PERSPECTIVES
On the Professions

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"Center Hosts Second National Conference on Ethics in Engineering"

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Funded by the National Science Foundation and directed by the Center's Senior Research Associate, Dr. Vivian Weil, the March 5-6 Conference in Chicago brought together over 150 participants from the United States and Canada. They included academic engineers, philosophers, specialists in behavioral sciences, law, and management, and practicing engineers.

In prepared papers, speakers and commentators discussed the rights and responsibilities of engineers, individually and collectively. In the light of limited legal protection for those who speak out about alleged problems, speakers and members of the audience debated such issues as the demand for moral heroism, the role of government regulation, the foundation of employee loyalty, and the role of cost-benefit calculations in responsible decision making. In a sustained examination of the problem of creating an ethical work environment, speakers considered safety review procedures, particular obstacles to professional independence of engineers, the merits of an ombudsmen division, the power struggles which characterize organizational life, and the issue of elitism in the self-image of the profession.

A focal session featured a panel which probed the responsibilities of the professional societies. To begin the session on teaching, an engineer presented his actual experience as a case study . Panelists who responded analyzed the use of ethical codes and moral theory and considered the attitudes of engineers toward traditional patterns in the workplace. In the workshops which followed, broad-ranging discussions led to the expression of a widely shared interest in developing a clearinghouse for exchanging information on responsibility problems.

This issue of PERSPECTIVES ON THE PROFESSIONS provides a summary of the conference papers.

"Whistleblowing: Legal and Philosophical Viewpoints"

Vivian Weil, CSEP, Illinois Institute of Technology

Professor Martin Malin of IIT-Chicago Kent College of law summarized current law as it relates to whistleblowing. In this regard, he first discussed the measure of protection for whistleblowing under the common law, that is, the law as laid down by judges in cases that do not arise under specific statutes passed by a legislature. Malin next discussed collective bargaining and statutory protections for whistleblowers. He concluded with a few suggestions of his own for a legal standard to protect whistleblowers.

Describing the common law as it relates to whistleblowing, Malin noted that for the most part the doctrine of "employment at will" governs employer-employee relations in the private sector. This doctrine looks upon employer and employee as equal partners to an employment contract. Just as employees may resign whenever it pleases them, so also may employers dismiss their employees whenever they desire. Malin cited examples from the voluminous body of case law in which judges affirmed the doctrine of employment at will. In this regard, he noted that while over the years courts have upheld suits by discharged employees in isolated cases, for example, when the discharge was for refusal to give perjured testimony, for serving on a jury, or for declining to participate in an illegal price fixing scheme, by and large they

have not acknowledged even these narrow limitations.

Malin did discuss, however, several potentially significant cases which may well open the door to substantially enhanced common law protections for whistleblowers. In one of these cases, Toussaint v. Blue Cross-Blue Shield of Michigan, the Michigan Supreme Court held that an employment contract may contain an enforceable promise to discharge only for just cause. This case marks a departure from previous law because the doctrine of employment at will has been considered so absolute as even to preclude enforcement of such agreements. In another case, Palmateer v. International Harvester, the Illinois Supreme Court overturned as unjust the discharge of an employee for reporting criminal activity of a fellow employee. Rather than treating this case as another narrow exception to the doctrine of employment at will, the Illinois Supreme Court appeared to base its decision on the ground that dismissals of employees in the private sector which contravene the "public policy" of the State should be deemed unjust. The court then defined "public policy" in a very broad way as " . . what is right and just and affects the citizens of the State collectively." Malin observed that reliance upon such abroad conception of public policy in employee discharge cases would effectively mark the end of the doctrine of employment at will. He noted, however, that it remains an open question to what extent courts will follow the lead of the Illinois Supreme Court in this regard.

As for protection of whistle blowers under collective bargaining agreements. Malin first outlined the relevant basic federal statutory framework. "Section Seven of the National Labor Relations Act guarantees the right to organize and bargain collectively. However, several types of workers, including supervisors and managers are excluded from the Act's protection . ...Most collective bargaining agreements require that the employers have just cause to dismiss covered employees." Furthermore, such agreements provide for grievance procedures indisciplinary and discharge cases which typically contain several steps, the final one of which is a hearing presided over by an impartial arbitrator.

Malin said that while arbitrators have generally reinstated employees discharged for statements made about their employers in connection with union activities, by and large, they have upheld discharges of whistleblowers. In this regard, he noted that many arbitrators take the "hard line" position that as an employee one may not "bite the hand that feeds you and insist on staying for future banquets." Main stated, however, that while those arbitrators favoring the above approach view whistle-blowing as per se disloyalty, others will consider such factors as an employee's motives and whether he or she first tried to work through normal internal channels.

In regard to statutory protection for whistleblowers, Malin said that many federal statutes contain anti-retaliatory provisions which specify penalties for employers who discharge or otherwise penalize employees far notifying authorities of employer violations under the respective statutes. Among such pieces of legislation he cited the National Labor Relations Act, the Fair Labor Standards Act, The Age Discrimination in Employment Act. Title VII of the 1964 Civil Rights Act, the Occupational Health and Safety Act, and the Federal Mine Safety Act. Malin said, however, that in some instances courts have interpreted these anti-retaliation provisions narrowly. For example, in one case a court held that the Federal Mine Safety Act does not protect a miner from discharge for notifying the union safety coordinator. The court said that under the Act, only reports to the Secretary of the Interior or his authorized representative are entitled to protection.

Malin concluded his presentation with some remarks about the conditions that a legal standard for protecting whistleblowers should satisfy. He said that its goal should be "making whistleblowing unnecessary. It should encourage employers to establish credible internal channels for the voicing of employee concerns about improper behavior . . . Where such internal channels exist, an employee's failure to use them should be grounds for discipline."

Tom Donaldson, Professor of Philosophy at Loyola University of Chicago, analyzed the moral basis of employee rights, in particular with respect to whistleblowing. Donaldson posed the primary questions in this regard as follows:

"(How might) defenders of employee rights . . . attempt to prove that such rights exist. Critics will certainly deny that the existence of such rights is self-evident. How can they be persuaded? What is the logic underlying the concept of an

employee right? Who is to say which rights should appear on an authoritative list of employee rights? These are challenges defenders of such rights can ill afford to ignore. Without a theoretical justification, it appears that rights are being postulated ex nihilo."

