An Introductory Essay: A Framework for Understanding Philosophical Controversies

When I wrote my *Dictionary of Concepts in the Philosophy of Science* (1988), for a Greenwood Press series edited by Raymond McInnis, I did my best to keep the tone evenhanded and encyclopedic. So when I volunteered—over a decade ago—to do a follow-up on philosophy of technology, I thought I could do the same. But my reason for volunteering in the first place was my long involvement with the Society for Philosophy and Technology as editor of most of its publications up to that time. Now that very reason seems to me to be an obstacle to keeping myself out of the controversies I talk about. I have an opinion on the work of every philosopher of technology I discuss here, and it now seems to me highly artificial to try to keep my opinions out of the story. So I won’t. I will still try to be fair to the defenders of the viewpoints I talk about, but I won’t hide my opinions, including my disagreements with particular philosophers where I have disagreements. In at least some of my accounts of controversies, I will join right in.

That is also why I have chosen an essay format for the book, rather than the encyclopedic style I felt constrained to use in the earlier book. This book looks at discourse within the community of philosophers who have taken technology and particular technologies as the focus of their analyses (or syntheses)—preeminently in the Society for Philosophy and Technology, and mostly in the United States, beginning around 1975. It is primarily to them that I address the book—though in the end I will argue that our disagreements have broader implications than we may have thought about, consciously, as we were engaging one another in our intramural disagreements within SPT.

My perspective throughout the book—in studied contrast to the proposal of Raymond McInnis (see his *Discourse Synthesis: Studies in Historical and Contemporary Social Epistemology*, 2001), that disciplines coalesce around what McInnis calls “discourse syntheses”—is to focus on the disagreements with other authors that show up in each philosopher’s body of work.

To make this fly, I mention briefly McInnis’s key idea, that knowledge communities—preeminently science communities but others as well—work toward a consensus on what constitutes genuine knowledge in (and the goals of) a given field. This includes not only key concepts but methods and values, respect for the community, and so on. And knowledge communities, according
to McInnis, have since the seventeenth century assumed that valid knowledge, especially scientific knowledge, is cumulative. There has also been a persistent claim, since Francis Bacon, that knowledge is power, and that power to control nature leads to social improvement. How knowledge becomes cumulative or progressive (at least internally, within the disciplines) is what synthesizing amounts to.

My Project

Many philosophers of technology within the SPT community have worried more about impacts outside academia than they have about cumulativeness (or not) within the academic community. By the end of the book I think the reader will see that at least for a significant part of philosophy of technology some philosophers at least claim to be able to help solve sociotechnical problems of our technological culture—although, as we will see, individual philosophers follow different paths toward this common goal. Some even think it can best be achieved through improvements in the status of the discipline within academia. This issue, of the social utility (or lack thereof) of philosophy, has been around almost since the beginning of philosophy in the Western tradition. In my view, it has been one core issue within the SPT community throughout its short 30-year history. There are, moreover, a number of other key issues that will show up in these pages again and again. It is my hope that this book will show that—in opposition to many critics of the philosophy of technology (and as we will see there are many)—the discipline (and I do not, at least not yet, call it an academic field) has much to offer that will be of interest not only to the broader community of philosophers but also to our culture.

Returning to the question of a consensus or not within the field, since Thomas Kuhn’s Structure of Scientific Revolutions (1962), the supposed cumulativeness even of science has come under attack. Parallel with this development there arose another concern, about whether the scientific disciplines and their supposed offshoots in technological development were in fact making the world better. Critics, indeed, pointed to how they were making the world, including the environment, worse. All of this has culminated in so-called postmodernist or social-constructionist attacks on the hegemony of science in modern culture.

Obviously I am more sympathetic toward this viewpoint, or set of viewpoints, than I think McInnis is—though he did include in the 2001 volume a contribution by Steve Fuller, who is one of the leading social constructionists. What I offer in
this booklength essay may not be exactly constructionism, but it is definitely a
pluralism. I wouldn’t even dream of saying at this point what the consensus is
among philosophers of technology—I leave the question open for the moment
whether there is a consensus—within the field in general or within any particular
group of philosophers of technology. But I must admit from the outset that
among the earliest intellectuals calling themselves philosophers of technology
there were many critics who were convinced that technology is, on balance, bad
rather than good for our technological society. This is the grain of truth that
lends weight to criticisms of the field as a whole. But I hope to show
convincingly that it is by no means the whole story.

Some key texts with which to situate ourselves within what I have called a
"philosophy of technology/philosophy and technology" discourse seem to me to
be Randall Collins’s *The Sociology of Philosophies: A Global Theory of
Intellectual Change* (1998). There, as I do here, Collins focuses on
controversies, covering an amazing range from the Greeks through various
controversies within and among philosophical schools in both Western and non-
Western societies up to the early twentieth century in the USA. Collins’s focus is
distinctly on *intellectual* change rather than on social change.

Nicholas Mullins’s *Theories and Theory Groups in Contemporary American
Sociology* (1973) is closer to McInnis; at the same time Mullins emphasizes that
in the sociology of the middle part of the twentieth century there was not one
dominant discourse synthesis but several. So his book is decidedly *pluralist.*

And of course we should not forget McInnis himself (2001). In his book,
McInnis not only lays out his basic idea but introduces a series of other people’s
takes on the discourse synthesis idea in different fields—including a contribution
I wrote on the place of encyclopedias in the history of discourse syntheses.
However, McInnis is also pluralist, in the sense that he emphasizes local
syntheses rather than any grand synthesis even in a single field such as
philosophy or sociology—though, like Collins, his interests are primarily
intellectual.

Against this background I place three books addressed to the issue of a
community of philosophers “of” or “and” technology: Carl Mitcham’s *Thinking
through Technology* (1994) I view here as a premature attempt at synthesis. We
will see that what he seeks is a metaphysical synthesis, which, if at all, could lead
to social reform only in the long run.
My edited volume in the Philosophy and Technology (Kluwer) series, *Philosophy and Technology, volume 7: Broad and Narrow Interpretations of Philosophy of Technology* (1990), summarizes some of the problems of the would-be field in the middle period. And one of the chief problems I talk about is based on the claim of some philosophers in the field who wanted at all costs to *keep it from* becoming an academic subspecialty.

Finally in this connection, editors Higgs, Light, and Strong in *Technology and the Good Life?* (2000) make a strong case that there is a good candidate to become the beginning of a *new academic field*, specifically in the writings of Albert Borgmann and reactions to them. Their concern is obviously academic, but many things they say in defending the new venture suggest that they want it to spread its concerns to other areas of public interest, possibly including social reform, as the title might suggest.

Returning to my book, this book—which was supposed to focus on concepts in the philosophy of/and technology—in my mind it was always *conceptual issues* that I wanted to focus on, and in our field one key issue has had to do with arguments over whether or not, and to what extent, it ought to be academic.

I have also now come to depend heavily on sketches—sketches of *intellectual disagreements* rather than personal sketches—which is why I came to feel more confident, after a slow start, about completing the long-delayed project. Another reason for optimism is that I have limited my scope, both in terms of the time period and in terms of the persons and controversies discussed. The main method will be reviews, not just of one major book but of the body of work of *the central figures in the first 30 years* of the Society for Philosophy and Technology.

Since I claim that discourse synthesis has not—at least not as yet—been achieved among the philosophers studying technology or particular technologies, I need some other organizing principle. Why? Why does one need an organizing principle for a venture of this sort? Well, my initial orientation in philosophy was Aristotelian (though I now consider myself a pragmatist following in the footsteps of the major figures in American Pragmatism, especially John Dewey and G.H. Mead). In an Aristotelian approach, especially an Aristotelian encyclopedic approach, it is thought to be important to lay out a framework within which to view intellectual controversies in any field of philosophy, from metaphysics to the philosophy of art. This is partly for teaching purposes, to help
people who are new to a field to orient themselves when they are just beginning. But it also has an intellectual purpose: in order to understand where people are coming from (in that hackneyed phrase) when they attack one another, it is helpful to have a list of places, a road map so to speak, to identify various “wheres,” and sometimes even to predict where attacks are likely to come from or against whom they are likely to be addressed. The best-known spokesman and utilizer of this Aristotelian approach was Mortimer Adler, not only in *The Great Books of the Western World*, including volumes 2 and 3, *The Great Ideas of the Western World*, but also in the *Propaedia* included within *The Encyclopedia Britannica* in recent decades. Adler and a group of co-workers also produced a series of concept volumes, including for example *The Idea of Freedom*, in which they also arranged controversies against a background or framework.

My framework is in this Adlerian tradition, though less grandiose. I simply let philosophers who study technology identify their own positions within a broad framework, spelled out by the philosophers themselves as they engage in controversies with other philosophers. Details of this broad framework I save for a concluding essay at the end of my book. But I can say for now that defenders of one or another approach identify themselves by their opposition to (at least one of) the other approaches. (Collins also says philosophers identify themselves in terms of their opponents, though he apparently felt no need for a framework.)

Some early hints of my approach can be found in a Society for Philosophy and Technology publication (see Cuello and Durbin in Techné 1:1 http://spt.org/journal). Cesar Cuello and I included a note on methodology. We said that making explicit the methodology used in discovering the underlying assumptions of parties to sustainability debates in environmental philosophy can move us toward links with the philosophy of technology. Knowing the risks, we nonetheless utilized the scheme of Walter Watson in *The Architectonics of Meaning: Foundations of the New Pluralism* (1985). We certainly did not endorse the exaggerated claim (on that book’s cover) that Watson has devised “the first truly useful taxonomy of all ideas,” but, stripped of such bloated claims, Watson’s book offers an interesting hermeneutic, and one should note his keyword is “pluralism.”

I am going to deal with these ideas at slightly greater length in the essay at the end of the book, but here I summarize Watson’s view, that every author or public speaker, in any discipline or field, betrays his or her philosophical assumptions by differentially utilizing the four necessary components of any piece of
literature:

author’s perspective (which may be entirely personal or that of a tradition and may be hidden even from the author);

objects discussed;

the text itself, and especially the methods that link items to one another; and

the goals or principles (ideals, values, etc.) that drive or motivate the text, which almost always reflect sets of background assumptions, such as the cultural values influencing both individual authors and intellectual traditions.

According to Watson, authors or speakers who stress objectivity above the other three components employ a scientific writing style (though that is not Watson’s term for it). They tend also to use logical methods, invoke reductionistic aims, and try to avoid values as much as possible. Authors, on the other hand, who consciously stress values and see the objects of their discourse as this-worldly shadows of otherworldly realities—typically linking the two by a method explicitly referred to as dialectical—Watson links to Plato. These idealist philosophers (using the term in a loose sense) tend to emphasize comprehensiveness, and often disparage narrow technical scientific knowledge. Authors who stress method and discipline (in the school subject matter or professional discipline sense), and who emphasize the pigeonholing of objects within large encyclopedic schemes, Watson links to Aristotle.

The fourth perspective requires elaboration. A significant feature of Watson’s scheme, (which represents a break with his mentors, especially Richard McKeon), is his recognition of this fourth basic group. Authors in the group emphasize their own subjective perspective, their own creativity, as an end in itself. In terms of method, they often tend to be anti-methodical, to utilize any means that will move the narrative (story, drama, etc.) along. Watson links this group to the Greek Sophist Protagoras (for whom humans are “the measure of all things”), and defends this as a philosophical perspective fully parallel with the other three.

Finally, it should be noted that Watson acknowledges that the four basic groups
do not exhaust the stylistic field; many authors combine modalities. For example, as Watson recognizes, almost all the great philosophers of the modern period, after Descartes, have tended to use hybrid styles. Even so, a hybrid style is recognizable—Watson thinks—as a joint use of two or more of the four basic styles. (For sample hybrid styles, see Watson’s index, beginning with Descartes.)

This is a hasty account—maybe even more idiosyncratic than Watson’s own—of an enormously complicated scheme. But it may be enough to suggest that a hermeneutic approach, roughly along Watsonian lines, can help discover philosophical presuppositions implicit in the language used in philosophical debates. However, where Watson’s aim seems to be Aristotelian, (to pigeonhole authors), Cuello and I called our aim (in Watson’s terms) creative. We wanted to let the authors have their own say about what it is they want to emphasize in the sustainability debate.

Cuello and I went on to attempt to figure out the mostly implicit philosophies of technology latent in recent controversies over the meaning of the slogan “sustainable development.” I am recommending the same approach here for all the controversies among philosophers of technology that I take up in this book.

Whatever the merits of this scheme, here is some concrete background for my analysis in this book:

a. Collins, agreeing with Mead, says that people define themselves through interactions with others; here that means that philosophers define themselves by their disagreements with other philosophers. No one should ever put people—especially not philosophers—in boxes. If one insists, they can be viewed as doing that themselves, at least implicitly, when they take on particular opponents.

b. In a controversy-based framework like Watson’s, there would be hundreds of philosophers in each quadrant, indeed hundreds of very independent thinkers with idiosyncratic opinions. If you count all the philosophers in all the universities and philosophical societies just in the USA, not to mention philosophers who work in non-university settings in education, government, and industry, as well as totally independent thinkers such as professional writers, then the total comes to more than 100,000. In round numbers, that could mean upwards of 25,000 very
independent thinkers in each quadrant, each ferociously resisting pigeonholing, and opposing other approaches. (Obviously in a small field such as philosophy of technology there are far fewer in each quadrant, but the point is to avoid pigeonholing even small numbers of cantankerous philosophers.)

c. Just like anyone else in a dynamic real-world environment, philosophers change their views, especially as they take on new opponents. Any grid should be used in a fluid and dynamic way.

Even with all these qualifications, we must still be careful. If we are, it seems to me not only helpful but possibly even necessary to have some sort of framework for analysis, if only to preserve one’s sanity or to get a useable book before the public.

Now for a preliminary outline of the book—based on a list of presidents of SPT and other philosophers associated with the group, including more or less regular attendees at society meetings—here is my outline by parts:

*Part 1. Philosophers of Technology Move Away from Philosophy of Science.*

This focuses on the first four presidents of SPT (Carl Mitcham, Alex Michalos, Kristin Shrader-Frechette, and Marx Wartofsky, along with early board member Edmund Byrne), and outsiders (though they too attended SPT meetings) such as Joseph Agassi and Joseph Margolis. Mario Bunge did not attend any meetings, but was a supporter from a distance.

*Part 2. The Field Refuses to Jell.*

This covers presidents Joe Pitt to myself, and includes many board members and meeting attendees, from Andrew Feenberg to Frederick Ferre; the exception is Steven Goldman, but even he has been a frequent contributor to SPT publications. Full list: Joe Pitt, Don Ihde, Langdon Winner, Andrew Feenberg, Jose Sanmartin, Larry Hickman, Goldman, Ferre, Donald Verene, Alois Huning representing international contacts, and myself.

*Part 3. Attempts to Establish an Academic Discipline.*

I start this with Higgs, Light, and Strong in the Borgmann festschrift volume,
because it claims to start a new discipline. I then include a chapter on our colleagues in the Netherlands, who also tend to think in disciplinary terms. I then loop back to Deborah Johnson, with her focus on ethics in engineering and computer science. This is followed by a chapter featuring the next SPT president, Andrew Light (of the new-discipline claim, above) and the important work of some philosophers of technology in environmental philosophy. Next I look at someone who has never been connected with SPT, Sheldon Krimsky, because of the importance today of controversies over biotechnologies of all kinds. Paul Thompson, who specializes in biotechnology in agriculture, comes next. Someone might argue that each of these sets of controversies amounts to (or could or should in the future amount to) one of a set of subspecialties in the philosophy of technology. Then I take up a less well-known topic that I feel is both important and neglected: what Larry Hickman and Andrew Light call “quotidian” technologies, especially films or the movies, but including as well other topics often missing in the "elevated" SPT discourse. Finally, I end with challenges to disciplines of all kinds, in “social constructionism” and/or postmodernism, where longtime SPT member Raphael Sassower has been the society’s most vociferous spokesperson, and where I will also include fellow-traveler Steve Cutcliffe, a historian of technology, who has ably summarized the Science, Technology, and Society part of this attack on academicism.

Note on quotation styles: in putting together this book: I have shamelessly used three kinds of sources, in addition to normal quoting. I believe that is almost essential in an account of this type.

As for “normal” quoting:

1. I violate a number of rules (e.g., in The Chicago Manual of Style) about the length of quotations that are permissible. In general, I will use quotation marks, rather than blocked quotes, for such material. Where I thought it necessary, I have sought permission from the publishers of the material.

2. The really difficult problem, however, comes with my use of material I have published elsewhere. For material I have published previously I follow the normal conventions in number 1, above—including seeking permission where necessary—except that I do not put the material in quotes. Even though not written expressly for this volume, the words are all my own.
3. For material quoted at length from SPT publications, whether or not I was the editor of a particular volume, I have received special permission from those who hold SPT copyrights.

