# Letters

## Cancer Policy Statement

The American Association for Cancer Research unanimously endorsed the following policy statement at its annual meeting on 12 April in Atlantic City, New Jersey.

The policy statement has been sent to President Nixon and to the director of the National Cancer Institute. We believe it is a document of general interest to the scientific community and to the people of the United States.

The American Association for Cancer Research includes in its membership a high proportion of the total research force of the United States that is involved in work leading to the solution of the cancer problem.

The Association gratefully acknowledges the national confidence in cancer research expressed in the Cancer Act of 1971. It accepts the responsibilities implied in this confidence.

The Association wishes to emphasize that problem-oriented research directed against cancer will prosper to the degree that it can draw on the nutrient soil of basic biological research. Research investment in cancer alone, without adequate investment in broad biologic research, will be less productive.

Truly original discoveries in science are often unpredictable and cannot be conveniently programmed. A sound research strategy must carefully balance centrally directed research with studies originating with the individual scientist.

The basis of scientific discovery is the prepared mind confronted by new or unanticipated findings. Such minds are most likely to be found among young scientists. Moreover, significant shortages have been clearly identified in several critical manpower areas. A cancer research program devoid of funds that can be applied to training is unsound, not only for the best development of new talent, but for technical capacities to translate new discoveries into improved care and treatment of the cancer patient.

The American Association for Cancer Research therefore recommends the following steps to the responsible Federal fiscal decision-makers and administrators of the National Cancer Program:

1) Prompt completion of review and prompt implementation of the National Cancer Plan.

2) Prompt release of authorized funds for cancer research for the present and future years.

3) Continued assignment of an adequate portion of the total available funds to training in critical cancer research areas.

4) Utilization of the peer-review system for the allocation of National Cancer Institute funds to assure high quality of both programmed and individual cancer research.

5) Reallocation of available funds to increase significantly the support of individual research projects, including competing initial applications.

6) Augmentation of the number of scientific staff positions at the National Cancer Institute commensurate with its expanded responsibilities.

MICHAEL B. SHIMKIN
*School of Medicine,*
*University of California, San Diego,*
*La Jolla 92037*

## Musine Grooming Behavior

I regularly read a number of medical and scientific publications, including *Science*. I am well aware of the usefulness and the necessity of animal research and experimentation. However, after several readings, I cannot discover any justification for the mutilation—however "painless"—described in the report by J. C. Fentress, "Development of grooming in mice with amputated forelimbs" (16 Feb., p. 704).

To this reader, the purpose, content, and procedure of this "experiment" are unworthy of *Science*. I do not look forward to a sequel called "Modified behavior patterns in flies with amputated wings."

J. B. VIATOR
*Bardwell's Ferry Road,*
*Conway, Massachusetts 01341*

Viator's letter appears to treat the dual issues of rationality and sensitivity in our dealings with nature, and as such is an important emotional expression. However, I am surprised by his unawareness of the importance of an unambiguous determination of the role of intrinsic mechanisms in the ontogeny and control of integrated patterns of behavior in mammals. The studies involving painless peripheral lesions in anesthetized animals provide not only a most direct but also humane approach.

The references I cited in my report indicate that major recent advances in neurobiology and behavior have indeed been made with careful study of the effect of peripheral lesions in invertebrates (including the amputation of wings of insects) and in lower vertebrates. As a result of my study, similar, though perhaps not identical, mechanisms for central programming are now demonstrable for the developmental integration of a precisely documented movement sequence in a mammal. The nature of model systems in science is such that data on mouse grooming may have wider implications (for example, possible intrinsic factors underlying complex mammalian skills, such as language development in man, and the behavioral potentialities of "thalidomide children").

The methods to which Viator refers as "mutilations" were decided upon only after much consultation, at an international level, with responsible and concerned colleagues. Because of my concern for the animals' welfare, I rejected possible alternatives, including technically difficult and potentially devastating central lesions (which would have been hidden and thus might have caused less emotional reaction on the part of observers) in newborn animals and controls involving peripheral lesions in adult animals (which have a preestablished behavioral repertoire). The fact that the animals in this study, by all available criteria, lived a full and apparently well-adjusted life not only adds further evidence to support the existence of certain endogenous behavioral potentialities in higher organisms but also suggests that surface emotional reactions may not be sufficient for either a rational or humane orientation to the world in which we live.

JOHN C. FENTRESS
*Department of Biology, University of Oregon, Eugene 94703*

## Atomic Safety Responsibility

An attempt to identify and evaluate the "human costs" of producing and utilizing nuclear fuel to generate electricity is offered by L. A. Sagan (11 Aug. 1972, p. 487). Such human costs must, of necessity, include the consequences of an operational failure or a catastrophic accident at an atomic power plant. However, some revolutionary new problems have arisen concerning both property insurance and third-party liability insurance for these power plants.

