ACTIVIST PHILOSOPHY OF TECHNOLOGY II:
ESSAYS 1999-2009

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Part One
FOUNDATIONS

Chapter 1

THERE IS AN IMPLICIT SOCIAL CONTRACT BETWEEN PROFESSIONALS
AND THE DEMOCRATIC SOCIETIES IN WHICH THEY LIVE

I said at the beginning of "Activist Philosophy of Technology: Essays 1989-1999" that what I do as a substitute for turning my sets of essays into a seamless web of a book is to treat these essays as if I were editing the essays of someone else. As I get closer to the present, that is likely to be more and more difficult. But I think it is still worth the effort. This first essay was one of two I wrote at the same time, not knowing whether either would be published. The result was so much repetition that I have banished the second, the longer essay, to an appendix: Appendix I, at the end of the volume. The one that I keep appeared first, in Ludus Vitalis (volume XV, number 27, 2007; pp. 195-197), *a Mexican journal, as part of a forum on particular disciplines - in my case, the philosophy of technology - and how they affect society today. The essay is structured around questions posed by the editors of the journal for contributors to the Forum. I offer it here as a short statement of my philosophical beliefs, to begin this set of essays. See Note on Sources at the end of the volume.*

HOW HAS THE DEVELOPMENT OF KNOWLEDGE WITHIN YOUR PROFESSIONAL DISCIPLINE MODIFIED THE POSSIBILITIES FOR HUMAN ACTION?

Philosophy of technology — which overlaps significantly with science and technology studies, as well as with environmental philosophy — probably offers more possibilities for human action than almost any other discipline (disciplines) in academia today. On the other hand, many of these possibilities have yet to be realized.

First, what I see as the possibilities. In my *Social Responsibility in Science, Technology, and Medicine* (1992), I invited technical professionals to get more heavily involved in the solution of technosocial problems than they had up to that point. It was addressed to technology educators, medical school reformers, media professionals, biotechnologists and bioengineers, computer professionals, nuclear experts, and environmentalists — as well as, paradigmatically, social workers and the "helping professions." About ten years later, I edited a group of my "activist essays" (available on my University of Delaware website), addressed to fellow philosophers and especially philosophers of technology; the message was the same, to get more involved in

solving the problems of our technological world. In both cases, I based my approach on that of philosophers in the American Pragmatist tradition — most especially John Dewey and his friend and colleague G. H. Mead — for whom there is no split between professional and civic work. Indeed, activities ought to flow smoothly in both directions, from academia to the "real" world and from there to academia — seamlessly.

This view is not shared by all philosophers calling themselves "pragmatists," and certainly not by all philosophers in general — even those in fields like bioethics or applied ethics generally or even environmental ethics. But mine was not a program — not even an invitation — for all. It was aimed only at increasing the number of activists, in academia or in the professions, who might have the expertise and the will to help solve social problems in our technological age.

HOW TO CHOOSE BETWEEN THOSE POSSIBILITIES?

Presumably this question seeks an answer in the "ought" category, perhaps something like an ethical or social or even political obligation. But that's not what I think is called for here.

The problems calling out for action in our troubled technological world are so urgent and so numerous — from global climate change to gang violence, from attacks on democracy to failures in education, from the global level to the local technosocial problems in your community — that it isn't necessary to talk about obligations, even social obligations. No, it's a matter of opportunities that beckon the technically trained — including philosophers and other academics — to work alongside those citizens already at work trying to solve the problems at hand. And when academics do get involved, they can't go in as though they had all the answers; they have to work as equals in a true democratic fashion.

Why? Can I offer a general answer to the question about how to choose among the numerous possibilities? I suppose I could try, but I don't feel the need to do so; certainly no urgency to do so. The problems are just there for all to see. And democratic societies have a right (there is a traditional ethics term, but I am not going to defend it) to expect that experts will help them, experts from all parts of academia and all the professions. I would even go so far as to say that there is at least an implicit social contract (another ethical/social/political term that I won't define here) between professionals and the democratic societies in which they live and work and get paid for their professionalism.

This may sound like rampant relativism: just get involved in any crusade you choose, as long as it "improves" society. To avoid this implication, I need again to fall back on American Pragmatism. It was the view of Dewey and Mead that there is at least one fundamental principle on which to take a stand: that improving society always means making democracy more widespread, more inclusive, inviting more groups — not fewer groups — into the public forum; elitism, "my group is better than your group," and all other such privilegings are anti-democratic. This "fundamental principle," however, is not just another academic ethics principle; it is inherent in the nature of democracy — at least as the American Pragmatists understood it. As I understand it.

I'm always happy when fellow philosophers try to provide academically respectable answers to questions of social obligation, of social contracts on the part of professionals, of the need to keep democracy open to ever wider inputs. But if we wait for them to provide such answers, it will typically be too late. Global warming proceeds apace. Loss of species diversity, of life on Earth, proceeds apace. Threats to local communities in the so-called "developing world" in the face of economic globalization proceed apace. And so on and on. These and others like them are not issues of academicism. What I have in mind are urgent social issues that cry out for answers now.

I have been accused, on these grounds, of favoring activism over principle — even of abandoning the traditional role of philosophy as theoretical discourse. But I don't mean to do that. I believe Dewey was right in opposing all dualisms, including the dualism of principle versus practice or theory versus action. I welcome academic work on my issues; I just ask academics to accept activism as a legitimate part of philosophical professionalism. The issues seem to me that important.

One final note, on the relation between these views and science, in particular the science of evolution: Mead and Dewey were writing at a time when evolution — biological evolution, social evolution, human cultural evolution — was beginning to emerge as the cultural matrix in which modern learning takes place, preeminently in universities. That it was not such a matrix for all led Dewey to many struggles against religious fundamentalists.

But this is the one point on which I do not agree fully with Dewey: better, I think, not to fight against fundamentalism but to invite fundamentalists to find a way to fit evolution within their systems of thought.

Mead, more clearly than Dewey I think, laid the groundwork for this, when he said that any adequate account of human knowing, philosophical or scientific, must recognize it as falling within the evolutionary unfolding of the human race. In Mead's terms: "It is the technical function of philosophy to so state the universe that what we call our conscious life can be recognized as a phase of its creative advance" (*The Philosophy of the Act*, 1938, p. lxxi). Even the most traditionalist of religious philosophies ought to accept this: what we know now depends on previous knowledge of earlier communities, all the way back to the beginning. Tradition is often taken to be the enemy of science, but this need not be so.

Chapter 2

HOW TO MAKE OUR FUTURE WORLD A BETTER WORLD

This essay, which was published (like Chapter 1) in a new forum in Ludus Vitalis (XVI, number 29, 2008), *extends my thoughts there into the future.*

My reply to the three questions for this forum builds on my reply to the earlier *Ludus Vitalis* forum (XV, number 27, 2007), "There is an implicit social contract between professionals and the democratic societies in which they live." But I will save that to the end because my reply also builds on my "Philosophy of Technology: In Search of Discourse Synthesis" (*Techne* 10:2, 2007; see spt.org, under journal).

I

First here I talk about the new types of knowledge needed in our field.

In my *Techne* online book, where I discuss the recent "professionalizing" of our discipline, I argue that the next generation of young philosophers of technology - including those still in graduate school - must master one of several fields outside philosophy. To master the philosophy of biotechnology, for example, a student today must know biotechnology, not just in general, but in detail in some specialty such as agricultural biotechnology (and there are several subdivisions of that field). Similarly for computer and information science, for ecology, for medicine, for engineering design, for cultural studies such as film, even for work in such cross-disciplinary fields as science, technology, and society (for example, on the issue of globalization).

That is my answer to the first question, What types of knowledge will have to be developed in your field? A philosopher of technology, to be prepared for the future, must become acquainted with advances in these rapidly advancing non-philosophical specialties. Not in all of them - that is impossible today - but he or she must become expert in at least one advancing field, must keep up to date with what the experts are learning in some particular field.

One example: to write in an expert fashion about the complexities of "virtual reality," the next generation must become accustomed to new computer and information science uses. And I will go even beyond that: to *better* uses.

Similarly for environmental issues: the next generation of philosophers of technology who specialize in those areas must be firmly grounded in the science of ecology - not just the basics but advances in the field, the latest knowledge. And, again, the latest improvements in the field (fields).

And so on for engineering design, advances in medical science and technology, film study, history and sociology of science, technology, and society - and so on and on.

But I emphasize again: typically the young scholar can master only one of these fields if he or she is going to be prepared to deal with the future. The next generation of philosophers of technology (particular technologies) must be specialists in a world of specialized knowledge.

II

Next, to talk about what types of futures these advances make possible, I will begin with environmental philosophy, including the demand that the next generation of scholars in the field need to learn the *best* ecological knowledge. The future needs better protection of the environment, for example in dealing with the global warming issue more effectively than we have in the past.

Or, on issues associated with species loss, loss of biodiversity not only in the tropics but worldwide, the future demands advances in ecological science, but also in the management of forests, in avoiding deforestation, for example. (The same would be true for the world's oceans; and so on to other examples.)

Or medical science and technology: clearly a better future will include not only newer medications and better medical technologies, but also better political ways of getting them to broader societies - for example in Africa or other parts of the globe where sickness and early death have been the norm.

Surely the next generation of philosophers of technology need to think about, but also to prepare for, a better world in these and other senses: better engineering design, more appropriate to the needs of a changing world; not only more and more widespread use of computers and information science, but more equitable, more democratic uses; even better television and films to educate the public about what their new world is really like and how they can better adjust to living in it in peace and harmony - including harmony with nature.

III

And third and last I come to your other question: How can such ideas of a better future contribute to its realization?

My *activist philosophy of technology* approach (previous *Ludus Vitalis* contribution) would say that we don't just need the next generation of philosophers of technology to be competent in related fields. We need for them to be *improvers* of those allied fields. And one way of doing so is to devote themselves in an activist fashion not only to learning new knowledge in those fields, and to improving future society by applying that knowledge, but also in terms of getting the various professional societies associated with the specialties they are studying to contribute more effectively to a better world for all.

This is likely to sound like a hard saying to such young scholars. Are you saying that I must not only master another field besides philosophy, but that I must also choose only the best in that field, what will make ours a better world, but *also* try to influence the professionals in the field I am studying to commit themselves, in an equally activist fashion, to improve their professional societies and get them to contribute better than they have in the past to the improvement of the

human condition? That seems too much to ask of a beginning scholar!

It's an ambitious goal, I admit. But I argued before in these pages that, "There is an implicit social contract between professionals and the democratic societies in which they live," and the expectation I had in mind was that professionals should contribute to the improvement of society, to the solution of its manifold problems. It would do little to advance this agenda if our next generation of philosophers of technology were to do *no more* than master new knowledge in ever-advancing new fields. In my opinion, democratic societies have every right to expect that the professional societies they support, and the professionals working in them, will try their best to help solve urgent problems facing their societies. And if that is true, say, for the next generation of engineers, or computer scientists, or environmentalists, surely it is equally true for those philosophers of technology who get involved with these efforts.

My call for an *activist philosophy of technology* may not appeal to all. But I am convinced that the problems facing society today - societies (in the plural) in all parts of the world - are so urgent that at least some should answer the call.

And our world - the new world of our unfolding future - will be a better future if they do; especially if they do so alongside equally committed professionals in the variety of fields of expertise in which they choose to become expert. It's a great adventure.

Chapter 3

A PRAGMATIST'S COMMENTARY ON
ALBERT BORGMANN'S *REAL AMERICAN ETHICS*

This essay has not been published elsewhere. In fact, I wrote it more or less for Borgmann himself, though I thought it might form the basis for a discussion of his book - preferably involving other critics - at a Society for Philosophy and Technology meeting. Unfortunately, that never took place.

In this essay, I try to be fair to Albert Borgmann. But the essay also uses Borgmann as a foil to present my own views about what the best sort of philosophy of technology ought to be like today.

Enough time has now elapsed since the appearance of Borgmann's fine book, *Real American Ethics* (2006) to write a judicious, fair, and non-precipitous assessment. In saying I want to offer that, I find myself objecting to the standard practice these days in academia in the USA, of beginning a reply with a very brief summary - often unfair to the author whose work is being assessed. So, before giving my reply, I will try to be as fair as I can be to Borgmann.

And my reply, in any case, is, only in a limited sense, an argument against Borgmann's approach. To put things more accurately, it is a defense of an *activist social philosophy* in the tradition of John Dewey, and even more so, of G. H. Mead. In Mead's terms, it would be a *social philosophy* that substitutes the *community solving its problems democratically* for traditional approaches to ethics and politics, whether theoretical or applied.

In passing, I should note that, when thinking about these pragmatists and their social philosophy, neither Borgmann nor anyone else should forget the "focal" aspects of their lives - which they resolutely refused to separate from their professional lives. Both had families, not only of origin -- which were influential in their lives and work - but during their entire lives. Dewey married twice, and had several children, one of them adopted; and Mead was helped by his wife's family in innumerable ways - they also had a son - and the family regularly hosted visitors in their home in lively get-togethers.

I have often quoted the following dictum from Mead (slightly modified from 1964, p. 266) because, for me, it summarizes what for these pragmatists was the core of their approach to ethics:

"The order of the universe that we live in *is* the moral order. It has become the moral order by becoming the self-conscious method of the members of a human society [acting in a democratic fashion to solve its problems]. . . . The world that comes to us from the past possesses and controls us. We possess and control the world that we discover and invent. . . . It is a splendid adventure if we can rise
to it."

In these terms, groups acting to solve their problems in a creative fashion are *by definition ethical*.

By whose definition? By Mead's definition, obviously, but he seems to mean that *any* ethics worth the name would find such communities to be acting ethically. His argument against Kant (which goes beyond what we will see Borgmann say) is that abstract theoretical duties do not help us at all in solving real-world ethical problems. Mead also argued against traditional utilitarianism, saying that what ethics calls for is altruism, whereas utilitarianism tends to be individualistic, depending on the satisfaction of individuals' interests. To complete the picture, I'm not clear about what he would have said about religious ethics, or the ethical systems of generations before Kant - for example, natural law ethics - though he was as much opposed to Aristotelians and Platonists as Dewey was. He might just have meant by the definition of the pragmatists themselves; or, with Dewey, of progressive democrats in the tradition of (their interpretation of) the American founding fathers.

This view needs a defense for at least two reasons. Even as staunch a defender of a pragmatist philosophy as Joseph Margolis, in *Reinventing Pragmatism* (2002), says that Dewey, the best known defender of this form of traditional American Pragmatism, is "epistemologically naive." His philosophy, especially his meliorist social philosophy, does not stand up well, Margolis

thinks, by the standards of contemporary analytical philosophy. This is not because it lacks sophistication, but simply because it focuses, more than Margolis and analytical philosophers think is "philosophically correct," on social meliorism. In the tradition of American Pragmatism, Margolis much prefers Charles Sanders Peirce, the isolated loner, to Dewey   the joiner in activist causes and activist groups.

The second reason is that Margolis is surely right on the point that nearly all academic analytical philosophers in the United States today would say that philosophers can get involved in social problem solving, if at all, only under an "applied" heading; and in working toward the solution of particular social problems in an activist fashion, only as a matter of "service," not philosophy proper.

One recent American Pragmatist philosopher who has been perceived as playing the cultural role of what I have called a "secular preacher," like Borgmann, is Richard Rorty (1997); but he tends to look to literary figures rather than philosophers for such cultured vision. (Rorty, of course, ultimately left the camp of academic analytical philosophy behind entirely.) So presumably, in this dichotomy, Rorty thought of himself as more a literary figure, an essayist, than as a philosopher -- at least in the narrow academic sense. Many critics - and I include myself among them - do not see Rorty as sufficiently activist in the Mead/Dewey sense. Rorty exercised his culture-criticism - especially his criticism of the contemporary culture of academic philosophy - mostly at the intellectual level.

And on the "service" point, we would do well, in my opinion, to return to the early twentieth-century view of academic life, in which scholarship and teaching and research were all of a piece, not separated.

All that said, here is what I want to do in this defense of philosophical activism in contrast to what I see as Borgmann's less activist approach in *Real American Ethics.* First I will summarize Borgmann's introduction, and, for contrast, I will introduce my own approach. In section 2, I will refer back to Chapters 1 and 2, to provide a substitute for fleshing out my view, while providing a detailed summary of Borgmann's elaboration of his views. And finally, in section 3, I will try to tie strands together in a conclusion.

I. A Contrast

For Borgmann in his first chapter, the meaning of "real American ethics" includes his answer to the question, why American? And he answers himself in terms of the spreading global reach of the USA and its institutions of all sorts; of the generosity of Americans, for example, in the rebuilding of Europe and Japan after World War II; as well as what he calls their (our) resourcefulness, especially in an attitude of refusing to take no for answer. To these characteristics Borgmann adds a uniquely American "fusing" of friendship, grace, justice, stewardship, wisdom, courage, "economy" (in a special sense) and design -- all of which virtues he thinks have unfortunately been "shrunk" by technology. There he is thinking of his earlier approach (Borgmann 1984) in terms of his distinction between "devices" and "focal things and practices."

For me, the most important disagreement is over our starting points: individual *virtues* under an overarching order ("compelling *moral vision*") reflected in *wisdom* (or, concretely, wise choices) versus the "complaints of the downtrodden," where I refer not to Dewey and Mead but all the way back to William James (1877, see 1967, p. 625).

I would paraphrase James as saying the "moral philosopher" is wise, in general, to be conservative, to abide by the social rules that have withstood the test of time. But (he adds): "Every now and then . . . someone is born with the right to be original, and his revolutionary thought or action may bear prosperous fruit. He may replace old 'laws of nature' by better ones; he may, by breaking old moral rules in a certain place, bring in a total condition of things more ideal than would have followed had the rules been kept." For James, this means a "better social order," one that will be more inclusive, that will give rise to fewer of what he calls "complaints"; that would lead to less social and political resistance -- and I would add, though James doesn't do so explicitly, less resistance from minorities, from those heretofore excluded from and thus "complaining" about the old order. I would further add that, reading this passage from James in recent decades, one can hardly avoid thinking of Martin Luther King Jr. and civil disobedience.

So for me the most important starting point of my activist philosophy is the *urgently felt social problems of our technological age* -- problems that call out for philosophers to join with other activists to try to do something about our technosocial problems in a conception of democracy as opening up opportunities to segments of society previously left out of the mainstream.

II. Being Fair to Borgmann

After Borgmann's introductory chapter, he turns to deficiencies in our (recent) American character, where he emphasizes that a general decency has given way to too much partisan passion. He focuses on examples: social justice broadly conceived (where he emphasizes the negativity of the recent debate over reforming welfare), environmental issues, and the abortion debate (where he takes a liberal side, while trying not to be partisan himself). He thinks that, since 1989 and the demise of Soviet Communism as a commonly compelling enemy, most passion has been exhibited by extremists. And this is where he brings in the need for a *compelling moral vision* that will get the broad center to do something beyond the demands of mere decency. In a single paragraph, he allows that the attacks that go under the label "9/11" could have offered the broad center an opportunity, but says it hasn't done so.

In this chapter he touches on many other issues that do not get full treatment in the book: globalization and indigenous rights, for one, or environmental damage broadly speaking, or the continuing denials of their rights to women, homosexuals, prisoners and ex-prisoners, immigrants (legal or illegal, it doesn't matter), including those too poor to afford health care (not just immigrants), exiles for example from the war in Iraq or the horrors subsumed under the heading Darfur, and on and on -- all mentioned, but mostly as asides, hinted at in a sentence or two or even just a clause.

His book then turns to ethical theory and what it might do to help us focus on these issues, and where he begins is with the different kinds. After talking about them as "moral landmarks," he puts together Thomas Jefferson (a "sense of what is right") and Immanuel Kant (reason-based categorical imperative). Both offer helpful "broad orientations," but he concludes that they are too far removed from the "quandaries of daily life."

Borgmann emphasizes, when talking about utilitarian ethics, its "dark sides" -- including the "commodifications" that he will talk about in later chapters. He also goes beyond other surveys in mentioning evolutionary psychology as a possibly promising new approach to ethics, but he ends up concluding that it is another "piece of the skeleton that fails to give us the tissue on the bones."

Clearly Borgmann's favorite theory is Rawlsian justice, but that too is, for him, too general and falls short of the needs of a "real" ethics.

He next contrasts such theories with the *practice* of virtue ethics -- though he laments that its defenders too often get lost in theoretical discussion rather than offering models of actual practice. Under this heading he makes a standard distinction (based on Aristotle) between personal and political virtue. Under personal virtues, he emphasizes wisdom (for him, especially Platonic), courage (he says the heroic kind championed by Aristotle is rarely called for today), friendship, and "economy." There Borgmann asks himself an important question: "What is the central ethical issue in building and dwelling?" And he answers: "We can take our cue from Aristotle who was one of the first to discuss economy [as household management] and did so in his *Politics*. But, Borgmann goes on, in his treatise *On the Soul*, Aristotle "framed two propositions that point us in the right direction. Aristotle's first proposition says: 'The soul is the form of the body'; the second says: 'The soul is somehow everything.' Together these two principles provide a fair definition of the human condition. The vital force of a human being has a material center and a potentially all-encompassing comprehension of reality." Borgmann ends here by saying this is threatened in today's America, especially by the way Americans typically make TV sets (and computers, etc.) the center of their homes.

I like the virtue Borgmann talks about next, grace (where he again gives it a special nuance), but I will not summarize what he says on the topic here.

