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2 JANUARY 1987
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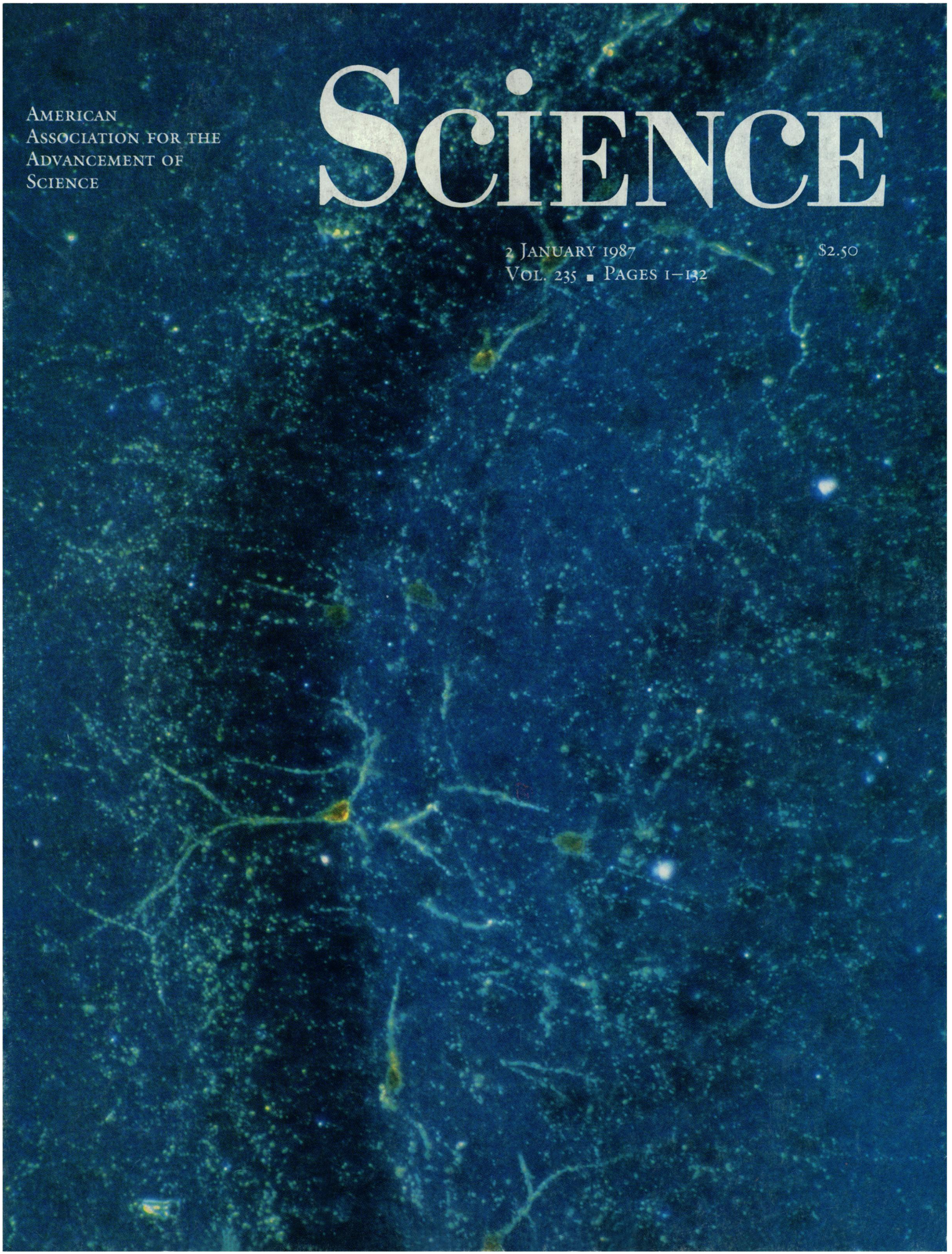

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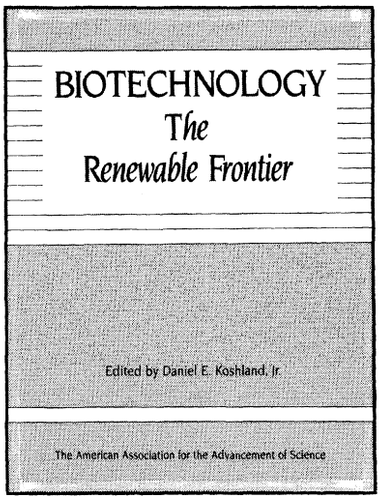

