American Association for the Advancement of Science

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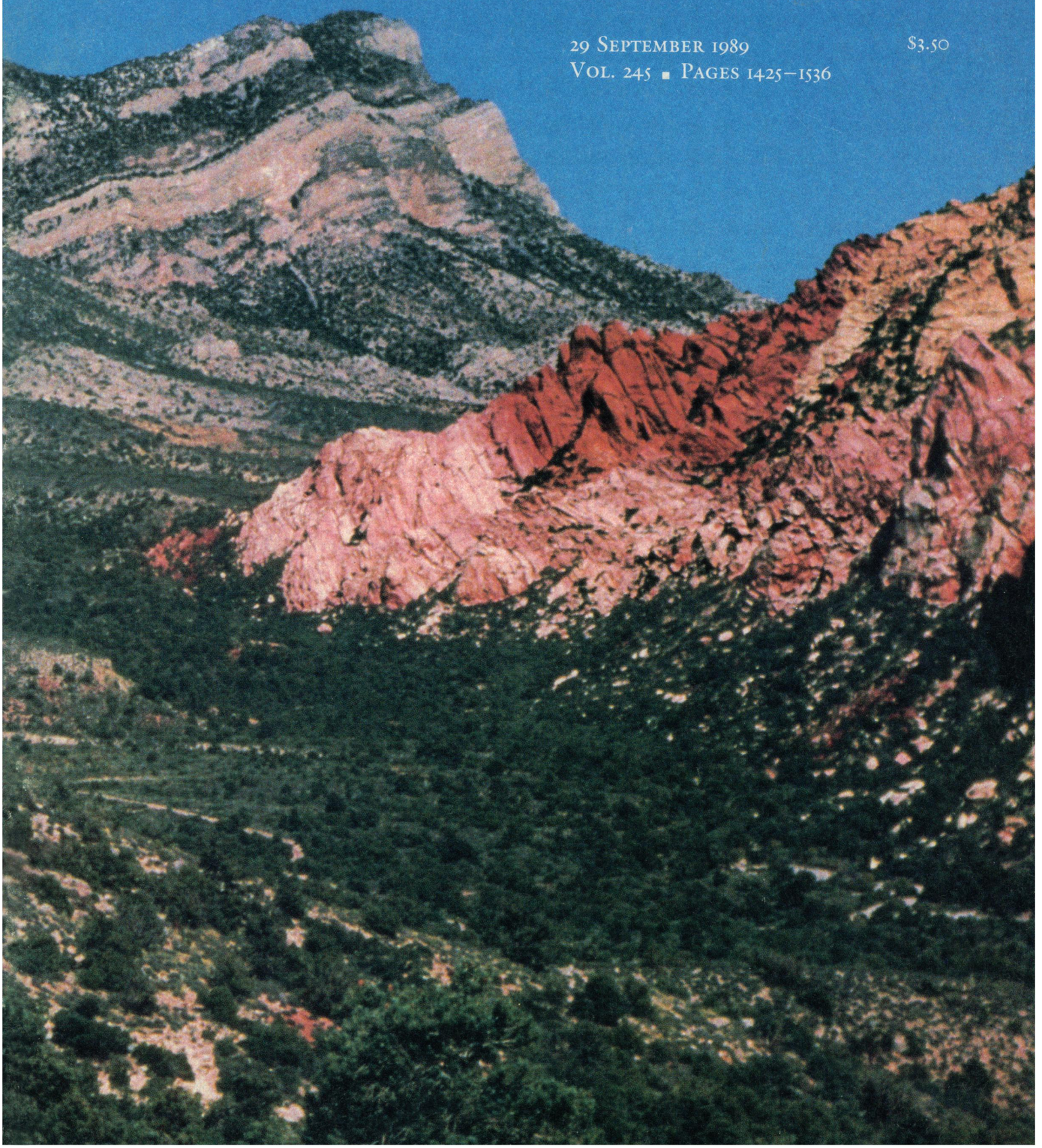