Under political virtues, Borgmann emphasizes justice, stewardship, and design -- all important but also threatened by the "commodifications" he then takes up in the next chapter. And that's where he finally turns to "real" ethics, under the heading: "recognizing reality."

In this central chapter of the book, Borgmann discusses various *commodifications* (plural) versus ethics. But I will focus this summary on his ending (pp. 158-160), where he again brings in his device-versus-focal-things thesis. Here I want to be absolutely fair and quote his own words:

"Once moral commodification [defined as an economy detached from the moral restraints of

time, place, and community] has alleviated misery and provided for the fundamentals of life, and when it begins to sweep everything before it and to colonize the centers of our lives, it becomes ethically debilitating and objectionable. A life, typically divided between labor, reduced to a mere means, and leisure, devoted to the consumption of commodities, is not worth living" (p. 158).

He goes on: "The availability of commodities . . . leads to an epidemic of depression and a decline of happiness."

And asks:

"What should we do? Lead a life devoid of pleasure? Draw another line? This time between moral commodification and what? The answer is not to find a line, but to remember and invigorate those centers in our lives that engage our place, our time, and the people around us. In the personal sphere these are focal things and practices such as the culture of the table. In the public sphere they are centers of communal celebration such as farmers' markets."

And:

"Here too the empirical evidence is illuminating and in fact encouraging. Enduring joy is intrinsic to the engagements of focal practices and communal celebrations. Moreover, pleasures embedded in engagements will not betray us. And finally, if we in the affluent countries lead lives that are good as well as pleasant, we can get off the hedonic treadmill and use our resources to be a global force of genuine liberty and prosperity" (pp. 159-160).

Borgmann then moves rather succinctly toward his conclusion, with chapters on modifying commodification through the "economy" of planning our homes -- where he uses the examples of Thomas Jefferson (again) and Frank Lloyd Wright -- and discusses economy, again, in conjunction with friendship, wisdom, and grace. All are threatened today, he thinks. Then, talking about the designing of public space (again in opposition to commodification), he praises "celebratory" spaces, which he finds to be too often lacking.

Finally Borgmann comes to "realizing this real ethics" through "dispersion" (in limited, "fragmented" positive examples) and a "Jeffersonian life" (minus racism, of course). He closes with a poetic meditation on "the culture of the table" as what he thinks individuals can still do to be "really ethical" -- presumably not only in America but wherever people emulate this better American culture.

As I said earlier, rather than flesh out my view here, I refer the reader back to Chapters 1 and 2, above.

I said there that I agree with Dewey and his equally activist friend Mead (see Feffer, 1993), that, when academics get involved with social issues, they cannot play the role of philosopher kings, advising others how to solve their problems; they must get involved as equals with all those working on a particular issue, everyone from scientists and engineers to social scientists to

government agents to experts of all sorts, but also including ordinary citizens involved in the issue. An example: when engineering professionals and their societies get involved, they will of course bring to bear on the problems their expertise. (The same is true for academics in general, for lawyers, and so on.) But expertise does not automatically confer a privileged position relative to citizen activists on a particular issue. What I am talking about are *social* problems of our technological society (particular technological societies in particular locales). And the only "expertise" that counts in that respect is *civic responsibility.*

To return to Borgmann: for me, the virtues he favors, even his political virtues, end up sounding like no more than the virtues of individuals. (I admit that this is the one place where I think he moves toward a limited activism, but not nearly far enough for me.) When Borgmann talks about justice and "civility," he refers to Robert Putnam's (2000) "social capital"; but what he emphasizes is its decline, documented, he says, in "Putnam's curve." By contrast, John Gardner (1972), a good example of what Dewey and Mead have in mind in terms of citizen activism, talks about the perpetual need for reformers to start all over again. My pragmatism would say, not to lament the decline of civility, but to revive it by recognizing what usually goes wrong, including bureaucratization (rather than Borgmann's commodification). I have often noted (see Durbin 1992 and 1999), as one example, how service organizations rarely turn their reform zeal back reflexively on their own organizations when they lose their original zeal.

In my opinion, Borgmann (and Putnam) may be right that the civic spirit of Americans has lessened in recent decades, but I think it's by no means dead. I think, among many examples, of what even groups I don't particularly like - fraternities and sororities at universities, Shriners, even golf and country club communities - continue to do: to mount food drives, Thanksgiving turkeys, Toys for Tots at Christmas, all the way up to major philanthropies. As I noted in *Social Responsibility* under the heading, "A Progressive Interpretation of American Democracy," almost from the beginning of the United States (Tocqueville commented on it in the early nineteenth century), when Americans of all stripes have seen a problem they haven't just lamented it, but have rolled up their sleeves and, collectively, done something about it. What I think is that this widespread urge to pitch in (often enough, I admit, in misguided and even self-serving ways) can be tapped - as it was by President Kennedy in founding the Peace Corps - to broaden activities to deal with major technosocial problems in a manner similar to the Progressive Era at the beginning of the twentieth century.

It is, paradoxically I think, this urge to pitch in and solve problems that probably makes Americans overestimate what the USA does for the needy in other countries by way of foreign aid - one of Borgmann's lamented shortcomings. They just assume the government is doing what they would do - or perhaps are doing in other ways in terms of particular local issues.

In short, what I argue for is not to lament the all-too-common failings, today, in terms of lack of civic involvement; what we should do, rather, is invite more people of all kinds - including philosophers - to do more.

III. Conclusion

As I thought about how to bring this to a conclusion in as amicable a fashion as possible, it occurred to me that, in a way, I had had a similar conversation with Borgmann once before. In *Technology and the Good Life?*, which had grown out of a marvelously congenial conference on his thought, held in 1995 in the beautiful Canadian Rockies, I had at the end of my contribution (Durbin 2000) offered him an olive branch. Among other possibilities for interpreting his *Technology and the Character of Contemporary Life*, I had invited him to take up activism to enlarge the numbers of the small groups of people he praises as already devoted to focal things and practices.

In his "Reply to My Critics" at the end of the volume, Borgmann was as always polite and even-tempered. He begins his discussion of "reform" there by saying, "Durbin's sense that our work must have practical consequences is one I share entirely" (Higgs, Light, and Strong 2000, p. 360). And later he asks:

"What is the prospect of coming closer to a commonwealth of the good life? . . . As for concrete steps that philosophers should take, I join the pragmatism of Durbin, [Larry] Hickman, and [Andrew] Light. I take from Durbin the commitment to social justice and social activism, from Hickman the diversity of approaches, and from Light the call for a measure of cooperation" (p. 367).

But immediately after the first concession, Borgmann adds:

"I am with Durbin, but not if [he] means [that philosophy should not be] 'distinctive' or 'special.' There is a strong position in the Western tradition that reflection clarifies one's vision and aids one's action. . . . As citizens, of course, we have no privileged task but are bound to join with others in the mundane enterprises of social and environmental reform, and even as philosophers we have no monopoly on reflection but must welcome contributions from all quarters. But if we give up on the Aristotelian notion of *theoria*, we *eo ipso* have abandoned the philosophy of technology" (p. 360).

And he ends his replies with this: "Whatever else the philosophy of technology may be, it *is* philosophy and should recognize the standards of its guild and tradition" (p. 368).

So here at the end of my review of *Real American Ethics*, I extend to Borgmann another olive branch. I have no intention of giving up the theoretical tradition of Western philosophy. But I join with Dewey in resisting all either-or's, or with Larry Hickman (2001) in defending the both-and. We are not asking Borgmann or anyone else to give up the search for wisdom (no matter how much we might disagree with the details of his formulation); we are just asking him - and all philosophers, of technology or any other kind - to recognize that activism is not separate but ought to be an *integral part* of philosophy. At least as the American Pragmatists understand it. As I think it ought to be understood. And to relegate activism to the realm of citizen "service" is to abandon the legitimate expectations that democratic societies have, that all the professions should contribute to the common good. Again we might disagree with Borgmann about the

extent of our philosophical activism - his (so far) limiting it to expanding the groups devoted to focal things and practices; we pragmatists extending it to the search for all sorts of solutions for technosocial problems (beginning at the local level) - but all of us should recognize the role that activism, of one sort or another, should have, and Dewey says (1948), *has had*, within at least the Western philosophical tradition.

Part Two. *BROADENING PROFESSIONAL ETHICS*

Chapter 4

ETHICS AND NEW TECHNOLOGIES

This essay began as two separate essays for a conference (at the University of Salamanca in 2002), on privacy and other issues associated with our information society. I broadened my focus to include other technologies allegedly demanding a "new ethic." So, as it stands, this chapter can serve as a useful introduction to Part Two, broadening professional ethics in terms of a variety of new technologies in the twenty-first century.

"Imagine discovering a continent so vast that it may have no end to its dimensions . . . Imagine a place where trespassers leave no footprints, where goods can be stolen an infinite number of times and yet remain in the possession of their original owners, where businesses you never heard of can own the history of your personal affairs, where only children feel completely at home, where the physics is that of thought rather than things, and where everyone is as virtual as the shadows in Plato's cave.

"Such a place actually exists, if place is the appropriate word. It consists of electron states, microwaves, magnetic fields, light pulses and thought itself — a wave in the web of our electronic processing and information systems."

-John P. Barlow, *Wired*

I have divided this paper into three parts. The first takes a common focus in discussions of the ethics of new technologies: the claim that new technologies require a "new ethic." For

example, new developments associated with the Internet are so radical that traditional ethical concepts are useless in dealing with them. Part 2 is a transition in which I say, peremptorily, that many of these claims — no matter how popular — are exaggerated if not outright wrong. The upshot of this dismissal of the "novelty" claims is that a host of ethical claims, some old, some new, remain defensible when it comes to dealing with the ethical problems associated with radically new technologies. In part 3, I take this not to be reason for despair but as a counsel for dealing, effectively, with a radically pluralist situation with respect to new technologies. Here I talk about what I think is the most effective way — a way rooted in the ethics of American Pragmatism   — of dealing with conflicting ethical claims (old or new). My thesis in part 3 is that, in every "new technology" case, mere philosophizing — no more than mere "professional ethics" on the part of experts -- will not solve our ethical or social problems. Only activism has a chance of doing so.

Part 1. "New Ethics" Claims

 I try in this part to do justice to claims about a need for "new ethics" related to new technologies: I end up discounting their urgency, but I try to be fair to the authors who make the novelty claims. Such claims range from the very broad — that the new world of the Internet requires a wholesale restructuring of the way large corporations are currently dominating it — to the specific: contemporary computer threats to privacy require rethinking and updating traditional privacy safeguards.

Turning now to "new ethics" claims, the long headnote, above, is a lead selection in one of the leading anthologies on computer ethics; and editors Deborah Johnson and Helen Nissenbaum (1995; see also Johnson, 1994) introduce it this way: "Some have argued that the ethical issues surrounding computers are unique in the sense that computers . . . make traditional ethical concepts and theories inappropriate" (p. 2). Here I want to address claims of this sort, not only for computer and information technologies but also for bioengineering and "political technologies" of environmental protection. Other "hot" technologies might lead to similar claims about the need for a new ethic, but these three seem to me enough for now.

The particular threatened ethical norm I will often use as an example is the protected status of secret, personal, private thoughts, motives, interests, etc., as well as personal information in which such mental (?) objects are concretized.

Lawrence Lessig, a famous legal expert on computer issues in the USA, discusses three different conceptions of privacy. Lessig says:

 The kind of privacy I have spoken of already . . . is only the first of at least three conceptions. . . . The first conception, which we could call the utility conception, seeks to minimize intrusion. We want to be left alone, not interfered with, not troubled. . . . The second conception tracks dignity. Even if a search does not bother you at all, or even if you do not notice the search, this conception of privacy holds that the very idea of a search of your possessions is an offense to your dignity. . . . These two conceptions of privacy, however, are

distinct from a third, which is about neither   preserving dignity nor minimizing intrusion but instead is substantive -- privacy as a way to constrain the power of the state to regulate. . . . On this conception, privacy is a substantive limit on government's power (pp. 146-149 in *Code*, chapter 11).

Lessig is as much concerned with corporations' invasions of privacy as he is with governments', but these definitions would apply to both types — especially in terms of government-sanctioned or government-tolerated corporate acts. (See Agre and Rotenberg, 1997, as one of Lessig's principal sources; also Privacy in the Digital Age, 1999, and Garfinkel, 2000.)

I now turn to a set of claims that the defense of privacy in today's world demands a new ethic; and I begin with this same author.

Example one: Lawrence Lessig's defense of the new versus the old:

Lessig's defense of the view that computerized information management and retrieval demands a "new ethic" is bolstered by his detailed knowledge of the history of "software architectures." (Although he repeatedly says he is no software expert, but only a lawyer, I wish I had the technical knowledge that he does. For a relatively accessible introduction to the history of software design, see Lohr, 2001, and Gelernter, 1998.)

Very early in his book on "the fate of the commons in a connected world" (Lessig, 2001, p. 6), Lessig says:

The struggle against these [damaging] changes is not the traditional struggle between Left and Right or between conservative and liberal. . . . This is not an argument about commerce versus something else. The innovation that I defend [the potential realized in the original Internet] is commercial and noncommercial alike; the arguments I draw upon to defend it are as strongly tied to the Right as to the Left.

Instead, the real struggle at stake now is between old and new. . . . Old versus new. The battle is nothing new. As Machiavelli wrote in *The   Prince*: "Innovation makes enemies of all those who prospered under the old regime, and only lukewarm support is forthcoming from those who would prosper under the new."

Lessig's argument for the new as against the old (in this case, not very old) is based on the idea of "commons" — though he does not agree with Garrett Hardin that commons must involve tragedy (see Hardin, 1968). Lessig claims that, "The debate right now is not about the degree to which free or common resources help. The attitude of the most influential in public policy is that the free, or common, resources provide little or no benefit. There is for us a cultural blindness" (p. 86). Lessig then continues with his defense of the new:

But there is another view: not that property is evil, or that markets are corrupt, or that the

government is the best regime for allocating resources, but that free resources, or resources held in common, sometimes create more wealth and opportunity for society than those same resources held privately.

Lessig tries to clarify his sense of commons (as distinct from Hardin's medieval public grazing ground) by analogy with public roads or a town square. He cites another legal historian, Carol Rose (1986), to the effect that these are cases where "increasing participation enhances the value of the activity rather than diminishing it" (Lessig, 2001, p. 88). It is in a long footnote (number 36 for chapter 5, pp. 288-290) that Lessig tries to demonstrate that this "new" view, of an open-Internet commons, is supported by authors from all parts of the political spectrum.

Here I am not interested in taking a stand, one way or the other, on Lessig's defense of an Internet commons; I am merely highlighting his claim that an old-fashioned left-right political (or moral) spectrum is no longer satisfactory as an approach. We need, to deal with his issue, a new ethic (a new politics, new legal structures). And Lessig makes explicit references to the privacy issue (and his earlier discussion of that issue, in Lessig, 1999, chapters 11 and 12) in the context of his "open code commons" argument (see Lessig, 2001, pp. 133, 140, and 213).

Example two: Richard Spinello's claims about a radical transformation:

Another author, Richard Spinello (1995), this time a computer ethics expert rather than a lawyer, devotes an entire chapter of his introductory textbook on ethical aspects of information technology to privacy in what he calls the "information age." His real focus is what he sees as threats to traditional notions of privacy in technologically advanced societies. Here is Spinello's basic claim: "The fundamental problem illustrated by [certain] . . . cases is that society's assumptions about the proprietary nature of information are undergoing a radical transformation — and often without the participation of those who are directly affected" (Spinello, 1995, p. 117).

The two cases Spinello uses to bolster his argument involve Lotus's attempt to introduce *Marketplace: Households* in 1990, and AT&T's proposal to distribute 800-number directories to selected prospects — for example, directories containing toll-free 800 numbers for travel agencies, airlines, hotels, etc., would be distributed to frequent users of such services. In the *Marketplace* instance, the software that would have been distributed would have allowed small businesses and other local organizations with limited resources to do what big companies do: use data from a major credit bureau to target mailing lists for direct mail campaigns. The AT&T case would require the company to use electronic phone records, normally thought of as off-limits except to police agencies. The *Marketplace* example would simply have extended to small businesses what is already possible for large corporations with access to the same credit bureau data.

On the basis of these and similar cases, Spinello concludes: "The extensive sharing of personal data is a clear example of how the erosion of privacy leads to the diminution of that freedom" (p. 121). Adding other possibilities, such as employer snooping on employees who use computers, he concludes:

According to the European [Economic Community] proposals, known as the Privacy Directive, "corporations using personal data must tell subjects of their use" [requiring either explicit permission to use or an opt-out feature]. . . .European companies would also be required to register all commercial databases with each country in the European Community (pp. 123-124; on the European Community, see Issues, 1998).

Spinello clearly agrees with these novelties, and he ends his conclusion this way: "These and other proposals incorporate principles of data protection that are seen as critical for safeguarding privacy" (p. 124). Personal privacy, here, is an old principle, but Spinello is saying that new principles of data protection are needed to safeguard it.

Example three: Calls for redoubled efforts to deal with the ethical, legal, and social implications of biotechnology:

When the Human Genome Project was begun about ten years ago, the National Human Genome Research Institute was a trendsetter in areas other than science. From the very beginning, supported by the U. S. Congress, a portion of the budget was set aside for a novel program, Ethical, Legal, and Social Implications (ELSI) of the Human Genome Initiative. It was assumed from the outset that the new genetics would give rise to new ethical, legal, and social problems. I feel privileged to have served on several of that body's grant evaluation panels, and I believe it is safe to say that a number of novel problems have turned up — and are beginning to be dealt with in novel ways.

A recent *New York Times* story (25 December 2001), written by a leading science journalist, Nicholas Wade (see Wade, 2001), had the catchy headline, "With Genome Decoded, the Study of Biology Takes a Radical Shift." The story acknowledged that the "Institute has long enlisted ethicists to think about the social and moral impact of genomic advance," but it went on to quote Leon Kass — one of the leaders in the field and chairman of President George W. Bush's new commission on bioethics — to the effect that the ethics of the "genome project might have been inadequately addressed up to now."

Some of the problem areas Wade mentions touch directly on the privacy issue. For example, it was predicted in the Institute conference that was the reason for the *Times* story that in 20 years scientists will be able to identify the genes predisposing to every human disease — with all the issues that raises about individuals being able to control, or at least monitor, what is done with

their genetic information. Similarly, though without specifying a date, it was predicted that an *individual's* genome could be sequenced, raising the privacy stakes to an even higher level.

Ethics textbooks have not adequately kept up with these novelties, but a new textbook is expected out this year ("in time for Fall 2002 classes") which claims to be "the first textbook of its kind." The editors are Richard Sherlock and John Morrey (forthcoming 2002), and some of the papers to be included explicitly address issues of genetics and privacy. For example, Madison Powers, "Privacy and the Control of Genetic Information"; and Rosamond Rhodes, "Genetic Links, Social Ties, Family Bonds." (See also Medical Privacy, 2001.)

So it is clear that many ethicists who keep up with scientific developments in genetics feel sure that the field will generate novel problems that demand novel (even radical?) ethical approaches for their solution — including privacy problems.

Another selection in the forthcoming genetic ethics textbook — Mira Fong, "Genetic Trespassing and Environmental Ethics" — can serve as the transition to my next case for new technologies as requiring a "new ethic."

Example four: Calls for novel approaches to solving environmental problems:

Environmental ethics, as a subfield in philosophy, is hardly new; some of the earliest writings in the field go back over 25 years. But I want to bring that field into our discussion by a sort of back door. Though environmental ethicists often seem to be making very lofty claims and creating pretty abstract theories (see, for example, Callicott, 1999; Katz, 1997; Norton, 1991). I do not think the field would ever have begun apart from the environmental movement — I might even say the environmental crusade — of the past thirty years (and more), not only in the USA but worldwide. Many environmental ethicists have seemed to say — and some have said explicitly (e.g., Naess, 1989; see also Katz, Light, and Rothenberg, 2000) — that unless we radically rethink our environmental values, we have no hope of cleaning up the environmental messes our technological society has produced. That is, many systems of environmental ethics have been proposed as guidelines for environmental remediation technologies — or, in some cases, as recipes to avoid any technological thinking, leaving "wild nature" alone (Katz 1997).

The remediation aspect may not be obvious, but the claim for ever widening ethical principles is absolutely clear in one leading textbook (DesJardins, 1999). I here summarize DesJardins's summary in even briefer terms than he does, but the thrust is clear:

[1] Many environmental issues easily fit within the categories of [pre-1970s] traditional ethics . . . using traditional concepts of responsibility, harm, rights, and duties. . . . *Applied ethics*

helps us . . .apply well-developed ethical theories to environmental issues. . . . [However, 2] some environmental issues do not easily fit within the categories of traditional ethics. . . . [for example], What responsibilities, if any, do present generations have to people living in the distant future? . . . *Ethical extensionism* represents this step beyond the more standard applied ethics model. . . . [3] *Nonanthropocentric ethics* [goes still further and] defends ethical standing for nonhuman living beings. . . . [4] Another important distinction developed out of the growing influence of the science of ecology. . . . Ecological "wholes" [in this view] such as an ecosystem, a species, or a population are more valuable than any particular member of that whole. *Holism* . . . [thus became another dominant view] within environmental ethics. [But 5] some environmental philosophers believe that challenges such as nonanthropocentrism and holism stretch traditional ethical theories beyond the breaking point. . . *Environmental philosophy* . . . [goes farther] including metaphysics . . ., epistemology . . ., aesthetics . . ., as well as ethics and social philosophy.