Edited by Daniel E. Koshland, Jr. Editor, *Science*

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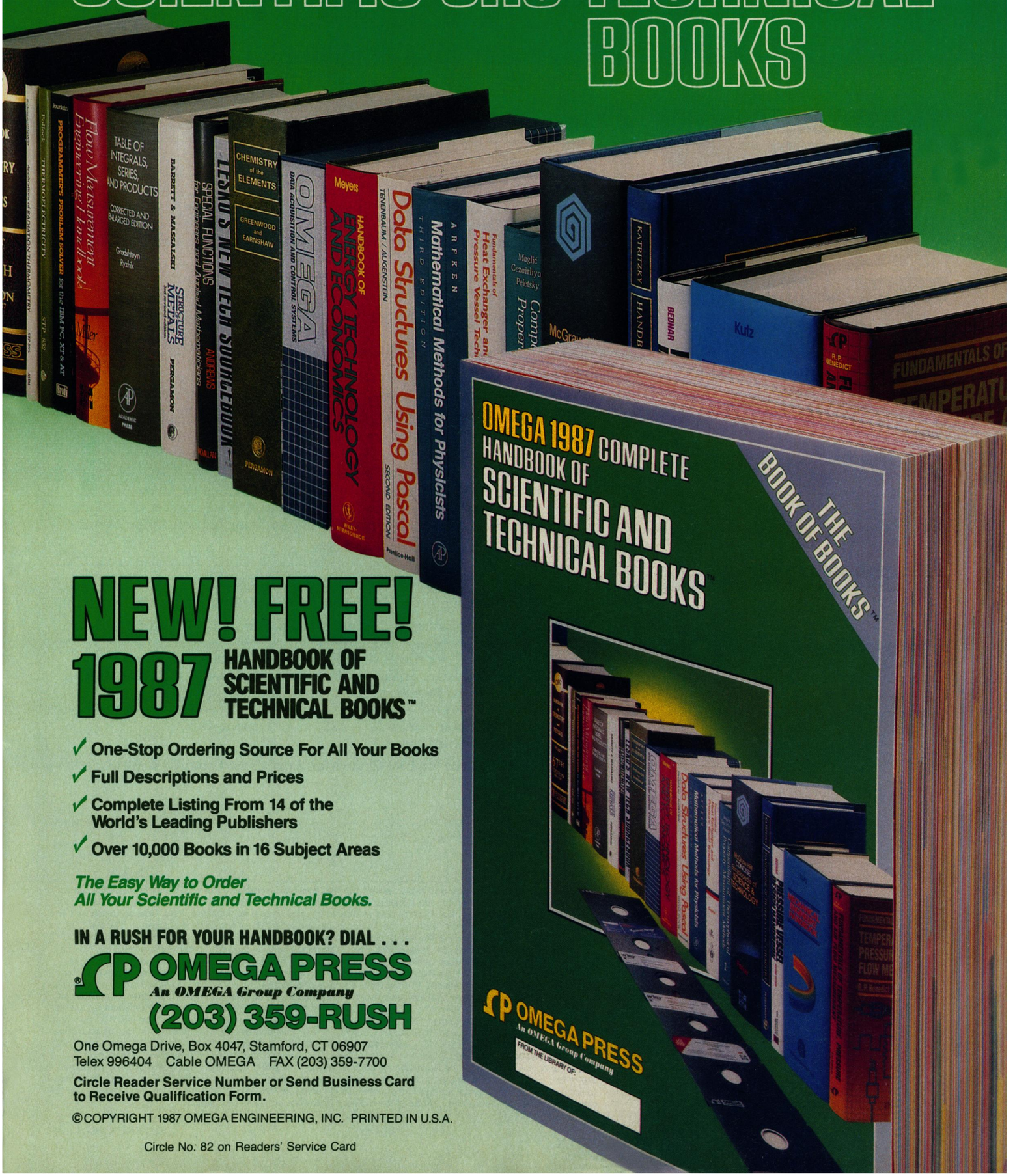

