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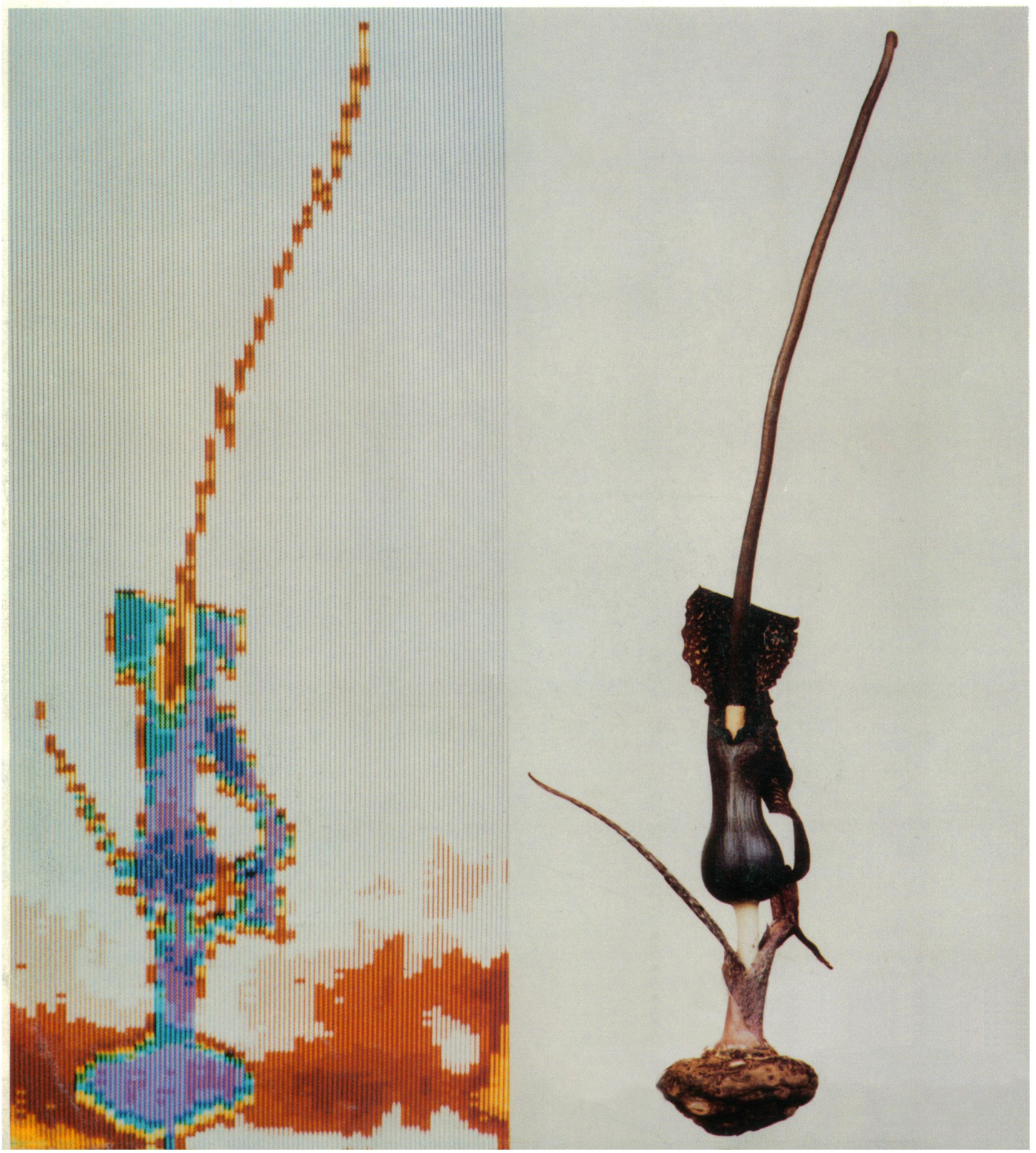

