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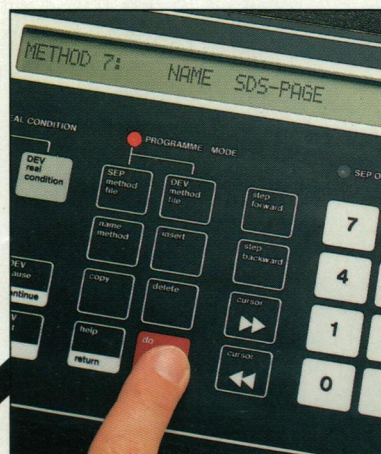
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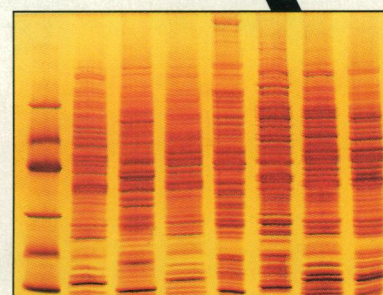
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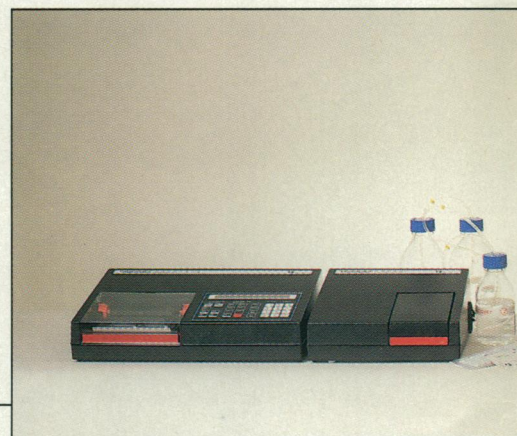
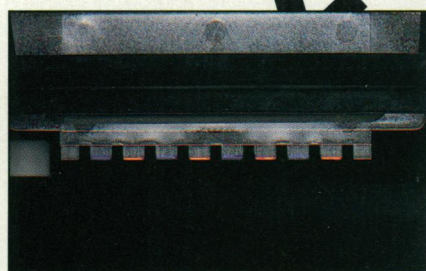
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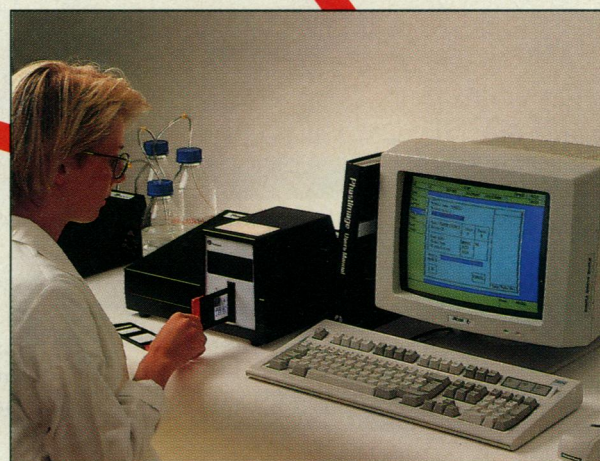


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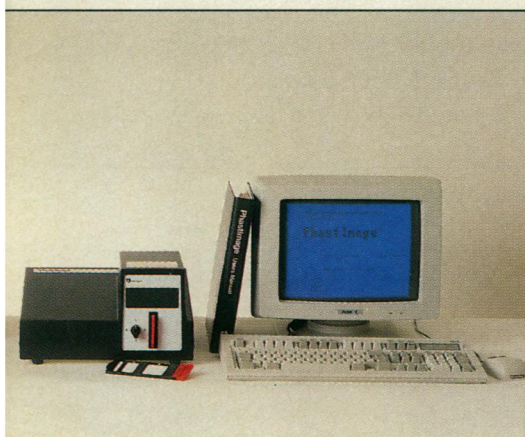
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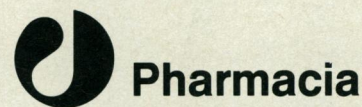
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COVER The hoatzin, *Opisthocomus hoazin*, a neotropical leaf-eating bird, is the only bird known to have ruminant-like foregut fermentation. This unexpected digestive system in a small flying endotherm provides new insights into theoretical size limitations in vertebrate herbivores and the evolution of foregut fermentation as a digestive strategy. See page 1236. [Photograph by Stuart D. Strahl, WCI—New York Zoological Society]

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This Week in SCIENCE

Whose data?

CRYSTALLOGRAPHERS are trying to hammer out an equitable policy on data release that will be fair to both an investigator who solves the crystal structure of a protein or nucleic acid and to others interested in using the data (page 1179). When a molecule's three-dimensional structure is solved, only the deduced structure is reported in the literature; the primary results, the three-dimensional coordinates for each atom in the molecule, are supposed to be deposited in the Brookhaven Protein Data Bank from which they can be obtained by other researchers. However, as reported by Barinaga, not everyone faithfully deposits data in the data bank; some omissions are intentional, for personal or commercial reasons, while others are oversights. Therefore, the development of a uniform policy that establishes what is a reasonable amount of time for the original researcher to work with data before sharing it will not be enough; it will also be necessary to determine who—individuals, journal editors, data bank personnel, or organizations—might be involved in enforcing compliance with the policy.

Moon meteorites

A phenomenal amount of information about the origins and histories of lunar meteorites has been obtained and inferred from analyses of noble gas isotopes trapped in such meteorites (page 1197). Eugster describes five lunar meteorites that are estimated to have landed on the Antarctic ice sheet some 70,000 to 170,000 years ago. The meteorites range in size from less than 50 to more than 600 grams; they were propelled into space by large comets or asteroids that hit the moon. For the meteorites to escape from the moon's gravitational field, the asteroids should have had diameters greater than 100 meters. Three of the lunar meteorites spent 5 to 11 million years traveling to the earth and may be pieces of the same falling rock; the other two traveled much faster and arrived at

the earth in less than 300,000 years. Studies of these lunar meteorites and of the rocks that were brought back to the earth during the Apollo and Luna missions have led to a richer understanding of the chemical composition of the lunar crust.

The Saturn system

NEW images of Saturn and its rings, at unprecedented resolutions, have been obtained from radio interferometric observations at the Very Large Array in New Mexico (page 1211). Astronomers can now study variations in brightness associated with the planet and with the rings. Grossman *et al.* use atmospheric models and the microwave maps to illustrate how temperature and ammonia concentration vary with latitude and affect the brightness of Saturn's atmosphere: there is a slight warming from the equator to the poles and, in the planet's northern mid-latitude, the most profound depletion of ammonia (indicated by a bright zone) was noted. From these data, inferences can be made about the sizes of the particles in each of the rings and about how the rings scatter the microwave thermal emissions from the planet and polarize the scattered radiation. As the limits of resolution and sensitivity have been reached for Earth-based radio observations, deeper probing into the natures of Saturn's atmosphere and rings will depend on future missions to Saturn.

Foregut fermentation

HOATZINS (cover) are exotic clawed birds that have been nicknamed "stinkbirds" because they smell like fresh cow manure. Their unpleasant odor is the result of an active fermentation process that is occurring in their foreguts (page 1236). Two gut structures, the crop and esophagus, serve hoatzins much as do the rumens of cows: in these organs, symbiotic bacteria ferment fibrous plant materials and produce volatile fatty acids, which are important energy sources.

Grajal *et al.* found that hoatzins of north-central Venezuela preferred high quality (water-rich and protein-rich) foods, specifically the new leaves of certain types of plants. Anatomic trade-offs that occurred to make foregut fermentation possible may account for some of the hoatzins' behavioral peculiarities; for example, they are not facile flyers, perhaps because the space taken up by their fermentation structures left little room for the attachment of flight muscles. Because foregut fermentation was previously believed to be confined to mammals, this discovery will alter theories of how and why this form of digestion has evolved.

Proteins of diapedesis

NEUTROPHILS, which are immune cells that circulate through the bloodstream, can respond rapidly to inflammation. They sense where infections have occurred, become activated, and quickly pass through the blood vessel wall into inflamed tissues. Adhesion molecules on the neutrophil interact with other molecules on the surfaces of vessel wall cells; the neutrophils first attach to and then pass through the wall in a process called diapedesis. Two neutrophil adhesion molecules—Mac-1 and gp100^{MEL-14}—appear to be coordinately and inversely regulated (page 1238): when neutrophils are activated, gp100^{MEL-14} molecules are shed from the surface and the expression of Mac-1 molecules is increased. Similar kinetics govern upregulation of Mac-1, downregulation of gp100^{MEL-14}, and the overall timing of the diapedesis process, which is thought to be complete within 10 minutes of the first interaction of cell with vessel wall. Kishimoto *et al.* speculate that, because unactivated neutrophils adhere to endothelial walls through gp100^{MEL-14}, the shedding of gp100^{MEL-14} may prevent released neutrophils from entering normal tissues and damaging them; when the functioning of Mac-1 molecules is enhanced, they and other "integrins" facilitate passage of the neutrophil to sites of inflammation.