Permissions and Acknowledgements

Because I have used so much material here that was not written specifically for this volume, I need to address acknowledgment and permissions issues. I can do so chapter by chapter. In Chapter 1, the only extensive quoting is from a review I did of Carl Mitcham's *Thinking through Technology: The Path between Engineering and Philosophy* (1994); the review appeared in a Canadian journal, *Philosophy in Review*, June 1997. I acknowledge that source but do not need permission for my own work. In Chapter 2, I had some difficulty getting permission from the publisher, Free Press, for the long Alex Michalos quote from my edited volume, *A Guide to the Culture of Science, Technology, and Medicine* (1980, 1984), so Michalos redid that material especially for this volume. I thank him and acknowledge Free Press as the original source. In Chapter 3, I used a translation of my own review essay, in Spanish, in *Isegoria*, October 1995, of three books by Kristen Shrader-Frechette. In Chapter 4, I use a long quote, on the persistence of Marxism after the collapse of the Soviet Union, from my book, *Social Responsibility in Science, Technology, and Medicine* (1992). In Chapter 5, I use a relatively short quote from Mario Bunge's *Treatise on Basic Philosophy*, volume 7 (Reidel, 1985). In Chapter 6, I use a long and complicated quote from Joseph Margolis that appeared originally in volume 5 of the Philosophy and Technology series, entitled *Technological Transformation: Contextual and Conceptual Implications* (Kluwer [now Springer], 1989) edited by Edmund Byrne and Joseph Pitt. I was the general editor for that volume, and Joseph Pitt has added his permission to use the material in his capacity as co-editor; I acknowledge Kluwer as the original publisher. In Chapter 7, I use a similar long and complicated quote from Joseph Agassi that appeared in volume 1 of *Research in Philosophy and Technology* (JAI Press [now Elsevier], 1978), which I edited; I acknowledge JAI Press as the original source. For Chapter 8, I used a long quotation, reviewing Edmund Byrne's *Work, Inc.* (1990), from my *Social Responsibility in Science, Technology, and Medicine*. In Chapter 9, the only quote needing acknowledgment is a short one, from Joseph Pitt's *Thinking about Technology: Foundations of the Philosophy of Technology* (Seven Bridges, 2000). In Chapter 10, I acknowledge Paragon House for permission to use several quotes from Don Ihde's *Philosophy of Technology: An Introduction*
(1993). In Chapter 11, I used material from my *Social Responsibility in Science, Technology, and Medicine* to review the work of Langdon Winner. In Chapter 12, I acknowledge permission from Sage Publications to use a long and complicated quote from a review in *Science, Technology, & Human Values* by Andrew Feenberg in a book by Sandra Harding. In Chapter 13, I have permission from Carl Mitcham, editor of the volume and author of the material quoted, to use a quote from the introduction to his *Philosophy and Technology in Spanish Speaking Countries* (Kluwer [Elsevier], 1993); I acknowledge Kluwer as the original publisher. In Chapter 14, a couple of longish quotes of material on Larry Hickman come from *Techné* (7:1, Spring 2003), a number that I edited. In Chapters 15, 16, and 17, there are no quotations long enough to require permission. In Chapter 18, I used material reviewing the work of Albert Borgmann from two of my publications, *Social Responsibility in Science, Technology, and Medicine*, and a contribution I made to *Technology and the Good Life?* edited by Higgs, Light, and Strong (University of Chicago, 2000). In Chapter 19, I use Pieter Tijmes's “Preface: Dutch Chandeliers of Philosophy of Technology,” from *Techné* (3:1, Fall 1997), and a review I did of Hans Achterhuis's *American Philosophy of Technology* (2001), which appeared in *Metaphilosophy* (35:4, July 2004). In Chapter 20, I use a long quote from an article I wrote for the *Bulletin of Science, Technology, and Society*. In Chapter 21, there are no quotes requiring permission or acknowledgment. In Chapter 22, Praeger kindly gave permission for a long quote from Sheldon Krimsky's *Bioethics and Society* (1991). For the long quotations from Paul Thompson's *Agricultural Ethics* (Iowa State University Press, now Blackwell, 1998) in Chapter 23, I had to pay Blackwell. There are no quotes requiring permission in Chapter 24. Finally, for Chapter 25, I received permission from Rowman & Littlefield to use material from Stephen Cutcliffe's *Ideas, Machines, and Values: An Introduction to Science, Technology, and Society Studies* (2000).

Specific page references and acknowledgments are made in the text, not only for quotes requiring permission but also for quotes falling within the guidelines of the *Chicago Manual of Style* for scholarly quotation.
Chapter 1

A Premature Attempt at Discourse Synthesis: Carl Mitcham in Thinking through Technology

I begin with a sketch of Carl Mitcham. He was educated at the University of Colorado (B.A., M.A.) and Fordham University (Ph.D.). Currently Professor of Liberal Arts and International Studies at the Colorado School of Mines, he has taught previously at Berea College (Kentucky), St. Catharine College (Kentucky), Brooklyn’s Polytechnic University, and Pennsylvania State University. Throughout his career—according to one of his self reports—Mitcham has reflected on the nature and meaning of living in a “high-science, high-technology society,” in both general and particular terms. Although critical assessment of particular technoscientific practices and achievements is crucial, and where reflection must begin, particular assessments do not (he says) exhaust the challenge of technoscience.

Mitcham’s publications are almost all relevant to this book. To set a pattern for my book, I will not list them here. They are included in the bibliography at the end, where citations are arranged by chapter.

Mitcham deserves more credit than anyone for enlisting an organized group of philosophers in the serious study of technology, previously relegated to sporadic discussions here and there. Mitcham and Robert Mackey produced a heroic initial effort aimed at achieving this in 1973, with the publication of the first version of their bibliography of the philosophy of technology in the history of technology journal, Technology and Culture. Mitcham also worked closely with me on the invitation list for the 1975 conference on philosophy and technology at the University of Delaware that led, shortly thereafter, to the formation of the Society for Philosophy and Technology. He was also the first elected president of SPT.

Mitcham is clearer than most early philosophers of technology in having spelled out his agreements and disagreement with others in one major book, Thinking through Technology: The Path between Engineering and Philosophy (1994).

I was asked to review that book for Philosophy in Review (June 1997). What follows is repeated here, almost verbatim, from that review.
I said there that because of my long association with Mitcham as collaborator and editor, but also as friend—I had refereed the original bibliography for *Technology and Culture* and championed its publication—I may not have been the most objective reviewer of one of his books. But I take that risk now as I did then. I do have, as longtime editor of the publications of the Society for Philosophy and Technology, a unique perspective on the philosophy and technology field, so I hope I can be sufficiently objective. (For that matter, I have become a friend as well as a colleague of many of the philosophers discussed here in this book.)

I decided to take the review task upon myself for two reasons. First, it had been alleged many times that the philosophy of technology had neither an adequate basic textbook nor an adequate history of the field. Mitcham’s book—and I am not the only one to note this—could serve as either or both of these. Second, Mitcham’s book seems to me to be important in its own right, in addition to reacting to the kinds of criticisms it was likely to experience. In fact, the book did receive criticisms immediately and undoubtedly will continue to do so.

So I begin this survey of concepts and controversies in the philosophy of technology in the last quarter of the twentieth century, not only with Mitcham but with this book.

Before turning to Mitcham’s own philosophy, together with his controversial stances and the critics’ replies, I take up the issue of Mitcham’s book as a history or a textbook. How does *Thinking through Technology* fare by contrast with other histories of or primers in this new field? I should say right off that I think an academic discipline—and only some philosophers believe that the philosophy of technology is or ought to become such—does need some sort of basic textbook. I think, furthermore, that historically grounded textbooks are the best kind.

There were five principal English language competitors when Mitcham’s book appeared on the scene: Friedrich Rapp’s anthology, *Contributions to a Philosophy of Technology* (1974); Rapp’s monograph, *Analytical Philosophy of Technology* (1981); Don Ihde’s early effort, *Technics and Praxis: A Philosophy of Technology* (1979), along with his later, *Philosophy of Technology: An Introduction* (1993); and Frederick Ferre’s *Philosophy of Technology* (1988). Two other books might be mentioned, Larry Hickman’s anthology, *Technology as a Human Affair* (1990), and Mitcham’s own anthology (co-edited with Robert
Mackey), *Philosophy and Technology: Readings in the Philosophical Problems of Technology* (1972; reprinted with enlarged bibliography in 1983). For comparative purposes here, as with my review in the Canadian Journal, I limit myself to the non-anthologies, by Rapp, Ihde (two books), and Ferré.

Among the five books, Mitcham’s is far and away the most comprehensive, as well as the best grounded in the history of the field. Mitcham includes a long part one on historical traditions in philosophy of technology, where he summarizes both pro-technology (“engineering”) and mostly anti-technology (“humanities”) philosophies of technology, along with attempts to reconcile the two—especially efforts in Germany and the United States.

In this historical introduction to his book, Mitcham summarizes contributions by a long list of authors, from Karl Marx and Ernst Kapp in the nineteenth century, to Peter Engelmeier in the early twentieth century, Lewis Mumford, José Ortega y Gasset, Martin Heidegger, and Jacques Ellul in mid-century, and on to Rapp, Hickman, and Ihde, among others. In addition, he discusses the relations of the developing field to philosophy of science, history of technology, and such other disparate fields as theology and political philosophy.

Mitcham has been criticized for not including recent work—recent at that time—in what is generally called the social construction of technology. He would later correct this oversight with a volume he edited in *Research in Philosophy and Technology*, volume 15: *Social and Philosophical Constructions of Technology* (1995).

Though Ihde’s *Philosophy of Technology* includes a long discussion of the history of human technological engagements with nature—and something of a history of the philosophy of technology—none of the comparator books comes close to matching the breadth and depth of Mitcham’s historical introduction.

Nor can any of the other would-be textbooks match Mitcham’s evenhanded discussions of competing viewpoints. Rapp’s text is avowedly “analytical” (see Chapter 13 below, on international connections of SPT). Both of Ihde’s books are rooted in phenomenology (though the later text does provide a somewhat broader focus). Ferré’s—which is the only one that reads like an introductory textbook—ends with a defense of a Whitehead-inspired metaphysics, a holistic critique of narrow technological thinking, not totally at odds with Mitcham’s. (For Ihde see Chapter 10; Ferre, Chapter 16.)
Each of these viewpoints can be seen as a source of criticisms of Mitcham’s work. To the extent that Rapp’s approach is different from engineering philosophy of technology—Mitcham’s primary target—Rapp’s complaint would be that Mitcham is not analytical enough or not analytical in the right way. But Mitcham views Rapp as falling within the engineering philosophy camp, where we would expect to find more objections to Mitcham. His reply to Rapp is that he is analytical, and includes analyses of technology in terms of ethics, epistemology, and, most important for him, metaphysics. The metaphysics, Mitcham says, is “part Aristotelian, part Heideggerian.”

So Rapp might retort, as would most of those Mitcham lumps under the engineering philosophy heading, that metaphysics of almost any kind is the problem with his humanities philosophy of technology. This basic controversy for Mitcham needs to be explored in more detail, but I postpone that for now.

Phenomenology of Ihde’s kind—phenomenological analyses of perception as colored by technological means—is, admittedly, something that Mitcham does not do.

Mitcham’s reply is that he does do careful phenomenological analyses, in particular of everything that engineers do and think, under his four headings of technology as object, process, knowledge, and volition; it’s just that he doesn’t do it in Ihde’s fashion. Mitcham actually gives Ihde a great deal of credit, though he puts his phenomenology down as pragmatist in effect, and says it (therefore?) doesn’t completely escape the engineering philosophy camp.

Ferre’s objection, though I don’t know of anywhere that he actually says this, would be to Mitcham’s kind of metaphysics. Ferre does critique Heidegger, so to some extent that would carry over to Mitcham; but he discusses Aristotelian substantialism only in the most general historical terms. Ferre’s metaphysics, in his neo-Whiteheadian process metaphysics (see Chapter 16 below), is opposed to substantialism, so possibly to Mitcham’s use of Aristotelian categories, but Ferre’s strong religious overtones are something that, on principle, Mitcham ought not object to.

These were some ideas I came up with based on my original review. Mitcham's own version of his controversies with others—at least his side of those controversies—follows.
First, his main controversy throughout the book involves humanities philosophy of technology versus engineering philosophy of technology, including his repeated defense of the humanities approach as better (though itself subject to further controversies).

Next, he does deal, however briefly, with four attempts to mediate between those two major adversaries:

1. He treats German attempts associated with the Verein Deutscher Ingenieure as little more than engineering philosophy in disguise.

2. He treats pragmatism (referring to myself and Hickman as based on Dewey) as a second attempt—and argues that it fails to extricate itself from the engineering pole. That, for me, sets up a controversy, best represented in later chapters (14 and 18) in this book, between Hickman and Borgmann over whether or not non-instrumental values are needed for an adequate critique of technological culture as a whole.

3. Mitcham next treats Ihde's phenomenological philosophy of technology as so closely related to pragmatism that it falls under the same doesn't-escape-engineering stricture as pragmatism more generally. Chapter 10 will deal with this, supplying Ihde's reply.

4. Mitcham also treats Marxism, to the extent he does at any length, in this same context:

   a. Mitcham says Marx himself ended up leaving a double legacy (see Chapter 4 below). His two candidates follow.

   b. Political Marxism (especially of the Soviet variety) Mitcham treats especially in terms of the *Man, Science, Technology* (1973) collective book, where Mitcham accuses Soviet thinkers of lapsing into a pure technocracy, clearly subject to the engineering philosophy stricture.

   c. Neo-Marxism, from Adorno and Horkheimer to Marcuse, to his competitor Habermas, then back to Marcuse-inspired Feenberg (see Chapter 12 below), which Mitcham seems to think is the
Best mediation offered so far. Even Feenberg's mediation, however, Mitcham says is “unrealistic,” leaving the charge unelaborated. (I treat that charge in the Feenberg chapter.)

Mitcham also deals with a series of controversies under his detailed accounts of “objects, knowledge, activity, and volition.” Whether technological objects are to be viewed better under the light of an engineering or a humanistic approach I treat under the main controversy. Discussions of the applied science model (p. 199) I take up in Chapter 5. Mitcham's entire chapter on engineering activities (it is a gem) is filled with controversies over likenesses and differences of engineering in relation to crafts and related activities; over the interpretation of invention; or of design, all the way to issues over the use by consumers of engineering products. I would probably single out one in particular as exemplary—Mitcham's treatment of so-called engineering design—but again I save that for a later chapter (Chapter 15).

Mitcham's final detailed discussion, of “volition” in engineering (or a culture that depends crucially on the products of engineering), returns us to the main controversy, Heideggerian culture critique versus an engineering-based technological culture, though the chapter also includes discussions of issues such as technological determinism.

Mitcham’s book ends with a defense of a particular viewpoint, in a way that introductions to other fields typically do not. But there is much evenhandedness about dozens, perhaps even hundreds, of different attempts to define a new field.

All of this detail ends up working against the book as a textbook, at least as an introductory text. Too many approaches and too many topics are touched on too concisely for the beginning student to be able to grasp them. At most, in my opinion, the book might serve as a sourcebook for an advanced seminar in philosophy of technology, where advanced undergraduates or graduate students could follow up on particular issues or look for thesis topics.

But I am more interested in the second of the issues I raised above and in my original review in the Canadian journal—the point of view of Thinking through Technology, its significance, and the controversial issues that it raises, either directly or indirectly. And the first thing to note is the subtitle, The Path between Engineering and Philosophy. Mitcham is at least implicitly suggesting that previous philosophers of technology had seemed to be ignorant of engineering
and related technical fields, an objection that Langdon Winner raised in a *Science* magazine review of the first volume of *Research in Philosophy and Technology*. Winner was giving voice to what would become a longstanding complaint (echoed more than once by Joseph Pitt, as we will see in Chapter 9) that too much of philosophy of technology amounts to critiques of Technology with a capital T. There were, the critics said, too few detailed examinations of actual efforts to control particular technologies at the concrete policy level. Early philosophers of technology had not seemed to take into account to any satisfactory degree what technical professionals actually do, the things they produce, and the values they hold, often claiming, for example, to be working “for the betterment of the human condition.”

Mitcham sets out deliberately to undercut this criticism, almost swamping the reader (at least the reader of his notes and references) in details of what engineers and technical professionals say about the objects they work on, their procedures and methodologies, the knowledge claims they make and defend, and even their values and motives.

This last heading—motives—is the least developed, and Mitcham says that is because neither engineers nor philosophers have written much about it. Mitcham’s chapter, “Types of Technology as Volition,” includes a long and detailed discussion of Heidegger’s eccentric though popular philosophy of technology, and Heidegger is one of the main philosophers whom defenders of technology have in mind when they claim that philosophical critics are ignorant of the real world of technology.

Unfortunately, despite the minute detail on engineering in Mitcham’s notes and references, his critics still accuse him of evaluating technology from an outsider’s perspective. This is partly because he does not do, or even depend upon, any of the detailed studies—historical or sociological—of the development of particular technologies or technological institutions that were available at the time he wrote the book. Mitcham basically concedes this point; that’s why, as I mentioned earlier, he would edit a volume on constructionism and technology. (See Chapter 25 below for my discussion of social constructionism within SPT.)

The crux of the issue here is that “the path between engineering and philosophy” is really a path from engineering to philosophy—in fact, to a humanistic philosophy whose avowed aim is to “take the measure of” not only technology in the abstract but of our modern technological culture as a whole. This is most
explicit in a section headed, “A Brief for the Primacy of Humanities Philosophy of Technology,” but the attitude is pervasive throughout the book.

Mitcham’s reply to this critique is that, “Although critical assessment of particular technoscientific practices and achievements is crucial, and where reflection must begin, particular assessments do not exhaust the challenge of technoscience” (as we have seen him say, above, in his web autobiography). He spells his arguments out in what he calls a “brief” for the primacy of humanities philosophy of technology over engineering philosophy of technology (pp. 88–93). Mitcham proposes three arguments, with the second one subdivided into three:

1. An argument from “historical subservience”: when engineers and their collaborators first proposed an engineering philosophy of technology (for example, in connection with the professional association of engineers in Germany in the 1970s), what they did was turn to traditional humanities disciplines, especially ethics.

2. A complex argument from “inclusiveness”:
   a. “Conceptually,” the humanities include historical perspectives that are broader than a Whiggish belief in technological progress, even when technological progress is equated with scientific progress and ultimately to social progress.
   b. “Functionally,” speculative knowledge and wisdom, since Aristotle (and Plato, though Mitcham doesn't say that), have been ranked higher than political virtue and honor, and clearly higher than the pursuit of pleasure (read the utilitarian "hedonistic calculus").
   c. “Anthropologically,” the humanities come closer to being coextensive with human activities broadly speaking—they reflect “more of human life.” You can only engineer so much, and even that much requires broader human social goals.

3. An argument from “spiritual continuity”: questioning has been the preeminent philosophical tool from Socrates to St. Augustine to Miguel Cervantes to Herman Melville; each “rejects or struggles against a
Mitcham elaborates on this last point in his brief (p. 93): “Often this insistent, sometimes conservative return to questions of justice, virtue, and piety will be perceived as romanticism if not mere churlishness. On occasion the return will degenerate into ritual . . . But were the philosophy of technology to become identified solely with a philosophical extension of technological attitudes, it not only would close itself off to the rich otherness of reality, it would also abandon its claim to be philosophy.”

Clearly C.P. Snow in The Two Cultures (1959) and other advocates of applying scientific and technological knowledge to the solution of world problems—especially to the solution of problems of hunger and poverty in the developing world—would react to this indictment with alarm. Do the humanities have anything to offer toward the solution of such human problems? Isn't it inhumane to go on as we did in the past?

