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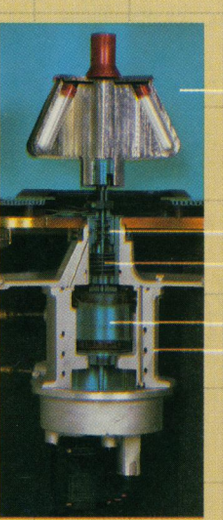

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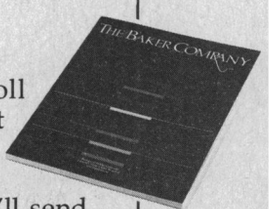

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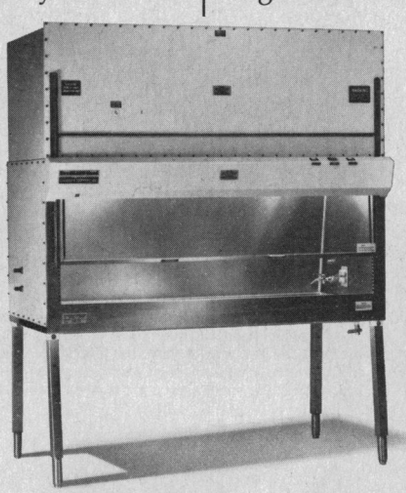

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SCIENCE

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COVER Aerial view of the meteorological tower and the canopy of the oak-hickory forest at Walker Branch Watershed, Tennessee. The large surface area of the forest vegetation results in significant interception of atmospheric particles and vapors. This material contributes to both the nutrient needs and the pollutant load of the forest. See page 141. [R. R. Turner and S. E. Lindberg, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831]

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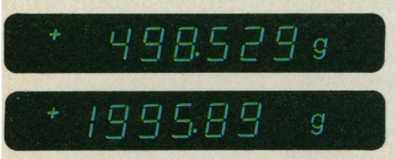

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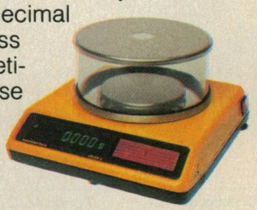

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Mass extinctions

RULES that govern longevity of groups of marine organisms during "normal" times do not apply during mass extinctions (page 129). Jablonski proposes that there is an alternation of evolutionary regimes. During mass extinctions, survival of groups is not related to their previous success. The composition of the biota is shifted in directions that could not have been predicted; traits heretofore unimportant to evolutionary patterns become highly influential to survivorship and extinction.

Nutrient and acid deposition in a forest

AIRBORNE particles and vapors bring essential nutrients as well as pollutants to a forest (cover) in Tennessee (page 141). Lindberg *et al.* analyzed chemical species in the atmosphere, in the forest canopy, and on the ground. Sampling provided a picture of ion sources and ion dispersal in the forest. Some ions were more commonly introduced by dry deposition, and others by rain and snow. Most originated from outside the forest, but some were resuspended from leaf surfaces or leached from the leaf interiors to cycle within the forest itself. The canopy retains certain ions by ion exchange or buffering. As the ecosystem continues to change in response to the introduction of airborne pollutants, new data can be compared to these contemporary values.

Magic bullets containing daunomycin

TARGETED immune suppression holds promise for treating problems associated with graft rejection and autoimmune, immunoregulatory, and neoplastic diseases in which immune responses contribute to pathology (page 148). Diener *et al.* achieved such immunosuppression in culture and in mice with "magic bullets" containing a molecule that directs the conjugate to specific cells; an antibiotic, duanomycin, that kills mammalian cells; and an acid-sensitive spacer that links the pieces together. The conjugates remain stable until exposed to acidic conditions like those found inside a target cell. Then, conjugates split to release daunomycin. It can intercalate into cellular DNA and inhibit proper functioning of the cellular machinery. Immunosuppression was achieved with antigens and with an antibody to a subpopulation of lymphocytes as the targeting compounds. The potential range of such magic bullets extends from killing single clones of antibody-producing cells to killing entire subsets of cells.

