

Report from the Center for

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Not With a Bang: The Moral Perplexities of Nuclear Deterrence

To make its research readily available to a broad audience, the Center for Philosophy and Public Policy publishes a quarterly newsletter: *QQ—Report from the Center for Philosophy and Public Policy*. Named after the abbreviation for "questions," *QQ* summarizes and supplements Center books and working papers and features other selected work on public policy questions. Articles in *QQ* are intended to advance philosophically informed debate on current policy choices; the views presented are not necessarily those of the Center or its sponsors.

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In this issue:

Does deterrence work? If it works, does anything else matter in its moral assessment? And what if deterrence fails? These are among the most vital questions we face, for "any policy which is seriously thought necessary to maintain peace, yet which may end by extinguishing all human life, must raise moral perplexities on an unprecedented scale"..... p. 1

Two Harvard economists defend cost-benefit analysis against a battery of recent objections..... p. 6

Third Thursday Briefing: What values and principles underlie criteria for rational use of America's millions of acres of unspoiled public lands?..... p. 9

The microprocessing revolution promises to usher in the fully computerized "office of the future," raising troubling questions about the rights of clerical workers and the meaning of work..... p. 12

Newly released working papers are announced... p. 15

In this century, poets have wondered whether the world will end in fire or ice, in a bang or a whimper. But in the almost four decades since the first atomic bomb was detonated over Hiroshima, eschatological questions have no longer seemed the poet's special province. Fears of global nuclear holocaust have occupied millions of ordinary human beings who, though more or less resigned to living with the bomb, remain determined not to die by it.

These fears are now particularly intense. Anti-nuclear rallies proliferate in Europe to match the proliferation of nuclear warheads positioned there. Referendums calling for a bilateral freeze on the development of new nuclear weapons have appeared on local ballots across the country, and have met with an enthusiastic response. A full conference of the U.S. Catholic Bishops last May approved a highly publicized pastoral letter expressing grave reservations about the moral legitimacy of current U.S. deterrence strategies. And tens of thousands of demonstrators in Greenham Common, England, have formed a human chain around a proposed Trident nuclear warhead site, resolved to resist Armageddon.

No goal could be more widely shared than the goal of having human life on earth continue and flourish, of not destroying human life or—perhaps even worse—altering it beyond recognition. Do the over 17,000 nuclear warheads the superpowers currently point at each other place human life as we know it in peril? It is a commonplace to observe that each side possesses ample nuclear capability to destroy the other side many

times over. Those who build and deploy these massive arsenals maintain, however, that, unlike all previous weapons known to man, nuclear weapons, precisely because of their terrifying destructive potential, exist not to be used, but to *deter* their ever being used. They serve the ends of peace, not of war, by making nuclear war too terrible to contemplate.

Philosopher George Sher of the University of Vermont finds these claims about the deterrent role of nuclear weapons radically perplexing: "Any policy which is seriously thought necessary to maintain peace, yet which may end by extinguishing all human life, must raise moral perplexities on an unprecedented scale." Certainly our current deterrence policies raise a battery of urgent moral questions. Does deterrence work? Which policies work better, deter more surely? If policies of deterrence work, do we need to know anything else to assess their moral acceptability? What other human concerns could possibly weigh in the balance against the need to avert nuclear war? And what if deterrence fails?

Counterforce and Countervalue

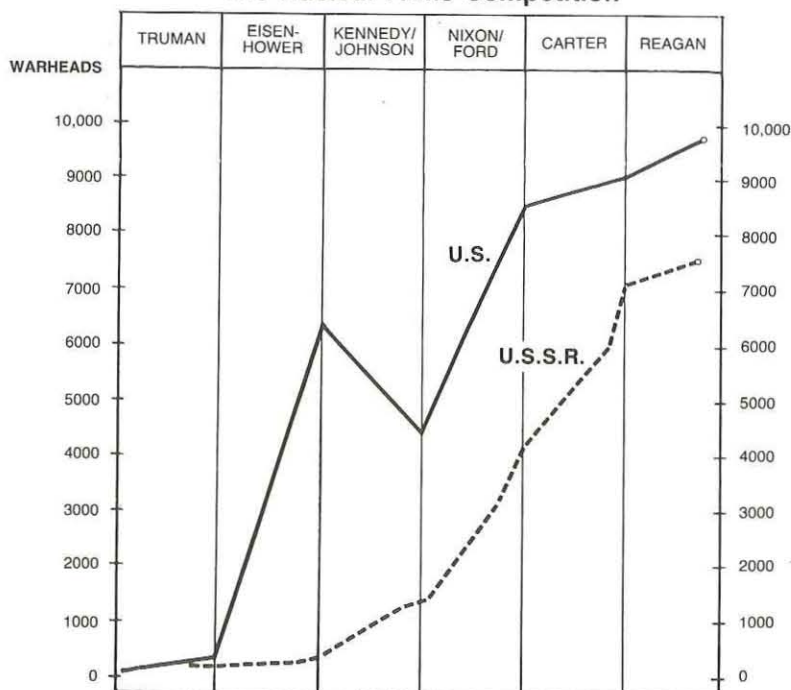
Two dominant positions have defined themselves in the nuclear strategy debate among those who can bring themselves to deploy nuclear weapons at all: one camp would target the warheads against cities and civilian populations; the other would restrict the targets to military installations and missile sites, with the primary aim of disarming, rather than decimating, the other side.

The latter, *counterforce* strategy embodies the long-standing military tradition that, in the words of University of Maryland political scientist George Quester, "To attack the enemy of the same cut of uniform is fair game. To bomb civilians is not. . . . The most honorable note of military training anywhere is that the only legitimate target will be people in uniform on the other side." Civilian immunity is a cornerstone of just war theory, which condemns waging war against the "innocent."

In the nuclear age, however, *countervalue* strategy has come into its own. In the early years of nuclear weapons design, indeed, targeting technology was insufficiently developed to permit aiming at specific military installations. Accuracy extended only to targeting enemy cities, raising the specter of the indiscriminate slaughter of civilians. Deterrence theorists have turned this very crudeness of nuclear weapons to advantage in justifying their existence, however. Unsited for waging and winning a war, these new and terrible weapons were suited instead for ensuring that such a war would never be fought. Counterforce strategy, these theorists claim, however humane it might sound, is actually far more dangerous, for it destabilizes the fragile peace that countervalue strategy can preserve.