And there is more. In his book, Mitcham also has what seems to me a somewhat strange attitude toward the ethics and politics of technology. He says (p. 12) that he wants to emphasize “the vitality of theory” but what theory means in his view is primarily metaphysical and to a lesser extent epistemological theorizing about the objects, processes, and knowledge claims of technologists. There is little ethical theorizing. Mitcham has written or edited several books on engineering ethics, but he has written virtually nothing about the politics of technology. When Mitcham discusses Marxism and neo-Marxism, his main complaints are that Soviet-era philosophers of technology reduced politics to a kind of fetishism of technology, a kind of technocracy out of step with Marx's initial insights about a broader cultural context of technology and economics; he says most neo-Marxists have been politically “unrealistic.”

This rather cavalier attitude may have been Winner’s real complaint about Mitcham and other early philosophers of technology (see Chapter 11, below), but in any case a serious political objection to Mitcham deserves discussion here. One does not have to subscribe to Marx's claim about religion as the “opiate of the masses” to claim that Mitcham's easy linking of his metaphysics with religion stands in need of political discussion, if not critical rejection.

Similarly, when it comes to American pragmatism (and Ihde's phenomenology which Mitcham says is closely akin to pragmatism), Mitcham seems to think that
he can deal with them effectively by simply stating that they do not manage to mediate between engineering and humanities philosophy of technology, that in fact they do not successfully escape from an engineering attitude toward our culture. His critiques of that attitude, he thinks, are also effective against the pragmatists, including Ihde as Mitcham interprets him. (Reactions from Ihde and from pragmatists can be found in Chapters 10 and 14 below.)

When it comes to the values and motivations of engineers and other technical workers (as well as modern consumers, the users of their products), Mitcham seems to be most comfortable with a Heidegger-like claim that they are “forgetful of being,” unwilling to grapple with goals or ends as opposed to instrumental means. And he concludes his book with an appeal to Heidegger, even though he says it is an appeal “not wholly consistent with Heidegger’s own analysis or intentions” (p. 297), where this may be a cryptic reference to his reliance, instead, on neo-Heideggerian Albert Borgmann (see Chapter 18).

At that point, Mitcham appeals to “the romantic way of being-with technology.” And he concludes with a lament: “The paradox of the romantic way of ‘being-with’ technology is that, despite an intellectual cogency and expressive power, it has yet to take hold as a truly viable way of life” (p. 299). And his very last word on the matter in the last sentence of the book is a question, about whether, perhaps, the “internal ambivalences” of a romantic critique of technological society “vitiates its power.” This does not seem to be an effective reply to objections about Mitcham’s neglect of politics (see above and Chapters 14 and 17).

To sum up, Carl Mitcham’s Thinking through Technology is an ambitious and detailed summary of some of the major contributions to the growing field of the philosophy of technology, as well as a refreshingly complete summary of what engineers and technical experts say about their work and its products. But it is also a brief for an attitude toward modern technology, and the culture within which it holds a central place, that wants to be “romantic/critical,” while also recognizing that objections may be forthcoming from his engineering opponents on that point.

Thinking through Technology, thus, though it did not lead to the development of a new field of philosophy of technology in academia, is a good place to begin my study here in this book of controversies among philosophers of technology.
Summary of full quadrant range of controversies

It seems to me that Mitcham, more than anything else, champions an *idealism* of
the religious sort. He does try to meet academic philosophy standards, thus
following, in some sense, *scientific/analytical* standards, which would, he thinks,
put him in opposition to some philosophers of technology who do not. One's
position in the grand scheme, however, is determined more by one’s opponents
than by anything else, and in those terms, “engineering philosophers of
technology” are Mitcham’s main antagonists. In this book, see Chapter 4, on
Bunge. And this could be generalized to cover a whole range of his opponents in
the *science* quadrant, e.g., Shrader-Frechette (Chapter 3) or Pitt (Chapter 9).
Mitcham would also oppose and be opposed by Marxists (Chapters 4 and 12). In
Thinking through Technology, while he acknowledges the roles of *pragmatism*
and Don Ihde’s *phenomenology* as significant contributions to the early history of
the would-be field, he also criticizes these approaches as too limited, as not
challenging the cultural dominance of a short-sighted engineering mentality—
and, of course, pragmatists (e.g., Hickman, Chapter 14) and phenomenologists,
pre-eminently Ihde (Chapter 10) among philosophers of technology challenge
him on this point.
Chapter 2

Philosophy of Science and Social Responsibility: Alex Michalos

Alex Michalos’s autobiographical accounts in two websites are surprisingly expansive for such a normally modest man. Currently Professor Emeritus at the University of Northern British Columbia and director of an institute for social research there, he is a fellow of the Royal Society of Canada—a long way from M.A., B.D. (bachelor of divinity), and Ph.D. degrees at the University of Chicago. Among many, many honorary or appointive positions, he has been president of the Canadian Rural and Remote Health Association; vice president of Academy II (Humanities and Social Sciences) of the Royal Society of Canada; president of the International Society for Quality of Life Studies; and—important for our purposes here—he was the second person elected president of the Society for Philosophy and Technology. Michalos was also a Federal New Democratic Party candidate for Parliament in Guelph-Wellington, Ontario, twice and in Prince George Peace River once, and has held several offices in the party over the past two decades or so. Michalos has taught social sciences and philosophy since 1962, with 28 years at the University of Guelph prior to moving to UNBC.

He has published at least 18 books and 70 refereed articles. He founded and, though he is now retired, still edits four scholarly journals: Social Indicators Research (an interdisciplinary and international journal for quality-of-life measurement); Journal of Business Ethics (with Deborah Poff); Teaching Business Ethics (also with Deborah Poff); and Journal of Happiness Studies (with Ruut Veenhoven and Ed Diener). He has served on the editorial boards of the Journal of Medicine and Philosophy, Research in Philosophy and Technology, Theory and Decision, International Journal of Value-Based Management, Optimum (the journal of public sector management), and the South Asian Journal of Psychology.

Following my convention here, his books, especially those that I think are relevant to controversies in the philosophy of/and technology, are included in the bibliography at the end, under Chapter 2.

Michalos’s five volume treatise, North American Social Report: A Comparative Study of the Quality of Life in Canada and the USA from 1964 to 1974 (1980–82), received the 1984 Secretary of State’s Award for Excellence in
interdisciplinary studies in the area of Canadian Studies. His Science for Peace volume on *Militarism and the Quality of Life* (1989) argued that some scientific research and development was counterproductive from the point of view of improving the quality of life. His four volume *Global Report on Student Well-Being* (1991–93) gives the results of a survey of over 18,000 university students in thirty-nine countries. It is the biggest international survey of students ever undertaken and involves the most extensive testing of a social scientific theory across national boundaries.

Michalos has also been a consultant to many federal, provincial, regional, and municipal government departments and agencies in Canada and other countries, and his writings have been translated into Japanese, Chinese, German, French, Spanish, Italian, and Polish.

Most of this is from Michalos’s own websites. And it means that, for our purposes here, Michalos is a very special case. He has written little about philosophy of technology as such; much about philosophy of science, including a chapter in a book I edited, *A Guide to the Culture of Science, Technology, and Medicine* (1980, 1984), that touches on ethics and social responsibility in science; but mostly on measures of the quality of life in the contemporary world. His *Guide* chapter puts on display many opponents in philosophy of science, on which issues he is open-minded and fair, down-to-earth, almost the total opposite of most of his opponents. His early technical writings on the interpretation of the foundations of statistics were well received by experts; there his view is down-to-earth practical; he even calls himself a pragmatist, and often does so while citing Dewey.

To try to sum up Michalos’s views in a sentence, he believes passionately in the power of public opinion polling and statistical analysis to provide the intelligence we need in modern society for good democratic governance. It is difficult to fit Michalos within a framework of discussions in the philosophy of/and technology. I won’t even try, but I should give him his due as the second president of SPT—though with strong links to the Philosophy of Science Association in the early days, and as a genuine maverick since.

To give him his due I will focus on the part of his chapter in *A Guide to the Culture of Science, Technology, and Medicine* that touches on ethics and social responsibility in science. It admirably reveals his evenhanded and self-effacing approach.
“From a logical point of view, the central problem underlying . . . [many] discussions [in the Guide] is the conflict between cognitive and pragmatic (or social) utilities or values—i.e., the subject of this section.

“Anyone who has an ordered set of preferences that may be exhaustively measured on an interval scale is said to have a utility function. Interval scales are such that their basic units of measurement are of equal size, allowing one to say, for example, not only that one item is larger than another but exactly how much larger in terms of a standard unit of measurement. For some limited areas, provided that they do not contain more than half a dozen items, one may be expected to have such a utility function. However, given the wide variety of things that people value, it would be a rare person indeed who could neatly order her or his total set of preferences. Most people do not have, and probably do not miss, utility functions for all their preferences.

“Since preferences are, by anyone’s reckoning, closely related to values, it is often assumed that insofar as one has a utility function, one’s values are measured on an interval scale. Moreover, by combining utility and probability values, it is possible to increase substantially the variety of one’s inductive procedures. The method of combination is straightforward, involving a Maximization of Expected Utility (MEU) rule, which is itself easy to illustrate.

“Suppose, for example, you are considering buying one of two houses. Both houses are selling for $100,000, but one is 10 miles from work and the other is 30 miles away. If all other things are roughly equal, you might think that because you will suffer three times as much in travel time at one house as at the other, the expected utility or value of buying the house closer to work is about three times greater than that of the house farther away. So, following the MEU rule, you buy the house closer to work.

“It has been suggested that the idea of utility considered here is too general to serve the specific interests of science. After all, the argument runs, the values that are of particular concern to scientists represent only a subset of all the values that people hold. Moral, political, aesthetic, religious, economic, and social values, for example, are supposed to be irrelevant to the scientific enterprise. Hence, if one is going to use the MEU rule to determine the acceptability of scientific hypotheses, one is going to have to put some constraints on one’s utility function. More precisely, one must distinguish epistemic from pragmatic utility,
and employ only the former in science. Pragmatic utility may be identified with the broader concept with which this discussion began. Epistemic utility requires a bit more explanation.

“The epistemic utility or value of a hypothesis is its utility or value from the point of view of the aims of pure or basic science. Without getting bogged down in a debate about the difference between pure and applied (or ‘mission-oriented’) science, one may safely assume that truth is near the top of the list of aims of pure science. Besides truth, defenders of this position claim, there are other epistemic values—e.g., the explanatory power of a hypothesis, its internal coherence (self-consistency), its external coherence or consistency with other hypotheses, its precision. So far as the expected utility of a scientific hypothesis is concerned, then, these are the only kinds of values that should be taken into account . . .

“Such considerations as how much it will cost to test the hypothesis, whether the right personnel are available to get the job done, how one’s reputation will be affected if the hypothesis succeeds or how much one’s reputation might be damaged if it fails, are all important for the assessment of the hypothesis’s pragmatic utility, but not for its epistemic utility.

“As one might expect, there is some dispute about the matter. Some people believe that pragmatic values must be considered in the determination of the acceptance of scientific hypotheses. According to these people, the decision to accept or reject a hypothesis is always based, for instance and among other things, on the seriousness of making a mistake. One must take into account the expected utility of accepting a hypothesis that may turn out to be false, and the utility must be as pragmatic as the actions one is likely to perform under the influence of a false belief. That is, because one’s scientific beliefs influence one’s actions beyond the realm of science, one’s assessment of the consequences of holding those beliefs must include an appraisal of the consequences beyond this realm. Hence, the evaluation of the expected utility of scientific hypotheses must be based on pragmatic as well as epistemic utility . . .

Social Responsibility

“The preceding section has taken us slightly beyond the threshold of a discussion of the social responsibilities of scientists as scientists. . .
“As scientists, what, if any, special social responsibilities do scientists have? Since no one has been able to provide precise necessary and sufficient conditions for distinguishing the scientific enterprise from everything else, one should not expect a logically tight answer to this question. Still, several worthwhile points may be made.

“In the first place, a wide variety of social responsibilities accrue to scientists as a direct consequence of what scientist do for a living or, perhaps more precisely, of the very nature of the scientific enterprise. Suppose, for example, we begin with the fairly uncontroversial idea that one of the most important aims of science is to discover well-warranted, descriptively true claims about the natural world. Publication of the claims, procedures used to warrant the claims, procedures used to assess, audit or certify the alleged warranting procedures and claims all require special responsibilities. A history of science is in large part a history of human reflections, discussions and debates about what are to count as good, acceptable or appropriate procedures. Someone must decide who is qualified to decide such things and what procedures are to be used to make such decisions. Thus, disciplinary, multidisciplinary and transdisciplinary organizations are created to provide the personnel, procedures and criteria to make such authoritative decisions. Official, or at least, authoritative outlets have to be created, indicating the approval of the right people, with the right credentials, using the right rules of procedure. All of this routine day-to-day work has to be undertaken by scientists as their social responsibility as scientists. Much of this work is not scientific but social, e.g., founding disciplinary organizations, journals, networks of likeminded researchers, rules of proper behaviour for chemists is not like bench chemistry. Just as the creation of a workable political/social/economic/moral infrastructure that allows people to interact productively in a community is different from the variety of individual activities undertaken within the community as residents perform their daily roles as bakers, cooks, teachers, etc., the creation of a scientific infrastructure is different from inventing hypotheses or theories, testing them, and so on. Broadly speaking, then, the first social responsibility of scientists is to construct a good infrastructure for the scientific enterprise to flourish responsibly.

“In the second place, it must be appreciated that scientists are not immune to the buck-passing syndrome. Most of them will almost certainly be inclined to narrow the range of activities for which they are prepared to accept responsibility and, at the same time, widen the range of activities for which they are prepared to accept authority. Notwithstanding the psychological theory of cognitive
dissonance, most human beings seem to manage this particular pair of incompatible inclinations.

“Although people in business seem to be the only group blessed with the analytic aphorism, ‘The business of business is business,’ others certainly try to have their way in the same fashion, namely, by fiat. In the case of science, the inclination is to come down very hard on the as scientist part of our question, thereby paving the way for the narrowest possible purview. Scientists, after all, are not moralists, politicians, social workers. So they need not have the concerns of moralists, politicians, and so on. So the answer to our question is a flat no; scientists as scientists have scientific responsibilities and that is that.

“Apart from all the issues mentioned under the first point above, the trouble with this argument is that it assumes that all concerns or problems can be uniquely sorted into mutually exclusive pigeonholes. On the contrary, most concerns or problems can be regarded as species of several genera. For example, unemployment is an economic, moral, political, and scientific, as well as a social, problem. The task of ‘correctly’ measuring the number of unemployed people in a country or region continues to haunt official and unofficial researchers around the world. In fact, about this problem there remains a considerable disparity of views from one country to the next. Officially unemployed people may be eligible for compensation. Unofficially unemployed people—e.g., housewives—will not usually be eligible. Hidden unemployed people are surely unemployed but not officially unemployed and not eligible for compensation. To be counted as a member of the hidden unemployed is to be counted as a person without hope at best and as a slacker at worst. In either case, because they are no longer trying to find work, they are not officially regarded as unemployed. Their official status thus depends on their desires and the activities in which they engage in the interest of satisfying those desires. Or rather, it depends on some interviewer’s perception of those desires and activities. Needless to say, the self-images of the hidden unemployed and unemployed housewives are affected by their employment classification. Indeed, it is unlikely that the self-image of anyone in a work-oriented society is unaffected by her or his employment status. Clearly, then, the question, ‘Who ought to be regarded as unemployed?’ is as much moral, political, economic, and social as it is scientific. Hence, anyone who sets out to measure unemployment scientifically must be aware of, and must make decisions concerning, the propriety and consequences of a number of alternatives. Anyone attempting to measure unemployment without regard for the presumably nonscientific facts of unemployment would be a poor scientist. A good scientist
as a scientist would address the problem in all its richness. He or she may not be able to manage the problem in that form and may have to introduce arbitrary restrictions in order to manage it at all. But that is not the same as refusing to grapple with its richness on the grounds of its unscientific character, whatever that may be.

“It must also be remembered that because the results of scientific investigation may be used intentionally to influence or control human action, investigators should at least be required to share some of the responsibility for aberrant uses. Although one may balk at the suggestion that Pavlov should be condemned for all the immoral uses to which operant conditioning has been put, one should not be oblivious to the unseemly side of the social impact of his discovery. Undesirable consequences unleashed by scientific discoveries may be as real as desirable consequences.

“Again, if allegedly scientific claims are used to legitimize socioeconomic policies, then the scientists making those claims in behalf of those policies should be held partly responsible for the consequences of the policies if they are put into effect. For example, those who recommend separate tracks in schools for minorities and majorities or bright and dull students on the basis of their research should be held responsible for the costs as well as the benefits that follow the development of programs consistent with those policies. Whenever social programs are initiated on the strength of the recommendations of scientists, whose recommendations would not be heeded at all if they were not made as scientific, the scientists must share the responsibility for the consequences of the programs. If scientists are not held accountable for the consequences of their scientific pronouncements then they will be encouraged to be irresponsible, and they will enjoy an unwarranted social privilege that most people cannot and should not enjoy. These two arguments are used in the document, Scientific Freedom and Responsibility (1975), produced by the A.A.A.S. Committee on Scientific Freedom and Responsibility. . . .

“It is also the case that because scientists draw from the same limited resource pool from which the rest of the human race draws, they have an obligation to try to make their demands reasonable from the point of view of the public interest. The assumption behind this argument is that there is no invisible hand operating to allocate the world's resources equitably or even efficiently. Moreover, it is demonstrably certain that if everyone attends only to what he or she perceives as his or her own interests, a socially self-destructive result may occur. That is the
clear message of so-called ‘prisoner’s dilemma’ studies. It is also the message of two children in a playpen who finally tear the toys apart rather than share them.

“Finally, there is an argument from self-interest that is worth mentioning. Scientists as scientists must look beyond their own interests in order to preserve those interests. They must try to assess the total demands on the resource pool that they are tapping in order to avoid what one author has called ‘the tragedy of the commons.’ Here, as on our roadways, one must drive defensively. To assume that the ‘other guy,’ an elected representative, civil servant, or kind-hearted citizen, is going to be wise enough or morally good enough to balance all interests equitably and efficiently is to reject the lessons of history. The public good is the business of everybody—scientist and nonscientist alike.”

Some readers might think that all of the assertions in this long quote are far removed from philosophical concerns about technology. But if we assume—along with the American Association for the Advancement of Science that Michalos quote—that “scientists” include all technically trained workers, including, for example, engineers and economists, then we can conclude that Michalos’s assertions can fall under the heading of philosophy and technology. Presumably the members of SPT who voted for Michalos read him that way.