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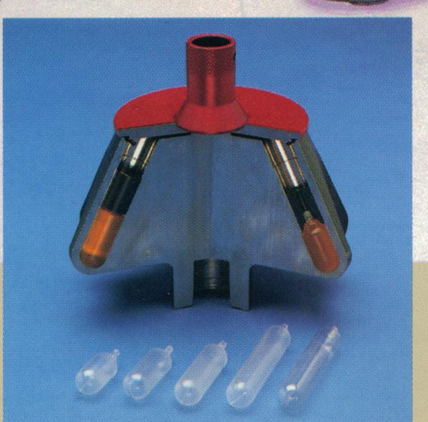

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COVER The thermogenic inflorescence of *Sauromatum guttatum* Schott, voodoo lily (right) and its thermographic image (left) on the day of flowering. Each 1°C difference in surface temperature corresponds to a different color. The appendix, upper cylindrical part of the inflorescence, is about 9°C warmer than the rest of the plant. This heating is triggered by salicylic acid which moves into the appendix 1 day before inflorescence unfolding. The heat is used to volatilize putrid-smelling compounds attractive to insect pollinators. See page 1601. [M. E. Nuttall, Photo Services, Du Pont Experimental Station, Wilmington, DE 19898]

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2 pTGFβ2 is a structurally distinct second form of TGFβ (sequence homology 70% in the first 50 a.a. to hTGFβ/pTGFβ1). When assayed as above, it gives the same ED_{50}s on NRK and AKR cells. However, some cell lines can distinguish between pTGFβ2 versus pTGFβ1/hTGFβ.

3 Human platelet derived growth factor h(PDGF) is assayed on Balb/c-3T3 and NIH-3T3 cells for H^3-thymidine incorporation as per Raines and Ross, Meth. in Enz. *109*, p749.

4 Porcine PDGF is structurally very different from hPDGF (i.e. differs in M.W., subunit composition, N-terminus), it's activity is determined as in 3 above.

5 Both the acidic and basic forms of bovine fibroblast growth factor are isolated from brain and assayed for H^3-thymidine incorporation on NR6-3T3 cells after Gospodarowicz, *et al* JBC, *253*, p3736, 1978.

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This Week in

SCIENCE

Biomaterial implants

In clinical medicine, artificial organs, extended-wear contact lenses, dental implants, and other biomaterials are being used with increasing frequency (page 1588). These tissue substitutes integrate within host tissue; for the integration to succeed, available "dangling bonds" on the surface of the implanted biomaterials must be filled with cells of the host. With each implant, there is a race for surface sites between host cells and bacteria. Sometimes bacteria win the race, sabotage the "take" of the implant, and cause severe and even fatal infections. Gristina describes the desirable surface features for implant materials, physical and chemical interactions that take place between surfaces and bacterial or host cells, host immune defenses that affect implantation, types of bacteria that most often colonize implants, and ways in which the success rate of biomaterial implants can be increased.

Voodoo lily heater

Voodoo lilies and certain other related plants heat up before they flower (cover); the "calorigen" that causes heating is 2-hydroxybenzoic acid, commonly called salicylic acid (page 1601). On the day when a plant will flower, the upper part of the tall flowering structure unfolds and becomes hot. The heat causes some of the plant's smelly amines and indoles to evaporate and these chemicals attract insect pollinators. The temperature may rise as much as 14°C that afternoon but returns to ambient temperature by night; somewhat later the same evening, the plant's pollination chamber heats up. Raskin *et al.* purified the heat-inducing substance from voodoo lilies and identified it by mass spectrometry; heating and odor production were then induced through the application of crude or purified salicylic acid to plants. In the 5-day period leading up to flowering, the plants were sensitive to salicylic acid; on the day of flowering, the temperature always peaked 4.5 hours after plants were exposed to light, thus showing the dependence of this process on daylight. The facilitation of flowering and pollination is but one role that has been defined for salicylic acid in these plants.

Haughton Astrobleme

An asteroid hit Devon Island in the Canadian Arctic 22.4 ± 1.4 million years ago in the Miocene Epoch (page 1603). It left behind on the island the Haughton Astrobleme, a large circular scar with a diameter of 20 kilometers that has both the gross and fine shock features that characterize impact craters. After the impact, the multiring crater filled with water and sediments; the sediments retain fossils of flora and fauna that once lived in the area. Omar *et al.* were able to establish the time of the asteroid impact through nuclear fission-track dating of some of the crater's sedimentary materials. Tracks left in the mineral appatite by alpha particles that escape from decaying uranium nuclei are visualized, and the density and number of tracks is related to the elapsed time since the appatite was shocked and all previous tracks were obliterated, that is, since the impact. The precise determination of the time of the asteroid impact provides a valuable reference point for the biochronology of the arctic; this marker will contribute to an understanding of the evolution and the succession of the flora and fauna in this isolated region.

