Letters

Ecologists, Unite!

"A policy for conservationists" (24 May, p. 857) deserves the thoughtful study of all segments of society that exercise any measure of control—either by policy or action—over the state of our environmental quality. Kesteven's seven-point policy propositions should become inviolable guidelines if humanity ever hopes to maintain its habitat as a heritage for future generations. His rules for carrying out his policy, however, seem too idealistic to be workable. How can we weave into the fabric of government his ethics, principles, and methodology when so many divergent views exist both in government and in the scientific community? These views were well documented in the Daddario subcommittee report on the status of the International Biological Program (*1*). On the one hand are the "prophets of doom" who predict nothing short of disaster in our present course. At the other extreme are those who simply do not care—those who refuse to be moved by the threats to our resources and environment. Somewhere in between are those who advocate—for economic reasons—controlled pollution, a compromise between complete cleanliness and the havoc of uncontrolled filth. Among those in the "don't care" camp, two distinct subgroups can be identified: (i) scientists who frown on their basic research being contaminated with social concerns; and (ii), to quote the Daddario report, "the marketplace which prefers to sidestep the painful economic consequences of any direct confrontation with forecasts of deteriorating environments."

Attaining Kesteven's ideal policies and programs will depend largely on whether or not these divergent sectors can decide upon some degree of unanimity.

WARD W. KONKLE
Agricultural Science Review,
U.S. Department of Agriculture,
Washington, D.C. 20250

Reference

1. P. M. Boffey, *Science* **159**, 1331; **160**, 865 (1968).

Kesteven says, "Man has a capacity to analyze the systems of the natural world (including himself); to ascertain the connection between cause and effect; to measure the role of each component; and to some degree to predict the outcome of events. Thus he is highly aware of what is going on about him and of his own actions. At the same time he has a capacity for reasoned abstention —that is, he is an ethical being."

I would like to believe this is true of the general public. I am afraid it is true primarily of a very small minority, and of relatively few lawmakers at local, state, and national levels in this country. In various capacities, I have observed them at close range for 30-odd years and few are "highly aware of what is going on about [them] and of the consequences of [their] own actions." Bills relating to resources are seldom written by ecologists and too often lawmakers have only a sketchy understanding of ecology itself.

Kesteven's suggestions can be meaningful only if our educational leaders are stimulated to encourage an awareness of the ecological (conservation) ethic at all levels of education, from early elementary school through college or university. There is little evidence that state boards of public education are so inclined, judging from their budget allocations. One state coordinator of conservation-outdoor education whom I know recently received a total 12-month budget that amounted to just $500 more than her salary.

WILLIAM VOIGT, JR.
Interstate Advisory Committee on the
Susquehanna River Basin,
2101 North Front Street,
Harrisburg, Pennsylvania

Belgian Autocracy

As a Belgian scientist who recently left his country without much hope of return, I can vouch for the accuracy of Walsh's account of the crisis at Louvain University (8 Mar., p. 1084), and also for the sympathetic understanding he showed for the problems faced by Belgian universities. One point, however, should be emphasized. The "linguistic crisis" at Louvain reflects a much more fundamental problem common to all universities in the country. Academic structures in Belgium are very anachronistic. Most of the power is vested in an institution called the "chair," a responsibility given by decree to an individual within a university to preside over a collection of scientific objects which includes, in particular, all the other individuals in the same discipline. With a few notable and widely acclaimed exceptions, this system is disastrous. A recent study has shown that such an institution is very much akin to an absolute monarchy in political terms, often with some hereditary traits. This tremendous power exists in the national scientific foundations, where members of the executive and scientific committees are largely the same individuals.

I believe this highly undemocratic system is responsible for the fact that the universities have served as the focal point for the linguistic (and many other) questions. Younger scientists, Flemish or Walloon, from Brussels or Leuven, from Ghent or Liège, never have had difficulty cooperating with one another. As Walsh alludes, the language line is easily crossed in the laboratory.