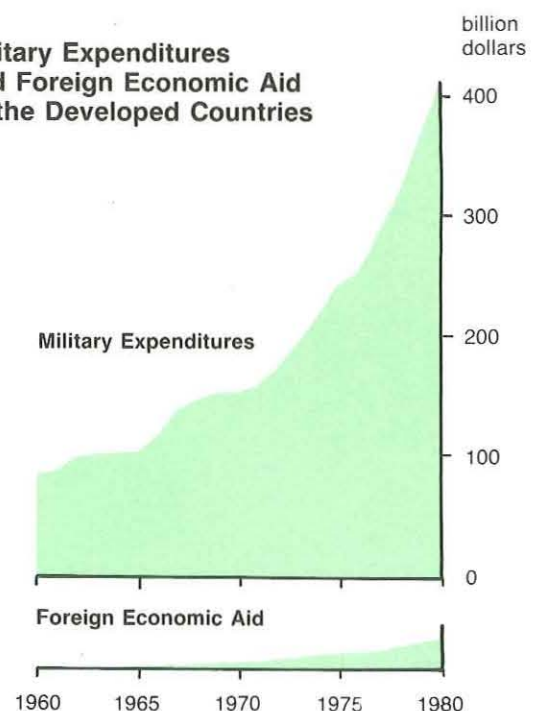
Quester explains: "When either side has the ability to disarm the other's military, it will be tempted to do so, lest it lose this ability later on, lest the other side attain it afterward. . . . Victory may simply go to whoever strikes first, with a result that each side will race to strike in crisis, shooting first and asking ques-

The Nuclear Arms Competition



Source: National Defense Budget Estimates FY 1983
Office of the Assistant Secretary of Defense, March 1982

Military Expenditures and Foreign Economic Aid of the Developed Countries



Source: Ruth Leger Sivard, *World Military and Social Expenditures, 1981*

tions later, producing a war which neither side may have wanted." Strategists must consider not only how to wage a war fairly and effectively, but how not to let the war begin in the first place. It may not matter if counterforce strategy makes war somewhat less deadly if it also makes war more likely.

If each side pursues a countervalue strategy, targeting its missiles against civilian population centers instead of missile sites, then neither side has any incentive to strike first. Neither is led to the brink of "use them or lose them" trigger-happiness, for each side's arsenal will survive the other side's attack. But their

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cities, and their vital life as a nation, will not survive. If A destroys B's cities, B's weapons will be launched in retaliatory destruction against A's cities as well. Countervalue strategy raises the stakes of war by ensuring that everyone, including any side that gambles on starting a war, will lose utterly. This approach of "Mutual Assured Destruction" (MAD) is argued to be a powerful peace-keeper.

Strategies like MAD escalate the magnitude of the possible horror, but seek above all to deter it. On the traditional counterforce strategy, the horror is less horrible, but considerably more likely to befall. Since the consequences of nuclear war in either case will be horrible enough, and only dubiously contained, it may be most important that the war not begin. As George Sher notes, "The consequences of nuclear war will count against deterrence only if that policy runs an appreciable risk of failure. . . . If there is no appreciable risk of failure, then the consequences of failure become irrelevant." In the final analysis, it seems, what counts is whether deterrence works.

Does Deterrence Work?

What does it mean for deterrence to work? McGeorge Bundy, advisor on major elements of U.S. foreign policy over the past twenty years, remarks that in one sense our deterrent policies have obviously worked: there has been no nuclear war. In the same sense, he reminds us, the deterrent policies of Finland, Austria, Canada, and Mexico have worked as well. These nations also have a concept of deterrence, "a view of what is necessary to prevent the use of nuclear weapons against them." And these nations can equally well claim on behalf of their policies that "there has been no war against them, and no coercion that has prevented their citizens from living lives decisively bet-

ter than those of the generation before them." Clearly, Bundy says, "the judgment that deterrence has worked is not a judgment that any particular form of deterrence was the best available—or even that it was necessary. . . . It is only an assumption, and one not open to proof, that the nuclear weapon [is] indispensable to [deterrence]."

These considerations imply that other policy elements may work to deter as much as the balance of terror does—or perhaps more. Bundy suggests that detente itself may be "a reinforcement to deterrence, in the sense that clear agreements can be more stable, more reliable, more costly to challenge, and more reassuring than tension caused by open disagreement."

Such considerations also imply that the vast economic costs of the MAD strategy are not unimportant in its assessment. When no one can empirically prove or disprove that a massive arsenal effectively safeguards peace, it is not clear how many additional trillions of dollars should be earmarked for the military. But Bundy, for one, thinks that "prudent modernization" should suffice to maintain a credible deterrent, so the monetary costs of deterrence perhaps need not be as staggering as Pentagon estimates might suggest.

Mutual Assured Destruction carries with it moral as well as economic costs, however, and some have argued that these may be great enough to count decisively against MAD, *whether or not it works*. Some means may be flatly ruled out as morally unacceptable, even if they are necessary to achieve important ends. We ordinarily don't believe that "It works" gives a full answer to the question, "Is it morally acceptable?" Of course, most ends are not as vital as deterring nuclear war. What moral reasons tell against MAD, and how much weight should we give them?

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Intentions, Innocence, and Immunity

The original objection to MAD was that targeting nuclear warheads against cities violates the principle of civilian immunity. To this it was replied that MAD is not a strategy for fighting a nuclear war, but for deterring a nuclear war, and so the carnage that *could* result if a war *were* fought on this strategy need not count against it.

It is true, nonetheless, that the warheads are in fact pointed at civilian populations and that each nation has threatened to launch them if attacked. Our leaders

even now declare their firm intention to launch such a retaliatory assault, knowing full well the resultant slaughter. Suppose we believe that it is always wrong to kill the innocent, and that the ordinary citizens of any country are by and large innocent of any acts of war. Is it any less wrong to *intend* to kill them than to commit the killing itself?

