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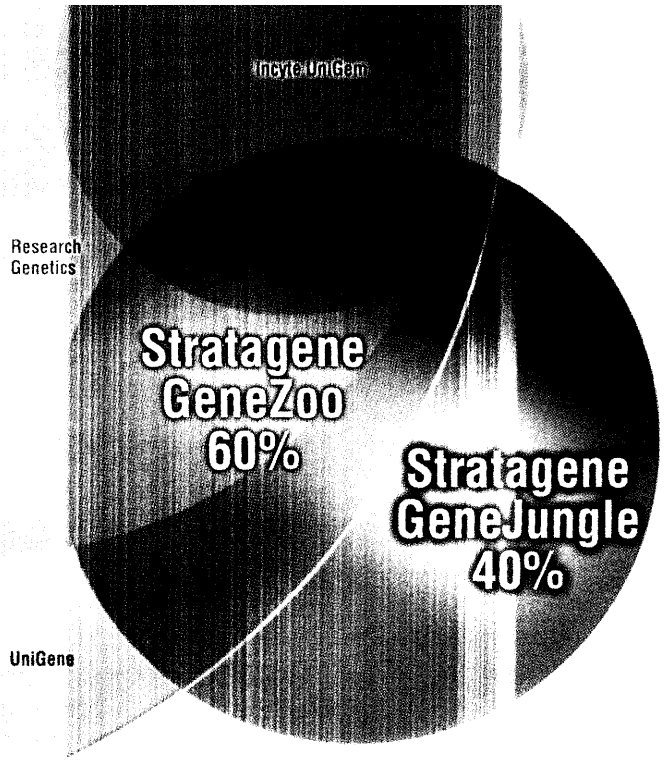

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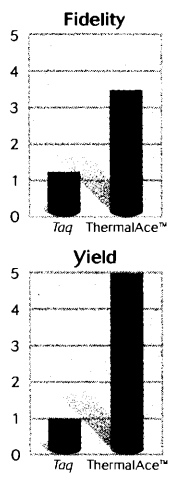

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Science

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COVER Regularly layered rocks such as these seen in western Candor Chasma (6.5°S, 77.2°W) are among the best examples of sedimentary rocks on Mars. This image was acquired in March 1999, shortly after the Mars Global Surveyor spacecraft attained its final, mapping orbit. The area shown is ~1300 m by 1600 m; layers are ~10 m thick. The spacing of ripples at far right averages 8 m. Layering attests to a dynamic sedimentary environment of global scale. [Image: NASA/JPL/Malin Space Science Systems]

1876
What HIV does inside the cell

1955
Fossil feathers

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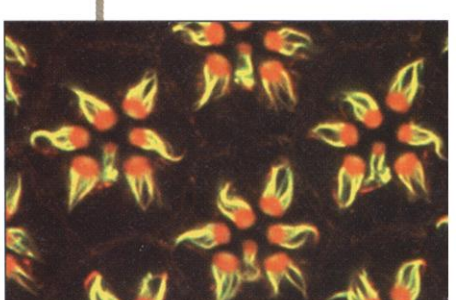
SCIENCE'S COMPASS

1898
Balancing privacy and public health

PATHWAYS OF DISCOVERY

Piecing Together the Biggest Puzzle of All M. J. Rees

In this month's essay, the last in the Pathways of Discovery series, Martin J. Rees celebrates the way astronomers and cosmologists have systematically uncovered the biography of the universe. Rife with neutron stars, black holes, and multiple universes that emerge from quantum fluctuation, it's a story as grand as it is strange.



1978
Photoreceptor rescue

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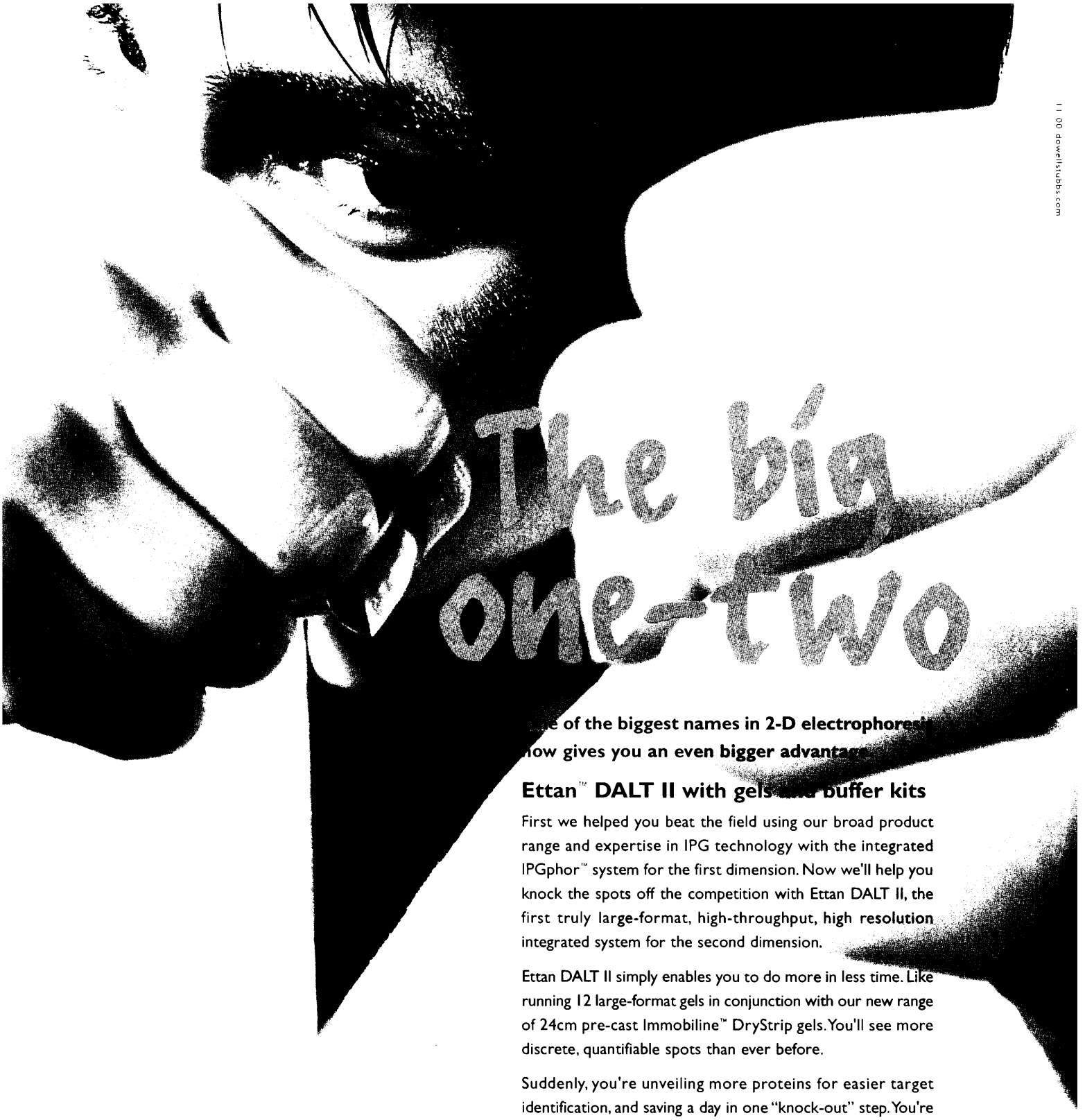

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COLLISION IN THE MEDITERRANEAN

The collision of the European and African plates has helped to create six curved mountain belts—the Betics, the Maghrebides, the Apennines, the Alps, the Carpathians, and the Dinarides-Hellenides. In the midst of all of this compression, there are also several regions of extension such as the Alboran Sea and the Pannonian Basin. Wortel and Spakman (p. 1910) review the possible processes that could lead to complex regions of compression and extension in the Mediterranean Sea region. They primarily focus on the three-dimensional images of the velocity structure of the upper mantle to show that subduction and detachment of the subducting slab are key components that create the tectonic complexity along the Mediterranean coast.

SEDIMENTARY ROCKS ON MARS?

Sedimentary rocks on Earth form by erosion of igneous and metamorphic rocks by wind, water, and ice. Malin and Edgett (p. 1927; see the cover and the news story by Kerr), using images from the Mars Orbiter Camera and topography from Mars Orbiter Laser Altimeter from the Mars Global Surveyor mission, document laterally extensive and, in some cases, vertically thick layered units that may be sedimentary rocks on Mars. These layered units are concentrated between 30°N and 30°S on relatively old martian surfaces, which would favor rock formation by wind and water early in martian history. Although more work is needed to interpret the genesis of martian features, the influence of water on the martian landscape continues to gain support from detailed mapping.