In determining the theoretical foundations of employee rights, Donaldson first noted the existence of a fundamental moral right to equal freedom which he maintained is presupposed by the very concept of moral evaluation. In this regard he said:

"One condition necessary for genuine moral behaviour is that people possess the freedom to act: for if they were restrained from acting, or if their behavior were under the control of external influences, then we could not evaluate them from a moral point of view. Freedom, thus, seems to be the indispensable and necessary condition for any moral behavior whatsoever. Thus, one may conclude that any moral agent, has a right to freedom. "

The notion of a right to freedom, however, Donaldson maintained, strongly suggests that of another right, namely the right to behave responsibly:

" . . . if one has a right to what is a prerequisite for behaving responsibly and irresponsibly, then of course one at least has a right to what is a prerequisite for behaving responsibly. To put it another way, if one has an equal right to the conditions for moral behavior in general, including right and at least some wrong actions, then one necessarily has an equal right to the conditions for performing right actions."

But the right to behave responsibly, Donaldson argued, in turn implies a number of strong employee rights:

" . . . if all people have a right to the conditions for responsible behavior, then it can be argued that corporations and other employers are obligated to establish conditions which are compatible with responsible behavior. And it can be argued that if corporations fire employees who undertake morally responsible acts such as (1) refusing to obey immoral orders, or (2) complaining about dangerous products, they have discouraged responsible behavior and, thus, have infringed upon employee rights."

In summary then, Donaldson conceived of employee rights in regard to whistleblowing as implicit in the idea of a broader right to behave responsibly. This right in turn he regarded as derivable from an even broader and more fundamental right, the right to freedom. In the discussion that followed Donaldson's paper, a number of people asked for further statements about how the right to behave responsibly applies in various specific situations. For example, it was asked whether it requires that anyone who hires someone to work for him or her, even on a very short term basis, has a correlative duty to dis-charge the employed person only for just cause? Donaldson acknowl-edged he has not yet developed his approach to provide detailed answers to this kind of question.

"Engineers as Moral Heroes"

Vivian Weil, CSEP, Illinois Institute of Technology

Professor Ken Alpern advanced the seemingly paradoxical thesis that "ordinary moral requirements" frequently demand moral heroism of engineers. Alpern distinguished between two types of moral heroism. "The first type is supererogation or moral sainthood. It is to regularly do morally good things in excess of what is strictly required by morality. It is action above and beyond the call of duty. The second type of moral heroism is fortitude or moral courage. It does not involve exceeding ordinary moral requirements, but rather meeting ordinary requirements in the face of extraordinary obstacles, temptations, pressures and the like." Concerning the general requirements of morality, Alpern advanced the following principle as incontestable: "When one is in a position to contribute to greater harm or is in a position to play a more critical part in producing harm, one should exercise greater care to avoid doing so."

The foregoing principle, together with Alpern's specification of the second type of moral heroism, yielded the principal thesis of his paper: "Engineers in general exercise considerable control over technology-its design, quality, safety, use, and maintenance. They are thus in a position to affect the public's well being, for better or worse, to a greater extent than others. It is therefore appropriate to require of engineers greater care, including a willingness to make greater personal sacrifices in order to do what they ought in regard to the

public welfare. This higher standard is not a matter of supererogation, but is merely the consequence of ordinary moral requirements applied in their situation. However, since there will often be significant pressures and disincentives to their meeting these ordinary moral requirements, engineers must exhibit moral courage in the course of their everyday work."

Alpern defended the above thesis against four objections which one might advance against it. First, he noted that individuals at times attempt to evade a difficult morally required action by complaining that doing so would cause them to lose their jobs. Second, one at times hears people disclaim moral responsibility by saying 'If I don't do it then someone else will.' Third, in some instances, a person insists that a given difficult but morally required action is not his job. Finally, the omnipresence of immoral practices on the part of employers is often cited as a reason for regarding them as unavoidable, that is, as practices one will have to engage in regardless of where one works.

Alpern presented a variety of grounds for categorically rejecting all four of the above kinds of arguments. He added, however, that engineers faced with situations that require moral heroism deserve sympathy. In addition, Alpern contended that society owes these engineers support because ". . . it is not neutral in the choice to become an engineer. To some extent society creates their problem by channeling student into a rigorous engineering curriculum which usually offers them little idea of what to expect on the job while extolling the virtues of the profession. Society thus `owes' support, at least to the extent that it is responsible for the engineer's moral predicament."

Professor Lisa Newton of Fairfield University, who served as commentator for the first Friday morning session, warmly endorsed Alpern's conclusions. ' As Alpern points out," she said, "no new rights and duties have to be derived to fit the case of engineers. The good old principle of due care will suffice, given the understanding long accepted in the law, that the duty bears with special force on the responsible professional. Only acceptance of this duty . . . will do the job we need done." "Government regulation, Newton declared, "is hopelessly ignorant, misguided, slipshod, and occasionally corrupt, not to mention expensive beyond belief. The responsible professional is guarantor ultimately of the moral conduct of the enterprise of engineering."

"Engineers and Regulation"
Vivian Weil, CSEP, Illinois Institute of Technology

Professor Roland Schinzinger of the University of California, Irvine, advocated a conception of engineering as experimentation to serve as a framework for dealing with ethical issues. "To live in harmony, Schinzinger maintained, social man must carefully balance his individual needs and desires against those of the collective. Accordingly, ethical conduct would achieve this end; however, since nobody within the engineering profession can seem to agree on ultimate goals, compromise is an essential component of ethical conduct. Rules represent this compromise, he claimed, and if engineers can reconcile practice with rules, therein lies the model for behavior."

To demonstrate the ethical problems induced by technology's vast range, Schinzinger introduced four examples. The first one, Hammurabi s Building Code, issued in 1758 BC, provided an incentive for self regulation. The code demanded that the builder be responsible for his work with his life; it also necessitated a marginal bureaucracy and left the specifics to the experts. His second example, the Steamboat Code enacted in this country in 1852, highlighted the dire consequences of corruptible safety inspectors and unspecific instructions for safety inspectors. As a result of these lapses, boiler explosions occurred frequently and a substantial number of lives were lost. With his third example, the sinking of the Titanic, Schinzinger quoted a situation where an unforeseen problem (the sinking of an "unsinkable" ship) stemmed from insufficient safety measures (there weren't enough lifeboats to go around). Since "current vessel regulations regarding lifeboats did not foresee vessels of this magnitude," the code was useless in a crisis. The 1969 Santa Barbara Oil Spill, a case of expert knowledge being ignored, served as his final example. The leaking of 235,000 gallons of crude oil from offshore drilling led to a demand for tighter laws and controls.

Schinzinger argued that the massive scale of technology demands immediate attention;

society can't afford to wait until after-the-fact to remedy "self-regulation by industry to avoid costly litigation." He explained that since the legal system could not be expected to keep pace with technology, regulatory agencies were created. However, as his examples pointed out, these agencies often proved inefficient because the growth of technology was always a step ahead. Thus, responsibility for safety can only be determined by professional experts and it is on their shoulders, he contended, that the burden must lie.