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COVER Cholecystokinin (CCK)-containing neurons of the normal rat hippocampus illustrated by dark-field microscopy after immunocytochemical staining. These CCK-containing interneurons are a subset of γ-aminobutyric acid–containing interneurons that are resistant to epileptic seizure activity (magnification, ~400). See page 73. [Robert S. Sloviter, New York State Department of Health, West Haverstraw, NY 10993, and Columbia University, New York, NY 10032]

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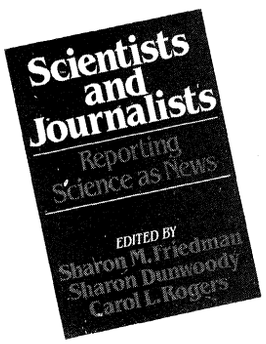

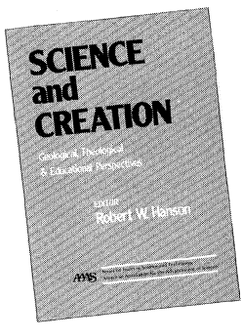

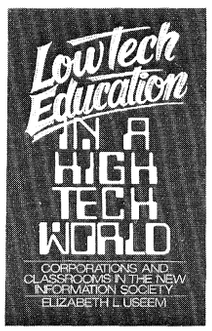

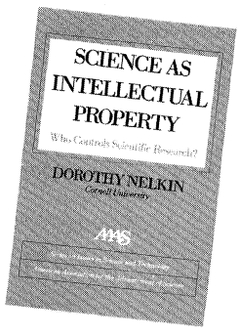

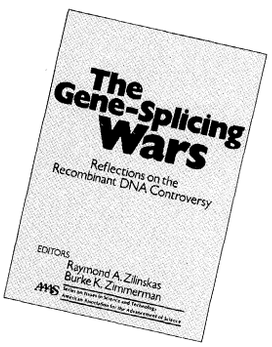

Scientists and Journalists: Reporting Science as News

Edited by Sharon M. Friedman, Sharon Dunwoody, and Carol L. Rogers

The public is interested in science and depends largely on the mass media for the latest information. But how well do scientists and journalists connect to communicate to the public? This book examines the human aspect of the links between scientists and journalists through the eyes of both.

1985, 352 pp., hardcover; $24.95, AAAS members $19.95

Science and Creation: Geological, Theological, and Educational Perspectives

Edited by Robert W. Hanson

The creation/evolution controversy is examined by scientists, theologians, educators, and historians. These authors view the controversy as a false dichotomy and as an attempt to force a choice between two ideas that are not mutually exclusive. Includes case studies from several states.

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Low Tech Education in a High Tech World: Corporations and Classrooms in the New Information Society

Elizabeth L. Useem

Are students in the U.S. developing the skills necessary for a high technology society, or will it be technological boom, educational gloom? Useem examines education in California's "Silicon Valley" and Boston's Route 128, two of the country's leading high tech centers, and suggests ways for education and industry to forge a stronger partnership for the future.

1985, 256 pp., hardcover; $19.95, AAAS members $15.95

Science as Intellectual Property: Who Controls Scientific Research?

Dorothy Nelkin

Who controls research? A growing number of legal and administrative disputes raise critical issues of professional sovereignty, scientific secrecy, and proprietary rights. Nelkin offers cases illustrating the dilemmas that arise as the interests of scientists, the rights of citizens, and the security needs of government and industry come into increasing conflict.

1984, 130 pp., softcover; $10.00, AAAS members $8.00

The Gene-Splicing Wars: Reflections on the Recombinant DNA Controversy

Edited by Raymond A. Zilinskas and Burke K. Zimmerman

Questions of safety and ethics about recombinant DNA techniques continue to surface. This book takes a look at historical, political, industrial, scientific, and international aspects of these issues. The authors show how lessons learned from the experience can be used to cope with similar issues in the future.