Gregory Kavka, philosopher at the University of California at Irvine, explains our usual reasoning for thinking it is not. "We regard the man who fully intends to perform a wrongful act and is prevented from doing so solely by external circumstances (e.g., a man whose murder plan is interrupted by the victim's heart attack) as being just as bad as the man who performs

supposed immunity of innocent civilians. Generally we believe that "persons have moral immunity, and it is impermissible to deliberately impose significant harm or risk on them, unless they are themselves morally responsible for creating relevant harms or dangers." But the degree of moral responsibility necessary to annul this immunity may be construed more or less strictly in different situations. "Our beliefs about dangerous situations are complex enough," according to Kavka, "to take account of the fact that there are various kinds of connections an individual may have to a given danger, and that these may hold in various combinations and degrees. . . . When there is a significant present danger, and control of that danger *requires*

Wide World Photos



Protestors in Greenham Common, England, form a chain for peace.

a like wrongful act." (Kavka notes that the principle also holds if I intend to kill my neighbor *if he insults me* and fail to kill him only because he happens to refrain from insult.) We tend to treat the intention to perform an act as the beginning of the act itself.

However, Kavka rejects the principle that if an act is wrong, intending to perform it is also wrong. The principle fails precisely when applied to deterrent intentions, to "intentions adopted solely to prevent the occurrence of the circumstances in which the intention would be acted upon." In the usual case, an agent forms an intention to do something because he or she desires to do that thing, and thus the moral evaluation of intention and act are fused. But in the case of deterrent intentions, the intention is formed independently of any desire to carry out the act intended and is indeed compatible with desiring *not* to carry it out. The intentions driving the MAD strategy, Kavka concludes, may be evaluated on their own merits.

Furthermore, Kavka casts doubt more broadly on the

loosening the conditions of liability, our inclination is to regard some loosening as justified."

Thus, we feel more justified in stopping a knife-wielding madman by shooting him than in achieving the same result by shooting an uninvolved third party, although the madman is not strictly responsible for what he does. Or, Kavka suggests, compare deterring country Y from attacking by threatening retaliation against its cities, with deterring it by threatening retaliation against the cities of uninvolved nation Z. In the case of collective action by an organized group, individual contributions are typically indirect and insignificant, and to insist on a tight causal connection to establish responsibility "would be to let too many people (in some cases perhaps *everyone*) off the hook, and largely lose the ability to influence group acts by deterrence."

Finally, we may not want to accept the moral prohibition against killing the innocent in its most absolute form. Even those who believe that certain acts

are wrong regardless of what good they may produce or what evil they may avert are reluctant to rule out *all* attention to consequences. If the fate of the world hangs in the balance, acts that would otherwise lie beyond the moral pale may be countenanced.

It seems, therefore, that this objection against Mutual Assured Destruction strategies of deterrence fails. If nuclear deterrence works to avert a great evil—and of course no one can know that it does—then these moral costs it involves do not seem weighty enough to tip the scales against it.

If Deterrence Fails

Suppose, however, that deterrence fails. Despite nation A's declared intention to retaliate against any nuclear attack launched by nation B, B pushes the button. Millions of A's citizens are killed; untold millions

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more are horribly maimed and burned. The threat of retaliation having accomplished nothing, should A retaliate nonetheless? *May* A retaliate? For retaliation could accomplish nothing more, it might seem, than sheer, pointless vengeance, butchery for butchery, with no human good to be gained.

The one thing we can know about what *would* happen if deterrence failed is that we can know nothing. Bundy writes: "No one can have or hope to have any clear idea of what would in fact happen 'if deterrence failed'—that is, if nuclear war began. This difficulty is not escaped by any theory, because no theory can predict with any confidence the behavior of any government, friend or foe, in such a situation." How would heads of states react in a situation of "unprecedented stress and danger, . . . in the midst of already appalling destruction"? Would credible communication among the superpowers still be possible? Which weapons would function with what efficiency? Which intentions would be read into what actions? "Would the impulse to stop the slaughter be stronger than the impulse to kill the killers, and would it be the same or opposite on the two sides? Who can tell?"

Philosopher David Lewis of Princeton University argues that in situations of such vast and overwhelming ignorance we can also know next to nothing about what we *should* do. In the early stages of a major nuclear war, no strategist could know what course of action could help to save his or her country—or if there was a country left to save. Where no one can possibly know what retaliation could or could not accomplish,

moral evaluation of the decision to retaliate is on extremely shaky ground.

Lewis points to the radical uncertainty under which generals and soldiers of all ranks would be groping toward a decision. "It might indeed be true, if deterrence failed, that our retaliation would accomplish no good purpose, would accomplish nothing but dreadful and off-target vengeance. It might also be false. What is preposterous . . . is to imagine that anyone could *know* that there was nothing left but vengeance. . . . I say that it might well be right to launch the counterattack: instrumentally rational and morally right, all things considered. As right, that is, as any choice could be in so desperate and tragic a predicament."

It might, of course, be wrong. Retaliation might do nothing more than to complete the devastation already begun, gratuitously incinerating additional millions and rendering huge portions of the earth unfit for human life—if the extensive genetic damage that would also be wreaked did not preclude the possibility of future generations' enjoying anything that could be called "human" life. And it *would* be wrong, on Lewis's account, for our strategists to *intend* to launch a counterattack massive beyond any military necessity, massive beyond any consideration of what could possibly be right.

Wrong, and pointless. For Lewis believes that "no such intentions are necessary to provide deterrence. The intention to launch a counterattack only if, and only to the extent that, it is right provides deterrence

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galore. . . . The sort of counterattack that might serve a good purpose would be a dreadful retaliation as well."

We need not worry that anything less than the vastest devastation imaginable will not be sufficiently terrifying. In a world such as ours, with arsenals such as ours, there is no shortage of fear, just a shortage of hope.

The views of George Sher, George Quester, McGeorge Bundy, and David Lewis are taken from papers presented at a conference on Nuclear Deterrence: Moral and Political Issues, sponsored by the Center for Philosophy and Public Policy, held at the University of Maryland, April 7-9, 1983. Gregory Kavka's views are taken from his paper presented at this conference and from his article "Some Paradoxes of Deterrence," which appeared in The Journal of Philosophy, vol. LXXV, no. 6, June 1978. Selected papers from the conference will appear in The Security Gamble: Deterrence Dilemmas in the Nuclear Age, edited by Douglas MacLean, Maryland Studies in Public Philosophy.

Cost-Benefit Analysis Defended

In past issues, QQ has printed articles that raised philosophical objections to the use of cost-benefit analysis in public policy decision-making. In the following discussion, Herman B. Leonard and Richard J. Zeckhauser, of the John F. Kennedy School of Government at Harvard University, present a defense of cost-benefit analysis against many of these objections. This article is drawn from a longer paper written by Leonard and Zeckhauser for a Center research project on risk and consent, funded by the National Science Foundation.