Malaria antigenicity

GAMBIAN children recovering from *Plasmodium falciparum* malaria develop isolate-specific antibodies that generally react only with their own parasite-infected red blood cells; Gambian adults have antibodies that react with infected cells from most of the children (page 150). Marsh and Howard speculate that "shared" antigens are inserted in the red cell membranes by all isolates for common functions (cytoadherence, an immune evasion tactic of infected cells, and metabolite transport) and that it is these antigens that are recognized by adult sera. The susceptibility of children to reinfection may be a consequence of the antigenic diversity since children mount only isolate-specific immune responses. Immunity in adults may derive from the ability to respond immunologically to conserved antigens on the red cell surface. Antigens shared by many isolates will be targets of vaccination programs.

Platelets and CRP in schistosomiasis

PLATELETS and C-reactive protein (CRP) contribute resistance in rats to schistosomiasis (page 153). Because of this natural resistance, rats have been used as models to study schistosomiasis and to experiment with control and prevention strategies. Over 200 million people have this chronic debilitating infection that is acquired by contact with water contaminated with infective parasites. Organisms penetrate the skin, develop first to immature worms (schistosomula), and then to mature worms that reside in pairs in the liver and mesenteric veins where they produce eggs for years. The eggs are excreted and mature to a form that lives in snails. Eventually snails release infective forms into the water and the infection in humans can be reinitiated. Bout *et al.* found that the liver protein CRP peaks in rat serum 4 weeks after an infection—just when rats naturally reject immature worms. Schistosomula in culture could be killed by CRP in combination with platelets from normal rats. The CRP-treated platelets transfused into normal rats protected them from subsequent infections. It may be possible to amplify CRP, which is also elevated in rheumatoid arthritis and other inflammatory conditions, in infected individuals to enhance protection against schistosomula.

Structure of TRH precursor

THE structure of the thyrotropin-releasing hormone (TRH) precursor has been determined (page 159). TRH is a small brain neuropeptide that participates in interactions among the hypothalamus, pituitary, and thyroid glands. Lechan *et al.* used hybridization and histochemical techniques to define regions of the hypothalamus in which the precursor was made. The complete sequence of the large precursor was deduced; it contains five copies of TRH and perhaps seven other neuropeptides. The presence of several copies of a hormone on a single precursor may be an important physiologic mechanism for amplifying hormone activity and effectiveness: the amphibian TRH precursor also contains multiple copies of the active peptide, showing that the pattern has been conserved in evolution.

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VOLUME 231
NUMBER 4734

Planet Earth

A new public television series, "Planet Earth," will premier on Wednesday, 22 January. A total of seven 1-hour episodes, to be shown at weekly intervals, will portray the tremendous advances that have occurred in earth and planetary science. Geologists and geophysicists who have seen the films are high in their praise of the series. And well they may be, for the authenticity of the content was intensively monitored by committees of the National Academy of Sciences. Nearly 100 of the nation's leading earth scientists participated in vetting the material. But there is more than authenticity in the series. There are high-quality entertainment and educational values for viewers from all walks of life. During the past 30 years, a revolution has occurred in earth science, made possible by new tools for exploration of the solid earth, the ocean depths, the atmosphere, the planets, and the sun. The studies have created knowledge. They have also provided marvelous photo opportunities. WQED in Pittsburgh has chosen from among many existing film clips and has made others to produce an informative series of pictures that accompany a well-judged narrative.

The titles of the seven episodes are The Living Machine, The Blue Planet, The Climate Puzzle, Tales from Other Worlds, The Solar Sea, Gifts from the Earth, and Fate of the Earth. These titles do not always well convey the content. The Living Machine might better have been called The Restless Earth, for it deals with the history of the earth, plate tectonics, and related volcanism and earthquakes. The Blue Planet might have been called Oceanography, but that would not have conveyed the excitement of exploration of the ocean deeps. Tales from Other Worlds deals with lunar and planetary exploration and meteorite impacts. It includes a summary of highlights of the space effort and reviews recent findings relating to the Cretaceous-Tertiary extinctions.

The film that will be shown on 22 January, The Living Earth, provides historical background before dealing with the recent findings. It tells of Hutton's late 18th-century observations that created the foundation for field geology. It also treats of Wegener's pioneering evidence for continental drift, set forth early in the 20th century. Then it describes the more recent work involving mapping of the Mid-Atlantic Ridge. Subsequently, magnetic observations on dated terrestrial basalts showed that the polarity of the earth's magnetic field reverses from time to time. Measurements made on mid-ocean basalts showed corresponding magnetic reversals at different distances from the Mid-Atlantic Ridge. These observations constituted conclusive evidence of sea-floor spreading. As a first episode in the seven-part series, The Living Earth is a particularly good starter. Its educational values are reinforced by its pictures. Volcanism and earthquakes provide marvelous photo opportunities that dramatize the violence and power of nature.