Alaskan dinosaurs

During the Late Cretaceous Period some dinosaurs lived far to the north close to the Arctic Ocean, where, each winter, they probably experienced months of total darkness (page 1608). The Alaskan location at which dinosaur bones and pollen and spore fossils were collected marks the most northerly paleolatitude yet discovered for dinosaurs: the site probably was situated between 70° and 85° North during the Late Cretaceous. At this high latitude, most vegetation would have been seasonal, and the dinosaurs may have entered a state of torpor, slowing their activities and metabolism considerably in order to endure the long winter. (An alternative is that these dinosaurs migrated south each year, but the great distance to a year-round food source and the mix of bones of old and young individuals in the collection make this scenario less likely.) Brouwers *et al.* speculate that something other than an impact may have caused the extinction of dinosaurs at the Cretaceous-Tertiary boundary, because at least these Alaskan dinosaurs were adapted to and should have been able to withstand the adverse conditions—months of dark and cold—that an impact is thought likely to have triggered.

Duchenne muscular dystrophy gene

Patients with Duchenne muscular dystrophy (DMD) have severe cardiac and mental abnormalities; those with Becker muscular dystrophy have similar but milder pathologies (page 1620). In 20 women, these diseases have been associated with a gene that maps to a region of the X chromosome where a piece of chromosome 21 has been translocated; although only one X chromosome has this diagnostic translocation, carriers develop disease because their normal X chromosome is preferentially inactivated. Bodrug *et al.* studied the sequence of nucleotides at the translocation junction of the disease-causing X chromosome of one woman with DMD; comparisons were made with sequences at corresponding regions of derived and normal (unrearranged) X chromosomes and chromosomes 21. No major structural changes were found at the junction. However, small deletions (about 100 base pairs total) and some minor differences were found; in addition, a repeated tetranucleotide—possibly a recognition site for an enzyme catalyzing the translocation process—was found on both sides of the breakpoint. How these or other minor changes occur and whether they are causally associated with the development of disease remain to be determined.

