Towards a Social Ethics of Technology: A Research Prospect

Richard Devon
The Pennsylvania State University

Introduction

Most approaches to ethics focus on individual behavior. In this paper, a different approach is advocated, that of social ethics, which is offered as a complement to individual ethics. To some extent, this is an exercise in renaming some current activities, but it is also intended to clarify what is a distinct and valuable ethical approach that can be developed much further than it is at present. What is described here as social ethics is certainly practiced, but it is not usually treated as a subject for philosophical inquiry.

Social ethics is taken here to be the ethical study of the options available to us in the social arrangements for decision-making (Devon 1999; see also a follow-on article to the present one, Devon and Van de Poel 2004). Such arrangements involve those for two or more people to perform social functions such as those pertaining to security, transportation, communication, reproduction and child rearing, education, and so forth. In technology, social ethics can mean studying anything from legislation to project management. Different arrangements have different ethical tradeoffs; hence the importance of the subject.

An illustration of social ethics is provided by the case of abortion (a technology). The opponents of abortion take a principled position and argue that abortion is taking a life and therefore that it is wrong. The opponents of abortion believe all people should be opposed and have little interest in variations in decision making practices. The pro-choice proponents do not stress taking a position on whether abortion is good or bad but rather on taking a position on who should decide. They propose that the pregnant woman rather than, say, male dominated legislatures and churches should have the right to decide whether or not an abortion is the right choice for them. The pro-choice position would legalize abortion, of course, hence the debate. The pro-choice position, then, is based on social ethics. Very clearly, different arrangements in the social arrangements for making a decision about technology (abortion in this case) can have very different ethical implications and hence should be a subject for conscious reflection and empirical inquiry in ethics.

