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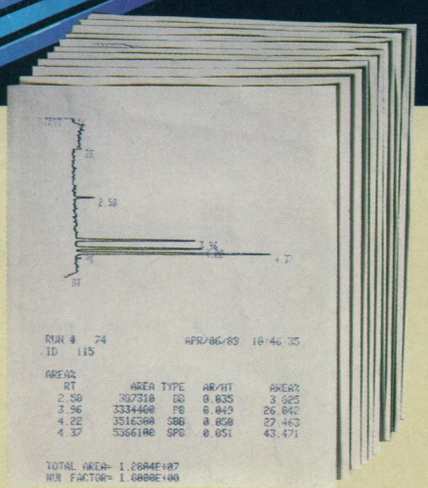

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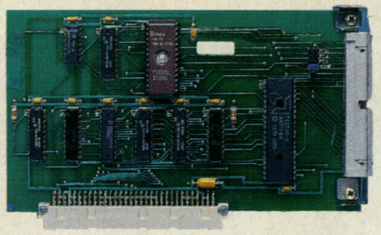

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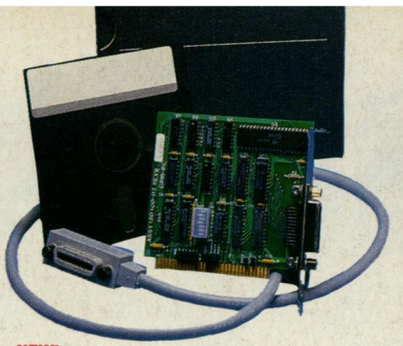

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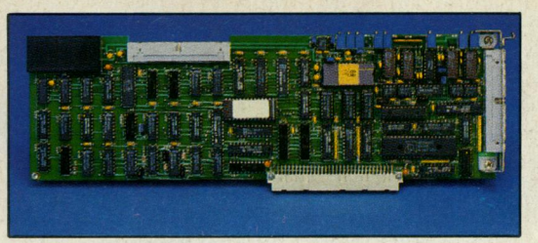

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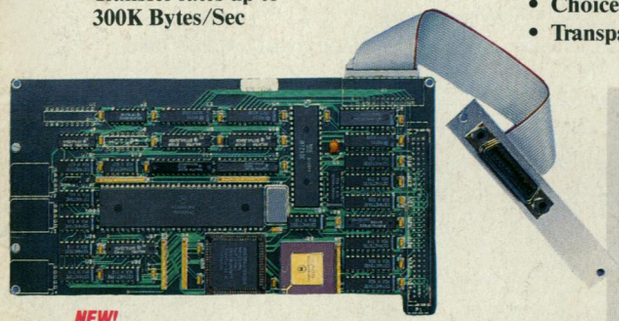

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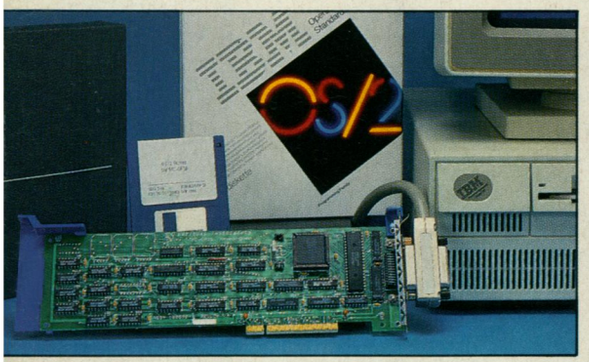

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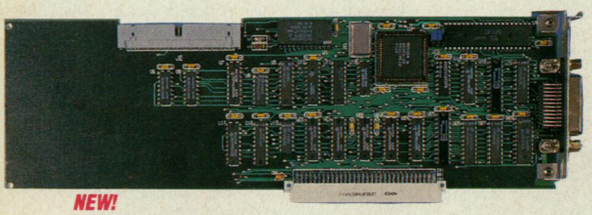

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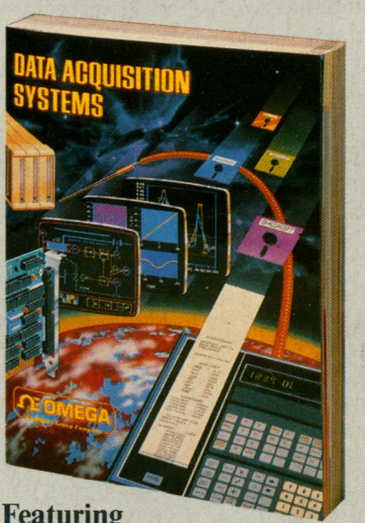

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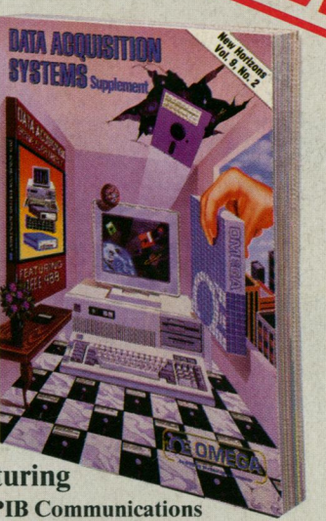

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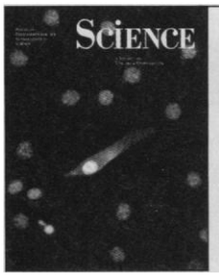

COVER C3H10T1/2 cells transfected with a MyoD1 expression vehicle. Nuclear expression of transfected MyoD1 was localized by antisera to MyoD1 and a rhodamine-conjugated secondary antibody (red). Expression of MyoD1 converted this fibroblast to a muscle cell, as shown by the expression of myosin heavy chain [visualized with a fluorescein-conjugated secondary antibody (green)]. DAPI staining shows the nuclei of untransfected cells (blue). See page 532. [Photograph by Stephen J. Tapscott]

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Species conservation

As species extinction rates continue to increase, some see a parallel decline in the overall diversity of animal populations. Hunting has thinned out populations that used to be large and healthy and natural habitats are disappearing. Attempting to prevent or delay extinction, wildlife groups may move certain species to more favorable environments, intentionally releasing populations of animals in numbers and areas where they might not naturally occur. In a survey principally focused on the thousands of North American releases from 1973 (the year the Endangered Species Act became law) to 1986, Griffith *et al.* find information that could help define elements necessary to make future translocations successful in establishing, reestablishing, or augmenting species populations (page 477). In their survey, herbivores fared better than carnivores or omnivores, and early breeders with large numbers of offspring were slightly more likely to be successfully moved than were species that bred late and had small broods. Native game (nonthreatened) species, constituting 90% of the translocations, were nearly twice as likely to establish themselves as were species that were classified as threatened, endangered, or sensitive.