Thus in terms of controversies, Michalos's opponents come primarily from within a science quadrant, though he thinks there is no sharp divide between scientists and technologists, and he wants all of them to be socially responsible.

He also sometimes says he is a pragmatist (though Hickman, see Chapter 14 below, would challenge his reading of Dewey). His principal explicit opponents are narrow positivist philosophers of science; that is, defenders of the narrowest possible claims for exclusive epistemic values. In his political career, Mitcham has been a socialist New Democrat, which places him squarely in opposition to Canadian conservatives (typically idealists in Watson's terms) and liberal meritocrats. Michalos’s socialism is also opposed to Marxism, though he does not make a big deal of this. In short, we must guess where Michalos would stand on a number of philosophy of technology issues, because he has not entered explicitly into controversies with other philosophers—either “of” or “and” technology.
Chapter 3

*Philosophy of Technology as Risk Assessment of Technological Ventures: Kristin Shrader-Frechette*

Kristin Shrader-Frechette (according to her web autobiography) studied physics at Xavier University and then graduated, summa cum laude, in 1967, with an undergraduate major in mathematics from Edgecliff College. In 1972, she received her Ph.D. in philosophy from the University of Notre Dame—where she now teaches. Shrader-Frechette did postdoctoral work for two, one, and two years, respectively, in biology (community ecology), economics, and hydrogeology. She has held Woodrow Wilson Foundation, National Science Foundation, and Carnegie Foundation fellowships in philosophy of science and has held offices or served on committees in the American Philosophical Association, the Philosophy of Science Association, the Society for Philosophy and Technology, the Risk Assessment and Policy Association, the International Society for Environmental Ethics, and the US National Academy of Sciences. She has been a member of many boards and committees of the National Research Council/National Academy of Sciences, including its Board on Environmental Studies and Toxicology, its Committee on Risk Characterization, and its Committee on Zinc-Cadmium-Sulfide Dispersions. Associate Editor of *BioScience* until 2002, and editor-in-chief of the Oxford University Press monograph series on Environmental Ethics and Science Policy, Shrader-Frechette also serves on the editorial boards of 17 professional journals. Past President of the Society for Philosophy and Technology; the Risk Assessment and Policy Association; and of the International Society for Environmental Ethics, Shrader-Frechette was the first woman president of all three of these international organizations. She has also served as principal investigator for grants from the National Science Foundation, the National Endowment for the Humanities, the Council on Philosophical Studies, and the US Department of Energy.

Most of Shrader-Frechette’s work is either on scientific method, on ethical theory, or on ethical issues related to technological risk and their environmental consequences. Since 1984, her work has focused on methodological and ethical problems associated with nuclear technology or with ecological measures of technological risks.

Shrader-Frechette has published more than 300 articles and more than a dozen
books or monographs, and many of these publications have been translated into half a dozen languages. Moreover, Shrader-Frechette has appeared—often as featured speaker—in all the countries where those languages are spoken. Since almost all of her books are relevant to this book, they will be found in the bibliography at the end.

Much of this sketch comes from Shrader-Frechette's own website. What I would add is this, that nearly everyone would agree with the claim that Shrader-Frechette’s large body of works are important philosophical analyses of particular technologies and particular approaches to assessments of technology and the status of the environment. She strongly opposes philosophers of technology who cannot deal with technical experts on their own terms, and she has also made important contributions in the philosophy of science, for example to the analysis of the foundations of probability and statistics. There she seems ready to endorse a kind of learn-from-experience Bayesian approach—though on topics such as technology and environmental assessments she is quick to point out places where the assessors are not learning from experience but treating their prejudices as though they were exempt from criticism. To sum up her views in a nutshell, she is an avowed Rawlsian egalitarian social contract ethicist who uses this yardstick in all her particular assessments related to technological controversies. She is also an avowed feminist. I think she would also accept the currently unpopular liberal label, along with her intellectual hero, John Rawls.

In her approach to philosophy, Shrader-Frechette always insists on being precise, on getting things right. I will try to do the same here, and one way is to stick close to her own texts. They usually spell out her opponents’ views in short arguments, philosophy-of-science style, before refuting them with equally short and precise arguments.

It would be impossible here to do full justice to everything Shrader-Frechette has written, so I am going to repeat what I did once before and focus on a representative series of three books. The survey appeared originally in Spanish (see Isegoria, October 1995), but the version I repeat here is in English, and can be found in my “Activist Philosophy of Technology: Essays 1989–1999” (www.udel.edu/Philosophy/pdurbin.html). I started with the latest of the three, Burying Uncertainty: Risk and the Case against Geological Disposal of Nuclear Waste (1993), then worked back to her earliest (and probably still the best known) book, Nuclear Power and Public Policy (1980). Here is that material, almost unchanged.
Almost from the beginning of her philosophical career, as noted above, Shrader-Frechette has been involved with a variety of technology assessment and environmental impact assessment commissions, first at the state level and then at higher and higher levels up to the Federal level in Washington, D.C. Indeed, I think it is a fair guess to say that no North American philosopher has been involved in more such committees. In some ways this is paradoxical, because, since the appearance of *Nuclear Power*, Shrader-Frechette has often been accused of being not only anti-nuclear but anti-technology in general—a charge she has repeatedly felt that she has to combat. But several characteristics—the fairness of her arguments, the expertise that she brings to discussions, and the fact that she always tries to make a positive contribution—keep getting her invited back again and again.

*Burying Uncertainty* is in many ways the most detailed of her books, and it is a good example of all of the best qualities of her work. The first four-fifths of the book constitute her critique of the major plan to bury nuclear wastes deep in Yucca Mountain in Nevada. The critique includes many by-now-familiar features of her arguments: the risk assessments used to justify the plan are faulty because they hide certain value judgments; the subjective risk assessments used are in fact mistaken in many cases; faulty inferences are drawn from these faulty assessments; there are fatal but unavoidable uncertainties in predictions of the geological suitability of the site; and the entire venture violates an American sense of fair play and equity, especially with regard to the people of the state of Nevada. These are her conclusions. The arguments in support of them are meticulous, even-handed, and unemotional in every case.

This does not mean, of course, that they have been or will be viewed as such by Federal officials, including scientists, especially bureaucrats in the Department of Energy with vested interests in pushing the official project to completion; she has even been heckled when presenting her arguments in their presence.

A second notable point is that Shrader-Frechette knows what she is talking about; indeed, her knowledge of both geology and the risk assessment process is remarkable in a philosopher in these days of academic specialization—though her critics, naturally, maintain that some of her geological claims are irrelevant and that her accounts of particular risk assessments are biased against official government experts.
One bias Shrader-Frechette does not attempt to hide is in favor of equity; she has even given one of her more general studies a subtitle that underscores this bias: *Risk and Rationality: Philosophical Foundations for Populist Reforms* (1991). This might make her sympathetic toward some aspects of John Dewey’s progressivism, but the social philosopher she invokes most often is Rawls and his contractarian, neo-Kantian theory of justice as fairness.

What typifies Shrader-Frechette’s approach more than anything, and what clearly makes her a welcome addition to any discussion (including the discussion, here, of how to deal fairly with the urgent problem of finding a place to put highly toxic nuclear wastes), is her insistence on being more than just a critic. She feels that it is necessary to make a positive contribution to the discussion; as she says, one purpose of the book is “to provide another alternative to the two current options of either permanently disposing of the waste or rendering it harmless” (p. 2). The positive contribution makes up the last part of the book.

Admittedly providing only a sketch (one-fifth of the book versus the four-fifths devoted to critiquing current policy as epistemologically faulty and ethically unfair), what Shrader-Frechette argues for, in place of permanent disposal, is placing “high-level radwastes in negotiated, monitored, retrievable, storage facilities” (negotiated with the host community or communities), for at least a hundred years.

It is too early to tell whether Shrader-Frechette’s book will have any impact, either on Department of Energy scientists and officials, or on public officials more generally—or even on the educated public (except perhaps in Nevada). The debate is still ongoing. But one thing is clear even now: if a philosopher were to choose to follow Dewey’s advice, to get involved actively in trying to solve some urgent technosocial problem like the disposal of nuclear wastes, he or she would have to search far and wide for a better model than Shrader-Frechette as she makes her case in this book. (For a contrast with a more specific pragmatism, see Chapter 14 below on Hickman.)

Taking a step back in time, Shrader-Frechette’s *Nuclear Power and Public Policy: The Social and Ethical Problems of Fission Technology* (1980, with a second edition in 1983) was her first venture into the epistemological/methodological fallacies of nuclear policy, along with its ethical inequities. It is clearly more strident than *Burying Uncertainty*. There is already all the care—to get the facts right, to deal with risk assessors on their own terms
(even when pointing out their errors), and to argue carefully and meticulously—that one finds later. Also, as later, the ultimate aim is to make an equity-based ethical claim; but here it is reduced to little more than a dozen pages. And, though Shrader-Frechette, when she wrote this book, already had an exemplary record of working with assessment teams, this early venture does not show the same degree of care as the later one when it comes to understanding and appreciating the motives and feelings of her opponents.

Shrader-Frechette’s *Science Policy, Ethics, and Economic Methodology* (1985), falls midway between *Nuclear Power* and *Burying Uncertainty*. There, Shrader-Frechette broadens the scope of her critique, taking on the fallacies and hidden assumptions of a whole host of technology and environmental-impact assessments. *Science Policy* is an extended critique of risk/cost/benefit analysis, the most widely used methodology in these various assessments. In this book, Shrader-Frechette points out general and specific problems, and she makes an extended case for what she calls regional equity—avoiding, where possible, imposing risks or costs on people in particular geographical regions.

In this middle one of these three books, Shrader-Frechette clearly moves toward providing positive alternatives to the methodologies she has criticized. She offers two: an ethically-weighted version of risk/cost/benefit analysis, and a technology tribunal—a public procedure for weighting equitably the competing values that different scientists bring to their risk/benefit analyses. Shrader-Frechette is here, then, clearly moving toward the positively collaborative attitude so much in evidence in *Burying Uncertainty*—though perhaps the generality of the argument, focusing on a variety of assessments, probably dooms the book to have less of an impact than the later book. *Nuclear Power* may have had more of an impact, though it also gave more ammunition to opponents accusing her of being anti-technology.

Shrader-Frechette’s *opponents*, as they show up in these summaries, include not only public officials she accuses of bias but also early philosophers of technology, whom she accuses of not doing their homework before offering their critiques of technology—especially if they are critiquing something like Technology with a capital T. Defenders of current policy on nuclear power, including the disposal of nuclear wastes, do not agree that they are biased. And, while early generalist critics of technology within the Society for Philosophy and Technology welcomed Shrader-Frechette within their circles, most did not follow her example with detailed technical studies. We have already seen Carl
Mitcham, in Chapter 1, say that concrete studies are a good beginning, but what is more important is a broad critique of technological culture as a whole. One bias that Shrader-Frechette does not attempt to hide, as noted, is in favor of equity; she has even given one of her more general studies a subtitle that underscores this bias: *Risk and Rationality: Philosophical Foundations for Populist Reforms* (1991). This might make her sympathetic toward some aspects of John Dewey’s progressivism, but the social philosopher she invokes most often is Rawls and his contractarian, neo-Kantian theory.

So, full range of controversies? Clearly Shrader-Frechette's controversial stands make her a hybrid, disagreeing with many within the science quadrant. For example, Joseph Pitt (see Chapter 9 below) also falls within the science camp, but Shrader-Frechette has accused him of not being fair to LangdonWinner (Chapter 11 below), the non-Marxist but radical critic of undemocratic technological ventures. Shrader-Frechette herself tends to interpret Rawls as meritocratic, which would still keep her within the science quadrant. On the other hand, her egalitarian value slant is often perceived (e.g., by her nuclear bureaucrat opponents) as idealist (even anti-science). But opponents also include idealist philosophers of technology who do not think they need to do the kind of scientific work that she does, or (like Mitcham) who insist that what our technological culture needs is radical critics. Shrader-Frechette is less clear about her opposition to standard Marxists, but it seems clear that she opposes them—as they oppose liberalism. Her attitude toward pragmatists like Hickman (Chapter 14) is not clearly spelled out—though some pragmatists and other progressives (e.g., recent writings of Martha Nussbaum) criticize Rawls’s version of egalitarianism in ways Shrader-Frechette might have questions about.
Chapter 4

A Marxist Critique of Capitalist Technology: Marx Wartofsky

The Society for Philosophy and Technology grew out of a conference that I hosted at the University of Delaware in 1975. The original idea came from Carl Mitcham. But it was a set of fortuitous circumstances that made the conference possible. I had come to Delaware in part because of an earlier, aborted effort to establish a center there for philosophy of science, memorialized in a set of conference proceedings called the Delaware Seminar—an effort that had not received a warm welcome from scientists associated with the DuPont Company. Even so, a university that existed within the milieu of, and was well supported by that company with its slogan, “Better Things for Better Living through Chemistry,” seemed a natural locus for such an effort. And the local scientific and engineering community did support the idea of the 1975 conference. Also, at the University of Delaware there was a robust history of science and technology community of scholars, including a strong link with the DuPont-related Hagley Fellows program of the Eleutherian Mills Hagley Library. Eugene Ferguson, an eminent historian of technology with an engineering background who was a member of the Delaware history department, had been instrumental in getting Mitcham’s bibliography of the philosophy of technology published in *Technology and Culture* in 1973. The editor of that journal, Melvin Kranzberg—who had, earlier, in 1966, published in its pages one of the first major symposia on philosophy of technology—was easily enlisted to help provide names of philosophers to invite to the conference. But probably what was most significant was that the time was right. The North American academic community was just emerging from, and still influenced by, a social movement—the so-called New Left—that was critical not only of the Vietnam War but also of the technologies utilized there, and by extension a whole range of technologies that were widely perceived to be damaging especially to the natural environment.

Marx Wartofsky, the fourth SPT president but only one focus of this chapter, was not involved with the 1975 conference. Nevertheless, he and his colleague at Boston University, Robert S. Cohen—who together ran the Boston Colloquium for the Philosophy of Science with its Boston Studies series of publications—supported the venture from a distance. (The first proceedings volume of SPT based on an international conference was jointly published in the Boston Studies series and in the new Philosophy and Technology series.) And one of their colleagues at Boston, Joseph Agassi (who had contributed to the *Technology and
Culture symposium in 1966), was a presenter at the Delaware conference. (See Chapter 7 below on Agassi.) So it was natural to invite Wartofsky and Cohen to get involved in SPT—even though, as was the case with Michalos, Wartofsky was another interloper from philosophy of science. Wartofsky’s Marxist leanings, however, made his work more relevant to philosophy of technology—and popular critiques of technology—than the typical philosopher of science of that era.

Wartofsky’s best known publication at the time was his *Conceptual Foundations of Scientific Thought: An Introduction to the Philosophy of Science* (1968). And he did not go on to publish a great deal in philosophy of technology other than his presidential address to SPT in 1989, “Technology, Power, and Truth” (included in Winner, ed., *Democracy in a Technological Society*, 1992), and two or three other articles. So this chapter focuses less on Wartofsky’s own work in particular than on a general line of Marxist and neo-Marxist thought that strongly influenced many leaders of the New Left.

Here is a key text from Wartofsky’s 1989 SPT presidential address: “[I] characterize some of the objective conditions of the fourth revolution [in the history of technology], . . . namely, those conditions which politicize technology as a central question of national policy, the national economy, international competition, rivalry, or war, and governmental or global regulation of massive hazards for species life. All this is new [though . . .] this does not mean that aspects of such problems did not already show themselves much earlier . . .

“The fourth revolution, by contrast to the first three, introduces a terrifying option; it makes technological or maker’s truth hostage to political power, in a decision-procedure that tests policy against the lives of millions, against the planet’s future . . .

“However loose the fit between intentions and outcomes in policy matters, good faith requires some reading of the relevant facts, in their best determination, upon which the policy decision is crucially based. The willful distortion or suppression of facts, or even of reasonable conjectures and arguments about the facts, in the interests of some favored policy goal, or of some exercise of power, is the most dangerous corruption that the politicization of technology makes possible in the context of the fourth revolution” (pp. 27 and 33).

I will return to this text, but in my book, *Social Responsibility in Science,*
Technology, and Medicine (1992), I include a section on why Marxism seems to offer a solution for the social problems associated with modern technology. I borrow from that here almost verbatim. I did not there and do not here want to glibly dismiss Marxist responses to the problems of technology.

I take the Marxist response seriously in spite of the end of the Cold War. Here is why. I had proposed early in that book a list of ten types of social problems that beset contemporary high-technology society. The problems range from the nuclear arms race to commercialization of traditional high culture, from ecological catastrophes and genetic engineering to boredom in high-technology jobs and alienation in family life in today’s sprawling urban centers. But at the center of my list is growing technoeconomic injustices, and especially the increasing disparity between the haves and the have-nots—whether these are national, between socioeconomic classes in high-technology economies, or international, between developed and supposedly developing nations.

It is this problem that Marx, and Marxists ever since, have focused on. I would in fact go so far as to say that any interpretation of Marx that does not focus primarily on the class struggle between, on one hand, those who control the means of production appropriate to a given stage in the dialectic of history, and, on the other, the exploited workers who actually produce economic wealth is not within the mainstream of Marxist theory as I understand it. I would go further and say, anticipating objections to my interpretation, that any authentic Marxist ought to say that none of the other problems of technological society I list will be solved until the class struggle is resolved worldwide.

Why is this? There would seem to be an obvious link between the economic issue—especially if interpreted in class-struggle terms—and all the other issues: the nuclear economy obviously; industrial and consumption-driven wastes; the temptation of the haves to use high-tech surveillance methods, and perhaps eventually genetic intervention, to keep the exploited have-nots in line or to mold them for particular sorts of work; bribes for workers to induce them to accept hazardous or mind-numbing jobs; worker alienation carrying over into family life, or even leading to its breakdown; schools turned into corporate training grounds without attention to their traditional role of educating responsible citizens; politics turned into media manipulation, frustrating true democracy; the arts no longer critical of society but corporation-dominated. This all-too-familiar litany of contemporary social problems almost always sounds, to defenders of the corporations and of high-tech society, as though it must come from left-wing
enemies of capitalist society—“fellow-travelers” at worst, or dupes of the Communist line at best.