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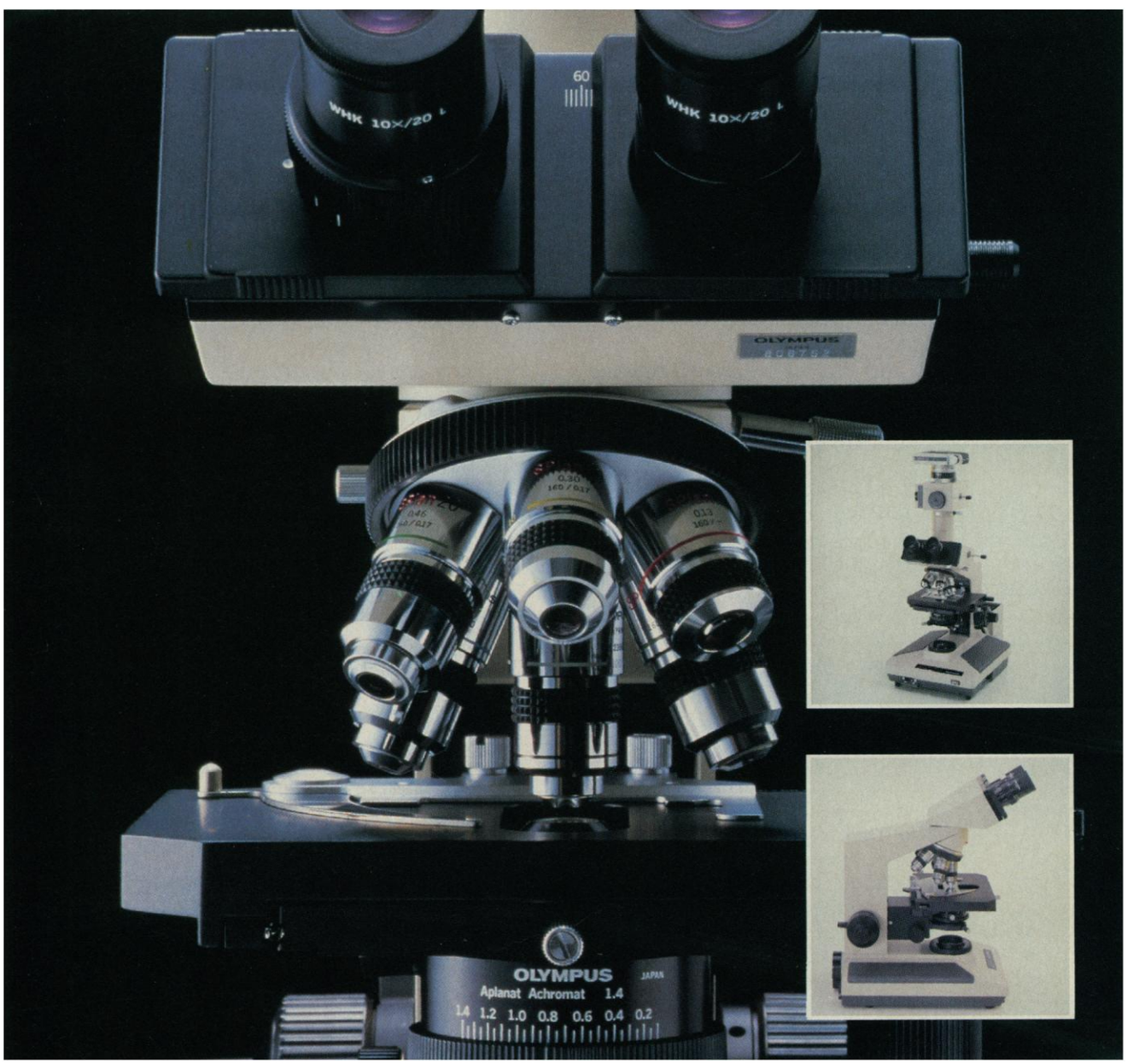

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SCIENCE

25 SEPTEMBER 1987
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California's Proposition 65

Impending implementation of the recently enacted California law entitled Safe Drinking Water and Toxic Enforcement Act of 1986 is causing concern among a substantial fraction of companies doing business in California. The groups affected include grocery manufacturers, producers of alcoholic beverages, the chemical industry, and restaurants. Anxiety is mounting because part of the law will become effective 1 March 1988, and there is uncertainty about what must be done to comply with it. Beyond that, the law contains a "bounty hunter" clause that is likely to lead to an enormous amount of litigation. Individuals can file suits against alleged violators of the law and share 25 percent of any fines. It costs only a few hundred dollars to file a suit. Defending against one may involve millions of dollars.

The new law has two major parts—one dealing with drinking water, the other requiring a warning before exposure to chemicals known to cause cancer or reproductive toxicity. It is the second part that becomes applicable on 1 March. This part of the law states, "No person in the course of doing business shall knowingly and intentionally expose any individual to a chemical known to the state to cause cancer or reproductive toxicity without first giving clear and reasonable warning to such individual. . . ."

The Grocery Manufacturers of America pointed out that virtually all food naturally contains arsenic and other trace elements known to be carcinogenic. Thus they estimate that 15,000 items on a supermarket's shelves may have to be identified as carcinogenic. The law does provide an exemption: "An exposure for which the person responsible can show that the exposure poses no significant risk assuming lifetime exposure at the level in question for substances known to the state to cause cancer, and that the exposure will have no observable effect assuming exposure at one thousand (1000) times the level in question for substances known to the state to cause reproductive toxicity. . . . [T]he burden of proof that an exposure meets the criteria of this subdivision shall be on the defendant."

The proviso about reproductive toxicity has the effect of requiring the labeling of common table salt as a reproductive toxic agent. The same is true of beer or wine. Ultimately when more tests have been performed on other substances that are ingested, most of them too are likely to be deemed toxic if the reproduction criteria of the law are applied.