Schinzinger's proposal to view engineering as experimentation results from the inherent technical uncertainties that the professional must face. He suggested that, with this recognition comas the duty to obtain informed consent from those who may be affected by the technology. Thus, to encourage professional responsibility, the engineer would be further obligated to share information and to monitor projects after completion. Such a focus on experimentation, concluded Schinzinger, would ultimately regulate individual behavior for the good of society.

Professors Dan Platte and George Gray of the Engineering Department of the Virginia Polytechnic Institute weighed engineering accountability against corporate responsibility.Decrying the current excess of government regulation, they suggested that responsible individual conduct replace regulatory control. Platte and Gray concluded by proposing that professional societies organize to the end of enforcing engineering accountability. Thus, they claim, industry would realize greater profit, which would ultimately serve to benefit the public.

Within the private enterprise system, Pletta and Gray view the growth of the Industrial Revolution as having provoked a strategic shift from "Let the buyer beware" to "Let the corporation take care." Increased bureaucracy and decreased personal freedom resulted. To counterbalance what they consider the threat of restricted freedom, Platte and Gray proposed joint professional corporate teamwork.

Before describing their solution, Platte and Gray investigated the origin of government regulation. They claimed that, as industrial products became more complex, buyers became unable to judge product liability. However, with the resultant cost of insurance born by the public, citizens were the ultimate victims of technological sophistication.In response to the public's increasing disenchantment with unsafe products and services, as well as its disillusionment with the unconcerned professional, politicians created more government agencies. Pletta and Gray argued that the cost of these agencies to society "has been estimated to exceed industries' net profit five fold." Thus, in the name of the public's health, safety, and welfare, self-regulation by local professionals would diminish the need for these constraints.

To achieve self-regulation, Platte and Gray proposed a two-part system. While engineers would be held "ethically accountable," corporations would assume the financial burden. Additionally, the "engineer-in-charge of the project would be held accountable by his peer group." This situation would give rise to the need for a professional society, run according to a code of ethics whose enforcement would be the duty of the society.

Anticipating several imperfections in their system, Pletta and Gray proposed the following. To the charge of "short-sighted managers more interested in profit than safety." they would offer the services of a professional ombudsman. To guard against erratic judicial dispensations, they advocated that one organization administer one uniform code.

Platte and Gray maintained that a unified organization based on participatory membership would succeed if members were allowed to directly elect their council. This procedure, they claimed, could be echoed on a national and on an international level as well as on the initial local level.Commenting on the session, Samuel C. Florman of Kreisler Borg Florman Construction Company criticized both speakers' viewpoints. Though he strongly endorsed a competitive economic system, he also saw a need for government intervention on the basis that self-regulation "ignores . . . the fact that our most serious problems stem not from evil intent, but rather from simple ignorance." Florman argued that "selfdiscipline is no substitute for government regulation." Directly disputing Platte's and Gray's argument, he said that ". . . under no circumstances do I want my safety or well-being to depend upon the taste or inclination of a designated engineer, much less on his moral whim."

To substantiate his claim that self-regulation is ineffectual, Florman also charged that it "rewards the renegades and rascals." Furthermore, he pointed out that

our country's legal system protects "the rights of individuals against the pressure of their peers," so the enforcement of ethical accountability by professional societies, as suggested by Pletta and Gray, would be virtually impossible.

Florman concluded, "In most cases, however, the problem to be dealt with is not a matter of ethics but a matter of reasoned choice not what risk is moral, but rather what risk is acceptable, and this is a choice. I maintain, that should be made by society as a whole."

"Corporations and Moral Responsibility"

Vivian Weil, CSEP, Illinois Institute of Technology

John Ladd, Professor of Philosophy at Brown University, contended that much thinking about responsibility with respect to corporations rests upon "the fallacious assimilation of corporations to moral persons." According to Ladd, "the concept of moral responsibility, as contrasted with other kinds of responsibility, cannot properly or even meaningfully be attributed to corporations . . ." He maintained that once we recognize this, we will be able to sort out more clearly and coherently mutual rights, duties, and responsibilities in society in relation to each other."

Ladd acknowledged that certain kinds of responsibilities may be ascribed to corporations. In this regard he listed the following four: role responsibility, that is, the type of responsibility that goes with roles tasks and jobs; causal responsibility, which is simply the responsibility for having caused something; liability responsibility. which concerns who must pay damages; and capacity responsibility, that is, the psychological capacities required for holding a person legally accountable. Ladd observed that ". . . all four (of the above) senses of responsibility can be attributed to corporations, for corporations can (a) fill roles, they can (b) cause things to happen, they can be (c) liable, e.g. for damages, and they have (d) the capacities of 'understanding, reasoning and control of conduct.' It is easy to see why (these) senses of responsibility apply to corporations; for they are essentially legal entities and as such are subject to law. . ."

Ladd insisted, however, that the situation is quite otherwise with respect to moral responsibility. In this regard, he said the following: ".(moral responsibility) is about what people ought to do to bring about or to prevent future states of affairs. It is based on the duty each one of us has to watch out for what may happen to others or to oneself. As such, it implies concern, care, and foresight. To be responsible in this sense is a virtue that cannot be meaningfully predicated of a corporation conceived of as a formal organization, that is, as a structure of rules, offices, and jobs, etc."

For similar reasons, Ladd maintained that the notion of a duty of loyalty to a corporation makes no sense. In his words, ". . . we need to ask whether or not there is any validity or merit in the concept of loyalty to an organization. We should note right away that the loyalty in question here is not at all like the loyalty that physicians and lawyers are expected to have towards their patients and clients; for the latter kind of loyalty simply amounts to observing the duties of devotion, zealousness, and avoidance of conflicts of interest that are owed to their patient and clients as individuals as a result of the relationship."

Ladd maintained that only persons can stand related to one another in terms of bonds of loyalty. It therefore makes no sense to suppose that one has duties of loyalty to a corporation. " . Before we can speak meaningfully of loyalty in the context of a corporation," Ladd said, "we need to ask: who in the corporation is the object of tiffs loyalty? Is it the managers? the stockholders? One's fellow employees? or all of these? Obviously, loyalty to these different groups requires quite different kinds of conduct, some of which may be inconsistent." Ladd also noted that if one identified the corporation itself as the object of loyalty, another paradox presents itself. Ladd contended that "loyalty is thought to be a twoway thing. (It) is a bond tying people to each other reciprocally." By contrast, however, he said, corporate loyalty, by its very nature, can only be one way. In Ladd's words, "dedication and devotion can only be in one direction-from the employee to the corporation."