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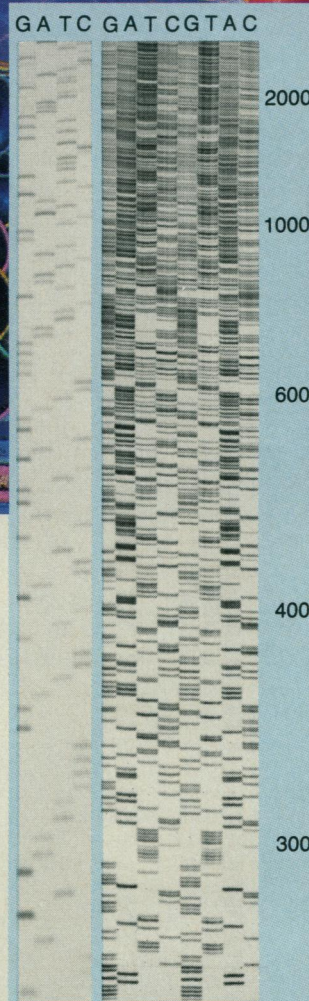


FIGURE 1. FIGURE 2.

Figure 1.
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Figure 2.
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The Human-Voyager 2 Collaboration

The successful Grand Tour of the outer planets by Voyager 2 represents one of humanity's great achievements. The splendid outcome* of the mission carried out in forbidding and hostile environments was due to exemplary exercise of imagination, ingenuity, careful design, and a high level of human-machine operational interaction. An essential ingredient was excellent engineering capability at the Jet Propulsion Laboratory (JPL) that had been nurtured by earlier Mariner missions to the inner planets. Vidicon TV cameras developed for those flights had proved their utility and dependability. Instruments used in science experiments had also been successfully flown. Perhaps most important was experience gained in long-distance human-computer interaction that permitted response to glitches that too often arise in electronic equipment exposed to the rigors of space.

Voyager, though light in weight, had features that facilitated coping with many contingencies. In the 1800-pound spacecraft were six computers, eleven different science instrument packages, ²³⁸Pu thermoelectric generators furnishing about 400 watts of power, attitude-controlling devices, propellant for mid-course maneuvers and attitude control, two radios for sending information, and two for receiving it. Redundancy in the computers and radio receivers was later to prove crucial.

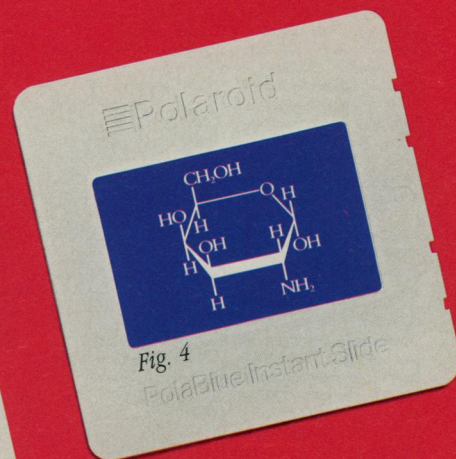
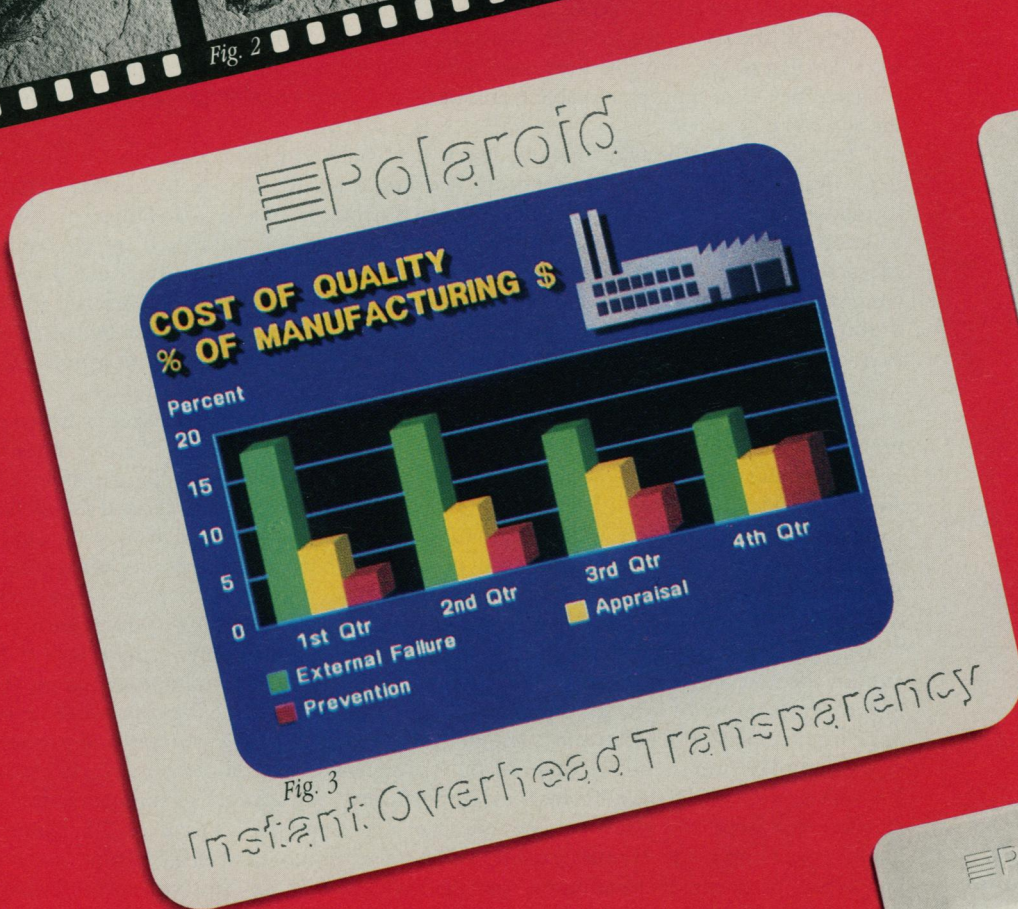
Two of the six computers were devoted to attitude control in three dimensions. Two were devoted to the scientific instrumentation. The remaining two were the brains of the vehicle. They were reprogrammable from Earth and could control the various functions of the spacecraft.

Less than 8 months after blast-off, defects that could have ruined the mission developed in the two radio receivers. One went dead. The second was found to be "tone-deaf." That is, it could not cope with the variations in frequency arising from a variable Doppler effect. In addition, the frequency that the receiver could recognize was influenced by temperature effects as small as 0.25°C. The JPL engineers diagnosed the problems and prepared computer tapes that slowly varied the sending frequency to compensate exactly for the disturbing effects. This restored good communication with Voyager. More than 11 years later, the receiver is still tone-deaf, but it can recognize the signals coming to it from Earth more than 4 light-hours away.

The Voyager 2 mission was one of the few times that a major space effort exceeded the promises made for it. JPL had only promised exploration of Jupiter and Saturn. But even before reaching Saturn the Voyager 2 team was making plans and developing capabilities for encounters with Uranus and Neptune. The images obtained from Jupiter and its satellites had been well received by the public. It was desirable to obtain good and many images of the two outer planets despite the low intensity of sunlight on them. At Neptune, light intensity is only 1/900 that at Earth. To obtain good pictures at the outer planets required a comparatively long exposure. But the attitude of the spacecraft tends to drift, leading to blurring of the image. The engineers devised and tested a way of minimizing this drift and radioed the necessary instructions to Voyager 2. Steps were taken to improve reception of image signals on Earth through expanding the array of radio dishes. A major improvement came from employing a redundant computer on the spacecraft. The memory and processor of the computer were used to compress the TV signals. A special computer code enabled Voyager 2 to send back the differences in light intensity from adjacent picture elements. This in effect enhanced the rate of communication of images by a factor of 2.5. Another improvement applicable to small satellites being passed at more than 40,000 miles per hour was to pan the camera by rotating the spacecraft while passing by. Instructions for this were communicated to the spacecraft which later implemented them at the appropriate moment.

One is left with a deep admiration for the quality of teamwork between humans and the spacecraft though they are nearly 3 billion miles apart. The humans safe on Earth have been able to use facilities of equipment and consultation to devise programming techniques that have wrung from Voyager 2 performance that was not imagined at blast-off on 20 August 1977.—PHILIP H. ABELSON

*Results from Voyager's encounter with Neptune and Triton will be published in a future issue of *Science*.



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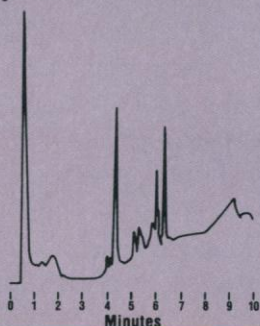
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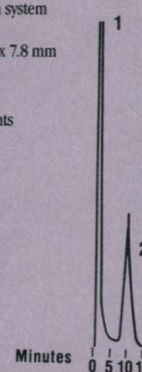
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certainly not with technical carelessness.

Incidentally, the weakness of the argument is exposed by the author himself. Publishing twice (1) pictures of purchased ammonoids as evidence, he stated without qualifications that they are "from the vicinity of Erfoud, Morocco." Thus, while I trusted the information coming from another scientist, Talent appears to have trusted the information coming from his shopkeeper—hardly a more cautious "approach to the primary facts."

To sum up, whistle-blowing seems to be in our days an urgent necessity. Whistle-blowing should, however, refrain from overzealous exaggerations that could easily harm the reputation of marginally involved, but basically innocent, persons.