Several common interpretations of what is going on here need to be dispatched quickly. Students, when they come in contact with Marxist views on the impact of economic power on social problems, often think of it in terms of the exercise of raw economic power. Wealthy individuals, high-level corporate managers, politicians in league with the wealthy and managerial classes, can simply do as they will. If it means profit for them, they can start wars or keep cold wars going indefinitely. (Perhaps they would now say almost indefinitely.) Similarly, critics often take Marxists to be saying that leaders of the capitalist exploiting class act in conscious concert to control education or the media. And, finally, cynics interpret capitalist exploiters as pure and simple greedy men who will do anything, no matter the effects on workers or on the environment, if it means more short-term profits for themselves. (Short-term profits, of course, turn into long-term capital investments, and the cycle goes on.)

None of these interpretations is necessarily or entirely false. No doubt leading capitalists do exercise raw economic power, do sometimes act in collusion in ways that seem to amount to conspiracy (or monopolistic practices), and can be as greedy as anyone else in society. But none of this is the point of the Marxist claim that class divisions pitting capitalists against workers are the root of all social ills in our technological society—or in any previous version of capitalist society. According to Marxist theory (as I am interpreting it here), it is not the individual motives of capitalists, singly or acting in concert, that explain why class-division disparities between capitalists and workers lead inevitably (according to this view) to toxic wastes, hazardous workplaces, and boring high-technology jobs. What makes these social problems insoluble until exploitation ends, according to Marxism so interpreted, is that capitalism is a wholesale ideological superstructure erected on the base or substructure of capitalist-era modes of production. Our entire way of life, all our social relations, not only at work but in the home and everywhere else, are intelligible only in terms of the ideology of capitalism (or, in the present view, techno-capitalism).

A slightly dated example: Eugene Genovese, a neo-Marxist historian, provides a telling picture of how all of this is supposed to have been in evidence at one time, in his interpretation of life in the slaveholding society of the Old South in the United States, including its accompanying (and legitimating) worldview. The ideology afflicted not only the slaveowners themselves, but their wives, their
mores, the law of the land—and even the self-images of non-slaveowning whites, of overseers, as well as of the slaves themselves (however much the slaves later came to see their interests as at odds with the slave economy). In one among many passages (the book must be read in its entirety to get the total picture of a worldview as a seamless—though class-divisive—web), Genovese says: “This ideology . . . developed in tandem with that self-serving designation of the slaves as a duty and a burden which formed the core of the slaveholders’ self-mage. Step by step, they reinforced each other as parts of an unfolding proslavery argument that helped mold a special psychology for master as well as for slave. The slaveholders’ ideology constituted an authentic world-view in the sense that it developed in accordance with the reality of social relations.”

The kind of men and women the slaveholders became, their vision of the slave, and their ultimate traumatic confrontation with the reality of their slaves’ consciousness cannot be grasped unless this ideology is treated as an authentic, if disagreeable, manifestation of an increasingly coherent world outlook.

Genovese’s marvelously comprehensive account of an earlier capitalist society, where class divisions are obvious, goes into all aspects of the problem—religious legitimations as part of the ideology, and so on. But if his depiction of how economic relations spread out in every direction to become a wholesale ideology seems esoteric and far removed from techno-capitalist ideology, it nonetheless highlights, in a historian’s fashion, the substructure/superstructure dialectic.

The same thing is done from a social-scientific perspective by Peter Berger and Thomas Luckmann. Their focus is on ideological consciousness and how it comes to have the authoritative character it does throughout a culture: “Only at this point does it become possible to speak of a social world at all, in the sense of a comprehensive and given reality confronting the individual in a manner analogous to the reality of the natural world. Only in this way, as an objective world, can the social formations be transmitted to a new generation. In the early phases of socialization the child is quite incapable of distinguishing between the objectivity of natural phenomena and the objectivity of social formations. . . . All institutions [including the most basic institution of all, language] appear in the same way, as given, unalterable and self-evident.”

It should not be thought that such “objectivity” of social institutions, of ideology, ends when the child grows up. Berger and Luckmann admit that one of the most difficult cases for their dialectical theory of social consciousness is that of the
alienated intellectual—and especially of the revolutionary intellectual. But far from disproving the wide-ranging impact of reigning ideologies, the case of the revolutionary intellectual actually confirms the theory: it is extraordinarily difficult for anyone to break out of an ideology, and, in Berger and Luckmann’s view, when one does so, he or she will immediately try to rally a group together and produce a counter-ideology.

Such praxis-oriented revolutionary theorizing has been applied directly to technological society and its problems. The best-known instance is the theories of Herbert Marcuse, especially in *One-Dimensional Man* (1964). For my part, however, I prefer the elaborations of Marcuse’s views, in a historical mode, by David Noble (1977, 1984). Where Marcuse claims that any opposition to the reigning ideology—for example, in cases of union opposition to hazards in high-technology industrial workplace—ends up being interpreted as counterproductive, even irrational (according to the “logical” demands of technological “progress”), Noble spells out in relentless detail, and wherever possible in the words of corporate managers, the total way in which the ideology of science and technology in the (alleged) service of society came to permeate every aspect of society in twentieth-century America. To speak of solving particular social problems in our science-based economy without changing the overarching ideology, according to Noble (and those who think like him), is, paradoxically, to reinforce rather than undermine the foundations on which the problems rest.

Once again Peter Berger (this time with Brigitte Berger and Hansfried Kellner) can be cited to provide a social-scientific confirmation of this dialectical view. Berger and his colleagues call their method phenomenological, but they intend for their comprehensive account—of how technological production and bureaucracy permeate every aspect of ordinary consciousness in thoroughly “modernized” societies—to be taken to be scientific. They believe that it is impossible to conceive of a modern society without technology and bureaucracy (that is the phenomenological part of their account), but they are equally convinced that empirical studies will confirm the implications of their account. And to deal in any radical way with major social problems such as the boring character of work in highly automated production facilities without changing the overall technoeconomic system would, on their account, seem extremely unlikely. (In fact they think it is unlikely in any case.)

What all of this boils down to is a powerful Marxist objection to reform politics
(sometimes disparaged as “mere procedural justice”): it cannot get at the roots of techno-social problems without challenging the techno-economic system. And that system has built-in disparities between exploiting managers and exploited workers, and between high-technology nations and the so-called “developing nations” so often exploited for the raw materials and exotic minerals needed for high-technology production.

What should one conclude from this? If anything is going to be done to deal with technosocial problems, they cannot be dealt with one at a time. They are all interconnected, and the fundamental problem is economic. Only a political revolution that eliminates the power of capitalists and quasi-capitalist bureaucrats over the masses of workers offers any real hope of success.

In Chapter 12, we will see how Andrew Feenberg thinks some managers can be won over to more enlightened views.

The most obvious objection that can be raised against the kind of Marxist thinking presented in this brief account is that it is far too totalistic. (See Bunge in Chapter 5, or Pitt in Chapter 9.) Part of a reply can already be seen in the Wartofsky quotation earlier. The stakes in our technological society are truly worldwide.

But Wartofsky’s emphasis on the willful distortion of the facts the public needs to know, in making good democratic decisions where a decision “tests policy against the lives of millions,” or “against the planet’s future,” suggests another question to me. It follows, I think, his own Marxist lead. Suppose that distortions are not willful but ideologically blindered; and suppose that the ideological blinders affect not only leaders but the entire populace. Is not that situation even more terrifying than the one Wartofsky talks about explicitly?

This might lead us to continue to think that the only way out is to heed the radical critique and act accordingly, to join in the worldwide workers’ revolution. Unless the late-capitalist ideological blinders, of leaders and the masses, are removed, there is no way of avoiding technological catastrophes affecting millions of people—or even techno-blunders that might destroy life on earth.

The problem with this kind of revolutionary rhetoric today is the end of the Cold War and the demise of Communism in Eastern Europe. Almost no one today thinks that Marxism, or at least the version put in power in Russia and its
sate noles under Stalin after World War II, is the solution for any kind of problem.

There have been at least two kinds of replies on the part of radicals to this situation. The first, in Russia and the former Iron Curtain countries and among some intellectuals in the West, is a dogged insistence that Marxism still has the answers—and that the first answer is still to unmask ideology, to show up technocapitalist imperialism for what it is wherever it is, even among supposedly populist leaders in what is left of the old East Bloc.

A second kind of response has been made by Andrew Feenberg, among others. (I will consider Feenberg’s version of neo-Marxism in Chapter 12.) Feenberg takes Marcuse as his starting point. To put the matter briefly here (saving Feenberg’s full account for later), a new order can become a reality if workers are educated to recognize the clear benefits of a new socialized system, and if their consequent demands are met with a sufficiently sympathetic response on the part of at least some technical managers now imbued with a “culture of responsibility.”

It seems, however, that this fails to show how ideological blinders are going to be removed.

What I have elsewhere proposed as the role for radical socialist theorizing today is that it be merged with a Deweyan progressive politicking. According to Dewey, philosophers should know, the solution of urgent social problems—including technosocial problems and even including the problem of technological manipulation of public opinion (see Hickman in Chapter 14)—is to be sought by way of collaboration among all sorts of activists, from workers and union leaders, to corporate and civic and educational leaders, to intellectuals. Dewey had an ambivalent attitude toward Marxism and toward Communism in Russia; he recognized the need to unmask the ideological obfuscations of corporate leaders and their cronies in government but he was extremely leery of violations of civil liberties in the name of democracy. Though I am not aware that Dewey ever said this explicitly, the thrust of his thinking on the matter ought to lead us to conclude that the unmasking efforts of Marxist and other radical intellectuals can be a tremendous boon to progressive social activism. It is not necessary that everyone involved be radicalized; it is enough that the radicals among progressive social activists help the rest to see through ideological obfuscations. Of course, unreconstructed Marxists are going to retort that this is naïve liberal posturing.
Controversies? Wartofsky always remained an unreconstructed Marxist, in the scientific materialist sense, though he had many differences with other Marxists. In general, that would place him in opposition to almost any kind of liberalism, but in fact he was notably pragmatic in terms of short-term means. (In the Bordeaux address quoted above, for example, he didn’t take on Jacques Ellul directly on the latter’s home turf; he preferred instead to acknowledge the young Ellul’s Marxist roots—while decrying his later departure from them.) Wartofsky, like all Marxists, was a lifelong opponent of idealism in all but some neo-Hegelian forms. On one occasion, at an SPT session at an American Philosophical Association meeting, Wartofsky explicitly took on the well-known neo-Kantian critic of technology, Hans Jonas, accusing Jonas of being unduly pessimistic, even in the face of the global challenges both of them worried about.

In his well-received philosophy of science book, Wartofsky clearly opposed positivist philosophies of science—which put him in opposition to many of his friends in the science quadrant. However, in general, Wartofsky wrote so little explicitly on philosophy of technology that it might be better here to talk about ways in which a great many neo-Marxists continue to address technology in controversial ways. I have chosen to delay that until Chapter 12.
Chapter 5

Mario Bunge’s Systematic Definition of Technology

Mario Bunge is my first non-president here, though he was a candidate for president in the very first election for the presidency of the Society for Philosophy and Technology. He had already had, in the late 1970s, a long and very productive career, including a reputation as one of the pioneer philosophers of technology in the world. He had contributed to the first major symposium on philosophy of technology, held in 1966 under the auspices of the Society for the History of Technology; the papers were published in the SHOT journal, Technology and Culture. He was already a good way into his multi-volume magnum opus, Treatise on Basic Philosophy (first volume published 1974), though volume 7, which includes his most complete treatment of the philosophy of technology, wouldn’t appear until 1985.

Bunge is now professor emeritus at McGill University in Montreal.

Bunge’s list of books is much too long to list here; the relevant works related to philosophy of technology (not always obviously) are listed in the bibliography at the end of the book.

In his own words in “The Scientific Philosophy of Mario Bunge” (1974): “The Treatise encompasses what the author takes to be the nucleus of contemporary philosophy, namely semantics (theories of meaning and truth), epistemology (theories of knowledge), metaphysics (general theories of the world), and ethics (theories of value and of right action). Social philosophy, political philosophy, legal philosophy, the philosophy of education, aesthetics, the philosophy of religion and other branches of philosophy have been excluded from the above quadrivium either because they have been absorbed by the sciences of man or because they may be regarded as applications of both fundamental philosophy and logic. Nor has logic been included in the Treatise although it is as much a part of philosophy as it is of mathematics. The reason for this exclusion is that logic has become a subject so technical that only mathematicians can hope to make original contributions to it. We have just borrowed whatever logic we use. The philosophy expounded in the Treatise is systematic and, to some extent, also exact and scientific. That is, the philosophical theories formulated in these volumes are (a) formulated in certain exact (mathematical) languages and (b) hoped to be consistent with contemporary science.
“Now a word of apology for attempting to build a system of basic philosophy. As we are supposed to live in the age of analysis, it may well be wondered whether there is any room left, except in the cemeteries of ideas, for philosophical syntheses. The author's opinion is that analysis, though necessary, is insufficient—except of course for destruction. The ultimate goal of theoretical research, be it in philosophy, science, or mathematics, is the construction of systems, i.e. theories. Moreover these theories should be articulated into systems rather than being disjoint, let alone mutually at odds.

“Once we have got a system we may proceed to taking it apart. First the tree, then the sawdust. And having attained the sawdust stage we should move on to the next, namely the building of further systems. And this for three reasons: because the world itself is systemic, because no idea can become fully clear unless it is embedded in some system or other, and because sawdust philosophy is rather boring.” (From the general preface to the Treatise on Basic Philosophy, vol. I, 1974, pp. v–vi.)

Bunge's application to philosophy of technology can be seen in the following selection from volume 7, part II of Treatise (I have used the 1990 edition, pp. 231–232): “Technology may be conceived of as the scientific study of the artificial or, equivalently, as R&D (research and development). If preferred, technology may be regarded as the field of knowledge concerned with designing artifacts and planning their realization, operation, adjustment, maintenance and monitoring in the light of scientific knowledge. (Recall . . . that an artifact can be a thing, a tate or a process, and that it can be physical, chemical, biological, or social.) This definition may be spelled out as follows with the help of concepts elucidated in the previous section. . . .

“A family of technologies is a system $T$ every component of which is representable by an eleven-tuple $T= \langle C, S, D, G, F, B, P, K, A, M, V \rangle$ (p. 231).

“Here:

$C =$ a professional Community within 

$S =$ a larger Society 

$D =$ Domain of objects, natural, artificial, social
As defended by Bunge, this systems definition presupposes an approach that identifies systematization with an exact—and preferably mathematical—formulation in the manner of theorizing within pure science. Furthermore, Bunge thinks that the ideal limit of this general approach is a set of mathematical systems (though General Systems theory—see von Bertalanffy, 1973—is controversial, especially in the singular, he nonetheless adopts it). General systems theory, Bunge admits, cannot alone solve any particular problem, but he thinks that using it can help pose problems—identifying their components, couplings among these components, and relations to an environment—in ways that make solutions more likely. Bunge refers to examples, including the general theory of machines, automata theories (deterministic and indeterministic), linear systems theory, cybernetics, statistical information theory, catastrophe theory (his addition to the list), general Lagrangian equations, and (here Bunge say he has strong reservations) decision theory. Moreover, Bunge insists that systematizations, wherever possible, ought always to be consistent with the findings of contemporary science. (See also Padilla, 1993.)
Using this approach, Bunge claims to be able to address, in a comprehensive fashion, problems in the ontology, epistemology, action theory, and axiology (both valuation and codes of ethics) of technology (Bunge, 1979). But even this does not exhaust the comprehensiveness claims that Bunge makes. He also includes a “systematist” social theory, “systemic emergent materialism” (which repudiates while at the same time also embodying aspects of two opposed theories, atomistic individualism and ontological holism), along with a commitment to both “social technology” (Bunge’s phrase for a broader function which includes what others call social engineering) and a flexible, democratic control of social technologies.

To a certain extent, Bunge is saying no more here than that philosophers should be as clear as possible about “exactly” what they mean (he advocates “exact philosophy”) when they talk about technology (or anything else). But his insistence on exact mathematical formulation coupled with support from the data of science can be thought to carry the search for clarity and precision too far. In any case, there can be no doubt that broadscale critics of technological culture, like Jacques Ellul (1964), would object to Bunge’s entire approach as not a critique but an uncritical, wholesale endorsement of science-based technology with all its rationalist presuppositions.

Bunge’s reply to this objection is to concede, but also to turn the objection against such critics. He says that they cannot even pose a clear problem for solution with such sweeping characterizations of Technology (Ellul’s Technique); you have to be clear about particular technological communities, including their goals and values as well as their knowledge limitations, before you can even think about controlling them democratically for the benefit of society. (We will see Joseph Pitt echo Bunge on this point in Chapter 9, below.)

Moreover, even a friendly critic like Friedrich Rapp (1991) can say that Bunge’s version of an assessment of technology goes too far. Though the goal of precise characterization may be good, it leaves issues about which values to choose up in the air and thus fails to solve the very problems it is aimed at helping to solve.

Again Bunge has a reply. Issues about value choices must be left up in the air; even if we choose to oppose particular choices, we need to know what they are before opposing them.
Rapp’s rebuttal challenges Bunge to be precise about what his choices would be in particular cases. To which Bunge replies that he has: he is all for democratic values. More particularly, he is opposed to capitalists and small-minded conservatives, especially religious conservatives, who want to undermine those values in the name of pseudo-technologies that have no more scientific validity than psychoanalysis or pseudo nostrums for the “reform” of education.

Other philosophers have other objections. I would enlist Aristotelian Martha Nussbaum (1986) to offer an objection to what she sees as technicism (not specifically to Bunge), which she identifies with a Platonic approach to ethics. The wise or prudent person never trusts technical exercises in preparing to face life’s uncertain outcomes. A measure of belief in fate or luck is always wiser and more prudent. This kind of objection, Nussbaum quickly found out, can be turned into a conservative objection to any and all social engineering. According to conservative critics, social engineering, whether science-based or not, makes the problems it addresses worse rather than better. The way to face life’s problems is with faith—in God or in the traditional ways of handling the fickleness of fate. (See Kirk, 1953; this is the view of Ellul, 1954 [1964], according to Lovekin, 1991.)

Bunge’s reply would be that he is not proposing a technicism, and certainly not of the Platonic sort. But you do need technical exercises in order to be clear about what is at stake in particular controversies. As for opposing social engineering, what better examples do we find in history than religious conservatives’ indoctrination-of-the-young education schemes?