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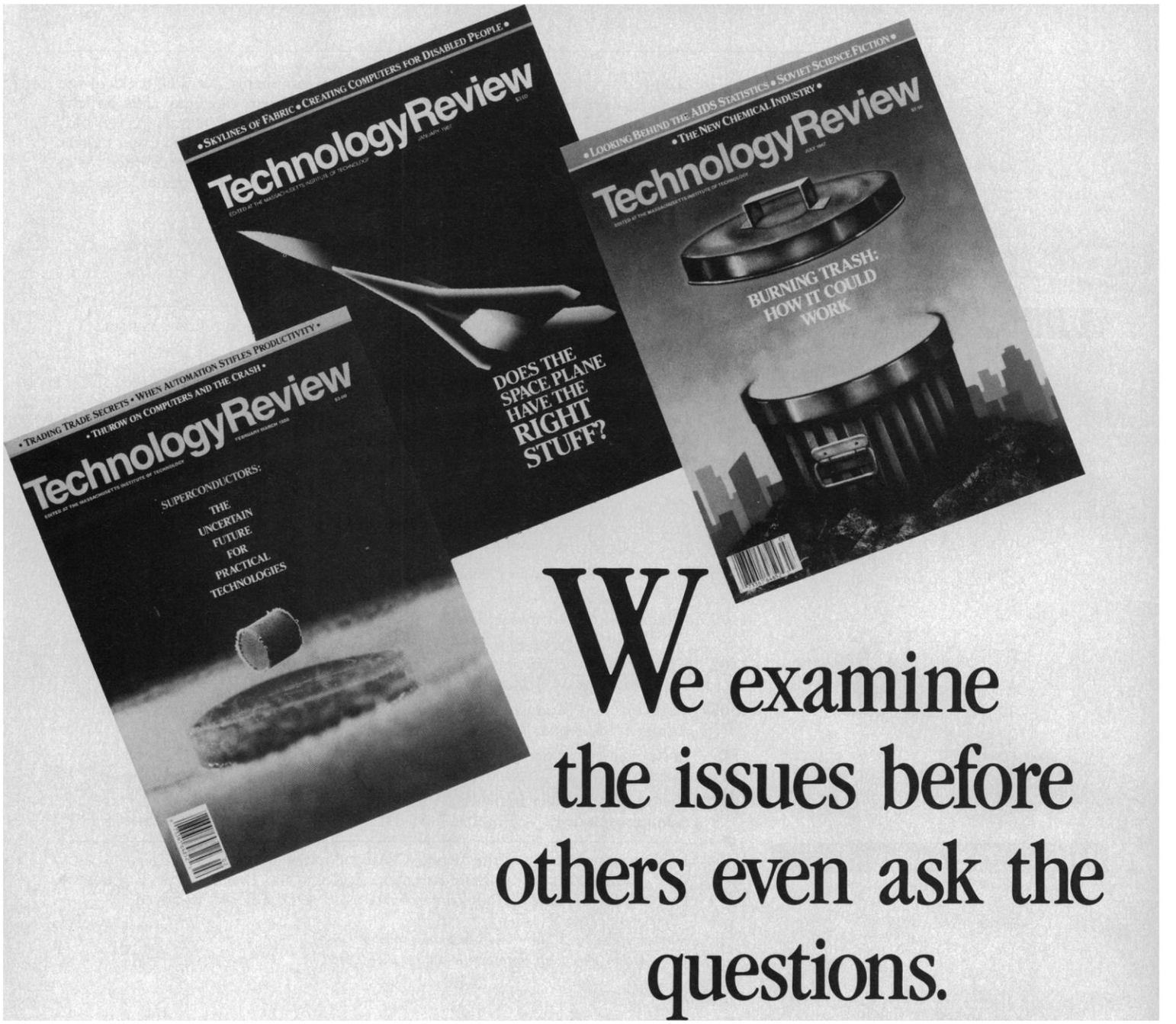
COVER Along the eastern side of the Spring Mountains, Nevada, rocks of the Cambrian Bonanza King Formation (~530 million years old; gray cliffs on left) overlie overturned red beds of the Triassic and Jurassic age (~200 million years old) along the Keystone trust, one of a series of major thrust faults in the eastern Great Basin. The amount of displacement on these thrust faults must be accounted for in order to restore the older rocks to their original geographic positions. See page 1454. [Photograph by N. Cristie-Blick]