The thrust is clear: as environmental problems increase, or become better understood, or prove to be intractable on traditional terms, an ever broader set of radically new ethical principles are needed to deal with the problems. Indeed, by the time we get to wholesale "new environmental philosophies," we seem to have left traditional ethics far behind.

With this broad-brush survey of allegedly "new ethics" demanded by new technologies behind us, I want to give one last example in the area of computerized information flow and privacy. It is a problem that seemed to have been solved 10 years ago — technically rather than ethically — but that has re-emerged after the 11 September 2001 terrorist attack on New York City's trade center towers and on the Pentagon.

Example five: The encryption debate, old and new:

I bring in this last example for a special reason. Sometimes an issue arrives on the scene that seems to demand a new ethic. That issue gets "solved." (That is, temporarily resolved in one direction or another: in this case, a consensus seemed to be reached, that regulating encryption was not the right thing to do. See Levy, 2001.) But then the issue arises again, as a new cry for new regulation.

Encryption can be seen as a personal privacy issue, but as it was debated in the 1980s and is being debated again now, it has much more to do with the security of corporate and governmental transactions, especially international transactions (say, of banks, including those involved in money laundering for criminal organizations). (See, among others, Denning, 1999; Electronic Frontier Foundation, 1998; *Cyber Attacks*, 2000; Cybercrime, 2000; CRYPTO, 1999; and International Workshop, 2001.)

In the 1980s, the encryption debate was one of the hottest issues in computer ethics. But Lawrence Lessig, in his book Code (1999), says this about the issue:

The best example [of governmental difficulties with managing software code writing] is the history of encryption. From the very start of the debate over the government's control of encryption, techies have argued that such regulations are silly. Code can always be exported; bits know no borders. So the idea that a law of Congress would control the flow of code was, these people argued, absurd (p. 52; see also Levy, 2001, and *Cyber Attacks*, 2000).

And although the U. S. government did eventually get involved (see *Electronic Communications Privacy Act of 2000*), and former President Bill Clinton strongly backed a "key escrow" system, events seemed to render the proposals outdated before they could really take effect. Foreign competitors produced strong encryption products relatively invulnerable to the keys, and encryption experts may even have joined forces with hackers to show that even the best encryption systems can be broken into.

The proposals were outdated, that is, until 11 September 2001, after which U. S. Senators were ready to back the Bush Administration's Attorney General, John Ashcroft, in seeking legislation that would force foreign companies that sell products in the USA to provide access when — as one Senator, Judd Gregg, put it — "a bad guy or a terrorist" was suspected of using encryption techniques. (See John Schwartz, "Disputes on Electronic Message Encryption Take on New Urgency," *New York Times*, 25 September 2001.)

Lessig says (1999, pp. 52-53) that the needs of commerce had, long ago, indirectly forced corporations to back down under government threats; and groups unlikely to support a "government back door" (e.g., the developers of PGP, Pretty Good Privacy) were designing "corporate back doors" that could, if necessary, be turned into government back doors. And of course now that criminal activities, including those of terrorist groups, are getting headlines suggesting that they might develop highly invulnerable encryption codes, a great many people are demanding that the issue be reopened — and that new regulations should be written and enforced.

This completes my survey of "new ethics" claims. There is, of course, an old philosophical adage, that examples prove nothing. And I am not saying that these examples prove that a "new ethic of new technologies" is needed; I am not even saying that the authors of these claims believe that their case is proven. At this point, all I am saying is that there are many new-ethics claims out there, and we would probably be wise to pay some attention to them. That claim of ethical novelty, it seems to me, is worth discussing, whatever one may make of the claims substantively.

Part 2. Transition

In part 1, I summarized calls for "a new ethic for new technologies." Here I reveal my own bias: such claims, in my view, almost always mask very traditional ethical assumptions. "Social

Ecologists," to choose just one example, seem to me to be simply trying to find new ways of applying old ideas (derived ultimately from Karl Marx) to new environmental problems; and "environmental realists," skeptical about Deep Ecology as well as Social Ecology, are just political moderates who happened to wander into supposedly novel debates about "deep" environmental policy. I will not try to prove this here. I will just assume it. This may seem to be a suspect move in a philosophy paper. But in my opinion the only proof one could bring forward is factual. And as a factual matter, I would maintain that every time I personally have encountered a supposedly novel ethical theory, it has turned out that the defender of the supposedly new view — when critiqued by other philosophers — turns out to be defending one or another view that has been around in philosophical circles for decades, sometimes for centuries or even millennia. I may be cynical, but I believe there is rarely anything really new under the philosophical sun.

Part 3. An Ethic to Deal with This Situation

I will here also assume, without providing its foundations, my own approach to an ethics of technology. Based on the American Pragmatism of John Dewey and the less well known George Herbert Mead, it is an ethics of piecemeal social reform (see Durbin, 1992 and 1997). But my approach is also in line with the thinking of William James, in "The Moral Philosopher and the Moral Life" (1891/1967). There after surveying the bewildering variety of ethical systems available in the late nineteenth century — and finding all of them deficient in one way or another — James says:

> What can [the philosopher] do, then, . . . except to fall back on scepticism and give up the notion of being a philosopher at all?
>
> But do we not already see a perfectly definite path of escape which is open to him [sic] just because he is a philosopher, and not the champion of one particular ideal? Since everything which is demanded is by that fact a good, must not the guiding principle for ethical philosophy (since all demands conjointly cannot be satisfied in this poor world) be simply to satisfy at all times as many demands as we can?
> (James, 1891; see McDermott, 1967, p. 623).

James then goes on to say that is what, in fact, has happened historically, as right-minded citizens (including philosophers with conflicting views) have worked together, in progressive stages, to bring about ever-better social arrangements.

In a recent obituary for the famous Oxford University ethicist, R. M. Hare (1919-2002), in the *New York Times* (17 February 2002), Hare is quoted as saying (in 1992) that, "The only thing that philosophers, as philosophers, can do to help resolve practical issues is to address the arguments that are put forward on the different sides, and try to show which are good and which are bad arguments. . . . Almost everything else that can be done to help resolve the issues can be done better by somebody else." Although Hare did some work in applied ethics, the quotation would presumably represent his gloomy assessment of any and all ethical approaches to

computer technologies, bioengineering, and environmental reforms. It would not have been the assessment of philosophers in the American Pragmatist movement, and I include myself there too. Dewey was a lifelong opponent of "either-or" thinking, and here that would mean opposing the view that solutions come either from philosophers or from technical experts (or those employing them). Dewey believed that solutions to social problems come from the combined activities of many members of the communities involved — including philosophers. For Dewey, philosophers have a responsibility — certainly an opportunity — to move outside of academia, to get involved in real-world problem solving; and they need to abandon any claim to have "the answers" in doing so. They need to work as equals alongside other professionals, but also alongside knowledgeable non-professionals, in searching for answers.

According to Mead (1964, p. 266), a community seeking solutions for its problems in the most intelligent way possible is by definition ethical. No ethicist experts are needed.

More recently, another professed Pragmatist, Richard Rorty, has gained fame by attacking analytical philosophers as not only detached but irrelevant. As long as this was Rorty's only message, I had my doubts about his claim to be a follower of Dewey the activist. But finally, in a recent book, *Achieving Our Country: Leftist Thought in Twentieth-Century America* (1998), Rorty has explicitly acknowledged the need for activism and for piecemeal social reform — really, reforms (plural), content-specific and policy-specific "campaigns" rather than "movements." Here the campaigns we are concerned about have to do with privacy protection in the age of computers and genetics, as well as cases I find to be similar — environmental protection and the encryption issue as it relates to "the war on terrorism" after 11 September 2001.

My thesis here in part 3 is this: In every case, mere philosophizing, no more than mere technical professionalism on the part of the experts, will not solve our ethical (read social) problems; only activism has a chance of doing so.

I will not attempt a defense of this thesis any more than I have defended my view that there is rarely if ever anything genuinely new under the sun in philosophy. I will just show how my thesis might unfold within the framework of the five examples I listed in part 1. To begin, I will combine two examples, Lawrence Lessig on open code and Richard Spinello on threats in the computer age to personal privacy.

Examples one and two: computers and privacy:

Spinello's *Ethical Aspects of Information Technology* (1995) shares many features with Deborah Johnson's *Computer Ethics* (2nd ed., 1994). About ten years ago (Durbin, 1992), I took Johnson to task for claiming that, "Engineers do not have special social responsibilities as engineers, but they do have responsibilities as persons." And I argued, in particular (chapter 8), for the claim that computer professionals ought to go further than just shouldering their professional responsibilities. Here (Johnson, 1994) admits that, at times, a particular issue "cannot be dealt with fully at the societal level [say, of laws or regulatory policy] but, rather, requires responsible behavior on the part of . . . those who understand and work with computers." And my response was to say that exercising responsibility, for computer professionals, can

sometimes require more than technical professional responsibility; it might, for example, require them (or at least invite them) to share in the activist work of groups such as Computer Professionals for Social Responsibility or physicist dissenters who refused (some still refuse) to work on projects such as so-called Strategic Defense (anti-missile) programs.

Spinello displays as much concern as Johnson about ethical responsibilities of computer professionals to protect such civil liberties as privacy protection in computer usage; he even endorses — as we saw in part 1 — the European community's privacy protection regulations. But he seems no readier then Johnson to say that computer professionals must protect privacy — much less that they must become actively involved with groups fighting to do so.

Lawrence Lessig, in his discussions of privacy protection in *Code* (1999, chapters 11 and 12) or of open code for the Internet (2001), might seem to be a different story. In describing himself, Lessig says, "As fits my profession (I'm a lawyer), my contribution is more long-winded, more obscure, more technical, and more obtuse" than the computer experts he admires (1999, p. xi). And then he goes a step further: "But I am also a teacher. If my writing produces angry reactions, then it might also effect a more balanced reflection."

I will call this Lessig One. He could be viewed as saying that the role of the lawyer — or ethicist in our case — in discussing such issues as computers and privacy is to write books, to provoke discussion, to be a teacher, whether publicly or in the classroom.

But Lessig may also go further. On the next page (p. xii), he adds: "This is not a field where one learns by living in libraries. I have learned everything I know from the conversations I have had, or watched, with an extraordinary community of academics and activists, who have been struggling over the last five years both to understand what cyberspace is and *to make it better*." (Italics added.) And Lessig names some of the activist groups: the Center for Democracy and Technology, the Electronic Frontier Foundation, and the American Civil Liberties Union. In his book on open code (2001, p. viii), Lessig adds to the list: the Center for Public Domain and the Consumers Union. And he also says a few things about his involvement, as a lawyer, in the Microsoft antitrust case.

I will call this Lessig Two, and my activist approach to the ethics of technology tells me that this is the Lessig I ought to admire most. To do something about our ethical concerns about computers and privacy, we must get involved.

Example three: Genetics and privacy:

Lessig, in one of his activist ventures, is involved with huge and powerful institutions: the U. S. Government and Microsoft Corporation. In his second book (2001), on open code, he is in effect taking on equally huge and powerful institutions, the major media enterprises which are attempting to control the Internet as they have all other aspects of communications, from book and magazine publishing to music and film and TV production and distribution. The same kinds of large-scale enterprises are players in the genetics and privacy issue: from governments,

including the military and intelligence networks to criminal justice systems and prisons, to huge financial enterprises, from banks to insurance companies to large corporate employers. These are "the big bad guys" who have the potential to use genetic information to the disadvantage, if not actual harm, of individual citizens and particular groups in society.

Accordingly, the stakes are as high here as in the computer case(s), and we need to think just as carefully about whether or not, and to what extent, ethical concerns can have an impact.

As I said in part 1, there are only a limited number of books — for example, textbooks — on the issue of genetic ethics. (See, as my one example, Sherlock and Morrey, forthcoming 2002.) On the other hand the Ethical, Legal, and Social Impacts program of the Human Genome Initiative has published a series of bibliographies with the intent of making available to the public everything published in connection with the program or even related to it. Unfortunately, only a limited number of the references there are to ethics issues, and even fewer to works by philosophers.

For comparison purposes, I want here to reference a textbook on a narrower topic. It is Michael C. Brannigan, ed., *Ethical Issues in Human Cloning* (2001). Brannigan echoes some of the "new ethic" rhetoric — he talks about "a critical crossroads" for human beings, and says cloning "may pose the ultimate challenge to our notions of family" (p. 3) — but what is most remarkable about the book is that it brings together a very traditional spectrum of philosophical and religious reactions to the possibility of cloning humans (whole humans or only parts). Even in a section supposedly devoted to the science of cloning, Brannigan includes a contribution by a religion-based opponent of cloning, Leon R. Kass — who happens to be President George W. Bush's choice to head a new U. S. Commission on Bioethics. When it comes to his explicit section, Perspectives from Religion, Brannigan includes a liberal Roman Catholic theologian; a less liberal Lutheran theologian; two African-Americans worried about racist implications; a fairly conservative Jewish spokesperson; an openly conservative representative of Eastern Orthodoxy; a representative of a Muslim Public Affairs Council; a Native American; a Buddhist who favors cloning; a Hindu scholar who is ambivalent; and two scientists, one of whom pays at least lip service to religious objections and another who does not. In short, whatever demands for a "new ethic" may be forthcoming, the issue of cloning humans brings forth all the old points of view on what is or is not morally right.

On this issue, R. M. Hare, in spite of his claims about philosophers not having answers on concrete issues, has spoken out on bioethics issues (Hare, 1989), and his views are echoed by a number of other British analytical philosophers — equally conservative — on cloning and other issues of reproductive rights. (See Institute of Medical Ethics, 1991; and Nowell-Smith, 1989.)

At the religious/philosophical pole opposite to that of Brannigan, cited earlier, stands Glenn McGee's *Pragmatic Bioethics* textbook (1999). There McGee himself discusses "genetic enhancement of families," and comes to the conclusion that "eugenic selection is already present in social engineering," and this represents a danger to democracy: "It may be engineering that benefits only the powerful and wealthy" (McGee, 1999, p. 180). But he also includes a selection by Herman Saatkamp, on "genetics and pragmatism," that makes this claim.

Pragmatism suggests that parents (1) should not be bound by ideological approaches to parenting or to moral decisions, (2) should get genetic information and wisely use it in shaping their lives and that of their children, and (3) should accept responsibility not only for wisely using the new genetics, but also for shaping our society and environment so that future generations may flourish (p. 163).

The question, for me, is whether either Saatkamp or McGee would take that further step, turning their Pragmatist energies to support for a campaign to see their Pragmatist views turned into public policies. McGee, at least, works in an institute at the University of Pennsylvania that would afford him that opportunity.

One philosopher of genetics in the USA has taken his concerns to the public arena. I have in mind Sheldon Krimsky; see his Genetic Alchemy (1982) and Biotechnics and Society (1991) — but it is his work, over a decade or so, on the U. S. National Institutes of Health Recombinant DNA Advisory Committee and the U. S. Congress's Office of Technology Assessment project, New Developments in Biotechnology, that I admire. And he had prepared for this activist work in Cambridge, Massachusetts, with the earliest attempts to regulate recombinant DNA research.

Example four: Environmental problem solving:

I need to introduce this section by pausing, for a moment, to justify my inclusion of environmental ethics in a list of supposed "new ethics" for new technologies. As I hinted in part 1, but did not spell out, my reason has to do with what we mean by technologies in the phrase "new technologies." Some uncritical commentators on computer and information technologies, or on genetic technologies, speak as if the "technologies" in question were simply new tools or gadgets or techniques that, all by themselves, raise ethical concerns. But as Lessig's discussions of computers and privacy clearly show, "when we talk about computers" (and the phrase "information systems" shows even more clearly), what we should be talking about is social systems as much as technical systems; both producers, such as software designers, and users; and the corporations and government agencies involved; and the list could go on. If authors in the social studies of science and technology school (e.g., Bijker and Law, 1992) have shown us nothing else, it is clear that "technology" ought to mean "technosocial systems" (often more chaotic than the word "system" might suggest). In this sense, efforts to meliorate environmental problems — from simple reforestation to whole systems of forest management and forest protection — surely count as technosocial. And I would say this is true even in cases of wilderness preservation; society has impacted wild areas to such a degree that efforts to hold back this relentless onslaught also require technologies in this technosocial sense.

I can be fairly brief in my discussion here, if one accepts this framework for discussion. There seem to me to be, in environmental ethics discussions, authors who would limit the role of

philosophy to that of writing professional-level articles and books; I have documented the attitude, citing Eugene Hargrove, founder of the journal, *Environmental Ethics*, in my *Social Responsibility* book (1992, chapter 10). At a recent Society for Philosophy and Technology conference (Aberdeen, Scotland, 2001), I even chided my good friend and fellow Pragmatist, Larry Hickman (see his 1999), for getting pulled too easily into abstract theorizing about environmental ethics (see Durbin, forthcoming). (Hickman, of course, denied it, and I respect him for his lifelong activism.) Finally, I would say — because I try to do it (see Durbin, 2002) — that it is possible to be completely Deweyan in terms of "both-and" with respect to environmental philosophy and environmental activism. Where I have been doing my activist work is with people trying to save the incredibly rich biodiversity of Costa Rica's rainforests — ironically, by helping poor people directly, and the forest indirectly (see Durbin, forthcoming 2002).

Another example is Andrew Light, current president of the Society for Philosophy and Technology. He can debate environmental philosophy with the best of the breed (see Katz, Light, and Rothenberg, 2000); but he has also written about *Environmental Pragmatism* (1996, with Eric Katz); and he is even actively involved with ecological restoration efforts in and around U. S. cities (see his contributions to Gobster and Hull, 2000).

Example five: Encryption and the war on terrorism:

I save this example for last because it raises the most serious objections to the activist ethics of American Pragmatism. In our country, citizens after 11 September 2001 are expected to support President Bush's "war on terrorism," no questions asked. If the U.S. Senate proposes new laws to prevent terrorists (and other criminals) from using new encryption techniques to make their messages invulnerable to U.S. (and other governments') spying, citizens are expected to applaud this effort to intercept terrorist attacks before they take place. And, in this context, a computer professional who provides such encryption techniques to "the enemy" might well be prosecuted, convicted, and end up serving many years in prison.

In such a climate, what is a civil-libertarian or a pacifist — John Dewey was a prominent early member of the American Civil Liberties Union, an organization with which I am also affiliated — to do? Although they are somewhat timid about it, some civil-libertarians and their sympathizers are actively resisting some of President Bush's proposals for limiting the civil rights of Afghani, especially Taliban, soldiers who have been captured, as well as of Middle Eastern-background persons suspected of aiding the 11 September attackers or plotting new terrorist attacks within the United States or worldwide. For the most part, these politicians and their supporters are not likely to suffer — but they are also not likely to succeed in their efforts to keep anti-civil-liberties legislation and presidential directives off the books.

On the other hand, as mentioned, some computer professionals may well be prosecuted if they are not careful about work that might "aid the enemy." What would a Lawrence Lessig, with his appeals for open code — and the activist groups with which he identifies himself — what would they do in such a case? What would a believer in the ethics of American Pragmatism do? That is our problem for the moment.

The first thing to note is that, when a "progressive" activist, like Dewey or myself, invites others to be activists as well, he or she had better be prepared for some of these other activists to represent opposing views — even views that, in his or her opinion, are anti-democratic or authoritarian.

To this possibility (inevitability?), the Pragmatist's reaction ought to be one of tolerance toward these opposing views. (Dewey often was not tolerant of his opponents, especially religious conservatives who opposed his progressive-education proposals.) A committed adherent of open democracy needs to be genuinely committed to open debate, to strong partisan attacks in political venues. But he or she can still hope that democratic values will, in the long run, prevail over anti-democratic values — even though, on particular issues at particular times, the progressives may lose in their campaigns.

Some issues, however, seem to push such openness and tolerance to the breaking point — and war is clearly one of them. James Campbell (1992) is the best exponent I know of with respect to G. H. Mead's thoughts on the problem. He first talks about Mead's emphasis on "social fusion" — where "the independent self really does disappear. In social fusion we have a process of breaking down the walls so that the individual is a brother of everyone" (Campbell, 1992, p. 246). And Campbell cites several statements of Mead about warfare as an extreme example: "The likelihood of social fusion in any community is enhanced by the existence . . . of an external enemy. Such warfare can make 'the good of the community the supreme good of the individual.' . . . In social fusion brought about by hostility toward the common enemy 'individual differences are obliterated'" (p. 246).

Campbell goes on to show that Mead thinks it is possible -- indeed it is highly desirable -- to develop, even in times of extreme social solidarity such as during a war, a counter attitude: "This kind of 'rational' politics would entail the acceptance by society of a high level of ongoing creative tension in the place of . . . fusion" (Campbell, 1992, p. 248). But neither Campbell nor Mead thinks this is easy, or even likely in wartime.

And this was the experience of Mead before and during World War I, as Andrew Feffer (1993) shows in a critical study. Feffer says first, that, "Until 1917, Mead doggedly argued for the United States to maintain a neutral 'internationalist' position, a foreign policy that he believed embodied the same reciprocity as found in his social psychology" (Feffer, 1993, p. 257). However,

> Support for Mead's position in the reform community [of Chicago] . . . did not last long. The City Club, representing informed opinion in Chicago's professional and business middle class, at first tried to maintain its official impartiality. . . . [But] impartiality melted away as American liberals and socialists . . . rallied behind the emerging war effort in 1917 (p. 257).

