References

1. "Empfehlungen des Wissenschaftsrates zur Struktur und Verwaltungsorganisation der Universitaeten" (Wissenschaftsrat, Cologne, 1968); "Empfehlungen des Wissenschaftsrates zur Struktur und zum Ausbau des Bildungswesens im Hochschulbereich nach 1970" (Wissenschaftsrat, Cologne, 1970).
2. J. Habermas, *Protestbewegung und Hochschulreform* (Suhrkamp Verlag, Frankfurt am Main, 1969).

It is perhaps inevitable that those outside a university department have a different view from those within. Wolfle's comments about the educational constraints of a university's departmental organization are those often heard from certain university administrators and others who have been too far removed from active participation in teaching and research to appreciate the values that are the target of their criticism. A department is the focal point of academic expertise in a given field. Besides being a convenient administrative device, it establishes the necessary environment for scholarly pursuits. A viable academic department continuously adjusts its goals, frontiers, and internal composition to the changing requirements of the fields that it serves. The rigid and inflexible department, surrounded by unscalable walls that shield it from external influences, cannot survive and fortunately exists more in the minds of external critics than in reality. Perhaps the most telling proof of the validity of this assertion is provided by my colleague Dael Wolfle himself when he reminds us that one-fifth of American doctorates have moved out of their degree field 5 years after their doctorate and 30 percent after 15 years. Such interdisciplinary moves contribute to the vitality of science fields. Their high incidence is evidence of the flexibility of departmental boundaries.

I doubt that Wolfle's desire for the ceremonial burial of university departments will be realized. A university cannot function without administrative units; divisions tend to subdivide and old "walls" are replaced by new ones. Interdisciplinary collaboration already exists to a high degree, despite departments, if not because of them. Most importantly, collaboration is a highly individualized undertaking that can be enhanced by sensitive and understanding university leaders, but cannot be enforced by administrative measures.

HANS NEURATH

Department of Biochemistry,
University of Washington,
Seattle 98195

About 2 years ago, I proposed that the Johns Hopkins Medical School substitute for its present department structure a new organization, with small groups of faculty joined together by common interest. This suggestion did not arise from lack of respect for the outstanding quality of our departments. My reasons were similar to Wolfle's, but extended beyond them because of the special and additional problems in medical schools. To a large extent these problems have to do with the ambiguity of clinical departments, which are, on the one hand, traditional university departments dedicated to teaching and research, and, on the other hand, hospital departments obligated (and dedicated) to providing clinical service. Under certain circumstances these two kinds of functions are complementary. The stimulus of taking care of patients can focus attention on important problems, basic or applied, that require and invite investigation; experience in research and teaching can clarify and expand ideas useful in patient care. But under many circumstances, particularly with respect to administration, faculty priorities, and division of effort, these two kinds of functions can be in conflict, to the detriment of both. A by-product of the patient-care function of clinical departments was that, as patient care became more specialized, the size of the full-time clinical faculty grew, until now many such a department is as large as some medical schools used to be.

More importantly, the natural association of those who are interested in special areas is not with other members of their own department in outside areas, but with members of other departments with related special interests. Several voluntary associations in our institution were formed for the purpose of teaching medical students; these groups hold joint research seminars, train postdoctoral fellows, and even consolidate laboratory studies, to the advantage of all. These natural associations of faculty have been more productive and far less wasteful of faculty time than artificial "integrated teaching" efforts that, in my experience, are invented by individuals with no understanding of the reality of the direction of faculty interests. Medical schools need one kind of organization, hospitals another. We have gotten into trouble by trying to force one structure to serve both needs.

The proposed plan could improve the research atmosphere and thus stimulate research, raise the level of postdoctoral teaching, produce natural integration, particularly vertically in the curriculum, of medical student teaching, and could improve patient care by providing opportunities for earlier and more direct involvement of the basic science faculty with those engaged in patient care.