DEPLETED MANTLE

The uppermost 300 kilometers of mantle beneath ancient continental crust, called the tectosphere, may be distinct from the rest of the mantle. Anomalies in geophysical data, such as gravity and seismic velocities, suggest that the tectosphere is different in its temperature, composition, or both. Forte and Perry (p. 1940) translated anomalies in shear-wave velocity into density anomalies and developed a mantle-flow model that couples rigid-plate motions with mantle convection. This model indicates that the tectosphere is depleted in iron relative to the rest of the mantle. The chemically distinct nature of the tectosphere may be related to the growth of continental crust.

CLIMATE CLUES FROM THE CARIACO BASIN

The sediment record in the Cariaco Basin off of Venezuela exhibits annual layering that occurred during anoxic episodes that spanned periods of tens of thousands of years. This record is now providing new clues to climate change (see the Perspective by Labeyrie). The abundance ratio of radioactive ^{14}C to stable ^{12}C in the atmosphere is a function of the strength of the exchange of CO_2 between the atmosphere and the ocean because more vigorous exchange better mixes the atmospheric inventory of "younger" carbon with the "older" carbon in the ocean. Thus, estimates of atmospheric $^{14}C/^{12}C$ can provide important information about the strength of ocean circulation in the past. Hughen *et al.* (p. 1951) analyzed Cariaco Basin sediments to create a high-resolution ^{14}C record for the period between 10,000 and 15,000 years ago that extends the radiocarbon calibration curve thousands of years beyond the upper limit possible using tree rings. They show that the climate cooling event called the Younger Dryas was primarily the result of a sudden change in ocean circulation. Ice cores from Greenland contain a record of large and abrupt periods of local warming (called "interstadials") that lasted for thousands of years during the last glacial period, but additional evidence is needed to determine if these changes were regional or global. Peterson *et al.* (p. 1947) show that the sedimentary record from the Cariaco Basin contains evidence of sudden, dramatic changes in the hydrologic cycle of the tropical Atlantic during the last 90,000 years. Their record, which is tightly coupled to the record of climate reversals found in Greenland ice, supports the idea that the tropics played an important role in forcing climate change during the last glacial cycle, and helps reinforce the case that interstadials were global in extent.

CARBON SURPRISES

Saturated carbon is usually tetrahedrally coordinated, but recent experimental studies have demonstrated that planar four-coordinate carbon species, which had been predicted theoretically, can be synthesized. Exner and Schleyer (p. 1937) now make similar predictions of molecules in which carbon is bound to six other atoms in a planar arrangement. They predict that molecules containing carbon and boron, such as CB_6H_2 or CB_3B_4, may form metastable planar structures and that the activation barriers for rearrangement to more stable isomers would be sufficiently high to enable experimental observation.

EARLY BIRDS OF A FEATHER

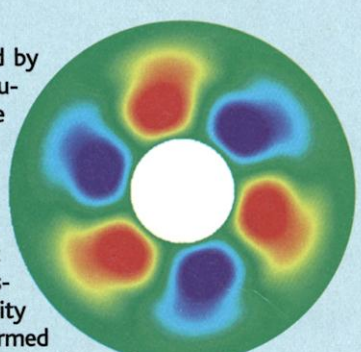
Feathers likely evolved from reptilian scales through a series of intermediate structures. Zhang and Zhou (p. 1955) describe the most primitive known enantiornithine bird, *Protopteryx*, from early Cretaceous deposits in northern China. Unlike other known avian fossils (including *Archeopteryx*), this specimen exhibits feathers with visible intermediacy between reptilian scales and true bird feathers. The specimen also exhibits novel skeletal features clearly distinguishing early birds from the theropod dinosaurs. The authors interpret their finding as evidence for the aerodynamic function of early feathers, rather than heat insulation.

SECOND-SOURCING OF INSULIN

Diabetes, resulting either from decreased levels of insulin production from pancreatic β cells or a lack of insulin altogether, affects more than 100 million people. One approach to treatment would be to induce insulin production from other cells. However, it has not been possible to achieve proper regulation of insulin release from nonpan-

CONTINUED ON PAGE 1855

CONVECTIVE COMMUNICATIONS



The interiors of planets and stars are dominated by convective fluid motions that are thought to influence such processes as magnetic dynamos and the transfer of heat from the interior to the surface. Zhang and Schubert (p. 1944) have added another dimension to computer models of convective processes by considering convection in a rotating layered spherical body. Their simulations suggest that a thermal instability in the inner layer can be transferred and concentrated into a convective instability in the corotating outer layer. This phenomenon, termed teleconvection, may explain the source of the convective instability on Earth's outer core that produces the geodynamo. Thus, thermal instabilities initiated elsewhere can create convective instabilities in outer layers.

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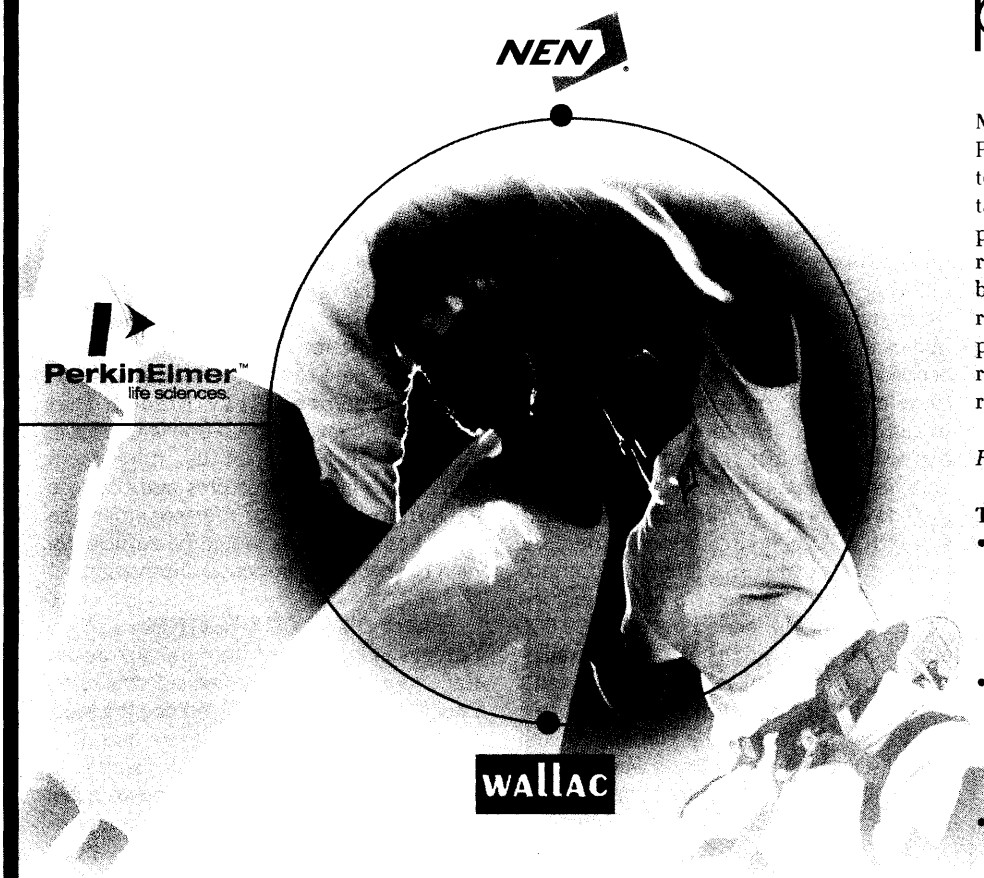

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THIS WEEK IN *SCIENCE*

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creatic cells. Cheung *et al.* (p. 1959) programmed specialized endocrine cells in the gut, K cells, to coexpress a human precursor of insulin and the regulatory region of glucose-dependent insulinotropic peptide (GIP), a hormone that normally promotes insulin release. Mice transgenic for the insulin-GIP combination produced human insulin and were protected from diabetes induced by the β cell toxin streptozotocin. Despite destruction of β cells, these mice could tolerate an oral glucose challenge.

FOCUSING ON BROKEN DNA

The formation of double-strand breaks (DSB) in DNA leads to the localization of DNA damage sensors such as γ-H2AX and NBS1 within the nucleus. Extensive DSB occur during the process of somatic V(D)J recombination required for the generation of T cell and B cell receptors. H. T. Chen *et al.* (p. 1962), using antibody staining and confocal microscopy, observed that foci of γ-H2AX and NBS1 localized at sites corresponding to V(D)J recombination in developing thymocytes. Such foci were not detected in cells in which recombination had ceased or that lacked the enzymatic machinery necessary for DNA recombination. DNA sensors mig be recruited to sites of V(D)J recombinati as a means of preventing unwanted and p tentially oncogenic translocations that could occur during these recombination events.

GETTING AN EARFUL

Classical embryological experiments suggested that the vertebrate inner ear is initially specified by signals both from mesoderm and neuroectoderm. Ladher *et al.* (p. 1965; see the Perspective by Graham) have now identified some of the molecular signals involved in the chick. A new variant of the FGF family, FGF-19, is responsible for signaling from the mesoderm to promote development of the otic placode. FGF-19 is present in the right place for only a brief period of time—just long enough to set up the next steps, such as activating Wnt-8c signaling from the neuroectoderm. Together, these signals direct formation of the otic placode and induce appropriate expression of a variety of ear-specific genes.