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O'Toole's Charges

Margot O'Toole (Letters, 16 June, p. 1243) states that her charges against the paper by D. Weaver *et al.* (1) have not changed since the inception of the controversy over that paper. However, 3 years ago in a memorandum she wrote to me setting out her original charges, she took issue only with what she saw as "serious weaknesses" in the data presented in the paper and in their interpretation. In that paper, the authors attributed the high frequency of the idiotype-positive hybridomas derived from their transgenic mice to idiotype-positive immunoglobulins encoded by endogenous genes rather than by the transgene. O'Toole, on the other hand, appeared to believe "that the observed phenomena are best explained" by three other considerations: (i) an overlooked low-level expression of the transgene in many hybridomas from these mice; (ii) a high frequency of the idiotype-positive hybridomas from normal mice of the same strain; and (iii) heterodimer formation, involving disparate classes of immunoglobulin heavy chains, one from the transgene and the other from an endogenous gene.

In evaluating the dispute I examined the data in the published paper and discussed

them extensively with various colleagues. Yet O'Toole says in her letter that I "did not even look at data." It may be that this statement was made because I did not examine laboratory notebooks and O'Toole wishes to convey the impression that it is only through examination of data in the form of raw notebook entries that disagreements, like those in her original memorandum, can be evaluated. But the review of unedited laboratory notebooks is an enormous undertaking with major disruptive effects on the research activities of the laboratories under review. Though opinion may vary over when this drastic process should be applied, it seems reasonable to reserve it for situations where the charges made, such as fraud, are correspondingly drastic. Yet fraud was not suggested in O'Toole's original memorandum, and in response to direct questioning she emphatically denied making such a charge.

Although in the beginning O'Toole focused entirely on disagreements with the authors' interpretations of what she regarded as weaknesses in their data, she has recently adopted the position that there were no data at all to support some of the published results, for example, that certain hybridomas had not been "subcloned."



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To state, as she now does, that her charges have not changed from the beginning is clearly incorrect. In referring to O'Toole's shifting charges as a "moving target," Barbara J. Culliton's report (News & Comment, 19 May, p.765) got it just right.

HERMAN N. EISEN
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Caldera Unrest

Richard A. Kerr's article "Good news for volcano watchers" (Research News, 21 July, p. 255) calls welcome attention to our recently completed review of unrest at large calderas of the world (1). However, several of our conclusions are quite different from those noted. (i) The statement that "something is stirring beneath Mammoth Mountain, California, and hardly anyone seems to care" does not apply to the U.S. Geological Survey, or to our colleagues in the state of

California, or to the officials and residents of the area with whom we work. Those who are responsible for monitoring Mammoth Mountain and the Long Valley caldera continue their careful surveillance, and we continue to look for lessons from elsewhere that might apply to Long Valley. (ii) Although we concluded that caldera unrest is common, has many origins, and frequently ends without eruption, we also stated that "The outcome of a specific episode of unrest cannot and should not be forecast solely on the basis of patterns of unrest at other calderas. . . ." The current swarm of small earthquakes beneath Mammoth Mountain, which postdates our review, reminds us that the final outcome of unrest at Long Valley is still uncertain. (iii) Lessons from history are different from those of geology, to be sure, but they are not contradictory, as Kerr implies. Geology records eruptions and a few long-lasting noneruptive processes, while contemporary monitoring records day-to-day and year-to-year, mostly noneruptive processes. History is a bridge between geology and monitoring, offering complementary lessons.

We hope our review will be a useful reference for scientists and citizens around the world who are faced with similar unrest

and that it tells the people of Mammoth Lakes that they are not alone. But we also hope that it will not be mistaken as reason to relax during such unrest. If anything, the knowledge that caldera unrest can have many origins and many outcomes makes the task of dealing with such unrest harder, not easier, for scientists, officials, and residents alike.

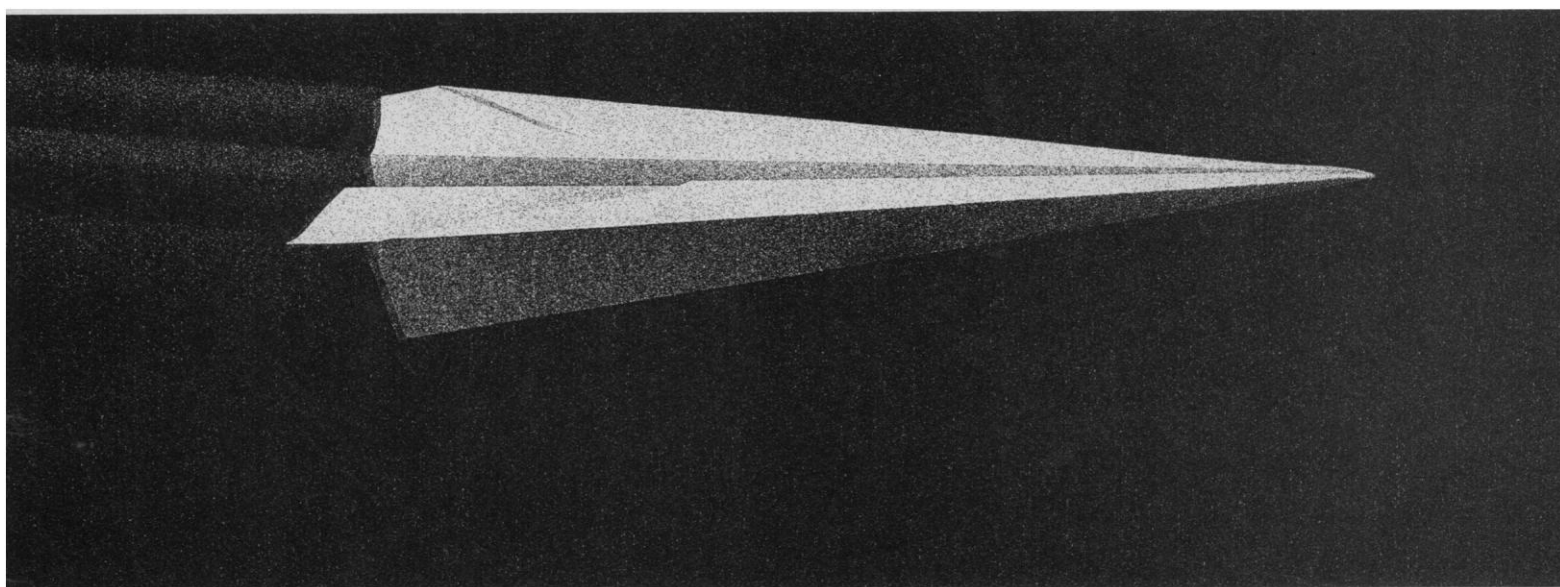
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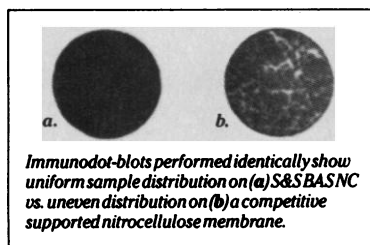
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Erratum: The caption of the photograph accompanying the article by David Dickson "Fetal tissue transplants win U.K. approval" (News & Comment, 4 Aug., p. 464) should have read, "Human fetal pancreas cells transplanted into mouse tissue will produce insulin."

Erratum: In Eliot Marshall's News & Comment article "Fallout from Pacific reaches Congress" (14 July, p. 123), Rongelap Atoll is described as "three-tenths of a square mile of sand and coconut palms." The atoll actually contains about 4 square miles of land surfaces. In addition, the lagoon encompassed by the atoll covers approximately 350 square miles.