The evolution of Triton

NEPTUNE sports satellite and ring systems that stand in contrast to those of Jupiter, Saturn, and Uranus. Instead of complete rings, Neptune has a collection of between 10 and 100 ring arcs; a large moon, Triton, moving in a retrograde sense and two other known moons replace the rich and regular satellite systems of the other giant planets. Goldreich *et al.* seek to explain Neptune's peculiarities by proposing a scenario for the evolution of Triton—this unusual satellite may have had an unusual origin (page 500). Triton, moving in its proposed original orbit around the sun, may have collided with some primordial satellite system of Neptune. Such a collision would have dissipated enough orbital energy to allow the capture of Triton by Neptune; the large moon (roughly the size of Earth's moon) then would have cannibalized any smaller satellites it crashed into, accounting for the absence of a regular satellite system around Neptune. In its highly eccentric (elongated) orbit, Triton would have forced profound perturbations in surviving satellites before evolving into its present circular, inclined path. Though the orbits of the two other known moons fall (just) within calculated boundaries for the perturbations, more information from Voyager 2 will be needed before the scenario can be corroborated or modified.

Fish antifreeze

FISH living in sea water near its freezing point can produce a novel kind of antifreeze: water-soluble peptides or glycopeptides that prevent the growth of ice crystals without lowering the equilibrium freezing point of the solution in which they are dissolved. The antifreeze might do this in one of two ways. First, the antifreeze molecules could lie flat on the interface between ice and water, adhering to the ice surface structure and preventing further growth. Second, the antifreeze molecules could project partway into the ice crystals. Knight and DeVries use antifreeze material refined from the blood of the Antarctic fish *Dissostichus mawsoni* to observe a melting inhibition effect whose strength may approach that of the known freezing inhibition effect (page 505). They describe superheated ice and argue that this shows that the second process described above does not take place.

Disorder to order

TINY spheres suspended in cyclohexane settle under gravity's pull to form layers with distinct boundaries between more ordered and less ordered regions. To probe the dynamics of crystal formation, Davis *et al.* monitor the order-disorder transitions that appear during the sedimentation of organophilic silica spheres (page 507). The low dielectric constant and the refractive index of the cyclohexane inhibit electrical charges and van der Waals forces; the resulting sedimentation process couples gravity settling, diffusion, and crystallization. As the sediment accumulates, ordered packing of the spheres diffracts white light in such a way as to cause bands of iridescence to appear in the liquid-sphere mixture. A sharp interface between the iridescent sediment and the opaque disordered liquid above them indicates a true phase transition. Scanning electron microscopy of the sediment reveals planes of hexagonally packed spheres, arranged in either a cubic structure or randomly stacked layers.

Contradictions in atmospheric models

MANY of the warnings of an impending rise of a few degrees in the earth's atmospheric temperature—and the catastrophes that would accompany such a rise—are based on computer models that include rough simulations of how climate depends on atmospheric, glacial, and oceanic processes and interactions. To evaluate the accuracy of these general circulation models (GCMs), the quality of the components describing the complicated feedback processes of clouds must be assessed. In an intercomparison of 14 GCMs of the earth's atmosphere, Cess *et al.* examine the effects of how cloud-climate feedback is simulated in the various models as part of a larger study directed toward improving GCMs and climatic projections (page 513). When changes in snow and ice coverage were suppressed, the 14 GCMs showed excellent agreement among clear-sky projections but a nearly threefold variation when cloud feedback was taken into account. These vastly different cloud feedback effects emphasize the need for improvements in the treatment of clouds in these models if they are ultimately to be used as climatic predictors.

■ PAT JANOWSKI

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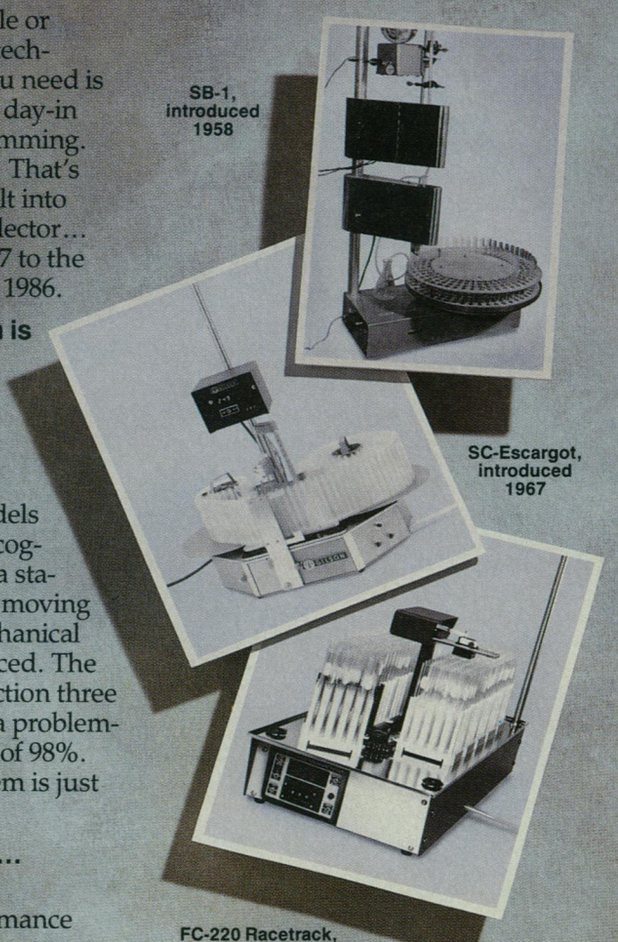

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Global Change

For more than 150 years a major activity of geologists has been to elucidate the great episodes of global change that have been wrought by natural processes. Today the challenge has expanded, for humans have become agents for environmental degradation with effects comparable to, and in some instances more profound than, those of nature. In assessing what is happening and in formulating remedial measures, earth scientists will have at their disposal a great array of instrumentation, data storage, and computational capabilities. In addition, geologists are accustomed to engage in cooperative international efforts.