Creating a seven-part television series is an expensive undertaking. The costs were in excess of $4 million. That kind of money is not easily available for a science-based series. When "Planet Earth" is shown it will represent the culmination of efforts that began in 1979. The key enthusiast and idea man for the project was the late Hugh Odishaw, who was then dean of the College of Earth Sciences at the University of Arizona. Odishaw had been director of American endeavors for the International Geophysical Year (IGY) in 1957–1958. He was impressed with the many discoveries that had occurred since IGY and felt that the earth sciences had dramatic stories to convey to the public. Through enthusiastic salesmanship and sheer persistence, Odishaw lined up the sponsorship of six major scientific organizations, including the National Academy of Sciences, six relevant government agencies, and three foundations. These contributed more prestige than money, but their support in the early phases enabled Odishaw to develop further the feasibility of a "Planet Earth" series. Knowing of WQED's reputation and production expertise, he contacted WQED's executive vice president, Thomas Skinner, who recognized the potential of the theme and began working with Odishaw to develop the series. The major financing included $3 million from the Annenberg–CPB Project and $1 million from IBM.

One of the by-products of the "Planet Earth" series is a major hardcover book by the same name. This high-quality publication, which is a January selection of the Book-of-the-Month-Club, covers much of the content of the television series. It can be read with interest by scientists and the lay public.—PHILIP H. ABELSON

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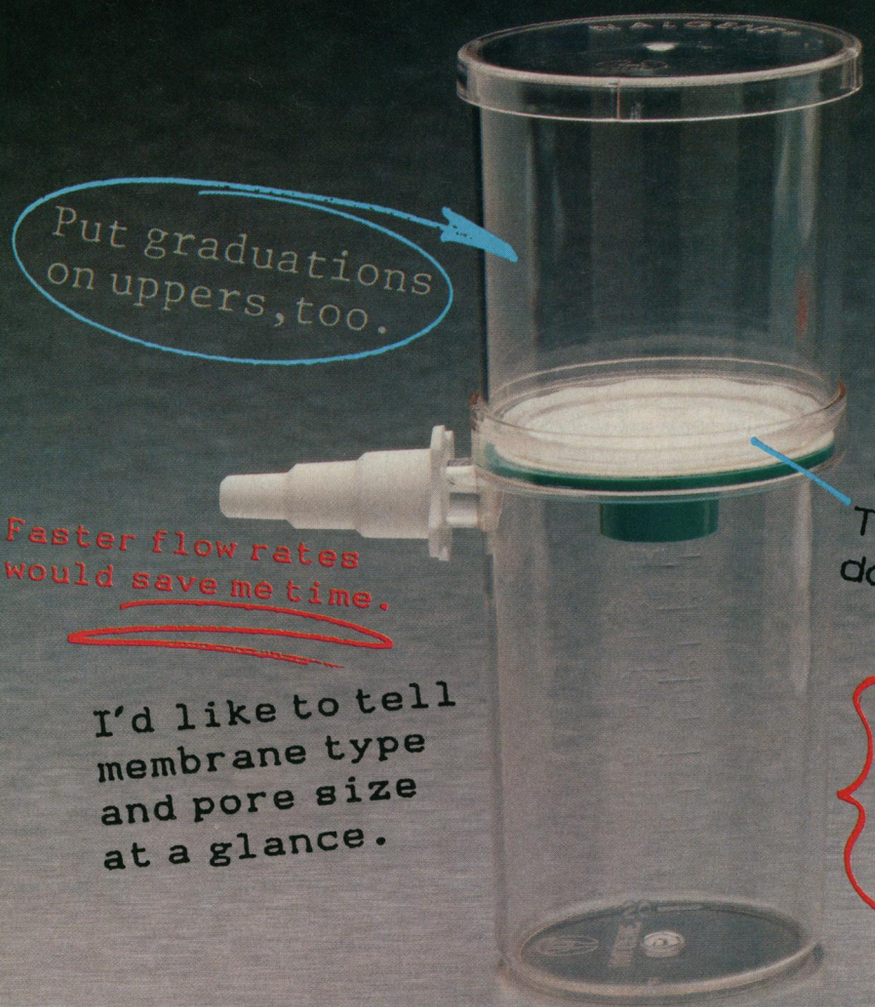