PERMANENT RECORD

In many cellular systems, polarity is critical for further development. Diploid yeast cells exhibit a distinctive and predictable pattern of budding at their poles that requires a sort of memory for previous bud site usage. T. Chen *et al.* (p. 1975) now describe the identity of a long-lived marker of polarity that is deposited at the bud site and remains there through many generations—the Rax2 protein.

ABOVE-AVERAGE PERFORMANCE

The models of orientation selectivity in the primary visual cortex that have been developed are still incomplete. The observed invariance of orientation tuning for different stimulus contrasts has been repeatedly pointed out as one of the unsolved problems for the dominant so-called feedforward model of information flow. Anderson *et al.* (p. 1968; see the Perspective by Volgushev and Eysel) show that averaged membrane potentials of nerve cell recordings, which contain high-frequency stochastic components, do not provide a consistent relation between these averages and the average spike probability of a neuron's output. Instead, the high-frequency components present in the recordings are of such amplitude and steepness that they force the nerve cell to generate action potentials even if the average level remains clearly subthreshold.

CULTURAL ADAPTATION

Hepatitis C virus (HCV) infection has

THIS WEEK IN *SCIENCE*

CONTINUED FROM PAGE 1853

new therapies has been the absence of a reliable cell-culture system for studying viral RNA replication. In a study of a previously described replication system, Blight *et al.* (p. 1972; see the news story by Marshall) have discovered a constellation of adaptive mutations in the HCV nonstructural protein NS5A that confer greatly increased replicative capacity to HCV RNA in vitro. These mutations have been used as tools to establish a more robust system for genetic and functional analyses of HCV.

MORE THAN LIGHT WORK

Rhodopsin, one of the proteins responsible for sensing light in the eye, is also important in the generation of photoreceptor cells—photoreceptors that lack rhodopsin degenerate. Chang and Ready (p. 1978; see the Perspective by Colley) managed to prevent photoreceptor degeneration in *Drosophila* lacking rhodopsin by expressing a constitutively active form of a Rho guanosine triphosphatase, Drac1. It appears that Drac1 organizes the actin cytoskeleton in the developing photoreceptor cells. Rhodopsin appears to play an additional role beyond sensory perception in that it activates a signal transduction pathway to stimulate morphogenesis during development.

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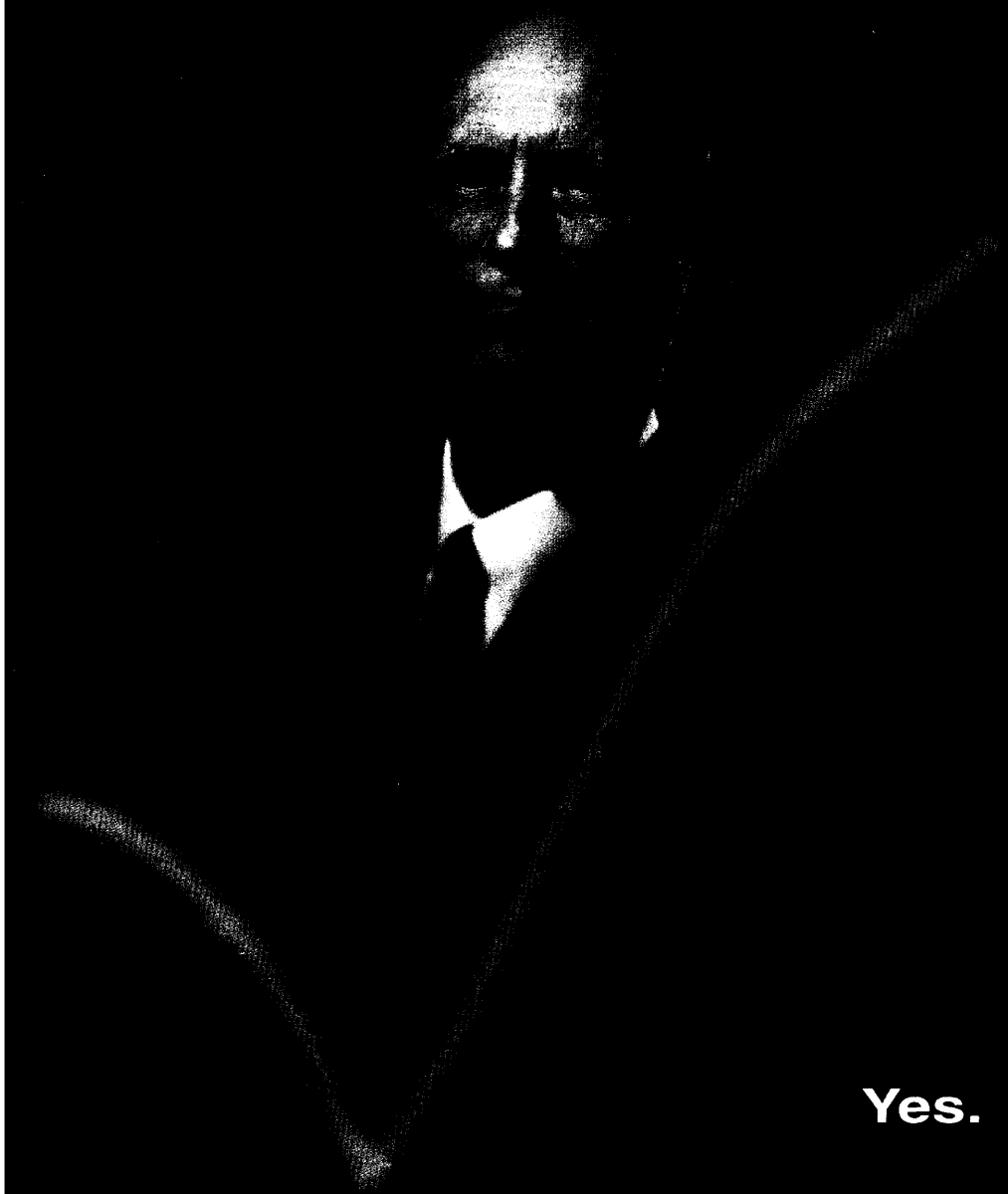

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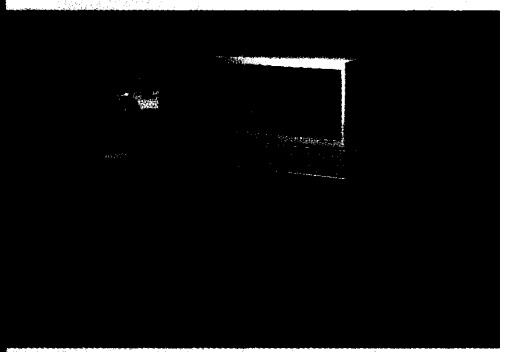

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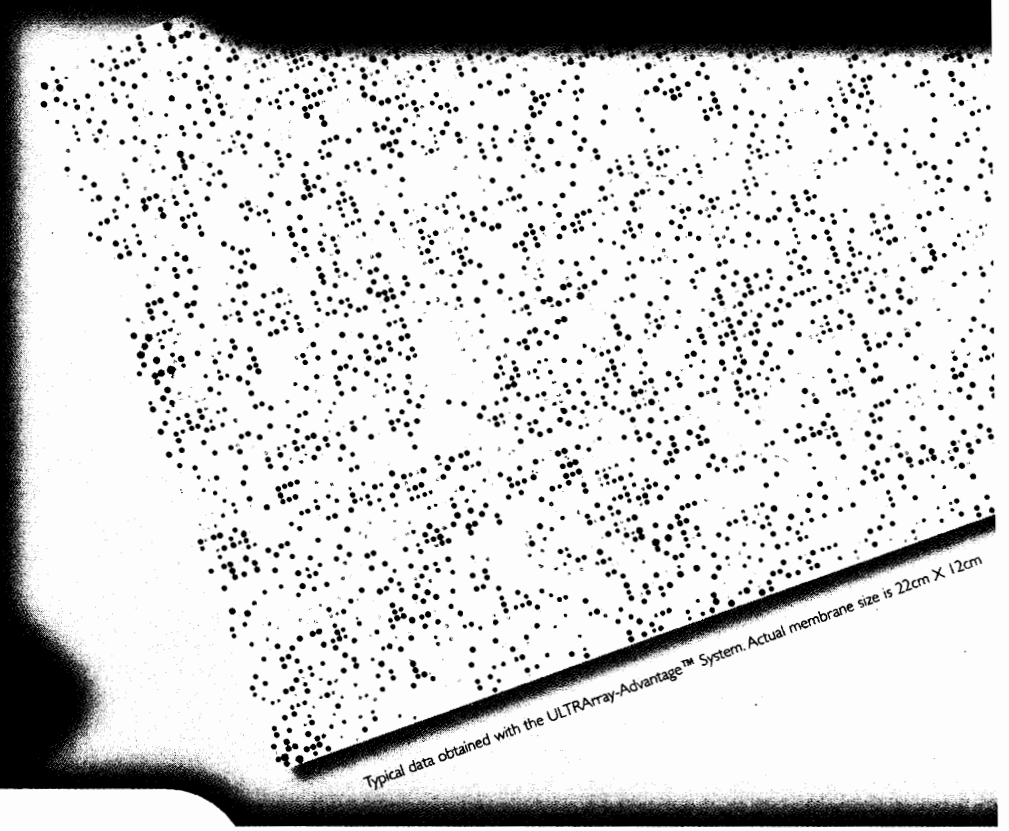