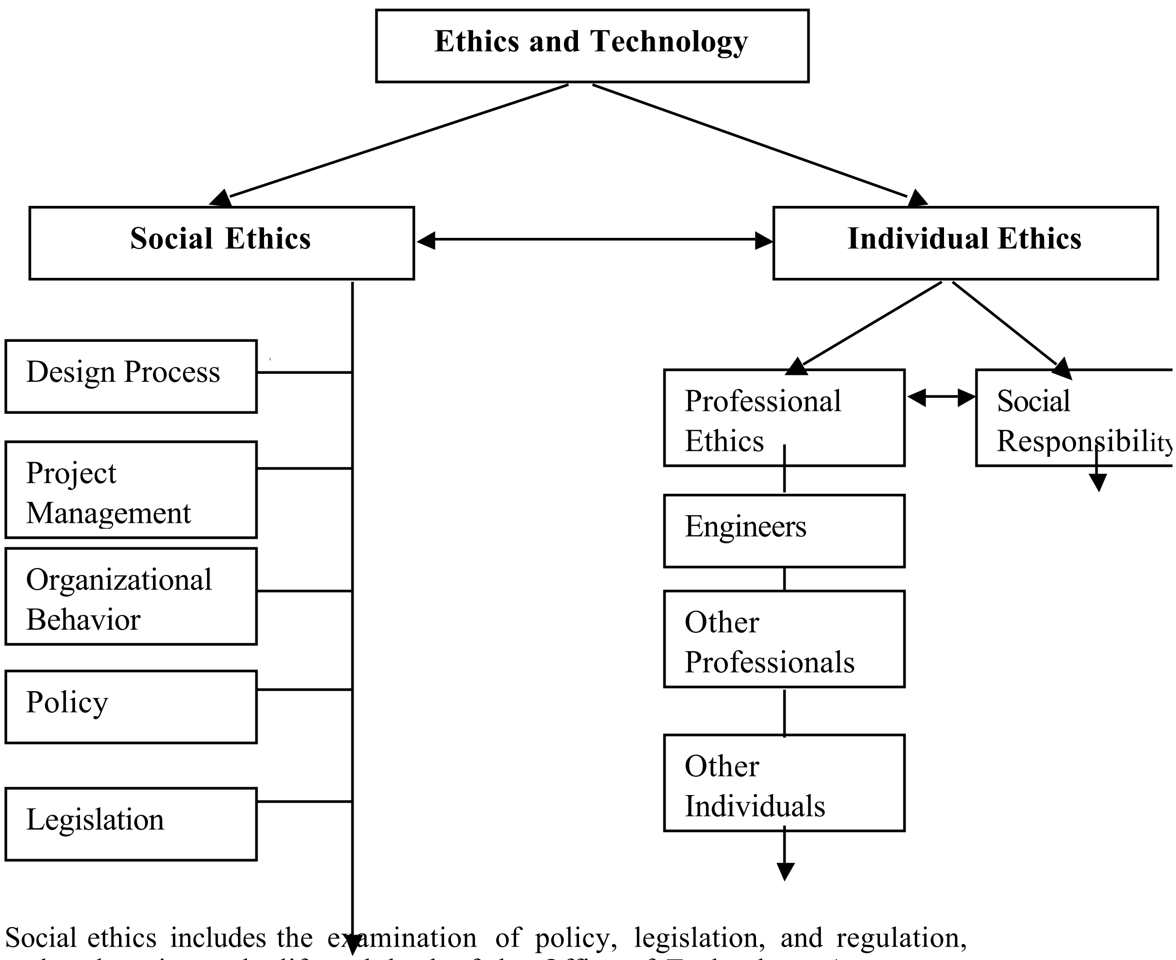
There is no shortage of illustrations of the role of social ethics in technology. Consider the question of informed consent in the case of the Challenger. The launch decision was made in the light of a new and considerable risk, of which the crew was kept ignorant (Boisjoly 1998; and see Vaughan 1996). This apparently occurred again in the case of the Columbia (Ride 2003). Informed consent, absent here, is a well-known idea and represents a social arrangement for making a decision. The skywalk of the Hyatt Regency failed because of a design change that was both bad and unchecked (Petroski 1985; Schinzinger & Martin 2000, p. 4). A bad decision is one thing, an unchecked decision means that the social arrangements for decision-making were inadequate. The original design was also bad (very hard to build) and this was largely because the construction engineers were not consulted at the outset. Similarly, this was a bad social arrangement for making decisions, and it may be compared to the concurrent engineering reforms in manufacturing that use product design and development teams to ensure input from both design and manufacturing engineers among others. An unchecked, faulty design decision by a construction company was also the cause of the lift slab failure during the construction of Ambience Plaza (Scribner & Culver 1988; Poston, Feldman, & Suarez 1991). The Bhopal tragedy was the result of a failure in a chemical plant where many safety procedures were disregarded and almost every safety technology was out of commission (Schinzinger & Martin 2000, pp. 188-191). The global oversight of Union Carbide at the time rested on the word of one regional manager, which was not a safe management practice either (McWhirter 1988).

It is hard to find a textbook on engineering ethics that takes project management as a worthy focus for analysis. Schinzinger and Martin (2000, p. 3-5) do have a good engineering task breakdown but it is not focused on management. And project management is not usually prominent in engineering curricula. Where it is present, ethics is usually not included (e.g., Ulrich & Eppinger 2004). Yet, as the examples above suggest, it is very easy to see the importance of project management in most of the famous case studies of engineering ethics.

Studying only individual behavior in ethics raises a one-shoe problem. It is valuable to lay out the issues and case studies and to explore the ethical roles of the participants. However, what we also need to study are the ethics involved in how people collectively make decisions about technology. A collective decision has to be made with participants who have different roles, knowledge, power, personalities, and, of course, values and ethical perspectives. This is the other shoe. How do they resolve their differences and, or, combine their resources and wisdom? And insofar as engineering ethics only focuses on engineers and not on the many other participants in decision-making in technology, it exacerbates the problem (Devon 1991).

Studying ethics and technology means looking at both individual and collective behavior in the production, use, and disposal of technology. This broad scope may be contrasted with the best-developed sub-topic of professional ethics applied to engineering, which has concentrated on roles and responsibilities of working engineers (see Figure 1).