And:

By 1917 the notions of reciprocity and cooperation Mead used to criticize the war became the [same] reasons he and his pragmatist colleagues cited for entering it. Having declared himself for Wilsonian internationalism, Mead found it difficult to dissociate himself from [President Woodrow] Wilson's evangelical military quest for world peace (p. 258).

So, "even though they had long considered patriotism primitive and impulsive, Mead and his colleagues joined the ranks of the patriots" (ibid.) — and, "Thereafter, Mead threw himself wholeheartedly into the war effort" (p. 259).

Much the same thing happened to John Dewey on the national stage, as another critic, Robert Westbrook (1991), has noted. Just before World War I, Dewey had taken on "the larger task of public education" (p. 193), especially as a regular columnist in the weekly magazine, the *New Republic*. And it was there that he "placed himself squarely in the center of the arena of the concrete as he struggled to bring his democratic theory to bear on the politics of World War I" (p. 195). Although, "This struggle led him from support of American intervention in the war and Woodrow Wilson's 'new diplomacy' to a critical postwar appraisal of American foreign policy and a leading role in the Outlawing of War movement in the 1920s" (ibid.) — even so, this does not eliminate the earlier "support of American intervention."

The whole situation here is very complicated, and obviously World War I was a long time ago. But these highlights of the two stories — of Mead among progressives in Chicago and Dewey nationally — can help us, today, to see the second main objection to Pragmatism as an ethical approach. It has, its critics say, no principles. Depending on shifting political winds, its proposed "solutions" also shift — even contradict other supposed solutions within a single decade. What kind of ethics of technology is it that can bend so easily to circumstances? What hope of support could our encryption experts have, if hounded by the government, from such a fickle quarter?

Dewey did once (at least once) say that Pragmatism has only one overriding principle: the growth of democracy. That has been interpreted, by his followers and allies since, to mean a constant expansion of democratic rights to groups left out of America's mainstream — and other mainstreams: "minorities" generally, but as some examples, women, blacks, nowadays homosexuals. But Dewey's real stance, on principles, was to treat all of them as no more than instruments in the search for solutions of social problems (a search that is, according to Mead, "by definition" ethical, as long as it is "progressive").

How can this approach help us in the solution of social problems such as excessive "social fusion" (Mead) in times of war? Mead and Dewey came to regret their World War I militarism (even a militarism aimed, with President Wilson, at eliminating war), and what I think they should have done, at the time, was to pay more attention to their openness and tolerance views — even if they would say that those views, all the while, are only "instrumental." Even "instrumental" principles can be the source of a stand against over-zealous "defenders of the country." I cannot say that I would have had the courage of these convictions if I had been in Mead's and Dewey's shoes, in their situation in 1917; but I can say that, today, if the government were to try to clamp down too forcibly on certain encryption experts accused of "aiding the

enemy," I would hope that I would have the courage to stand up for civil liberties. (For some other discussions of the ethics of the war on terrorism, see Lichtenberg, 2001; they are to be found in the very useful *Philosophy & Public Policy Quarterly* of the Institute for Philosophy and Public Policy at the University of Maryland.)

Conclusion

I have not meant, here, to disparage other approaches to the ethics of new technologies. I do more than tolerate; I admire fellow philosophers who attempt to devise principled ethical systems — for technologies as well as other features of modern life. Indeed, I assume that attempts to provide novel treatments of ethical issues associated with computers, genetics, environmental regulation, and many other novel or emerging technologies will continue to be made. I would even encourage their proliferation. Neither do I expect all ethicists of technology (technologies) to be activists. Some will surely see their role as limited to teaching or the writing of books and articles. Some may hope that their teachings and writings have an influence on policy makers. But, while not disparaging these efforts, as always my appeal is to do more — to get out there and work for the reforms you believe in. And with Dewey I believe in "both-and" (rather than "either-or"): I think it is possible to be both a responsible philosopher and a philosophical activist — though not without conflict between the roles, to be sure.

Chapter 5

TOWARD A PHILOSOPHY OF BIOTECHNOLOGY: AN ESSAY

This essay - which is being considered for publication (finally) in Ludus Vitalis *in 2010 - has a checkered history; it was originally written for a panel at the World Congress of Philosophy in 2003, but the panel was cancelled when one member died and another could not attend the conference. I offered to do a brief summary for the SPT international conference at Delft in 2005, and did so, but the summary was not included in the proceedings. I then sent the full paper to* Ludus Vitalis, *where it has been on hold until recently. Here it takes its place as the first concrete example of what the previous chapter suggests: extending philosophical reflection to particular new technologies - while at the same time inviting those who do so to go beyond theory alone to get involved with activism on the issues involved.*

A sharp-eyed critic might say that this chapter is out of sequence. The chapter that follows is an introduction to multiple facets of philosophy and engineering, which, surely, should include bioengineering or biotechnology as one facet. But as I say in introducing that chapter, that essay

is the introductory part of a set that includes several related essays. So, somewhat arbitrarily, I decided to put this essay before the multiple facets chapterand those related to it.

Introduction

It is not only the recent (see *New York Times*, April 15, 2003) virtual completion of the ambitious Human Genome Project — ahead of schedule and under budget — that makes biotechnology in all its facets a hot topic. Everyone who reads popular science at any level knows something about Dolly the cloned sheep; they might even know that Dolly died not long ago — and has been duly enshrined in her native Scotland (*New York Times*, February 15, 2003). Many also know about controversies over genetically-altered foods — so-called "frankenfoods" — and resistance to their introduction into some countries, especially in Europe. And the story goes on, sometimes with praise for biotechnology or bioengineering as the only hope for starving people in underdeveloped countries, but more often with blame for crossing a threshold that humans (scientists) ought not pass (or something similar) — almost always in a tone of high dudgeon.

In this chapter I try to sketch out the beginnings of a philosophy of *biotechnology*. First I summarize efforts to date on the topic. There are a number of preliminary efforts, from a variety of what I consider limited perspectives. I then turn to some other beginnings within the philosophy of technology, to which contributions I hope to make some additions.

A. Philosophical Work to Date

Philosophers, historically, have attempted to tone down heated discourse of the kind that bedevils public discourse on biotechnology; we philosophers try to introduce the voice of reason. To some extent that has been true already, and before anything else here I will do a brief survey of the literature that is currently available under a "philosophy of biotechnology" heading. But, to be truthful, there has not been as much work done on the topic as one might expect. Here is a summary of some of what has been done.

1. Ethics:

As one should expect, the bulk of the literature so far falls within the range of ethical concerns, broadly construed — in line with the shrill complaints about genetic engineering and other aspects of biotechnology. One of the earliest attempts by a philosopher — an analytical philosopher in this case — to be balanced in his approach was that of Jonathan Glover, in his *What Sort of People Should ThereBe?*(1984); there Glover gives a cautious green light to some sorts of genetic engineering.

At about the same time, a Heideggerian, Wolfgang Schirmacher (1987) offered his reflections on the early debate in Germany; Schirmacher's endorsement was even more positive, arguing that we have a responsibility to use genetic manipulations to improve human behavior, so often less than moral up to now.

In our library at the University of Delaware, moreover, I have found at least four books with "genethics" or a variant in their titles:

-- David Heyd, *Genethics: Moral Issues in the Creation of People*(1992);
-- Kurt Bayertz, *GenEthics: Technological Intervention in Human Reproduction as a Philosophical Problem*(1994); reflects the same German debates as Schirmacher;
-- David T. Suzuki, *Genethics: The Clash between the New Genetics and Human Values* (1989); more critical; and
-- David T. Suzuki, *Genethics: The Ethics of Creating Life*(1988).

Nor does this exhaust the list. There are at least two collections with similar titles:

-- Justine Burley and John Harris, *A Companion to Genethics*(2002); contributions mostly by philosophers; and
-- M. Khoury, W. Burke, and E. Thomson, eds., *Genetics and Public Health in the 21st Century: Using Genetic Information to Improve Health and Prevent Disease* (2000); mostly non-philosophers and mostly optimistic.

In addition (and finally, because my intent is not to be exhaustive), there are two textbooks on related subjects:

-- Michael Boylan and Kevin E. Brown, *Genetic Engineering: Science and Ethics on the New Frontier* (2001); and
-- Michael C. Brannigan, *Ethical Issues in Human Cloning: Cross-Disciplinary Perspectives*(2001), which includes an interesting range of perspectives from religious ethicists.

2. Politics:

Many things have been written about the politics of various aspects of genetics, including the exporting of genetically modified foods and seeds to various countries. But one philosopher has had the field all to himself in providing balanced, judicious assessments of all aspects of biotechnology.

That philosopher is Sheldon Krimsky; see the following books:

-- *Genetic Alchemy: The Social History of the Recombinant DNA Controversy* (1982);
-- *Biotechnics and Society: The Rise of Industrial Genetics*(1991); and
-- *Agricultural Biotechnology and the Environment: Science, Policy, and Social Issues* (1996).

3. Philosophy of Biological Science:

For the most part, philosophers of biology — though that subfield is flourishing — have had little to say about biotechnology. On the other hand, they have had much to say about genetics,

where one big issue has been whether genetic explanations are (wrongly) reductionistic.

The basic science (accessible to an intelligent lay reader) can be found in Michel Morange, *The Misunderstood Gene*(2001). Morange is not a philosopher but a biologist and historian of science; however, his treatment of genetics is judicious and balanced enough to satisfy any philosopher. He also, conveniently, has authored a *History of MolecularBiology*(1998).

The basic reductionist text is Richard Dawkins's *The Selfish Gene*(1989). Kim Sterelny, *Dawkins vs.Gould*(2001), summarizes one controversy. And Richard Lewontin, in *It Ain't Necessarily So: TheDream of the Human Genome and Other Illusions*(2000a), and *The Triple Helix:Gene, Organism, and Environment*(2000b), provides the best-known anti-reductionist counterpoint.

Many traditional philosophers of science, including philosophers of biology, are critical of social-constructivist interpretations of the sciences, including the biomedical sciences.The major social constructivist who has worked closely with biological research communities and provided detailed quasi-anthropological accounts of what goes on there is Karin Knorr-Cetina, beginning with her *The Manufacture of Knowledge*(1981), but continuing in such studies as "Image Dissection in Natural Scientific Inquiry" (1990, with Klaus Amann). Knorr-Cetina's work neither takes sides in the reductionism controversy nor deals directly with biotechnology, but it could support the claim that much of what passes for pure science in biology is closely akin to goal-directed biotechnology as found in Krimsky's industrial genetics labs (above).

B. Philosophy of Biotechnology Proper?

At last we come to the main point of this project. One of the reasons why traditional philosophers of biology have little to say about biotechnology beyond the issue of genetic reductionism is that they often buy into (at least implicitly) the notion of biotechnology as simply applied biology.

1. Biotechnology as Applied Medical Science:

The philosopher who has identified technology (in general) with applied science is Mario Bunge, and he has spelled out this approach to biotechnology explicitly in his magnum opus, *Treatise on BasicPhilosophy*(multivolume, each volume with a different date, beginning in 1983; the material on biotechnology is in volume 7, 1985, pp. 246ff.).

Bunge begins: "This section deals with biotechnology" (p. 246), and it becomes obvious very quickly what Bunge's approach is, as he says next, "Iatrophilosophy, or the philosophy of medicine . . ." — where he identifies philosophy of biotechnology with philosophy of medicine.

Unfortunately, according to Bunge, not much "serious iatrophilosophy" has been published yet, so there is "much that analytically oriented philosophers could do to prepare the terrain" (p. 246).

Bunge continues: "Medicine [recently tapping biology in general and molecular biology in particular] . . . is now on the right track, though it has a long way to go before attaining the rigor and effectiveness of engineering" (p. 246).

For Bunge, "Therapeutics [is] a branch of biotechnology" (p. 248). And he provides what for him is a telling example: "Once . . . a [biochemical] mechanism [of a pathogen] has been unveiled, the technical problem of designing drugs inhibiting the pathogen can be posed in precise terms" (p. 249). So medicine can become a science, and medical cures are straightforward "engineering" applications of that science.

If this seems too narrow and deterministic, Bunge admits that, "Over the past decades, medicine has gradually . . . adopted the systemic model of man as a biopsychosocial entity" (p. 249) — so the range of medical sciences to be applied in bioengineering and biotechnology has been broadened considerably. But whatever the branch of medical science and therapeutics as straightforward bioengineering, the model is the same: science applied equals engineering or technology. For more detail, see Martin Mahner (with Bunge), in *Foundations of Biophilosophy*(1997).

2. Critics of the Application Model:

Historians of science and technology, for more than twenty years, have attacked the notion that technology (or engineering) is simply applied science; see, for example, Edwin Layton, "A Historical Definition of Engineering" (1991, where Layton summarizes his own previous work and that of other historians). But I am not aware that any of them have challenged Bunge on biotechnology.

Philosophers have similarly challenged the applied science model. For example, in the same volume in which Layton's historical critique appears, philosopher Steven Goldman (1991) argues that the nature of engineering has been obscured by both scientists and engineers (along with managers and the public), who think along the lines laid out by Bunge. By cloaking their work in the mantle of praise for science — nearly always adding "for the public good" — engineers and their defenders, according to Goldman, are able effectively to mask the "social determinants of technological action" that actually drive modern engineering at every level, including the level of what counts as engineering knowledge. Using example after example of how engineering decision makers almost never pursue the "technical best," deferring instead to managerial decisions about what to pursue and how far, Goldman concludes:

"Engineering thus poses a new set of epistemological problems deriving from a rationality that is different from that of science. The rationality of engineering involves volition, is necessarily uncertain, transient and nonunique, and is explicitly valuational and arbitrary. Engineering also poses a distinctive set of metaphysical problems. The judgment that engineering solutions 'work' is a social judgment, so that sociological factors must be brought directly into engineering epistemology and ontology" (Goldman, 1991, p. 140).

In my long experience working with engineers, industrial chemists, and others in science-

based industry, this is not going to come as any surprise. On the other hand, these "captive" experts tend to see nothing wrong with the "applied science" model. Goldman attributes this to a kind of cultural blindness: "The purported value neutrality of the technical is an ideologically motivated stratagem." (Goldman says engineers voluntarily go along with their managers, with whom, on this point at least, they share the ideology.) "It serves," Goldman goes on, "to insulate from criticism the social factors determining technological action" (p. 141).

Goldman's conclusion is controversial, but it seems to me that both critics and defenders of engineering agree on the "captivity" of engineering practice. Defenders seem to claim that engineering, freed of its constraints, could be more objective — this is clearly Bunge's hope. Critics like Goldman say, instead, that we have to judge engineering — even engineering's epistemology or knowledge claims — not by what it might be, but as it is in the real world.

None of Goldman's examples has anything to do with biotechnology, but I have a really good example that does. The University of Delaware has recently joined with an industrial joint venture to create the Delaware Biotechnology Institute. About this, the president of the University says that, "This century is going to be the century of biology. We are on the verge of something very, very important in the whole history of mankind." For purposes of supporting DBI, the State of Delaware defines biotechnology ventures as including: "Any company that makes medical devices, analytical equipment, laboratory service providers, the entire pharmaceutical industry and businesses that focus on crop protection and the development of bio-based materials." And according to Delaware's governor, all of this represents "the next evolution of Delaware's science-based growth." Finally, the director of DBI says it "seeks academic researchers who are comfortable in an institute that promotes commercial scientific applications." (All these quotes come from an article by reporter Michael Sigman, "Bio-Feedback: Biotechnology is the wave of the future, and Delaware is riding the crest," *Delaware Today*, November 2002, pp. 73ff.)

It would be hard to imagine a better description of "captive biotechnology," similar to Goldman's "captive engineering."

3. An Engineer's Philosophy:

Because I think engineering is a key component of any adequate philosophy of technology (see Durbin, 1991, introduction), I pause for a moment to consider the philosophizing of an engineer, Billy Vaughn Koen (1985, 1991, 2003), who believes both that engineering has been almost totally ignored by philosophers and that he has captured the essentials of the engineering method. It also happens that, in his latest book (2003) — which ambitiously turns his engineering method into the universal method of human problem solving — Koen also includes a brief comment on the current state of bioengineering.

The essence of the engineering method that Koen thinks he has discovered can be summarized briefly (too briefly?) under two headings: heuristics, and "sota" or state of the art. Koen concludes: "My Rule of Engineering is in every instance to choose the [always fallible] heuristic from what my personal sota takes to be the engineering sota at the time I am required to choose"

(Koen, 1991, p. 57). And: "If . . . all engineers in all cultures and all ages are considered, the overlap [among their sotas] would contain those heuristics absolutely essential to define a person as an engineer" (p. 58).

Koen has little use for definitions like that of Bunge, that engineering is applied science — though he readily admits that engineers' sotas do include scientific knowledge. Nor does Koen agree wholeheartedly with Goldman's anti-Bunge "captive engineering" view, though he does emphasize that the state of the art in any engineering project clearly must include managerial and other non-engineers' constraints (including public and political input). What Koen wants us to see is that good (he would even say the best) engineering practice always contains the fallibility of heuristics (he thinks unlike science), but it is also always bound by best practices of the time, the sota or state of the art.

I mentioned that Koen is willing to go far out on a weak branch to generalize: "The responsibility of each human as engineer [is] clear. Everyone in society should develop, learn, discover, create, and invent the most effective and beneficial heuristics. In the end, the engineering method is related in fundamental ways to human problem solving at its best" (Koen, 1991, p. 59). And Koen's latest book, *Discussion of the Method*(2003), attempts to turn this generalization into the universal method of human problem solving, following in a long line of philosophers (and others) who have attempted to discover such a universal method. All of that, however, is far from my focus here.

What is relevant is Koen's few comments (2003, p. 249) that apply his universal method to an assessment of the state of the art today in bioengineering:

"Both behavioral and genetic engineers recognize that they want change in a highly complex, unknown system and, not surprisingly, instinctively appropriate the title engineer. Saying you are an engineer, however, doesn't necessarily mean that you are a very good one" (Koen, 2003, p. 249).

What is the source of Koen's skepticism with respect to genetic (and behavioral) engineering? He goes on:

"The present state of the art of both the behavioral and genetic engineer contains the appropriate heuristics for behavioral modification, but few of the heuristics of engineering. . . . Neither has the slightest notion of the importance of making small changes in the sota, attacking the weak link, or allowing a chance to retreat" (p. 249).

This is a serious indictment of genetic (and behavioral) engineering, as currently practiced, and here it comes from an engineer/philosopher, not from one of the public critics of bioengineering and biotechnology.

4. Bioengineering Sciences and Biotechnology:

A third step toward a philosophy of biotechnology was suggested to me by one of my doctoral

students, now a postdoctoral colleague. Ana Cuevas Badallo, in her ambitious doctoral thesis (2000), discussed the role of the so-called engineering sciences in a new philosophy of technology that would be more adequate than any offered so far. After listing more than a dozen engineering sciences, classical and modern, she chose to focus on the most traditional, so-called Strength of Materials. But her basic list (Cuevas Badallo, 2000, pp. 79-80), a very standard list in engineering education, extended from strength of materials to aeronautic engineering, systems of control, management as a part of engineering, and — our focus here — bioengineering and genetic engineering. And she ends her thesis this way:

"Here I have analyzed only one theory among the engineering sciences, so the future is open to see if the proposed characterization is correct in relation to other cases — a task beyond our present scope. The conceptual framework presented here needs to be refined through studies of other engineering sciences and their relationships to other natural sciences, to mathematical sciences, and even to the social sciences" (p. 372; my translation).

In the remainder of this paper, I attempt, among other things, to see whether Cuevas Badallo's framework would hold up in a philosophy of biotechnology that might be elaborated along her lines.

Cuevas Badallo's argument is simultaneously simple and complex. The simplicity is to be found in a schema she borrows from Miguel Angel Quintanilla (1996; in this respect, he does not depart far from Bunge's line of argumentation). According to Quintanilla, knowledge of any kind must fall into one of four categories: tacit practical, explicit practical, tacit descriptive, or explicit descriptive. (The original Spanish has *operacional* and *representacional*, and Bunge sometimes uses English transliterations of those terms; but standard lingo in English-language philosophy of science — which, recall, almost never talks about the engineering sciences — is closer to "practical" and "descriptive," even when it implicitly accepts Bunge's applied science model.)

The complexity comes in a careful analysis of strength of materials as a set of engineering sciences going all the way back to Galileo at the beginning of modern science. From the beginning, "engineering" sciences (long before engineering was recognized as a separate cognitive enterprise) for purposes of designing fortifications, bridges, and similar structures had to adapt the laws of mechanics to suit practical purposes: "The engineering sciences [here, strength of materials] are permitted certain simplifications and abstractions which, from the point of view of the natural sciences [here, the laws of mechanics], would be unacceptable."

Cuevas Badallo draws the following conclusions about the epistemological character of such engineering sciences as the (formulas of) strength of materials: they are simultaneously both practical — they are related to specific engineering goals — and descriptive: strength of materials equations share with the laws of mechanics (from which they cannot be derived by any process of application) the character of being laws of nature or descriptions of the world (here the practical world) as it is. (She acknowledges Goldman's "captive knowledge" formulation, but she is attempting to characterize more precisely what he is getting at, using specific examples of theoretical-practical formulas used everyday, successfully, by engineers.)