KENNETH L. ZIERLER

School of Medicine,
Johns Hopkins University,
Baltimore, Maryland 21205

Radiation Protection

Despite the Atomic Energy Commission's reported denials (News and Comment, 18 June, p. 1215) that its hand had been forced by critic-generated pressures, its recent proposals to sharply reduce the limit on the amount of radiation exposure that the public may receive from light-water-cooled nuclear power reactors have little other apparent justification. By publicly airing sensational claims that the standards-setting bodies have grossly underestimated the risk level of current public radiation standards, such critics as Gofman and Tamplin (see News and Comment, 28 Aug. 1970, p. 838) helped to bring about a climate of public and legislative opinion in which the AEC had little choice.

If adopted, the AEC's proposals would occasion an unfortunate distortion of priorities in both radiation and environmental protection policies. The current rate at which the U.S. public is exposed to medical x-rays is in the order of 2×10^7 rems per year, which is in addition to a comparable natural background rate. From a recent report by Gamertsfelder (*1*), it appears that in 1969 the average exposure per power reactor (designed to meet current standards) was about 40 rems. The extra design cost per reactor to meet the proposed more restrictive limits appears to be more than $1 million. J. G. Terrill, former director of the National Center of Radiological Health, has recently estimated (*2*) that if this money were applied to the reduction of x-ray exposure, the annual population dose could be reduced by 35 millirems per capita (a total of 7×10^6 rems).

The Committee on Pollution of the National Research Council has calculated (*3*) that the total annual cost attributable to air pollutants from fossil plants is $13 million. Starr has calculated (*4*) that they result in about

20,000 deaths per year. No demonstrable environmental effect from nuclear power plant effluents has been found, and even in the Gofman-Tamplin risk estimates they produce less than one death per year.

It therefore appears that the expenditures which would be forced on the utilities (and ultimately the public) by the proposed AEC limits would be woefully misdirected toward making what is already quite safe even safer, while neglecting other areas that cry out for attention from those who have a genuine concern for the public health and for the environment.

ANDREW P. HULL

P.O. Box 413,
Upton, New York 11973

References

1. G. C. Gamertsfelder, "Regulating experience and projections for future design criteria" (Southern Conference on Environmental Radiation Protection at Nuclear Power Plants, St. Petersburg, Fla., 1971).
2. *Nat. Health*, June 1971, p. 6.
3. *Waste Management and Control* (Report to the Federal Council for Science and Technology, National Research Council Committee on Pollution, Washington, D.C., 1966).
4. C. Starr, *Nucl. Safety* **5**, 326 (1964).

Two statements relating to radiation protection were issued during the annual meeting of the Health Physics Society (HPS) held in New York during the week of 11 July. The first is a motion adopted by the board of directors of the HPS.

Inasmuch as the major source of man-made radiation to the U.S. public is from medical x-ray units, the Board of Directors and officers of the Health Physics Society urge each of the respective states to promulgate regulations and/or laws that require operators and medical supervisors of medical x-ray units to have training in radiation protection to the patient.

The second is a statement by the president and past presidents* of the HPS with regard to a paper presented at the 1971 annual meeting by E. J. Sternglass:

On the third such occasion since 1968, Dr. Ernest J. Sternglass, at an annual meeting of the Health Physics Society, presented a paper in which he associates an increase in infant mortality with low levels of radiation exposure. The material contained in Dr. Sternglass' paper has also been presented publicly at other occasions in various parts of the country. His allegations, made in several forms, have in each instance been analyzed by scientists, physicians, and biostatisticians in the Federal government, in individual States that have been involved in his reports, and by qualified scientists in other countries.

Without exception, these agencies and scientists have concluded that Dr. Sternglass' arguments are not substantiated by the data he presents. The United States Public Health Service, the Environmental Protection Agency, the States of New York, Pennsylvania, Michigan and Illinois have issued formal reports in rebuttal of Dr. Sternglass' arguments. We, the President and Past Presidents of the Health Physics Society, do not agree with the claim of Dr. Sternglass that he has shown that radiation exposure from nuclear power operations has resulted in an increase in infant mortality.

DADE W. MOELLER

Health Physics Society,
Harvard School of Public Health,
665 Huntington Avenue,
Boston, Massachusetts 02115

Managed Creativity

I share the skepticism of many people about President Nixon's intention to conquer cancer by a task force approach. Such a problem would traditionally be handled by small groups of men or individuals who are highly creative in the field. A bureaucracy is rarely creative.