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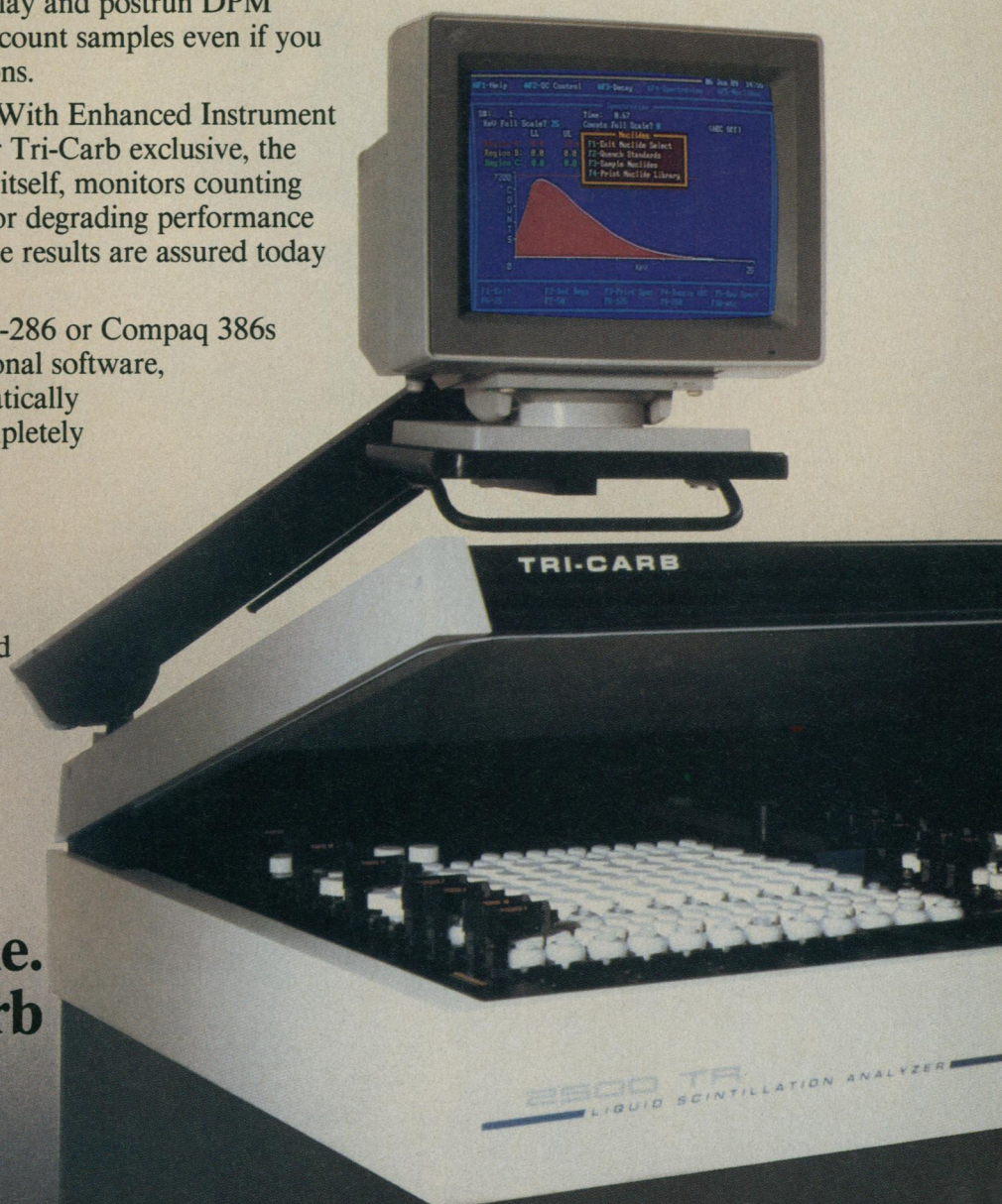
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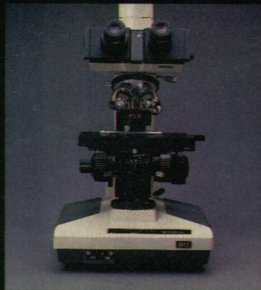
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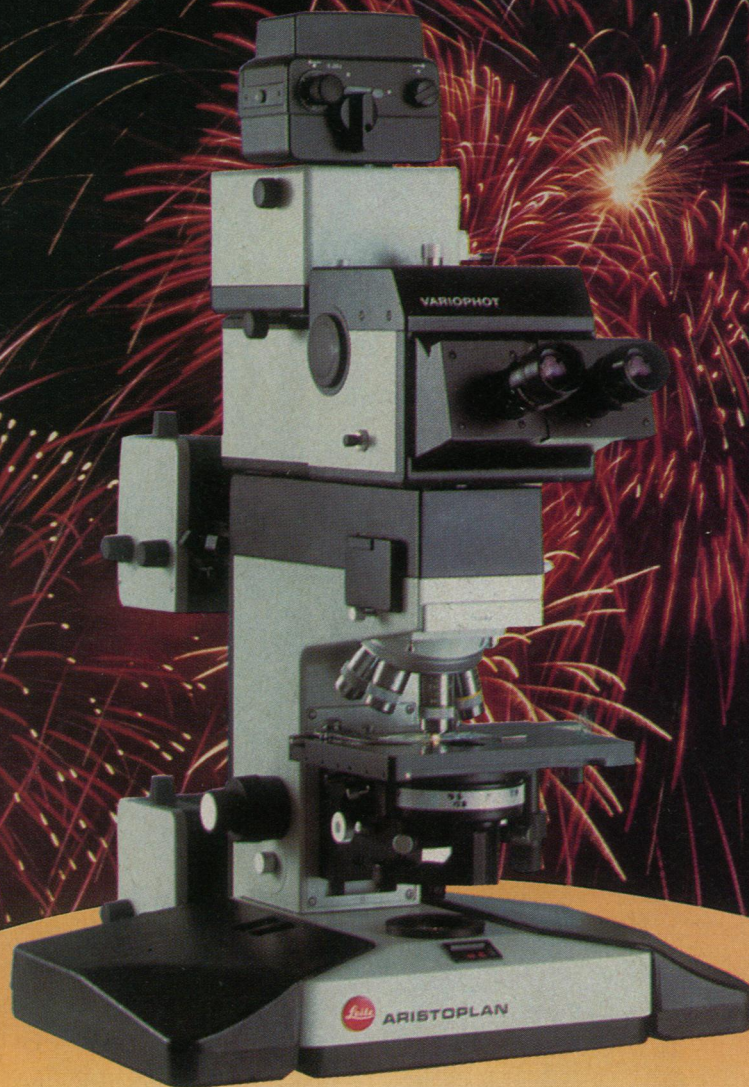