At the opposite end of the political spectrum, Marxists (see, for example, Marcuse, 1964) and other radical critics (see Winner, 1977 and 1986) tend to see Bunge’s formulation as no more than a careful delineation of the status quo, leaving all the power in the hands of those who now wield it, namely the managerial classes. (On the issue of whether some managers can be won over to help achieve worker control of the means of production, see Feenberg, 1991.)

It would be easy for Bunge to reply that his background was as Marxist as theirs (I’m not aware that he ever actually said this), but such undemocratic control is a good reason to be clear about these issues. If you don’t know what the status quo values are, including how they impact particular technical communities, how are you going to challenge the managerial classes and their control of workers—including such technical workers as engineers?
Even those who share Bunge’s confidence that particular technologies can be controlled democratically would place more emphasis than Bunge does on the activist politicking that is going to be needed if participatory values are to win out over managerial values in the democratic control of technology (see Chapter 12 on Feenberg, and Durbin, 1992, as well as Chapter 14 on Hickman).

But Bunge even has a reply to this: he’s not necessarily opposed to activism, but that’s not philosophy, certainly not his brand of “exact” philosophy.

Finally, there are those who say that Bunge’s presupposition of a clear distinction between facts and values is misguided from the outset. Even Bunge’s ideal of basic science sought purely for its own sake, as actualized in real-life scientific communities, is constrained by needs of technological survival (see Margolis, 1984 and 1986, and Chapter 6 below). It is also socially constructed along the ideological lines of powerful groups in society (see, for example, Latour and Woolgar, 1979, and Pickering, 1992, as well as Chapter 25 below).

Bunge doesn’t say it in reply to social constructionists (he despises them), but he views the distinction of facts from values—along with a whole set of other clear and exact distinctions—not as society dictating to applied scientists and engineers what is true or false, right or wrong, but as something necessary to a systematic account. To deny clear distinctions is to revert to the fuzzy philosophy that exact philosophy is supposed to challenge.

But, these final objectors retort, to try to be absolutely clear about all the constituents of our technological world, along the lines of Bunge’s exact philosophy, does not, in the end, solve the crucial philosophical problems he claims to have a solution for.

In Bunge’s defense, we should recall that he doesn’t talk about solutions but about clearly posing problems so that conclusions will come more easily. Nevertheless, he must defend the values he wants to see embodied in technological systems, and he must overcome strong philosophical objections (see Margolis in Chapter 6) to the clear fact-value distinction his approach presupposes. In my opinion, this may be Bunge’s weakest point: he simply assumes we can be clear about what is fact and what is value, and that the two don’t intertwine in ways that undercut the distinction.
So to sum up the controversies: as a staunch defender of science—though Bunge had Marxist roots and never lost his social meliorism orientation—he is clearly 

expertist. His opponents are “unclear” thinkers of any stripe—his most vociferous condemnations, for example, fall on psychoanalysts, among the social engineers he would otherwise welcome. Bunge’s clear fact/value distinction is opposed by Margolis (Chapter 6), among others. Bunge doesn’t actually say much about Heidegger, but he clearly opposes Heidegger’s Nazi connections, along with idealism of any kind, as well as doctrinaire Marxism. A number of European philosophers of technology—for example, Miguel Angel Quintanilla (1996; see also Agazzi and Lenk, 1997, along with Chapter 13 on European philosophy of technology)—follow Bunge’s lead. But they are also countered by 

resolute opponents of positivism among recent philosophers of science (best represented here in Chapter 11 on Ihde)—as well as by social constructivists (see Chapter 25).
Chapter 6

Joseph Margolis on Technological Society

Laura H. Carnell Professor of Philosophy at Temple University in Philadelphia, Joseph Margolis’s main interests (according to his website) are in the philosophy of the human sciences, the theory of knowledge and interpretation, aesthetics, philosophy of mind, American philosophy, and pragmatism. Academic positions have included Columbia University and Long Island University, at the beginning of his career, through a professorship (including chairmanship of the department) at the University of Western Ontario to his present position as professor of philosophy at Temple University, with honorary and visiting professorships all over the world, from the University of Toronto to the University of South Africa.

Honors, fellowships, awards, grants and other responsibilities (according to his website) have included everything from an honorary lifetime membership in the International Association of Aesthetics to the co-directorship of the Greater Philadelphia Philosophy Consortium, and from a doctorate honoris causa from the University of Helsinki to Fulbright fellowships in Sweden and Scandinavia, and grants from the Pew Charitable Trusts to being distinguished professor in the College of Liberal Arts at his home institution, Temple University (among many, many others).

Editorial boards have included dozens of journals, from the electronic journal of the Canadian Society of Aesthetics to the Journal of Value Inquiry, from the International Journal of Applied Philosophy to Research in Philosophy and Technology, as well as numerous book series.


Margolis's own writings are so numerous that even a partial listing is overwhelming. The books I find relevant to this chapter are listed in the bibliography at the end.

I am going to do something different, and perhaps risky, in this chapter. Until recently, Margolis had been involved with SPT during most of its existence. He contributed important articles to several of our early publications, and practically
every year I would importune him to turn those articles into a full-scale book—even a short book—on philosophy of technology as he understood it. He never did so. So I am here going to try to reconstruct what he might have said, using his own SPT publications—in conjunction with a recent book of his on pragmatism.

Before beginning that risky project, I note that in a textbook, Philosophy of Psychology (1984), Margolis explicitly claims he is a “non-reductive materialist”—like Marx in some respects but anti-Marxist in others. In his recent pragmatism book, Margolis is more Peircean than Deweyan, and he sees pragmatism in analytic philosophy terms, as the yet-to-be-fulfilled promissory note on a defensible future analytical philosophy/epistemology. Indeed, Margolis attacks Dewey for his activism. Most of this has much more to do with general analytical philosophy than it does with philosophy of technology. I think the early essays, placing himself in the middle between Bunge and Ellul, and between Marx and Heidegger, while fitting in with other philosophical work on technology, can—somewhat arbitrarily—be linked with Margolis's recent book to create my interpretation of a Margolis philosophy of technology. The effort will, unfortunately, entail some rather long quotations because of Margolis's style, which is even more dense than is customary in analytical philosophy. However, Margolis's (implicit) philosophy of technology is worth the effort.

I begin with Margolis's most recent statement of his general philosophy in his Reinventing Pragmatism (2002); what follows is my summary, taken from an article on pragmatism that I prepared for the Encyclopedia of Science, Technology, and Ethics (2005). The published article (volume 3, p. 1468) has been modified by the editors to make it fit within the encyclopedia's style, so I don't feel the need here to treat what follows as a quotation. (See Note on Quotation Styles, at the end of the introduction.)

The Recent Revival of Pragmatism

Margolis contrasts early American pragmatism with the revival of pragmatism in American analytic philosophy after about 1980. In the revived version, the focus is not on Mead and Dewey’s “meliorizing” progressivism, with its suspicion of large science-based corporations, but on quarrels over different versions of epistemology. With the exception of Richard Rorty, who wants his pragmatism (he says it is more literary than philosophical) to join in leftist causes (Rorty, 1998), none of the “revived pragmatists” have much interest in ethics, less in
technology, and an interest in science that is reducible to a scientistic model of human knowing—or opposition to such.

Margolis’s is the best summary of these disputes that I know of, though his writing style is as always dense and convoluted. The primary debate Margolis talks about pits what he thinks is an acceptable pragmatism against “naturalizers.” In fact, he talks about several debates between Rorty (claiming to speak for Donald Davidson as well as himself) and Hilary Putnam. The conflict has to do with how to safeguard a “true” pragmatism from relapsing into a Cartesian quest for a guaranteed foundation of knowledge, primarily scientific knowledge.

To summarize the account, at some cost in terms of glossing over the nuances, Margolis (p. 15) says: “In any event, Putnam’s [1994] newly minted denial of his earlier denial [1980] of the subject-object disjunction . . . risks his joining forces with the Cartesian realists he opposes.”

Margolis gives the reader some help in understanding the controversy: “On any serious reading, you can hardly deny that the essential philosophical questions that arise from the first appearance of Descartes’s principal tracts persist to the very end of the twentieth century. We are evidently still trapped by the two unavoidable paradoxes Descartes has bequeathed us: one, that of . . . pretend[ing] to reclaim an objective and neutral grasp of the way the world is apart from our inquiries; the other, that of the conditions for resolving the first puzzle, if we are confined to inner thoughts and perceptions” (Margolis, 2003, p. 13).

Putnam, in Margolis’s view, makes too much of a concession to “naturalizers.” (Margolis lists W.V. Quine, 1969, and Donald Davidson, 1986.) Naturalizing, Margolis thinks, is incompatible with the earlier generation of pragmatists’ repudiation of any and all versions of Cartesianism.

Margolis’s critique of Rorty as the other pole in his “primary debate in recent pragmatism” is easier to state in simple terms. Rorty’s “postmodernism” is incompatible with any pragmatism legitimately related to earlier pragmatism, with its trust in science and expertise generally.

In the end, Margolis outlines his own version of pragmatism. He sees it as following from the failures of the two parties: “Putnam went much too far in rejecting his internal realism when he rejected his [earlier] representationalism;
and Davidson and Rorty go too far in construing the mind-dependent constitution of the independent world” (p. 22).

According to Margolis, there can today be “no viable realism that is not also a constructivism. Constructivism means at the very least that questions of knowledge, objectivity, truth, confirmation, and legitimation are constructed in accord with our interpretive conceptual schemes . . . ; that, though we do not construct the actual world, what we posit (constructively) as the independent world is epistemically dependent on our mediating conceptual schemes.”

This is Margolis's take on his place within general philosophical pragmatism today. I next turn to his various contributions to SPT publications, where Margolis showed in some detail how all of the above implies a technological construal of the knower and the world known. The first selection comes from volume 5 of the Philosophy and Technology (Kluwer) series, entitled *Technological Transformation: Contextual and Conceptual Implications* (1989) edited by Edmund Byrne and Joseph Pitt. (See pp. 1–4, 8–9, 13.)

*The Technological Self*

“There is a double puzzle that Thomas Kuhn collects in certain well-known remarks in his *The Structure of Scientific Revolutions* that compellingly links the theory of science and the theory of human inquiry—in effect, the theory of cognizing agents, of selves, of persons. One may doubt that Kuhn has formed an entirely coherent picture of the sciences, but there can be no question that he has completely neglected the analysis of what a human being must be like in order to live and work in the world he posits. Kuhn's linking these two issues remains instructive, nevertheless. For he grasps its paradoxical features in a way that does not really depend on the validity of his own account of the historicized sciences; and what he does say about the sciences is quite compatible with (indeed, it memorably instantiates) a number of very large doctrines that the entire sweep of Western philosophy may fairly now be said to be converging upon. These include at least: (a) the rejection of all forms of cognitive transparency and privilege; (b) the indissoluble unity of realist and idealist elements in any plausible theory of the sciences; (c) the conceptual symbiosis of cognizing self and cognized world; and (d) the matched historicity of self, science, and world. Doctrines (a)–(d) dissolve any hierarchical advantage that might otherwise be assigned so-called naturalistic and phenomenological theories vis-à-vis one another and fix at the same time the sense in which theories of
either sort could incorporate so-called deconstructive or post-structuralist exposes of their own pretensions regarding any form of cognitive transparency. By a term of art—a fair term—contemporary views incorporating (a)–(d) may be dubbed pragmatist.

“Kuhn’s remarks are these: first of all, that ‘Lavoisier . . . saw oxygen where Priestley had seen dephlogisticated air and where others had seen nothing at all. . . . Lavoisier saw nature differently . . . Lavoisier worked in a different world’; secondly, speaking of that phase of post-fourteenth-century physics (affecting Galileo’s work) in which Buridan and Oresme’s impetus theory replaces Aristotle’s, that ‘I [that is, Kuhn] am . . . acutely aware of the difficulties created by saying that when Aristotle and Galileo looked at swinging stones, the first saw constrained fall, the second a pendulum. Kuhn, of course, favors the thesis that these paired scientists ‘pursued their research in different worlds.’

“Until [for example] that scholastic paradigm was invented [Kuhn says], there were no pendulums, but only swinging stones, for the scientist to see. Pendulums were brought into existence by something very like a paradigm-induced gestalt switch.

“We are not interested here in the bafflements of Kuhn’s own conception of the sciences except as they may help us to understand what is required of a theory of the cognitively apt selves that pursue particular inquiries under the conditions Kuhn advances or, more generally, under constraints (a)–(d) that Kuhn’s own views instantiate. Kuhn gladly abandons all talk of ‘the given of experience,’ ‘immediate experience,’ ‘a pure observation-language,’ ‘mere neutral and objective reports on the given.’ But he effectively reneges on this proviso—however unwittingly—in his explanation of the viability of the contingently different worlds of different societies: ‘An appropriately programmed perceptual mechanism,’ Kuhn explains, ‘has survival value. To say that the members of different groups may have different perceptions when confronted with the same stimuli is not to imply that they may have just any perceptions at all.’ The remark is fair enough. But on what grounds (accessible to Kuhn) can we speak of the operations of ‘the same stimuli’ across different paradigms, differently ‘programmed perceptual mechanisms’? ‘Two groups,’ Kuhn maintains, the members of which have systematically different sensations on receipt of the same stimuli, do in some sense live in different worlds. We posit the existence of stimuli to explain our perceptions of the world, and we posit their immutability to avoid both individual and social solipsism. About neither posit have I the
slightest reservation. But our world is populated in the first instance not by stimuli but by the objects of our sensations, and these need not be the same, individual-to-individual or group-to-group. To the extent, of course, that individuals belong to the same group and thus share education, language, experience, and culture, we have good reason to suppose that their sensations are the same. . . . They must see things, process stimuli, in much the same ways. But where the differentiation and specialization of groups begins, we have no similar evidence for the immutability of sensations.

“These are very curious remarks: first, because ‘invariance’ or ‘immutability’ of ‘stimuli’ (neurophysiological connections, even physical laws) are merely posited to forestall solipsism (skepticism, radical incommensurability, intellectual nihilism, anarchy, relativism); second, because such invariances are themselves validly relativized to the shared ‘form of life’ of a given society and only there; and third, because, apparently both intra- and inter-societally, the division of labor and historical variation threaten our confirming any genuine, context-free invariances.

“Kuhn is not content with this kind of tenuousness. ‘We try,’ he says, to interpret sensations already at hand, to analyze what is for us the given. However we do that, the processes involved must ultimately be neural, and they are therefore governed by the same physico-chemical laws that govern perception on the one hand and the beating of our hearts on the other. But the fact that the system obeys the same laws [in all perceptual cases, presumably in all societies] provides no reason to suppose that our neural apparatus is programmed to operate the same way in interpretation as in perception or in either as in the beating of our hearts.

“It is in this same context that Kuhn concludes that, ‘An appropriately programmed perceptual mechanism has survival value.’ This means that those who live in ‘different worlds’ also live in ‘one world,’ that the provisional invariances internal to the different worlds of socially shared practices are also good guesses of some sort regarding the actual invariances that hold across such different worlds, that the ‘incommensurable viewpoints’ of these separate worlds are also collected within the range of commensurability (or, at least within the range of intelligibility) of the one overarching world. Incommensurability is not—or at least should not be—construed as equivalent to incommunicability or unintelligibility or untranslatability; on the contrary, moderate incommensurabilities, as much of conceptual categories as of metrical
instruments, must, on pain of incoherence, be intelligible, even comparable, to
the same inquirer or inquirers. And yet, of course, to be able to affirm
invariances across moderate incommensurabilities signifies cognitive sources
that cannot be confined within the bounds of such incommensurabilities. Kuhn
never explains that ability.

“There is no question that Kuhn has put his finger on the essential puzzle of a
historicized conception of science still bent on formulating the lawlike
invariances of the entire order of physical nature. But it is equally clear that
Kuhn’s solution is threatened with an ineliminable measure of incoherence. For
our present purpose, it is more important to emphasize what may be called the
‘constructive’ or ‘constitutive’ theme in Kuhn’s theories, the notion that the
world we live in—we ordinary percipients as well as Aristotle and Galileo as
more disciplined scientists—is in some way constituted by the socially shared
paradigms or practices that form or preform (tacitly rather than by explicit
conjecture) the way we perceive and think. Kuhn sees the matter more in terms
of the general nature and psychology of human investigators than in terms of the
merely formal features of potential truth-claims advanced within the relevant
space; and yet, he nowhere directly considers what a human person must be like,
constituted and reconstituted by such cultural forces in the same instant in which
the ‘world’ is constituted and reconstituted by our changing inquiries and
interventions. In this sense, Kuhn offers the barest glimpse of the interesting
notion (which his own theory requires and which is required by any generic
theory that subscribes to (a)–(d)): that the human self is itself technologically and
practically constituted. The potentially radical implications of this notion
normally escape our notice, in spite of the fact that constraints (a)–(d)—perhaps,
now, only marginally clarified by Kuhn’s own favored theories—must surely be
among the most salient conceded in our own age. The point may be taken as
embedded at least in Kuhn’s challenging distinction between a swinging stone
and a pendulum.

“We are marking off a strategy of argument, possibly a map of an argument, not
an actual argument. The approach enjoys a considerable economy. For, there are
a surprising number of quite powerful consequences that follow from admitting
(a)–(d) together with the cognate finding that if ‘worlds’ are constituted by the
inquiries and practices of human selves, then selves are correspondingly
constituted by processes internal to the formed worlds in which they contingently
mature. . . .
“Merely to concede the point of what may now be called (e), the thesis of the technological or technologized self, leads directly to a number of important findings—in a remarkably painless way. It affords a very simple conceptual lever by which to topple a large number of fashionable theories.

II.

“What we have sketched thus far are the lines of an argument by which, admitting the constructive nature of the world along the moderate (if somewhat muddled) lines of Kuhn’s historicizing, we find ourselves obliged to admit the constructive nature of cognizing selves. Mark that (the constructive thesis) as thesis (1) of what we have termed the doctrine of the technological or technologized self. It exercises an immense economy in disqualifying at a stroke all forms of logocentrism—all essentialisms, all universalisms, all natural necessities of cognition, all totalizing, all closed systems, all apodicticity. But it is itself fragile and incomplete as an account of what the technologized self entails. It does not sufficiently identify what, minimally, the achievement of human communication requires.

