LETTERS

Handicaps and Careers

Geerat J. Vermeij (Letters, 1 Dec., p. 930) expresses objections to the symposium, "Handicapped scientists: Some of their current contributions to biological and medical research," which I have arranged for the 1979 AAAS annual meeting in Houston. Let me assure him that having papers of some handicapped scientists grouped in a separate session does not represent a general policy of segregation by the AAAS. Any symposium proposal submitted by a handicapped scientist would receive the same consideration as those from other scientists. Indeed, there would be no way for the program planners to identify the scientist as disabled by reading the proposal. Similarly, it is impossible to state whether handicapped scientists have or have not been integrated into the other sessions simply by reading the program. Handicaps, like race or eye color, are not revealed by the printed word.

In the symposium I have organized, the label "handicapped" has been deliberately placed on the program because we wish to increase public awareness that a severe physical limitation need not preclude a productive career in science. None of the scientists who have consented to participate in the symposium requires a sheltered forum. All have presented papers at scientific meetings within their own scientific discipline. Some of the speakers are relatively prominent scientists. We are holding this particular symposium because we think it is important to provide role models for young people who might otherwise assume that a scientific career was not an attainable goal. We are emphasizing the participants' scientific work both because we want to show what handicapped scientists are capable of doing and because the scientists involved derive greater personal satisfaction from talking about their work than about their handicaps. We also hope to influence the attitudes of educators, counselors, and physicians who work with and determine the aspirations of the handicapped. To improve science education for the handicapped we must have teachers who believe that teaching science to the handicapped is not a waste of time.

I agree with Vermeij that there are other ways of doing this. One would be to increase the number of handicapped scientists taking part in the AAAS annual meetings by having individual handicapped scientists organize symposia. May I suggest that Vermeij help us by submitting a proposal for the 1980 AAAS annual meeting? In his letter Vermeij neglects to mention that he is blind. There are many who believe categorically that a career in biology is impossible for a person who is blind. This attitudinal barrier can be diminished.

NANSIE S. SHARPLESS
Foundation for Science and the Handicapped and *Department of Psychiatry, Albert Einstein College of Medicine of Yeshiva University, Bronx, New York 10461*

Nitrosamines in Animal Feed

The briefing about the detection of nitrosamines in laboratory animal diets (News and Comment, 13 Oct., p. 192) is of interest but of far less significance than is suggested. Use of the more sensitive analytical methods now available for detecting nitrosamines indicates that they are ubiquitous. The potent carcinogenic activity of many of them is well known. Low concentrations of some nitrosamines have been detected in some kinds of human food (frankfurters and fried bacon, for example) and, while not insignificant, these findings have not moved anyone to panic, even though occasional concentrations of 100 parts per billion (ppb) have been found. However, for safety's sake, measures are being taken to reduce these concentrations and, thereby, lower exposure to these carcinogens.

In contrast, the concentrations of nitrosamines found in the animal diets by Edwards and his colleagues present no measurable risk to experimental animals that live only 2 to 3 years. Dose-response studies have shown that nitrosodimethylamine (NDMA) had no measurable carcinogenic effect when fed to rats in doses of 2 parts per million (2000 ppb) in their diet for a lifetime (*1*); the one rat of 13 in that group which had a liver tumor could have developed it spontaneously, a limitation of all such carcinogenesis experiments.

The 50 ppb of NDMA found in the animal feed corresponds to an intake of 1 microgram per day by a rat. A higher dose (12.5 micrograms per kilogram or approximately 5 micrograms per rat per day) of the somewhat more potent nitrosodiethylamine failed to evoke a tumor response (*2*). The suggestion has been made that this quantity of NDMA could have a synergistic action with other carcinogens. There is little evidence of a detectable synergistic effect of nitrosamines in carcinogenesis, even when much higher doses are given, in my own experiments and in those of others.

I suggest that a study of chemical carcinogenesis and its literature would enable the scientists who made this report to place their findings in perspective. Such perspective will, I believe, show that, while 50 ppb of NDMA might be of some significance if present in human food consumed by millions of people for as long as 70 years, its presence at this concentration in the diets of rats or mice could have no bearing on the outcome of any test.