The vitality, broad capabilities, and enthusiasm for tasks ahead was showcased at the International Geological Congress held 9 to 19 July in Washington, D.C. About 5900 registrants from more than 80 countries attended the meeting. Presentations were made by scientists from more than 73 countries. Among them were geologists from Vietnam, Cuba, Iran, Iraq, Israel, Yemen, and South Africa. All the Eastern Bloc countries sent representatives, including 207 from the Soviet Union. This was one of the few instances in which the Russians arrived as promised, and in which passport problems were largely nonexistent. The People's Republic of China sent 127. In the three decades previous to the 1980 and 1984 International Geological Congresses, the PRC was conspicuous by its absence.

A large number of activities were conducted in connection with the Congress, including field trips, committee meetings, short courses, and workshops. A major transfer of information occurred in 13 sessions involving 20 to 25 simultaneous 15-minute talks plus a total of about 650 posters. A feature worthy of copying by other scientific groups was a set of extended abstracts for each presentation: no abstract, no place on the program. There were about 3500 abstracts, and these occupied 1858 pages. The average length was more than 800 words. From these it is possible to gain an impression of the status of earth science in the respective countries. As might be expected, geologists of the Third World were preoccupied with applied studies, for example, those relating to fossil fuels and minerals. Presentations from the developed world touched on a wide variety of additional topics, including radioactive wastes, ground-water contamination, soil erosion, seismic tomography, continental deep drilling, high-pressure studies, isotope geochemistry, and comparative planetology. At one time, the typical geologist strolled to rock outcrops and with pick and hammer obtained a hand specimen. Examination with a hand lens followed. Today, the most advanced equipment of the physical sciences is employed as well as supercomputers. Storage of information in databases and extracting information from them are now effective aids to progress in earth science. Cooperation between biochemists and paleontologists using DNA techniques is producing new understanding of phylogenetic relationships between living and extinct taxa.

This was the 28th International Geological Congress. The first was held in Paris in 1878. The President of the current Congress was Charles Drake of Dartmouth, with Bruce Hanshaw of the U.S. Geological Survey as Secretary General. They were excellent organizers. The next Congress will be held in Japan in 1992 with the Japanese in charge. Collaborating closely with the successive congresses is the International Union of Geological Sciences. It serves to foster international cooperation in the years between and during the congresses. The current President of the IUGS is Umberto Cordani of the University of São Paulo, Brazil. In a speech to the Congress he surveyed the many current successful research activities of earth scientists. He also pointed to an expanded role for geoscience in cooperation with other sciences in a worldwide effort to achieve sustainable development. He further noted:

> Damage to the environment and the many problems related to it are now a major worldwide concern. The challenges cut across the divides of national jurisdiction, and political decisions on the management of resources and land-use planning are crucial. Sustainable development will give rise to an unprecedented demand for information, advice, and technologies that only an integrated approach can satisfy. In many countries, the focus of the challenge ahead is shifting from protection and restoration to planning and prevention. Possible solutions to environmental issues are becoming more and more complex and dependent on the cooperation of a multitude of sectors—but first and foremost, that of science.

—PHILIP H. ABELSON

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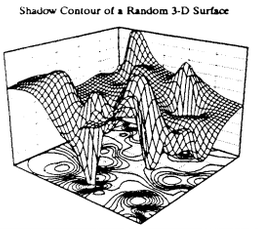

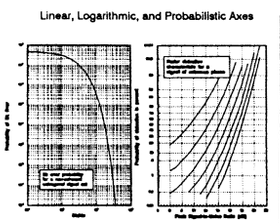

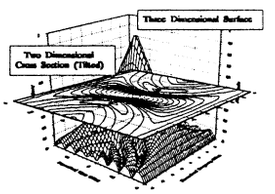

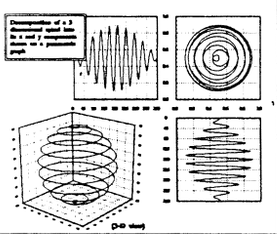

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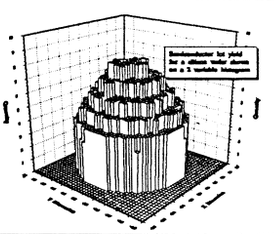

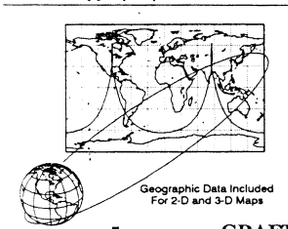

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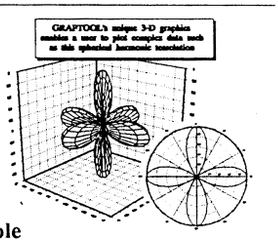

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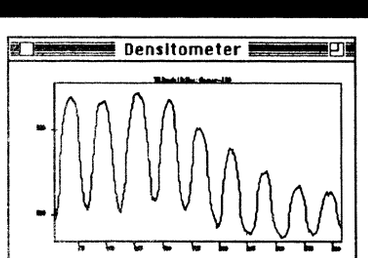