Are there engineering sciences (not unlike cookbook formulas, but at a higher theoretical level) in biotechnology? Cuevas Badallo does not say, but her conclusion (above) hints that her thesis might be applicable (?) in that area of engineering every bit as much as in structural engineering.

To support this hint, I refer to four crucial discoveries in genetic engineering: cutting DNA strands using restriction enzymes; recombining them; proliferation of useful genetic materials through polymerase chain reactions; and so-called "knockout" or gene inactivation studies for the purpose of determining gene activities in a precise way. All of these discoveries are complex and have led to what outsiders might view as cookbook formulas somewhat parallel to strength of materials equations, but it is interesting that people have been awarded major science prizes for their discovery, however inseparable the discoveries are from practical goals. I make no claim to being a bioengineering or biotechnology expert, but those who are refer to these breakthroughs as both scientific and practically oriented in the sense described by Cuevas Badallo:

(1) Michel Morange says, "The experiment carried out at Stanford by David Jackson, Robert Symons, and Paul Berg and published in l972 in the *Proceedings of the National Academy ofSciences*marked the beginning of genetic engineering. In this article, Jackson, Symons, and Berg describe how they obtained in vivo a hybrid molecule containing both the DNA of the SV40 oncogene and the DNA of an altered form . . . that already included the E. coli galactose operon" (Morange, l998, p. 187).

(2) According to Morange (1998, p. 186), others disagree and credit earlier work — of Werner Arber, Hamilton Smith, and Daniel Nathans, summarized by Arber (1979) — on the use of restriction enzymes to cut or cleave DNA at precise points, of which the Berg group's work was a "natural development."

The fact that Berg did not receive a Nobel Prize and his predecessors did does not detract from the point made here. Both accomplishments have been recognized (Berg won other prestigious prizes) both as important scientific breakthroughs and as key techniques for future practical work in genetic engineering.

(3) Still following Morange (1998, p. 231), we come next to PCR, the polymerase chain reaction technique — which Morange says (p. 242), "More than any other technique, has changed the work of molecular biologists."

Here is Morange's summary of how it has done so:

"In 1983 Kary B. Mullis developed a technique for amplifying DNA called the polymerase chain reaction (PCR). [See Mullis, 1990.] PCR can amplify virtually any DNA fragment, even if it is present in only trace amounts in a biological sample, thus allowing it to be characterized. It can aid forensic medicine by characterizing DNA molecules present in biological samples such as hair, traces of blood, and so on. It is sufficiently sensitive to permit the detection and

characterization of the rare DNA molecules that persist in animal or human remains thousands of years old. This technique also makes possible a genetic diagnosis on the basis of a single cell. . . . Finally, it permits the early detection of bacterial or viral infections" (p. 231).

All these practical applications led one seemingly jealous previous Nobel Prize winner to call PCR "a mere technical trick" when Mullis won his Nobel in 1993. But Morange (1998, p. 242) clearly thinks it was a significant scientific breakthrough as well as a significant breakthrough in genetic engineering.

(4) In a more recent book, Morange (2001, pp. 64ff.) talks about a completely different technique, or set of techniques. The book focuses on gene function rather than genes in the abstract or genetic engineering; indeed, Morange says:

"My description of gene function is . . . as concrete as possible, giving a precise image of their functions in the most fundamental life processes: development, aging, learning, behavior, the establishment of biological rhythms, and so on" (Morange, 2001, p. 4).

And in that context one particular technique, so-called "gene knockouts," seems particularly important to him. "Inactivating [a] gene makes it possible to see in which tissues and organs its action is necessary. Conversely, when the product of a gene has been sufficiently studied . . . [even] fully described, it may seem unnecessary to verify the function in vivo by a knockout experiment. However, knockout experiments . . . have produced more surprises than even the most enthusiastic partisans of this new technique expected" (p. 64).

In this case (these cases), the practical payoff is not usually bioengineering but some scientific discovery that may have an impact, say, on clinical medicine. So I may be stretching in bringing this in here, but it does seem to me that such gene knockout experiments represent another case of the kind of theory-practice combination that might exemplify what Cuevas Badallo would be seeking in a more complete philosophy of technology — here philosophy of biotechnology.

C. Summary and an Unexpected Conclusion

Summarizing what I have here suggested are first steps toward a comprehensive philosophy of biotechnology, I will first refer to a more recent   paper of Cuevas Badallo (forthcoming), in which she takes great pains to show that many contributions need to be taken into account in an adequate philosophy of technology (in general). Even Bunge's applied science model sometimes works, as do approaches that make scientific advances dependent on technological or instrumental advances (e.g., Pitt, 2000) — and a whole host of other approaches; Cuevas Badallo is, reluctantly, even willing to say that "technoscience" constructivist approaches (see Hughes, 1988) are sometimes useful. Her point is not that her engineering sciences approach is better than the others. All are necessary, and complementary, for an adequate and complete philosophy of technology in general or any particular technology or set of technologies.

Here I have emphasized, in my approach to an adequate philosophy of biotechnology (including bioengineering), the ethics and politics of biotechnology and genetic engineering,

debates about genetic reductionism, and approaches to an engineering philosophy of biotechnology for which I have borrowed ideas from Steve Goldman, Billy Vaughn Koen, and Cuevas Badallo herself. Biotechnology, combining these views, is a part of "captive" engineering (Goldman); is necessarily related to the state of the art at any given time (Koen says current genetic engineering is deficient in this regard); and involves key bioengineering theories/techniques (where I have supplemented Cuevas Badallo with references to historian of genetics Michel Morange). As Cuevas Badallo says for any technology, I would say biotechnology is highly complex and has a variety of complicated relationships with genetics and other biological sciences.

A final surprise in all of this can be seen if we return to the public furor over biotechnology that I used as a grabber at the beginning of the paper. Far from being illegitimate, public concerns about biotechnology and genetic engineering ought to be expected — even welcomed. Biotechnology may be "the wave of the twenty-first century" (as I have quoted the president of our university), but if the twentieth century has taught us anything, scientific and technological developments are fraught with social consequences. Originators of the Human Genome Project were wise to try to deal in advance with the ethical, legal, and social implications of the venture (the so-called ELSI program; see Marshall, 1996; and National Human Genome Research Institute, 1997); and promoters would do well to consider the same for bioengineering, genetic engineering, and biotechnology generally. (Krimsky's 1982, 1991, and 1996 leave broad openings for this.) If developments in biotechnology are to be truly valuable for society, there ought to be public input into their evaluation and management. This does not mean we have to take seriously every outspoken critic of biotechnology or genetic engineering; only that, in a democratic society, public discussion of such issues is welcome.

Chapter 6

MULTIPLE FACETS OF PHILOSOPHY AND ENGINEERING

I prepared this essay for a conference in Fall 2007 in Delft, the Netherlands, on philosophy and engineering. Here it serves the purpose of introducing the next several chapters, two of which were direct spinoffs of this paper, and the other two simply expanded the focus to the case of computer engineering. So the reader can consider the remainder of this Part Two as a set. For that reason - and because all of these essays were written within a short time period - I will limit my introductory comments for them. The goals seem to me self-explanatory, given the nature of this essay.

INTRODUCTION

Is there a philosophy of engineering (singular)? My answer is no, though I don't intend that to discourage anyone who would want to produce one. I use the metaphor of a diamond with many facets to bolster my negative answer, but also to suggest the complexity if anyone were to do so. And this is not just my opinion. I base my view on a variety of discussions of engineering in the literature of the Society for Philosophy and Technology. And, following the guidelines of engineer Billy Vaughn Koen, I mark the time period as 1975-2005, from the beginning of the society until the SPT conference in Delft in 2005. The diamond metaphor seems useful to me, to suggest looking at the phenomenon of engineering both from the inside - the inner crystalline structure, so to speak - and from the outside of external criticism. Among inner facets, I look at engineering as a guild, with its own self-selected guidelines, professional associations, educational system, and place within the larger society in which it thrives. I hope that what I say reflects changes in the world of engineering, outside philosophical circles, in the same time period, not only in my home country of the USA but in the Netherlands, Germany, Great Britain, Spain (and indirectly in other countries, including Poland, Russia, China and Japan, among others), with which SPT has had contacts. But my primary focus is on what philosophers (and a few engineers) have said in publications associated with SPT.

I base my views here on two of my books, *Critical Perspectives on Nonacademic Science and Engineering*, a collection of essays intended to produce a philosophy of engineering; and *Philosophy of Technology: In Search of Discourse Synthesis* (published online in *Techne*, the journal of SPT). In the latter book, a history of 30 years of controversies in SPT, I include three chapters directly devoted to competing philosophies of engineering - engineering in general, computer and engineering ethics, and bioengineering/biotechnology - as well as discussions of engineering philosophies in the Netherlands, Germany, and Spain. The theme throughout those discussions is that controversies in SPT related to engineering have sorted out fairly neatly into four types of philosophical approaches that emphasize (1) connections to science, (2) metaphysical critiques of the narrowness of the engineering approach to problem solving, along with two political approaches - (3) pragmatic and (4) radical - which combine a positive use of engineering with political critiques of its social arrangements. My remarks here follow that outline, after which I include a very brief mention of engineering education and professional regulation within engineering societies, based on the same sources.

1. INSIDE THE DIAMOND: THE STRUCTURE OF ENGINEERING AS ENGINEERS SEE IT

1.1 The oldest tradition of philosophical discussion of engineering within SPT focuses on its relation to science and begins with the approach of the Canadian (originally Argentine) philosopher Mario Bunge. He calls his approach "exact philosophy" - and he has many followers in many countries, from Spain (Miguel Angel Quintanilla) to Germany (Friedrich Rapp, with reservations) to Czechoslovakia (Ladislav Tondl) and Poland (praxiology) and, indeed, all over the world. Bunge's view in general is that engineering (or technology more broadly) is applied science. Even when he laments the failure of "exact" philosophers to produce

an adequate approach to biotechnology - as one example - he says that such work as has been done is simply an application of the biochemistry and physiology of disease organisms to medicine as an "engineering" application.

1.2 But even Bunge himself recognizes the narrowness of this approach if pushed too far, and he relates it to systems theory - even the General Systems Theory of Ludwig van Bertalanffy - to make sure that the approach covers the full breadth of values and other aspects of engineering, including its democratic political control. Systems engineering is closely related to this broader aspect of Bunge's approach, and it too has a following throughout the world - not least in the approach of the German philosopher Gunther Ropohl. A number of Dutch philosophers of technology, including several at the University of Delft, provide formal, analytical approaches to technology that can easily be linked to this broader neo-Bungean systematic approach.

1.3 There are even further variations on the theme. American philosopher Joseph Pitt emphasizes the reverse direction, of the influence of *technological instruments* on developments in science. And the Spanish follower of Quintanilla, Ana Cuevas Badallo, directly challenges Bunge by emphasizing the central role of the so-called "engineering sciences" in technology - as does the American philosopher of science, Ronald Laymon, following a totally different philosophical path. For the two of them, there are scientific-cum-practical aspects of engineering and technology that can in no straightforward way be derived from so-called pure science theories, whether by "application" or otherwise.

1.4 Then there are two American engineers-turned-philosophers - Billy Koen (mentioned earlier) and Samuel Florman - who emphasize other aspects of engineering. Koen downplays the role of applied science, relegating it to one of the "state of the art" influences on engineering *heuristics*, which he takes to be central to a philosophical approach to engineering.

1.5 Florman emphasizes the teamwork of the whole range of engineers often involved in massive projects (he likens it to the intricacy of staging an opera); and he explicitly opens the door to government regulation when engineers' self-regulation breaks down.

So much for the inside of the diamond. Few engineers quibble with these philosophical characterizations, though different engineers are likely to emphasize different ones of these philosophical approaches. The "external facets," so to speak, to which I turn next, are more controversial.

2. VALUES AND ENGINEERING

Usually thought to be the polar opposites of those who emphasize the scientific aspects of engineering and technology are philosophers I lump under the perhaps unfortunate heading of metaphysical critics.

2.1 For example, American philosopher Carl Mitcham explicitly opposes "humanities philosophy of technology" to what he calls "engineering philosophy of technology," saying that

the former must "take the measure of technological culture as a whole" - where he explicitly refers to the German existentialist philosopher of technology and technological culture, Martin Heidegger, as well as the more moderate American neo-Heideggerian philosopher Albert Borgmann.

   (On another other hand, it should be noted that Mitcham has also resurrected the thought of another German engineer-philosopher, Friedrich Dessauer, for whom metaphysics offers a positive near apotheosis of engineering as having a "transcendent moral value.")

2.2 Other metaphysically-inclined philosophical critics of technological culture (they rarely mention engineering in particular) include the American, Donald Verene - a follower of the French techno-critic Jacques Ellul (who calls his approach "sociological" rather than philosophical). I assume Ellul's writings are known to some engineers and need no elaboration here (however much engineers may dislike this mode of thinking).

2.3 Another American metaphysician, Frederick Ferre, does talk about some engineering practices, including biotechnology, though he wants them to be limited by a "metaphysical organicism."

2.4 There are other opponents of a "scientific" approach to engineering and technology, such as another American, Don Ihde, for whom close phenomenological analyses of individual practices, including engineering in a variety of forms, is much better than the science-aping analytical philosophy so dominant in the USA and Britain. Ihde's approach is well known in Europe, and possibly even more so in the Netherlands, where it is not perceived as being at odds with what I might call the "Delft School."

2.5 Another well known American is the critic of Artificial Intelligence, Hubert Dreyfus, who also acknowledges debts to phenomenology in general and Heidegger in particular. Dreyfus's critique of AI is well known enough that I don't feel the need to elaborate it here.

   (Neither Ihde nor Dreyfus should be thought of as hostile to engineering, but only to some exaggerations in its practices; and both philosophers have much to offer to engineers.)

   Should engineers pay any attention to these philosophers? I would say that the phenomenological approaches should by no means be ignored in philosophical discussions of engineering. And in my experience many engineers are religious people who would be wise not to leave metaphysical or values issues for "church on Sunday."

2x. Addendum: There is also a whole school of thought - so-called Social Construction of Technology - strong in the Netherlands (where it is not viewed as in any sense hostile to engineering), as well as in Spain, Britain, and the USA, which emphasizes the intertwining of engineering and technology with society in the actual practice of engineering within what is often called "technoscience." I do not think any engineer who has a serious interest in philosophy can afford to ignore this approach.

3. A PHILOSOPHY POSITIVE ABOUT ENGINEERING: AMERICAN PRAGMATISM

3.1 American Pragmatism, best represented in SPT by Larry Hickman's work on John Dewey, represents a philosophical approach to engineering and science that is simultaneously *positive* in its recommendation of their utility in technosocial problem solving, while at the same time being *critical* of engineers' too easy incorporation within capitalism in the form of large science-for-profit corporations and large government laboratories - a situation that is dominant in the USA, but is also common enough within the European Community. (I might be tempted, because I am a follower of this school of thought, to expand on the positive points here; but I'll resist and offer no more than the brief hint that I'm offering for the other views listed here.)

3.2 Another American Pragmatist, and former president of SPT, Paul Thompson, takes Dewey's thought in another direction: he says, for example, that philosophers should *work constructively* with bioengineers and other members of the biotechnology (including agricultural technology) communities, *including* government regulators (often themselves technically trained).

3.3 And one of the first presidents of SPT, the Canadian philosopher Alex Michalos, regards suggestions like that of Florman (above) - that engineers should regulate their own affairs until there is a breakdown that requires regulatory intervention - with profound suspicion. According to Michalos, both scientists and engineers ought to recognize, and shoulder, *social responsibilities* as an *intrinsic* part of their professional work.

   I am convinced of the high value of these approaches as contributing a great deal to the philosophical understanding - and, more important, the *improvement* - of engineering practice.

4. EVEN RADICALS DESERVE A HEARING

4.1 Radical critics of technology, including engineering, such as another American, Langdon Winner, are rarely welcomed warmly within engineering circles - though it should be noted that Winner teaches at Rensselaer Polytechnic, that bastion of engineering education. Winner's thesis, usually viewed as being radical, is that engineers and other technical personnel need to think about the often anti-democratic implications of their grand ventures, not after but before undertaking them.

4.2 Another radical critic of engineering, the American philosopher Steve Goldman, also teaches at a well known engineering school, Lehigh University. He describes his thesis as the "social captivity of engineering," and he maintains that engineers (and applied scientists such as chemists in industry) are culturally blind when they buy into the notion of engineering as "scientific." They are thereby shielding themselves from the obvious, the social and managerial determination of what goes on in engineering and applied science, even to the point of determining what is good engineering knowledge: engineers rarely, he says, do what they know to be their best work, deferring instead to managers, to what the customer (or the market) will accept.

(I have worked with many engineers who readily accept Goldman's analysis but see nothing wrong with the situation: that's the world we live in, they say, and we have to accept it.)

4.3 Explicitly radical is the American philosopher Andrew Feenberg (strongly influenced by the neo-Marxist German philosopher Herbert Marcuse). But where Marcuse and the Frankfurt School were highly critical of engineering, Feenberg sees possibilities of reform within managerial circles, *if* both workers and managers (often engineers) can be persuaded of the advantages of more equitable - and environment-friendly - arrangements within technoscientific corporations and the governments they serve.

Should engineers pay any attention to these radical critics? What I would say is that an honest engineer, if one wants to be genuinely philosophical about his or her work, cannot ignore radical critiques. At the very least, their views should be taken as warnings about extreme excesses or extreme failures on the part of not only individual engineers but also engineering societies and the other organizations within which engineers typically work.

5. ENGINEERING AS A GUILD AND ENGINEERING EDUCATION

To talk about engineering as a guild - especially in terms of professional self-regulation - I turn to one of the chapters in my online book, "Philosophy of Technology: In Search of Discourse Synthesis." There I look at the record of engineering societies in the United States with respect to the enforcement of ethics rules among their errant members, and I find it to be woefully lacking. But this is not just my opinion. Studies have been done of the phenomenon, and they conclude that bad actors are rarely if ever called to task by the rules enforcers of the societies. If anything is done about negligence or other failures, it is more likely to be done by the courts or by government regulators.

I don't think that this argues for the elimination of engineering society regulatory bodies, but in my opinion it does argue for a great deal of soul searching about the mechanisms of enforcement.

With respect to engineering education, I turn to the other book I have used as my source here, my edited volume, *Critical Perspectives on Nonacademic Science and Engineering.* There our German colleague Gunther Ropohl argues that engineering students need to be educated better than they are - to the point of substituting for 20 percent of the technical curriculum carefully designed courses on humanities and social science related to the systematic character of contemporary engineering. And Taft Broome argues that engineering faculty need much more experience with interdisciplinary teams than they typically have if they are going to be able to help their students deal with complex problems in the real world. Furthermore, radical critic Langdon Winner, referred to earlier, has argued in other SPT publications that the way engineering ethics is normally taught these days does not prepare them for the *political* tasks that they *must* be prepared for if they are to do their professional best in today's world.

I could but won't say more here about these dual failures in contemporary engineering - I see them as failures, as do our SPT authors - but I can say at least this: that adequate approaches to philosophy and engineering cannot ignore the two issues of enforcement of ethical guidelines and better education of engineering students in the *relevant* humanities and social sciences.

A final note: One reviewer found this inventory of topics that SPT authors have claimed to be relevant to an *adequate* philosophy of engineering dull. But all I promised was an inventory of relevant SPT writings, and inventories often make for dull reading. What we are after here is not dull; it's no less than a comprehensive philosophical discussion of engineering and its practices today, and I believe such a comprehensive approach would do justice to the thinking of all my SPT colleagues.

Chapter 7

ENGINEERING PROFESSIONAL ETHICS IN A BROADER DIMENSION

In spite of what I said before, I do need to make a comment about this chapter. I borrow one whole section, on engineering ethics, almost verbatim, from an earlier collection of my activist essay (2000) *. In a sense, that version can be viewed as a first draft, with this essay coming closer to the overall message that I wanted to convey there.*

INTRODUCTION

In this paper, I try to foment change in terms of engineering and its professional societies as a guild. What I suggest is the need to modify a guild mentality. Many professional groups continue to defend their right to sanction misbehaving members as though we were back in the sixteenth century. The first effect of the change I propose would be to minimize the sanctioning of individual wrongdoers; what would become more important instead would be to maximize service to the larger society as an ethical norm. All engineering codes of ethics seem to include service to humanity as a paramount responsibility. What I advocate is that this needs not only to be given more prominence but to be implemented concretely in specific ways. When engineering professionals get involved in this way, they will of course bring to bear on the problems their expertise. But expertise does not automatically confer a privileged position relative to citizen activists on a particular issue. Finally, I argue that this modification would depend on significant behavioural changes: engineers and their professional societies would need to broaden their outlook, moving beyond a focus on individual misconduct to broader social responsibilities. And this seems to me to amount to a better definition of engineering ethics.