Ultimately, roasted or broiled food will be added to the list of toxics, for they contain carcinogens. Thus the law will then require that those who dine out be informed that the wine is a carcinogen and a reproductive hazard, and when served their food, they will be told that their charbroiled steak is also carcinogenic. Such warnings will scarcely promote a romantic atmosphere or increased dining out.

Labeling a large number of items as carcinogens because they contain parts per billion of something of doubtful carcinogenicity will not enable the public to act more judiciously in safeguarding health. In fact, the opposite may be true. Milton Russell, who until recently was assistant administrator for Policy Planning and Evaluation at the Environmental Protection Agency has made the following comments in a different but similar context:

> Real people are suffering and dying because they don't know when to worry, and when to calm down. They don't know when to demand action to reduce risk and when to relax, because health risks are trivial or simply not there. I see a nation on worry overload. One reaction is free floating anxiety. Another is defensive indifference. If everything causes cancer, why stop smoking, wear seat belts or do something about radon in the home? Anxiety and stress are public health hazards in themselves. When the worry is focused on phantom or insignificant risks it diverts personal attention from risks that can be reduced.

As time passes, many substances will be added to the state's list of carcinogens and reproductive toxins. Twenty months after they appear on the compilation, they will also be controlled by the drinking water part of the law. As a result, use of some agricultural chemicals is likely to be proscribed. Were Californians to find parts of the law irksome, it would not be easily changed. Modifying a California law that has been enacted by the initiative and referendum process is difficult and unlikely to be done soon.

—PHILIP H. ABELSON

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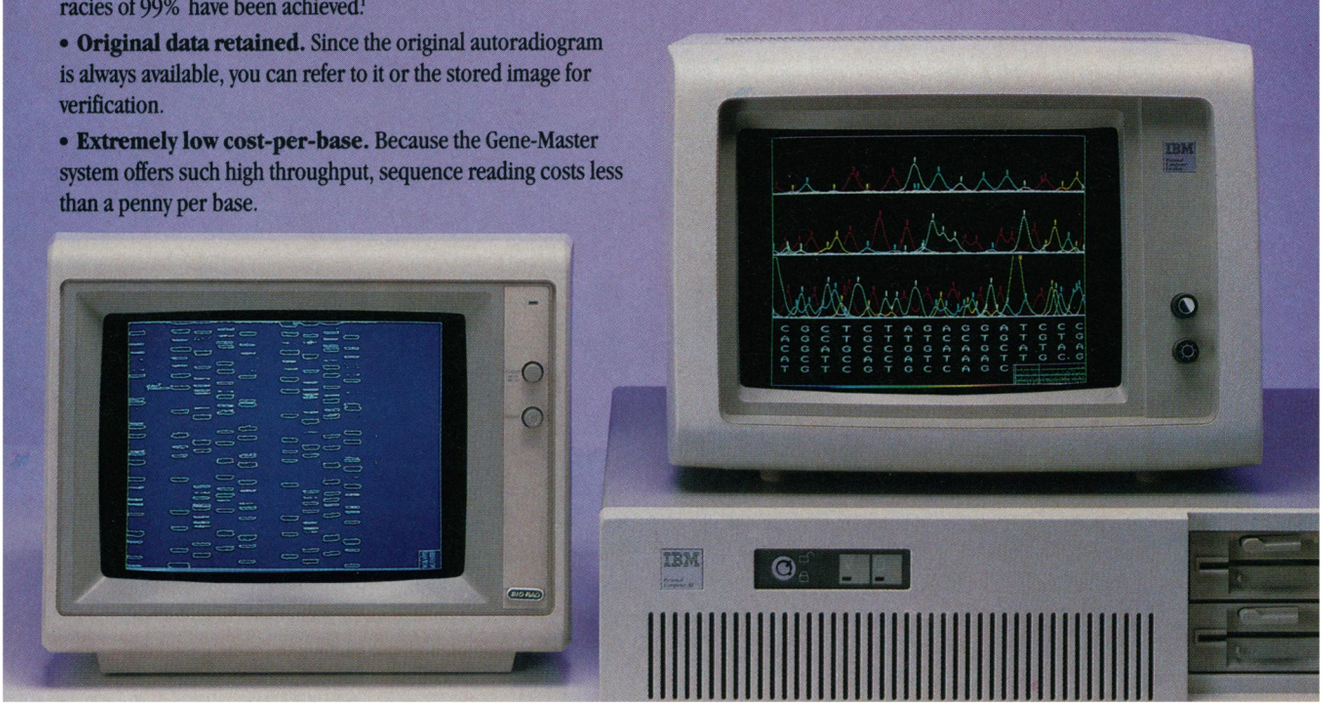
1. Elder, J.K., Green, D.K., and Southern, E.M. (1986). *Nuc. Acids Res.* **14**:417-424.