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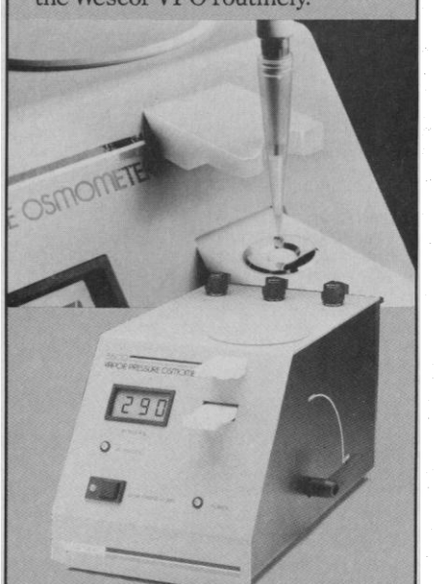

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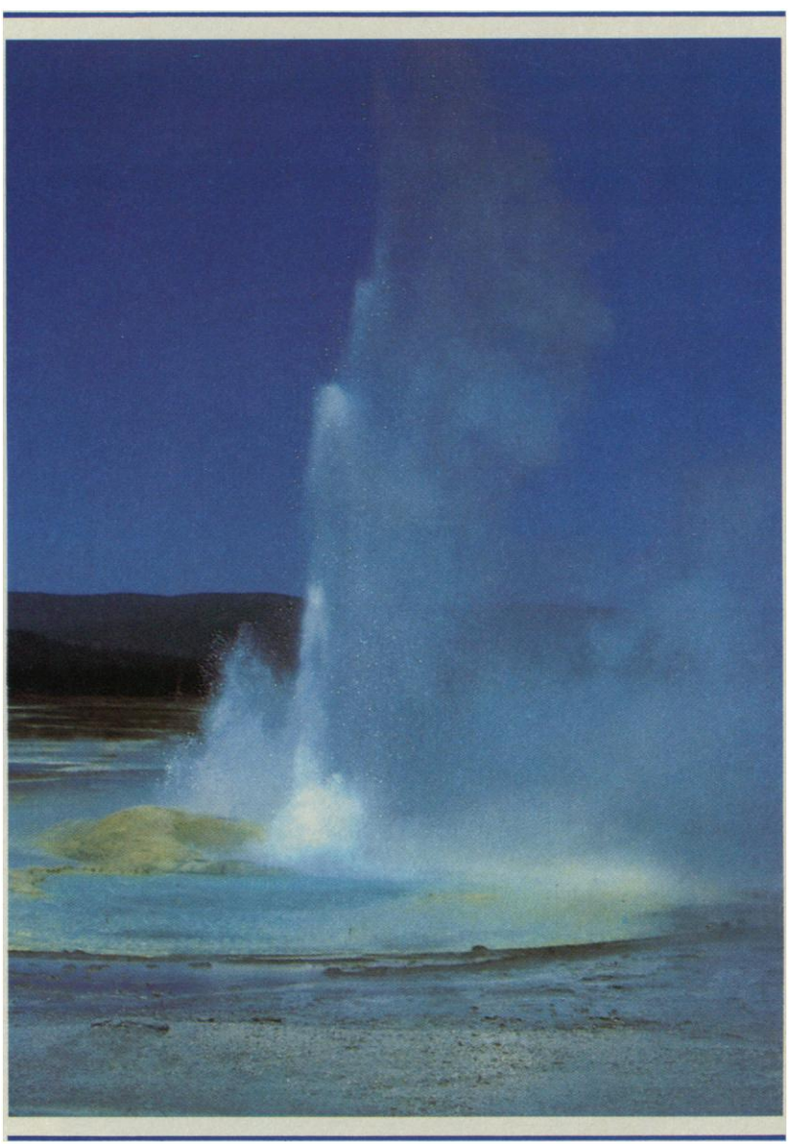

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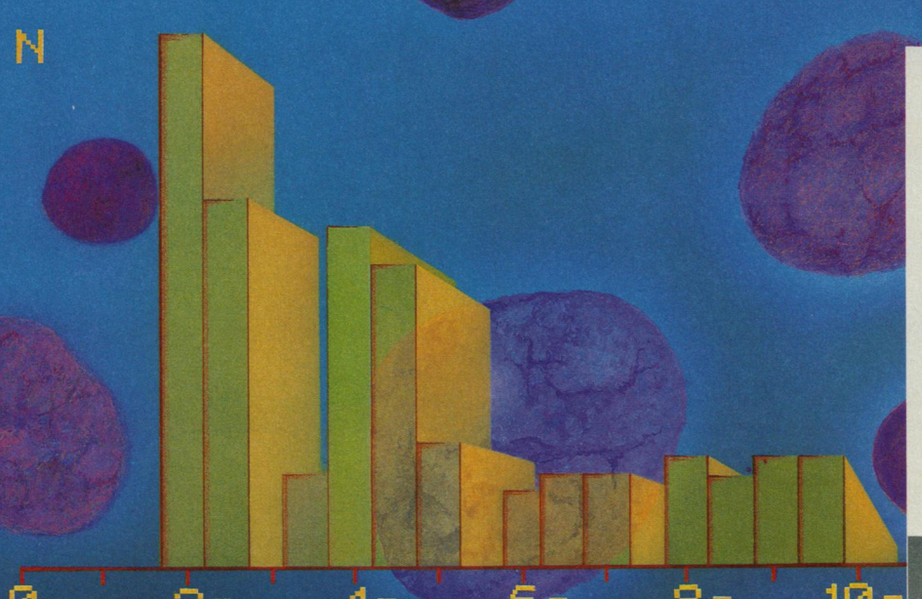

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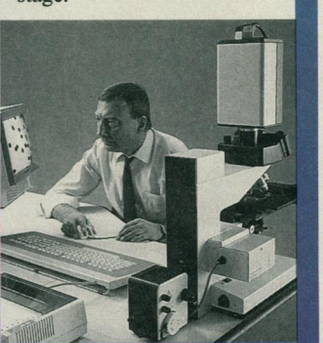