“A better clue lies elsewhere—in the biologized philosophical anthropologies of the European tradition. Marjorie Grene, for instance, captures what we shall mark here as theme (2) of the technologized self: to be a person is to be a history. In what respects? In two respects, opposed but related. On the one hand, being a person is an achievement of a living individual belonging to a natural kind whose genetic endowment and possible behaviors provide the necessary conditions for that achievement. On the other hand, a human being becomes the person he is within, and as one expression of, a complex network of artifacts—language, ritual, social institutions, styles of art and architecture, cosmologies and myths—that constitute a culture. A culture, of course, is itself a sedimentation of the actions of past persons; but it is, nevertheless, preexistent with respect to the development of any particular person.

“. . . Technology, then, is the biological aptitude of the human species for constituting, by alternative forms of equilibration, a world suited to a society of emergent selves or a society of such surviving selves adjusted, diachronically, to such a world. We understand one another for the same reason we survive as a species. Technology is the flowering of our biological endowment and is incarnate in it.”
Conclusion

“One cannot refuse the bare option of the reduction or elimination of the cultural dimension of the real. But its intended prize has yet to be earned. The doctrine of the technological self is incompatible with the victory of that project; and, in fact, the separate vindication of its own characteristic claims—the constructed nature of reality and self, the incarnation of cognition, the praxical nature of theory—counts against a bifurcation of the real and the rhetorical, in virtue of which one might be otherwise tempted to endorse their ultimate rejection. Failing that, we are invited to make a fresh analysis of what is clearly salient in human history—of what, in the opposing view, tends to be neglected anyway. Nevertheless, in achieving just this small advantage, we have not yet explained what the sense is in which the technologized self or its world are constructed and yet are not merely constructed.”

This long and complicated quote—which whittles down Margolis’s account in a way to which he would surely object on the ground that it has ignored his nuances—can be supplemented by way of two other SPT publications, in which Margolis situates himself in the middle between extreme opponents on both sides of him (as he sees things). The first is found in Research in Philosophy & Technology, vol. 7 (pp. 146, 156):

Three Conceptions Of Technology: Satanic, Titanic, Human

“. . . Theories of technology . . . are strongly tempted—when they are drawn to moral appraisal—to construe the present age in an apocalyptic light or in such a way as to confirm the promising advance of the powers of human reason over the alien and troublesome forces of brute nature.

“. . . On Bunge’s view, ‘technology is applied science’; and the rules of conduct he is prepared to favor are those only (opposed to merely ‘conventional,’ ‘groundless’ rules, like those of etiquette) that are ‘based on a set of law formulas [scientific laws] capable of accounting for [their] effectiveness.’ Once, however, science is historicized, and science and technology praxicalized, there is no longer room for the elementary confidence Bunge exudes. The truth is that there can be no discovery of the right objectives to which our technology and social reforms ought to be consecrated. But there is a tradition of reflecting on the ends of man—diachronically changing, plural, self-conflicting, and yet conserving; and it can only be in a dialectical enlargement and revision of that tradition
within the particular processes of human history (changing, plural, self-conflicting, and conserving still) that the ‘human’—not the satanic or titanic—alternative of the emancipatory possibilities of technology can be found at all.

“The point is that we must look for reasonable directives and constraints in the right place and give up those yearnings that are impossible to satisfy. Technology is nested in historicist and praxical processes. In recognizing that, we understand as well the rearguard disappointment that Ellul’s and Bunge’s opposed essentialisms are hopelessly designed to dissolve. It is also to understand, with considerable trepidation, the dangerous options of a genuinely human freedom.”

The final quotation is from volume 1, Philosophy and Technology (eds. P. Durbin and F. Rapp) of the Philosophy and Technology (Kluwer) series (pp. 291, 296, 305–306):

*Pragmatism, Transcendental Arguments, And The Technological*

“. . .To assimilate Heidegger’s contribution and to reject it at a stroke, we may say, by way of epithets that are somewhat cryptic but perhaps not disagreeably so, that Heidegger pretends to have made a *transcendent* discovery about technology (indeed, about the whole of Western philosophy), whereas the best (and entirely adequate) effort that men can hope to make in answering the Overwhelming Question is to offer a *transcendental* proposal about the nature of technology and reality. . . .

“. . . It is impossible to ignore, here, Marx’s insistence on construing philosophy and science—all theoretical knowledge—as forms of *praxis*; they are, Marx affirms, conceptually and really dependent on the historical conditions of actual production. In this sense, whether or not we agree with Marx’s diagnosis of capitalism (or, indeed, of the whole of human history), we cannot fail to see the important sense in which Marx anticipates and (in effect) resists Heidegger’s philosophical injunction. . . .

“. . .The technological, therefore, performs a double role. On the one hand, in accord with Heidegger’s and Marx’s view, it signifies how reality is “disclosed” to humans—primarily because it is through social production and attention to the conditions of survival (both precognitively and through explicit inquiry) that our sense of being in touch with reality is vindicated at all; but contrary to the thrust
of Heidegger’s late qualification, the correction of all theories of cognition and reality thus informed is itself inevitably historicized and subject to the ideological limits of any successor stage of praxis. There is no escape from the historical condition, but the recognition of that fact itself is the profoundly simple result of transcendental reflection within the very condition of history—which obviates, therefore, the inescapability of Heidegger’s various (transcendental) pessimisms and the need for his extravagant (transcendent) optimism. On the other hand, the technological signifies how the study of the whole of reality—of physical nature, of life, of the social and cultural activities and relations of human existence—is unified in terms of our own investigative interests. Hence, at the very least, not only can the theory of the physical sciences not afford to ignore the systematic role of the actual historical work of particular human investigators (for instance, against the model of the unity of science program); but also, we can neither preclude the scientific study of man nor insure that the human sciences must conform to any canon judged adequate for either the physical or life sciences. The primacy of the technological, therefore, facilitates a fresh grasp of the methodological and explanatory peculiarities that the human studies may require—for example, regarding the analysis of causality in the human sphere, the relation of causality and nomologicality, and the bearing of considerations of rationality, understanding, interpretation on the explanation of human behavior.

“Seen both in its transcendental role (as insuring inquiry a measure of objectivity relativized to the conditions of praxis and dialectical review) and in its role vis-a-vis the human sciences (as modelling the methodological distinction of such sciences) the technological may fairly be interpreted as helping to preserve whatever distinction bears on human freedom and dignity, the thrust and direction of human inquiry, the balance between realist and idealist components of cognition, the tolerance of plural, even incompatible, theories compatible with a common praxis, the provision of grounds for disclosing ideological distortion without appeal to foundationalism, the admissibility of a moderate relativism consistent with objectivity, and such similar doctrines as the recent currents of pragmatism have been advancing. But that is probably as much as one can ask of any relevant theory—and more than most can afford.”

In terms of controversies, in these last two selections, Margolis situates his version of technological pragmatism in the middle between Bunge (science quadrant) and Ellul (idealism), as well as between Heidegger (idealism again) and Marxist socialism. We might ignore his similar approach, above—situating himself between Rorty and such “naturalizers” as Quine in recent attempts to turn
analytical philosophy or epistemology into pragmatisms (plural)—or, alternatively, we could try to draw the analysts into the game. (But that would need to be done in a book with different purposes than the present one.) So in whatever fashion, we can clearly identify Margolis's positioning of himself within quadrants, though my reference at the beginning to Margolis's calling himself a “non-reductive materialist” would seem to keep him within the same general quadrant as Marxism while still being opposed to all versions of it.

Finally, if we add in his disparaging of Deweyan pragmatism as “epistemologically naïve” (while defenders like Hickman would say Margolis's resultant pragmatism is not pragmatic at all), Margolis would be opposing the whole range of quadrant positions.
Chapter 7

Joseph Agassi, Philosophy of Technology, and Mass Movements

An Israeli, Joseph Agassi was born in Jerusalem in 1927; studied 1940–1944 at the Jewish Theological School in Cincinnati, then 1946–1951 at the Hebrew University, Jerusalem, with a physics major, but with additional concentrations in mathematics and philosophy. He married Judith Buber in 1949.

Current and past positions: 1997 Emeritus Professor, Tel Aviv University, Tel Aviv and York University, Toronto. 1971–1996 Professor of Philosophy, Tel Aviv University, Tel Aviv. 1982–1997 Professor of Philosophy, York University, Toronto. 1965–1983 Professor of Philosophy, Boston University. 1963–1965 Associate Professor of Philosophy, University of Illinois. 1960–1963 Lecturer and then Reader and Head of Department of Philosophy, University of Hong Kong. 1957–1960 Lecturer in Philosophy, logic and scientific method, London School of Economics. 1956–1957 Research Associate, Center for Advanced Studies in the Behavioral Sciences, Stanford.

Additional previous positions (among many others): 2000–2001 Shann Lecturer, St. John College, Hong Kong University. 1998 Summer, Resource Person, Central European University Summer School, Budapest. 1998 Summer, Visiting Professor of Philosophy, Karl-Franzens-Universität, Graz. 1996 Fall, Distinguished Visitor, Faculty of Education, University of Calgary.

There are two volumes of essays in honor of Agassi, both edited by I.C. Jarvie and Nathaniel Laor in the Boston Studies in the Philosophy of Science series, vols. 161–162:


Agassi's books in English (there are many others in Hebrew and Italian) that are relevant (in my opinion) to this chapter are included in the bibliography at the end.
Agassi was already well known in philosophy of science circles—mostly as a faithful follower in the footsteps of Karl Popper—when the Society for Philosophy and Technology was founded. But he was also recognized for having wandered onto the turf of philosophy of technology very early. Never losing his Popperian roots, Agassi picked up on one of Popper’s maxims about engineers (whom Popper despised), about how they are “looking for a needle in a haystack.” Agassi parlayed this into a distinction between philosophy of science and philosophy of technology that Popper probably never intended. But all of this belongs among philosophy of science controversies. Once Agassi entered the not-yet-existent field of philosophy of technology (in 1966), he never left; he was one of the most regular attendees in the early days of SPT meetings. There, however, all his energies were focused on how engineers and philosophers of technology, alongside philosophers of science, should be actively involved in campaigns for social responsibility among technical workers. This makes a contrast with Alex Michalos (Chapter 2) interesting.

Michalos never talks much about engineers, and his concerns about social responsibility among philosophers of science barely mention them. This is also true for Agassi. The chief difference is that, in all his presentations at SPT meetings, Agassi explicitly addresses fellow philosophers of technology, urging them to join in the sorts of mass movements for social change that Agassi identifies with Bertrand Russell’s Ban the Bomb movement at the beginning of the nuclear age. As we have seen, Michalos chose rather to address more or less the same constituencies, but by way of work with a non-Marxist socialist party in Canada.

Agassi more or less ignores his obvious opponents, those who think that talk of social responsibility is needless—philosophers who say that scientists and technologists when they do their jobs well are already working for the common good. (Agassi does call this an ostrich posture.) We saw Joseph Margolis, in the previous chapter, join Agassi in a forceful attack on this view as defended by Mario Bunge (Chapter 5); as we saw, Margolis says Bunge’s view—treating scientists and other technical workers as having social responsibility as an add-on, when their very professional work is already shot through with values—is nothing more than hidden positivism.

Agassi’s goals, like those of Margolis when he defines what a technological society is, are involved with avoiding the catastrophic; but Agassi is explicit in framing these goals in terms of technological disasters such as nuclear war and
wholesale pollution of the planet. What is different with respect to Michalos is that Agassi comes close to sermonizing when he urges his new friends among philosophers of technology to join in mass movements to save the world. (Agassi is explicit in saying that earlier philosophers of technology had nothing to offer in this regard.)

In this chapter I am going to follow my pattern in the previous one; though Agassi wrote a book on technology, *Technology: Philosophical and Social Aspects* (1985), it does not reflect the directions he pursued in his SPT publications. So here again I try to reconstruct his view. What follow are more or less brief (at least truncated) selections from several of Agassi’s contributions to SPT publications. The first quotation comes from the very first SPT publication, *Research in Philosophy & Technology*, vol. 1 (pp. 53–64, with omissions signaled by ellipses):

*Technology, Mass Movements, And Rapid Social Change: A Program For The Future Of Philosophy Of Technology*

“The problems the philosophy of technology encompasses are very broad, starting from the question: are we better off with technology or without, and with what tool is this decidable? This is an example of a hardly practical question. Consider, however, questions such as. What criteria are used by government agencies to allow the implementation of innovations? How do different agencies and different countries compare? Such questions are of great philosophical-methodological interest, as well as of a great practical value. Is it true, as pilots believe, that runways are improved only after disasters? If so, why? Can this be improved? Questions of this sort are hinged on methodology, on the philosophy and methodology of the social sciences, and on (democratic) social philosophy. It is no surprise that this area is backward, especially in view of the classical opinion that technology is purely physical technology and thus hardly problematic.

“The classical philosophy of technology made no provision for the adaptation of society to technology, no provision for social reforms necessitated by technology. Though social changes of this sort were made, they lagged behind. Now, due to population explosion and pollution many ecologists predict certain inevitable calamities, perhaps an irreversible change in the balance of nature that might make mankind extinct. The question I wish to pose here is *a priori* practically hopeless. It is. What changes ought we introduce, and how can we introduce
them rapidly so as to avert too much of a calamity? To narrow down the question so as to make even a preliminary discussion of it at all conceivable, I wish to put this question for my present discussion: can we learn something from the recent mass movements about rapid social change? Can we make the mass movements more effective, more democratic, more instructive? More pointedly, can we focus the mass movements on the solution of what I call the ‘technological apocalypse’?

“I shall, then, divide my time now among the three following topics:

1. What the mass movements were meant to be;
2. The politics of mass movements; and
3. The technological apocalypse.

1. What The Mass Movements Were Meant To Be

“I wish to begin by quoting from the third and last volume of the autobiography of Bertrand Russell, who, in a certain sense, was the father of the modern mass movements, or at least a major factor in their evolution. Of course, Russell did not plan things in any manner that resembled the outcome. What he had was an immense sense of urgency, a sense of now-or-never about the choice between abolishing nuclear war and abolishing mankind. What Russell felt was that the choice was in the hands of the fates, whereas it should be made rationally by all concerned. We are prone to forget this because his Ban the Bomb movement ended in a failure of sorts, and because somehow, perhaps miraculously, perhaps not, a precarious balance is kept and we pretend to have learned to live with the bomb. I do not think we can get the proper sense of the events of barely two decades ago, unless we try to empathize with Russell’s sense of emergency and his desperate effort to step up his activities. . . .

“What then happened has not yet been sufficiently chronicled, but is still fresh in memory. The movement crossed the ocean and spread in the United States in diverse directions: student liberation, black liberation, sex liberation, women’s liberation, gay liberation. But all these movements were, for most of the time, put in the shade by the mass protest against the American involvement in Vietnam—indeed ever since the day Martin Luther King, Jr., declared he could not go on in good conscience leading the black liberation movement without joining the anti-Vietnam War movement as well and until the end of the war. The movements, especially the student movement and the anti-Vietnam War
movement spread all over the world. Their techniques included, as had the black liberation movement before, both civil disobedience and violence. What the students introduced first were the teach-ins. These were immensely popular and successful, I think, but some viewed them with suspicion as possible means of slowing down the movements and thus dampening their impetus and robbing them of their mass character. I shall return to this soon.

“Soon after the Vietnam War was over, much of the impetus dissipated. Some of it went into a new mass movement—the ecology movement.

2. The Politics Of Mass Movements

“. . . It is a historical fact that the leaders of the mass movements, from Bertrand Russell to Noam Chomsky and Howard Zinn, declared their cases to be clear and unarguable. Of all of them only Martin Luther King was right.

“The movement that has the greatest promise for technological problems and that should undertake the greatest and most important and urgent roles is the ecological movement. That movement developed rapidly—as rapidly as other movements—partly because a vacuum was there to be filled in the space of mass movements (the vacuum is still there) partly because of the new and intolerable level of pollution (the situation is rapidly deteriorating). The movement was defeated—as a mass movement, I mean—by its inadequacy.

“Here I come to a philosophical aspect of the matter. The problem of induction as a problem of empirical justification of action, social or private, is insoluble. We never know whether we are too slow or too fast in implementing an innovation. Different societies have standards regulating all this, and the standards are regularly tested and altered. But some innovations are not subject to standards, some standards vary greatly depending on the urgency of the situations. Military establishments take greater risks in testing and implementing innovations since they fear the greater risk of unpreparedness; market mechanisms push corporations to similar considerations. Pilots say runways only improve after blood is spilled on them; because, I presume, runways conform to standards but standards are inadequate and improve too slowly.

“That population control and pollution controls are matters of emergency is commonly admitted. That standards to deal with them are either grossly inadequate or nonexistent is likewise admitted. The mass movement can come in
here, and of course it will make mistakes like any other movement, and more. This should be no discouragement if it is a priori admitted beforehand, especially since the mass movement, being so spontaneous and almost entirely amorphous, can be more flexible than any organized body.

3. The Technological Apocalypse

“The wedding of mass movement new style and apocalypse new style into the ecological movement was as obviously propitious as ill-fated. As the first phase is complete we may try to consider or plan the next one.

“Apocalypse, meaning revelation, has traditionally meant a prophecy of doom, especially war, famine, and pestilence, perhaps also the end of the civilized world or of humanity or of earth as a whole. The ecological apocalypse is not new, and its modern prophet was Aldous Huxley, who wrote about it extensively in his Point Counter Point, in his Ape and Essence, and elsewhere; and also Julian Huxley, one of the most ardent campaigners against population explosion. But the discussion on whether technological progress as a whole is really progress is old. That is to say, admitting that every innovation is implemented because someone finds it worthwhile; and assuming the questionable thesis that my progress is not your regress; even then we can ask, is it on the whole worthwhile to introduce technology or not?

“We do not have the intellectual tools to ask such a question, since we study questions within intellectual frameworks, and frameworks take for granted answers even to some global questions. Indeed, intellectual frameworks constitute sets of answers to some given questions such that they generate some research programs, as I have explained elsewhere.

“Also, the question is of no practical importance. We simply cannot stop the march of technological progress. We can, at most, impede it.

“Moreover, as we cannot stop the march of technological progress globally; it is mere folly, an ostrich policy, to try to impede it or ignore it locally. One who eats natural foods but breathes polluted air and drinks polluted water is but a fool. And soon all air on earth may be polluted.

“This, however, is not to say it is never wise to impede progress. Quite possibly the success of the American ecological movement to impede the implementation
of supersonic civil aviation will lead to the evolution of better techniques that will not risk the environment more than subsonic flights do. No doubt, the rapid implementation of Western technology in underdeveloped countries with little or no planning causes severe cultural lags there, creates new tensions there, and so on. But I cannot enter all this now. Rather, let me say some general things about the growth of technology and its social implications. . . .