Figure 1



Social ethics includes the examination of policy, legislation, and regulation, and such topics as the life and death of the Office of Technology Assessment in the United States (Kunkle 1995). It also provides a useful method of inquiry into ethical issues in the design process (Devon & Van de Poel 2004) and in project management. These are very practical areas in which researchers may well attract corporate and public funding. As noted above, many of the case studies that are currently popular in texts and websites on engineering ethics may best be reduced to issues of poor project management: that is, reduced to social rather than individual ethics. See, for example, http://www.onlineethics.org/ and http://ethics.tamu.edu/. The social ethics of technology is not simply a matter of extending the scope of ethics to collective decision-making. The method needs exploring and developing. And we need empirical studies of the ethical effects that different social arrangements have for decision-making. Research, a lot of research, is the next step.

Fortunately, social ethics is practiced ubiquitously; even professional codes have plenty of statements that concern the social ethics of technology. And the codes themselves represent a social arrangement that has been commented upon extensively. What is lacking, and what is proposed here, is a clear scholarly methodology for developing the field.

Politics or Ethics

As with Aristotle's view of both ethics and politics, ethics is seen here as the practical science of finding the right goal and the right action to achieve that goal. Engineering ethics, as it has been traditionally viewed, is a subset of this larger domain of the ethics of technology, since many others join engineers in the way technology is created and used. Whereas engineering ethics has tended to answer the question what makes a good engineer good, a social ethics of technology asks what makes a good technology good (Devon 1999).

Traditionally, ethics has primarily been the study of appropriate standards of individual human conduct (*Nichomean Ethics* 1990). Anything about appropriate social arrangements has been referred to as politics, notwithstanding Aristotle's view of ethics a subset of politics, which he viewed as the supreme science of correct action and obviously a collective process (Aristotle *Politics*; Apostle & Gerson 1986).

Engineering ethics has been affected by this dichotomy between what is ethical and what is political. An exchange in the *IEEE Spectrum* revealed this distinction clearly (*IEEE Spectrum* December 1996; February 1997; March 1997). After well known experts on engineering ethics had engaged in a roundtable on the subject, several engineers wrote letters that included the argument that two of the ethicists had "confused a political stance with ethics" (*IEEE Spectrum* February 1997). The topic was the work of engineers in various technologies such as chemical and other warfare technology, and even working on the Cook County Jail. The ethicists in question did, in fact, indicate personal opposition to such technologies and the letter writers were making ethical defenses of working in such fields of engineering.

The letter writers in this case clearly felt that engineering ethics, as presented, was excluding their values and, worse, condemning them. The same experience occurred in the newsletters and meetings of a small, short-lived group called "American Engineers for Social Responsibility," in which I participated. A single set of values was presented under a general rubric for values, implicitly excluding (pejoratively) those who held other values, some of whom told us as much. On the other hand, many engineers who feel there are major ethical problems with the deployment of their skills can gain little solace from codes of engineering ethics, and not much more from the discourse of their professional societies.

We presently have no satisfactory way of handling this type of discourse/conflict within engineering ethics, beyond making optimistic injunctions such as calling for employers to accommodate any disjuncture between the ethical profiles of employees and the work assigned to them by the companies that employ them (Schinzinger & Martin 1989, p 317; Unger 1997, pp. 6-7) This frustration has led to protest emerging as a theme in engineering ethics, and this, in turn, gets rejected by many engineers as being politics rather than the ethics.

There is a way of dealing with the problem. Taking a social ethics approach means recognizing not only that the ends and means of technology are appropriate subjects for the ethics of technology, but also that differences in value systems that emerge in almost all decision-making about technology are to be expected. The means of handling differences, such as conflict resolution processes, models of technology management, and aspects of the larger political system, must be studied. This is not to suggest that engaging in political behavior on behalf of this cause or that is what ethics is all about. That remains a decision to be made at the personal level. Rather, the ethics of technology is to be viewed as a practical science. This means engaging in the study of, and the improvement of, the ways in which we collectively practice decision making in technology. Such an endeavor can enrich and guide the conduct of individuals, but it is very different than focusing on the behavior of individuals in a largely predetermined world in which their options are often severely constrained.