Recently I contributed a paper to a conference on philosophy and engineering ([above] Durbin forthcoming). I began with a question I posed to myself: Is there a philosophy of engineering (singular)? My answer was no, though I didn't intend that to discourage anyone who would want

to produce one. I used the metaphor of a diamond with many facets to bolster my negative answer, but also to suggest the complexity if anyone were to do so. And my doubtful answer, I said, was not just my opinion. I based my view on a variety of discussions of engineering in the literature of the Society for Philosophy and Technology (SPT). The diamond metaphor seemed useful to me, to suggest looking at the phenomenon of engineering both from the inside – the inner crystalline structure, so to speak – and from the outside of external criticism. Among inner facets, I included just the briefest of looks at engineering as a guild, with its own self-selected guidelines, professional associations, educational system, and place within the larger society in which it thrives. I hoped in that essay to reflect recent changes in the world of engineer-ing, outside philosophical circles, not only in the USA but in the Netherlands, Germany, Great Britain, Spain (and indirectly in other countries, including Poland, Russia, China and Japan, among others), with which SPT has had contacts.

In this paper, I am not trying just to reflect recent changes in engineering. I want to foment change. And my focus is on just one aspect, engineering and its professional societies as a guild – with a still more narrow focus on professional regulation within engineering societies. What I want to suggest is the need to change or modify a guild mentality.

(The following dozen or so paragraphs repeat, almost exactly, corresponding paragraphs in my earlier collection of activist essays (2000)*. A reader of that collection with a good memory may well want at the very least to skim these parts here - or, alternatively, to see this as the better context for what I said there.)*

In an essay written more than ten years ago (for the last version, see Durbin 2000), I argued that the efforts of engineers, in terms of ethics activities, was as disappointing as earlier efforts among philosophers, who had taken up the task in the eighties and nineties of the past century to help engineers do a better job in terms of their ethics activities. (See, with special reference to the USA, Baum 1980, and Hollander 1983; or to Germany, Lenk and Ropohl, 1987.)

It happened that the American Association for the Advancement of Science – about halfway through the period I was reviewing there – had conducted a survey of engineers' (and scientists') ethics activities and published the results in a report (Chalk, Frankel, and Chafer, 1980). The report's stated objectives included: to document the ethics activities of the AAAS-related societies surveyed; the codes of ethics and other formal principles adopted; significant issues neglected; and recommendations for the future.

Four engineering societies were among those that reported their activities: the American Society of Civil Engineers (approximately 80,000 members at the time), the American Society of Mechanical Engineers (roughly the same number), the National Association of Professional Engineers (also about the same), and the Institute of Electrical and Electronic Engineers (more than double the size of the others). All had active ethics programs, with differing levels of staffing, based in part on a code of ethics and enforcement procedures. Few allegations of ethics violations, however, were re-ported as being investigated, and even fewer had led to sanctions. (In a handful of cases, members had been expelled.) The electrical engineers, shortly before the report was issued, had initiated a formal program, with some funding, to support whistleblowing

and similar activities. And NSPE regularly published, then as now, case reports and decisions of its judicial body in its journal, Professional Engineer.

The American Chemical Society, another large technical group whose members often work with engineers in large technology-based corporations, also provided a report. It too had an active ethics program, but it seemed (to me) most often to concentrate on allegations of unethical or unfair employment practices where the members work.

Only a handful of the organizations discussed in the AAAS report replied that they spend much time or effort on "philosophical" tasks – defining and better organizing ethics codes or principles. More work than before was going into education, into increasing ethical sensitivity in the workplace, and into providing better enforcement procedures. The need for that last item, though important (and it might be expected to lead to more enforcement proceedings), would seem not to have had a high priority considering the small number of investigations the societies were actually conducting.

One can follow more recent developments in *Professional Ethics Report* (PER) (since 1988), another venture of the American Association for the Advancement of Science – this time, under the auspices of its Committee on Scientific Freedom and Responsibility and Pro-fessional Society Ethics Group. This quarterly newsletter provides regular updates on the activities of member societies – including all the major and some minor engineering societies and numerous other scientific and technical societies.

In general, the activities reported on in PER – including new or updated codes of ethics, more rigorous enforcement and/or more equitable investigation procedures – are simply an extension, with modest increases, of the activities discussed in the earlier AAAS report. There are regular reports on new legislation and court decisions, and there is even an occasional review of a book that contributes to the advancement of thinking about professional ethics in one fashion or another.

Activity on the enforcement front is best followed in the continuing series of case presentations, and quasi-judicial decisions, that appear regularly in *Professional Engineer*. However, even if the incremental improvements reported in PER, and the greater sensitivity to ethics issues displayed in *Professional Engineer* (and a few similar sources), continue into the future, we cannot, in my opinion, expect a great deal from these efforts. The recommendations of the 1980 AAAS report included the following. In addition to heightened sensitivity and more enforceable rules, as well as better and more frequently utilized investigational procedures, the other recommendations included: better definition of principles and rules; recognition of the inevitable conflict between employee efforts to protect the public and employer demands; more publicity for sanctions imposed; coordination of ethics efforts of the various professional societies and inclusion of ethics efforts of such other institutions as corporations and government agencies; benchmarks for judging when ethics efforts have succeeded; and full-scale studies, including full and complete histories of cases. Very few of these laudable proposals, 30 years later, seem yet even to be contemplated, and there is little to suggest that very many of the recommendations will be carried out any time soon in the future.

I should note that I write here from a North American perspective, where I know the terrain reasonably well – though from a philosopher's outsider perspective. (Doubly so, now that I'm living in retirement in Spain.) I would be delighted to hear that things might be different in other engineering circles in other countries.

In general, the ethics activities of the professional societies have been more successful than the efforts of philosophers to help out in the process, but there are still glaring weaknesses. As one example, the ethics activities of the professional societies – however much publicity they sometimes receive – still represent a small, almost an infinitesimally small, part of the activities of engineers and of the engineering societies. Meanwhile, allegations of unethical or negligent behaviour on the part of technical professionals seem to be increasing dramatically.

My conclusion in my earlier essay was pessimistic. Studies have been done of the phenomenon, and they conclude that bad actors are rarely if ever called to task by the rules enforcers of the societies. If anything is done about negligence or other failures, it is more likely to be done by the courts or governmental regulators. Nonetheless, I do not think that this argues for the elimination of engineering society regulatory bodies – though in my opinion it does argue for a different focus.

CHANGING A GUILD MENTALITY

For my purposes here, I am going to define a "guild mentality" as the defensive attitude of a group of workers in a given specialized field. Attaching the "guild" adjective is designed to link the phenomenon to the rise of guilds, especially in the Netherlands, in the so-called mercantile age beginning in the sixteenth century. At first the guilds were necessary, at least in the thinking of the members, to protect their rights especially against royal encroachments or depredations. But it wasn't long before the guilds had gained a great deal of power in their own right. Even so, they continued to practice a high level of protectionism, now protecting individual members against attacks as well as protecting the privileges of the group. One aspect of this protectionism was the right that they exercised to sanction their own members for misconduct.

In our own day, technical professional societies are not the only groups which exhibit this sort of mentality. Labour unions are famous – or infamous – for doing the same. And I include as another example the American Association of University Professors in the USA, of which I have been a long-time member. It was established early in the twentieth century, with the support of one of my favourite philosophers, John Dewey; and it seemed to him and to the other founders that the organization was much needed to defend the rights of professors in the then-new universities in the United States. The organization remains, to this day, the best defender of those rights, especially the right to teach without the interference of university administrators or, more important, of governments looking over the shoulders of those administrators. But for all practical purposes, the AAUP has also become a labour union, acting with respect to its members exactly the same way that other unions act with respect to their members. There is sanctioning, but almost exclusively of university (or college) administrations that have been accused of violating the rights of non-interference (for example, on religious grounds in denominational

universities). It is not the case that an individual professor is never sanctioned for misbehaviour. But when that is done, it is typically by the university, and the AAUP gets involved only to the extent of assuring the accused that all the proper rules have been observed in the proceedings.

The professors' union, and corresponding teachers' unions in the schools (Dewey was also influential in establishing those in the early twentieth century), are now politically powerful in the USA. But their power pales in contrast with the most powerful organizations of the type. I think particularly of the American Medical Association (though it has lost membership in recent decades) and the Pharmaceutical Manufacturers Association. These are not only powerful defenders of their members' rights but powerful – extremely powerful – actors on the national political stage. They have practically dictated national policy on health insurance for more than a generation in the USA. But when it comes to the sanctioning of individual doctors' misbehaviours, or to misbehaviour on the part of individual pharmaceutical companies (huge scandals in recent years), individuals are rarely punished for rules violations, and bad-acting companies are punished (if at all) only as a result of court action.

All of these organizations, including professional engineering societies, have long since passed beyond the need to protect themselves from royal or other governmental interference or encroachment of their rights. They often equal or surpass governmental agencies in their political power, as well as in their influence on what is spent by governments in support of their work. (On the power of engineering professional societies – along with some scientific societies – in the USA in the twentieth century, see David Noble, *America by Design*, 1977.)

But there are more recent examples than last century. For one, consider the billions of euros that have been spent for the construction of a new supercollider at CERN, the European nuclear agency, on the frontier between France and Switzerland. It is often thought of as a scientific venture. But it is also a monumental engineering venture, as is the case with all modern technoscientific endeavours. (Or boondoggles, in the view of critics; for example, among large engineering firms allied with the American-led invasion of Iraq.)

Or, on a smaller scale and involving a social science group rather than engineers, I think of the city planners involved in the redesign of Aalborg in Denmark. (See Flyvberg, 2001) There the city planners, though they ended up learning a democratic civic lesson, were well supported by the local government. And equally so in other countries, especially in Europe. I bring in that example so as not to be perceived as picking on engineers.

But all these groups continue to defend their right to sanction misbehaving members as though we were back in the sixteenth century. That is what I am defining here as a guild mentality, and it is what I am arguing needs to be modified. I am sure there will always be bad actors in professional organizations, and I see no reason why the leaders of these societies cannot continue to sanction them (if they ever do). But the ethics role of professional engineering societies – my focus here – ought to have a different focus, or at least a larger additional focus. So my conclusion under this heading is that professional associations of all kinds, but in a special way engineering professional societies, should now be more self-confident, more aware of their political muscle. (They already throw their political weight around when they want to.) While still doing their protectionism and self-regulation and member infraction enforcement, as a minor

part, they need (in my opinion) to take on a new ethics orientation.

SANCTIONING AND ENFORCEMENT

If the first effect of the change would be to minimize the sanctioning of individual wrongdoers, what should become more important is to maximize service to the larger society as an ethical norm. And this should include fundamental changes in the way the next generation of engineers is taught to think about ethics.

I have argued elsewhere [Wording changes needed here!] (Durbin 2007a, 2007b) that ever since a John Dewey-inspired definition of the academic's role in North American universities as involving a "service" component – not as an add-on but as essential to one's role as an academic professional – at least lip service has been paid to the demand that academics contribute to the good of society. As various engineering disciplines were absorbed within the universities, this applied to engineering professors as much as any others. What I am advocating here is that engineering societies, as well, should include within the scope of their activities service to society, to humanity, not as an add-on but as essential to their mission.

I believe that any separation between academics and the so-called "real" world, with its many problems, is not only arbitrary but pernicious. Dewey was well known for opposing all dualities, including that of separating academia from life, and I agree with him completely on that point. (See his *Reconstruction in Philosophy*, 2d ed., 1948, and *Liberalism and Social Action*, 1935.) And what is true for academics ought also to be true for the professional societies to which they belong.

I also agree with Dewey, and his equally activist friend and colleague, G. H. Mead (see Feffer, 1993), that, when academics get involved with social issues, they cannot play the role of philosopher kings, advising others how to solve their problems; they must get involved as equals with all those working on a particular issue, everyone from scientists and engineers to social scientists to government agents to experts of all sorts, but also including ordinary citizens involved in the issue.

All the engineering codes of ethics with which I am familiar include service to humanity, beginning of course with their own societies, as a paramount responsibility. What I am advocating here is that this needs not only to be given more prominence but to be implemented concretely in specific ways – to be defined by the engineering professional societies themselves, of course. In doing this, these societies would be following Mead's definition (1964) of what "ethics" means:

"The order of the universe that we live in is the moral order. It has become the moral order by becoming the self-conscious method of the members of a human society [to solve their problems democratically] . . . . The world that comes to us from the past possesses and controls us. We possess and control the world that we discover and invent. . . .   It is a splendid adventure if we can rise to it."

That is, groups acting to solve their problems in a creative fashion are by definition ethical. But it is more than ethics; it is a politics that substitutes the community solving its problems democratically for traditional approaches to ethics and politics.

In one of my books (*Social Responsibility in Science, Technology, and Medicine*, 1992), I appeal to technical professionals to do this in greater numbers than at present. The professionals I appeal to there include technology educators, medical school re-formers, media or communications professionals, bioengineers and biotechnologists, computer professionals, nuclear experts, and ecologists. And my basic assumption is that some subgroups within these groups of professionals are already heavily involved in social action for the common good. One engineering-related example is Computer Scientists for Social Resonsibility. (In another book [Durbin 2000] I appeal to fellow philosophers, especially fellow philosophers of technology, along with environmental philosophers, to do the same – so I am not picking on engineers here.)

In these books, mine was not a program – not even an invitation – for all. It was aimed only at increasing the number of activists, in academia or in the professions, who might have the expertise and the will to help solve social problems in our technological age. Why should they – should we – do this? Presumably this often-heard question seeks an answer in the "ought" category, perhaps something like an ethical or social or even political obligation. But that is not what I think is called for here. The problems calling out for action in our troubled technological world are so urgent and so numerous – from global climate change to gang violence, from attacks on democracy to failures in education, from the global level to the local technosocial problems in your community – that it is not necessary to talk about obligations, even social obligations. No, it is a matter of opportunities that beckon the technically trained – including engineers as well as philosophers and other academics – to work alongside those citizens already at work trying to solve the problems at hand. And when professionals do get involved, they can not go in as though they had all the answers; they have to work as equals in a true democratic fashion.

[What to do here (?): Can I offer a general answer to the question about how to choose among the numerous possibilities? I suppose I could try [I have said a number of times], but I do not feel the need to do so; certainly no urgency to do so. The problems are just there for all to see. And democratic societies have a right to expect that experts will help them, experts from all parts of academia and all the professions. I would even go so far as to say that there is at least an implicit social contract between professionals and the democratic societies in which they live and work and get paid for their professionalism.

This may sound like rampant relativism: just get involved in any crusade you choose, as long as it "improves" society. To avoid this implication, I need again to fall back on American Pragmatism. It was the view of Dewey and Mead that there is at least one fundamental principle on which to take a stand: that improving society always means making democracy more widespread, more inclusive, inviting more groups into the public forum; elitism, "my group is better than your group," and all other such attitudes are anti-democratic. This "fundamental principle," however, is not just another academic ethics principle; it is inherent in the nature of democracy – at least as the American Pragmatists understood it and as I understand it.]

When engineering professionals and their societies get involved, they will of course bring to bear on the problems their expertise. (The same is true for academics in general, for lawyers, and so on.) But expertise does not automatically confer a privileged position relative to citizen activists on a particular issue. What I am talking about are social problems of our technological society (particular technological societies in particular locales); and the only "expertise" that counts in that respect is civic responsibility.

The ethics codes of most engineering societies typically begin with some vague statements about serving the common good, or society at large. At present, that seems often to be mainly flag waving or window dressing. What I am calling for is to turn it into a primary responsibility in specific and concrete ways.

CONCLUSION

We philosophers – and members of other humanities and social science professions – could also flex our muscles in this sense, and, all together, we could present a "professional responsibility" front to democratic societies, in which service would be the dominant theme. "Ethics" in the narrower sense would become much less important.

There would, of course, always be bad actors, those who placed their private interests above the public. I think especially of corruption or bribes to obtain contracts, and such like. And there is no reason why engineering professionals societies (as just one example) should give up entirely on ethics enforcement. But, as now seems often to be the case, the majority of that would be taken care of by the state, through court or regulatory proceedings – or, as a last resort (again as now) through public shaming in the press.

I ended my original survey of the failures of engineering professional societies, in terms of sanctioning their misbehaving members, by saying that I believe that the way to go is through collaborative efforts involving philosophers (and other humanists and social scientists, as well as citizen activists) alongside engineers. And there is some evidence of a change in this respect. My own professional society, the American Philosophical Association, has been involved with a consortium of other professional societies, at the national level in Washington, D.C., to exert an influence on the larger society. To date, the effort has had less input from engineering and other technical professional societies than from other scholarly societies.

But even if the movement takes on wider dimensions, I would qualify any optimism I might feel about the approach by saying that its success, when it comes to engineers, depends on significant behavioural changes. Engineers and their professional societies need to broaden their outlook, moving beyond a focus on individual misconduct to broader social responsibilities. And where it is a matter of defending their public image, they also need to welcome a broader range of people into the dialogue. (On the other hand, philosophers, social critics, reporters and editors, environmental activists, and so on, need to be less confrontational and more willing to dialogue.) Together, I am convinced, we can hope to solve some of the more pressing social issues facing our technological societies.

This seems to me a better definition of engineering ethics activity than an approach that focuses mainly on individual engineers' and technical professionals' potential misconduct. And actions based on the new focus might, in the next generation, see engineering ethics make a significantly greater impact on society than has been the case in preceding generations.

Chapter 8

PHILOSOPHY, ACTIVISM, AND COMPUTER AND
INFORMATION SPECIALISTS

When I wrote this piece, it was as an invited follow-up to an earlier version of similar material. I have now placed that at the end, as Appendix II. Here I move beyond that earlier version, to make a new claim about changes needed within the professional societies of computer experts. The piece is currently scheduled to appear in 2010 in a book edited by Arun Komar Tripathi.

INTRODUCTION: HOW PROBLEMS OF COMPUTER PROFESSIONALS ARE BEST FACED

As early as 1992, in my book, *Social Responsibility in Science, Technology, and Medicine* (Durbin 1992), I included a chapter that invited computer professionals to join with such colleagues as their compatriots in Computer Professionals for Social Responsibility to help deal with social problems connected to work in the computer and information fields.

In my "Ethics and New Technologies" (Durbin 2005), I added to earlier concerns about privacy, the "open source" or "free software" programming issue. I also added an old issue, encryption (an issue older than the "open source" debate) with respect to business and government transactions now made more urgent as a "national security" issue after the 9/11 attacks in the USA. On the privacy issue, I could refer to a number of activist groups -- those that Lawrence Lessig (1999, 2001), a legal expert who had written a great deal about computer issues, said he had worked with, such as the Center for Democracy and Technology, and the Electronic Frontier Foundation, among others. On issues such as encryption and the war on terror, I had fewer activist organizations to refer to, but the message was still the same. I hoped that more computer experts would get involved in activism than had done so up to that point.

In making these calls for more activism in the name of social responsibility, I fall back on my personal philosophy, but also on the philosophy of the American Pragmatists, especially John Dewey (1935, 1948) and G. H. Mead (1964).

First, I believe, with Mead, that ethics is not some abstract system of deontological or utilitarian rules, but the *community attempting to solve its problems in as intelligent a way as possible.* Hans Joas, in an intellectual biography of Mead (Joas 1985), has pointed out this contrast, for Mead, between his community action view and standard deontological and utilitarian ethical theories. Mead (1964) wrote, almost a century ago, as follows:

"The order of the universe that we live in *is* the moral order. It has become the moral order by becoming the self-conscious method of the members of a human society [solving their problems democratically]. The world that comes to us from the past possesses and controls us. We possess and control the world that we discover and invent. And this is the world of the moral order. It is a splendid adventure if we can rise to it."

In recent years I have distilled my version of this to its basic elements. What follows is borrowed, more or less verbatim, from Part I, Foundations, above.

MY VERSION OF THIS VIEW

In my opinion, society expects us to rise to the challenge, especially democratic society. Democratic societies, at least, have a right to expect that experts will help them, experts from all parts of academia and all the professions. I have even gone so far as to say that there is at least an implicit social contract between professionals and the democratic societies in which they live (Durbin 2007b), giving rise to this expectation that professionals will shoulder their responsibilities to improve the societies in which they live and work.

In these terms, some people talk about an obligation to shoulder social responsibilities. But I don't prefer that terminology:

"That's not what I think is called for here. The problems calling out for action in our troubled technological world are so urgent and so numerous -- from global climate change to gang violence, from attacks on democracy to failures in education, from the global level to the local technosocial problems in *your* community -- that it isn't necessary to talk about obligations, even social obligations. No, it's a matter of *opportunities* that beckon the technically trained -- including philosophers and other academics -- to work alongside those citizens already at work trying to solve the problems at hand" (Durbin 2007b).

The problems calling out for action in our troubled technological world, I went on, are so urgent and so numerous -- from global climate change to gang violence, from attacks on democracy to failures in education, from the global level to the local technosocial problems in *your* community -- that it isn't necessary to talk about obligations, even social obligations. No, it's a matter of *opportunities* that beckon the technically trained -- including philosophers and other academics -- to work alongside those citizens already at work trying to solve the problems at hand. And when academics do get involved, they can't go in as though they had all the answers; they have to work as equals in a true democratic fashion.

Why? Can I offer a general answer? I suppose I could try, but I don't feel the need to do so; certainly no urgency to do so. The problems are just there for all to see. And democratic societies have a right (there is a traditional ethics term, but I am not going to defend it) to expect that experts will help them, experts from all parts of academia and all the professions. I would even go so far as to say that there is at least an implicit social contract (another ethical-social-political term that I won't define here) between professionals and the democratic societies in which they live and work.