Ladd contended that we "cannot and should not shift our moral responsibilities onto abstract entities like corporations .. . .there is a sense in which all of us, engineers and non-engineers alike are responsible for, say, things like Pinto accidents, because we accept a way of life . . . that assumes that what is good for

business, is good for us-for society; and correlatively it is good for business to mind one's own business."

"Ethical Issues in Cost-Benefit Analysis"

Vivian Weil, CSEP, Illinois Institute of Technology

Evaluating the possible application of Probabilistic Risk Assessment (PRA) to engineering ethics, Paul B. Thompson of Texas A&M University cautioned that ultimately PRA "ought to be used to make technologies safer; it ought not to be used as a proof that a technology is already safe." Though PRA can provide a model of a technological system which provides "a mathematical technique for estimating the probability of events which entail physical damage or loss of life," he maintained that instituting PRA does not discharge engineers and planners from their ethical responsibilities. Furthermore, though Thompson contended that PRA can contribute to the field of public policy analysis, he admitted that its implementation cannot and should not constitute a basis for ethical decision making.

Since the reactor Safety Study of the seventies was the first PRA ever attempted, Thompson used it as an example for surveying PRA techniques . . . He claimed that PRA serves two functions: 1) to provide "some sort of model of plant systems which, when quantified, yields an estimate of the likelihood of accidents," and 2) to provide "an estimate of the consequences ensuing from a given type of accident.

When applied to a technological system, both analysis techniques are multiplied; this results in a single number which represents ' the risk. ' However, Thompson noted that," whether or not such a number truly represents the risk as studied by PRA is yet another point of contention among risk analysts."

Thompson maintained that increasing technical complexity as well as economic factors have made it "more difficult for an individual engineer to bear in mind external factors in interactions which jeopardize safety and reliability." In this regard, he sees the contribution of PRA as an indicator of whether a situation merits further attention rather than as a basis for public policy decisions. He believes that implementing PRA as such would reduce instances of "whistle-blowing" because "the engineer's fulfillment of ethical responsibilities would become more clearly consistent with management's desire to protect capital. Ethics would cease to be a negative drain on capital."

Finally, Thompson reminded his audience that without an objective commitment on the part of its supporters to PRA as an independent, ongoing process, its value is negligible. He concluded with the following observation: "It is clear that the ethical dimension of PRA depends upon the ability of analysts and the model to adjudicate controversial claims in a fair manner. If the project feels pressured to skew results in order to favor one view rather than another, the potential benefits of PRA are lost."

Professor Edwin Levy of the University of British Columbia and Professor David Copp of Simon Fraser University pointed out several ways in which ethical and value considerations enter into risk assessments and cost-benefit analyses. In regard to the former, they noted the following distinction between two kinds of comparisons which each play crucial roles in arguments about the acceptability of risks. The first kind, referred to by Levy and Copp as "legitimating" comparisons, are introduced specifically to argue for the acceptability of a given risk. A legitimating comparison draws an analogy between the risks associated with a controversial and, hence, acceptable nature. To the second type of comparison Levy and Copp appended the designation "metrostick." Metrestick comparisons are not intended to convince one of the acceptability of a given risk. Instead, they serve to make its magnitude comprehensible to the general public, which is unfamiliar with the phenomena, terminology, and statistics at issue.

Levy and Copp pointed out that "for [a] legitimating comparison to be successful it must be shown the ethical features of the situations being compared are on a par. For example, it must be shown that the data involved are equally reliable and that the situations of those at risk are approximately the same with respect to involuntariness." By contrast, they noted, "[in] a metrestick comparison one need not demonstrate the ethical parity of the parties at risk."

Levy and Copp called attention to several misuses of legitimating

and metrestick comparisons, which they consider widespread. In some instances, they said, "metrestick comparisons play the rhetorical role of legitimating comparisons; and the weaknesses of the legitimating comparisons which are offered are less discernable in the muddied waters." Levy and Copp also asserted that "legitimating comparisons have beguiling but insupportable implications: they suggest that what is already accepted is acceptable; that is, just because a practice is accepted certainly does not show that that practice is-morally or otherwise-acceptable. Furthermore, especially in the domain of public policy, just because a particular practice is followed does not necessarily show that it is accepted."

In the area of cost-benefit analysis, Levy and Copp decried the practice of "(taking) a mix of moral viewpoints into account within a cost benefit orientation . . . by counting a person's moral disapproval of a proposal as a 'psychic' cost and moral approval as a'psychic' benefit." Such an approach, they complained, "treats ethically based disapproval [as] data to be tabulated rather than a substantive issue to be addressed. It fails to treat members of the community as peers of the decision maker."

Levy and Copp concluded by saying that "it is unavoidable and desirable that ethical considerations be brought into play in policy analysis. But it is essential that this be done overtly so that the role which ethical considerations play can readily be discerned.

Commentator Professor Michael Martin of Chapman College suggested that the considerations Levy and Copp treat as constraints upon risk assessment and cost benefit analysis might be directly integrated into those procedures. Martin suggested that the notion of a rights based as well as a consequence based cost-benefit analysis deserves further exploration. With respect to Thompson's paper, Martin stated that in his opinion, "Thompson greatly overestimates the benefits of [probabilistic risk assessment] for ethical decision making for engineers and others within a corporation." Martin contended that the ethical standards of corporate decisions are affected by a variety of diverse factors which at best, will only be marginally affected by the adopting of probabilistic risk assessment techniques. The impact of such techniques, he said, will vary enormously with differences of organizational structure, particularly in regard to the degree of decision making discretion granted engineers.

"Creating an Ethical Work Environment"

Vivian Weil, CSEP, Illinois Institute of Technology

Safety Standards:

Professor Albert Flores of Rensselaer Polytechnic Institute described some of the results of a study sponsored by the National Science Foundation. This study explored "the ways in which the dosign activities of engineers are structured by their employers to insure that the end product meets acceptable standards of safety." Flores and his colleagues at R.P.I. interviewed nearly seventy-five engineers from engineering organizations with established reputations in their respective fields for placing a high premium on safety. They also surveyed four hundred and fifty other engineers at these same organizations.

In his presentation Flores described four significant institutional mechanisms for including safety considerations in the design process: safety reviews, safety officials, safety regulations and standards, and the "safety atmosphere." In evaluating the import of this study, Flores said: "Although it is difficult to assess the degree which [the above] mechanisms actually influenced design engineering practices, the following results may provide some concrete idea as to engineers' perception of their influence."

