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About the Institute

The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

The Ivory Tower Is Under Siege

by STEWART L. UDALL

TO WHICH IS A SCIENTIST PRIMARILY RESPONSIBLE—his discipline or his society? The way this question is answered in the 1970s will have a profound effect on this country's environmental future. For we have entered what may be the most important period of transition in our history. Nothing less than a redefinition of progress, a redirection of growth, and a recasting of the role of American technology is involved.

No group is better prepared to make a critical contribution to change—to point the way, and prepare the tools for the shaping of tomorrow—than the men and women of the scientific community. Yet it is painfully obvious that scientists are making only a fraction of the impact they could make to encourage creative change. Worse, many men of science are allowing their findings to be used as buttresses for status-quo thinking, and others are unnecessarily accepting a role as backseat "technicians" in which their larger opinions about the American future are not even sought.

Let me be even more blunt. The most encouraging development of the last two years has been not only that some scientists have begun to speak out with power and vigor on environmental issues and the errors of misguided technology, but that they have won a growing national audience for their views. Whether I agree with their every conclusion or not, I admire scientists such as Barry Commoner, Garrett Hardin, Kenneth Watt, Paul Ehrlich, George Wald, René Dubos, and the others who have contributed to an exciting new national debate over science, public priorities, and the future of man. And as I have watched young scientists in all parts of the country leave their laboratories to lead or backstop new regional environmental action organizations, I have marveled at the power scientists can wield when they get involved in day-to-day issues of public interest organizations like the crusading Environmental Defense Fund and the Committee for Environmental Information. We need their indignation at the fouling of man's habitat and the misuse of his resources as much as we need their ideas for better solutions.

Yet I have looked on with dismay as a few elders of the scientific establishment have made studied efforts to put down some of these leaders as "unscientific upstarts." A few weeks ago, Dr. Philip Handler, the president of the National Academy of Sciences, saw fit to warn that "the nations of the world may yet pay a dreadful price for the public behavior of scientists who depart from established fact to indulge themselves in hyperbole." But is it wrong for scientists who have deep-seated fears about the future to express them? Are we not already paying a "dreadful price" for our past misuse of science and technology? When the survival of the species—or at the very least the quality of human existence—is at stake, is it "unscientific" for scientists to enter the lists?

I would rather see scientists err on the side of activism

and occasional "hyperbole" than to see our nation's leaders adopt abortive plans based on inadequate information. If the more aggressive environmental scientists are "rebels and troublemakers," perhaps we need the fresh air of their dissent to help quicken the pace of change.

Surely, the conventional attitudes which have tended to make scientists political eunuchs—mere technicians detached from a value system and its attendant "political" judgments—are at fault. By overemphasizing an ascetic discipline that abhors involvement and drains off emotion, the scientific community has stifled the response of science to the environmental crisis. Of necessity, the scientific method is a discipline that requires the mastery of minutiae. But does this imply that its practitioners must be robots indifferent to the human consequences of their work?

We need scientists who dare to stretch their minds and relate their expertise to the whole human enterprise. We need men and women of all disciplines who are not afraid to integrate their ideas into a larger context that embraces man, nature, and technology. It is the fragmented, overspecialized approach to progress that has put us in peril.

The shortcomings of the old system (one might call it the "cowed scientist" system) are clear. Why, in the 1950s, did Dr. Commoner's small band of scientists at Washington University in St. Louis—rather than the official science committees of the government—gather the data and ring the alarm that alerted the nation to the dangers of nuclear fallout? Why, a decade ago, did Rachel Carson and, more recently, the dedicated scientists of the Environmental Defense Fund—and not the kept consultants of the government—arouse the world to the perils of DDT? Or why did the National Academy of Sciences backstop the government agencies promoting the SST and issue a bland report to be used by the Federal Aviation Agency to justify its gung-ho support of this machine, when evidence gathered by concerned scientists and other citizens increasingly pointed to the conclusion that the SST would be an airborne Edsel and an environmental disaster? Don't concerned scientists have a duty to speak out when we are spending \$1.2 billion to develop an SST for a travel elite—and a pitiful \$2 million to develop a cleaner combustion engine that could benefit every American?

"The National Academy of Sciences has become the tool of vested interests. It is no secret that among government administrators a simple ploy for pushing a goal is to ask the Academy to study the matter, then ask it in a fashion that will assure the right answer, and even to stack the study committee so that no maverick will spoil the results." (Daniel S. Greenberg, former news editor of Science magazine)

With rare exceptions, the American scientific community—both individually and institutionally—has historically worn blinders when viewing the relationship between science and society. To be sure, a handful of scientists must be accorded a high place of honor for alerting the public to the menaces of nuclear weapons, population growth, environmental degradation, and the inadequacies of American education. But in many instances, these scientists have been lone voices in the wilderness. And more often than not, they have been looked upon with disdain by colleagues for venturing outside precisely defined fields of professional expertise—and have received little or no support from the official institutions of science. In fact, many of

these institutions have served to dampen activist "aberrations" by defining their own roles so narrowly as to remove themselves from independent participation in critical issues.