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This Week in SCIENCE

Lidar technology

ONE positive outcome of recent volcanic eruptions of Mount St. Helens and El Chichón was that ash in the atmosphere served as a tracer for global wind and circulation patterns; lidar (an acronym for light detection and ranging) was used to measure backscattered laser signals that were reflected off the ash (page 37). This same technology has been used to measure patterns of urban air pollution and local wind circulation (such as wind shear near airports), to calculate atmospheric pressure and temperature as a function of altitude, to map the distribution of rain, snow, ice crystals, and dense clouds in the atmosphere, and to characterize chemical species in the atmosphere. The technology was developed in the 1960s; advances in laser technology in the last 5 years have enhanced its sensitivity in detecting chemical species in the part-per-million or part-per-billion range over a few to tens of kilometers. Killinger and Menyuk discuss features of the atmosphere and properties of the laser signals and detectors that contribute to the versatility of lidar systems and affect the accuracy of lidar measurements. Future uses are expected to include studies of the hole in the ozone layer, exploration of oil and gas resources on the earth, forecasting of weather, exploration of space, and industrial and medical applications.

Calcium channels

TRANSIENT increases in free calcium in the cytoplasm of cells initiate a number of important cellular processes (page 46). The calcium either is released from intracellular storage or enters the cell through a calcium channel from the extracellular fluid (where the concentration of calcium may be four orders of magnitude as great as it is within the cell). Some characteristics and functions of calcium channels associated with vertebrate neurons are reviewed by Miller. To date, three types of channels have been distinguished; each channel may regulate calcium in association with different cellular functions (for example, secretion of a neurotransmitter or rhythmic bursting behavior). Channels with diverse properties and sensitivities apparently coexist within a single cell, and the number of channels on a cell may change with time in response to such insults as chronic drug use or disease. Channels have been distinguished by sensitivity or insensitivity to drugs (dihydropyridines) that promote or inhibit functioning, to cadmium and to a snail venom. The location of a channel may also determine whether it will participate in a given cellular process.

Land life in the Ordovician

BURROWING millipedes may have been living on dry land some 50 to 100 million years earlier than the fossil record has shown (page 61). In ancient soil at a Late Ordovician site, the Juniata Formation near Potters Mills, Pennsylvania, Retallack and Feakes found numerous fossil burrows of sizes and shapes that could have been dug by Ordovician land animals resembling millipedes; they could also have been dug by now extinct species or by species not generally considered capable of burrowing. From the characteristics of the burrows they left behind, the diggers should have had bilateral symmetry, been resistant to desiccation, and have grown in well-defined increments; the millipedes fulfill all these requirements. This is the earliest date so far ascribed to millipedes or to any nonmarine animals (440 to 445 million years ago); the soil must have supported fodder (perhaps low-growing nonvascular plants) to nourish the burrowers.

Preventing neuronal death

OVEREXCITATION of neurons in the central nervous system can produce neuronal death (page 66). Saji and Reis now show that loss of normal inhibitory input to neurons may be another mechanism by which neurons remote from the site of a brain injury are killed and that neuronal death can be prevented by restoring activity of the inhibitory transmitter that was lost. Neurons in the caudate nucleus of the brain were experimentally destroyed; consequences of the destruction were sought elsewhere in the brain, in the substantia nigra pars reticulata, a region into which many of the caudate neurons project. The most extensive neuronal destruction was in areas showing heavy loss of terminals for the inhibitory neurotransmitter γ-aminobutyric acid (GABA) that originated in the caudate nucleus. When muscimol, a GABA agonist, was continuously infused in the brain, death was prevented for neurons in the substantia nigra. Intervention with drugs of this sort may be useful for preventing some neuronal deaths associated with strokes or other injuries to the brain in which delayed neuronal loss contributes to pathology.

Vaccine for Rocky Mountain spotted fever

ROCKY Mountain spotted fever is a bacterial disease that is transmitted to humans through the bite of a tick (page 83). The disease is tricky to diagnose because the symptoms may mimic those of other diseases, and there is no satisfactory diagnostic test. The infectious agent, *Rickettsia rickettsii*, is difficult to grow in culture, because it is an obligate intracellular parasite, and hard to isolate from the host cell; thus vaccines to protect against the disease have not been easy to prepare. McDonald *et al.* have cloned the gene for protective antigen on the bacterial surface. The gene product induced protection in mice against a lethal injection of *R. rickettsii*; a monoclonal antibody reacting with the gene product also provided protection for mice against an otherwise lethal challenge injection. This is a promising prototype subunit vaccine that now will be tested in other species susceptible to Rocky Mountain spotted fever.