According to Flores, the safety review procedure constitutes the most important organizational influence on design for safety. Such reviews "function to identify and evaluate the hazards associated with a particular design, including the type and quality of materials used to manufacture it, the safeguards it requires, the energy sources needed to operate it, and any other environmental factors affecting its safe use." Flores noted that safety reviews typically occur at the initial conceptual development stage when a product is being considered for manufacture, as well as during the preliminary design stage which occurs later. Even after the preliminary design phase there may also be several other safety reviews before the final design review just prior to initiating full production.

The second institutional mechanism for putting safety considerations into the design process Flores identified was the safety engineer. Safety engineers, he said, "are . . . charged with directing and enforcing an organization's policies in matters affecting product safety. The safety unit is usually an independent group from the engineering development section and has reporting responsibilities to executives supervising engineering. This independence allows them to pursue safety concerns which they believe are legitimate without undue influence from engineering management, who may be faced with cost and schedule pressures." Flores reported that although design engineers acknowledge the valuable contribution of safety engineers to the design process, many complained that safety officials tended to take an excessively conservative approach.

Flores next discussed internal safety standards and regulations "which safety officials are responsible for enforcing and which form the basis of all design safety reviews." Such standards, Flores noted, generally fall into two categories. "Performance standards . . . specify performance levels which the end product should achieve; and specification standards specify, in detail, for example the type of materials which should be used, the dimensions and clearances which should be maintained, the energy sources that allow for safe operations, and any other safeguards that may be required." Flores said that in virtue of the greater scope of discretion they allow to engineers, most engineers prefer performance standards. Flores also noted, however, that organizations frequently supplement such standards with internal manuals that in corporate the relevant government or industry standards tailored to the needs of the organization in regard to a specific project.

Finally, Flores said that the "safety atmosphere" of an organization fostered by the demonstrated attitude which engineering supervisors, management, and safety officials take toward safety has an influence that permeates each of the other major factors. Where the commitment to safety is genuine, "the design practices of engineers will exhibit conscientious concern for product safety."

Ombudsmen:

Normand M. Laurendeau, Professor of Mechanical Engineering at Purdue University, advanced a case for a corporate ombudsmen division in companies that do engineering work. Laurendeau said that " . . .the wise control of technology should begin where technology is developed . .. . in industry. If the corporation encourages responsible action, some engineer within the corporation will undoubtedly perceive the problem before it arises and act accordingly." To promote such activity, Laurendeau proposed "a committee of ombudsmen hired by the corporation for the express purpose of acting as consumer advocate and responding to concerns voiced by individual engineers." His paper outlined the make-up, place, and duties of such a committee within the corporation. It also enunciated grounds for corporations to support an ombudsman group financially and morally.

Laurendeau maintained that effective operation of an ombudsman committee would require that it have three basic characteristics: independence, representation, and accessibility. To maintain independence, Laurendeau proposed that the committee consist of a group of full time engineers versed in technology assessment and public policy. The group, however, should also include engineers from various divisions of the company who would serve on a rotating basis. The rotating members of the group could supply new insights "that can only come from hands on experience at the division level." The permanent members would have as their basic function to assert and maintain the independence of the ombudsman group. To foster such independence, Laurendeau further noted that the group must be accessible to decision making centers within the corporation.

Laurendeau conceived of the primary duty of an ombudsman division as providing "corporate executives with feedback based on public advocacy and the concern of individual engineers within the corporation." Through the ombudsman committee, he said, "potential whistleblowers will be able to express opinions on such issues as product reliability, waste disposal, or occupational safety. The ombudsman division will then be responsible for assessing social benefits and risks associated with suggested changes in product design and construction."

Laurendeau noted that to perform its primary duties, the ombudsman division must both reflect public opinion and be capable of defining 'acceptable risk.' With

respect to reflecting public opinion, he said that the ombudsman division can only do this, "if its members are encouraged to identify with the public more than with the corporation." Such will obtain, he believed, however, only if the members of the ombudsman division are "given leeway to assume the role of professional whistieblowers." As for defining `acceptable risk,' Laurendeau said that such a definition in particular contexts "must be based on reasonableness, social benefits, adverse effects, equity in the distribution of risks, benefits, and costs, and whether the risk is voluntary or involuntary. . Proper decisions [in this regard] . . . rely more on values than facts."

Laurendeau maintained that corporations have three major incentives for supporting an ombudsman division: "(t) special concern will command respect from both consumers and public officials. (2) treatment of engineers as responsible professionals will enhance employee loyalty, and (3) anticipation of public responses will yield desirable products without costly litigation." All three of these benefits, Laurendeau noted, "are consistent with the corporation's requirements for profitability and survival in the marketplace."

Laurendeau, however, raised the question of whether corporate ombudsmen could generally maintain sufficient power and independence within a corporation to carry out their essential functions. Will not many corporations, he asked, treat the ombudsman division as a "public relations gimmick"?

To deal with this latter problem, Laurendeau proposed that corporate ombudsmen form a national association under the auspices of a single engineering society. Such a national association, he maintained, "is necessary to produce the center of power needed to contest corporations that neglect social responsibility, manipulate ombudsmen, or disavow engineering professionalism . . . . A potential tactic is to censure companies that do not comply with policies recommended by a national board representing all engineering societies. Properly publicized, a censure procedure could strongly affect the ability of a corporation to hire new engineering talent. The ombudsman division and associated censure mechanisms," he believed, "could be harbingers of a new era in which engineers identify less with their employers and more with their profession."

Organizational Power Struggles:

Richard J. Boland Jr., Professor of Accountancy at the University of Illinois, Champaign-Urbana, argued that commitment to an outmoded rational-bureaucratic conception of large business organizations stands in the way of perceiving substantial opportunities for engineers to assert themselves as an important force in the determination of corporate policy.

Boland observed that according to a rational-bureaucratic conception, "the organization is pictured as purposive, directed from the top by a series of commands to subordinates. It is imagined that functional units are coordinated in a machinelike fashion . . . the organization is assumed to be guided by planning. Planning is a forward looking, intentional process in which goals are defined, alternatives are examined and courses of action are chosen based on the highest return to the organization."

Boland contended that such a picture, however deeply entrenched is fundamentally mistaken. Citing recent studies in organizational theory for support, he put forward a very different point of view. Large business organizations, though rationally organized in theory, consist in practice of diverse factions which contend for power with one another. In such a struggle Boland maintained. "groups have power not because their understanding of the organization is coherent, complete or wise, but because they control a resource seen as critical to its continued functioning. Control over funds, markets, labor, supplies or information can all be sources of power, depending on the nature of the environment." Boland expressed the view that "power is not evil and the fact that organizations have multiple competing centers is not bad. Rather, the responsible exercise of power by various groups within the organization is part of a necessary process of aligning the organization with the appropriate factors, resources and problems of its environment-including the technical, legal, economic and social aspects."