This may sound like rampant relativism: just get involved in any crusade you choose, as long as it "improves" society. To avoid this implication, I need again to fall back on American Pragmatism. It was the view of Dewey and Mead that there is at least one fundamental principle on which to take a stand: that improving society always means making democracy more widespread, more inclusive, inviting more groups -- not fewer groups -- into the public forum; elitism, "my group is better than your group," and all other such privilegings are anti-democratic. This "fundamental principle," however, is not just another academic ethics principle; it is inherent in the nature of democracy -- at least as the American Pragmatists understood it. As I understand it. [?]

I'm always happy when fellow philosophers try to provide academically respectable answers to questions of social obligation, of social contracts on the part of professionals, of the need to keep democracy open to ever wider inputs. But if we wait for them to provide such answers, it will typically be too late. Global warming continues. Loss of species diversity, of life on Earth, continues. Threats to local communities in the so-called "developing world" in the face of economic globalization continue. And so on and on. These and others like them are not issues of academicism. What I have in mind are *urgent* social issues that cry out for answers *now.*

I have been accused, on these grounds, of favoring activism over principle -- even of abandoning the traditional role of philosophy as theoretical discourse. But I don't mean to do that. I believe Dewey was right in opposing all dualisms, including the dualism of principle versus practice or theory versus action. I welcome academic work on my issues; I just ask academics to accept activism as a legitimate part of philosophical professionalism.

The issues seem to me that important.

A NEW CLAIM

To my concerns in the *Ubiquity* essay (Durbin 2007a), I'd like now to add a new claim:

If their technical professional societies don't get involved in issues in this fashion, that constitutes, in my opinion, one more problem of our technological society; and *individuals in those societies should* -- as a matter of opportunity if not a social obligation -- *work actively to see that the organizations in which they work do so.* And not just their professional societies; other organizations in or by which they are employed -- universities, government agencies, large corporations (or small businesses), and so on and on.

An example: in recent years, a number of environmental ethicists have lamented the fact that the universities in which they work do a terrible job of environmental protection, on their own campuses and elsewhere where they have an influence. And they have started a *movement for environmentally responsible universities*.

PART 1. MY BASIC CLAIM HERE

What I want to argue here is that what we need today are *responsible organizations,* goaded if necessary by their *individual members* (often collaborating with others in small groups) *acting responsibly*. That means that what I am adding here is individuals' *opportunities (maybe even responsibilities) within organizations* to get those organizations to deal with the issues, if they're not already doing so -- or not doing so to a sufficient degree -- to make these issues a high *professional and public* priority. And what I'm worried about is that, as computer scientists and computer professionals more generally begin to take ethics issues seriously, including teaching about ethics in the education of future computer professionals, they will follow the pattern established over the past 40 years as engineers began to take ethics issues seriously and include ethics within the curriculum of future engineers. I'm concerned, that is, that there will be too much of a focus on individuals' responsibilities and too little focus on the bigger issue of professional responsibility for the good of society up and down the line, from individual to group responsibility, at every level in which computer professionals work.

PART 2. WHY THERE IS A PROBLEM

And this is why I think there is a problem here. The jobs associated with the computer-and-information-related professions today cover a bewildering range. Everything from the sheer drudgery of writing code (using "open" software or any other kind) to the most fantasy-based designing or inventing or imagining of programs, all the way to the invention, design, production, selling, and maintenance of the most advanced artificial intelligence systems. (And many computer geeks do a lot of things on their spare time, for the sheer fun of it.) And when we think of this type of work, we're usually thinking primarily about *software* work. To which we have to add the nuts-and-bolts work of imagining, inventing, designing, fabricating, selling, applying, adapting, and maintaining both *hardware and systems* -- right down to the level of the technician who repairs or upgrades your personal home system.

At every level, these types of jobs call for a high degree of training and technical skill. The danger, in my view, is that too often the "ethics" of such work, at whatever level or in whatever type of job or leisure pursuit, will be reduced to just doing one's job as well as possible, with a minimum of "unethical" shortcuts -- however individual computer professionals might choose to define those two terms. I taught engineering ethics for over fifteen years -- to extremely bright young students in an excellent college of engineering with most of the major specializations -- and I found there (and then) that a high percentage of the students came into these specializations with the mentality that all that ethics demands is to do your job well. The students often resisted

mightily any effort on my part to get them to think about the complexities of the real-world work they would be doing after they got their engineering degrees (sometimes even adding on a Master of Business Administration). And that continued to be true, no matter how persuasive I might have thought I was being about the complexities -- even the *politics* (within and outside their organizations) -- that their future work would *necessarily* entail.

From what I know -- whether at first hand or by way of what others tell me -- I have every reason to believe that computer professionals, and not just the computer engineering fellow students of my former student engineers, fall under pretty much the same general stereotype. There are always exceptions. But the old saying has it that the exception proves (i.e., supports) the rule. By and large, computer-and-information-related professionals are technically-trained people who want very much to do their technical best.

On the other hand, even the most stereotypical, introverted "computer geek" you can imagine, involved with a dozen or so like-minded peers in the solution of a highly technical hardware (or software) design problem, is going to run into dozens of "political" or infighting problems on the job, not to mention problems dealing with management at various levels, who are thinking about the problems of various end-users (and not just customers), and so on. To train such a person *only* to do his or her technical best, is to fail to *educate* him or her in ways appropriate to all sorts of ethical behaviors that are surely going to be demanded, and that from day one on the job. (In my mind, ethical and socially responsible behavior is needed even in the professional's leisure time activities.)

PART 3. A POSSIBLE SOLUTION?

How to overcome this built-in bias? Some of my first encounters with young engineers my age -- this was over 50 years ago -- already suggested a partial answer. Back in Louisville, Kentucky, in the USA in the early 1950s, our local engineering school was heavily into "cooperative education": *every single* student had to do one semester (other schools required a full year) of real work in a real engineering job -- and those running the program made sure that the managers of those engineers-in-training weren't assigning just make-work tasks. Later, when I was teaching engineering ethics, I found that the most receptive students were often older than their peers, and had actually done some real-world engineering work before. And, best of all, among the engineering professors with whom I collaborated on designing engineering ethics programs, the most helpful and insightful were professors who had, in their careers, actually worked in the field as engineers.

Many centuries ago in ancient Greece, Aristotle said that the practice of ethics (and he subsumed ethics under politics) requires maturity; it requires experience with the in's and out's and up's and down's of life.

We probably can't go wholly against the grain and change the entire career track of would-be computer professionals, deferring their ethics (with politics) training until they have sufficient real-life experience. But other methods have been devised; for example, some organizations send

young professionals -- after a few years of technical work in which they have learned firsthand how important the non-technical aspects of technical work are -- back to school again to learn what they have missed (not just ethics and politics but humanities and social sciences more generally). Or at least give those who want to do that the permission -- and company or organizational support -- to do so.

I don't claim to have all the answers here. I just know that, until some changes are made in the career preparation of computer and information professionals, it isn't likely that future members of those professions will be any more likely than their predecessors to pro-actively push their co-workers and their bosses and the managers of their companies or other organizations to get, equally pro-actively, involved in the pursuit of solutions for the problems that vex our society today -- our societ*ies* right down to the local level.

CONCLUSION: WHAT THIS WILL REQUIRE

But I'm not just talking here about changes in the ethics education (if there is any) of would-be computer professionals. I'm talking about an *attitude* change -- on the part of mature computer professionals and the leaders of the organizations with and in which they work -- when they think about the ethics of their professions. And I'm even surer that, under that heading, I don't have all the answers.

In the end, I'm not naive enough to think that I'm talking to more than a minority of computer professionals in what I say here -- probably not to more than those already dedicated to getting computer professional societies and the whole range of organizations that depend heavily on computers (are there many in our society that don't?) *actively* involved in efforts, including citizen-driven efforts, to solve urgent social problems of our technological society (societies, right down to the local level). And, within those organizations, I'm probably addressing another small minority, those who will take it upon themselves pro-actively to get their organizations to do this. But, I'm confident, minorities can be a mighty force in bringing about a change for the better.

Chapter 9

A WAY TO IMPROVE ETHICS EDUCATION IN ENGINEERING

This chapter, like those that precede it, is another direct spin-off of chapter 6. It brings to a conclusion this part, on broadening professional ethics concerns, by focusing on what I consider the all-important aspect of an education to prepare students for real-world problems.

I recently published an article on philosophy and engineering (Durbin 2008; chapter 6, above), in which I included a very brief discussion of engineering education. There I turned to an earlier book of mine, *Critical Perspectives on Nonacademic Science and Engineering* (1991), in which I had included more extensive materials on the topic. For example, in that edited volume I had included a contribution from an expert on the subject in Germany, Gunther Ropohl, along with another contribution from an American engineering educator, Taft Broome.

Ropohl argues that engineering students need to be educated better than they are. He suggests substituting, in place of up to 20 percent of the normal technical curriculum, carefully designed courses on the humanities and social sciences that are directly related to engineering. What he is thinking about is the *systematic* character of contemporary engineering, which he feels is almost totally neglected now.

Broome, for his part, argues that engineering faculty need much more experience with *interdisciplinary* teams than they typically have, if they are going to be able to help their students deal with complex problems in the real world.

In what I offer here, I combine some aspects of both these proposals. I talk about how engineering students might be better prepared for the complexities they will face in future real-world work if they can be taught by teams of professors with the appropriate preparation.

But I should note at the outset my title: I am not talking about a *best* way to change the education of engineering students about ethics and social dimensions of their future work; I merely offer *one* way of doing so that I have found to be useful.

I

I begin by citing the work of another philosopher, Steven Goldman (1987), who has taught for many years in an American polytechnic institute, Lehigh University. Goldman has thought, and written, about the failings of engineering education in the USA over a long time period. In one particularly forceful paper (written for the now eliminated Office of Technology Assessment of the United States Congress), Goldman (1987) begins with what he says is "a common recognition among engineering educators":

"There is an overwhelming consensus among writers on engineering education that the engineering method is fundamentally different from the scientific method. Where the latter is essentially analytical, the former is based on design, expressing a synthesis of general theory and specific technical knowledge with relevant pragmatic judgments about workable means of achieving predetermined objectives."

Goldman goes on to talk about the "solution space" of engineering design problems, and says this:

"It is defined by the interests of the (actual or projected) client for whom the design exercise is

being carried out, together with the available technical knowledge base: from formal theories of matter and energy to machining capabilities. Scientists, by contrast, pursue patronage but, even for [recent] radical sociologists of scientific knowledge, do not explicitly factor into the solutions they propose for scientific problems the expressed demands of their patrons, or of their peers."

And he continues:

"The consequences of these contrasting 'solution spaces' for the practice of engineering as distinct from the practice of science are profound. Values are revealed to be an ineluctable concomitant of engineering practice, manifesting themselves in the social relations of the institutions through which engineers and the public interact. The study of values and of the way that values enter into and shape engineering practice thus finds a natural place, in principle, in engineering education."

But his main point is to underline that "in principle" reservation. He next notes that it was explicitly recognized in "a long series" of engineering education reports -- where he cites a Mann Report (1920s); Wickenden and Hammond (1934); Grinter and "subsequent American Society of Engineering Education reports" in the 1950s and 1960s; Grayson (1974); and an "Engineering Undergraduate Education" [EEPUS] report (1986; for the references, see Goldman, 1987) -- all of which had called for building into the engineering curriculum an "understanding of social and economic forces and their relationship with engineering systems, including the idea that the best technical solution may not be feasible when viewed in its social, political, or legal context."

Goldman then cites another education reformer, Louis Guy (1986), to this effect: "It is not enough for engineers to know how to do the thing right; we must also know what is the right thing to do. Otherwise our education has failed us."

All of these reformers, Goldman goes on to say, were echoing William Wickenden, as far back as 1934, who had said that accepting prevailing values uncritically meant reducing the engineer "to a mere servant of vested interests."

But, alas, Goldman concludes: "The integration of teaching about values into the engineering curriculum remains, 70 years after the Mann Report, in the realm of recommendations and proposals."

It should be noted that Goldman's pessimistic assessment reflects only the North American experience, and that in the late 1980s. My recent paper, referred to at the outset, was given at a conference in the Netherlands in 2007, and there was some evidence there that things may have changed, in some respects and in some countries (Holland itself, for example). But Goldman's sad history of recommendations never implemented can serve as a salutary reminder of what it is that those of us who would like to see a reform in engineering education are up against.

II

Because it fits the model I am going to propose as one way to go, I refer next to the proposals of Taft Broome about the need for retraining engineering educators to prepare them for their new tasks.

In his paper, Broome (1991) starts by commenting on what he sees as the failures of philosophers when they attempt to engage with engineering. But his thesis, he says, is that gaps on both sides of the interaction can be filled by what he calls "an emerging culture of *science, technology, and human values*." That is, by successful interdisciplinary endeavors. And he bases his recommendations on a long personal history of working with interdisciplinary teams, not only (though especially, in the context) of engineers and philosophers, but of humanists and technologists in general, including medical doctors.

The flavor of Broome's proposals comes out in the following, where he says that:

"Engineering education is fraught with instances of the phenomenon commonly known as *the* right answer. Moreover, the right answer is always arrived at through proper implementation of *the* right procedure. In practice [however], individual judgment plays a greater role than in the classroom, [though] codes and standards remain dominant factors in the daily life of the engineer. While creative use of these factors separates good engineers from others, engineering can still be criticized for not emphasizing intellectual liberation and freedom -- goals of the philosopher."

Then Broome adds:

"Nevertheless, agreements on what the right answer is, and how to get it, are essential to the preparation of students for teamwork and leadership in situations requiring the orchestration of many persons and machines, and the application of sophisticated principles to unique, complex, life-threatening, economically and politically sensitive, legally precipitous, time constrained problems. . . . No wonder at all, then, that engineers criticize philosophers for not finding *the* correct solution to every moral problem. . . . Nor is it any wonder that engineers criticize philosophy for not equipping philosophers with *the* correct procedure for arriving at *the* correct solution."

Not any interdisciplinary team involving philosophers and engineers is going to work out well, Broome is arguing. Both sides need re-educating.

In my proposal here, it makes no difference whether or not philosophers (ethicists in particular) are involved in changing the educational approach to engineering ethics, or the inclusion of other humanities and social sciences in engineering education. Appropriate engineering educators can do the job themselves -- *provided that* they have the appropriate backgrounds and attitudes. And both Broome and I would say that requires special training for the purpose.

III

To round out my recognition of those who have preceded me along this path, I next refer to a German colleague, Gunther Ropohl. He picks up on the point of the complexity of real-world engineering that Broome emphasizes.

Introducing his contribution to my edited volume, I wrote (Durbin 1991) this about Ropohl's paper:

"He is echoing literally thousands of laments, made over the last century (many of them emanating from prestigious engineering educators), that there is something radically wrong with engineering education. What is more or less standard about Ropohl's appeal for change is that engineering education ill prepares students for the broader interpersonal, social, and political dimensions of the work that they will be doing. What he adds to this dimension is a European background, plus a focus on the interdisciplinary aspect of the technosocial problem solving that engineering students must face in the modern world. What is unique about Ropohl's proposal for dealing with this issue is his focus on a *systems* approach."

And here are Ropohl's own words on the point:

"It seems to me that a systems approach -- successful already in systems engineering -- might provide the appropriate methodology for completing [the] task of integration. In a word, systems thinking could be the best answer to the sectorizing of knowledge. Scientific specialization cannot be undone, but it -- and the entire analytical approach of 'the project of modernity' -- might find its compensation in the synthetic approach, in a systemic holism."

Ropohl goes on:

"To improve engineering education requires overcoming [an] ideology, readying future engineers to take on their social responsibilities. [This] will, or course, require the gradual introduction of an engineering curriculum that presents a different view of engineering knowledge. Moreover, this paradigm shift in the engineering disciplines must be based on an integrative approach to general education, unifying technical and nontechnical knowledge along the lines of [what he calls 'metatechnology']. To repeat, systems engineering provides one model for such a program because it demands generalists (but *not* dilettantes) who should be T-shaped persons -- broad in their overall knowledge (the horizontal bar of the T), yet deep in one field (the vertical bar)."

It is in this context that Ropohl proposes his radical restructuring of the engineering education curriculum:

"It seems to me [that] it would not be detrimental at all to cut down on the hours required for specialist training, say, by 20 percent, to allow time for general education. . . . 20 percent is a minimum amount of time necessary to provide even basic outlines of the *engineering-related*

[emphasis added] general education fields."

And Ropohl is emphatic about this:

"We must be clear about the difference between the old, 'additive' approach and a genuinely integrative approach. . . . For example, instead of requiring a history of economic schools, I would prefer a course on the economics of technological development . . . and instead of a course on medieval poetry [another example], I would prefer a course focusing on the image of technology presented in modern literature. . . . Such examples illustrate my point earlier that materials from nontechnical fields must be closely related to technological practice if they are to help provide as comprehensive an understanding of technology as possible."

Clearly, professors in different countries with different intellectual cultures would prefer their own choices of what they think are the best "engineering-related" general education courses. But the thrust is clear.

IV

I come next to my proposal of something that I think has some possibility of being effective, even against the odds. Under this heading, I say the approach might work because I have seen it work first hand -- or read about similar successful ventures at universities in the USA other than my own (Durbin 1992).

What I claim is that there are four ways to change a group of faculty members -- provided that they are open to improving what they have been doing (unsuccessfully) up to now -- to bring about the changes in the curriculum that are needed.

1. In my experience, you must start with volunteers who already have an interest.

2. They would preferably represent a mix, such as one traditional *academic* engineer (with experience, say, trying to teach ethics to engineering students), one engineer with much *life experience* on the job (preferably in a specialty different from the first), and an engineer or engineering manager who has worked in a setting involving *public input*, such as an environmental impact assessment team.

Other combinations are clearly possible, and I am here assuming that the mix would include only engineering professors, rather than adding in philosophers or historians or social scientists. You often have to make do with those who volunteer. Still, there are some sets that are better than others.

3. Then you must give them a chance to *learn how to manage group discussion* among engineering students (which is not always easy). This might even involve a trial run for one semester or one educational block.

What I would recommend, in this regard, is for them to learn what in the USA is called Problem Based Learning (PBL; see below). But this is by no means the only method in which the three professors might be trained. There are dozens of student discussion approaches in the literature. All I would say is that the best ones *minimize* as much as possible *hierarchical* differences -- between professor and student, or between one student and another.

The ideal is group learning, by equals, motivating one another to contribute to finding their own solution to a problem that at least simulates real-world problems. (This process motivates better than any individual professor ever could, no matter how gifted a teacher he or she might be.)

4. Finally, the team members need to meet not only at the beginning, to plan carefully, but at the end of each unit -- to discuss among themselves what has worked and what has not worked.

They can also educate one another about what they have read, about their differing backgrounds and experiences as these have or have not helped them deal with the process, and similar things.

The point is, as much as anything, to help them adjust to one another, to become a better facilitating team for student learning. (It's ideal if a team can be kept together for more than one year, but that might be difficult to arrange in particular institutional settings.)

V

For those unfamiliar with it (much information is available online from the University of Delaware, which has pioneered in the approach; see www.udel.edu/pbl), in the PBL approach as I have been involved with it, the faculty are not teachers in the traditional sense, but facilitators of student learning-by-discussion in groups of about 6.

The students are assigned (or select their own topics) to prepare materials on a faculty-prepared case (one example might be a real-world environmental impact case). Each student gets an assignment to prepare a presentation of one aspect of the case (not just technical aspects, but legal, social, how to manage discussions, etc.), and presents it to the members of his or her small group each day.

After that there is written feedback among the students, in which they are urged to criticize one another in a fashion as positive as they can make it, especially in terms of helping the other students both to understand and to move the discussion along positively.

The first task of the professor-facilitators is to choose good cases -- ones that have feasible solutions but are difficult enough to challenge gifted and motivated students.

After that their primary role is to make sure that *no student* dominates, turning sessions into mini classes taught by one student; and that *all students participate*, no matter how timid they

may be to start with.

The facilitators also need to resist at all costs giving in to the temptation to play the teacher, to provide information that the students should have provided; or correcting their presentations (unless there is a gross error -- and even then he or she should mainly send the student back to do a better job).

At the end of a discussion, which normally takes about 3 weeks and ends with the group "solving" the problem the case presents, the facilitators do give feedback to the students, but mostly on how well they have managed the group learning, not on content.

This system works best with a class of about 20, with each of the 3 professor-facilitators taking different groups in rotation throughout the semester or other time period.

VI

In conclusion, someone might well ask if this will work in other settings, or only in the USA, and possibly only at the University of Delaware. My answer is that something like this could work in many settings, but not in terms of just this one model. Taft Broome offers his USA-based model. I offer my University of Delaware model. Gunther Ropohl offers his German model based on years of experience there. Anyone reading what I have written here might have other ideas or other models that have worked in his or her institutional setting.

The point is not the model. It is the call to reform, to choose *some* model to break the lock-step that has gripped engineering education up to the present. And not just the education of young engineers in ethics or the related humanities and social sciences. The ultimate goal, in my opinion, would be to transform the entire culture of engineering education, from the ground up, to lead eventually to a type of engineering education that will prepare students for the real world in which they must work.

In my view, it is an exciting challenge.

APPENDIX I

PHILOSOPHY OF TECHNOLOGY: 5 QUESTIONS;
ANSWERS BY PAUL DURBIN

Here the title gives the context. While many phrases and paragraphs are repetitions of what I said in chapter 1, the format - and especially answers to questions not addressed in the shorter version of the same message, above - make this a more complete summation of my views as I have been developing them now for nearly 20 years. The answer to the first question also provides some personal history.