Reports

Book Reviews

Author Index to Volume 245 is found on pages I–X.
Information for Contributors is found on XI–XII.



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This Week in
SCIENCE

Human genome project

THE game plan for the "human genome project" is to have a physical map of the genome—all of the genetic material present in human cells—in 5 years. The problem is to define exactly what a physical map is and how it should be constructed and to find ways to integrate into it data obtained with different techniques. In a Perspective, members of the National Research Council's Committee on the Mapping and Sequencing of the Human Genome present a proposal for defining a common language for and a common set of landmarks on the human genome (page 1434). The genome lingua franca would be sequence-tagged sites or STSs; data obtained through restriction mapping and contig mapping experiments would be converted into STSs. In a News feature, Roberts elaborates on the specifics of the proposal, on how the translations into STS nomenclature would work, and on the strengths of such an approach (page 1438).

Great Basin evolution

THE Great Basin is centered in Nevada and Utah and stretches into California and Idaho. It is an area rich in geologic clues about the earth's evolution. Using a combination of recent structural, stratigraphic, paleomagnetic, seismic, and borehole data, Levy and Christie-Blick have developed a new pre-Mesozoic palinspastic map—one focusing specifically on sedimentary rocks from the time interval between 1600 and 535 million years ago—for the eastern part of the Great Basin (page 1454); such a map (the name comes from the Greek for "stretched back") restores the region's outcrops to their original positions. Crustal shortening occurred from 150 to 50 million years ago whereas crustal extension was a more recent phenomenon, prominent in the past 37 million years; when the effects of crustal shortening (cover) and extension are removed, new interpretations of the geologic evolution of the region before 245 million years ago become possible. Despite a number of uncertainties in parameters used in map construction, new insights have been gained about when and how the size, orientation, and shape of the region have changed over time.

Antarctic sponges and anchor ice

DURING the past three decades, there have been dramatic shifts in the densities of the Antarctic sponge *Homaxinella balfourensis* and its predators near McMurdo Sound (page 1484). The immediate cause of the population fluctuations is anchor ice, aggregated crystals of ice that form beneath the surface of the sea; the anchor ice damages and ultimately kills the sponges, and when it eventually breaks away it carries off the sponges with it. (Damage caused by anchor ice is easy to distinguish from damage caused by predators: the anchor ice discolors the flesh whereas the predators strip the flesh from the skeleton.) At times when sponges have been rare (in the 1960s and again around 1984), the anchor ice was thick; in contrast, in the early 1970s, there was little anchor ice, and population explosions of both sponges and their predators occurred. Dayton describes the changes that have occurred in sponge populations and speculates that the formation of anchor ice is a consequence of upwelling frigid water from deep in the sea, that this upwelling reflects shifts in regional currents, and that the current variations may be outcomes of large-scale and long-term oceanic and atmospheric phenomena.

Monocyte chemoattractant

TUMOR growth is affected by soluble substances that are secreted by infiltrating macrophages. Tumors recruit monocytes from the circulation, the monocytes mature into macrophages, and the powerful substances that the macrophages produce can either stimulate or inhibit the tumor cells. What attracts the monocytes to the tumors are chemical substances that are related to or identical to chemoattractants released by normal muscle cells. Smooth muscle cells secrete the monocyte attractant called smooth muscle cell–derived chemotactic factor (SMC-CF); Graves *et al.* show that an SMC-CF–like protein, whose presence is correlated with a monocyte attractant activity, is secreted by a variety of tumors, including osteosarcomas, fibrosarcomas, melanomas, glioblastomas, and rhabdomyosarcomas (page 1490). Thus it appears that normal smooth muscle cells and various malignant cells use a similar mechanism for recruiting macrophages. The possibility is therefore raised that SMC-CF–like molecules could have a clinical role in the regulation of tumor growth.