Boland asserted that "engineering, with its widespread impact on the critical needs of innovation, productivity and regulatory requirements, has control over resources that should be an important base of power. In

addition," he noted, "engineers have other characteristics that tend to enhance power in organizations. They are professionals with their own language; experts with control over secrets useful to others. The work of an engineer is hard to evaluate, especially by the uninitiated. Finally, in one form or another engineers have control over information that others in the organization need, and they are in a position to create a sense of obligation in others for sharing that information."

Boland suggested several steps engineers in organizations can take to develop and exercise power effectively. "First," he said. "they must establish themselves as participants in as wide a range of activities within the organization as possible. They should increasingly insist on the use of teams in which engineers can play key liaison roles linking different departments in a common problem focus." Boland also advocated that "engineers . . . work to develop an effective network of peer communication throughout the organization, avoiding physical isolation from other engineers and creating opportunities for meeting on a regular basis to discuss common concerns, and develop positions with respect to them." Finally, he said, "they must learn to use their unique control over the critical resources of information and innovation to establish their agenda and concerns as an integral part of the organization's dialogue on its problems." At times, Boland said, "this might require holding back certain projects or analyses. At other times it may mean sharing their influence to support another group who will later be in a position to reciprocate.

Boland concluded by reiterating his primary thesis: "The engineer cannot retreat behind the shield of management decision making. What we imagine to be a rational, coherent, comprehensive management process is a shifting, dynamic power struggle between diverse, partial and incoherent centers of power . . . . Quite simply, the engineer, as a participant in the power struggle, is responsible for creating it."

Commentary:
Professor David Noble of the Massachusetts Institute of Technology served as commentator on the papers at the Friday afternoon session. He criticized the papers by Flores, Laurendeau, and Boland as all highly unrealistic insofar as they assume that significant measures to promote safety in product design can be effected while keeping capitalism basically intact. Against such a view, Noble contended the incompatibility of capitalism not only with safety, but also with peace and humane living generally. For this reason he maintained that far more radical steps must be taken, steps which the engineering profession cannot take alone. Instead. Noble insisted, problems of safety in product design can only be addressed meaningfully in a broader context wherein engineers participate as citizens in cooperation with other citizens.

Noble called for a movement to radically restructure both the engineering profession and the economy. He said the former must abandon its essentially elitist notion of professionalism, and the latter must be reorganized in such a way as to eliminate its capitalistic and militaristic imperatives. Noble proposed three elements of a program to achieve these goals. First, engineers should unionize. Second, engineering education should be changed so as to allow students more time to reflect upon social and political issues. Third, engineers must enter into alliance with other organizations, such as unions and disarmament groups. Noble said that he did not inherently oppose the kinds of measures for product safety advocated by Flores, Laurendeau, and Boland. He insisted, however, that they would only be effective if undertaken within the broader context he described in his comments.

"Perceptions of Engineers' Professionalism"

Vivian Weil, CSEP, Illinois Institute of Technology

Engineering Professor Barry D. Lichter presented an account and analysis of a project carried out jointly with philosophy Professor Michael D. Hodges, both of Vanderbilt University. They had conducted workshops for engineers on professionalism and engineering ethics at two on-site settings in the chemical industry. The first was held at Tennessee Eastman Company, Kingsport, Tennessee on March 7 and 8, 1980. The second was held at the DuPont Corporation, Old Hickory, Tennessee on March 27, 1980. The Tennessee Eastman group contained about twenty-five people at a variety of different levels within the organizational

structure of the company. The DuPont group consisted of fifteen individuals all drawn from the ranks of middle management.

Both groups were given as curriculum materials Edwin Layton's Revolt of the Engineers, David Noble's America, by Design,' and; Robert Baum's and Albert Flores' Ethical Problems in Engineering. The DuPont group, however, also read some additional material on the subjects of corporate end individual responsibility. At each workshop session, Professors Lichter and Hodges introduced the topics under consideration and then opened the floor to general discussion.

Professor Lichter said that both corporations were extremely hospitable and receptive to the idea of the workshops. Yet as they dealt with the two companies, he end Professor Hodges perceived an interesting difference betweeen them in their attitudes toward professionalism in engineering. To Lichter and Hodges, DuPont appeared to adhere to an "explicit or implicit policy, the effect of which was to discourage 'professional identification'." They noticed that company personnel tended not to identify themselves by way of profession. At the outset, Lichter and Hodges were told that not many of the workshop participants would think of themselves as professional engineers. They also noticed that few DuPont personnel are either licensed as professional engineers or have memberships in professional engineering organization. Lichter said that though he and Hodges would in no way suggest that DuPont consciously discourages professional identification, it nonetheless seemed to them that this situation is the effect of the company's policies.

By contrast, as Lichter and Hodges perceived it, the situation at Tennessee Eastman was almost the exact reverse. The local chapter of the Tennessee Society of Professional Engineers served as a cosponsor of the workshop, and the company appears to strongly support the professional society. Many of the engineers in the Tennessee Eastman workshops, with whom Lichter and Hodges worked closely, immediately identified themselves as professional engineers.

On the face of it, the two companies appear to represent very different attitudes toward professionalism. Lichter and Hodges, however, came to regard appearances as deceptive. According to Lichter: "A deeper look indicates that there (were) not fundamentally different attitudes at work here but simply different strategies for accomplishing the same purpose . .. . At neither location did (he and Hodges) find any sense that allegiance to a 'profession' might constitute a separate and even potentially conflicting source of duties and obligations. This result was accomplished," Lichter suggested, "in one case by ignoring and in the other by absorbing the role of the professional. But in both the result was the same. The role of the professional and that of employee were collapsed."Lichter said that "because of this inability to identify oneself in a way independent of one's employment status .... the almost universal response to particular ethical problems presented for discussion . .was that of 'individual failure'. . in almost all cases where problems emerged they were seen as the result of some failure on the part of en individual to really do his or her job. They were never seen in terms of inherent weakness in the institutional system within which individuals worked."

Lichter cited the question of "the company doctor" as "one of the most illuminating examples of this problem. In an attempt to illustrate the way in which institutional context could affect honest professional judgement, it was proposed that two doctors, one employed by a company and the other in private practice, would reach quite different conclusions with regard to the question of when given individuals were fit to work. It was suggested that the company doctor would more often favor the company and the private doctor would favor the patient. However, instead of meeting the issue, participants (at DuPont) reduced the matter to a technical question. That is, they argued that the company doctor would be right because he knew his patients and the work situation better. The very suggestion that one's judgement might honestly be affected by the institutional setting in which that judgement was formed simply was not even an intelligible option."