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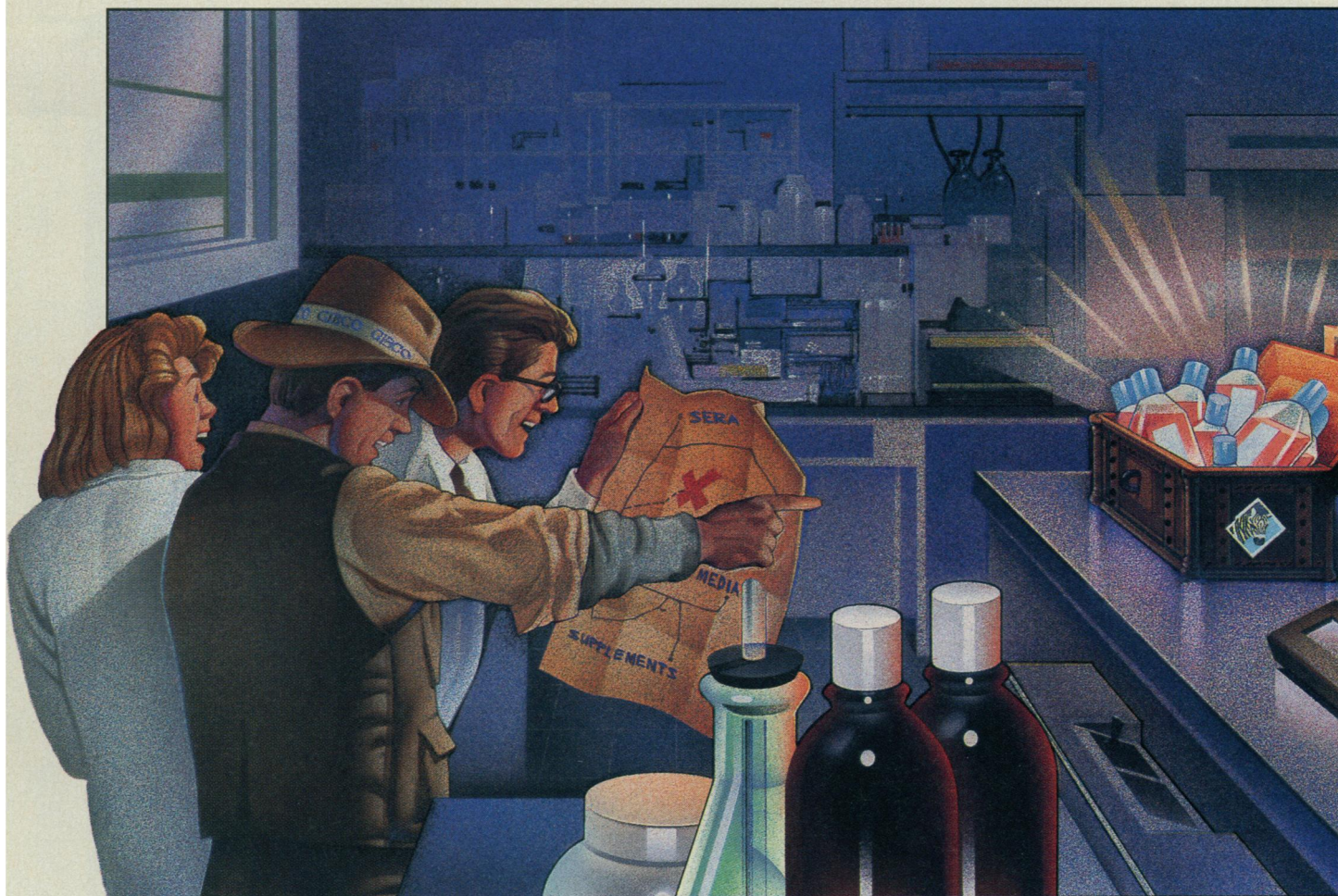
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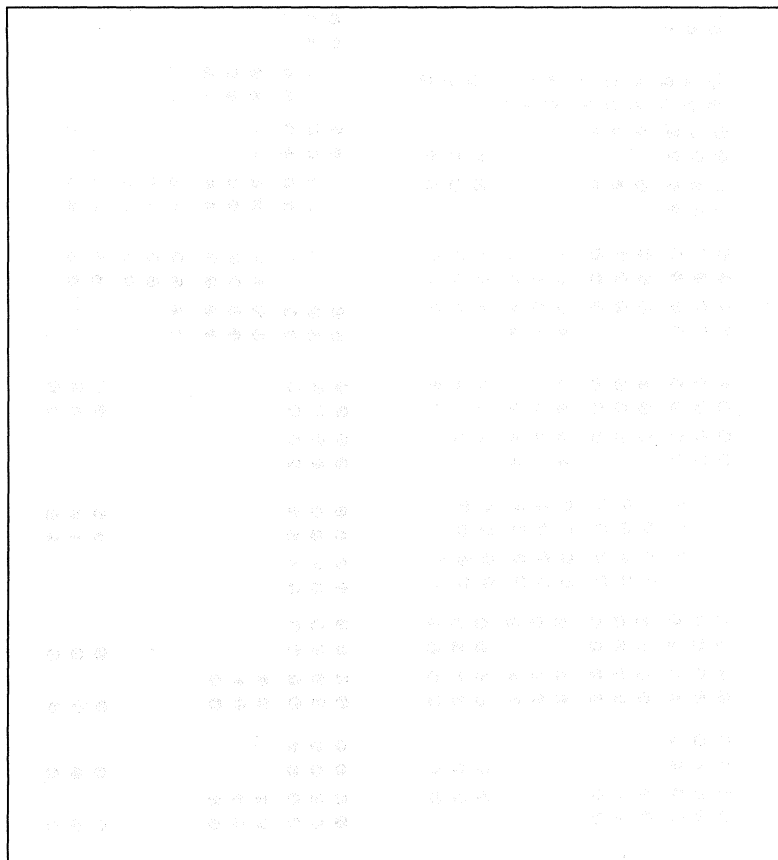
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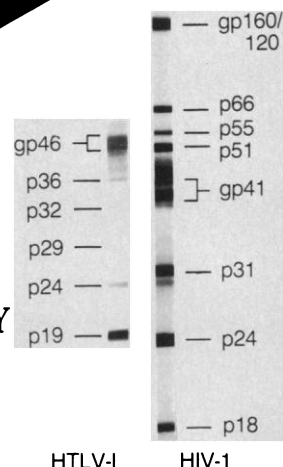
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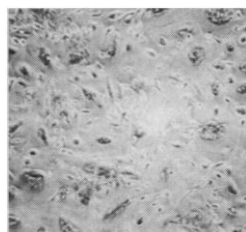
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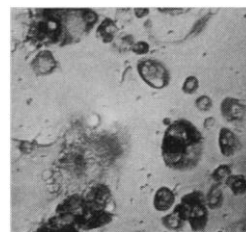
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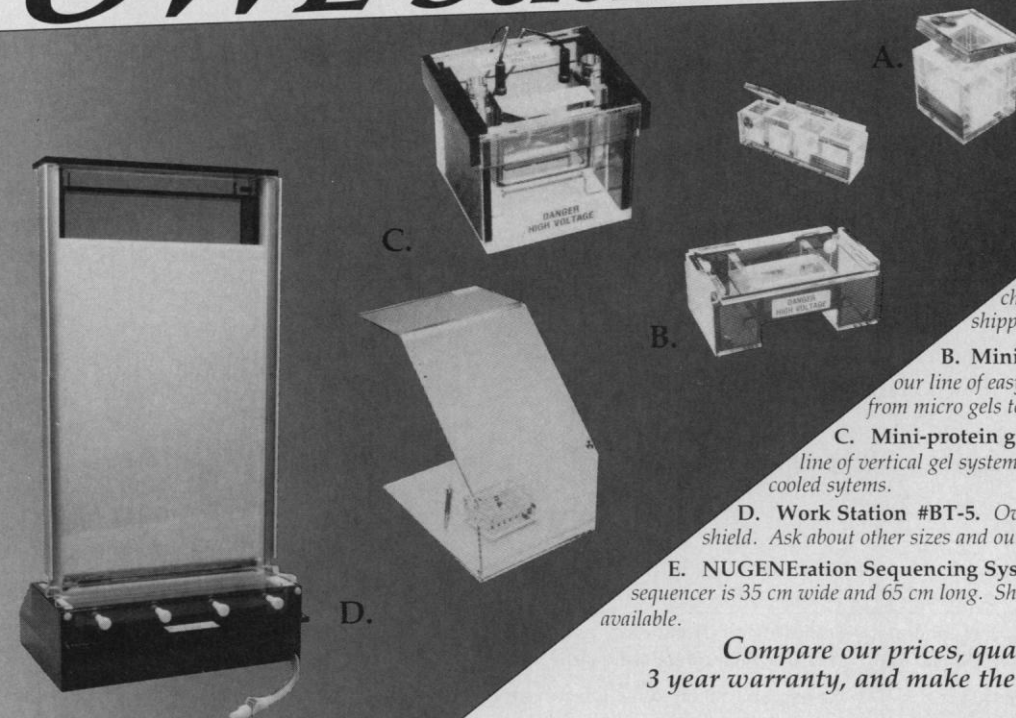
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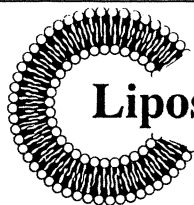