The Scope and Method of Social Ethics

The social ethics of technology is not just a consequentialist approach. The desired outcome is taken to be good technology, but the process of getting there (right social action) is also very important in social ethics. Rather than look at right action in principled terms, focused on the individual, an action may equally be ethically evaluated on the basis of the social process leading up to it.. Deontological social ethics means that if the process is a good one, the results will take care of themselves. Practitioners may view the right process as the best they can do and tolerate a wide range of outcomes as a result. So, for example, if we establish good democratic information flows and decision-making in the design process, we will have answered the question of what is a "good" technology with one solution: one produced by a good process. Similarly, we may still take a social consequentialist approach and examine the outcomes, just as we do at the individual level, and change the social arrangements to achieve the types of outcomes that seem ethically desirable. Virtue ethics might also be applied with examples of establishing decision making groups of virtuous people. It all sounds familiar, but it is not studied as a science of ethics.

Technology is socially constructed. Technological designs express what we want and they shape who we are. People in all walks of life are involved in demanding, making, marketing, using, maintaining, regulating, and disposing of technology. Design is the focal point of technology. It is where societal needs meet technological resources in a problem-solving context. As we design technology, so we design our lives, realize our needs, create opportunities, and establish constraints, often severe, for future generations. It is the design process that creates the major transformations of society and the environment that technology embodies. Early stages of the design process determine most of the final product cost and this may be emblematic of all other costs and benefits associated with technology (National Research Council 1991). The similarity between applied ethics and design has been noted (Whitbeck 1996). Design may be the best place to study ethics in technology. Design affects us all. However, not all of us are involved in design, and this asymmetry has great import for the social ethics of technology.

Most decisions about technology are collective, to which individuals only contribute, whether in a product design and development team, or in a legislature. The nature of such collectivities varies enormously. There are many different varieties of organizations in industry, and many different governmental bodies. Consider the area of risk management, for example. In addition to personal judgment, there are many different institutions involved such as legislatures, regulatory agencies, tort and common law, insurance, worker's compensation, government industry agreements, and voluntary standard-setting organizations (Merkofer 1987). One can examine individuals purchasing a consumer product, and the subsequent use and disposal decisions that follow. Family members and friends play a significant role in all these stages, not to mention advertising, insurance, laws, and community codes. This is not to deny that individuals are very important in innovation, buying commodities or making administrative decisions, but the autonomy implied by a sole focus on individual ethics may exaggerate the ethical space that is usually available and distract attention from more powerful social realities.

Accepting that we have complex social arrangements for handling technology, it is also true that these arrangements are mutable. For example, in the last three decades, international competition has revealed different approaches to the social organization of industry. The long dominant top-down scientific management approach is steadily being replaced by flatter organizations with more participatory management (Smith 1995). Product design and development teams are replacing the old sequential approach to engineering. These changes occurred because they made companies more competitive, but they also have profound ethical implications for the people who work for the companies. A case can be made that the ethical situation improves in some ways for the employees with the change to participatory management. Similarly, greater sensitivity to customer needs also has an ethical benefit even though tradeoffs are not hard to find (Whiteley 1994). In fact, not viewing the social relations of production as a variable made U.S. industry very slow to see what their competition was doing.

To summarize, decisions are usually made collectively and in social arrangements that represent one of many possibilities. Further, changes in these social arrangements must have an impact not just on the technology but on the ethics involved in the technology, both as product and in the processes that create that product. Surely, then, we can consider the study of these social arrangements as appropriate subject matter for the ethics of technology. Dewey argued in much the same way for a scientific and experimental approach for ethics in general. "What is needed is intelligent examination of the consequences that are actually effected by inherited institutions and customs, in order that there may be intelligent consideration of the ways in which they are to be intentionally modified on behalf of generation of different consequences" (Dewey 1996, p. 305).