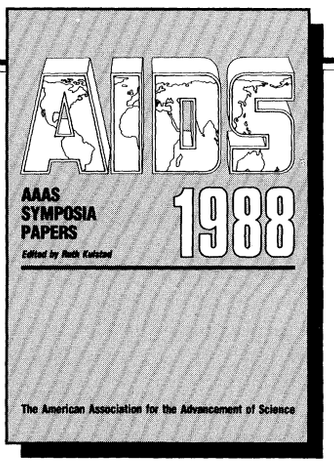
Neurochemistry of satiation

CHOLECYSTOKININ (CCK) plays a pivotal role in inducing feelings of satiety after a meal (page 1509). Although earlier experiments had shown that injections of this neuropeptide induced satiety, it was unclear whether CCK present in the body is involved in the normal mechanism by which satiety is felt. However, with the availability of specific antagonists of CCK, Dourish *et al.* now confirm the importance of this substance for bringing about feelings of satisfaction after eating. Two antagonists were used, one that specifically blocked the receptors in the brain for CCK and one that blocked CCK receptors outside the brain. Brain receptors were found to exert the major influence on satiety: their antagonists were two orders of magnitude more potent than peripheral antagonists in blocking the onset of feelings of satiety and in increasing feeding. Because the sequelae of CCK action can now be altered, it may be possible to use agonists and antagonists of CCK as appetite suppressants and stimulants in a range of human eating disorders.

■ RUTH LEVY GUYER

AIDS

Books from AAAS



AIDS 1988: AAAS Symposia Papers

Edited by Ruth Kulstad
Foreword by C. Everett Koop

This volume contains many of the groundbreaking papers on AIDS presented at the 1988 AAAS Annual Meeting.

The wide variety of the papers presented here reflects the current thinking about AIDS research today—that control over the AIDS epidemic must be achieved through a collaborative, multi-disciplinary effort that includes not only the medical and biological sciences, but the social and behavioral sciences as well.

This fully indexed volume is organized into five major sections: The first explores the epidemiology and natural history of AIDS and the HIV infection both in the United States and internationally. It also looks at the difficulty of predicting the course of the virus—statistical issues; patterns of HIV-1 incubation, infectiousness, and transmission; and approaches to demographic impact modeling.

Section two discusses the social consequences of AIDS as they relate to gender, intravenous drug users, and public policy, and it examines the dilemmas that AIDS presents to the medical community.

The third section focuses on the AIDS prevention strategies currently employed around the world.

Section four considers the economic, political, ethical and legal issues surrounding the epidemic.

The final section presents several recent medical and biological studies on AIDS and HIV.

AIDS 1988 is a timely, authoritative source of information on the growing body of AIDS research being conducted around the world. It is essential for medical, biological, social, and behavioral scientists, and for everyone who is professionally or personally concerned about the AIDS epidemic.

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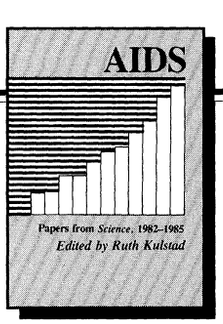

AIDS: Papers from Science, 1982-1985

Edited by Ruth Kulstad

This collection includes frequently cited research papers and news reports on AIDS that were published in *Science* between August 1982 and September 1985.