LEON J. RICHELLE
School of Dental Medicine,
University of Connecticut, Storrs 06268

Nuclear History

Roderick Spence's excellent article on nuclear rockets (31 May, p. 953) prompts this historical footnote about Los Alamos. Today the program reflects methodical progress, stability, and expert understanding, but a decade ago it was very different. We were all amateurs, filled at once with excitement and scientific misgivings, confronted always with organizational convulsions and fiscal panic.

The three crucial criteria for an effective nuclear rocket engine—(i) high gas temperature, (ii) large power-to-weight ratio, (iii) reliability after long running times and frequent restarts—which Spence quotes, originally were not well-formulated goals. The following remembrance will illustrate.

Concurrent with the early Kiwi de-

velopment, a rocket based upon a metal heat exchanger-reactor was also investigated. In this design heat conduction was canceled by opposing gas convection (which is the same means by which a cold bunsen burner maintains a hot flame). By this strategy gas temperatures up to and including the melting point of tungsten (3600°K) were reliably achieved without risk of failure. A sizable fraction of the output of gas was atomic hydrogen, and the power density in the exchanger, as compared to that in the flame of an atomic hydrogen torch, yielded a very favorable power-to-weight ratio. Exchanger modules were run at full power and heat for as long as 2 hours and restarted repeatedly hundreds of times in 1/10 second without visible deterioration. The problem of thermal neutron capture, which Spence mentions, proved far less formidable than had been feared; actual rocket designs which were submitted to nuclear mock up became critical with very modest uranium loadings (*1*). In brief, feasibility had been widely demonstrated for a device with performance far beyond the potential of graphite. Design was rapidly maturing and construction of the first model had already started when we were given a directive to use the Kiwi-A nozzle. This meant cutting back the hydrogen flow to 3 kilograms per second. At this miniscule flow rate, the buffering effect of gas convection was gone, and the entire project was scrapped for the single reason that the design would not tolerate an unrealistically *low* power. Had Spence's criteria been well appreciated at the time, the decision would have been different. As an old space buff, I can daydream quite wistfully on what the scientific fruits of a post-Apollo program might have been.

BRUCE KNIGHT

Rockefeller University, New York 10021

Reference

1. B. W. Knight, *Nucl. Sci. Eng.* **19**, 393 (1964).

Federal Funds Mean Federal Control

Abelson's editorial (17 May, p. 721) about federal support of universities was apropos concerning reductions in federal funds. It suggests how a mere threat of reduced funds can enslave the recipient. But it seems to me he missed the *major* point about federal control. Obtaining funds by means of the power to tax is appealing, to be sure, as against our having to sell our programs to willing "buyers" as voluntary purchasers or supporters. But we must never forget that the overriding point comes from the highest judiciary (law) of the land:

> It is hardly lack of due process for the government to regulate that which it subsidizes. *United States Supreme Court Wickard v. Filburn*, 317 U.S. 111, p. 131, October 1942.

One wonders what the course of finance for education would now be if this ruling decision had been on the desk of every university administrator continuously over the past quarter century. It is a stern discipline for all who yearn for easy money from this source and at the same time hope to be free from political control.

F. A. HARPER

Institute for Humane Studies, Inc., 1134 Crane Street, Menlo Park, California 94025

Orwellian Parody

My letter (15 Mar.) was written as a parody. Several of my friends and colleagues understood it as such, without prompting from me. Did Herz (Letters, 24 May)?

My parody was inspired by another parody which, like the sentence I objected to, was a paraphrase of Scripture. In his essay "Politics and the English language," George Orwell used an example to show what he felt was wrong with the writing of his day. He obtained it by translating Ecclesiastes 9:11 as follows:

> I returned and saw under the sun, that the race is not to the swift, nor the battle to the strong, neither yet bread to the wise, nor yet riches to men of understanding, nor yet favour to men of skill; but time and chance happeneth to them all.

into what he called "modern English of the worst sort":

> Objective consideration of contemporary phenomena compels the conclusion that success or failure in competitive activities exhibits no tendency to be commensurate with innate capacity, but that a considerable element of the unpredictable must invariably be taken into account.

Clearly Orwell's essay applies as well to science as it does to politics.

KENNETH MANLY

Department of Biology, Massachusetts Institute of Technology, Cambridge 02139