* * *

Cost-benefit analysis, particularly as applied to public decisions involving risks to life and health, has not been notably popular. A number of setbacks—Three Mile Island is perhaps the most memorable—have called into question the reliability of analytic approaches to risk issues. We believe that the current low reputation of cost-benefit analysis is unjustified, and that a close examination of the objections most frequently raised against the method will show that it deserves wider public support.

Society does not and indeed could not require the explicit consent of every affected individual in order to implement public decisions that impose costs or risks. The transactions costs of assembling unanimous consent would be prohibitive, leading to paralysis in the status quo. Moreover, any system that required unanimous consent would create incentives for individuals to misrepresent their beliefs so as to secure compensation or to prevent the imposition of relatively small costs on them even if the benefits to others might be great.

If actual individual consent is an impractically strong standard to require of centralized decisions, how should such decisions be made? Our test for a proposed public decision is whether the net benefits of the action are positive. The same criterion is frequently phrased: Will those favored by the decision gain enough that they would have a net benefit even if they fully compensated those hurt by the decision? Applying this criterion to all possible actions, we discover that the chosen alternative should be the one for which benefits most exceed costs. We believe that the benefit-cost criterion is a useful way of defining "hypothetical consent" for centralized decisions affecting individuals with widely divergent interests: hypothetically, if compensation could be paid, all would agree to the decision offering the highest net benefits. We turn now to objections commonly raised against this approach.

Compensation and Hypothetical Consent

An immediate problem with the pure cost-benefit criterion is that it does not require the actual payment of compensation to those on whom a given decision imposes net costs. Our standard for public decision-making does not require that losers be compensated, but only that they *could* be if a perfect system of transfers existed. But unless those harmed by a decision are *actually* compensated, they will get little solace from the fact that someone is reaping a surplus in which they could have shared.

To this we make two replies. First, it is typically infeasible to design a compensation system that ensures that all individuals will be net winners. The transactions costs involved in such a system would often be so high as to make the project as a whole a net loss. But it may not even be desirable to construct full compensation systems, since losers will generally have an incentive under such systems to overstate their anticipated losses in order to secure greater compensation.

Second, the problem of compensation is probably smaller in practice than in principle. Society tends to compensate large losses where possible or to avoid imposing large losses when adequate compensation is not practical. Moreover, compensation is sometimes overpaid; having made allowances *ex ante* for imposing risks, society still chooses sometimes to pay additional compensation *ex post* to those who actually suffer losses.

Libertarians raise one additional argument about the ethical basis of a system that does not require full compensation to losers. They argue that a public decision process that imposes uncompensated losses constitutes an illegal taking of property by the state and should not be tolerated. This objection, however strongly grounded ethically, would lead to an untenable position for society by unduly constraining public decisions to rest with the status quo.

Attention to Distribution

Two distinct types of distributional issue are relevant in cost-benefit analysis. First, we can be concerned about the losers in a particular decision, whoever they may be. Second, we can be concerned with the transfers between income classes (or other defined groups) engendered by a given project. If costs are imposed differentially on groups that are generally disadvantaged, should the decision criterion include special consideration of their interests? This question is closely intertwined with the issue of compensation, because

it is often alleged that the uncompensated costs of projects evaluated by cost-benefit criteria frequently fall on those who are disadvantaged to start with.

These objections have little to do with cost-benefit analysis as a method. We see no reason why any widely agreed upon notion of equity, or weighting of different individuals' interests, cannot in principle be built into the cost-benefit decision framework. It is merely a matter of defining carefully what is meant by a benefit or a cost. If, in society's view, benefits (or costs) to some individuals are more valuable (costly) than those to others, this can be reflected in the construction of the decision criterion.

But although distribution concerns could be systematically included in cost-benefit analyses, it is not always—or even generally—a good idea to do so. Taxes and direct expenditures represent a far more efficient means of effecting redistribution than virtually any other public program; we would strongly prefer to rely on one consistent comprehensive tax and expenditure package for redistribution than on attempts to redistribute within every project.

First, if distributional issues are considered everywhere, they will probably not be adequately, carefully, and correctly treated anywhere. Many critics of cost-benefit analysis believe that project-based distribu-

tional analysis would create a net addition to society's total redistributive effort; we suggest that is likely, instead, to be only an inefficient substitution.

Second, treating distributional concerns within each project can only lead to transfers within the group affected by a project, often only a small subset of the community. For example, unisex rating of auto insurance redistributes only among drivers. Cross-subsidization of medical costs affects only those who need medical services. Why should not the larger society share the burden of redistribution?

Third, the view that distributional considerations should be treated project-by-project reflects a presumption that on average they do not balance out—that is, that some groups systematically lose more often than others. If it were found that some groups were severely and systematically disadvantaged by the application of cost-benefit analyses that ignore distributional concerns, we would favor redressing the balance. We do not believe this is generally the case.

Sensitive Social Values

Cost-benefit analysis, it is frequently alleged, does a disservice to society because it cannot treat important social values with appropriate sensitivity. We believe that this view does a disservice to society by



Drawing by S. Harris; ©1979
The New Yorker Magazine, Inc.

unduly constraining the use of a reasonable and helpful method for organizing the debate about public decisions. We are not claiming that every important social value can be represented effectively within the confines of cost-benefit analysis. Some values will never fit in a cost-benefit framework and will have to be treated as "additional considerations" in coming to a final decision. Some, such as the inviolability of human life, may simply be binding constraints that cannot be traded off to obtain other gains. Nor can we carry out a cost-benefit analysis to decide which values should be included and which treated separately—this decision will always have to be made in some other manner.

These considerations do not invalidate cost-benefit analysis, but merely illustrate that more is at stake than just dollar measures of costs and benefits. We would, however, make two observations. First, we must be very careful that only genuinely important and relevant social values be permitted to outweigh the findings of an analysis. Second, social values that frequently stand in the way of important efficiency gains have a way of breaking down and being replaced over time, so that in the long run society manages to accommodate itself to some form of cost-benefit criterion. If nuclear power were 1000 times more dangerous for its employees but 10 times less expensive than it is, we might feel that ethical considerations were respected and the national interest well served if we had rotating cadres of nuclear power employees serving short terms in high-risk positions, much as members of the armed services do. In like fashion, we have fire-fighters risk their lives; universal sprinkler systems would be less dangerous, but more costly. Such policies reflect an accommodation to the costs as a recognition of the benefits.