Project Management and Social Ethics

Since the way technology is created and managed in society is vast and complex, how can we hope to study it systematically? One answer is that there is a lot of work to do close at hand, such as the design and operation of product design and development teams and other forms of project management. For example, as noted in the Introduction, many failures that are used as case studies in engineering ethics seem to have project management pathologies at the heart of them. Apparent examples are: not checking a design and not enforcing worker safety rules in the Ambience Plaza lift slab collapse (op cit.), assigning the person with the wrong competency and, again, not checking a design in the chemical plant explosion at Flixborough (Taylor 1975), failing to exercise design control over changes during construction of the Citicorps Building in New York (Morgenstern 1995), and the Hyatt Regency in Kansas City (op cit), not providing proper training in handling toxic chemicals in the case of the "Aberdeen Three" (http://ethics.tamu.edu/ethics/aberdeen/aberdee1.htm), and not maintaining proper management, and oversight of a plant at Bhopal (op cit.). Although there are dramatic ethical issues involved in these cases, none of the disasters seems to reduce well to a problem of individual ethics. They are prime case studies for teaching project management and social ethics, however. For further analysis of such case studies, see Devon and Van de Poel (2004).

An excellent exception to most case studies is the study of the DC-10 failures and crashes (Fielder & Birsch 1992). This set of studies explicitly engages in social ethics by examining the role of corporate and regulatory behavior, and revealing, for example, that engineers' concerns at subcontractors such as expressed in the Applegate memo had no legal means of reaching the FAA which was responsible for the regulatory oversight. This was an arrangement that could have been different.

The Role of Cognizance

Up to this point we have made a case for a social ethics of technology. Now, two general values are suggested that are important in realizing a social ethics of technology. Cognizance is important. We have an obligation to understand as fully as possible the implications of a technology. While such understanding seems to be increasingly characterized by uncertainty, we are still obliged to do the best we can. There is simply no point making ethical judgments in a state of reparable ignorance.

Some texts have appeared that provide new resources in areas where information has been lacking. For example, it is now possible to have some idea of the global social and environmental changes that create the life cycles of consumer products (Ryan, et al. 2000; Graedel & Allenby 2003). This is at least a surrogate for inclusion (see below). But it is still easier for engineers to understand a lot about how a technology works as a technology, while having a limited understanding of its possible uses and its social and environmental impacts in extraction, production, use, and disposal. Experts are usually paid for their technical expertise and not for their contextual understanding – nor do their bosses usually ask for it. It is irritating to wrestle with, and to solve, the technical issues of a problem, only to be confronted with social issues such as marketability, regulatory constraints, or ethical concerns (Devon 1989). It is a recipe for producing defensive behavior. So, it is not enough to call for cognizance, we need a methodology. And, while cognizance can be achieved by social responsibility approaches at the individual level, the methodology suggested will show how social ethics can powerfully supplement the conscience and awareness of individuals.

The Role of Inclusion

This brings us to our second general value: we need to make sure the right people are included in the decision making. Deciding who the "right" people are should be a major focus in the social ethics of technology. Who they might be is a point of concern in any industry where the clients, customers, design and manufacturing staff, sales engineers, lawyers, senior management, and various service units such as personnel are all relevant to a project. And there will be other stakeholders such as environmental agencies, and the community near a production plant, a landfill, a building, or a parking lot. The classic article by Coates on technology assessment is instructive in this regard (Coates 1971). Inclusion might be viewed as the difficult task of adding stakeholder values to shareholder values, but that would be a misleading representation.

Neglecting different stakeholders will have different outcomes at different points in history. Neglect your customer and you risk losing money. Fail to design for the environment and you may pay heavily later. Neglect safety standards and you risk losses in liability as well as sales. Neglect underrepresented minorities and the poor by placing toxic waste sites in their communities and you may get away with it for a long time, but probably not for ever. In general, neglecting stakeholders, even when you are free to do so, is a calculated risk and rarely ethical. The consequences of failure can be severe. Nuclear energy technology ground to a halt with huge amounts of capital at stake, in part, because the stakeholder issue was so poorly handled. Once the public trust had gone, even reasonable arguments were discounted.