The prestigious National Academy of Sciences is a prime example of the passive, science-as-usual approach. Since its founding by Congress more than a century ago, this body has taken refuge in the circumstance that it was initially created to provide advice to government "upon request." Its charter does not forbid it from providing advice or recommendations upon its own initiative. However, the Academy, functioning all too often as a virtual puppet of government, has chosen to define its role in a fashion that leaves it little room to serve as an independent, critical voice. By confining itself to a clientele almost exclusively made up of government agencies—and by permitting its clients to phrase the questions that it will study—the Academy has all too often become a mere adjunct of established institutions. Is it any wonder that science is on the defensive when it dutifully provides a convenient rationale for the SST lobbyists, the highway contractors, or the Defense Department?

"I share the concern for the possible hazards of DDT—but not the hysteria of those who demand an absolute prohibition against its use before an acceptable substitute is available. The predicted death or blinding by parathion of dozens of Americans last summer must rest on the consciences of every car owner whose bumper sticker urged a total ban on DDT." (Dr. Philip Handler, president of the National Academy of Sciences)

There are good reasons if some segments of youth are disillusioned with science. While courageous individuals in the scientific community were raising the alarm about the lethal threat of chemical and biological warfare, what was the Academy doing? It was working under contract to the Defense Department to select bright young scientists to work in the department's chemical and biological weapons centers.

I fear the august scientists of the Academy are tied to a system of "consulting" that asks them the can-it-be-built questions, but does not solicit their judgments on the should-it-be-built questions—and the overriding issues of national priorities and the preservation of the overall environment. It is tragic if American science ties itself to a stultifying science-as-usual approach when the prestige and force of this profession could be used to effect basic changes in our national policies. The finest hour of science in recent months was the brilliant, volunteer effort of Dr. Jerome Weisner of the Massachusetts Institute of Technology and other former government scientists which alerted the nation to the dangers and shortcomings of the antiballistic missile system. This was scientific politics of the highest order, and provoked a great debate in the Congress and the country. We need more, not fewer, contributions of this kind.

For too long now the American scientific community has sought a special status for itself that has restricted its sense of responsibility. Some leaders of science have seemed to assert that their profession merits public support without public accountability, public support without any assurance of value returned, public support without any guarantee that such largesse will be used in the long-term national interest. There is no doubt that in the main,

science has returned good value in terms of scientific results. But as we all know today, science, lacking any far-sighted ethical or social vision, can be a menace to man as well as a beneficence.

It is dismaying that many of today's best students have an anti-science bias. We should also be disturbed that *The Myth of the Machine*, the magnum opus of Lewis Mumford, who has written and thought more about the human and social implications of science and its inventions than any man alive, is an indictment of misdirected human purposes and the misguided use of technology.

"The vast majority of the scientific community are 'Uncle Toms.' They have sold their souls to the Defense Department and the federal government for small grants and status in the intellectual community. Others have sold their souls to industry." (Dr. George A. Wiley, executive director of the National Welfare Rights Organization and former professor of chemistry at the University of California at Berkeley)

I believe we need a new breed of scientist-statesmen who have opinions on the national purpose and are unafraid to speak up for reform. It is curious to note that, though we have, at public expense created the most affluent scientific community in history, very few of the leaders of this community have given us a vision of science's place in the moral firmament of these times. British science has spawned such splendid, outspoken thinkers on science and society as John Desmond Bernal, the Huxleys, Conrad Waddington, Lord Russell, and Sir Peter Medawar. Where are our scientist-statesmen counterparts?

The old science produced the brilliant specialists who helped us understand the complexity of the natural system and literally take it apart. The new science must produce more holistic thinkers who can help us put it back together and enrich our culture in the process. The scientist of tomorrow must have the inventiveness of Leonardo da Vinci, the discipline of Johannes Kepler, the resourcefulness of Charles Darwin. But he will truly distinguish himself if he dares to step onto the larger stage and expound his views on those values and human priorities that will lead us out of the environmental morass and social malaise of these troubled times.

Dr. Edward Teller's startling disclosure of an attempt among the scientists who developed the atom bomb "to show the world that science can stop a terrible war without killing a single person" is a case in point. Dr. Leo Szilard was right, of course, when he circulated a petition among the atom-scientists urging President Harry Truman to use this awesome new weapon in a nonlethal way to intimidate the Japanese before the Hiroshima blast. These scientists who held such views had a moral duty to express them. It was an abdication of responsibility for them to shirk this responsibility by pretending they had no "right" to influence "political" decisions on the initial use of this weapon.

Scientists alone, of course, cannot forge new public policies or change basic institutions. But they can have a vast influence if they only will speak out. ■

This article is based on Stewart Udall's recent remarks at the 137th Meeting of the American Association for the Advancement of Science. Mr. Udall was Secretary of the Interior from 1961 to 1969 and is now an environmental consultant.