Measurability

Another objection frequently raised against cost-benefit analysis is that some costs and benefits tend to be ignored because they are much more difficult to measure than others. The long-term environmental impacts of large projects are frequently cited as an example. Cost-benefit analysis is charged with being systematically biased toward consideration of the quantifiable aspects of decisions.

This is unquestionably true: cost-benefit analysis is *designed* as a method of quantification, so it surely is better able to deal with more quantifiable aspects of the issues it confronts. But this limitation is in itself ethically neutral unless it can be shown that the quantifiable considerations systematically push decisions in a particular direction. Its detractors must show that the errors of cost-benefit analysis are systematically unjust or inefficient—for example, that it frequently helps the rich at the expense of the poor, or despoils the environment to the benefit of industry, or vice versa. We have not seen any carefully researched evidence to support such assertions.

We take some comfort in the fact that cost-benefit

analysis is sometimes accused of being biased toward development projects and sometimes of being biased against them. Cost-benefit analyses have foiled conservation efforts in national forests—perhaps they systematically weight the future too little. But they have also squelched clearly silly projects designed to bring "economic development" to Alaska—and the developers argued that the analysis gave insufficient weight to the "unquantifiable" value of future industrialization.

In our experience, cost-benefit analysis is often a tool of the "outs"—those not currently in control of the political process. Those who have the political power to back the projects they support often have little need of analyses. By contrast, analysis can be an effective tool for those who are otherwise not strongly empowered politically.

Analyzing Risks

Even those who accept the ethical propriety of cost-benefit analysis of decisions involving transfers of money or other tangible economic costs and benefits sometimes feel that the principles do not extend to analyzing decisions involving the imposition of risks. We believe that such applications constitute a *particularly* important area in which cost-benefit analysis can be of value. The very difficulties of reaching appropriate decisions where risks are involved make it all the more vital to employ the soundest methods available, both ethically and practically.

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Historically, cost-benefit analysis has been applied widely to the imposition and regulation of risks, in particular to risks of health loss or bodily harm. The cost-benefit approach is particularly valuable here, for several reasons. Few health risks can be exchanged on a voluntary basis. Their magnitude is difficult to measure. Even if they could be accurately measured, individuals have difficulty interpreting probabilities or gauging how they would feel should the harm eventuate. Compounding these problems of valuation are difficulties in contract, since risks are rarely conveyed singly between one individual and another.

The problem of risks conveyed in the absence of contractual approval has been addressed for centuries through the law of torts, which is designed to provide compensation after a harm has been received. If only a low-probability risk is involved, it is often efficient to wait to see whether a harm occurs, for in the over-

whelming majority of circumstances transactions costs will be avoided. This approach also limits debate over the magnitude of a potential harm that has not yet eventuated. The creator of the risk has the incentive to gauge accurately, for he is the one who must pay if harm does occur.

While in principle it provides efficient results, the torts approach encounters at least four difficulties when applied to many of the risks that are encountered in a modern technological society. The option of declaring bankruptcy allows the responsible party to avoid paying and so to impose risks that it should not impose. Causality is often difficult to assign for misfortunes that may have alternative or multiple (and synergistically related) causes. Did the individual contract lung cancer from air pollution or from his own smoking, or both? Furthermore, the traditional torts requirement that individuals be made whole cannot be met in many instances (death, loss of a limb). Finally, paying compensation after the fact may also produce inappropriate incentives, and hence be inefficient. Workers who can be more or less careful around dangerous machinery, for example, are likely to be more careful if they will not be compensated for losing an appendage.

Our normal market and legal system tends to break down when substantial health risks are imposed on a relatively large population. These are, therefore, precisely the situations in which the cost-benefit approach is and should be called into play. Cost-benefit

analysis is typically used in just those situations where our normal risk decision processes run into difficulty. We should therefore not expect it to lead to outcomes that are as satisfactory as those that evolve when ordinary market and private contractual trade are employed. But we should be able to expect better outcomes than we would achieve by muddling through unsystematically.

We have defended cost-benefit analysis as the most practical of ethically defensible methods and the most ethical of practically usable methods for conducting public decision-making. It cannot substitute for—nor can it adequately encompass, analyze, or consider—the sensitive application of social values. Thus it cannot be made the final arbiter of public decisions. But it does add a useful structure to public debate, and it does enable us to quantify some of the quantifiable aspects of public decisions. Our defense parallels Winston Churchill's argument for democracy: it is not perfect, but it is better than the alternatives.

This article is substantially condensed and adapted from "Cost-Benefit Analysis Applied to Risks: Its Philosophy and Legitimacy," by Herman B. Leonard and Richard J. Zeckhauser, Center for Philosophy and Public Policy Working Paper RC-6 (College Park, Md.: Center for Philosophy and Public Policy, 1983). The original includes a wide variety of illustrative examples, which could not be reprinted here. To order this paper and other newly released working papers from the Center's project on risk and consent, see page 15.

America's Public Lands: To Use or Not to Use?

The federal government owns about three-quarters of a billion acres—approximately one-third of the land area of the United States. Although something approaching one-third of these public lands (or one-ninth of all U.S. lands) can be considered preserved lands, only a fraction of these lands are fully protected. The remaining 150 million acres of public lands now set aside from use are either recommended for permanent designation, under study, or under planning. The continuing battles over the final decisions regarding the use of these lands constitute some of the major land-use decisions our country faces.

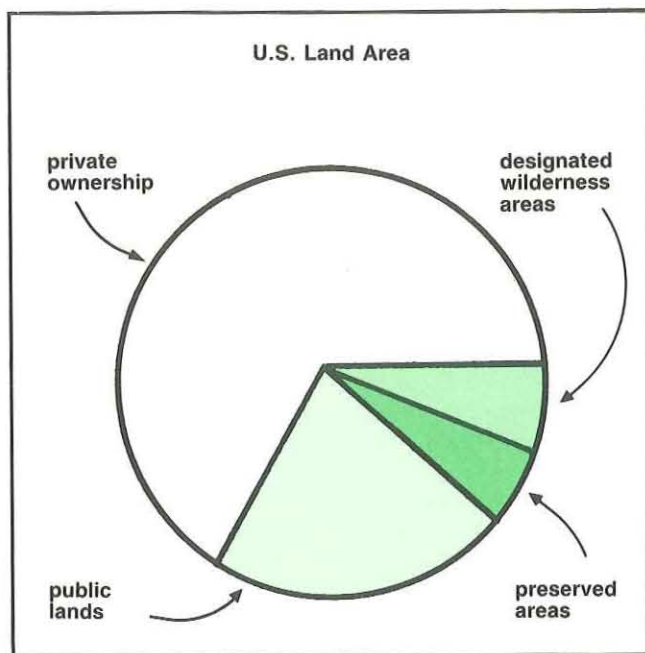
It would be a tragedy if these crucial decisions were made on the basis of short-term economic gains for private corporations or by self-interested defenses of wilderness generated by local environmental groups

bent on forcing the problems accompanying growth to occur elsewhere. Such a tragedy can be avoided only if decisions are made on the basis of rational land use criteria. What concepts, values, and principles underlie such criteria?