The best guidelines for evaluating

the human cost of power generation are found in the historical records of oil or coal burning steam plants. Following the development of the American Society of Mechanical Engineers (ASME) Boiler Code, with its high standards for engineered safety in design and operation, a notable record of safety was achieved through the voluntary initiatives and the ethical commitments of individual engineers. They have carried out their professional responsibilities of designing and building such steam plants with an overriding obligation to protect the public health and safety.

An influence of equal importance has been the ethical commitment of the engineers employed by private insurance companies, and their constant surveillance over the fabrication, testing, installation, and operation of every steam boiler and its related pressurized equipment. It has been their responsibility to certify that the installation conforms to all of the requirements of the ASME Boiler Code and qualifies for full insurance coverage, or for good cause to deny such certification and thereby prevent the issuance of an insurance policy to the owner of the steam plant.

By these procedures the insurance companies have protected the public health and safety while maintaining their financial stability. The private insurance companies have constantly evaluated the risks and human costs of the power generation technology, and no one else is in a better position to perform this function.

By contrast, this traditional course of professional and financial responsibility has been repudiated in the case of the revolutionary new technology of atomic power (*1*). In 1957, a small group of manufacturing and utility executives persuaded the U.S. Congress to enact the Price-Anderson Indemnity Act (*2*). This act authorizes the U.S. Treasury, in the event of a serious failure in an atomic power plant, to pay $500 million to the victims and survivors or approximately 10 percent of the estimated cost of a major disaster [as evaluated by the Atomic Energy Commission in its Brookhaven report of March 1957 (*3*), which indicated the possibility of 3,500 fatalities and 35,000 radiation injuries from a major failure of a moderate-sized atomic power plant].

It is regrettable that private insurance companies have quietly compromised the confidence extended to them by a trusting public by lending their good names to "token" insurance policies on atomic power plants that cover only 1 percent of the estimated damage. By this means, the evaluation of risk (and human cost) has been discarded for atomic power plants. The Price-Anderson Indemnity Act relieves the power companies and public power agencies, along with their insurance companies, of any financial risk. As a consequence, the traditional influence of the insurance companies on the engineering and design standards for fossil-fuel power plants have not been carried over to atomic power plants. The application of these standards to atomic power plants, and the resulting high safety factors, could make these plants 100 percent insurable (*4*).

Instead, today's atomic power plants are being designed and located with unjustifiably low factors of safety and their deficiencies will become apparent only in the aftermath of a catastrophe. Unfortunately, our national policy for atomic power plants is the product of deficient engineering and regulating practices and of an obscure type of "pollution of responsibility and integrity" at the board-of-director levels of public and private utilities and reactor manufacturers.

Before a competent evaluation of the human costs of atomic power can be undertaken, the responsibility for public safety must be defined, as it has been for fossil-fuel power plants. This can be achieved only by having the Price-Anderson Act declared unconstitutional, or by having it repealed by congressmen who understand the importance of the word "responsibility."

ADOLPH J. ACKERMAN
*1250 Sherman Avenue,*
*Madison, Wisconsin 53703*

#### References

1. A. J. Ackerman, *Trans. Amer. Soc. Civil Eng.* **128** (part 5), 17 (1963).
2. ———, *IEEE Trans. Aerosp. Electron. Syst.* **5**, 363 (1969).
3. *Theoretical Possibilities and Consequences of Major Accidents in Large Nuclear Power Plants* (WASH Report No. 740, Atomic Energy Commission, Washington, D.C., 1957).
4. A. J. Ackerman, *IEEE Trans. Aerosp. Electron. Syst.* **7**, 418 (1971).

As a doctor and a radiotherapist, I try to save the lives of men, or at least to ease their suffering by applying radiant energy. It seems strange to me to convert the value of human life into a certain amount of money. Considerations like those suggested by Sagan should not be used to alter the values of maximum permissible exposures worked out by the International Commission on Radiological Protection (ICRP), and now adopted by practically all countries of the world.

A dose of 5 rems per year for persons exposed to radiation while working in their professions is now generally accepted. For the general population, one-thirtieth of this dose (not one-tenth, as Sagan states) is considered acceptable (*1*). The smaller dose is justified because the general population includes sick people, children, and pregnant women and the genetic load to society depends on the average genetic dose and not on the actual dose applied to an individual. Of course, a dose of 166 millirems per year from artificial sources has not been proved fully harmless, but it is equal to the additional amount of cosmic radiation received by people living in the mountains. These radiation doses cannot be compared with those given in medical radiology, which are to support or restore health. In the present stage of our knowledge, maximum permissible doses set by the ICRP should not be altered. Changing radiation standards could increase radiation hazards to mankind.

