Even Scientists Can't Halt Power Shovels

THE "LOVE-HATE" relationship of modern culture and science must have many historical and psychological roots. Some of them are mutually contradictory.

We hear that "scientists are too indifferent about the consequences of their discoveries," but also that "the technocrats are trying to run our lives." This ambivalence may flow directly from the nearly total dependence of modern life on technology, on which is then focused every grievance, real or fancied, that human imperfection can produce.

Technology is, of course, a powerful amplifier of those imperfections and must share a burden of responsibility, together with human nature and other human institutions, for the inhumanities of modern life. But if we think of technology as the devil, we will waste our strength in vain theological controversies over the best ritual formula for exorcising it.

Rather, it is a somewhat wonderful, but often wild and ignorant creature that we must yet learn to domesticate.

We must then understand technology within its social context in a fashion that most scientists and technologists have neglected before.

Present-day discussion of the "evils of technology" contains more angry metaphor than useful diagnosis. One of our most constructive, and poetic, critics—Lewis Mumford—has faulted the nuclear physicists who argued against the atomic bombing of Hiroshima for stopping short of "a general strike of scientists and technicians." Should the scientists alone control such decisions? What would the further consequences have been if such a technocratic coup had failed, or even worse, if a scientific junta had succeeded?

Mumford neglects to mention the trial of J. Robert Oppenheimer for little more than his lack of enthusiasm about developing the H-bomb. Oppenheimer's conviction must rank with the inquisition of Galileo as the Establishment's guideline for a scientist's place. As J. D. Bernal pointed out in his "Science and History," the Galileo affair set the pattern whereby scientists could "carry on their work free from religious interferences so long as they did not trespass in the religious sphere . . . producing the type of pure scientist who kept out of controversies of a religious or political kind."

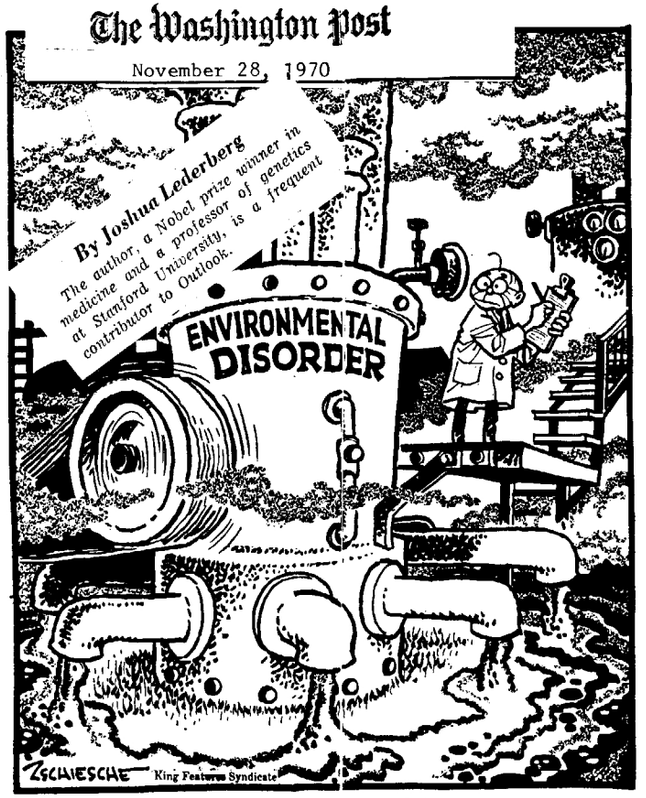
An Insoluble Problem?

ELSEWHERE IN "The Myth of the Machine," Mumford finds a truer target in the failure of Albert Einstein and his associates "to mobilize the intelligence of mankind to prevent such potentially catastrophic energy from being prematurely released." But this failure was not for want of trying. "Politics is far more difficult than physics," and the problem may be fundamentally insoluble in a world system of nation-states.

Before we call for a new act of martyrdom that might symbolize the resetting of the balance between private genius and public responsibility, we need a better understanding of the political processes by which they can be harmonized. The problem is no different than the central dilemma of relating individual freedom to the collective welfare in a democratic society.

But if the scientist has abdicated a political power he never had—to control the uses of the technology he inspires—who does have that responsibility? The answer to this question is so elusive that it understandably aggravates the "green rebellion." A clear allocation of responsibility could lead to rational confrontation and tolerable compromises. As it stands now, we all watch helplessly while the power shovels denude the earth—and the most sophisticated scientist can truthfully say, "Who, me? What do I have to do with that clumsy relic of last century's machines?"