Involving diverse stakeholders helps with the problem of cognizance since this diverse representation will bring disparate points of view and new information to bear on the design process. There is also evidence that inclusiveness with respect to diversity generates more creativity in the design process (Leifer 1997) and facilitates the conduct of international business (Lane, DiStefano, & Maznevski 1997). Creating more and different options allows better choices to be made. While the final choice made may not be the most ethical one, a wide range of choices is likely to provide an alternative that is fairly sound technically, economically, *and* ethically. To some extent then, the broader the range of design options that are generated, the more ethical the process is. Thus, increasing representation in the design process by stakeholders is ethical in itself and it may be in its effect on the final product or process, also, by expanding cognizance and generating more options. One area of design that is growing rapidly is inclusive or universal design which studies adaptive technology for what used to be those with disabilities. It is now embracing a continuum approach to human needs and abilities with much interest, for example, in aging effects (Clarkson, et al. 2003). It is clear that such designs often have benefits for the "average" consumer such as ramps to buildings, and wider, better grip pens. This reflects the power of diversity that comes from more inclusive social processes in design.

Democratizing design is not straightforward. Experts exercise much executive authority. Corporate and government bosses think the decisions are theirs. Clients are sure that they should decide since they pay. And the public is not always quick to come forward because we have strongly meritocratic values.

Purely lay institutions like juries are sometimes regarded with suspicion. Yet in Denmark they have been experimenting with lay decision-making about complex issues like genetic engineering. Lay groups are formed that *exclude* experts in the areas of the science and technology being examined. At some point, such experts are summoned and they testify under questioning before the lay group. Then the lay group produces a report and submits it to parliament. These lay groups ask the contextual questions about the science / technology being examined: what will it do, what are the costs and benefits and to whom, who will own it, what does it mean for our lives, for the next generation, or for the environment. The results have been encouraging, and industries have become increasingly interested in the value of these early assessments by the general public for determining the direction their product design and development should take (Schlove 1996).

The Decision Making Process

So far it has been argued that:

- There should be a social ethics of technology because most decisions about technology are made socially rather than individually
- The social arrangements for making such decisions are variable and should be a prime subject for study in any social ethics of technology
- Two key questions about such social arrangements are, who is at the table and what is on the table?
- Enhancing cognizance is essential to ethical decision making
- Representation by stakeholders in the design process is desirable
- Diversity in the design process opens up more choices, which is ethically desirable and could well benefit both the technology and the marketability of the technology.

The process of decision-making advocated here implicitly sees technology as always good and bad. The key is to find out in what ways the technology is good and bad, and for whom. The process that is suggested is a democratic one.

In some recent views of design, a set of norms has emerged which are reputedly good for creativity; better quality, shorter time to market and customer satisfaction. These norms include openness, democratic information flows, conflict resolution, diversity, non-stereotyping behavior, listening to stakeholders, assessment of tradeoffs (Devon 1999). In general, these values derive from the democratic values of our political system and render more seamless the relationships between technology and the socioeconomic system.

Social and Individual Ethics Compared

To illustrate the distinctive nature of a social ethics approach, it will be compared with engineering ethics, which has primarily been characterized by an individual ethics approach with social issues appended via the concept of social responsibility. The comparison is provided in Table I.

Table I: Social and Individual Ethics Compared

	Social Ethics of Technology	Engineering Ethics (Individual)
Subject population	**Everyone**	**Engineers**
Target process	**Social arrangements for making decisions about technology**	**Individual accountability**
Key loyalties	**Inclusive process and cognizance**	**Fiduciary loyalty and conscience (social responsibility)**
Conceptualization	**Seamless connection to social and political life**	**Political values and processes are seen as externalities**

The debate in *IEEE Spectrum* ground to a halt over a clash of opinions and an irreconcilable disjuncture between what is ethics and what is politics. Using a social ethics framework, the differences of opinion would be treated as normal, and the idea of a boundary between ethics and politics would be rejected as detrimental to both ethics and politics. The discussion would focus on assessing the technologies and the social arrangements that produced them. Asymmetries between those who control the technology and those who are affected by the technology would characterize at least a part of this discussion.