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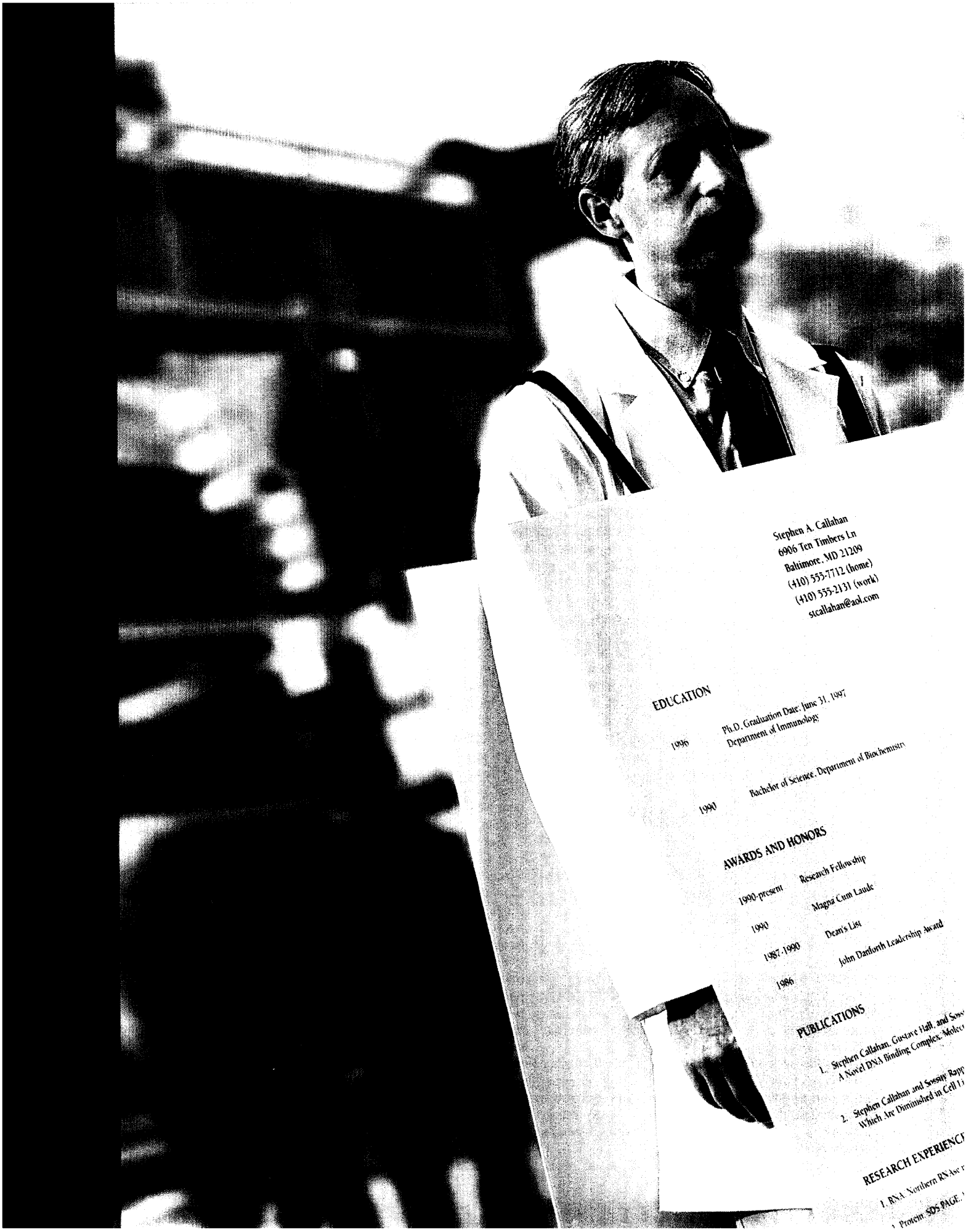

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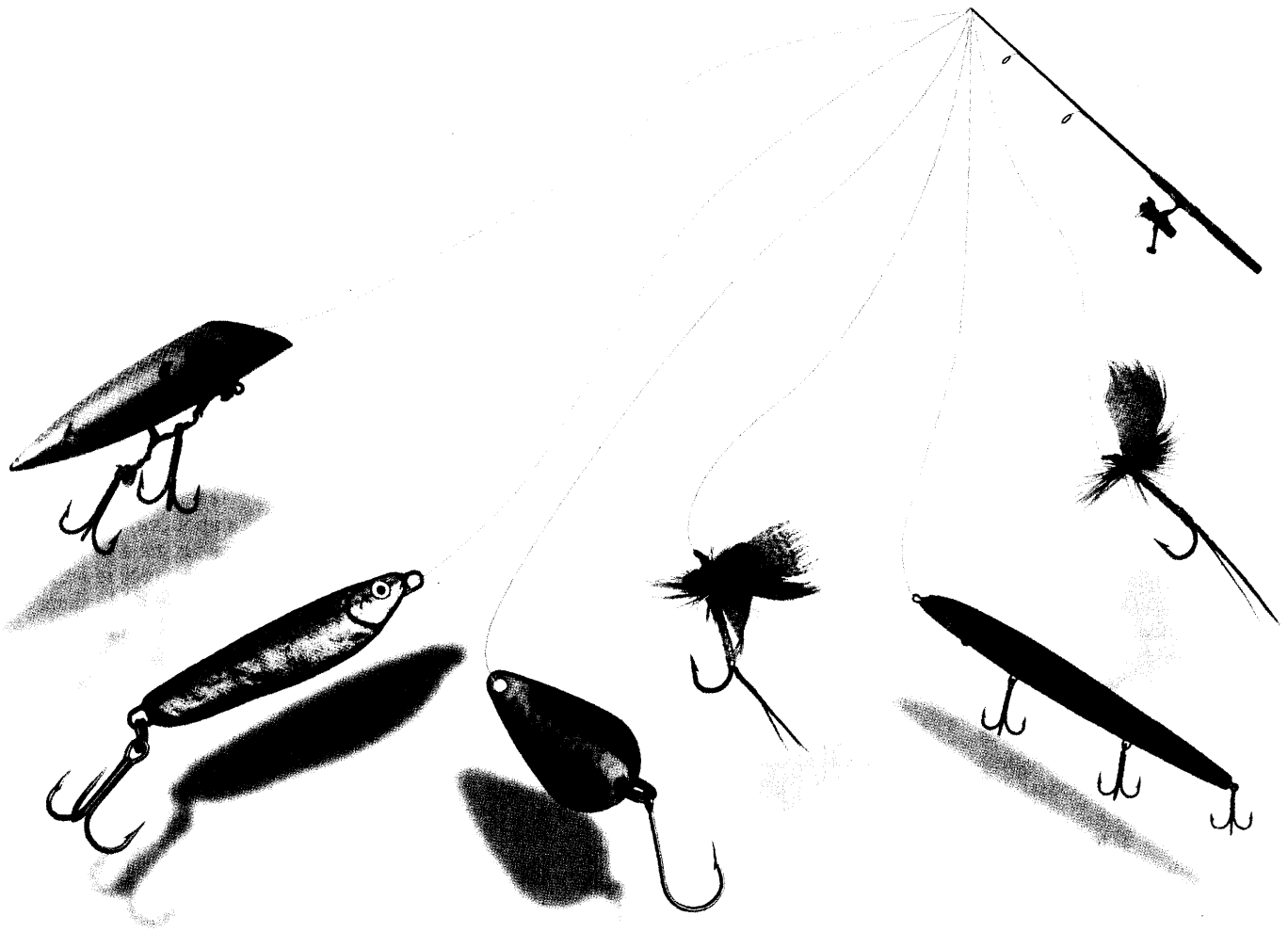