Conservation and Preservation

Policies regarding a parcel of land range from radically exploitative to radically preservationist. This continuum is best seen as varying according to the time frame over which the benefits and uses are judged.

Radical exploiters of resources use them in a way that damages or destroys their regenerative capacity. The mathematician/economist Colin Clark has shown that, under fairly common economic assumptions, corporate profits will be maximized by radical over-exploitation.



Economic interest is often served by maximizing short-term profits and reinvesting them in alternative profit-making ventures—in the process destroying the resource exploited.

Conservationists advocate moderate use of resources—the derivation of extractive and consumptive products in a way that does not damage the regenerative processes of the resource. Preservationists advocate removal of the resource from use for consumptive and extractive purposes.

If we assume even a moderate concern for the future, there are obvious advantages in protecting resources that could yield indefinite bounty. This gives us a reason to reject radical exploitation and to advocate vigilance in avoiding destructive use of natural resources. But there remain many controversies among environmental protectionists, which include advocates of moderate use (conservationists) and of removal from use (preservationists).

These controversies cannot be resolved by appeal to the motivations driving the two positions. It is common to suggest that these are diametrically opposed—that conservationists advocate balanced use of nature for human purposes, while true preservationists defend nature for its own sake. This contrast is overdrawn, however. The preservation of unspoiled wilderness can be and has been endorsed for *human* motives, as in the Wilderness Act of 1973, which seeks “to secure for the American people of present and future generations the benefit of an enduring resource of wilderness.” When this principle is combined with the factual belief that human beings lack the knowledge to manage complex natural systems adequately, the result is a preservationist stance. On this view, some mature, complex, and relatively large pristine

areas should be set aside from present extractive and exploitative human use, with human management avoided whenever possible.

John McPhee uses an anecdote to illustrate this version of preservationism in his wonderful little book, *Encounters with the Archdruid*. The preservationist David Brower had raised butterflies and

had often watched them emerge from the chrysalis—first a crack in the case, then a feeler, and in an hour a butterfly. He said he had felt that he wanted to help, to speed them through the long and awkward procedure; and he had once tried. The butterflies came out with extended abdomens, and their wings were balled together like miniature clenched fists. Nothing happened. They sat there till they died.

On the preservationist view, butterflies, like the other complex processes of nature, work best when left alone. Human interference does not, in such cases, lead to an improvement.

Thus, while preservationism *could* be justified by a belief that nature is intrinsically valuable and should be protected from human use for its own sake, this difficult-to-understand and even more difficult-to-support position is not essential to preservationism. The preservationist attitude can be fully sustained on a humanistic basis, given a concern for the very long run and a skepticism about human abilities to manage ecosystems over such long periods of time.

The conservationist and preservationist positions *are* distinguished, however, by different underlying concepts of ecosystem health and stability. Moreover, an examination of these concepts assists in making a choice between the two positions, since ecological theory favors the preservationist over the conservationist concept of ecosystem stability. Thus ecological theory provides strong support for the view that the best way to secure human benefits from nature over the long run may be to remove significant tracts of land from current human use.

Two Conceptions of Stability

Both conceptions of environmental protection embody an idea of what it is for an ecosystem to function normally. The core of this idea is the belief that a system is healthy only if it is in some sense stable. But the concept of stability is notoriously ambiguous, and conservationists and preservationists implicitly use two different conceptions of stability to inform their view of protectionism.

Conservationists tend to interpret the stability of a system statically, in terms of concepts such as constancy or resilience. A system is constant if it does not change through time; a system is resilient if it undergoes change, but demonstrates an ability to return to its normal (i.e., predisturbance) state after a disturbance. This cluster of stability concepts treats change as in one way or another abnormal.

The static view of stability comes naturally to conservationists because of their dominant concern to increase the output of some small number of products

that contribute to human well-being. Since humans find only a few natural products useful for their purposes, human needs dictate a limited definition of natural productivity. Furthermore, since it is difficult to project human demand for products beyond a generation or so, the conservationists' concern for constant production of consumptive products encourages a focus on short- and medium-term productivity. Major structural changes in an ecosystem are likely to decrease rather than increase production of these goods, because as the system becomes more diverse, energy inputs will be distributed more widely. Thus, when productive systems begin to change, whether as a result of natural or artificial forces, conservationists propose further management of the system, with the goal of maintaining the system's constancy or at least resilience, so that it will continue to yield the desired products.

concentration on the autonomy of systems shifts attention away from particular products of human interest and so away from short- and medium-term goals to a concern for the very long run.

Ecological theory lends strong support to dynamic concepts of ecosystem stability. Constancy hardly ever occurs in nature. Even when a system appears constant, it is usually because compensatory changes return the system to equilibrium. Ecosystems are normally resilient, provided that perturbations do not exceed a certain threshold of severity. But if that threshold is exceeded, then the system may collapse or a new equilibrium may be established.

Systems change, both in response to internal developments and to external pressures. Systems pass into new developmental phases or, in response to heavy exploitation, restabilize at lower levels of complexity. Systems change through ecological time as a

Photo credit Bureau of Land Management



The Aravaipa Canyon Wilderness Area, Arizona

Preservationists, on the other hand, view stability dynamically. On this view, a system is stable even through profound changes in structure and function, provided those changes result from patterns that emerge from the present internal states of the system. For example, if a pine forest ecosystem passes naturally into a mixed hardwood forest in the absence of a major disturbance, this system can be considered stable in the sense that its alterations are predictable on the basis of causes inherent in the system.