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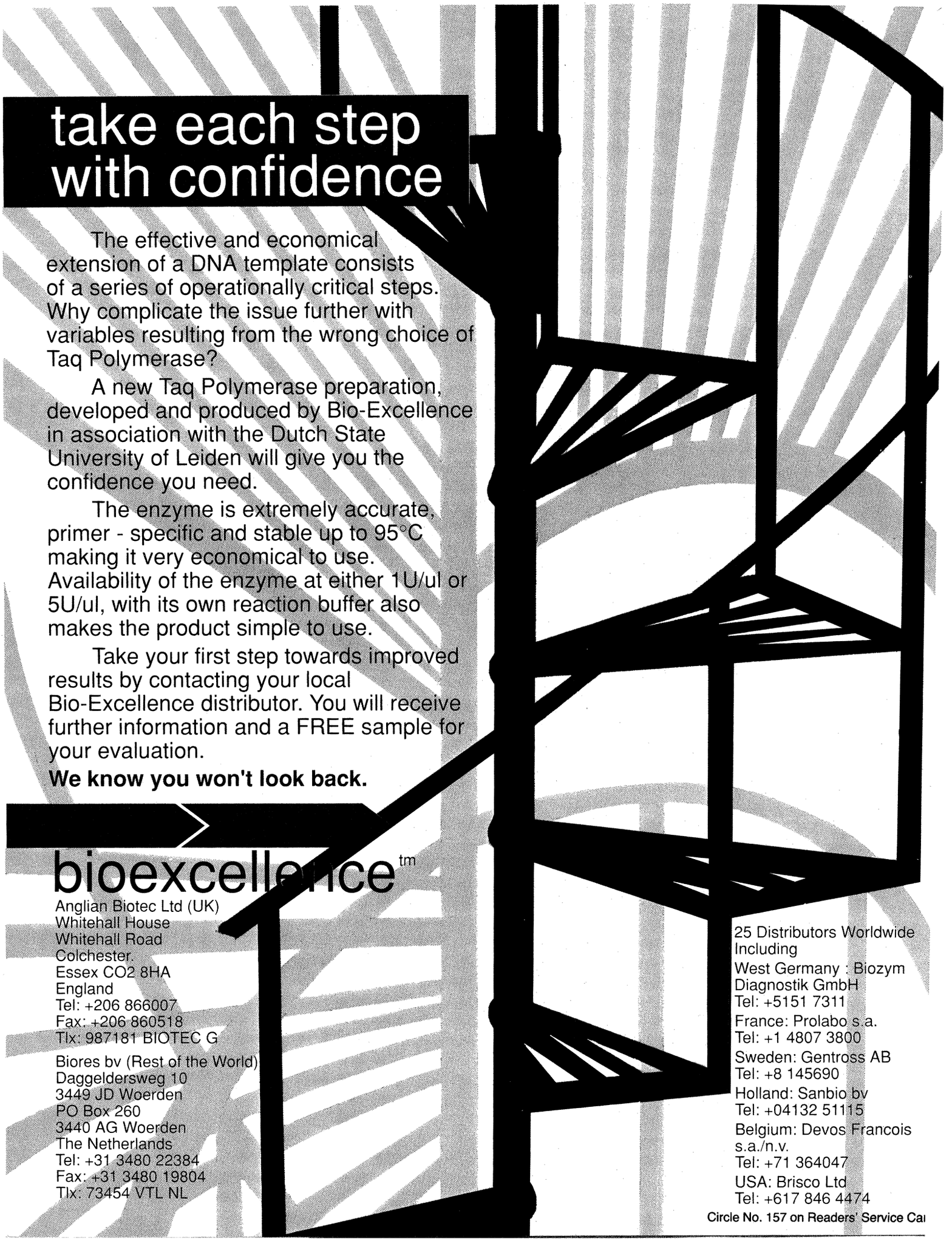

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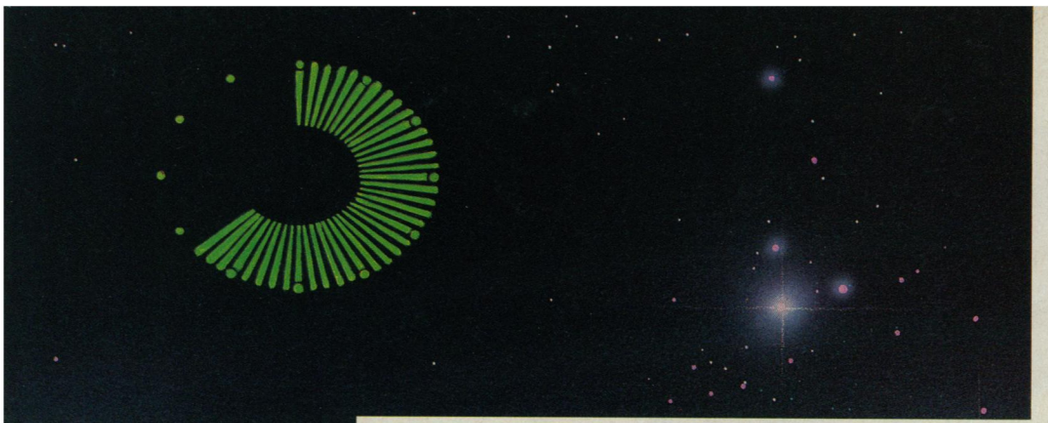