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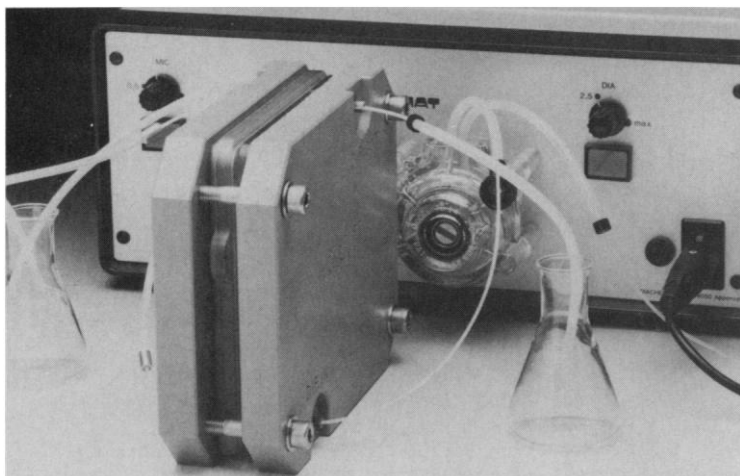
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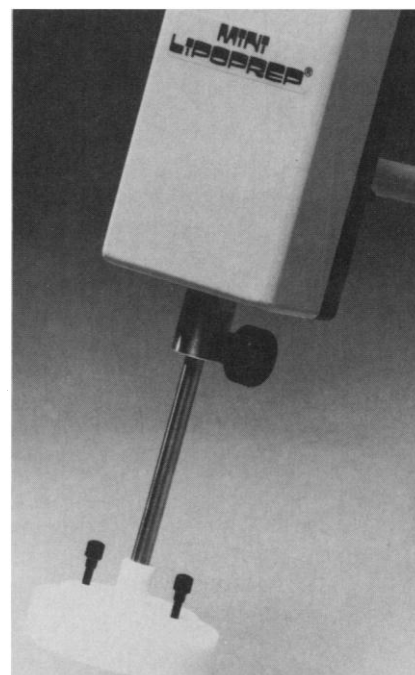
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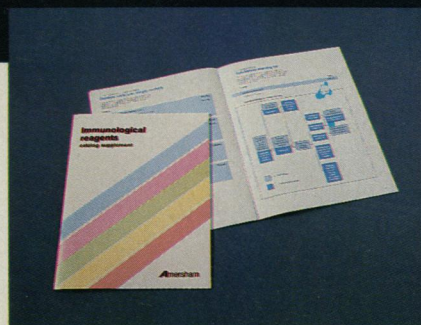
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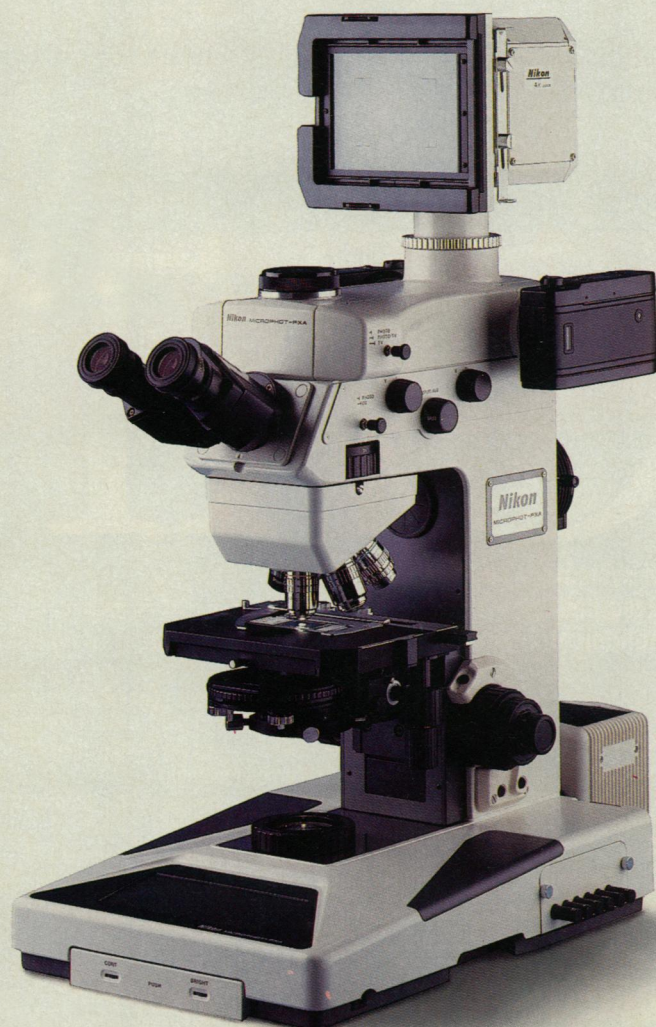
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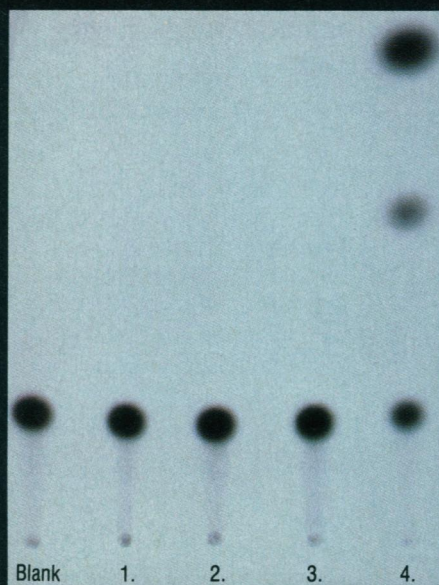
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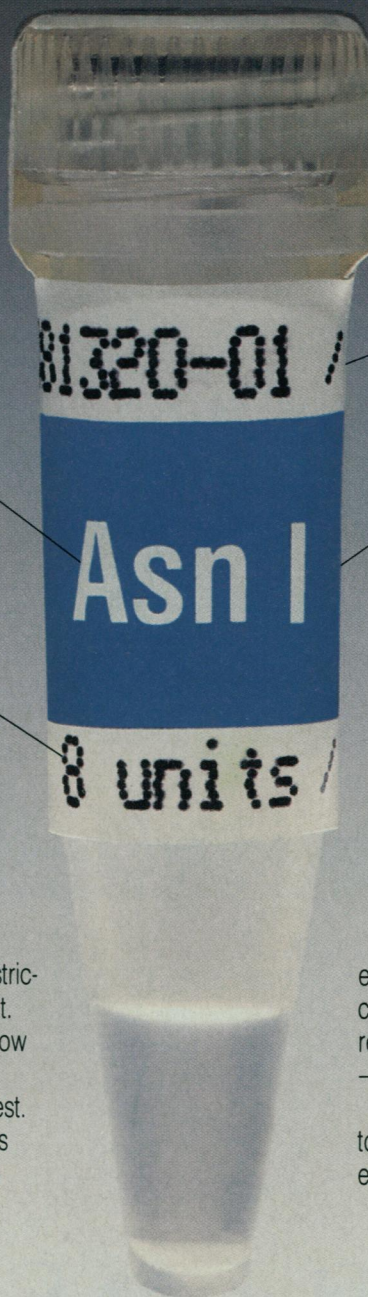
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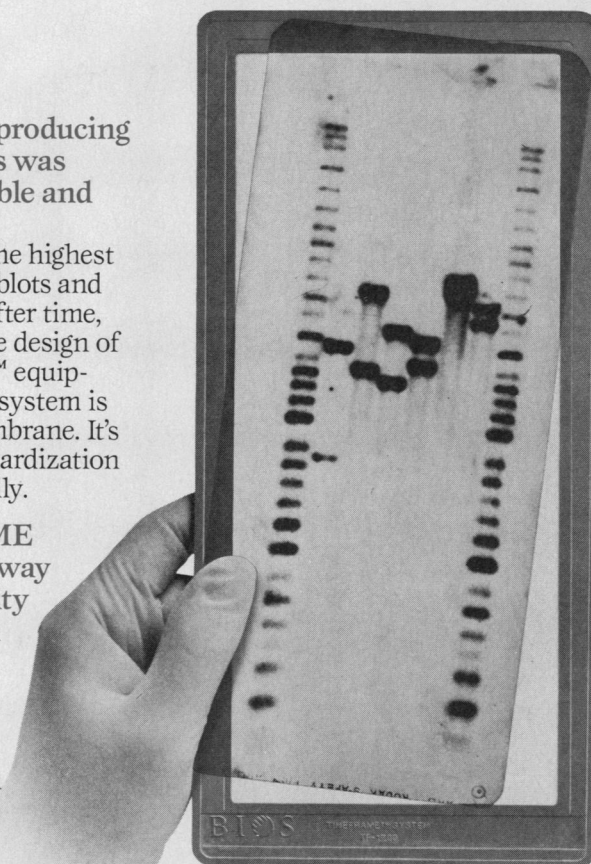
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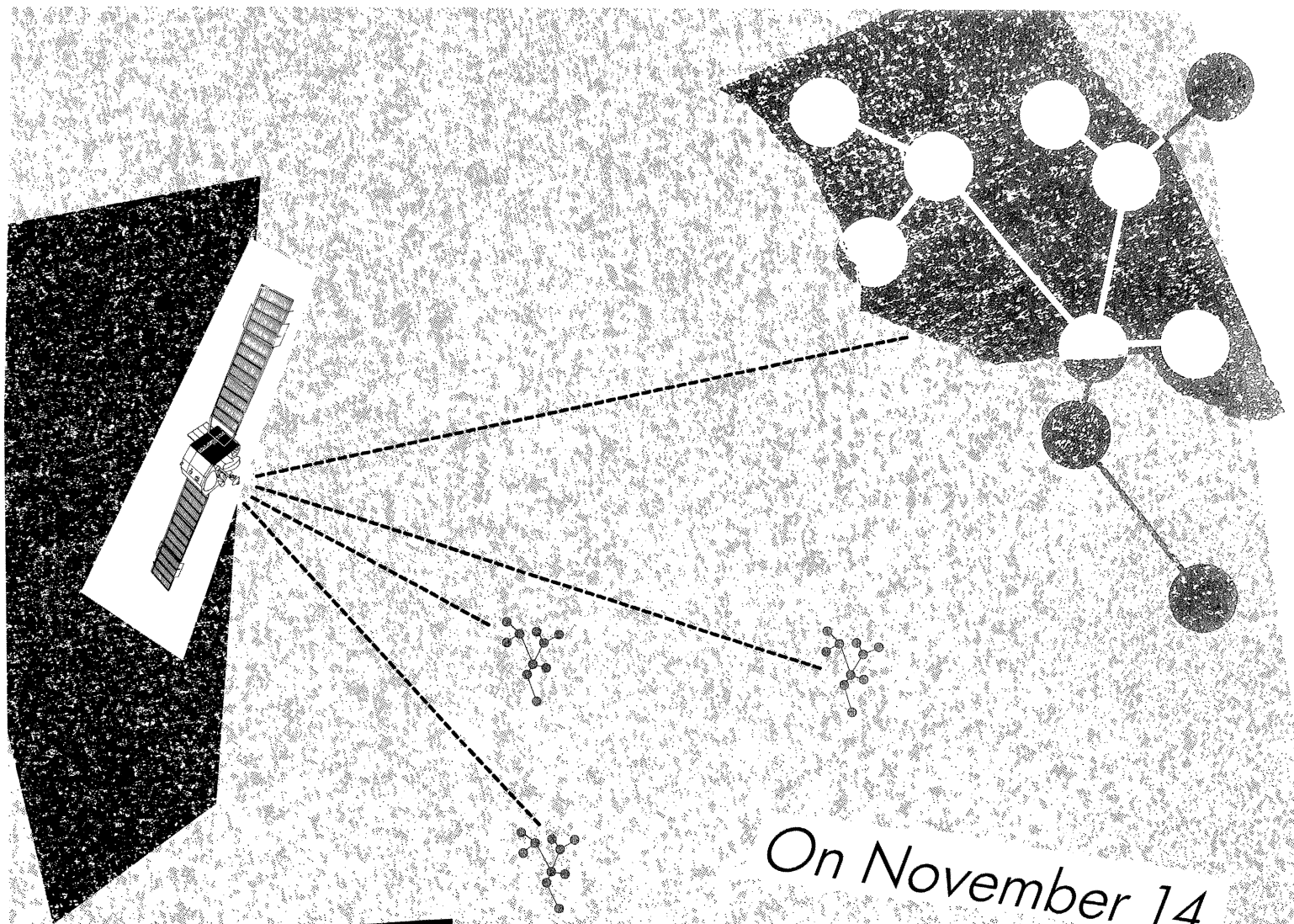
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Program Agenda: **Bioresearch Tools for the 1990's**

Overview of New Technology
Jack Johansen, Millipore

Human Genome Instrumentation
Charles R. Cantor,
Lawrence Berkeley Laboratory

Capillary Electrophoresis
James Jorgenson,
University of North Carolina

Covalent Protein Sequencing
Darryl Pappin,
MilliGen/Biosearch
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2-D Electrophoresis
Calvin McLaughlin,
University of California - Irvine