WILLIAM LIJINSKY
Chemical Carcinogenesis Program, Frederick Cancer Research Center, Frederick, Maryland 21701

References

1. B. Terracini, P. M. Magee, J. M. Barnes, *Br. J. Cancer* **21**, 559 (1967).
2. M. J. VanLogten, E. M. Den Tonkelaar, R. Kroes, J. M. Berkvens, G. J. VanEsch, *Food Cosmet. Toxicol.* **10**, 475 (1972).

The Effectiveness of NEPA

Sally K. Fairfax, in her article on the National Environmental Policy Act (NEPA) entitled "A disaster in the environmental movement" (17 Feb., p. 743) basically attempts to refute what she calls the "external reform" thesis on NEPA effectiveness, with which Friesema and I, among others, are associated (*1*). I suggest that her interpretation of case law in a key attack on the thesis is misleading and that she fails to note the logical relationships of the thesis.

At two important points in her argument, Fairfax neglects to describe the important interrelationship between the National Environmental Policy Act (*2*) and the Administrative Procedure Act (APA) (*3*). First, she argues that NEPA's intraagency environmental analysis goals had already been accomplished by the *Scenic Hudson I* decision (*4*). Second, she argues that NEPA did not contribute to the environmentalists' "standing to sue." A key provision of the APA specifies that persons are entitled to judicial review of agency actions only "within the meaning of a relevant statute" (*3*, section 702). Thus a part of the test for standing is that the plaintiff argues that the "injury" done to the plaintiff's interest is "arguably within the zone of interests to be protected" by the statute which the plaintiff alleged the respondent agency violated. And, in deciding the case, the courts review whether the agency decision is "arbitrary, capricious, . . . or otherwise not in accordance with law," (*3*, section 706), that is, with respect to the *relevant statute*. The *Scenic Hudson I* decision has nothing like the legal value (as a precedent) of NEPA

because the court ruled that the Federal Power Commission (FPC) had not complied with the Federal Power Act, which conferred standing to the environmentalists under the APA. But the Federal Power Act applies *only* to the FPC. NEPA, on the other hand, applies to all "major actions" of *all* federal agencies and is a statute in which the "zone of interests to be protected" is environmental. Thus, all environmentalists may obtain standing to sue any federal agency with regard to any major decision when they allege NEPA is violated by the agency against their interests of an environmental nature. On its face, then, the reach of NEPA is infinitely more wide than that of *Scenic Hudson I*.

Fairfax then proceeds to belittle agency public participation programs. She seems to debunk NEPA public participation, as mandated by the Council on Environmental Quality (CEQ) guidelines, because other statutes' participation mandates are stronger (which they are). But, so what? The point is, NEPA *has* generated increased public participation. Fairfax's somewhat better point, from her *Journal of Forestry* article (*5*), is that participation is often rather mundane, and thus frustrating to agency officials and the public alike. But even that point, while true, misconstrues the logic of public participation.

The key to NEPA is that it created real and legitimate access by a wider public to agency decision-making, an access reinforced by the anticipatible intervention of the courts if agency decisions were "arbitrary and capricious." That access itself is important, addressing Reich's well-known critique of natural resources policy-making (*6*). Wider public access is, however, more important as the predecessor of a more balanced set of public constituencies of the natural resources agencies (when occurring, as it did, in conjunction with greater environmentalist activism). Such a balanced constituency has been critically important as the cause of the very significant shifts of agencies' policies in a pro-environmental direction (*1*, *7*). Certainly the environmental movement can not—and it does not—regard something which makes a critical contribution to a significantly pro-environmental change in policy as a "disaster."

Fairfax's more narrow criticism is that environmentalists are squandering their resources on "reports" and "proliferating paper," rather than on more important matters such as "redefinition of agency authorities" and "authorizing statutes." One envisions gross inefficiency on the part of the Sierra Club's talented Washington lobbyists, prostrated under a pile of environmental impact statements (EIS's). Such is, of course, not the case. The Washington-based environmental lobbyists spend their time, as they should, working on national policy issues. Meanwhile, out in the bush, the Sierra Club chapters and groups, and other local environmental activists, are participating in the majority of EIS processes. This local environmentalist role is appropriate because (i) local activists can legitimately participate in local decision-making, while they cannot all plausibly spend all their time lobbying Congress; and (ii) because of statutory grants of decision authority (plus the fragmented decision process Fairfax mentions), a large number of significant decisions are effectively made by decentralized decision-makers whom local activists can effectively influence.