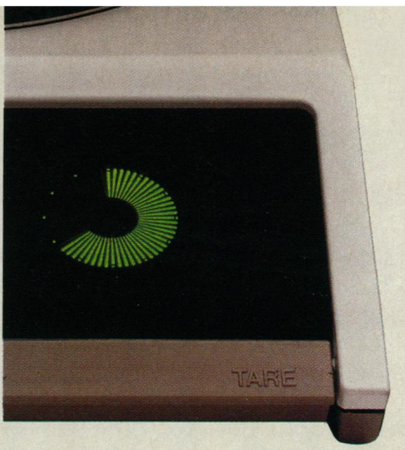

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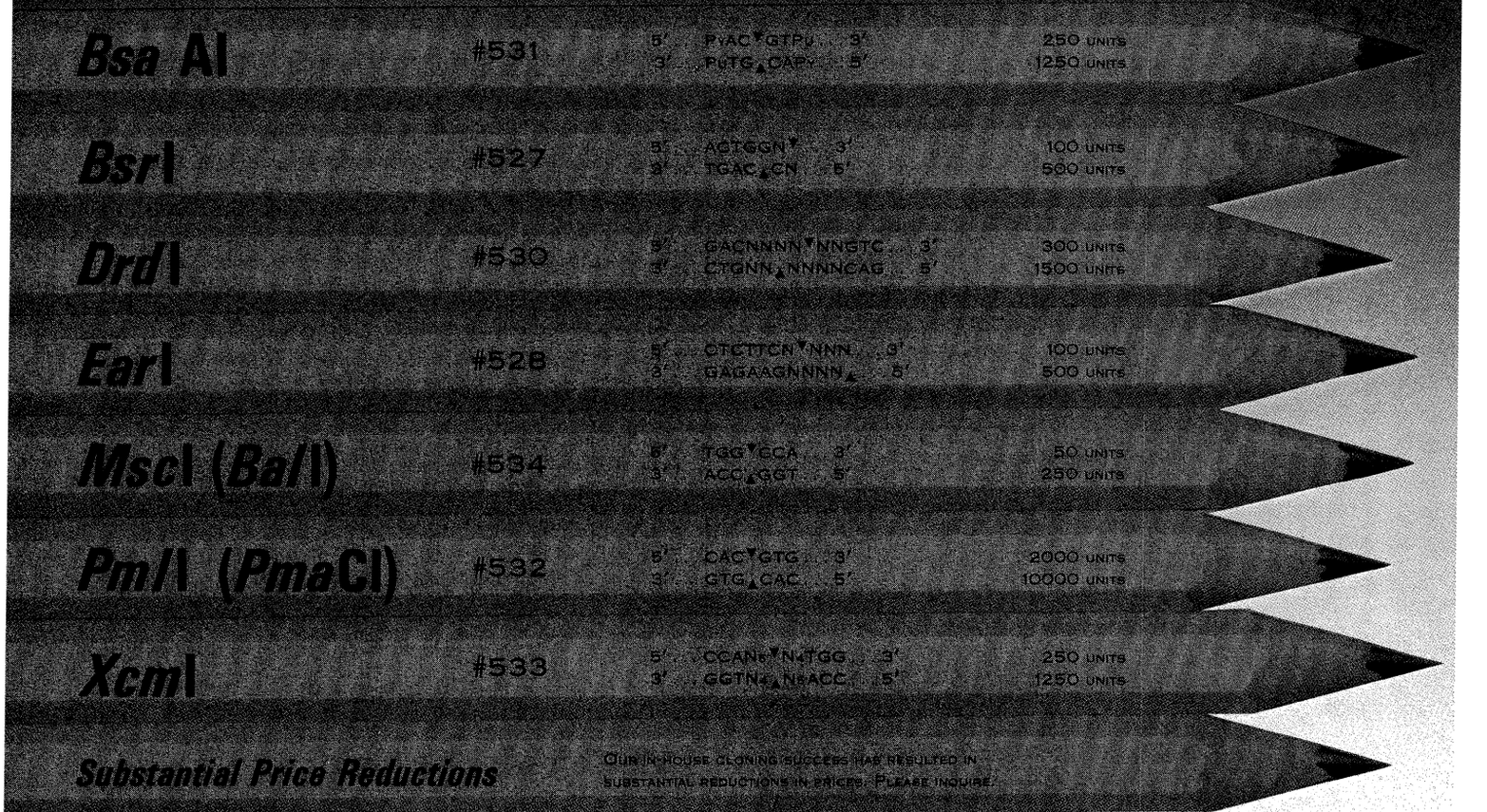

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HUMAN GENOME I

An International Conference On The Human Genome
1st Annual Meeting – October 2-4, 1989
Town & Country Hotel
San Diego, CA

Co-Chairman:
Daniel E. Koshland, Jr., Ph.D.
Editor of Science

Co-Chairman:
Charles R. Cantor, Ph.D.
Director of Human Genome Center
Lawrence Berkeley Laboratory

PROGRAM

KEYNOTE ADDRESSES

Opening Welcome:
Richard Atkinson, President, American Association for the Advancement of Science.
Role of the Meeting:
Charles Cantor, Director, Human Genome Center, Lawrence Berkeley Laboratory.

CURRENT STATUS OF THE GENOME PROJECT

THE GENETIC MAP: Raymond White, Howard Hughes Medical Institute, University of Utah.
RESTRICTION MAPS: Cassandra Smith, University of California, Berkeley.
CLONING: Ronald Davis, Stanford University School of Medicine.
ORDERED LIBRARIES: Sydney Brenner, MRC Molecular Genetics Unit, Cambridge, England.
APPLICATIONS: Thomas Caskey, Howard Hughes Medical Institute, Baylor College of Medicine.
SOCIETAL IMPLICATIONS: Daniel Koshland, University of California, Berkeley.

TECHNIQUE INNOVATIONS

PCR OF SINGLE SPERM: Norman Arnheim, Ahmanson Center for Biological Research, University of Southern California.
SEQUENCING METHODS: George Church, Harvard Medical School.
DNA CLEAVAGE: Peter Dervan, California Institute of Technology.
RADIATION HYBRIDS: David Cox, University of California, San Francisco.
IN SITU HIBRIDIZATION: Jeanne Lawrence, University of Massachusetts Medical Center.
RAPID MAPPING: Glen Evans, Salk Institute.

INTERESTING REGIONS

CYSTIC FIBROSIS: Francis Collins, Howard Hughes Medical Institute, University of Michigan Medical Center.
TELOMERES: Robert Moyzis, Los Alamos National Laboratory.
IMMUNOGLOBULINS: Tasuku Honjo, Kyoto University Faculty of Medicine.
IMMUNOGLOBULINS: Hans Zachau, Institute for Physiological Chemistry, University of Munich.
T-CELL RECEPTORS: Leroy Hood, NSF Science and Technology Center for Biotechnology, California Institute of Technology.
FRAGILE X: Jean-Louis Mandel, Institut de Chimie Biologique, Strasbourg.