Recent coverage of the plight of workers in secret government site, “Area 51,” in Nevada by the *Washington Post* (July 21, 1997) may be illustrative for this discussion. The workers are sworn to secrecy and the government denies the worksite even exists. According to the account, the workers are exposed to very damaging chemicals through disposal by burning practices. Their consequent and severe health problems cannot be helped nor the causes addressed, because, officially, nothing happened at no such place. While ethical defenses of weapons production exist, the situation as it is described in the *Washington Post*, reveals a problem. The problem is occurring where there is a large asymmetry in the social arrangements for decision making in technology between those who control it and those who are affected by it. A social ethics of technology provides a framework for discussing these arrangements that brings everyone to the table. And much could be done here without jeopardizing national security. A good result of such a discussion would be the generation of a variety of options in the social arrangements for pursuing the technology at hand, some of which would surely be safer for the workers' health.

Social Ethics of Technology in Practice

If the social ethics of technology is so important, it is reasonable to assume that we are already doing it. This appears to be true. A social ethics of technology is at work in legislatures, town councils, and public interest groups. Elements may be found in books on engineering and even in codes of engineering ethics. The tools are those of technology assessment, including environmental impact assessment, and management of technology. But these tools, like the social ethics of technology, are poorly represented in the university. There is no systematic attempt to focus in the name of ethics on the variety and efficacy of the social processes involved in designing, producing, using, and disposing of technology.

In education, for example, two of the best texts on the sub-field of engineering ethics address a lot of social ethics topics (Schinzinger & Martin 1989; Unger 1997). They study both means and ends, and both individual and social processes. But the subject matter is always reduced to the plight of individual engineers, their rights and social responsibilities. As the authors of one text summarize their views, "We have emphasized the personal moral autonomy of individuals" (Schinzinger & Martin 1989, p. 339). They note that "there is room for disagreement among reasonable people…and… there is the need for understanding among engineers and management about the need to cooperatively resolve conflicts" (op cit., p. 340). But this is said as a caveat to their paradigm of understanding individual responsibilities. A decade later they reiterate this view in a text with far more social and environmental issues than they had before: "Engineers must…reflect critically on the moral dilemmas they will confront" (Schinzinger & Martin 2000, p. ix). A social ethics approach would view these statements about value differences and management/employee conflicts as starting points and systematically explore the options for handling them. Further, even the emphasis on employee-management conflict is perhaps exaggerated by the focus on the individual. There are also some win-win options in conflictual situations as seen by accomplishments in negotiation and in design for the environment practices. An individual ethics approach tends to set the individual up with a choice between fiduciary responsibility and whistle blowing. This disempowers engineers and others who work in technology, by excluding alternative approaches.

In our political system, we have a great need for objective assessments of science and technology with the public in mind and involved. The demise of the Office of Technology Assessment (OTA) is much to be regretted and reflects our ambivalence about practicing what we are calling here the social ethics of technology (Kunkle 1995). The OTA was something of a role model internationally and its loss came as a surprise in many countries.

So is social ethics really ethics or is it politics? The answer is both. It is a position that clearly has political implications, and it is a position that includes, at times, a study of political processes as they affect technology. However, many other disciplines are subject to the same observations, such as economics. Drawing sharp boundaries between disciplines denies reality. Try separating civil, environmental, and chemical engineering, for example. And individual ethics also takes a political position: one which stresses individual accountability and fiduciary loyalty, and which reduces almost everything else to an externality, perhaps for the conscience to consider. That is, the individual ethics approach, as epitomized by professional codes, denies most of the contextual reality of technology and owes little to the political values of the larger democratic society. This individualized worldview, in turn, can diminish the design process technically as well as ethically. When extended by social responsibility considerations, individual engineering ethics leaves many engineers behind who view it as engaging in politics.

Aristotle states that the "good" is the successful attainment of our goals through rational action, and there is no higher good than the public good, he reasoned, because we are essentially social and political by nature (Aristotle, *Nichomachean Ethics*, Book Six, Section 8, p. 158; Book 10, Section 9, pp 295-302). Design is, in the Aristotelian sense, a science of correct action. Ethics is an integral part of all aspects of our designs and all our uses of technology. Technology is human behavior that, by design, transforms society and the environment, and ethics must be a part of it.

It has been said that Socrates set the task of ethical theory, and hence professional ethics, with the statement "the unexamined life is not worth living" (Denise, et al. 1996, p. 1). In this paper, it has been suggested that the unexamined technology is not worth having.

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