“...[W]hat is characteristic of today’s ecological crisis is, first of all, that on the national scene of every advanced country where it is a problem, it sharpens the conflict between production and preservation: while production is run by a well-organized capitalist market, preservation has no spokesmen of any force; and second, the crisis has become international or global, with no spokesmen for global interests to speak of. . . .

“When we come to the global level we are stymied. The founders of the ecology movement felt this very keenly. Some ecologists said explicitly that it is a scandal that Western governments allowed themselves to offer Ceylon large-scale means of over-coming epidemics, especially malaria as it happens, without coupling the offer with some means of population control. I find such comments both unintelligent and immoral. But I mention this to illustrate the low level of present ability to cope with the problem of population control on the global level.

“Some ecologists said zero population growth begins at home, on the family and the national level. But suppose the West keeps its level constant, or suppose Protestants keep their level constant, while the others grow. This will cause a rapid demographic trend that not all will welcome. For my part, I suppose there is much consolation in those enlightened people who would rather teach than breed. But I cannot simply see here a solution to the global problem—at least not without an extensive debate leading to a radical change in attitude, i.e., at least not without a mass movement. But sooner or later the agenda will be: how can one country influence progress in another and how can global planning develop soon and effectively to avert the coming apocalypse?

“Obviously, the laissez-faire theory allowed first nineteenth-century imperialism and later the tendency of governments of advanced countries to help governments of backward countries consolidate, no matter how backward these were, so as to be able to trade with them, to invest there, etc. The paradigm is the oil-producing countries, and it is really of no import at all whether the official organization in charge of the process is a Western company, a joint Western and
local concern or a local concern. The local elite is backward and prevents progress at home; it sells oil for some luxury items and for arms and for almost no goods and services to distribute to the large masses which are still mostly illiterate.

“The ameliorating move of the West, the programs of foreign aid, failed since they were purely economic: they took no notice of local impediments to economic progress and so failed even economically; moreover, they were based on the hope that in the long run economic progress will bring all sorts of progress. Perhaps; but the long run is too long. I shall leave this topic referring the interested and concerned to D. V. Segre’s excellent *The High Road and the Low*, London, 1974.

“One still better move was the Peace Corps and Care and their like. They failed; the unenlightened leaderships of backward countries found ample reasons, good, bad and indifferent, to put an end to such programs. But there are countries that might still welcome the Peace Corps, perhaps if and when jointly organized; there are countries that can be made to accept the Peace Corps; and there is the Bourguiba plan of shipping masses of students from backward countries to be trained in highly skilled jobs in the advanced countries. These things need more thinking out and strong pressures on governments—and since time is short, teach-ins and mass movements may be called for.

“There is, however, no substitute for proper world coordination of world population growth, of world economic planning, and of worldwide arms control. The failure of the United Nations organization, even in the attempt to control nuclear proliferation, is a fact... .

“But I must leave it here: I have already entered deeper into politics than some might deem in good taste when in a symposium on the philosophy of technology. So let me just say, no program for a philosophy of technology can be viable unless it is highly political in orientation: the result of two centuries of effort in the direction of physical technology without attention to social and political technology have caused a lag, and the lag must be filled as rapidly as possible, since time is short and the catastrophe may be around the corner. All I can pose today is the questions on tomorrow’s agenda for philosophy of technology. A major one is, I say, Can there be democratic mass movement for world planning and peace?”
Next comes Agassi’s attempt to provide a framework in *Research in Philosophy & Technology*, vol. 6 (pp. 55–56):

**Technology As Both Art And Science**

*Preface And Summary*

“The word technique comes from the Greek word, *technē*, whose Latin cognate is *ars*. As often as we hear of surgery or of acoustic engineering or of any sort of a technique that it is an art, we also hear that it is a *scientific* art or technique. In fact it is both art and science, in the sense that some techniques are scientifically attested, some not, as well as in the sense that every item of our contemplation has both unique aspects, not given to science, as well as repeatable ones, subject to scientific investigation.

“This leaves open the question. Is technology as cumulative as science? In a sense science is indeed cumulative—though not in the traditional sense which most modern philosophers of science have assumed. In the sense in which science is cumulative, technology is not. Even so, a scientific theory of given techniques may succeed in rendering that technology cumulative.

“Applying all this to scientific method, one may wish to make methodology scientific and thus unite science and technology. Such ventures are not without promise, and at times they may produce exciting results; yet the project will be regularly threatened by unforeseen discoveries and by unforeseen inventions which will invite renewed efforts at integration. As uniqueness is inexhaustible, unifications by repeatable means may forever be met by diversification due to uniqueness. Science and art thus are competitors and partners in one and the same process.”

Finally, Agassi’s applications in *Research in Philosophy & Technology*, vol. 7 (p. 194):

**Political Philosophy And Its Implications For Technology**

“What has political philosophy to say to those concerned with the use of spreading technological advances for the relief of urgent global problems? What is the proper philosophy for technology transfer? . . .”
And in the Philosophy and Technology (Kluwer) series, vol. 5 (p. 277):

*Technology Transfer To Poor Nations*

“The present essay belongs to the realm of global politics. It takes it for granted that the cleavage between poor nations and rich nations is not merely the problem of the poor nations but of the whole human race since it threatens the very survival of mankind, and in many ways and at the very least, it affects adversely the quality of life everywhere on earth. We are generally sufficiently aware of this fact so as to conclude that foreign aid is not the preference of the interest of the poor nation over the interest of the rich nation, but rather an act well within the national interest of the donor as well. This was epitomized by John F. Kennedy’s edict: we can afford to offer foreign aid and we cannot afford not to. Also, Kennedy was aware of the difficulty of granting foreign aid to the poor nations on a permanent basis, like a rich philanthropist’s regular aid to the poor as practiced well within all traditional societies; hence, foreign aid must aim at helping poor nations achieve self-sufficiency, i.e., learn to reach high levels of production so as to be free of the need for aid. This, of course, means the transfer of technology.”

In terms of controversies here, Agassi is not explicit about all his opponents. But the thrust is clear. He is activist where he thinks (all?) other philosophers of technology are not. In one case, where Michalos is active within a socialist party, Agassi seems suspicious of party politics as less likely to succeed than mass movements. Next, Agassi more or less dismisses out of hand the then-traditional idealist philosophers of technology, such as Heidegger, as ostriches. And he says the same about narrow positivist philosophers of science—the science quadrant. This puts Agassi in opposition to more or less everyone in all parts of the philosophy of technology sphere—where (following Popper's lead in challenging everyone) he thinks he ought to be.
Chapter 8

Edmund Byrne on Work

Edmund Byrne taught for many years and was a chairperson at Indiana-Purdue University in Indianapolis. He is currently emeritus professor there, where he continues to publish. See items listed in the bibliography at the end.

Longtime treasurer of SPT and one of the most regular attendees at our conferences, Byrne always made interesting contributions. But in my opinion his book on work reflects his general outlook and philosophical style better than anything else he has written. I have, before, reviewed the book, Work, Inc., both for Research in Philosophy and Technology and, in modified form, as a chapter in my Social Responsibility in Science, Technology, and Medicine. Work goes to great lengths to spell out his agreements and disagreements with opponents, so it is perfect for my approach in this book. I thus feel confident about redoing my earlier review(s) for this chapter, with only the modification of underscoring his disagreements with key opponents. (See Note on Quotation Styles in the introduction.)

In simplest terms (I wrote in Social Responsibility), Work, Inc. is an appeal to philosophers who believe in social contract theory—and there are a great many of them—to revise their thinking in fundamental ways. The most important way, according to Byrne, is for these ethical theorists to take corporations—especially transnational corporations—more seriously in their speculations on the “just state” than they have up till now. The reason for this is simple (Byrne says): transnational corporations today exercise de facto sovereignty—a sovereignty that always influences, sometimes equals, and often overpowers the sovereignty of nation states.

(The first objection to his book, then, would come from philosophers of technology who depend on Rawls, such as Kristin Shrader-Frechette—see Chapter 3, above. But the fact of the matter is that few other philosophers of technology have taken the power of corporations as seriously as Byrne does.)

Easy as it is to state Byrne’s thesis, his is by no means a simple book. Its style is cryptic, dense, and allusive. And the argument is so subtle and nuanced that it is not inappropriate to say that the book contains just one long, convoluted argument that extends from cover to cover.
The premises of Byrne’s argument are laid out in an introduction. He begins with a paraphrase of a widespread complaint made by people in the labor movement: “We had a social contract, and now we don’t. The social contract has been broken. Government, business, and labor—each had its role and each understood its responsibilities to the others. All three together, cooperating for the betterment of all. That’s how it was, but no more.”

Byrne follows this immediately with an acknowledgement that this social contract existed for only a short time (especially in the United States)—roughly from the 1930s until the 1970s. And even then, Byrne says, the contract was from the beginning fatally flawed by a basic assumption accepted by all three parties: namely, that the parameters of the contract were national—and this in two senses. There was never any real commitment of the corporations to the local communities in which they operated and from which their workers derived such strength and meaning as they had; and the corporations were becoming increasingly transnational (“multinational” according to more popular usage).

Byrne’s conclusions are conveniently set forth in a separate chapter that brings the book to a close. Q.E.D. There are three conclusions, which Byrne labels “factual,” “hortatory,” and “theoretical.” The factual conclusion is the one stated earlier in a paraphrased complaint of union leaders, now bolstered by all the interpretations of facts argued for throughout the book.

The hortatory conclusion (Byrne says) is this: workers will be able to counterbalance the concentrated power of corporations only to the extent that they and the communities in which they live come to see their interests as intertwined and learn to defend these interests cooperatively.

The theoretical conclusion is this: social and political philosophy will remain irrelevant to a major social and political issue so long as its practitioners do not deal with the fact that corporations are becoming the world’s most powerful de facto bearers of sovereignty.

Byrne had spelled out who these irrelevant social and political theoreticians are in his introduction, but his primary target is John Rawls. Byrne views Rawls as a liberal defending the claim that the public sector has a responsibility to take care of people’s (including workers’ and their families’) basic needs, and he sees Rawls’s opponents (e.g., Robert Nozick) as libertarians with their emphasis on
the efficacy of individual initiative.

(So Byrne places himself to the political left of Rawls, while joining the latter in opposing Nozick’s libertarianism. Objections could clearly come from defenders of both, but once again they tend to operate at the abstract level rather than descend to the concrete real-world level where Byrne situates his book.)

Throughout the book Byrne uses as his means of arriving at his conclusions the method of demythologizing. What he claims to be doing is slaying “dragons that guard the gates of the status quo”: namely, legal assumptions about corporate personhood and eminent domain, or about private property and the commodification of goods; management ideas about employees as autonomous individuals rather than citizens with roots in local communities, plus the management ideology of “profits without payrolls” by way of robots and automation; and ideologies of progress and competition.

I look here, as I have done before, at three examples of Byrne’s demythologizing. The first is concerned with the obligation or right to work, the second with claims about “meaningful work,” and the third with obligations of justice in plant relocations.

In Part I, “Worker and Community,” Byrne deals with three issues: the obligation to work, the work ethic, and responsibility for people who are unemployed. Under the first heading, after reviewing the opinions of philosophers ancient and contemporary on the issue of forced labor, Byrne concludes that “freedom has come to be more highly valued than work . . . [so that] a well-informed representative of workers [Byrne’s point of view throughout] would want to proceed with caution before endorsing a social contract in which work is made obligatory” (p. 45).

On the work ethic, Byrne defends a somewhat controversial view about a possible “contractarian basis for [an] obligation [to work] in a just society.” He does so by defending four theses, namely that: (1) not all human beings would recognize or agree to an obligation to work (largely an examination of Johan Huizinga’s reading of history in *Homo Ludens: A Study of the Play Element in Culture*); (2) not all rational human beings would recognize or agree to an obligation to work (people throughout history whom one would not want to accuse of an adolescent predilection for play over work—for example, clerical academics—are cited as evidence); (3) not all rational, responsible persons would
recognize or agree to an obligation to work (here Byrne cites management rules: an ultimate rule, that whenever possible people are to be replaced by machines, and an interim rule that says to use the work ethic to get as much work as possible out of workers in the meantime); and (4) not all rational, responsible, knowledgeable persons would recognize or agree to an obligation to work. In defending this fourth thesis, Byrne arrives at his all-too-obvious conclusion: that few people value work for its own sake; or, stated more directly, that most people value work only as a means to some other end.

On responsibility for the unemployed, Byrne acknowledges that “a society’s welfare benefits may be influenced by presumptions about work obligations,” but “nonetheless one’s involvement in the work force does not guarantee eligibility for benefits” (p. 99). About this state of affairs Byrne’s indignation shows through: “We are all losers if we continue to acquiesce in a public policy that for all practical purposes abandons displaced workers like tools no longer needed. We do not cut off benefits to veterans of yesterday’s wars just because they served with now obsolete means of destruction. Still less should workers be forgotten simply because they served with now obsolete means of production” (p. 109).

Byrne describes “meaningful work” as a “seductive” notion. As a general proposition, he says that, “The more people expect their work to be meaningful, the more they seem to challenge employers’ claims to control over the work relationship” (p. 115). And Byrne raises four objections to the expectation of meaningful work: (1) job satisfaction is not a sufficient reason for keeping a job, and the absence of job satisfaction is rarely a sufficient reason for leaving one. (2) Meaninglessness is not peculiar to disappearing low-skill jobs, and meaningfulness is often missing in new high-skill jobs. (3) In any case, whether a job is viewed as meaningless or not, it is always subject to termination. And (4) no matter how well-intentioned the “meaningful work” movement is, it is peculiarly vulnerable to manipulation by management: “Under such labels as job enrichment, quality of work life, and cooperation, employers are (Byrne says) luring even unionized employees out of de-skilled niches inherited from the past into purportedly more complex and challenging assignments. Workers in their turn are expected to respond to this recognition of their potential with deepest gratitude. But gratitude is not the most common response. As these experiments in meaningful work are carried out in the workplace (rather than in scholars’ thoughts) they frequently involve more stress and less compensation” (p. 120).
This may seem to be a pessimistic conclusion, considering the inherent appeal (management’s objection to Byrne) of the meaningful work ideal, and Byrne (in an implicit reply) ends his discussion on an appropriately ambivalent note: “Employers are to be encouraged to provide opportunities for the exercise of creative potential. But people must remain free to decide for themselves how they personally want to go about exercising their own creativity” (p. 135).

Byrne slays his most important dragons and comes to his most important conclusions in part III, “Corporation and Community.” But earlier in the book he had already done some heavy demythologizing: “Plant closings are commonly defended as a matter of business necessity. Many labor-intensive plants have been closed in recent years . . . especially in . . . the so-called rust belt. Why is this the case? Some blame rising labor costs. . . . Others, including [union] experts . . . prefer to blame ‘the importance of technological innovation as a means of [meeting] competition.’ The pressure of competition may generate a desire to innovate. But it may also inspire a company to find an environment in which ‘cheap labor’ is available . . . [or it] may be an opportunity to ‘get out from under’ a union” (p. 17). (This pits Byrne against both management and unions.)

Under the heading of plant closings, one dragon Byrne attempts to slay is new laws and legal interpretations that try to restrain the property rights of corporations. But, he says, the corporations display a remarkable immunity to these efforts: “Exemplifying this immunity is the fact that corporate restructuring often undercuts the [National Labor Relations Board’s] distinction between partial and total closings, thereby exempting the ‘restructuring’ employer from notifying and negotiating with its ‘lame duck’ employees” (p. 212). And he goes on to cite the example of U.S. Steel, transformed into a division of USX, shutting down its mills in Youngstown, Ohio, in 1979.

Later Byrne says: “Judith Lichtenberg is certainly correct in saying that ‘the company’s ownership of the factory cannot settle the issue of its responsibility in plant closings.’ But, as we have seen ownership is not necessarily coextensive with control, and either may change about as quickly as the price of a stock on the trading board. So a narrowly focused insistence on advance notice and transitional benefits already concedes the characterization of a corporation as a commodity and leaves communities in the position of beggars who as has oft been noted, cannot be choosers” (p. 218).

After which Byrne launches into his last and most powerful argument: “It is
essential that communities . . . be in a position to be choosers. A community being, by my definition, a geographically localized complex of legitimate interests (abstractly) and (concretely) human beings who assign these interests moral priority, the task before us is to tie the community thus understood to a plant or facility which a corporation owns or controls.”

Byrne can accuse Lichtenberg of a narrow focus on legalistic definitions, but we should be clear what his own focus is: namely, on a broad political restructuring that would give back to communities the power (did they ever really have it?) to negotiate a social contract on an equal footing with multinational corporations. Here we should recall Byrne’s overall hortatory conclusion at the end of the book: that workers need to mobilize their power, in local communities, to defend their interests cooperatively.

Byrne should recognize that this will be seen, at least by managers (and members of what can justly be called the managerial classes), as a call to class struggle, of workers and their communities, not only against the owners of corporations but against the whole social, political, and legal system that supports them—and ultimately against the ruling ideology of capitalist society. That is, critics (the main objection against his book) will accuse him of being a Communist—and it thus may seem odd that he rarely mentions Marxism in the book, whether to defend or oppose it.

In short, it seems clear to me that Byrne’s hortatory conclusion demands far more—in the way of political savvy, political activism, even political power—than his final theoretical conclusion. All that that requires is for political philosophers to be more realistic. But then, if political philosophers got more realistic, maybe they would see the need to go beyond theory to calls for restructuring political power relationships. They would become more pragmatic. (See Hickman in Chapter 14.)

So, in terms of controversies, Byrne's book is fairly academic—though, he thinks, with a practical thrust. He situates himself to the left of Rawls in the latter's opposition to both utilitarianism and the libertarianism of Nozick. Byrne accuses Lichtenberg of a narrow focus on legalistic definitions, and it should be clear that this means he wants more than words; he wants action against the management policies he outlines—so often based on supposedly scientific economic theories. This ought to move him toward activism of some sort. However, he gives only fleeting recognition to the two main philosophies
espousing that in our philosophy of technology spectrum (or sphere)—
pragmatism and Marxism. His few references to Dewey (mostly positive) would
suggest that Byrne is more of a leftist liberal (Progressive or Social Democrat?)
than a Marxist.