Lichter concluded his presentation by summarizing four frequently advanced proposals for haw engineers should conceive of professionalism. He acknowledged that the workshop experiences he and Professor Hodges shared, do not count decisively in favor of any one approach. Yet Lichter expressed the hope that their account of the

workshops will prove helpful in clarifying thought about the issue.

"Professional Action and Professional Liability"

Vivian Weil, CSEP, Illinois Institute of Technology

Professor Larry May of Purdue University suggested the desirability, at least in some circumstances, of holding a professional engineering society liable for harms that ensue when its members violate the society's code of ethics. May contended that the legal conception of apparent authority provides a sound theoretical basis for such an approach.

As an illustration in this regard, he first provided the following summary of a recent case, Hydrolevel Corporation v. American Society of Mechanical Engineers: "Influential members of A.S.M.E., who had nearly exclusive authority over the interpretation of the society's boiler safety code, intentionally misinterpreted the code so as to benefit their own companies to the detriment of Hydrolevel Corporation which was trying to market a new steam boiler cut-off device. These members of A.S.M.E. were volun teers, who were under the full-time employ of Hydrolevel's chief competitor. The action taken by these members did not benefit A.S.M.E..

Regardless of these facts, which might otherwise have excused A.S.M.E.from liability in a normal tort proceeding, the Court of Appeals held A.S.M.E. liable for conspiracy to restrain trade fn violation of Section 1 of the Sherman Act. The court argued that A.S.M.E. had widespread influence through its various codes and standards, and misuse of these codes and standards could easily injure competitive firms. Furthermore, it was argued that the public could not ascertain who was acting within their proper authority at A.S.M.E. and who was not. Thus. 'A.S.M.E. would be responsible for its agents' actions if they acted within the scope of their apparent authority, even if they did not intend to benefit A.S.M.E.' and even if A.S.M.E. did not subsequently ratify the actions of these agents. Finally, it was contended that A.S.M.E.'s influence, combined with the likelihood that abuse of this influence would occur, created a corresponding duty on the part of A.S.M.E. to guard against this possible abuse."

May strongly endorsed the above line of reasoning. He noted, however, that one might dissent from it on the grounds that the court appeared to hold A.S.M.E. liable for the actions of its officers because certain third parties believed, falsely it turned out, that A.S.M.E. had authorized its officers' behavior. But under these circumstances, one might urge, the officers really had no authority from A.S.M.E. to act as they did. Against this objection May advanced the following analysis of apparent authority: " . . apparent authority, in its most plausible form, requires not merely 1) that I believe that X is the agent of Y, and 2) that it is reasonable for me to hold this belief, but also 3) that Y has supplied these reasons, and there is no basis for defeating these reasons in this particular case which is accessible tome . . . .If I initially delegate you to act for me and then also fail to provide a way to show when this is not true. I have created a prima facie presumption that you are my agent. I must publically announce that you are not my agent for this presumption to be rebutted. Private pronouncements about when you are my agent are irrelevant. You remain my agent until I publically disassociate myself from you."

May then went on to argue that there area number of good pragmatic reasons for professional engineering associations to accept the idea that they may be held liable under a theory of apparent authority for breaches of their respective codes of ethics by individual members. He said the following in this regard: "First, a number of recent commentators have stressed the need to enforce codes of conduct in professional associations, but as early as the first part of our century the point was put quite clearly by Edgar Heermance. He contended that 'unethical practices are not only a menace to society. They jeopardize the standing of the group as a whole, and tend to depreciate the value of its services. The enforcement of the standard becomes a matter of self-preservation.' Initially,then, it is reasonable for professional associations to enforce their codes, and thus come to accept some responsibility for the actions of their members.

Secondly, in our society we seem to be moving toward increasing regulation of professionals. If some type of regulation is inevitable, it would seem that self-

regulation would be the least offensive to professionals and that this would provide a further incentive for professional associations to accept responsibility for their members' conduct."

May concluded that "accepting associational liability, while not without its costs, may indeed be the most attractive alternative professional associations have if they wish to avoid the spectre of increasing governmental regulation of the activities of their members."

"Responsibilities of the Professional Societies"

Vivian Weil, CSEP, Illinois Institute of Technology

Jonathan Knight, Associate Director of the American Association of University Professors, provided a brief description of the history and current activities of the AAUP with respect to investigating violations of academic freedom. Knight said that at its inception in 1915, the AAUP's first president, John Dewey, believed the organization's first task would be to promulgate a code relating to academic freedom. That very same year, the AAUP became involved with the kind of investigative activity it has so prominently carried out up to the present time.

Knight reported that the AAUP receives about 2,000 complaints a year. Files are opened in regard to roughly half of these. He said that when investigating a complaint, the AAUP begins with a discovery process in which it familiarizes itself with the basic aspects of the case. It then explores the possibility of resolving the complaint offering itself as a mediator. If such efforts are unsuccessful, then it sends an investigative team to the institution against which a claim has been registered. After thorough examination of the case, if the facts warrant it, then an institution's name will be placed on the AAUP censure list.

Knight maintained that the censure list helps to instruct the academic community on the principles of academic freedom. As he said, "AAUP operates in the coin of moral persuasion." Knight also noted that courts on both the state and federal levels are more likely to intervene and lay down applicable standards for an institution where AAUP guidelines are not accepted.

Commentator Stephen Unger, Professor of Computer Science at Columbia University, said he thinks engineering professional associations should study the AAUP censure procedures very carefully as a model. Unger observed that university administrations are not so very different from corporation management hierarchies. Hence, he rejected the notion that AAUP-style censure activities are peculiarly appropriate only in academic contexts. Pointing to efforts on behalf of members who were involved in whistle-blowing situations, Unger maintained that both the IEEE and AAAS have prevented firings.

Taft H. Broome Jr., Professor of Civil Engineering at Howard University, described a new umbrella organization, the American Association of Engineering Societies (AAES) and its activities in the area of engineering ethics. According to Broome, "The mission of the AAES is to advance the science and practice of engineering in the public interest. The principal objectives by which the mission is to be fulfilled are (i) to undertake, for the good of mankind, the activities that the member organizations acting individually could not accomplish as well; and (2) to foster interaction of the engineering community with other segments of our culture. Members of AAES are not individuals but societies."

Broome reported that AAES has an ethics committee of which he is a member. He described the activities of the committee which are geared to achieve both "a short-range goal and a long-range goal." These he referred to collectively as "the AAES plan." According to Broome, "The short-range goal has two components. The first is to establish a common code of ethics for the AAES member societies. The aim is not to ratify a code by a majority of its membership to which all members are to be subject. The aim is rather to develop a model code that each member society would adopt as its own; thus, wherever additions to the code are made by any member society, such additions will not, as it is intended, be contrary to the provisions of this code."