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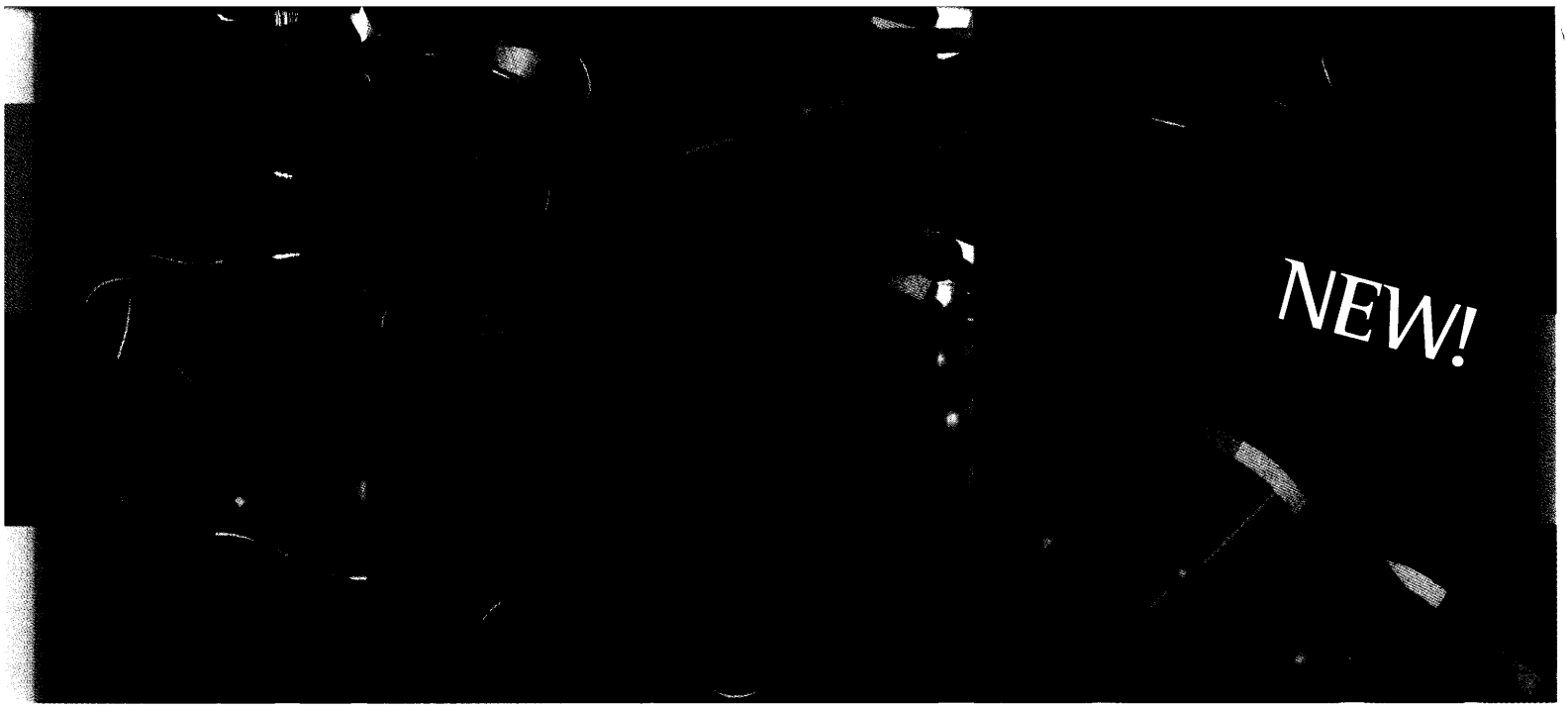

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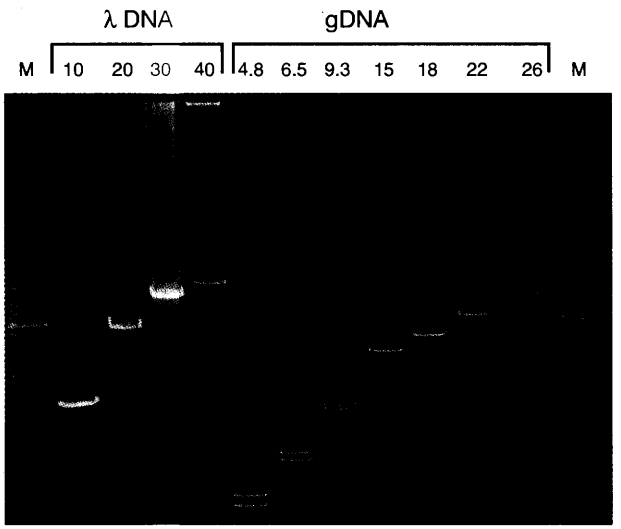

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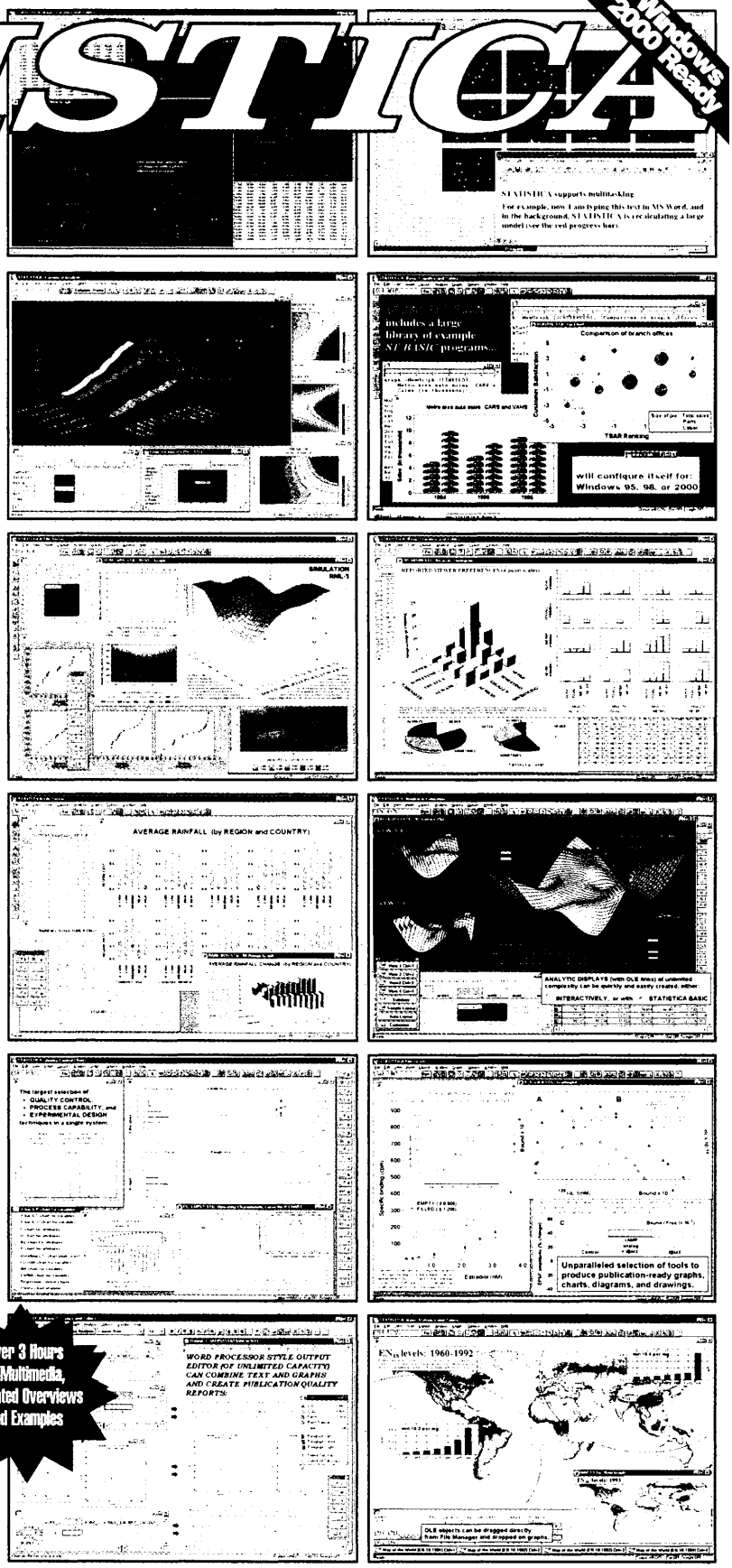