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Materials Research

". . . When as a debtor nation we must compete vastly better against the products and innovations of a smartening world, it is wise to review our progress in materials science and engineering." This is a quotation from William O. Baker, former chairman of the Board at AT&T Bell Laboratories. The occasion was a conference in October 1985 to commemorate the 25th anniversary of the Materials Research Laboratories. Participants in the conference included a distinguished cross section of industrial, governmental, and academic experts on materials science and applications. The proceedings, recently issued, include historical perspectives, status of scientific and technical areas, and policy matters.* The major fraction of the symposium volume consists of essays on frontier topics in materials science. These provide an interesting sample of recent advances, together with some tutorial essays. I found the chapters on metallurgical research, condensed matter physics, catalysis, and organic polymers particularly informative.

At the conclusion of World War II and for more than a decade thereafter, the United States enjoyed a novel position in commercial competition. West Germany, Japan, and most other developed countries were preoccupied with recovering from damage of the war. During the war, the United States had experienced great success in converting scientific knowledge into technology and important practical applications. From 1946 into the early 1970s, U.S. industrial research and development flourished and were world dominating. Particularly impressive were discoveries in materials science and the creation of such practical items as computers and polymers. Our major industrial laboratories conducted basic research, and they skillfully used interdisciplinary teams to exploit it.

Already in the late 1950s, it was evident that excellence in materials science was going to be crucial to the nation's future defense and commercial competition. Leaders such as John von Neumann, Frederick Seitz, and William O. Baker recognized the need to encourage interdisciplinary materials research at universities. In 1960, the Advanced Research Projects Agency initiated a program, Interdisciplinary Laboratories, designed to foster work in materials science. Later, in 1972, the National Science Foundation assumed responsibility for the program which was renamed Materials Research Laboratories.

In comparison with the true needs and opportunities, the Interdisciplinary Laboratories and their successor have had only a moderate impact. In part this is due to limited financial support—on the order of $20 million per year—a tiny sum compared to industrial R&D. At maximum, 12 universities were included, and the professional staffs numbered 600 faculty members. Recently, this number has been around 400. On the positive side, some 3000 Ph.D.'s have been granted. Two precedents have been established: the program has been supported by block grants, thus avoiding micro-management from Washington; the practice of other interdisciplinary efforts on campus has been fostered. Activity in materials research was slow in maturing. Peer pressure, the university departmental structure, and the quest for tenure and promotions caused many faculty to shun interdisciplinary research. Industrial managers have also often complained of the paucity of faculty activity in polymers and inorganic chemistry, fields that have come to have enormous practical applications while displaying interesting scientific phenomena.