APPLICATIONS

HUMAN EVOLUTION: Allen Wilson, University of California, Berkeley.
MULTIGENE DISEASES: Eric Lander, Whitehead Institute for Biomedical Research, Cambridge, Massachusetts.
HUMAN DIVERSITY: Jean Dausset, Human Polymorphism Study Center (CEPH).
SEX DETERMINATION: David Page, Whitehead Institute for Biomedical Research.
UNSTABLE SEQUENCES: Michio Oishi, University of Tokyo.
INTERPRETING SEQUENCE: Russell Doolittle, University of California, San Diego.

ORGANIZATION – DIFFERENT VIEWS OF CURRENT AND FUTURE SCIENCE AND PROCEDURES

HUGO: Victor McKusick, Johns Hopkins University School of Medicine; President, The Human Genome Organisation (HUGO).
NIH: James Watson, Cold Spring Harbor Laboratory; NIH Human Genome Project.
DOE: Charles Cantor, Human Genome Center, Lawrence Berkeley Laboratory.
EEC: Peter Pearson, Johns Hopkins University School of Medicine.
JAPAN: Nobuyoshi Shimizu, Keio University School of Medicine.
INFOMATICS: David Lipman, National Library of Medicine.
OVERVIEW: Renato Dulbecco, Salk Institute.

POSTER SESSIONS AND EXHIBITS

Registrants of the meeting may submit abstracts for poster sessions by requesting abstract forms on the registration tear off below. Exhibits will be open to all attendees and interested researchers Monday, Tuesday and Wednesday.

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- Ca and Ca Channels
- Ca-Dependent Enzymes
- Cellular Mechanisms Underlying LTP and Excitotoxicity
- Excitatory Amino Acids and Ischaemic Damage

SPEAKERS

P. Andersen *(Oslo, Norway)*, K. Beam *(Fort Collins, CO)*, D.W. Choi *(Standord, CA)*, T. Curran *(Nutley, NJ)*, B.A. Engelsen *(Bergen, Norway)*, M. Favaron *(Washington, DC)*, C. Fieschi *(Rome, Italy)*, D.R. Grayson *(Washington, DC)*, I. Hanbauer *(Bethesda, MD)*, K.P. Huang *(Bethesda, MD)*, C.B. Klee *(Bethesda, MD)*, A. Leon *(Abano Terme, Italy)*, R.R. Llinas *(New York, NY)*, G. Lynch *(Irvine, CA)*, H. Manev *(Washington, DC)*, C. Manni *(Rome, Italy)*, M. Morad *(Philadelphia, PA)*, F. Moroni *(Florence, Italy)*, T. Pozzan *(Padua, Italy)*, R. Siman *(Wilmington, DE)*, R. Simon *(San Francisco, CA)*, K. Suzuki *(Tokyo, Japan)*, R.K.S. Wong *(New York, NY)*, P.L. Wood *(St. Louis, MO)*, G.N. Woodruff *(Harlow, UK)*

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The registration fee is US $175 ($75 for students and postdoctoral fellows). There will be no charge for press. Fee entitles participants to the printed materials of the symposium, working lunches on October 27 and 28, a wine and cheese reception on October 26, and a dinner party on October 28.

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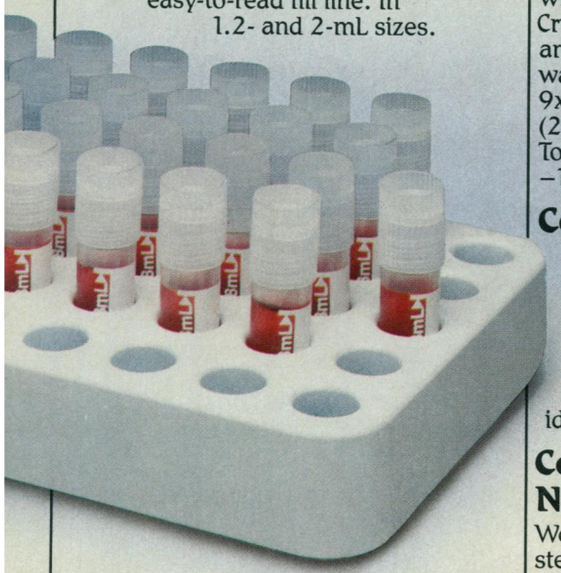

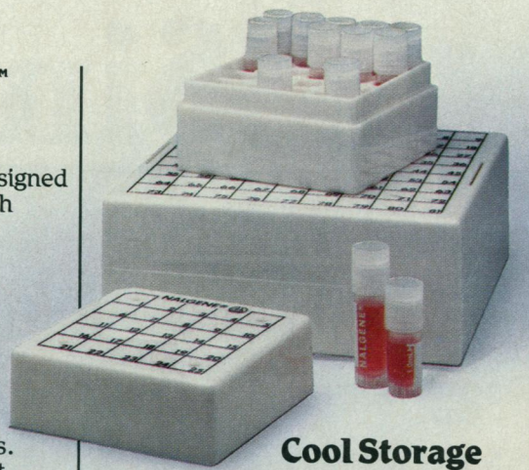

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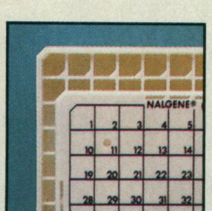

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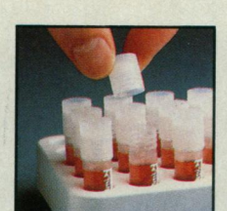
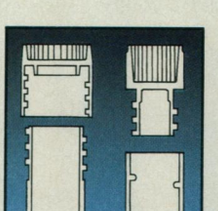
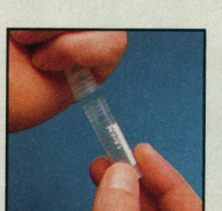


All-plastic Nalgene Cryovial Holder locks Nalgene Cryovials firmly in place for single-handed opening of closures.