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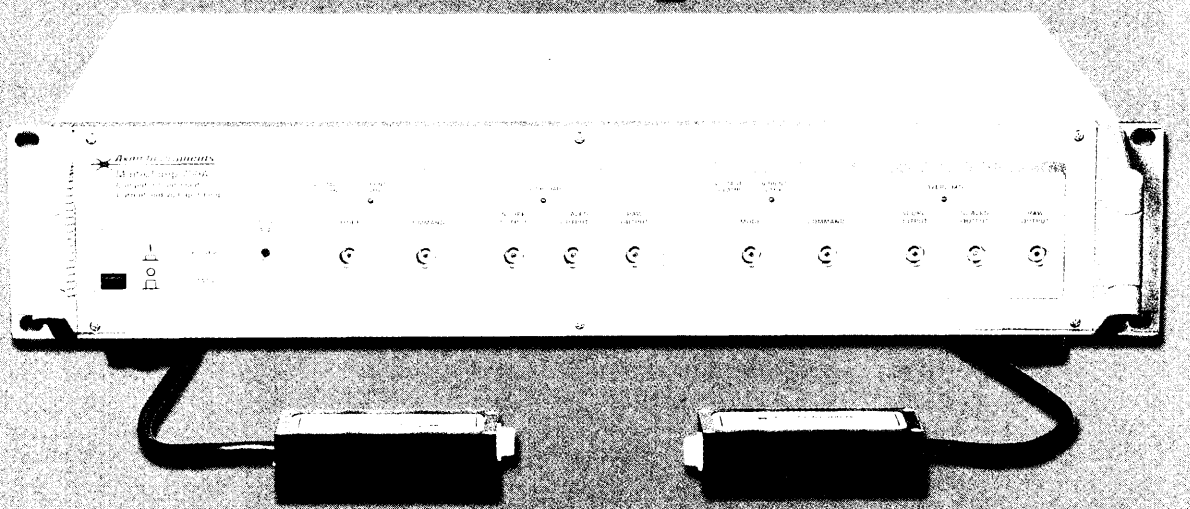

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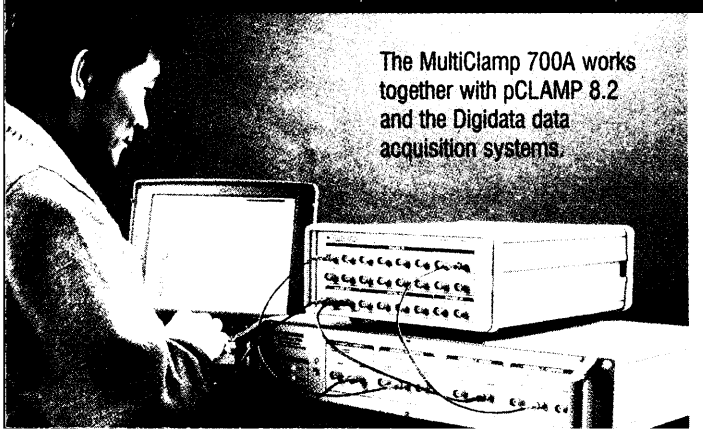

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Many remarkable advances in science and engineering hold great promise for the future. With completion of the human genome, attention turns now to the application of this massive body of information. The 2001 Genome Seminar will examine many of the issues, including drug development, proteomics, data management and ethics that this new frontier presents. Equally exciting are the startling potentials that will be presented in a special seminar on nanotechnology. Leading researchers will present the opportunities and challenges of nanotechnology in materials science, medicine, electronics, and computing.

In addition to the outstanding sessions on cutting edge science and engineering, the meeting will provide the unusual opportunity to hear in-depth discussions on a wide range of issues that confront us all—from how to best educate our children to the role of science in government to international environmental initiatives.

With meeting co-chairs, Michael Bishop of the University of California at San Francisco and Goéry Delacôte of the Exploratorium, I invite you to be a part of a most exciting and intellectually stimulating week.

I look forward to seeing you in San Francisco!

Sincerely,

Mary L. Good

AAAS President, University of Arkansas at Little Rock and Venture Capital Investors, L.L.C.

Plenary Lectures

Thursday, February 15

Student Science Convocation

5:00PM–6:30PM

American Junior Academy of Sciences Poster Displays

AAAS President's Lecture and Reception

6:30PM–9:00PM

Mary L. Good, President, AAAS, Venture Capital Investors and University of Arkansas at Little Rock

Friday, February 16

Plenary Lecture

6:30PM–7:30PM

Karen Stephenson, Chair and CEO, NetForm and Anderson School of Management, UCLA

Saturday, February 17

Plenary Lecture

6:30PM–7:30PM

Francis Collins, National Center for Human Genome Research, National Institutes of Health

Sunday, February 18

Plenary Lecture

6:30PM–7:30PM

J. Craig Venter, President and CSO, Celera Genomics

Monday, February 19

Plenary Lecture

8:00AM–9:00AM

Alfred Berkeley,* President, The NASDAQ Stock Exchange, Inc.

Plenary Lecture

6:30PM–7:30PM

David Malin, Photographic Scientist and Astronomer, Anglo Australian Observatory

**Invited, not yet confirmed*

Lectures

Topical Lectures

Friday, February 16

■ Morning Lectures (8:00AM–8:45AM)

Daniel Kleppner, Massachusetts Institute of Technology
Two Hundred Years of Quantum Physics

Luis Villarreal, University of California-Irvine
Role of Persisting DNA Viruses and Retroviruses in Host Evolution

■ Special Lecture (12:30PM–1:15PM)

Philippe Busquin, Commission for Research-European Union
Towards a European Research Area Opened to the World

■ Afternoon Lectures (1:30PM–2:15PM)

Troy Duster, University of California-Berkeley
Human Genetic Technologies and Taxonomies: Old Wine in New Bottles and New Wine in Old Bottles

Judy Kegl, University of Southern Maine
Language Emergence in a Language-Ready Brain

Norman Neureiter, U.S. Department of State

Lisa Randall, Massachusetts Institute of Technology
New Dimensions to Einstein's Gravity

Saturday, February 17

■ Morning Lectures (8:00AM–8:45AM)

Lewis Branscomb, John F. Kennedy School of Government, Harvard University
Setting the Standard for Scientific Integrity: 100 Years of NBS/NIST

Charles Groat, U.S. Geological Survey
Natural Hazard Reduction: Is Our Science Bold Enough?

Maria Elena Zavala, California State University-Northridge
Molecular Signals in Plants

■ Afternoon Lectures (2:00PM–2:45PM)

Donald Kennedy, Stanford University and *Science* Magazine
New Tests for Science

Isaiah Warner, Louisiana State University
Diversity: A Necessary Component of Science

JOHN P. MCGOVERN AWARD LECTURE:
Brenda Milner, Montreal Neurological Institute, McGill University

Sunday, February 18

■ Morning Lectures (8:00AM–8:45AM)

Susan Quinn, Author
Marie Curie

Mark Yim, Xerox PARC
Rethinking Robotics: A Modular Reconfigurable Approach

Alison Gopnik, University of California-Berkeley
The Scientist in the Crib

■ Special Lecture (1:00PM–1:45PM)

Rita Colwell, National Science Foundation

■ Afternoon Lectures (2:00PM–2:45PM)

Margaret Johnston, National Institute for Allergy and Infectious Diseases, National Institute of Health
Progress in HIV/AIDS Vaccine Development

Jerry Nelson, University of California-Santa Cruz
Astronomy and Adaptive Optics

GEORGE SARTON AWARD LECTURE:
David A. Hollinger, University of California-Berkeley
Why Are Jews Preeminent in Science and Scholarship? The Veblen Thesis of 1919 Reconsidered

Cynthia Kenyon, University of California-San Francisco
The Regulation of Aging in C. elegans

Monday, February 19

■ Afternoon Lectures (2:00PM–2:45PM)

Goéry Delacôte, The Exploratorium
Apoptosis: The Way for Science Centers to Thrive

Paul Sereno,* University of Chicago,
Dinosaurs

*Invited, not yet confirmed

Science Innovation

Seminars

NANOTECHNOLOGY

A New Frontier for Science and Engineering

Thursday, February 15
12:00NOON–5:30PM

Friday, February 16
9:00AM–12:00NOON
2:30PM–5:30PM

Organized by Philip H. Abelson, AAAS, Charles W. Clark, National Institute of Standards and Technology, James Ellenbogen, Mitre Corporation, Paul Alivisatos, University of California-Berkeley and Michael S. Strauss, AAAS

The emerging field of nanotechnology provides new opportunities to transform wide areas of science and engineering. The unique behavior of nanoscale materials enables them to serve as catalysts and to take advantage of giant magnetic resistance they afford. Further, new instrumentation is providing the tools for exploration and manipulation of the nanoscale environment. As a successor to the current technology employed in silicon and other semiconductor devices, nanoscale materials promise a new "computer revolution." Laboratories and research institutes in the U.S. have been increasingly active in studies related to nanotechnology and nanoengineering. However, these face a rapidly increasing global competition. To this end, recent government initiatives provide promise of much-needed funding for this work. This seminar will examine important opportunities presented by nanotechnology for engineering, technology, science and society. It will encompass several areas where this technology promises transforming innovations showcasing the work of leading scientists and engineers in this emerging field.