Many of the papers relate directly to AIDS research, while others touch on relevant aspects of the immune system. The news stories help to explain the ongoing research, while focusing on some of the sociological questions raised by the disease. The book is arranged chronologically, enabling the reader to trace the history of the AIDS epidemic through September 1985—a history that is of great sociological interest.

This fully indexed collection is valuable not only for the experimental data and conclusions, but also as an excellent bibliographic reference of AIDS work in major journals worldwide.

1986; 654 pp.; softcover
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Hydrocarbon Energy Revisited

Many energy experts now project a continuation of relatively low prices for oil for much of the next decade. This would lead to a large increase in U.S. importation of oil and help OPEC eventually to resume ability to dictate high prices.

The facts and trends on which the current estimates are based seem solid. From 1969 to 1988 non-U.S., non-OPEC free world production increased fivefold. This, together with conservation and substitution induced by high prices for oil, led to a drop in sales by OPEC from 1979 to 1985 of almost 50%. To avoid a further loss of market share the price was drastically reduced by Saudi Arabia and others. The current level of prices has slowed exploration and drilling by non-OPEC countries, but with excess production capacity already in place, there is little likelihood of a substantial rise in world oil prices in the next several years, short of a major Mideast conflagration.

The effects of continuing low world oil prices on the complex U.S. energy system would be many and profound. Some of them are already apparent. Efforts in conservation, improved energy efficiency, and substitution of other fuels for oil have diminished. Exploration and drilling for hydrocarbons has dropped; production of petroleum has decreased; consumption of petroleum is increasing; imports of oil and its products have risen. Additional effects such as tightness in supplies of natural gas and price increases for that fuel will become apparent later. A possible future development is sharply expanded dependence on hydrocarbons for generation of electric power.

Before the early 1980s the contiguous continental United States had already become a mature petroleum province; costs of finding oil in it exceeded those of many countries. High prices for oil in the early 1980s led to extensive drilling here, but the current rate is only about a fifth of the peak. Unless substantial reserves are added, production capability diminishes with time. In 1985 production of crude oil plus condensate totaled 10.6 million barrels per day (Mbd). In 1988 it was 9.8 Mbd, and in 1989 it will be 9.3 Mbd. Experts predict that in the year 2000 it will be 6 Mbd.

Consumption of petroleum increased an average of 3.3% per year between 1985 and 1988 (17 Mbd of products in 1988). Experts predict that demand will continue to increase, but at the rate of only 1.0 to 1.5% per year. This slow rate prediction could be an underestimate.

In 1985, while high prices still prevailed, net imports of oil and its products were 4.3 Mbd. In 1988 they were 6.6 Mbd. During 1989 they will be about 7.2 Mbd. A recently released CONOCO report, "World Energy Outlook Through 2000," projects imports of 11 Mbd in the year 2000. The estimate is based on the assumption that use of oil will increase at the slow rate.

For many purposes oil and natural gas are interchangeable as fuels. This is particularly true in industrial applications and when they are used in power generation. Many of the large consumers can easily switch back and forth. When oil is cheap, the price for natural gas is depressed and drilling for gas is curtailed. Already, producible reserves of natural gas have diminished. When cheap natural gas is no longer available, it will be supplanted by oil.

Demand for hydrocarbons by the electrical utilities could lead to substantially enhanced importation of oil during the next decade. In the past, most of the base load generating plants have been fueled by coal; nuclear energy now contributes about 20% of electric power. However, only a few nuclear and coal plants are under construction. If demand for electricity continues to grow at a rate approaching that experienced in 1987 and 1988, the United States is headed for large shortages of base load capacity. Construction of coal and nuclear plants is costly and requires many years. In contrast, combined cycle plants fueled by natural gas or oil can be put into operation quickly and at low capital cost. Apparently many of the utilities are planning to pursue this course. But it is a course that would increase imports of oil further.