G. FUCHS
*Kaiser Franz Josef Hospital,*
*Vienna A-1100, Austria*

#### References

1. International Commission on Radiological Protection, *Radiation Protection* (ICRP Publ. No. 9, Pergamon, London, 1966).

Fuchs apparently believes that in my cost-effectiveness argument for rationalizing radiation protection expenditures, there lurks a challenge to ICRP standards. Such is not the case. I conceive of those standards as a necessary ceiling but vigorously defend the contention that expenditures to reduce lesser exposures should be justified in terms of cost-effectiveness, just as all health and safety costs should be.

Fuchs makes the common error of imputing the origin of a population exposure limit of 166 millirems per year to ICRP. One need only check his own reference to confirm his error. In fact, it was the now defunct Federal Radiation Council which promulgated the guideline of 166 millirems annual exposure for members of large populations. This is in contrast to the 500 millirems permitted by ICRP for annual exposure to individuals.

An annual exposure of 166 millirems is indeed a relatively small dose, but is considerably larger than the dose suggested by the casual phrase Fuchs uses in comparing that with the dose, "re-

ceived by people living in the mountains." Since the rule of thumb is that cosmic radiation increases in the order of 1 millirem per year for each additional 100 feet of altitude, even the spectacular Austrian Alps cannot have many people living at 17,000 feet.

LEONARD A. SAGAN
*Department of Environmental Medicine, Palo Alto Medical Clinic, 300 Homer Avenue, Palo Alto, California 94301*

## Mercury Vapor Sources

I read with great interest Robert S. Foote's report on mercury vapor concentrations in buildings (11 Aug. 1972, p. 513) a few days after I installed a new fiberglass air filter, which was laced with mercury, in my furnace. I would be interested to learn if similar filters were in use in the buildings that Foote tested, and what effect they may have had on his results. The use of mercury on air filters in central heating systems would seem to be an excellent means of distributing mercury vapor throughout the home.

ARTHUR S. BROOKS
*Center for Great Lakes Studies, University of Wisconsin, Milwaukee 53201*

Foote found high concentrations of mercury vapor in three doctors' examination rooms. He comments that mercury thermometers had been broken there in the past.

I wonder if a more likely source of the mercury vapor might be the mercury-containing sphygmomanometer used by most physicians. In this instrument one pumps air from a rubber bulb through a flat rubber bag which has been fastened tightly around the patient's arm, and then through a rubber tube into a mercury reservoir. Air pressure forces mercury from the reservoir into a vertically positioned glass tube. At the end of the procedure a valve on the pumping bulb is opened, permitting the air in the system to rush out under pressure. In this manner, air containing mercury vapor could enter the room. Perhaps Foote would care to examine the mercury concentration in this effluvial air. If this is indeed a significant source, then thought should be given to redesigning these instruments.

SARAN JONAS
*Department of Neurology, New York University Medical Center, New York 10016*

Concentrations of mercury in wood-paneled or nonpainted homes, in which fiberglass filters (of unknown brands) were used in the furnaces, were very low. It appears that little mercury contamination is caused by the use of such filters.

Paint containing mercury compounds was probably the contributing factor in homes where high mercury concentrations were found.

ROBERT S. FOOTE
*GeoSensors Inc., 9731 Denton Drive, Dallas, Texas 75220*

## A Decent, Hardworking Word

Why do you allow a pair of silt-stained brigands like Irving and Harington ("Upper Pleistocene radiocarbon-dated artefacts from the northern Yukon," 26 Jan., p. 335) to arm themselves with bone awls and flint knives, sneak up behind a decent, hardworking word like "artifact," and stab it in the "i"?

Even Webster's Third, which sanctions everything from the Precambrian to the Aquarian, prefers the "i," although it suggests that if we really are going to get our usage from layer d of fluvial and lacustrine basin-fill sediments, we could go all the way to "artefac."

FRANK SARTWELL
*1801 16th Street, NW, Washington, D.C. 20009*

Although I am diffident about matching my pedantic talents against Sartwell's, I draw encouragement from the knowledge that Harington and I do not stand alone in our position with respect to the proper (I do not insist that it is correct) spelling of artefact. It is the custom of members of the Society for American Archaeology to spell "artefact" with an "e," for the very good reason that this would have been the spelling in Latin had the word been current when Latin was. Thus, also, "archaeology," with an "ae" rather than the vulgar neologism spelled with an "e" alone.

It is a question of values, which those of us who labor in the traditions of antiquity perceive, perhaps, more clearly than do most of those who do not, and which in any case we steadfastly refuse to relinquish, even in these times of wholesale abandonment of values, standards, and even whole fields of scholarship (for example, etymology) for the racy, the new, and, let us hope, the short-lived fads so prevalent today.