Speakers include:

Paul Alivisatos, UC-Berkeley
Phaedon Avouris, IBM-Yorktown
Charles Clark, NIST
Harold G. Craighead, Cornell Univ
Mildred Dresselhaus, MIT
Donald Eigler, IBM Almaden Rech Cntr
James Ellenbogen, MITRE
Franz J. Himpsel, Univ of WI
Phil Kuekes and Stan Williams, Hewlett-Packard
Uzi Landman, GA Tech
Neal Lane,* Asst. to President for Sci and Tech
James Meindl, GA Tech
Pierre Petroff, Univ of CA-Santa Barbara
Mara Prentiss, Harvard Univ
Mark Reed, Yale Univ
Michael L. Roukes, Caltech
Samuel Stupp, Northwestern Univ
George Whitesides,* Harvard Univ
Ellen Williams, Univ of MD
Bernard Yurke, Bell Lab, Lucent

* Invited, not yet confirmed

2001 GENOME SEMINAR

Beyond the Human Genome

Saturday, February 17
9:00AM–12:00NOON
3:00PM–6:00PM

Sunday, February 18
9:00AM–12:NOON
3:00PM–6:00PM

Organized by J. Craig Venter, Celera Genomics, Claire Fraser, TIGR and Barbara Jasny, AAAS and *Science*

The 2001 Genome Seminar is cosponsored by AAAS, *Science* Magazine and The Institute for Genomic Research (TIGR)

The recent sequencing of the human genome, although it represents an enormous landmark in the history of science, is not the end but the beginning of a new era of research. From microarray technology to DNA vaccines to taking the first steps into the new frontier of proteomics—this two-day seminar explores the new kinds of research that will be possible and the new technologies being developed.

Among the topics to be addressed are whole genome sequencing, comparative genomics regulatory regions, proteomics, microarrays, SNPs, functional genomics, genetic networks, pharmacogenomics, artificial chromosomes, DNA patenting and genetic discrimination.

Speakers include:

Adam Arkin,* Stanford Univ
Aravinda Chakravarti,* John Hopkins Univ
Andrew Clark, Celera Genomics
John Doll, U.S. Pat Off
Bernard Dujon, CNRS
Michael Eisen, Lawrence Berkeley Nat'l Lab
Eric Green, NHGRI/NIH
Leroy Hood,* Univ of WA
Dennis Hochstrasser, Geneva Univ Hosp
Mike Hunkapiller, Appl Byosyst
Barbara Jasny, AAAS and *Science*
Stuart Kim, Stanford Univ Med Cntr
Gavin Macbeath, Harvard Univ
Joe Nadeau, CWR Univ
Greg Petsko, Brandeis Univ
Wendell Weber, Univ MI
Hunt Willard, CWR Univ
Barbara Wold, Caltech
J. Craig Venter, Celera Genomics

* Invited, not yet confirmed

2001 FORUM FOR SCHOOL SCIENCE AND MATHEMATICS

Addressing Critical Issues in K-12 Science, Mathematics and Technology Education: What Can Urban School Districts Do?

Monday, February 19
9:30AM—6:30PM

Organized by Shirley Malcom, Madeline Long and Betty Calinger, AAAS

The 2001 Forum for School Science and Mathematics will be devoted to issues identified by urban school districts in California and across the nation as critical to the teaching and learning of science and mathematics. These include: (1) strategic uses of technology to support children's cognitive development, (2) what mathematics should be taught to all students, (3) literacy and K-12 science education, and (4) recruiting, preparing, and retaining K-12 teachers of mathematics and science. Participants will discuss these topics in multi-hour sessions organized by practitioners and researchers. In addition to group discussions, a panel of superintendents from large urban districts will address these issues and others that they have faced while leading system-wide programs to improve mathematics and science education.

Among those organizing panels and speaking are:

Louis Gomez, Northwestern University
Elizabeth Stage, University of California System
Jerry Valadez, Fresno Unified School District
Maria Lopez-Freeman, California Science Project
Martin Friedman, National School and Community Corps, Woodrow Wilson National Fellowship Foundation
Santiago Wood, Fresno Unified School District

Symposia

Brain, Mind and Behavior

Fri	AM	Reading & Dyslexia: The Brain
Fri	PM	Addiction Is a Brain Disease
Fri	PM	Statistics in Natural Language
Sat	AM	Origin of Mathematical Thinking
Sat	PM	Many Languages–One Grammar
Sun	AM	The Human Brain After Injury
Sun	AM	Wine & Conversation
Sun	PM	Precursors to Human Communication
Mon	AM	Modality Effects on Language
Mon	PM	Language Learning in Infancy

Communicating Science

Fri	AM	Juggling, Magic, Sports and Combinatorics
Fri	AM	Who Should Write the Story of Science?
Fri	PM	Communicating the Future
Sat	AM	Science & the News Media
Sat	PM	Science Is Fun!
Sun	AM	Science & Conflicts of Interests
Sun	PM	Communicating Sustainability
Mon	AM	Biotechnology Communications
Mon	PM	What Makes a Science Book Become a Best Seller?
Tue	AM	Science Fiction & Science

Doing Science Globally

Fri	AM	Int'l Efforts to Stop Invasive Species
Fri	PM	Science & Health Disparities
Fri	PM	Int'l Efforts to Stop Invasive Species
Sat	AM	Science at the Earth's Poles
Sat	AM	Drug Abuse Research: Latin America
Sat	PM	Science at the Earth's Poles
Sat	PM	Science & Technology in Latin America
Sun	PM	Pollutants Without Borders
Sun	PM	Agr Biotech & the Public Sector
Mon	AM	Globalization of Science
Mon	PM	Global Perspectives on Emerging Research
Mon	PM	Capital, Innovation & the Pacific Rim

Education and Public Understanding of Science

Fri	AM	Science Education as a Subversive Activity?
Fri	PM	Policy for Pre-College Science Education
Sat	AM	Minority Outreach in Science & Math
Sat	PM	Technological Literacy
Sun	AM	Beyond TIMSS: Professional Development
Sun	AM	Making Active Learning Successful
Sun	PM	Journey Beyond TIMSS: New Insights
Sun	PM	"Antievolutionism": What Changed?
Mon	AM	Computerized Adaptive Testing
Mon	AM	Collaboration of Scientists & Museums
Mon	PM	The Literacy Crisis in Deaf Education
Mon	PM	Bringing Space Science to Earth
Mon	PM	Historical Sciences & Science Education
Tue	AM	Genetically Modified Foods

Environment, Food and Natural Resources

Fri	AM	Prospects for Feeding 10 Billion People
Fri	PM	The Livestock Revolution
Sat	AM	Food Safety & the Tech Revolution
Sat	AM	Subglacial Lakes: Planetary Perspective
Sat	PM	Carbon Mgmt, Energy & Environment
Sat	PM	Natural Disasters Along the Pacific Rim
Sun	AM	Pre-European Landscapes of the West
Sun	PM	Advances in Wine & Cheese
Sun	PM	The Aquaculture Paradox
Mon	AM	Archaeology & Sustainable Development
Tue	AM	Science & Water Issues of Northern CA

Life Science and the Science of Life

Fri	AM	Deep-Sea Hydrothermal Vents: Life
Fri	PM	Phylogeny, Evolution & Genomics of Plants
Sat	AM	Understanding Domestication
Sat	PM	The Scientific Role of National Parks
Sun	AM	Biology Into Space: Gravity
Sun	AM	The Future of Plant and Animal Biotech
Sun	PM	Earth System Science: Quiet Revolution
Sun	PM	Life is Complex
Mon	PM	Influences on Biol Community Structure

Looking Beyond Earth

Fri	AM	Assembling the Universe: Star Formation
Sat	AM	From Gas and Gravity to Galaxies
Sat	PM	Rebuilding the Galactic Neighborhood
Sun	AM	A Telescope the Size of Earth
Mon	AM	Infrared Astronomy: Molecules of Life
Mon	PM	Human Exploration of Space
Mon	PM	Planetary Systems: Origin and Evolution

Medicine and Public Health

Fri	AM	Support During Pregnancy & Birth
Fri	AM	Bioactive Lipids & Drug Discovery
Fri	PM	Non-Injectable Insulin–A Reality?
Fri	PM	Stem Cell & Parkinson's Disease
Fri	PM	The Rebirth of Tetracyclines
Sat	AM	Malaria in Africa
Sat	AM	Screening for Inborn Diseases
Sat	PM	The Autoimmune Diseases–Why Women?
Sun	AM	Stress & Health
Sun	PM	How Long Can Humans Live?
Mon	AM	Mathematics & Medicine
Mon	PM	Obesity: Causes & Solutions

Science and Society

Fri	AM	Cultivating the Civic Scientist
Fri	AM	Language & the Criminal Law
Fri	PM	Visual Symbiosis of Art & Math
Fri	PM	Statistics & Human Rights
Sat	AM	Bio-Technology & Bio-Weapons
Sat	PM	Recruiting & Retaining Minorities
Sat	PM	Technology & Cultural Heritage Materials
Sun	AM	Native American Human Remains
Sun	AM	Music & Statistical Models
Sun	PM	Science for the Community
Sun	PM	The Return of 'Collegiality' to Science
Mon	AM	To Pledge or Not to Pledge
Mon	AM	Mathematics in Pricing & Hedging
Mon	PM	The Research Museum

Science and the Biosphere

Fri	AM	Sustainable Coasts: Counting the Costs
Sat	AM	The Scientific Theory of Marine Reserves
Sat	PM	Science & Policy of Marine Reserves
Sun	AM	Extinction Vulnerability
Sun	PM	Humans & High Altitude Environments
Mon	AM	Coral Reefs in Crisis