"The second component of the short-range goal," Broome reported, "is to establish a common position on whistle-blowing. Such a position," he said. "would probably consist of (1) a definition of whistle-

blowing; (2) case studies analysis; (3) delineation of pertinent legal rights of the parties; (4) recommended procedures for engineers involved in whistle-blowing situations; (5) a rationale for these procedures based on the common code of ethics; and (6) responsibilities (if any) of the AAES vis a vis whistle-blowing situations."

Broome reported that the ethics committee is reviewing the suggestion that AAES institute a hot line for giving advice to engineers in whistle-blowing situations, and that AAES sponsor investigating teams "which act in the public interest in such situations." Broome noted that at present the members of the ethics committee have divergent views on these proposals.

As for the long-range goals, Broome listed:

(1) Develop means for establishing a dialogue between interested engineers relative to the code of ethics.

(2) Re-examine particular provisions of the common code for clarity, relevancy to engineers, and acceptance by engineers.

(3) Examine areas not covered by the common code to determine whether additional principles . . . should be considered.

(4) Encourage a more structured approach to teaching engineering ethics and professionalism in engineering curricula.

(5) Explore alternatives for making the code of ethics effective and meaningful for all engineers whether licensed or not.

Broome concluded with an evaluation of the AAES plan, noting first a structural problem he perceives in AAES: ". . . attempts to unite engineering societies . . .fit into a now familiar pattern . . . . Their collapses can be attributed to conflicts between the interests of business and those of professionalism . . . . the AAES is not better structured to mollify business interests than its predecessors. . . A complex of mechanisms for strengthening the influence of old-line engineers and young engineers in decision making should be established.

Broome also suggested that the ethics committee consider methods of enforcement such as licensing for all engineers, and engineering tenure and corporate censure policies. He proposed defining a responsibility to the environment and to the least advantaged, i.e. those who cannot afford engineering services. Broome also identified a need to make engineering codes pertinent to areas of engineering practice not presently addressed, such as the ethical problems of engineering educators.

"Correspondence"

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The exchange between Schmaus and Weinstein in the September/ December 1981 Perspectives prompts an additional comment. While I applaud Schmaus' effort to recast the problem of fraud in science as a more generic tendency toward sloppiness, I must remind him that "sloppy research" and "fraudulent work" are post hoc judgments. If reform is the issue, then peer review is the mechanism by which duality control must be enhanced[1]. If "procedures for validating the results" of one's research team are lacking, then journal and funding agency referees must enter the breach. Since this is apt to occur-soon if at all-we are thrust back on "investigator's responsibilities." Such individual ethics, however, is no surrogate for collective ethics which must reside in institutions that support, promote, disseminate, or otherwise utilize science and technology. Establishing collective ethics, however, may be as difficult as ferreting out intent to defraud one's patrons and peers. The problem, as Schmaus recognizes, is one of theory or better yet, world view, that defines away ethical dilemmas and precludes moral codes. To decouple the experimental aspect of science from these "conceptual boxes," as Kuhn called them, is to erect (or maintain) a mythical ideal of both science as an institution and scientists as cultural, i.e., self-interested and political, beings.

It is such maintenance that plagues Weinstein's rebuttal. For as recent work in the sociology of science (at least some European varieties) has shown, "truth" and "reliable knowledge" are not absolutes; they are socially negotiated claims[2]."Experimental science," to use Weinstein's phrase, is not "Janus-faced"-truth is. Hence, a call for more replication just begs the questions surrounding fraud. So do arguments that separate basic from applied, and biomedicine from other sciences. Again, if

"replication of a multi-institutional clinical trial, such as the one at Boston University that Straws worked with, is financially and structurally impossible" (as Weinstein quoted Broad), then different criteria should be applied in reviewing such proposals at NCI or other agencies. Given the limited novelty that peer review engenders, the application of such criteria is dubious at best.

Finally, Weinstein's claim that "the growth of specialization and intensive division of labor makes it more difficult to rely on a preponderance of honest reports to counterbalance instances of fraudulent reporting" is utterly without foundation. Specialization should intensify the scrutiny of specialists whose breadth of research focus has shrunk. Only if the growing number of specialists has also become exceedingly callous and sloppy in their research and review procedures should fraud go undetected.

My own intuition is that fraud and sloppiness are intrinsic to science and only our presumption that scientists have been pure has placed the institution on a pedestal. There,the mythology has expanded to obscure the darker side. Now that this side is being illuminated, we social scientists must either rationalize our naivete or commit ourselves to studying quality control-whether or not we gain access to participants' intentions. Fraud and sloppiness are only symptoms; the body politic of science carries a common institutional disease.

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Footnotes

1. D. E. Chubin, "Peer review and the courts: Notes of a participant scientist." Bulletin of Science, Technology 6 Society 2 (1982): forthcoming; D. E. Chubin, "In science, as in scientific malpractice, competence is not enough." The Hastings Center Report 12 (1982): Forthcoming.
2. H. Barnes, Interests and the Growth of Knowledge (London: Routledge Direct Editions, 1977); H. M. Collins, "The seven sexes: A study in the sociology of a phenomenon or the replication of experiments in physics." Sociology 9 (1974): 205-224; M. J. Mulkey, Science and the Sociology of Knowledge (London: Allen and Unwin, 1979); R. Wallis (ad.), On the Margins of Science: The Social Construction of Rejected Knowledge (Keele, Staffordshire; University of Keefe, 1979).

"Announcements"

CONFERENCES: The Georgia Center for Continuing Education will host a conference entitled "Business and the Environment" August 4-6, 1982. This conference will be held at the University of Georgia at Athens. The purpose of the meetings will be to examine the business point of view in environmental ethics. For more information, contact Donald J. NeSmith, Georgia Center for Continuing Education, The University of Georgia, Athens, Georgia 30602; Phone: (404) 542-2242.

PUBLICATION: A special issue of Teaching Philosophy will be published next year that deals with courses, seminars and programs in philosophy that are offered outside the traditional context of colleges and universities. These might be lototed in private industry, hospitals, retirement homes, police academies or prisons. The deadline for submissions is September 1st. 1982. If you have been involved in any such programs, please contact Frederick Elliston, Criminal Justice Research Center, 1 Alton Rd., Albany, NY 12203, (518) 456-7731.

The Center for the Study of Ethics in the Professions at the Illinois Institute of Technology was established in 1976 for the purpose of promoting education and scholarship relating to ethical and policy issues of the professions.