Protein Characterization by HPLC
M. Patricia Strickler,
Waters Chromatography
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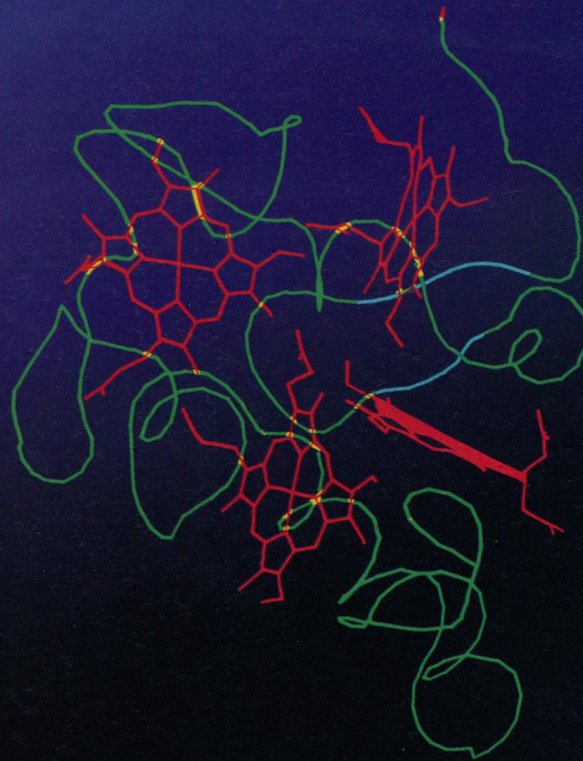


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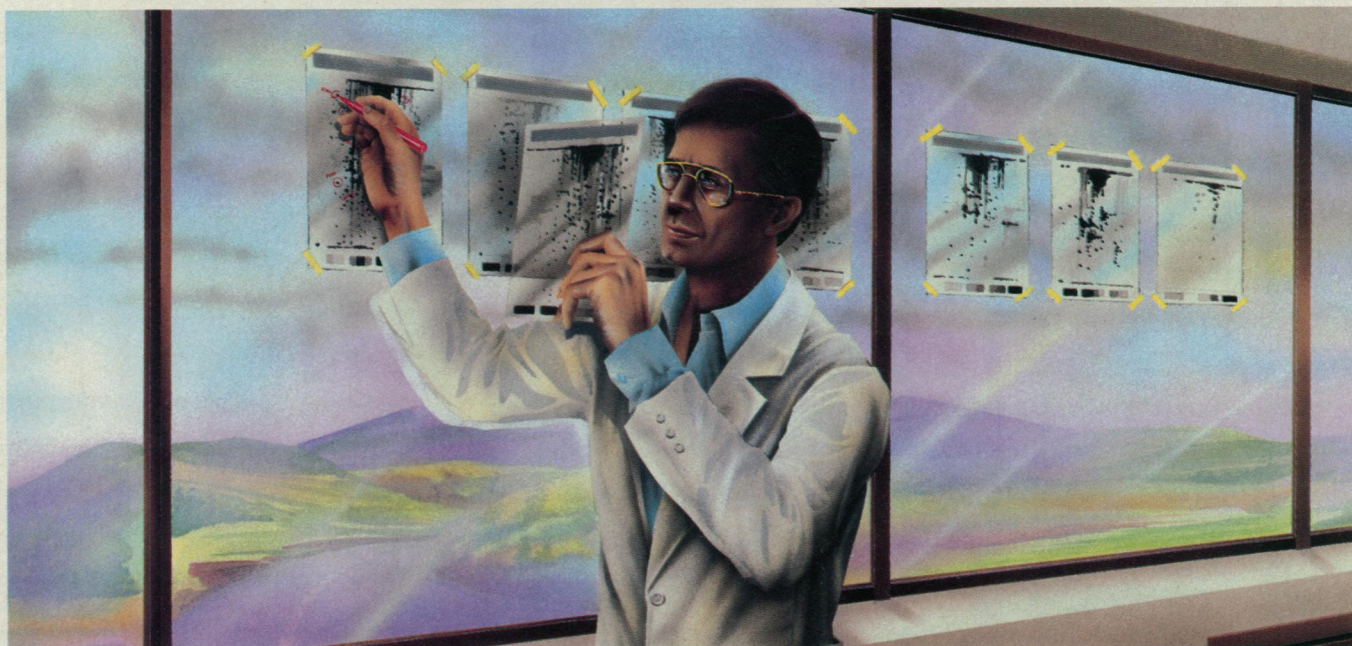
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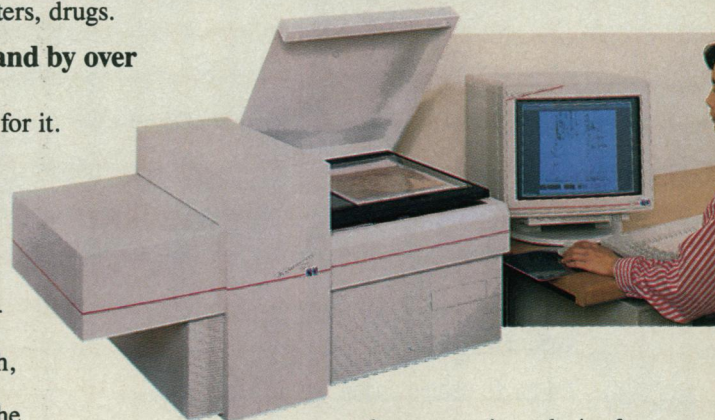
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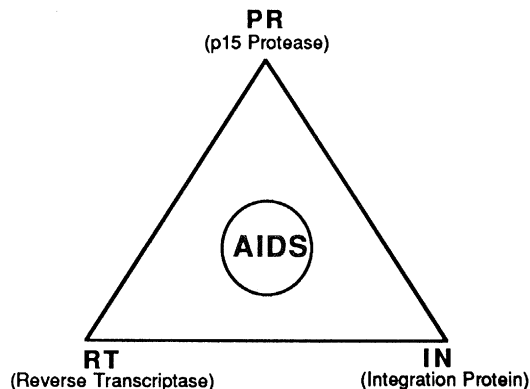
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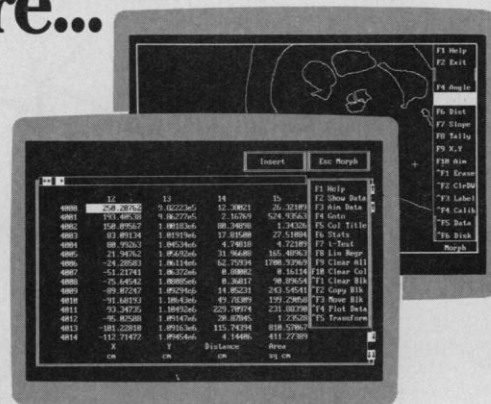
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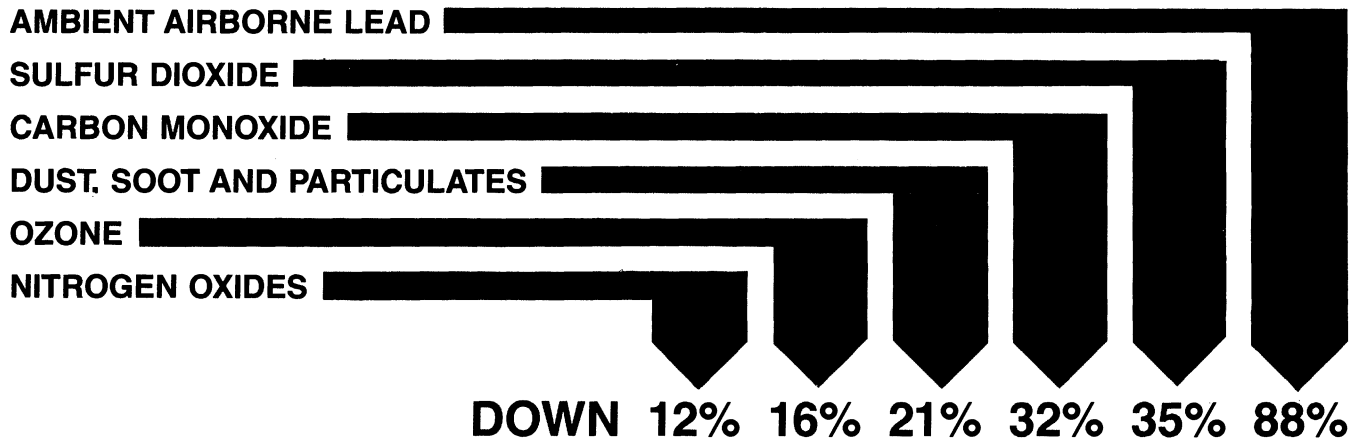
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Ryan: The Endothelium and Responses to Signals

Deuel: Vascular Growth Factors

Pathogenesis of Lipoprotein Disorders

J. Patsch: Enzymic Regulation of Triglyceride and HDL Metabolism

Mahley: Lipoprotein Remnant Disorders

Bierman: HDL and Reverse Cholesterol Transport

Drugs Affecting Lipid Metabolism

Havel: Drugs Affecting Cholesterol Synthesis

Eisenberg: Drug Effects on Hypertriglyceridemia and Lipoprotein Metabolism

Assman: Drugs Affecting HDL

Steinberg: New Anti-atherosclerotic Drugs

Recent Advances in Therapy

Grundey: New Perspectives on the Role of Fatty Acids

V. Brown: Dietary Factors in Lipid Control

Paoletti: Thrombosis, Lipoproteins and Drugs

Bilheimer: Clinical Management of Hypercholesterolemia

Gotto: Future Directions in the Treatment of Atherosclerosis and Lipid Disorders

Special Lecture: Smirnov: Control of Atherosclerosis in USSR

Symposia, Workshops, and Roundtables

MERCK SYMPOSIUM: A Five Year Basic Perspective on

HMG-CoA Reductase Inhibitors

Powell, Illingsworth, Tobert, Lefer, Grundy

WORKSHOPS:

Lipid Absorption, Synthesis and Secretion

Small, Greden, Spector, Davis, Baggio, Pownall, Weinberg

Receptors and Intracellular Cholesterol Homeostasis

Beisegel, Innerarity, Stanley, McPherson, Schneider, Calandra

Molecular Biology of Lipoproteins

Taylor, Brewer, Baralle, Leff, Getz, W. Patsch

HDL Receptors and Reverse Transport of Cholesterol

Ailhaud, Oram, Schmitz, Phillips, van Berkel, Rosseneu, McLean

ROUNDTABLE: National and International Cholesterol Campaigns

Goodman, Stein, Assman, Fernandez-Cruz, Jacotot, Lewis,

Mancini, Nestel, Smirnov, Horlick

SQUIBB SYMPOSIUM: Frontiers in Cholesterol

Metabolism and Intervention

Scott, Gregg, Tanaka, Karanewsky, Biller, Lusi

WORKSHOPS:

Fibrates

Davignon, Catapano, Lazarow, Newton, Knopp, Manzato, Vergani

Cyclooxygenase/Lipoxygenase

G. Gallis, Yamamoto, Weksler, Schror, Parthasarathy, FitzGerald

Diets

Nestel, Lenzi, Miettinen, Katan, Carmena, Foreyt, Lewis

Modified Lipoproteins and Their Receptors

Avogaro, Gianturco, Via, Corsini, Dresel, Freeman

MERRELL DOW SYMPOSIUM: Antioxidant Drugs

Steinberg, Yagi, Jackson, Daugherty, Esterbauer, Haberland, Houghlum

WORKSHOPS:

NonInvasive Techniques

Bond, Blankenhorn, Lees, Poli, Seidel, Palabrica

Clinical Trials Methodology and Endpoints of Measurement

Levy, Tyroler, Walldius, Descovich, Naito, Schaefer

ω -3 and ω -6 Fatty Acids

Conner, Drevon, C. Galli, P. Weber, Field, Nordoy

Intracellular Regulatory Effects of Cholesterol

Endo, Luskey, Sinensky, Schonfeld, Schwandt, Clarke, Rine

ROUNDTABLE: What is the Future of CHD Prevention and the Role of Lipid Regulation?

Gotto, Paoletti, Lichtlen, Carlson, Fuster

PARKE-DAVIS SYMPOSIUM: An Update on the Interrelationships of HDL and Atherosclerosis

Lewis, Assman, Castelli, Gotto, Olsson, Huttunen, Schaefer

WORKSHOPS:

Animal Models

Kritchevsky, Chapman, Rudel, Attie, Armstrong, Weinstein

Intravascular Dynamics of Lipids and Drugs

Dujovne, Hunninghake, Shepard, Simons, van Tol, Berglund

Cell Biology, Atherosclerosis and Ca^{++} Antagonists

Harmony, Betz, Bernini, Henry, Dicorleto, Hajjar

Triglyceride Metabolism and Fatty Acid Utilization

Bensedoun, Olivecrona, Chan, Schotz, Hayden, Verger

ROUNDTABLE: Control of Lipid Disorders in Latin America

Olivera, Ahumada, Alfaro, Arteaga, Boskis, Brusco, Lerman

SANDOZ SYMPOSIUM: Atherogenesis: Prevention and Control

Blankenhorn, Thompson, Bond, Kwiterovich

WORKSHOPS:

Regression: Human and Animal Studies

G. Weber, Cornhill, A. Yamamoto, Erikson, Clarkson, Wissler

Antidiabetic Drugs and Lipids

Crepaldi, Taskinen, Mancini, Steiner, Chisolm, Garg

Thrombosis and Fibrinolysis

Collen, Meade, Marcus, Tremoli, Bradley, Mann

ACAT Inhibitors, Resins, and Intestinal Lipid Absorption

Sirtori, Dietsch, Suckling, Chang, Ockner, Largis

For Registration Information contact

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IMPORTANT DATES

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October 1, 1989

Social Activities Deadline

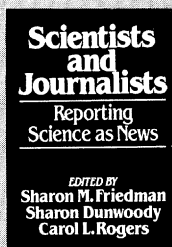
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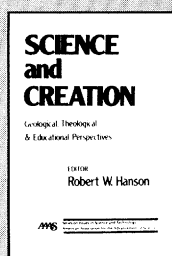
Books from AAAS



Scientists and Journalists: Reporting Science as News

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

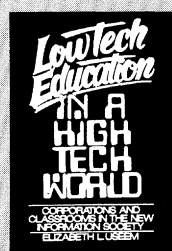
The public is interested in science and depends largely on the mass media for the latest information. But how well do scientists and journalists communicate with each other and to the public? This book examines the links between scientists and journalists as seen through the eyes of both. 1986; 334 pp.; *softcover* \$19.95 (\$15.95 for AAAS members); AAAS Publication #86-20S.



Science and Creation: Geological, Theological, and Educational Perspectives

Edited by Robert W. Hanson

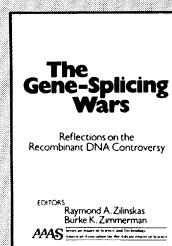
The creation/evolution controversy is examined by scientists, theologians, educators, and historians. These authors view the controversy as a false dichotomy—an attempt to force a choice between two ideas that are not mutually exclusive. Includes case studies from several states. 1986; 240 pp.; *hardcover* \$24.95 (\$19.95 for AAAS members); AAAS Publication #86-19H.



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

By Elizabeth L. Useem

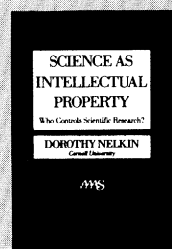
Are U.S. students developing the skills necessary for a high-technology society? Useem examines education in California's "Silicon Valley" and Boston's Route 128, two of the country's leading high-tech centers, and suggests ways for education and industry to forge a stronger partnership for the future. 1986; 278 pp.; *hardcover* \$19.95 (\$15.95 for AAAS members); AAAS Publication #86-21H.



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 these experiences can be used to cope with similar issues in the future. 1986; 288 pp.; *hardcover* \$24.95 (\$19.95 for AAAS members); AAAS Publication #86-18H.



Science as Intellectual Property: Who Controls Scientific Research?

By 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* \$9.00 (\$7.25 for AAAS members); AAAS Publication #84-17S.

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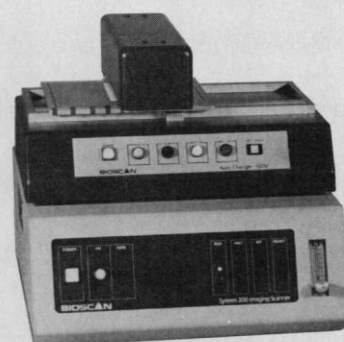
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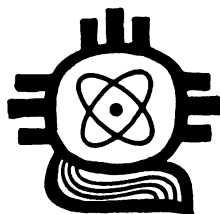
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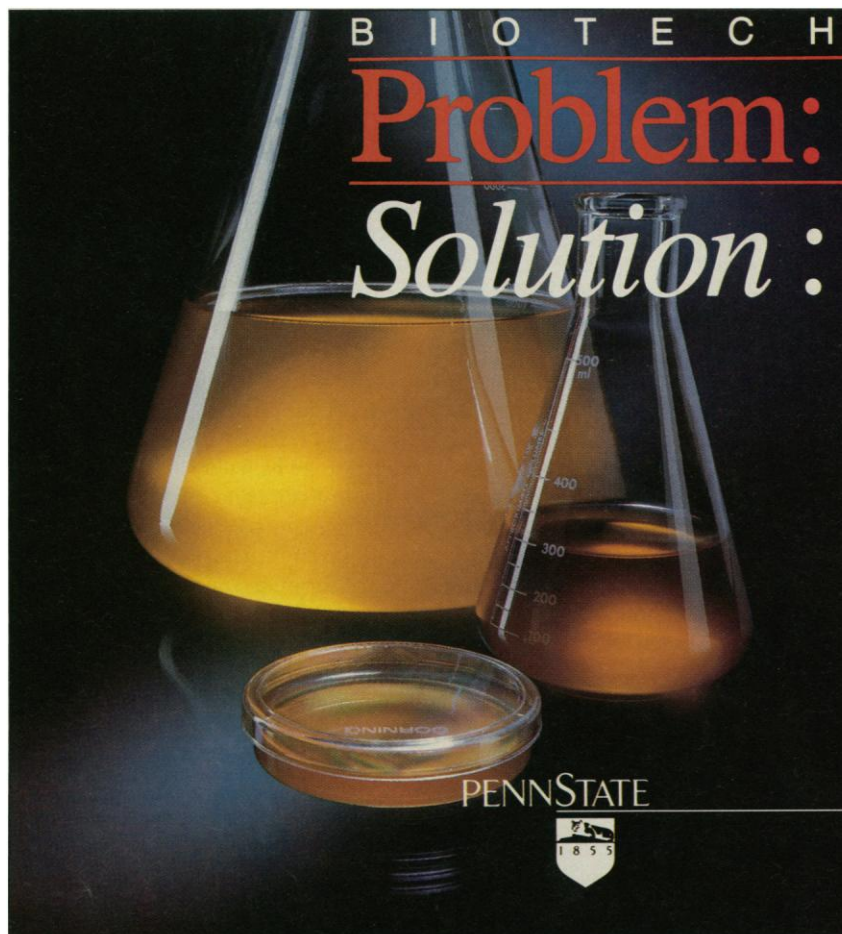
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