Since preservationists view natural systems as autonomous, highly integrated, and dynamic, they doubt that the knowledge and ability of humans is sufficient to manage a system totally and see each intentional modification by human manipulation as one more chance for natural functioning to be disrupted. Their

result of successional development, and they change through evolutionary time as a result of natural selection. Thus the conservationist's concept of stability does not encompass the entire range of ecosystem functioning.

Ecological theory also suggests that the conservationist faith in the prospects for human management of complex ecosystems is misplaced. If the goal of our wilderness policy is to protect biological diversity over the long run, manipulation of systems for productive outputs is counterproductive. It is well known that human management of a large area over time results in less diversity. Agriculture and forestry deliberately limit diversity and channel productivity into a small number of outputs. The preservationist, accepting some managed land use as necessary, insists that some

other lands be set aside to compensate for this loss of diversity in the heavily managed lands. Only by setting land aside in this way can anything like the full range of species and ecosystems be perpetuated for future generations, in the face of increased use for the fulfillment of human needs.

Finally, research on island biogeography has shown that species diversity is directly correlated with island size. Since land preserves are analogous to islands, this provides an argument that larger preserves are preferable to smaller ones.

Conclusions

The conflict between conservationists and preservationists is not a purely scientific one—public policy debates never are. It cannot be resolved by empirical means alone. If, however, we begin with the assumption that our society is committed to the goal of protecting biological diversity for the benefit of future

generations of Americans, there seems to be scientific evidence that only a preservationist approach can succeed. It is an important point in the preservationists' favor that the full range of data is better comprehended using their concept of predictability than the conservationists' favored indicator of resilience. The dynamic features of fragile ecosystems cannot be protected by management initiatives designed to maintain a static concept of stability. The preservationist approach deserves serious attention as we continue our national debate over the use of our remaining unspoiled lands.

This article is drawn from "Conservation, Preservation, and Controversies About the Use of Public Lands," a talk given by Bryan G. Norton, Research Associate at the Center for Philosophy and Public Policy, at the May Third Thursday Briefing, sponsored by the Center for Philosophy and Public Policy. Third Thursday Briefings, held on Capitol Hill from February to June, bring together academic theorists and policymakers to discuss the ethical or conceptual foundations of central policy decisions.

Brave New Office

A century ago the typewriter revolutionized American offices—and in the process transformed clerical work from a high-status male profession to a low-status female job. The gentleman's secretary became "just a secretary," with pay and career opportunities curtailed accordingly. Today the computer promises to bring far more sweeping changes, as the explosion in microprocessing begins to reverberate in the typing pool. Already the word processor has replaced 10 percent of the typewriters in the nation's 500 largest industrial companies, and with the cost of labor rising and the price of electronics dropping, few doubt that the automated, computerized, electronic "office of the future" is on its way.

A first fear is that office automation will boost clerical unemployment; optimists counter that the computer will create new jobs as it destroys old ones. But what will these jobs be like? How will they affect the workers—predominantly women and predominantly un-unionized—who have to do them? The "office of the future" raises important and troubling questions about the rights of workers and the nature and meaning of work.

Computers: Hazardous to Your Health

One danger of the electronic office lies in the deleterious health effects on the now more than 10 million workers who stare at video display terminals (VDTs) during their working day. A 1979-80 study by the National Institute of Occupational Safety and Health found high levels of both physical and mental stress among terminal operators, ranging from back-

aches, headaches, and eyestrain to depression and fatigue. Operators report that work on the terminals, however more efficient, is far more exhausting than work on old-fashioned typewriters.

The Occupational Safety and Health Act of 1970 takes as its stated purpose "to assure so far as possible every working man and woman in the nation safe and healthful working conditions." The right to a safe and healthful workplace is already guaranteed by law (although enforcement is lax and spotty), so office workers whose health is jeopardized by the stampede to computerization should face no new legal or moral battles.

Computer-age health problems seem amenable to commonsense remedies. Terminals can be redesigned to reduce glare and to achieve better contrast between text and screen; detachable keyboards and adjustable tables and chairs considerably improve worker comfort. These simple and relatively inexpensive design features have not been widely adopted, however. A more direct and effective solution is to limit the hours workers spend in front of the terminal. In Norway and Sweden, for example, workers cannot be required to do steady VDT work for more than four hours a day, scheduled in a two-hours-on/two-hours-off rotation. Even in this country, Newspaper Guild contracts negotiated for four newspapers in Minneapolis and St. Paul grant terminal operators extra rest breaks of up to 30 minutes a day.

These health problems are exacerbated, however, by other deeper problems posed by office automation. Computers can be used to increase the pace and

pressure of office work and to routinize and regiment it, in ways that take their toll on workers' health, as well as their humanity.

The Computer as Boss

Two features of computers give rise to particularly disturbing problems for those who must work with them. The first is the tendency of computer automation to lead to fragmentation in the labor process. According to Joan M. Greenbaum, author of *In the Name of Efficiency: Management Theory and Shopfloor Practice in Data-Processing Work*, "Computerization of a process requires that the steps in that process be defined in extreme detail so that computer programs can be written that will imitate the actions of the workers." Tasks must be broken down into their smallest discrete components, "rationalized" into their simplest basic steps. It is an easy transition from fragmenting the work process in this way to distributing the fragments among different workers, so that each worker completes only an isolated part of the full operation. Thus the secretary's job is broken down into separate, specialized tasks—inputting manuscripts, editing manuscripts, retrieving information from the computer's memory bank, filing—which may be parceled out to clerical workers who originally handled a wide variety of functions.

Computers have as well a remarkable capacity for minutely monitoring the pace and flow of work. Every stroke of the typist's fingers can be tallied—including every time she needs to strike the correction key. Pauses can be electronically recorded for a supervisor's easy review. While such unflagging surveillance permits a highly accurate measure of one sort of productivity, it leaves no scope for worker privacy and drives workers to meet ever higher machine-set quotas.