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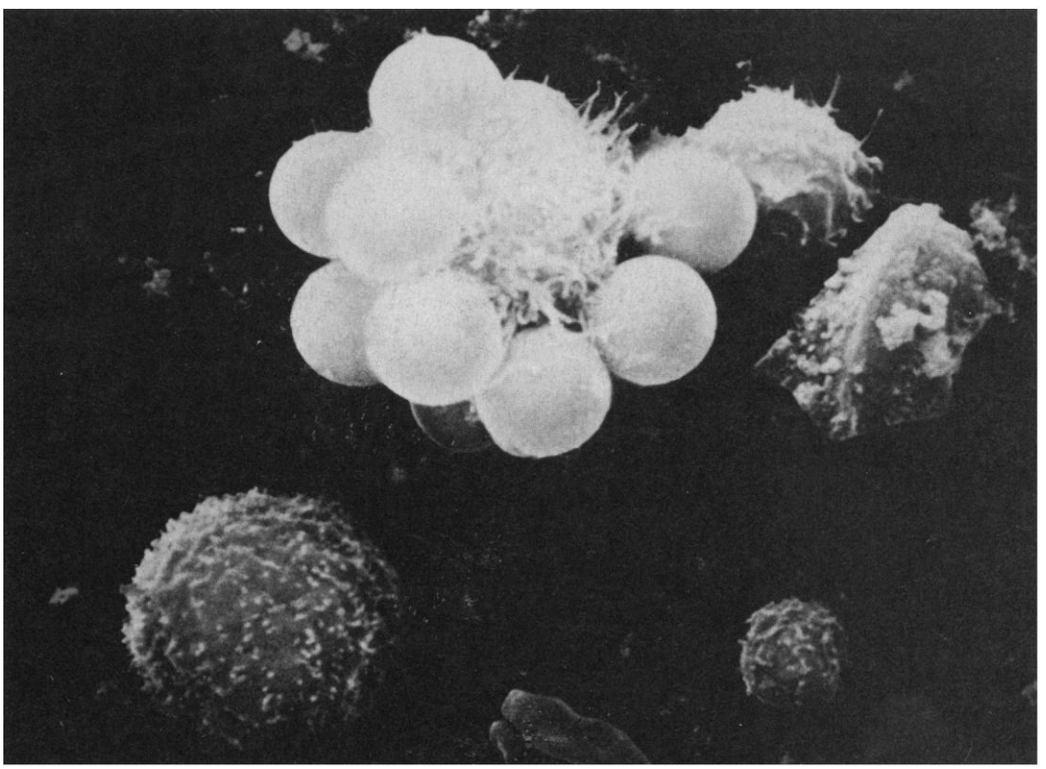

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THE ROBERT A. WELCH FOUNDATION CONFERENCE ON CHEMICAL RESEARCH XXXI
DESIGN OF ENZYMES AND ENZYME MODELS
November 2-4, 1987
The Westin Oaks Hotel, Houston, Texas

PROGRAM

Monday, November 2, 1987

9:00 **JACK S. JOSEY,** Welcoming of Guests
9:05 **EMIL T. KAISER,** Introductory Remarks

LONG-RANGE ELECTRON TRANSFER IN RUTHENATED PROTEINS
9:15 **HARRY B. GRAY**
Discussion to be led by **LOUIS B. HERSH**