Outside thread design on Nalgene Cryovial (left) reduces possible sample contamination. Inside thread of conventional vial (right) increases contamination risk and sample hang-up.



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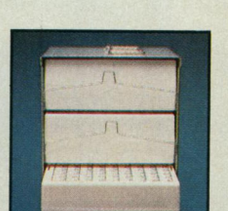

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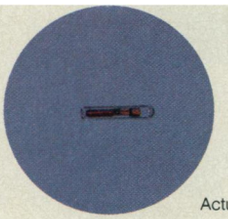

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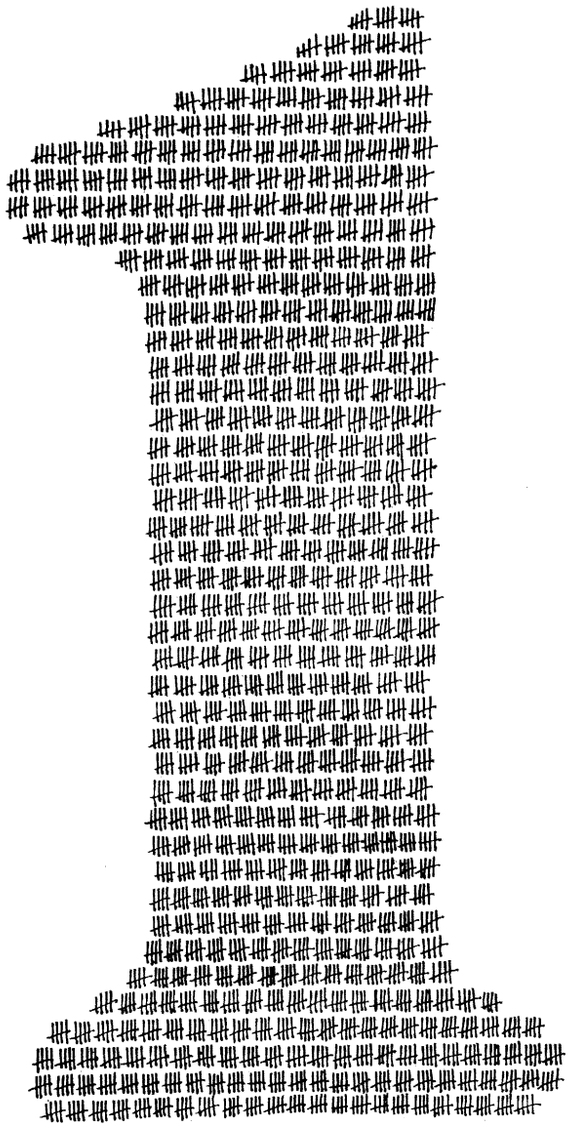
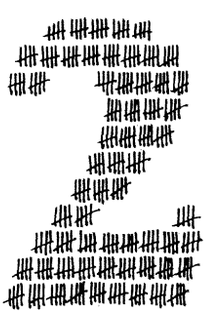


SCIENCE has 153,192* good reasons for being number one.



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Some Other Books of Interest

Insect Pheromones in Plant Protection. A. R. JUSTUM and R. F. S. GORDON, Eds. Wiley-Interscience, New York, 1989. xvi, 369 pp. $95.

Advertised as a "technocommercial review," this book, John Kennedy writes in the foreword, "chronicles—and in effect celebrates" the fact that "we have now passed the point where the practical, commercial feasibility of using pheromones to control insect pests could still be doubted." Although predicting that pheromones will never "sweep the board as did the insecticides," Kennedy notes that they provide an "object lesson" showing how "the development of new pest management techniques . . . is going to need a much larger *scientific content* than in the past." An introduction by the editors and a background chapter on pheromones and insect behavior open the book. There follow chapters on the monitoring of pest insects and the timing of treatment and on mass trapping of pests and disruption of mating, especially in the pink bollworm, *Pectinophora gossypiella*, through the use of pheromones. Another group of chapters is concerned with methods of commercial production and application, the latter including plastic laminate dispensers, hollow-fiber controlled release systems, and microcapsules. A final section, headed Commercialization and the Future, includes a discussion of the development and marketing of pheromones based on the experience of ICI Agrochemicals with *Pectinophora gossypiella* in Egypt, an outline of procedures involved in registration of pheromones with regulatory agencies, and a consideration of factors involved in their practical adoption. An "epilogue" by the editors, followed by species and subject indexes, closes the book.—**K.L.**

Crop Safeners for Herbicides. Development, Uses, and Mechanisms of Action. KRITON K. HATZIOS and ROBERT E. HOAGLAND, Eds. Academic Press, San Diego, CA, 1988. xiv, 400 pp., illus. $69.95.

Crop safeners, also known as herbicide safeners, herbicide antidotes, or crop protectants, are chemical agents used to manipulate the tolerance of crop plants to herbicides used for weed control. This volume, according to the editors, is the first overview of the subject in book form since 1978. Twenty-four authors from North America, Japan, Hungary, Switzerland, and Israel have contributed. In part 1 Hatzios discusses the development of safeners from the 1940s to the present and Matsunaka and Wakabayashi report on their use in Japan. Part 2 is devoted to their mechanisms of action, beginning with a general discussion by Hatzios and including consideration of herbicide effects on metabolism, enzyme activity, and terpenoid biosynthesis, the action of dichloroacetamide and thiazole safeners, and protection of grasses against acetanilide, sulfonylurea, and imidazolinone herbicides. Part 3 discusses "alternative approaches," including the use of activated carbon and other adsorbents, controlled release agents, growth regulators and fungicides, microbial agents, and potentially more selective safeners ("prosafeners"). A summary ("progress and prospects") by the editors, an appendix listing common or code names of agrochemicals mentioned in the text, and a 21-page subject index conclude the volume.—**K.L.**