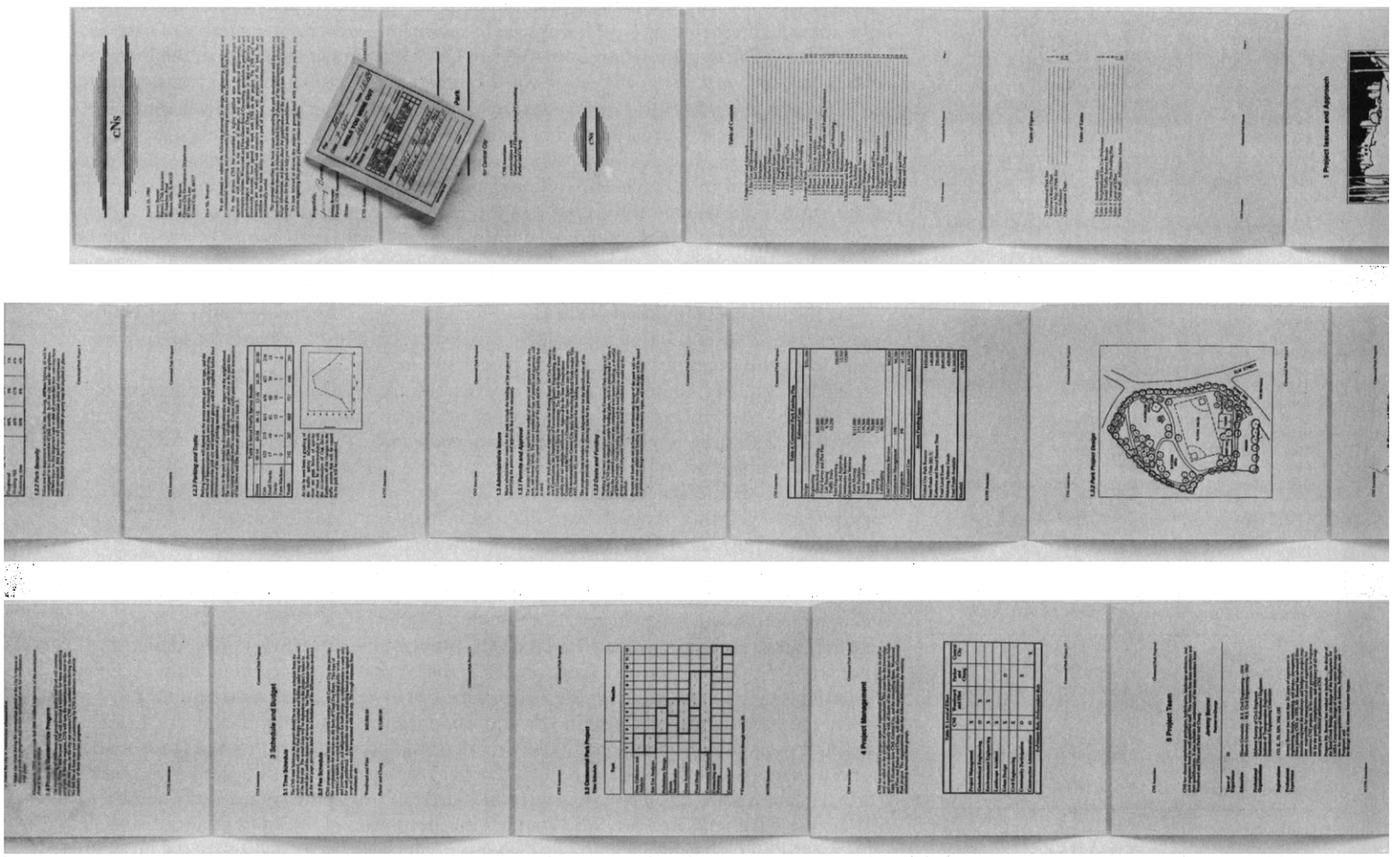
The economic situation in 1986 was far different from that in 1960. Most companies feel pressed by foreign competition and, if anything, are cutting back on fundamental research. They are looking increasingly to the universities for inspiration and new knowledge.

A significant recent development is the emergence of a vital Materials Research Society. This group organizes an important set of meetings characterized by enthusiastic interaction among peers. Other factors inhibiting university materials science efforts could be (and are being) overcome by university administrators.

Because modern equipment is costly, not every university can engage in materials research. Those that do will share a tremendous responsibility for enabling this country to compete in the many products that are part of our daily lives.—PHILIP H. ABELSON

*National Academy of Engineering, *Advancing Materials Research* (National Academy Press, Washington, DC, December 1986).

How to process docum



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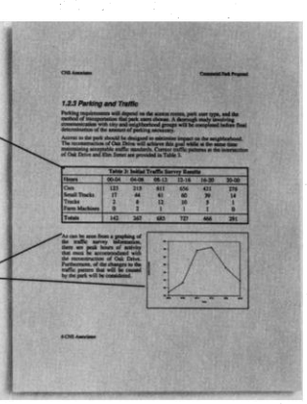