1. For me the move from a focus on philosophy of science to philosophy of technology was a natural development - from science to applied science to technology (in the now-outdated terminology of the time). I was finishing up my doctoral thesis on the discovery process in science - later published as *Logic and Scientific Inquiry* (1968). My thesis (recall that a doctoral thesis is exactly that) was that *plausible reasoning* is the key to understanding the discovery process in science. No one today doubts the fundamental importance of probability and statistics in the whole range of contemporary sciences, but every application I know of in real-world science involves non-certain, *plausible* reasoning.

While writing my thesis, I grew increasingly interested in the social aspects of the discovery process, especially as described by the American Pragmatist philosopher, G. H. Mead. (See in particular his "Scientific Method and Individual Thinker," in his *Selected Writings,* 1964.) There is a dynamic interplay, Mead says, between creative scientists and the groups within which they operate, but which also support them. Mead goes so far as to say that any epistemological account - and he discusses all those known to him at the time - that does not reflect the fact that creativity depends on communities of knowers is doomed to failure. In a famous phrase used later by sociologist of science Robert Merton, "We see further because we stand on the shoulders of giants." Yes, in science there are creative individuals, but their very creativity depends on their interaction with mentors.

A little more reading in the American Pragmatists quickly revealed that this was no genius insight on Mead's part. Beginning at least with C. S. Peirce and continuing with William James - with forebears all the way back to Descartes' own era among thinkers such as Giambattista Vico - the Pragmatists had recognized that Descartes' epistemological problem was a self-defeating pseudo-problem. Once we recognize that creativity is only fostered in groups, it becomes clear that fears on the part of individuals that they are being deceived by evil geniuses can themselves only gain traction in groups. All of us as graduate students in post-Cartesian settings may have perceived it as a real problem, but our fears could only be taken seriously by mentors who had taken their own doubts equally seriously - and promised us great rewards if we could "solve the problem." Even Descartes' own problem could only deserve to be taken seriously among a group of like-minded anti-Scholastics. And those with more serious problems on their minds - scientists, engineers, businessmen, ordinary citizens, you and I - cannot afford the luxury of universal doubt.

Once freed of the "epistemological problem," we are free to pursue serious discoveries. And it makes no difference whether the discovery is made within a so-called pure science community, or in applied or (what was then called) mission-oriented science, or in an engineering or technological community. So it was an easy step for me to turn my attention to technology, especially in the context of the late 1960s and early 1970s, when there were widespread critiques of the role of technology in the Vietnam War (we in the USA will recall John McDermott's famous article, "Technology: The Opiate of the Intellectuals," *New York Review of Books,* 31 July 1969), and in environmental issues (recall the first Earth Day in 1970).

From that time on, for over 25 years, I devoted myself mainly to editing the books associated

with the Society for Philosophy and Technology. I did publish a book of my own, *Social Responsibility in Science, Technology, and Medicine* (1992) -- I'll talk about that next -- and, as I will mention later, I ended up chronicling 30 years of controversies in SPT.

2. As I said, I linked my philosophical approach to that of the American Pragmatists, whom I read as linking their philosophical thought to activism in terms of helping to solve social or technosocial problems. (See Andrew Feffer, *The Chicago Pragmatists and American Progressivism*, 1993.) I went so far, on one occasion, as to describe my approach as "social work philosophy of technology." (See Carl Mitcham, ed., *Research in Philosophy and Technology,* vol. 16: *Technology and Social Action,* 1997, pp. 3-14.) There, as elsewhere, I try to avoid the trap of being asked for a "respectable" defense of my approach. No "academic" defense of activism on the part of philosophers is needed, or called for. Ever since a Dewey-inspired (or at least Dewey-endorsed) definition of the academic's role in North American universities as involving a "service" component -- not as an add-on but as essential to one's role as an academic professional -- at least lip service has been paid to the demand that academics contribute to the good of society.

I believe that any separation between philosophy and the so-called "real" world, with its many problems, is not only arbitrary but pernicious. Dewey is famous for opposing all dualities, including that of separating philosophy from life, and I am in complete accord with him on that point. (See his *Reconstruction in Philosophy*, 2d ed., 1948, and *Liberalism and Social Action,* 1935.)

I also agree with Dewey (and Mead) that, when philosophers get involved in social issues, they cannot play the role of philosopher kings, advising others how to solve their problems; they must get involved as equals with all those working on a particular issue, everyone from scientists and engineers to social scientists to government agents to experts of all sorts, but also including ordinary citizens involved in the issue.

I have found this approach to be relatively rare among philosophers, but there are others who employ it; and in one of my books I appeal to technical professionals to do so in greater numbers than at present. (See my *Social Responsibility in Science, Technology, and Medicine,* 1992.) The professionals I appeal to there include technology educators, medical school reformers, media or communications professionals, bioengineers and biotechnologists, computer professionals, nuclear experts, and ecologists. In another book I appeal to fellow philosophers, especially fellow philosophers of technology and environmental philosophers, to do the same. (See my "Activist Philosophy of Technology: Essays 1989-1999," 2000, available on my University of Delaware website [now modified, here, as Volume One, above].)

In that set of essays, I argued for so-called applied ethicists -- for example, engineering ethicists, or bioethicists, or environmental ethicists -- to move beyond admittedly good academic contributions to the literature, to get involved in real-world activism to improve engineering professional societies and especially their policing efforts and lobbying efforts; to work with those struggling to make contemporary high-tech medicine more humane; and to actually apply environmental ethics theorizing to help improve the environment. (Andrew Light and Eric Katz

seem to me to capture this best in their edited volume, *Environmental Pragmatism,* 1996.)

It is in this last arena where I have chosen to do most of my activist philosophizing in recent years, as I have traveled repeatedly to Costa Rica to join with friends there in the ongoing effort to protect that country's amazing biodiversity, and especially the forests that are so important for that. Costa Rica is a model for the rest of the world, but conservation and preservation efforts there are ongoing, and continually threatened with backsliding. Echoing another philosopher who has done work in Costa Rica, David Crocker of the University of Maryland, I see my work as involving what he calls "insider-outsider cross-cultural communicators" (see the newsletter of the Institute for Philosophy and Public Policy, Summer 2004) -- that is, non-resident outsiders with appropriate views and attitudes who work with like-minded people in a country or region to bring about change for the better.

 3. I prefer not to talk about obligations so much as opportunities.

[*Note to the reader: This section repeats, practically verbatim, what I said in chapter 1. So it makes sense just to skip to the next section.*]

Our contemporary technological culture has many problems -- probably no more than other cultures, but many -- and I believe that the citizens of a democratic society have the right to expect that technical professionals, including philosophers, will contribute what they can to the solution of these problems. In my *Social Responsibility,* as I mentioned, I try to enlist biotechnologists and bioengineers -- along with such others as ecologists -- in such activism.

Presumably this question seeks an answer in the "ought" category, perhaps something like an ethical or social or even political obligation. But that's not what I think is called for here. The problems calling out for action in our troubled technological world are so urgent and so numerous -- from global climate change to gang violence, from attacks on democracy to failures in education, from the global level to the local technosocial problems in *your* community -- that it isn't necessary to talk about obligations, even social obligations. No, it's a matter of *opportunities* that beckon the technically trained -- including philosophers and other academics -- to work alongside those citizens already at work trying to solve the problems at hand.

Why? Can I offer a general answer to the question? I suppose I could try, but I don't feel the need to do so; certainly no urgency to do so. The problems are just there for all to see. And democratic societies have a right, in my opinion, to expect that experts will help them, experts from all parts of academia and all the professions. I would even go so far as to say that there is at least an implicit social contract (an ethical/social/political term that I won't define here) between professionals and the democratic societies in which they live and work and get paid for their professionalism.

This may sound like rampant relativism: just get involved in any crusade you choose, as long as it "improves" society. To avoid this implication, I need again to fall back on American Pragmatism. It was the view of Dewey and Mead that there is at least one fundamental principle on which to take a stand: that improving society always means making democracy more

widespread, more inclusive, inviting more groups -- not fewer groups -- into the public forum; elitism, "my group is better than your group," and all other such privilegings are anti-democratic. This "fundamental principle," however, is not just another academic ethics principle; it is inherent in the nature of democracy -- at least as the American Pragmatists understood it. As I understand it.

I'm always happy when fellow philosophers try to provide academically respectable answers to questions of social obligation, of social contracts on the part of professionals, of the need to keep democracy open to ever wider inputs. But if we wait for them to provide such answers, it will typically be too late. Global warming proceeds apace. Loss of species diversity, of life on earth, proceeds apace. Threats to local communities in the so-called "developing world" in the face of economic globalization proceed apace. And so on and on. These and others like them are not issues of academicism. What I have in mind are *urgent* social issues that cry out for answers *now*.

I have been accused, on these grounds, of favoring activism over principle -- even of abandoning the traditional role of philosophy as theoretical discourse. But I don't mean to do that. I believe Dewey was right in opposing all dualisms, including the dualism of principle versus practice or theory versus action. I welcome academic work on these issues; I just ask academics to accept activism as a legitimate part of philosophical professionalism. The issues seem to me that important.

Richard Rorty, who also calls himself a Pragmatist in the Deweyan tradition, shows some ambivalence on this issue: he talks about the death of philosophy, meaning mostly academic philosophy, but in one recent book, *Achieving Our Country: Leftist Thought in Twentieth-Century America* (1998), he has also lamented the failure of philosophers -- and other academics -- to involve themselves in progressive social causes, where his examples are relatively vague, such as "substituting social justice for individual freedom as our country's principal goal," though Rorty does endorse a claim that his favored "leftists" should agree on a "concrete political platform," on "specific reforms."

There is, in my opinion, much that philosophers can contribute. At the very least, they can contribute their "clear thinking" skills, but they can also make contributions out of the store of knowledge they have gained (if they have) from, for example, political thinkers going back through the centuries from Machiavelli all the way to the Stoics and Aristotle and Plato. And, as I have mentioned, bioethicists and environmental ethicists -- among other so-called applied ethicists -- can move beyond their academic work to help improve medical care or save planet earth.

But I think it is going too far to talk about an obligation to do so.

4. Don Ihde, in his *Philosophy of Technology: An Introduction* (1993) provides an account of the history of ideas in terms of the relations of human beings to their technologies. I don't think I can improve on Ihde's account.

There was, of course, an earlier tradition among historians and social and cultural anthropologists that tried to link advances in social evolution to changes in the tools used by human societies (even some pre-hominid communities). That approach is now pretty much considered to be outdated, but it still makes sense to me to view history through the lens (Ihde likes that metaphor) of the changing types of technologies that various human societies have invented and utilized to improve their lives.

Larry Hickman (see his *Philosophical Tools for a Technological Culture*, 2001, as well as his earlier, *John Dewey's Pragmatic Technology,*) is now famous for arguing (he thinks that John Dewey first defended the view) that *philosophy* is a world-changing tool, a tool for improving society.

In a related view, I have argued (see Durbin 1991, where I collect about a dozen essays by the most important philosophers of engineering writing at that time) that a philosophy of engineering is an important -- and generally missing -- part of philosophy of technology, in spite of Carl Mitcham's disparaging of "engineering philosophy of technology" (in his *Thinking through Technology*, 1994) as falling short of what philosophy of technology ought to be doing.

Sadly, one example often used by tools-oriented historians of technology is war-making technologies. (Neither Ihde nor I think they contribute much to society.) Others disagree, and some go so far as to say that the major advances in the history of technology have come from war-related technologies. So I'll grudgingly admit that it can be important to accept the bad with the good, in these terms, in understanding human history.

5. In a book MS, "Philosophy of Technology: In Search of Discourse Synthesis" that I recently completed -- it should appear, online, in SPT's *Techne* [it has; see spt.org] within a year -- I try to do exactly this by way of a history of the major controversies within the Society for Philosophy and Technology.

Others have done something similar; for example, Hans Achterhuis and colleagues do so in *American Philosophy of Technology* (2001), where a group of philosophers at the University of Twente in the Netherlands survey the work of a group of representative American philosophers, including many invited to contribute to this project.

In either case, the point is that giving philosophers of technology a fairer reading than they (we) often get in philosophical circles -- indeed in the broader culture more generally -- is an important way to get at such issues. In my MS on the history of controversies in SPT, I end with a dozen of these issues that I think make a contribution, whether to academic philosophy or to the improvement of society. I will list just a few here.

First, on the academic side, I believe Joseph Margolis's "constructivist" characterization of the knower and the known as inherently technological and pragmatic -- ideas that he worked out in large part in contributions to SPT meetings -- is a much better contribution to epistemology than the better known characterization of Mario Bunge. (See Margolis, *Reinventing Pragmatism: American Philosophy at the End of the Twentieth Century,* 2002; and Bunge, *Treatise on Basic*

Philosophy. VII: Epistemology and Methodology III: Philosophy of Science and Technology. Part II. Life Science, Social Science and Technology. 1985.)

Also somewhat academic is the issue whether or not philosophy of technology ought to have a place for traditional metaphysics. Carl Mitcham and Albert Borgmann and Fred Ferre have probably been the best known SPT philosophers who say yes; while Joe Pitt has been the most vehement arguer to the contrary. (See Mitcham, *Thinking through Technology: The Path from Engineering to Philosophy, 1994; Borgmann, Technology and the Character of Contemporary Life,* 1984; Ferre, *Philosophy of Technology* ; and Pitt, *Thinking about Technology: Foundations of the Philosophy of Technology,* 2000**.)**

But most fundamental of all is the controversy within SPT publications over whether or not philosophy of technology ought to be an academic discipline in the first place. Recently, the issue seems to have been settled, with a resounding yes. (See Higgs, Light, and Strong, eds., *Technology and the Good Life?* 2000.) But I was not the only philosopher in SPT who argued, from the very beginning of the society, that philosophy ought to make a real-world contribution to the improvement of the world we live in.

Langdon Winner, among those invited to contribute to this project, has been the most outspoken advocate of this approach, to issues through philosophers (or thinkers more generally). (See his discussion of social construction of technology work, in *Science, Technology & Human Values* 18:3, Summer 1993: 362-378.)

APPENDIX II

PHILOSOPHY, ACTIVISM, AND COMPUTER AND INFORMATION SPECIALISTS
[Early version of Chapter 8; it was published in the online journal *Ubiquity*.]

In the decade before I retired from the University of Delaware Philosophy Department, I got to know a number of computer and information specialists in our Instructional Technology program. They were helping me, among other things, to put online a problem-based-learning (actually case-based) course on Contemporary Moral Problems, an innovative distance learning venture that was also interactive, involving dialogue between the students and with myself as moderator. But I never got into any discussions with them, at the time, about information technologies and ethics.

However, at least three times, before and after that period, I did write some items dealing with the topic. In 1992, in my book, Social Responsibility in Science, Technology, and Medicine, I included a chapter that invited computer professionals to join with such colleagues as their compatriots in Computer Professionals for Social Responsibility to help deal with social problems connected to work in the computer and information fields. The type of problems I refer to there had been summarized by an Office of Technology Assessment (United States Congress) report in 1985 that said the problems had "outstripped the existing statutory framework for

balancing interest in civil liberties and law enforcement" -- problems such as computer usage monitoring, electronic mail monitoring, and cellular phone and satellite interceptions. Computer Professionals for Social Responsibility publications claimed that its members had lobbied Congress, alerted the media, and watchdogged efforts of the Federal Bureau of Investigation (FBI), among other activities. The book is an appeal to technical professionals of various sorts -- not only computer and information specialists -- to get involved in greater numbers than had done so up to then in activism of this sort on what were widely perceived as technosocial problems.

Ten years later, I was invited to participate in a workshop at the University of Salamanca in Spain that focused, among other things, on problems of privacy in the information age. In an article based on my talk there, that appeared a few years later (2005), I again addressed social problems associated with computer and information specialists. In addition to the privacy theme of the workshop, I also addressed issues related to computer work as related to the war on terror; the September 11 2001 attacks on the World Trade Center in New York and the Pentagon in Washington, D.C., had occurred just months before my talk. On the privacy issue, I could again refer to a number of activist groups -- those that Lawrence Lessig, a legal expert who had written a great deal about computer issues, said he had worked with: the Center for Democracy and Technology, and the Electronic Frontier Foundation, among others. On issues such as encryption and the war on terror, I had fewer activist organizations to refer to, but the message was still the same: I hoped that more computer experts would get involved in activism than had done so up to that point. The issue, of course, is especially tricky when one is dealing with an issue like the war on terror; but my message (not very hopeful, I admit) remained the same.

Still more recently (2007), I included a discussion of similar issues in my online book, "Philosophy of Technology: In Search of Discourse Synthesis." There, because I was writing a history and not sermonizing to computer professionals, I limited myself to chiding the Society for Philosophy and Technology's leading expert on computer ethics, Deborah Johnson, for mostly limiting herself to recommendations to include computer ethics in the training of computer professionals. However, I had to admit that she went at least one step beyond that: "The bottom line is that all of us will benefit from a world in which computer professionals take responsibility; ideally we would have all computer professionals working to shape computer systems for the good of humanity." In her book on *Computers, Ethics, and Social Values* (co-edited with Helen Nissenbaum), Johnson had actually gone still another step beyond that vague wish, including in the anthology an essay by a renowned computer activist, Terry Winograd, in which he said, "We need to create an environment in which the consideration of human values in our technological work is not a brave act, but a professional norm." And Winograd mentions in his essay a number of his own efforts at activism, including efforts involving (once again) Computer Professionals for Social Responsibility. In making these calls for more activism in the name of social responsibility, I fall back on my personal philosophy, which I base on the philosophy of the American Pragmatists, especially John Dewey and G. H. Mead.

I have written on this topic numerous times, and in recent years I have distilled the message to its basic elements. First, I believe, with Mead, that ethics is not some abstract system of deontological or utilitarian rules, but the community attempting to solve its problems in as

intelligent a way as possible. (Hans Joas, in an intellectual biography of Mead, has pointed out this contrast, for Mead, between his community action view and both deontological and utilitarian ethical theories.) Mead wrote, almost a century ago, as follows:

"The order of the universe that we live in is the moral order. It has become the moral order by becoming the self-conscious method of the members of a human society. The world that comes to us from the past possesses and controls us. We possess and control the world that we discover and invent. And this is the world of the moral order. It is a splendid adventure if we can rise to it."

In my opinion, society expects us to rise to the challenge, especially democratic society. Democratic societies, at least, have a right to expect that experts will help them, experts from all parts of academia and all the professions. I would even go so far as to say that there is at least an implicit social contract between professionals and the democratic societies in which they live, giving rise to this expectation that professionals will shoulder their responsibilities to improve the societies in which they live and work.

In these terms [as I have said several times in these pages], some people talk about an obligation to shoulder social responsibilities. But I don't prefer that terminology. As I have written elsewhere:

"That's not what I think is called for here. The problems calling out for action in our troubled technological world are so urgent and so numerous -- from global climate change to gang violence, from attacks on democracy to failures in education, from the global level to the local technosocial problems in your community -- that it isn't necessary to talk about obligations, even social obligations. No, it's a matter of opportunities that beckon the technically trained -- including philosophers and other academics -- to work alongside those citizens already at work trying to solve the problems at hand."

I am an optimist, but not a blind optimist. I am happy that there are computer professionals who are activist in joining with others to solve the technosocial problems that vex our society, including the computer and information professions. And I will be happier still if more join their ranks. But I also recognize that many will not, that many will remain satisfied that they are doing their best if they just do their jobs well.

But the problems remain, and the opportunities to do something about them. And I'm optimistic enough to hope, like Mead, that some computer and information specialists will rise to the challenge.

A Note on Sources for This Volume:

1. *Ludus Vitalis*, volume XV, number 27, 2007, pp. 195-197.
2. *Ludus Vitalis*, volume XVI, number 29, 2008, pp. 169-172.
3. This essay was not written specifically for publication, and appears here for the first time.

4. "Ethics and New Technologies." In F. Adams, ed., *Ethical Issues for the Twenty-First Century*. Charlottesville, VA: Philosophy Documentation Center. Pp. 37-56.

5. This paper has a complex history. I prepared it first for a World Congress of Philosophy panel in 2003, but that panel was later cancelled. I then presented a small portion of the paper at the Society for Philosophy and Technology international conference in Delft, Holland, in 2005, but the brief version was turned down for inclusion in the proceedings volume of that conference. Next I included significant parts within a chapter in my *Philosophy of Technology: In Search of Discourse Synthesis* (2007, in *Techne*: see spt.org). It is currently under review for *Ludus Vitalis.*

6. To appear in D. Goldberg and I. van de Poel, eds., *Philosophy and Engineering.* London: Springer, expected early 2010.

7. *International Science Reviews* 33:3 (2008): 225-235.

8. To appear in special number guest-edited by Arun Tripathi (general editor is Karamjit Singh Gill), as "Ethics and Aesthetics of Technologies," in *AI & Society* journal; see details about the journal at http://www.springerlink.com/content/102816.

9. Prepared for a conference in 2008 at the Universidad Politecnica de Madrid, "Estudios de la ciencia, tecnologia y sociedad en la investigacion y la formacion." Publication status unclear. Appendix I. "Paul Durbin," chapter 5 in *Philosophy of Technology: 5 Questions*, ed. Jan-Kyrre Berg Olsen and Evan Selinger (Automatic Press, 2007), pp. 45-54.Appendix II. *ACM Ubiquity*, Vol.8, Issue 45 November 13 – November 19, 2007.