STUDIES WITH METALLOPORPHYRINS WHICH RELATE TO THE CHEMISTRIES OF CATALASE, PEROXIDASE AND CYTOCHROME P-450 ENZYMES
10:45 **THOMAS C. BRUICE**
Discussion to be led by **FRANCOIS N. DIEDERICH**

ARTIFICIAL ENZYMES
1:45 **RONALD BRESLOW**
Discussion to be led by **HAROLD KOHN**

Tuesday, November 3, 1987

DESIGN OF ARTIFICIAL RESTRICTION ENZYMES
9:00 **PETER B. DERVAN**
Discussion to be led by **SIR DEREK BARTON**

THE USE OF SITE-DIRECTED MODIFICATION IN THE STUDY OF ENZYMES
10:30 **STEPHEN J. BENKOVIC**
Discussion to be led by **CARL O. PABO**

12:00 Luncheon

1:00 **HARRY G. DRICKAMER,** 1987 WELCH AWARDEE

DISSECTION OF THE STRUCTURE AND ACTIVITY OF AN ENZYME
2:15 **ALAN R. FERSHT**
Discussion to be led by **WILLIAM P. JENCKS**

Wednesday, November 4, 1987

ENZYMES IN THE BIOSYNTHESIS OF POLYESTERS
9:00 **CHRISTOPHER T. WALSH**
Discussion to be led by **CHARLES S. CRAIK**

THE EVOLUTION OF ENZYME FUNCTION
10:30 **JEREMY R. KNOWLES**
Discussion to be led by **JOHN A. GERLT**

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A nominating letter citing the scientific accomplishments of the candidate in detail, two supporting nominating letters, a curriculum vitae, and up to six (6) selected reprints in eight (8) complete sets are required.

The deadline for receipt of materials is November 1, 1987, and no nomination will be considered unless all items have been received. The awardee must be present at the AAN meeting in Cincinnati, Ohio, U.S.A., on Tuesday, April 19, 1988.

Send nominations to:

Potamkin Prize for Alzheimer's Disease Research
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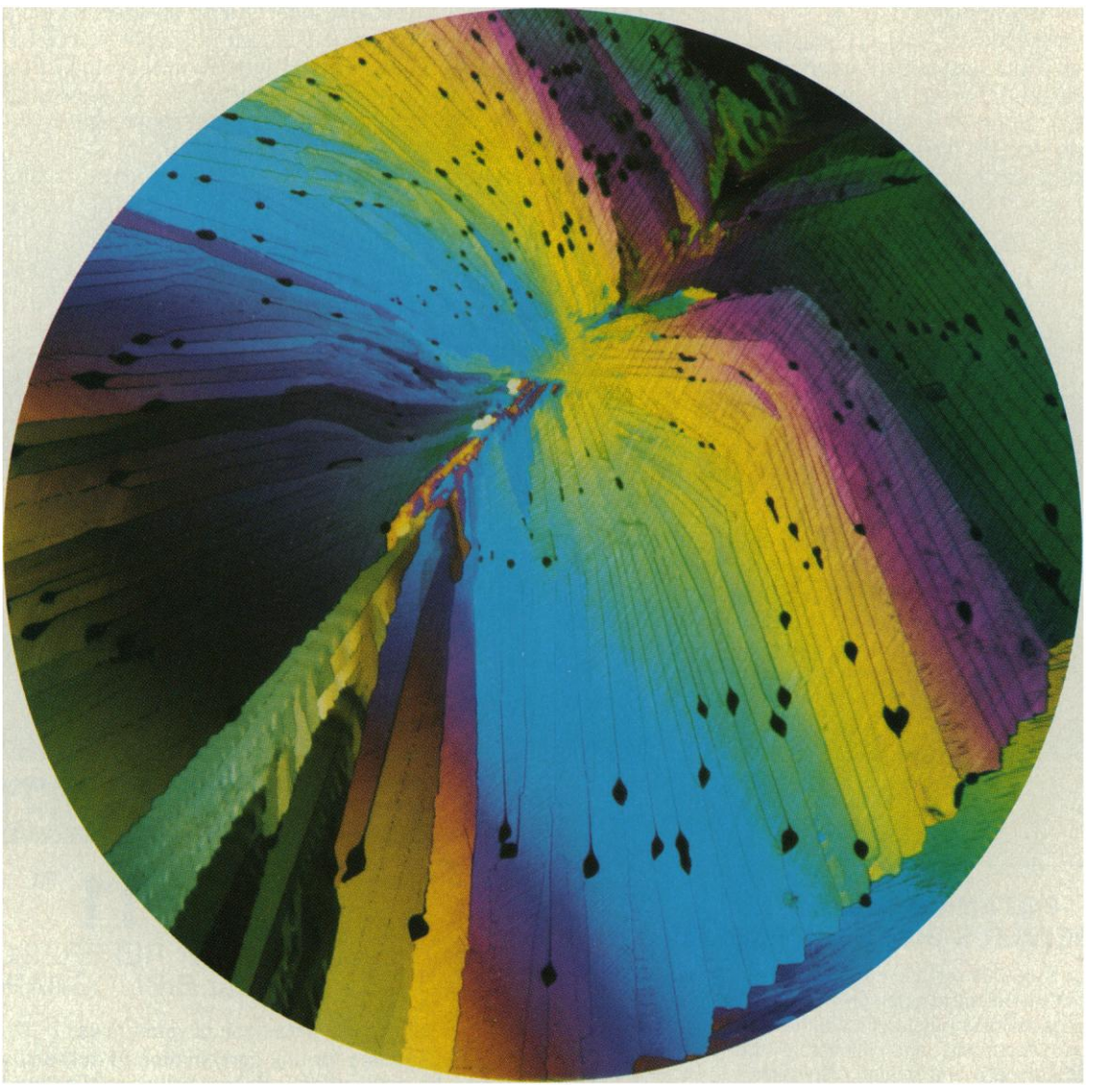
The Potamkin Prize is funded through the philanthropy of the Potamkin Foundation.