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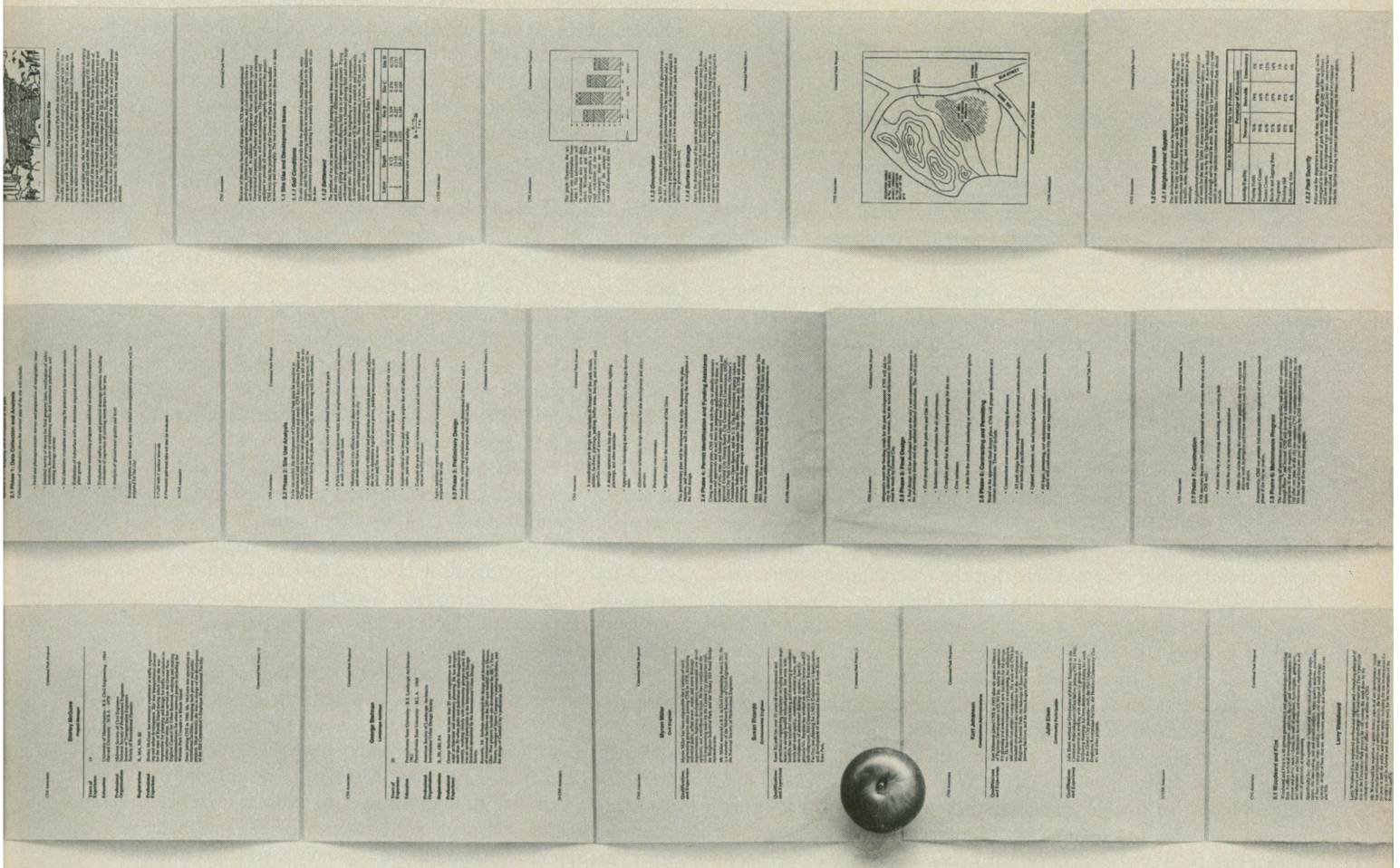

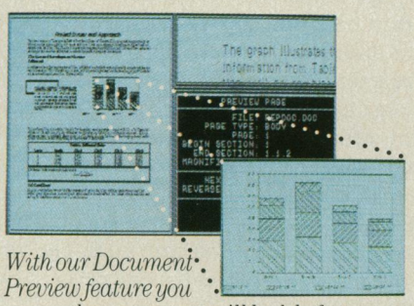

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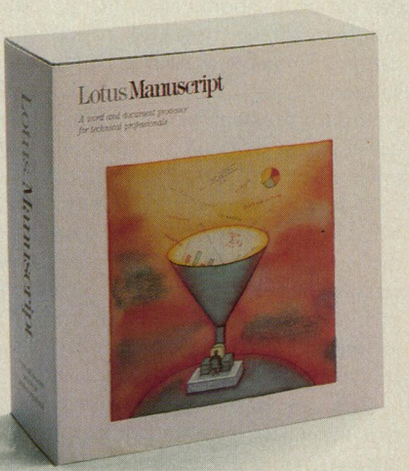

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in the Neotropics, but is not planned for Guanacaste National Park (GNP). Rather, GNP anticipates that wild animal populations may be sufficiently robust that some individuals may be removed to use for restocking in forest restoration projects elsewhere.

The animal figured is a tapir rather than a peccary.