At the same time, it appears that such attempts at "managed creativity" give the nation a novel opportunity to study innovation from the point of view of social reform (*1*). It is indeed a "natural" experiment, although some would disagree how natural it is to attempt such ventures. Nonetheless, reform is also being advocated as an opportunity to experiment with new social mechanisms (*2*). It is clearly important to study such phenomena. I would hope that these social experiments are getting adequate attention from the scientific establishment.

GEORGE W. LUHRMANN

New York State Department of
Mental Hygiene, Psychiatric Institute,
New York 10032

References

1. D. T. Campbell, *Amer. Psychol.* **24**, 409 (1969).
2. A. M. Rivlin, *Systematic Thinking for Social Action* (Brookings Institution, Washington, D.C., 1971).

Women with Ph.D's

The low level of information in the letters from Davenport and Jensen (12 Feb., p. 521) concerning women scientists and in the replies you chose to publish (7 May, p. 514) prompts me to suggest that scientists should do more homework. Evidence abounds, for instance, that (i) in all doctoral fields, women receiving the doctorate are brighter than their male counterparts (*1*); (ii) while studies with the necessary detailed controls over specialty, rank, age, and type of institution are still lacking, according to a study of full-time academic persons, there are no differences in the productivity of men and women scientists (*2*); (iii) women's durability on academic jobs is slightly, but not significantly, greater than men's although their rate of promotion and their salaries are less (*3*); (iv) in industry, according to the Department of Labor (*4*), women do not have the higher absenteeism or turnover that myths credit them with; (v) in spite of these high qualifications, hiring departments give the edge to males when applications are identical except for sex (*5*).

To judge whether the hiring of Ph.D's has been discriminatory, multiply by .91 [the percentage of women with doctorates working in the last decade (*6*)] the percentage of Ph.D's that were given to women scientists in the top five departments in each field (*7*): physics, 2.5 percent; chemistry, 6.9 percent; astronomy, 12.3 percent; biochemistry, 15.6 percent; anthropology, 20.6 percent; physiology-anatomy, 23.1 percent; psychology, 24 percent; and zoology, 29.4 percent. If any of the top five degree-granting institutions has hired enough women at each rank to qualify as discrimination-free, may they please announce their pioneer status.

SUSAN M. ERVIN-TRIPP

Institute of Human Learning,
University of California, Berkeley

References

1. L. R. Harmon, *High School Ability Patterns: A Backward Look at the Doctorate* (Scientific Manpower Report No. 6, National Academy of Sciences, Washington, D.C., 1965), p. 30.
2. R. Simon, S. M. Clark, K. Galway, *Soc. Probl.* **15**, 221 (1967).
3. E. Colson and E. Scott, *Discrimination against Women* (Government Printing Office, Washington D.C., 1970), vol. 2, pp. 1143–1221.
4. *Facts about Women's Absenteeism and Labor Turnover* (U.S. Department of Labor, Washington, D.C., 1969).
5. L. Fidell, *Amer. Psychol.* **25**, 1094 (1970).
6. H. S. Astin, *The Woman Doctorate in America* (Russell Sage, New York, 1969).
7. A. M. Cartter, *An Assessment of Quality in Graduate Education* (American Council on Education, Washington, D.C., 1966).

* H. L. Andrews, University of Rochester; W. D. Claus (retired); F. P. Cowan, Brookhaven National Laboratory; Merrill Eisenbud, New York University; W. T. Ham, Jr., University of Virginia; John R. Horan, U.S. Atomic Energy Commission; Wright H. Langham, Los Alamos Scientific Laboratory; J. S. Laughlin, Sloan-Kettering Memorial Hospital; K. Z. Morgan, Oak Ridge National Laboratory; Claire C. Palmiter, U.S. Environmental Protection Agency; C. M. Patterson, Savannah River Laboratory; Walter S. Snyder, Oak Ridge National Laboratory; J. Newell Stannard, University of Rochester; L. S. Taylor, National Council on Radiation Protection and Measurements.