also owes a good deal to the Bruno Latour of *We Have Never Been Modern* (1993). Verbeek´s very cautious conclusion is this: "Only by approaching the human as more-than-human does it become possible to adequately give shape to the respect for humanity the humanist tradition has rightly been defending for so long" (final sentence). Along the way, Verbeek uses the technology of antenatal ultrasound as the basis of his argument, rejects both Heidegger and anti-Heideggerians, and falls back on pre-modern virtue ethics as better than "modernism´s" favored duo of deontology and consequentialism. (I should add that Verbeek´s book, *What Things Do*, 2005, does constitute an advance over Ihde, a "new wave" in that sense.) Finally we come to the two essays in the volume that, in my opinion, best deserve the "new wave" label:

Evan Selinger, "Technology Transfer and Globalization: A New Wave for Philosophy of Technology?" Selinger begins with what are to me non-controvertible historical facts, that the Society for Philosophy and Technology was tardy in facing the globalization issue (the theme of its biennial conference only as late as 2007) and that such treatments of globalization as there have been among philosophers, not all of them self-consciously philosophers of technology, have been woefully abstract and have reflected a Western bias. To counter this, Selinger focuses, in this multiply nuanced essay, on a concrete case, "village phones," a "gift" of Grameen Banks primarily to women in rural Bangladesh. The result is an admirable case study, in the tradition of Science and Technology Studies, that both tries to eliminate Western bias *and* critiques non-Western critiques, on the ground in Bangladesh, of this technological development. It´s about time, I would say, for such a melding of the STS case study approach with philosophy of technology. More traditional philosophers of technology of Ihde´s "third wave" have done case studies, but not with Selinger´s attention to concrete practice in a non-Western setting. This essay alone is almost worth the price of the book, and an equally good one follows.

Casper Bruun Jensen and Christopher Gad, "Philosophy of Technology as Empirical Philosophy: Comparing Technological Scales in Practice." What these Danish authors mean by "empirical philosophy" is a use by philosophers of anthropological-style approaches (they give due credit to Harold Garfinkel, *Studies in Ethnomethodology*, 1967; and Barney Glaser and Anselm Strauss, *Discovery of Grounded Theory: Strategies of Qualitative Research,* also 1967) in order to deal with concrete case studies. Their examples are the introduction of "bush pumps" in Zimbabwe (Annemarie Mol and Marianne de Laet) and "fishery inspection" on the vessel *Vestkysten* (*West Coast*; one of the two authors, Gad, did fieldwork on the ship in 2006 and 2007), though they also refer at length to Marilyn Strathern´s "Enabling Identity? Biology, Choice and the New Reproductive Technologies" (1996) as well as to other concrete STS-type studies. Their conclusion, which makes empirical philosophy reflect the approach of the Social Construction of Technology (see Wiebe Bijker and John Law, eds., *Shaping Technology/Building Society,* 1992), is this: "Empirical philosophy assumes that we are often faced with technological situations of ambivalence, danger and possibility, in which indigenous and academic forms of action, value and conceptualization are associated and often at stake." And their last word is this: "In such cases we believe that this analytical mode offers a viable and interesting point of entry for a nuanced engagement with pressing technological matters of concern." To which I say Amen.

In short, though there is some originality here with respect to the reworkings of old material – some going all the way back to Ihde´s first and second waves, but predominantly the third – it is doubtful that they offer much more than mere reworkings. Whether that – together with the five or six genuinely original essays – constitutes a new fourth wave or not, I would leave to readers of the book. The editors of the *New Waves in Philosophy* series clearly think so, but this member of Ihde´s third wave has his doubts.

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Participatory Democracy, Science and Technology **by Karl Rogers (Palgrave MacMillan, 2008). 256 pp. ISBN: 978-0230522060.**

This book makes good on many of the promises made by Rogers' previous work, *Modern Science and the Capriciousness of Nature*. How exactly ought people in a well functioning democracy interact with the strongest forces that shape their lives (science and technology)? Do we threaten the objectivity of science when we democratize it? What role do technical experts have in a democratic society? What does "democracy" mean? Rogers ambitiously attempts to answer all of these questions while simultaneously building a convincing case that the democratization of science and technology isn't simply a good thing for democratic societies vis-à-vis the realization of democratic ideals, but is in fact a necessary component of "good" science and technology.

After a careful opening critique of technological determinism found in the substantivist theories of technology, (Heidegger, Marx, Marcuse, Ellul, Heilbron's soft determinism, etc.) the third chapter pulls heavily from Feenberg to suggest a "dialectical" theory of technology. This, at its core, is an attempt to make sense of the dialectical nature of the relationship between technology and society (i.e., how technologies are shaped by human choices and how human choices are shaped by technology). This departs from (or perhaps supplements) Feenberg's account by emphasizing an irresolvable ambiguity between what Feenberg calls the primary and secondary instrumentation of technology. This ambiguity arises out of the dialectical nature of technology, allowing Rogers to sweep away the last vestiges of determinism from the substantive theories of technology on which he is building.

Chapter four, on participatory democracy, is largely meant to explain how Feenberg's call for "deep democratization" is supposed to play out. The author worries that without a full account of how "deep democratization" is understood, there is no clear path to move from a technocratic authoritarianism to a democratic technological society without remaining open to traditional