Some of Fairfax's criticisms of EIS's are quite true. Her points about NEPA-as-rational-decision-making and caveats about EIS "data" are well taken. Certainly Friesema and I agree with her in this regard (*1*). And, apart from the political utility of EIS's to the environmental movement, they are certainly needlessly long tomes. Thus a major goal of the current CEQ revisions of the NEPA regulations is the reduction of EIS bulk (*8*)—an outgrowth, by the way, of the report of the Federal Paperwork Commission (*9*). Such a reduction of the size of the typical EIS should serve to improve an already efficacious administrative reform.

PAUL J. CULHANE
Department of Political Science, University of Houston, Houston, Texas 77004

References

1. H. P. Friesema and P. J. Culhane, *Nat. Resour. J.* **16**, 339 (1976).
2. National Environmental Policy Act of 1969, (PL 91-190, 91st Congress, 1970), sects, 4321-4361.
3. Administrative Procedure Act (1946), as amended by PL 89-554 (89th Congress, 1966), sects. 500-576; *ibid.*, sect. 701.
4. Scenic Hudson Preservation Conference *v.* Federal Power Commission, 354 *Fed Rep., 2nd Ser.* 608 (2nd Cir. Ct., 1965).
5. S. K. Fairfax, *J. For.* **73**, 10 (1975).
6. C. Reich, *Bureaucracy and the Forests* (Center for the Study of Democratic Institutions, Santa Barbara, Calif., 1962).
7. P. J. Culhane, thesis, Northwestern University (1977); in *Public Policies in America*, T. Lowi and A. Stone, Eds. (Sage, Beverly Hills, Calif., in press).
8. "National Environmental Policy Act. Proposed implementation of procedural provisions" (Council on Environmental Quality, Washington, D.C., 1978) [*Fed. Reg.* **43**, 25230 (9 June 1978)].
9. N. Cronin, *Environmental Impact Statements* (Commission on Federal Paperwork, Washington, D.C., 1977).

Fairfax's article contains several valid criticisms of NEPA. Unfortunately, the article's good points are far outweighed by its many assumptions and assertions that lack empirical validity and that lead the author to misguided conclusions. . . .

Fairfax argues that environmentalists' efforts have been "turned away" by NEPA from questioning and redefining agencies' powers and responsibilities and have become "focused . . . instead on analyzing documents." This ignores environmentalists' substantial legislative efforts of the past decade. Aside from working for basic environmental legislation governing air pollution, water pollution, noise pollution, toxic substances, endangered species, strip mining, the coastal zone, and marine sanctuaries, environmentalists have sought new mandates for the Bureau of Land Management's governance of public lands (*1*), the Forest Service's management of the National Forests (*2*), and the Corps of Engineers' regulation of development in the nation's wetlands (*3*). Environmentalists have also worked through the courts to force agencies to recognize that NEPA expanded their substantive mandates (*4*).

Fairfax argues that there are three basic flaws in the argument that NEPA has made great contributions in the area of citizen participation: the public involvement movement antedates NEPA; NEPA itself has few citizen participation requirements; and the public involvement that NEPA has induced has stifled dialogue between citizens and agencies.

Fairfax is correct that the public involvement movement antedates NEPA. But she ignores citizen groups' numerous complaints about the meaningless, charade-like character of those pre-NEPA public participation efforts. Often, agencies did not bother with any such efforts whatsoever. NEPA has not eliminated pro forma agency communication with citizen groups, but it certainly has provided many additional points for citizen access. Fairfax is correct in her second point that public participation requirements stem from the executive order implementing NEPA and not from NEPA itself. Students of the NEPA process are well aware of this (*5*). Fairfax's legalistic distinction contributes little to her argument. Finally, Fairfax's qualified assertion that NEPA seems to have stifled meaningful dialogue is not true, because she ignores the substantial formal and informal communication that precedes preparation of the environmental impact statement (*6*). In some cases, the informal contact may be designed to foster public resistance to a private proposal to which an agency itself is opposed (*7*).