The confusion of responsibility is well illustrated by the memoirs of Albert Speer, headlined as the modern-day Faust. The confession of his wiser years is a compelling human document. No thirst for scientific knowledge but rather mediocre architecture was his ruling passion in bargaining with the devil. The flawed artist, turned expert manager, now reflects that "Hitler's dictatorship . . . employed the instruments of technology to dominate its own people." But he is referring mainly to the radio and the telephone as instruments of communication and command, and above all to the technology of management by which every citizen was made to abdicate his sense of personal moral responsibility for the acts of the State. He calls this technocracy, but it has nothing to do with science or technology. It is, simply, total bureaucracy.



What hath man wrought?

A Two-Headed Bludgeon

THE METAPHORS of "1984" that the new technology of electronic surveillance and computerized dossiers would give a fascist state an overwhelming advantage over its citizens are difficult to challenge. However, as Speer noted, an autocratic educational system that smothers skepticism also dulls the technical competence needed to tend the complex machines.

Furthermore, the neo-technical society is ever more vulnerable to disruption by small numbers of urban guerrillas. The more complex our vital instruments, the more the tranquility of our daily lives depends on the consent of all the governed.

Over 30 years ago, the sociologist Robert K. Merton initiated a more systematic line of thinking about science as a social phenomenon. In writings collected in a volume entitled "Social Theory and Social Structure," he foresaw a backlash against the very principle of dispassionate objectivity. This principle is as essential for the method of science as it is troublesome in its psychological and social impact. He cautioned that "it may salve the conscience of the individual man of science to hold that an inadequate social structure has led to the perversion of his discoveries. But this will hardly satisfy an embittered opposition. The assumption that the social effects of science must be beneficial in the long run . . . involves the confusion of truth and social utility which is . . . in the non-logical penumbra of science."

This is not to say that social utility follows more naturally from superstition and scientific falsity than from objective research. But Merton's foresight was a warning that scientists had better discover how to justify themselves to the community. Unfortunately he did not offer a detailed prescription how they might keep their license, nor do we have one as yet. Nevertheless, it is good technical practice to define your problems as a first step to seeking the solutions.

To work out such a program will require new channels of cooperation among scientists, engineers and their social critics. We can, for example, compare our own problems of technological change with the modernization of less developed societies and thereby learn from those whom we sometimes patronize.

We are indeed learning that more careful assessment of new technology should precede our commitment to it. This has already provoked much thought about the instruments to make the assessment real and vital. Better that technology assessment be the habitual function of pluralistic ongoing institutions than having to invent a new one each time. And we are never sure when "each time" really is.

Regulating Regulators

THE NATIONAL regulatory agency has an undeniable place; but the regulator himself needs watching, and innovations inevitably outpace the formal laws. Questions like threats to privacy from computer applications have needed careful study before sensible and routinely enforceable laws could be written.

The public interest law firm is a social invention that attracted much interest when the Internal Revenue Service recently withheld, then finally approved, its tax-exempt status. The need for cautions about possible abuses of this device for private advantage cannot be disputed.

After more experience, Congress might restudy the legal basis of these firms together with that of the class action suits that may become their main avenue of effective change. Properly registered and regulated, such firms could eventually finance themselves with fees and damages collected in successful suits against unfair exploiters of personal advantage and the collective environment. They could then also advance the painstaking research often needed for protecting consumer and environmental interests.

But this extension from legal action to aggressive counter-technology is an experiment for the future. The public interest firms already have many challenges whose assessment is all too obvious to laymen's eyes, ears and noses.

Another existing device for assessing science and technology is the university, the fountainhead of most basic research. Now squeezed from all directions, including more rigid mission-orientation in many federal grants, the university may soon lose the vigor needed to pursue its historic function of independent criticism. Yet this is perceived as an indispensable part of an institutional environment in which good research can flourish.

The indirect cost, or overhead, of any mission-oriented research contract should then include a tithe for undirected, critical studies. (Unlike the commercial business, the university cannot earn a profit as a way of nourishing its own growth.) First priority should be given to work on independent critical assessment of goal-oriented projects, a scrutiny to which the sponsors may not always be sympathetic.

This proposal will get short shrift at a time when overall budgets for science are being calculatingly shrunk and remaining funds are channeled into work with obvious, short-term relevance. We are to see many more examples of the second law of technical dynamics—quick payoff projects always have the worst side effects for lack of scrupulous investigation. Another principle may keep us more content: When we keep our heads in the sand, we will be spared knowing what hit us. We can always blame it on a devil.