Science, Engineering and Public Policy

Fri	AM	The Comprehensive Test Ban Treaty
Fri	PM	Arms Control & Proliferation Concerns
Sat	AM	Standards & Rate of Technology Development
Sat	AM	Math of Apportionments
Sat	PM	Math Aspects of Intellectual Property
Sun	PM	Shaping the Genetic Future of Man
Mon	AM	Government's Role in the Commercialization
Mon	AM	Bench Scientists & Science Policy
Mon	PM	Patenting Genes & Business Methods
Tue	AM	Implications of Minimal Genomes

Technology Impacts on Society and Engineering

Sat	PM	Simulations, Complexity & Ethics
Mon	AM	Functional Genomics
Mon	PM	Networking Technologies & Research

Science Innovation

Fri	AM	Matter and Antimatter: Not Quite Opposites
Fri	PM	Accelerating Discovery: Supercomputers
Fri	PM	Coming Revolutions in Particle Physics
Sat	AM	Learning and Plasticity in the Brain
Sat	PM	Signal Transduction
Sun	PM	Mathematics & Visual Cortex
Mon	AM	Managing the Sea of Data
Mon	PM	Quantum Computing & Communication

Seminars

Thur	PM	Nanotechnology Seminar
Fri	AM	Nanotechnology Seminar
Fri	PM	Nanotechnology Seminar
Sat	AM	2001 Genome Seminar
Sat	PM	2001 Genome Seminar
Sun	AM	2001 Genome Seminar
Sun	PM	2001 Genome Seminar
Mon	AM	2001 Forum for School Science
Mon	PM	2001 Forum for School Science

Drug Discovery ▼ | Research ▼ | Clinical Screening

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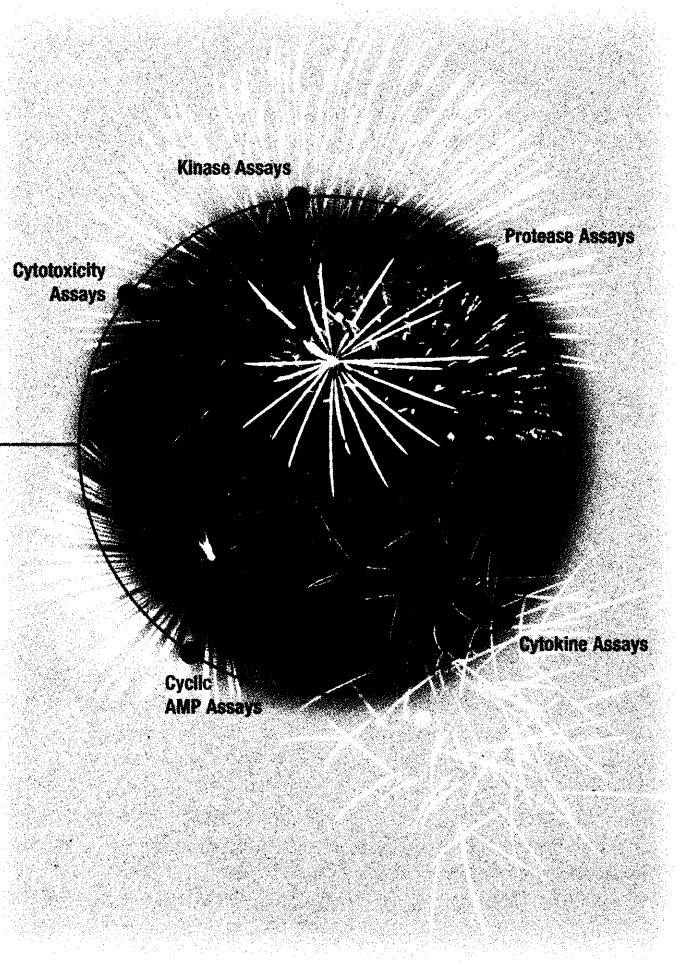

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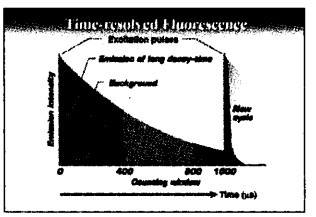
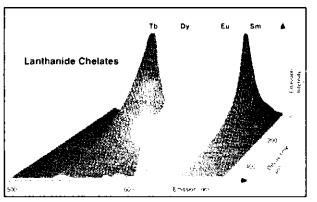


The excellent temporal and spectral resolution of our lanthanide chelates provide high sensitivity, and make them an excellent alternative to radioisotope labeling:



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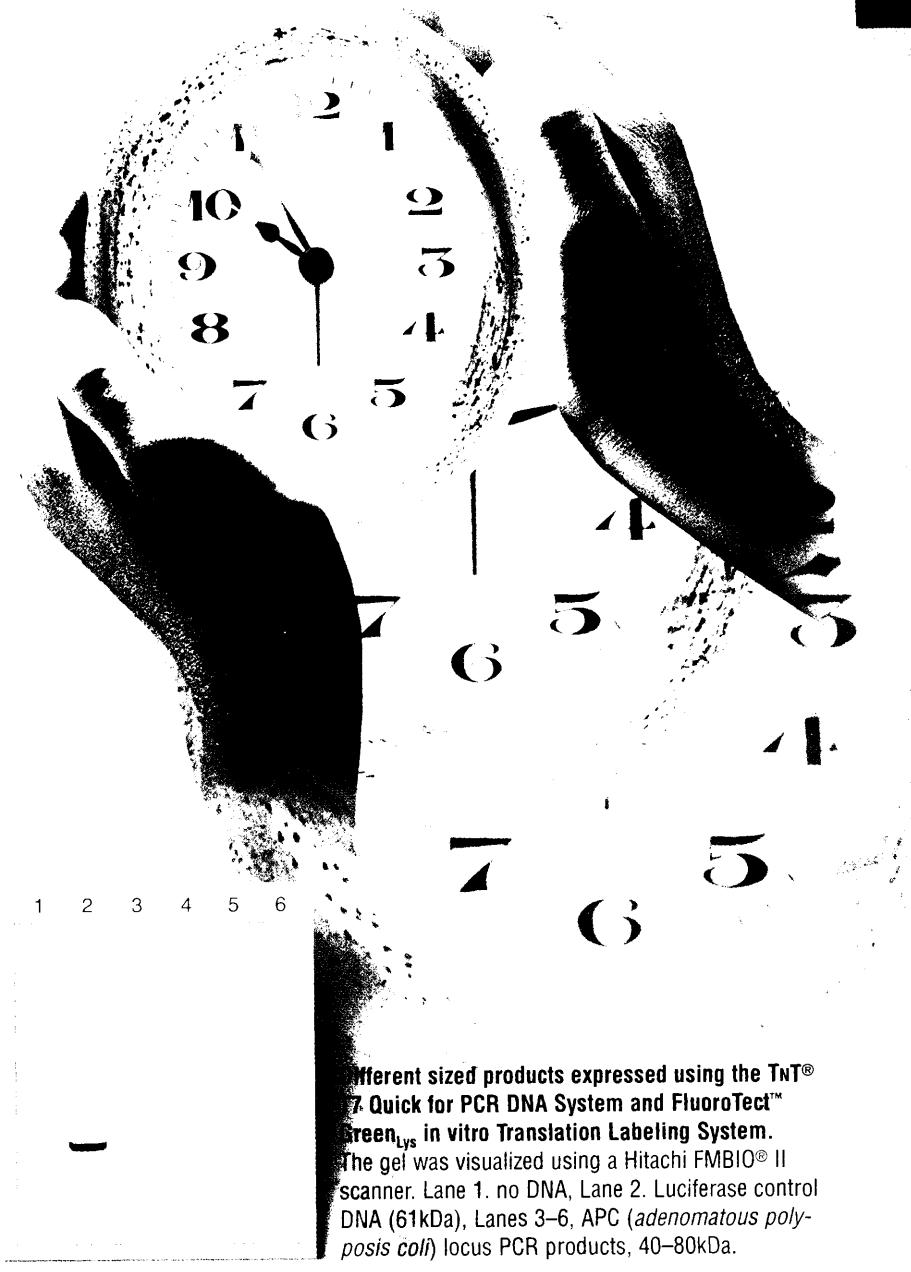

Different sized products expressed using the TnT® T7 Quick for PCR DNA System and FluoroTect™ Green$_{Lys}$ in vitro Translation Labeling System. The gel was visualized using a Hitachi FMBIO® II scanner. Lane 1. no DNA, Lane 2. Luciferase control DNA (61kDa), Lanes 3–6, APC (*adenomatous polyposis coli*) locus PCR products, 40–80kDa.

Features

Data can be obtained in minutes, eliminating overnight exposures associated with radioactive-based systems or time consuming steps utilized by traditional non-isotopic methodologies.

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