In the context of her argument that

NEPA has few citizen participation requirements, Fairfax notes that the Freedom of Information (FOI) Act and not NEPA "has been dispositive in creating an atmosphere conducive to citizen access to agency-held information." Yes, the FOI Act has helped, but as Fairfax notes, it was not until 1974 that it was significantly amended to enhance its utility. Moreover, the FOI Act largely mandates provision of information on the basis of citizen requests. NEPA, in contrast, provides that agencies should regularly produce for the public statements on the environmental impacts of their actions. The initiative under NEPA thus lies with the agencies rather than with individual citizens.

Fairfax may be technically correct in asserting that NEPA has not expanded standing, since the two general tests governing standing were developed in four major non-NEPA cases in 1968 and 1970. But there is little doubt that a major Supreme Court decision interpreting NEPA made it easier for environmental litigants to pass these tests by signaling lower courts that the two tests could be readily satisfied (*8*).

Fairfax contends that NEPA has distorted the direction of scientific inquiry by putting tremendous amounts of money and effort into applied rather than pure research. This undocumented assertion ignores the fact that the impact statement requirement has led some agencies to begin funding research to develop baseline ecological data for regions in which their projects were to be proposed. While some of the science in impact statements is suspect and inadequate, this is principally a function of the youthfulness of ecological science and should not be blamed on NEPA (*9*). The NEPA process, by providing for full disclosure and review, can help to identify data gaps and erroneous research assumptions. As Lynton Caldwell, the academic father of NEPA, has suggested, the statute has "expanded our ignorance" by making us aware of how little we know (*10*).

Fairfax contends that NEPA is misdirected "because it rests on the assumption that agency decision-making is rational, or can be." Unfortunately, her argument is misdirected. NEPA's sponsors were quite aware of the incremental nature of agency decision-making, of agency "bias," and of the multiple inputs provided to agency decisions by Congress, interest groups, and others. The sponsors' aim was to "break the shackles of incremental policymaking in the management of the environment (*11*). The "environmental rationality" of administrative decision-making could be increased by congressional insistence that agencies' incremental decision-making routines always incorporate an identification and evaluation of environmental impacts. Agencies' reluctance to alter their policies could be combated through external review. One of the staff members involved in the drafting of NEPA has noted that the statute contained requirements for an environmental impact "statement" and for interagency review precisely because "the temptation for agency officials to understate the adverse environmental consequences of favorite proposals was recognized" (*12*).

Environmentalists and others have called for preparation of environmental impact statements that are more concise and more useful to policy-makers. The Council on Environmental Quality expects its new regulations for NEPA implementation to achieve this objective.

RICHARD A. LIROFF
Environmental Law Institute, Washington, D.C. 20036

References and Notes

1. Federal Land Policy and Management Act of 1976 (PL 94-579, 94th Congress, 1976), sect. 1701.
2. Forest and Rangeland Renewable Resources Planning Act of 1974 (PL 93-378, 93rd Congress, 1974), as amended by the National Forest Management Act of 1976 (PL 94-588, 94th Congress, 1976), sect. 1600.
3. Federal Water Pollution Control Act (PL 92-500, 92nd Congress, 1972), sect. 404, as amended by the Clean Water Act of 1977 (PL 95-217, 95th Congress, 1977), sect. 1344.
4. See, for example, Environmental Defense Fund *v.* Matthews, 410 *Fed. Rep. Suppl.* 336 (1976).
5. R. Liroff, *A National Policy for the Environment* (Indiana Univ. Press, Bloomington, 1976).
6. P. Culhane, *Humboldt J. Soc. Relations* **2**, 33 (1974).
7. H. P. Friesema and P. J. Culhane, *Nat. Resour. J.* **16**, 339 (1976).
8. United States *v.* SCRAP, 412 U.S. Supreme Ct. 669 (1973).
9. R. Carpenter, *Environ. Law Rep.* **6**, 50014 (1976).
10. L. Caldwell, personal communication, 22 February 1978.
11. U.S. Senate, Committee on Interior and Insular Affairs, *A National Policy for the Environment* (90th Congress, 2nd sess., 1968).
12. D. Dreyfus and H. Ingram, *Nat. Resour. J.* **16**, 243 (1976).