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SYSTEMS and RESOURCES – Lewis Gevantman, National Bureau of Standards
This session will present examples of computer systems and developments related to and supporting biotechnology. Speakers will include Professor Carver Mead (CalTech), Professor David Mount (Arizona State), Richard Feldmann (NIH), Dr. Kevin Ulmer (CARB), Dr. Charlotte Hollister (BBN), and Dr. Dennis Smith (Intellicorp).

APPLICATIONS IN AGRICULTURAL BIOTECHNOLOGY – Joseph Modelevsky, International Minerals and Chemicals
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Development and Evolution of Perfusion Culture Systems and Static Maintenance Systems for Large Scale Production of Mammalian Cell Derived Products: W. Tolbert and C.V. Benton, Invitron, Clayton, MO.

Multiple Approaches to Protein Purification Using Solid Phase Interaction on Silica Based Bonded Phases: L.J. Crane, J.T. Baker Company, Phillipsburg, NJ.

POSTER SESSIONS – EXHIBITS

Synthetic DNA: Application of Robotics to the Purification of Oligonucleotides: S.S. Jones, J.E. Brown, D. Stone and E.L. Brown, Genetics Institute, Cambridge, MA.

Preparative High Performance Liquid Chromatography of Proteins: L. Beadling, C. Mason and G. Sofer. Pharmacia, Inc., Piscataway, NJ.

Ultrafiltration Processes for the Purification of the Enzyme Alkaline Phosphatase: C.S. Slater, H.C. Hollein, T.G. Hugguns, Jr., and C.A. Brooks III, Manhattan College, Riverdale, NY.

AFTERNOON SESSIONS – Thursday, January 30, 1986

Cell Culture on Porous Microcarrier Particles: A.F. Steuer and F. Cahn, Biotech Research Laboratories, Inc., Rockville, MD.
I.V. Yannas, Massachusetts Institute of Technology, Cambridge, MA.

L-Asparaginase from "Erwinia Cartovara": An Improved Recovery and Purification Process Using Affinity Chromatography: S. Lee, M.H. Wroble, J.T. Ross, G.M. Muschik and W.B. Lebherz III, National Cancer Institute – Frederick Cancer Research Facility, Frederick, MD.

Proteolytic Enzyme Removal by Zeta-Affinity Cartridge: K.C. Hou, AMF Specialty materials group, Meriden, CT.

Optimal Control of Temperature and Enzyme Feed Rate in Simultaneous Batch Saccharification and Fermentation: J.L. Spencer, W.H. Sun and J.A. Assenjo, Columbia University, New York, NY.

MORNING SESSIONS – Friday, January 31, 1986

Factors Influencing Monoclonal Antibody Production in Mouse Ascites Fluid: J.P. Chandler, Charles River Biotechnical Services, Inc., Wilmington, MA.

Study of High Immunoglobulin Productivity in Immobilized Hybridoma Cultures: N.G. Ray, Verax Corporation, Hanover, NH.

Hybridoma Data Bank: A New Resource: L. Blaine, American Type Culture Collection, Rockville, MD.

Buying and Selling Biotechnology Equipment, Supplies and Chemicals: W.J. Carik, The Salk Institute, San Diego, CA.

Optimization Strategies for Increasing Production of Monoclonal Antibodies in Hollow-Fiber Bioreactors: M. Tyo and M. Gruenberg, Endotronics, Inc., Coon Rapids, MN.

Production and Concentration of Monoclonal Antibodies Using the Opticell™ Culture System: J.E. Putnam, G.G. Pugh and L.A. Noll, KC Biological, Lenexa, KS.

Disposable Fermenters for Mammalian Cell Cultures – Cellift™: H. Founds and M. Young, Ventrex, Portland, ME.

CLOSING REMARKS.

POSTER SESSIONS:

Participants are invited to submit abstracts for the poster sessions. These abstracts will be reviewed up until the time of the meeting.
Contact Edward Ruffing, Scherago Associates, Inc. (212) 730-1050.

Registration Fee: $300.00
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