DANIEL H. JANZEN
Department of Biology, University of Pennsylvania, Philadelphia, PA 19104–6018

Rejection and Revolution

After adopting the relatively new policy of swiftly rejecting 60% of all manuscripts, *Science* offers the authors of such manuscripts the comforting thought (Editorial, 18 Jan. 1985, p. 249) that on that particular week they competed with someone of the caliber of Darwin. This flippant attitude assumes that scientists of Darwin's caliber arise about once a week.

The new policy has one disadvantage that totally outweighs any advantages. Those who make the initial decisions are bound to be recognized members of the scientific establishment, who according to Kuhn (*1*) are usually the last to recognize the value of a justified revolutionary stand in their scientific field. This is bound to turn totally disastrous what had been almost totally disastrous before, that is, the attitude of *Science* toward the authors of manuscripts that support such a revolutionary stand. Contrary to the advice offered by *Science*, the authors of such manuscripts can, however, find solace in the knowledge that the manuscripts of a scientific revolutionary like Darwin would have certainly been swiftly rejected by *Science* with no right of appeal.

R. ROSIN
126 West 83 Street, New York, NY 10024

REFERENCES

1. T. Kuhn, *The Structure of Scientific Revolutions* (Univ. of Chicago Press, Chicago, 1970).

Response: In Darwin's day there were so few scientists and so few journals that in most cases issues were printed only when enough manuscripts had been received, not on regular dates. With 90% or more of all the scientists who have ever lived being alive today, the volume of publications is totally different and the number of young Darwins far greater. Our sending back 60% of submitted manuscripts rapidly is a trade-off for faster decision-making at all levels; this is understood and the procedure has been given a generally favorable reception. We never treat manuscripts flippantly and our staff and reviewers are constantly encouraging publication of innovative research findings. I do not doubt for a moment that we will make an occasional mistake, but so far we do not know of any seminal paper that we have refused nor do we have any indication that well-known scientists are not as receptive to innovative ideas as their less famous colleagues.

—DANIEL E. KOSHLAND, JR.

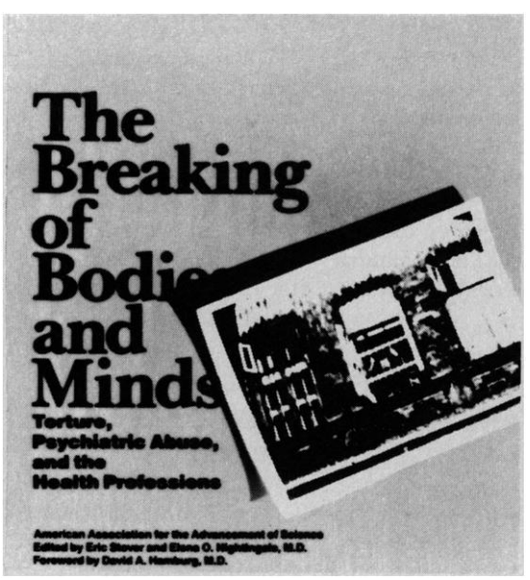
Erratum: In the Research News article by Gina Kolata "Maleness pinpointed on Y chromosome" (28 Nov., p. 1076), it is said that gametes always induce steroids. In fact, steroids can be produced without gametes. What is constant is that gametes can never be produced without steroids.

Erratum: In the caption for the figure on page 939 with the article "Debate about epilepsy: What initiates seizures?" by Deborah M. Barnes (Research News, 21 Nov., p. 938), the second sentence should have read "Middle trace shows electrical activity recorded from the space outside a neuron and bottom trace shows activity inside a single neuron."

The Breaking of Bodies and Minds

Torture, Psychiatric Abuse, and the Health Professions

A documentation of systematic use and effects of physical and mental torture throughout the world



Edited by Eric Stover and Elena O. Nightingale

With a Foreword by David A. Hamburg

This eye-opening book brings together for the first time writings on the role of medical personnel in cases of torture and psychiatric abuse. Through analyses and case histories, psychiatrists and other health care professionals, political scientists, ethicists, and other writers discuss the systematic use and effects of physical and mental torture in the Soviet Union, Latin America, and other parts of the world.

The book also details the complicity of an alarming number of medical personnel in torture and psychiatric abuse and examines the ways in which governments use a medical rationale to seek legitimacy for human destruction. Finally, it describes efforts by medical and other associations both to combat offensive practices and treat victims.

Contents

The Breaking of Bodies and Minds is important reading for anyone concerned with the preservation of basic human rights.

1985 352 pages

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