A recap of my article may assist the reader. I argued that environmentalists have been distracted by the environmental impact statement (EIS) or NEPA process and have wasted energy elaborating requirements for processing paper. I did so by attempting to summarize and rebut the enormous body of literature asserting the EIS's utility. I identified two main themes in the pro-EIS writings: gains in *internal administrative reform,* obliging agencies to consider alternatives to proposed actions and weigh amenity and environmental values; and *external reform*, which established or enhanced public access to agency decision-making and increased judicial review of agency action through expanded standing and scope of review. I argued that both internal and external reforms were accomplished before and apart from the passage of NEPA and that the EIS undercut these more promising starts on reform.

Since my article appeared, I have received many letters, as have the editors of *Science*. No one complains that I misinterpreted the NEPA literature, but many suggest I overlooked the importance of other sections of NEPA. I agree that other sections are more important than the "action forcing" EIS provisions of section 102(2)(C). I have recently completed an article about the Department of the Interior's reliance on section (102)(1) in its redirections of the coal leasing program. My *Science* article was criticized by Liroff, Culhane, and others generally for lack of empiricism and specifically on several points to which I would like to respond.

Liroff was not alone in complaining that my analysis lacked empirical support. In part this is true. Both advocates and critics of the EIS lack clear definitions of goals, standards of achievement, and indices for measuring progress. Therefore NEPA students have tended to rely on discussions of case studies and court decisions. This lack of empiricism does not invalidate these efforts but makes it difficult to raise questions about how much improvement has occurred in decision-making; how much of it can be attributed to the EIS process; what the cost is of improvement, and whether it is worth it. Nevertheless, these are important questions; in my article I referred repeatedly to the fact that I was suggesting or arguing for an alternative view of NEPA. It is not possible to do more than outline the bare bones of a different approach in five pages, and I do not apologize for having done so.

Fortunately, the specific points made by Liroff and Culhane are less problematic. Culhane argues that I neglected the important relationship between NEPA and the Administrative Procedures Act, and therefore failed to appreciate that NEPA is applicable to "*all* federal programs," unlike the *Scenic Hudson I* precedent. I did note this, stating that NEPA is easier to grasp then the route I proposed because that task "must be undertaken agency by agency, whereas NEPA applies to all agencies." Nonetheless, the tremendous number of NEPA cases suggests that the EIS has not reduced litigation, as Culhane implies. Virtually every federal agency has been sued numerous times under NEPA in spite of its apparently broad applicability. Culhane's related point regard-

ing standing—that NEPA expanded the "zone of interests to be protected"—is arguable. However, because environmental, esthetic, and amenity values were already included in the zone after the *Scenic Hudson I* and Mineral King (Sierra Club v. Morton, 405 U.S. 727) decisions, as I argued and Liroff concedes, I am not sure what NEPA added to the zone. Liroff relies on the *SCRAP* case to show that NEPA gave *needed* reinforcement to the expanded standing already achieved. This point is both debatable and marginal.

Culhane concurs with my arguments regarding rational decision-making. Liroff does not, but it is not clear why he finds them "misdirected." I argued that NEPA elaborators erred by assuming that environmental decision-making by federal agencies "is rational, or can be." Liroff suggests that I misrepresented the elaborators' assumptions but then appears to support my analysis. The difference between us is that Liroff appears to believe the EIS can make decision-making less incremental and more rational, while I see the EIS's simply becoming a part of the inherently incremental process.

Liroff and I seem to agree that NEPA has little to do with the Freedom of Information (FOI) Act, but we disagree about whether the FOI right to agency documents is more important than the requirement that agencies publish relevant information in an EIS. This may be best resolved by consideration of appropriate tactics in specific situations, although Liroff's point that proceeding under the FOI Act requires considerable citizen effort is certainly well taken. I would counter, however, that the right to demand is critical both for obtaining information not published in an EIS which might otherwise be unavailable, and for expanding the information which agencies now make available "voluntarily," knowing that they may be forced to release it. If the EIS's do become significantly shorter because of the regulations proposed recently by the Council on Environmental Quality, this distinction may become more important.