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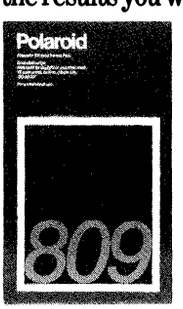

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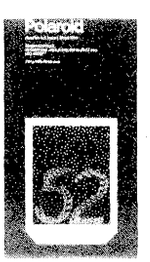

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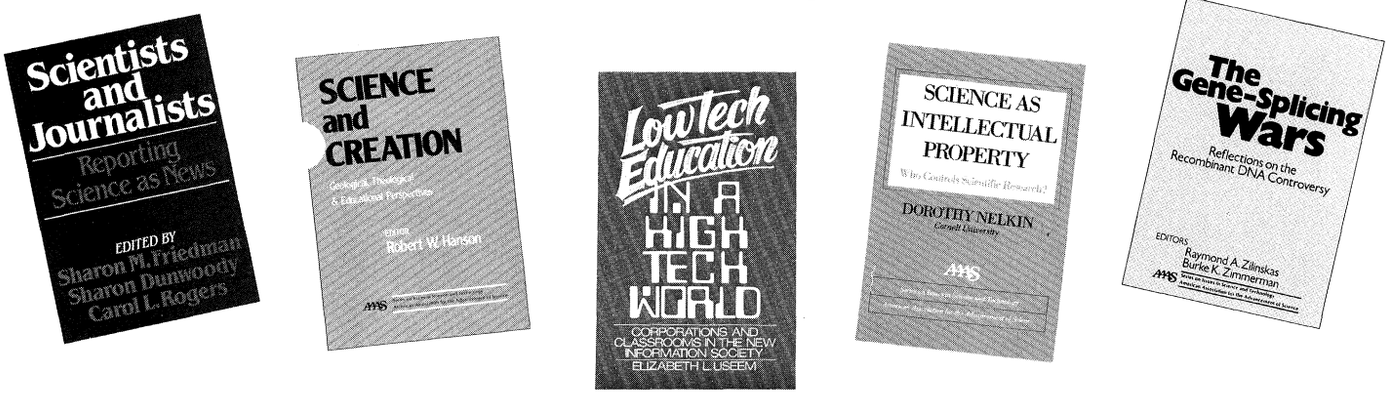

Scientists and Journalists: Reporting Science as News

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.

1986, 240 pp., hardcover; $24.95, AAAS members $19.95

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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