Substantial increases in importation of oil by the United States, Southeast Asia, and the less developed countries could restore control of the market to OPEC by the year 2000 or before. Unless there are economic incentives for improving energy efficiency, conservation, and substitution and for increasing domestic supplies, the United States will become increasingly vulnerable to a great, multicomponent energy crisis.—PHILIP H. ABELSON

through the ILP have differed in no way from the interactions I had when I served for 13 months as a liaison scientist with the U.S. Office of Naval Research–Tokyo in 1984–1985. How can Congress praise that program as a model of international scientific interaction, yet condemn the interaction when I do the same thing as an MIT faculty member through the ILP?

THOMAS W. EAGAR
Department of Materials Science and Engineering, Massachusetts Institute of Technology, Cambridge, MA 02139

NASA and Intellectual Quality

I was appalled to read in the 18 August issue of *Science* (Research News, p. 699) a statement, attributed to unnamed members of the astronomical community, that the intellectual quality at NASA centers is "mediocre at best." If these unnamed astronomers have the courage to identify themselves, I will personally invite them to visit the NASA-Ames Research Center to explain their point of view in face-to-face discussions with our outstanding scientific staff. We would point out in these discussions that many scientists here at Ames—and elsewhere within NASA—have passed up opportunities to join or remain on university faculties in favor of less well-paying civil service positions in which our efforts are largely devoted to developing new scientific opportunities for the entire astronomical community.

MICHAEL WERNER
Space Infrared Telescope Facility Project, NASA-Ames Research Center, Moffett Field, CA 94035

Animal Experimentation: Context of a Quote

My attention has been called to a letter by Brandon P. Reines (11 Aug., p. 583) citing a statement of mine that seems to align me with the antivivisection movement.

I did publish an article in 1979 (*1*), giving a history of the development of our knowledge of hepatitis and pointing out how much was learned by clinical observation alone. Reines plucked out these words: "progress by the study of man is by no means unusual, in fact, it is more nearly the rule." Of course I stand by that, but its use in the context of his letter is a distortion of my belief and my practice. As I said in another section of the same article, clinical observations may provide leads and these may need to be pursued by disciplines other than pure clinical observation. Most of the research I have engaged in over the past half century has involved use of experimental animals (mice, rats and rabbits).

PAUL B. BEESON
21013 Northeast 122nd Street, Redmond, WA 98053

REFERENCE

1. P. B. Beeson, *Am. J. Med.* **67**, 366 (1979).

Erratum: In the legend of figure 3 (p. 1437) in the Research Article "Synthetic amphiphilic peptide models for protein ion channels" by J. D. Lear *et al.* (27 May 1988, p. 1177), the holding potential for the $(LSLLLSL)_3$ peptide should have read, "−150 mV" instead of "−120 mV." In the same legend, the duration intervals of the plots in C, E, and F should have been given as 20 msec, 0.5 msec, and 20 msec, respectively.

Erratum: In the legend of figure 4 in the Research Article "Identification of the cystic fibrosis gene: Cloning and characterization of complementary DNA" by J. R. Riordan *et al.* (8 Sept., p. 1066), the oligonucleotide sequence "5′-GTTTTCCTGGATTATGCCTGGGCAC-3′" [error is italicized] should have read "5′-GTTTTCCTGGATTATGCCTGGCAC-3′"; one extra G residue was inserted in error. The same error appeared in note 35 (p. 1079) of the Research Article "Identification of the cystic fibrosis gene: Genetic analysis" by B. Kerem *et al.* (8 Sept., p. 1073). In addition, the first amino acid residue displayed in figure 2 of the paper by Kerem *et al.* should have been K (for lysine) instead of L; the N and the CF(ΔF) sequences were also mislabeled. The correct sequence should have read, "KENIIFGV" for N and "KENIIGV" for CF(ΔF).

Revised 23 December 1988

Information for Contributors

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2) the title of the paper and a statement of its main point;

3) three to eight keywords to be used for indexing;

4) the names, addresses, telephone numbers, and fields of interest of four to six persons outside your institution who are qualified to referee the paper;

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