Liroff's comments on pure versus applied research do not reflect my major points regarding data. Perhaps I invited trouble by using those terms. My concern was with adversarial research—science used to support a preferred outcome in a short time in an advocacy situation—as much as with basic research. That point was a small part of a larger issue. Moreover, I do not blame NEPA for the inadequacies of the "youthful" field of ecology; but the fact that the tools to do the analysis required by the EIS concept are unavailable raises important questions about the EIS. Liroff seems to concur, at least in part. My main point is that simply amassing and circulating data, inaccurate or otherwise, is not necessarily productive. In the specific area of influencing agency policy-making, the utility of circulating data must be weighed against the decision-maker's ability to absorb it; the need to make value judgments about competing economic, social, and political goals; and the tendency to select and interpret data in terms of existing ideas and biases. Data do not reveal the "correct" decision, and there is a limit to how much data we can use, especially in decisions typically and appropriately based on many nontechnical considerations.

Liroff and Culhane both take exception to my discussion of public involvement. I continue to believe, however, that if we are urged to applaud NEPA because it has improved citizen access to agency deliberations, it is more than a "legalistic" point to ask whether the EIS process is necessary to accomplish the goal or whether other approaches are preferable or adequate; and whether EIS-based discussions are meaningful and an improvement over previous public involvement programs. Both critics concede the obvious, that public involvement was well under way before NEPA was passed (Liroff) and that other statutes and programs provide a more comprehensive base for public involvement (Culhane). If pointing out these facts "seems to debunk NEPA public participation," as Culhane states, then I can only respond that it is about time. Culhane further argues that "wider public access is . . . important as the predecessor of a more balanced set of public constituencies of the natural resources agencies." I agree, and made the same point in the article: "The citizen involvement movement of the 1960's broadened agencies' focuses" because "new groups representing new values" participated in agency deliberations. I was neither questioning the importance of diverse constituencies nor missing the "logic of public participation" but asking whether NEPA supplemented the movement of the 1960's or undercut it. Although Culhane describes my analysis as "belittling" agency efforts, he states that the exercise is often "frustrating" and "mundane." I believe that NEPA replaced the developing opportunity for open, informal dialogue with formal, repetitious, and adversarial proceedings that frequently resemble elections rather than discussions.

Finally, both Liroff and Culhane make the point that the environmental movement did not shut down from 1970 to 1978 and concentrate on EIS processing. Of course not. I never suggested that it did. I simply stated that preoccupation with the EIS wastes effort that could better be spent in more substantive pursuits.

These letters indicate that the time is ripe for fundamental critique and assessment of the EIS process. Liroff and Culhane are among the most familiar and articulate of NEPA advocates. Yet, after sorting through my article, their criticisms, and what each or both of them conceded, I find that much of the ground traditionally claimed for the EIS is surrendered and many of the most fundamental aspects of the process are exposed to serious question. This is more significant, I hope, than counting coups in the Letters section. My hope is encouraged by the fact that no one has taken issue with the two major points in my article, which I identified as "questionable assumptions" underlying all the claims about the virtues of the NEPA process. First, the assumption that environmentally unsound decisions are the result of a bureaucratic system that fails because administrators lack information and do not want to make sound decisions; and second, the assumption that the public and the courts are capable of identifying environmentally correct decisions or forcing the agencies to do so. If these are indeed acceptable as assumptions underlying the EIS process, then the whole enterprise is in doubt. It is clear, in my opinion, that the causes of environmentally unsound decisions are more complex and profound than bureaucratic incompetence. Moreover, I see nothing to suggest that either the public or the courts are relatively more competent—less biased, better informed, or less implicated in the profundity and complexity of our problems—to make environmentally sound decisions.

If this analysis is correct—and I believe it is—then we should reflect more closely than in times past on the utility of the EIS, transcending the issue of how to improve the documents and focusing on such questions as, What are the goals of this process? What problems do we seek to solve? Are they the real problems? And can we solve them in an easier, cheaper, or better way?

SALLY K. FAIRFAX
Department of Conservation and Resource Studies, College of Natural Resources, University of California, Berkeley 94720