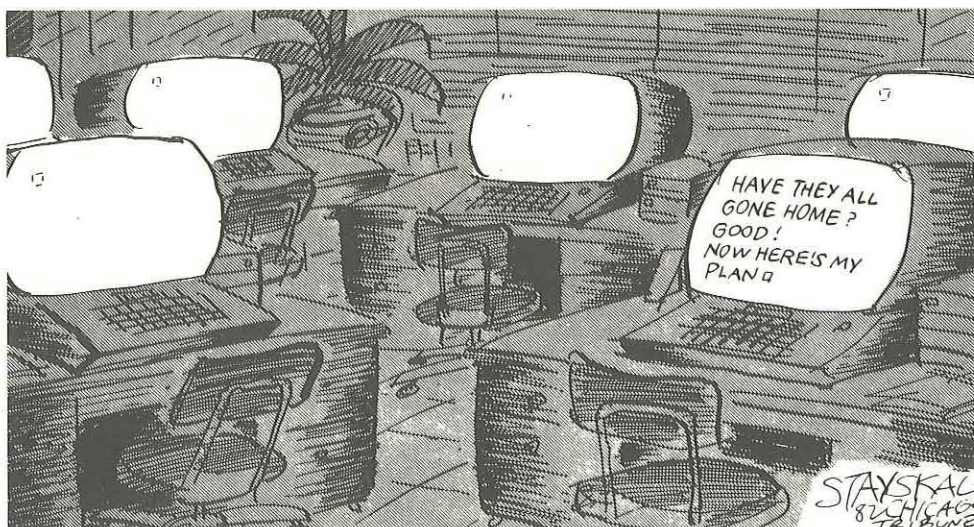
Computer fragmentation of work and computer monitoring of work reinforce each other. The worker's task must be defined as narrowly as possible in order

for the computer—and the human manager—to keep clear tabs on its progress. Greenbaum argues that fragmentation of work is designed as much to extend management control over work as to enhance efficiency. Conversely, when workers are evaluated only on the performance of certain carefully defined functions, this reinforces a single-minded focus on those functions, thus completing the fragmentation. If the number of keystrokes is all that matters to management, why should a secretary stop to correct spelling or to query an inconsistency?

Work and Humanity

The psychological and spiritual effects of office automation may be more serious still, for if computerization ends up substituting mechanical rigidity and regimentation for human imagination and initiative, it threatens workers' self-respect and self-esteem. The meaning of work, and the dignity of the worker, may both be degraded.

Philosopher Mary Gibson, writing in *Workers' Rights*, argues that just as workers have a right to a safe and healthful workplace, so they have a right to a useful and challenging job. In fact, the right to meaningful work is supported by the right to safe and healthful working conditions, because pointless, demeaning, and unchallenging work has itself been shown to be a health hazard. Gibson's thesis is supported by Charles Hampden-Turner's studies of the mental health of workers. Utilizing an index of "high" versus "low" mental health (where low mental health is characterized by such symptoms as depression, poor social relationships, anxiety, and hostility), Hampden-Turner found that the percentage of workers with high mental health correlated with job skill levels as follows: skilled—58%; semiskilled—35%; repetitive semiskilled—10%; repetitive machine-paced semiskilled—7%. As workers are deskilled and confined to rote, tedious jobs, their physical and mental well-being suf-



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fers significantly. Gibson concludes: "The right to a useful and challenging job arises . . . as a necessary condition for mental and physical health and from the right to a safe and healthful job."

On Gibson's view, the right to meaningful work is supported also by a commitment to individual autonomy. Workers in repetitive, machinelike jobs have no opportunity to make decisions about even the most trivial details of how they perform their own tasks. When secretaries who once supervised a host of complex office processes now sit all day in a word processing pool inputting data at the computer's command, autonomy is radically circumscribed.

The deskilling of workers and the degradation of

The right to meaningful work is supported also by a commitment to individual autonomy. Workers in repetitive, machinelike jobs have no opportunity to make decisions about even the most trivial details of how they perform their own tasks.

work deprive workers of an important component of human good. In *A Theory of Justice*, John Rawls posits what he calls the "Aristotelian Principle": "other things equal, human beings enjoy the exercise of their realized capacities (their innate or trained abilities), and this enjoyment increases the more the capacity is realized, or the greater its complexity. The intuitive idea here is that human beings take more pleasure in doing something as they become more proficient at it, and of two activities they do equally well, they prefer the one calling on a larger repertoire of more intricate and subtle discriminations." This basic principle of motivation explains why office workers, other things equal, would prefer to program computers than to carry out programs written by others, to edit manuscripts rather than type them.

Given the apparent truth of the Aristotelian Principle, individuals should strive to develop and use their talents and abilities, and social institutions, on Rawls's view, should be designed to facilitate their doing so. Otherwise, Rawls writes, "human beings will find their culture and form of life dull and empty. Their vitality and zest will fail as their life becomes a tiresome routine." The typical level of vitality and zest of VDT operators at five o'clock bears Rawls out only too well.

Technology and Choice

Champions of office computerization insist that the computer's potential to improve office working conditions is also great. Typing was never terrifically rewarding anyway, and the computer can eliminate endless retyping and messy cut-and-paste sessions. Furthermore, since "keyboarding" is not off-limits to executives in the way that typing has been, computerization can help to minimize hierarchical distinctions

and make offices at least seem more democratic. And computers can provide a more genuine democracy as well. Knowledge is often power, and broader access to information may lead to power being more equally shared.

Which will it be? Will office computers make things better or worse? The technology itself gives us no imperatives, or at least none that we need accept if we choose not to. Greenbaum points out that computer technology is from start to finish a matter of human choice. "This type of technological change did not fall from the sky. . . . Technological innovation is nothing more or less than a process, which, like any other process, involves people from beginning to end. Technology-based products are shaped by the people who specify the design objectives and by the people who are affected by them."

Traditionally, however, they have been shaped far more by management objectives than by workers' needs. The decision to utilize certain technologies, and how to utilize them, has been almost universally a management prerogative, challenged (so far unsuccessfully) by only a handful of American unions.

Now, alarmed by the rate and sweep of workplace automation, unions have begun to fight for an active role in assessing new technology *before* it is adopted and for specific protection against the negative impact of technological change. A recent United Auto Workers bargaining package included, for example, demands for full union access to all information created by any computerized system, for company assurances that computers not be used to monitor or discipline workers, and for establishment of technology committees and "data committeemen" positions to evaluate the potential effects of projected innovations.

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Vigilant unions provide little protection, unfortunately, to the millions of office workers who remain unorganized. Secretaries and clerical workers are by and large unable to bargain collectively to secure their rights. As the "office of the future" comes more and more to resemble the factory of the past, however, office workers may organize as factory workers did before them. This could be one result of the computer revolution least welcome to many who have heralded its coming.

—Claudia Mills

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