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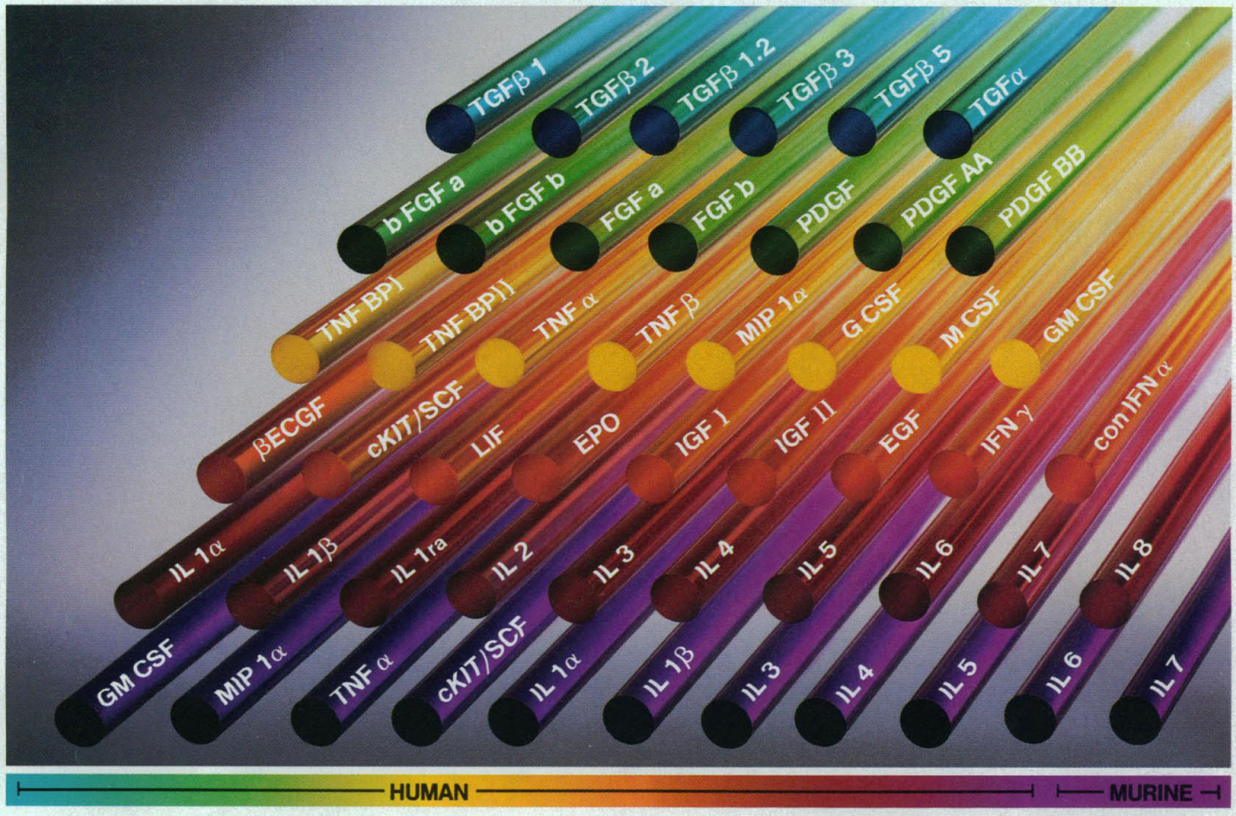

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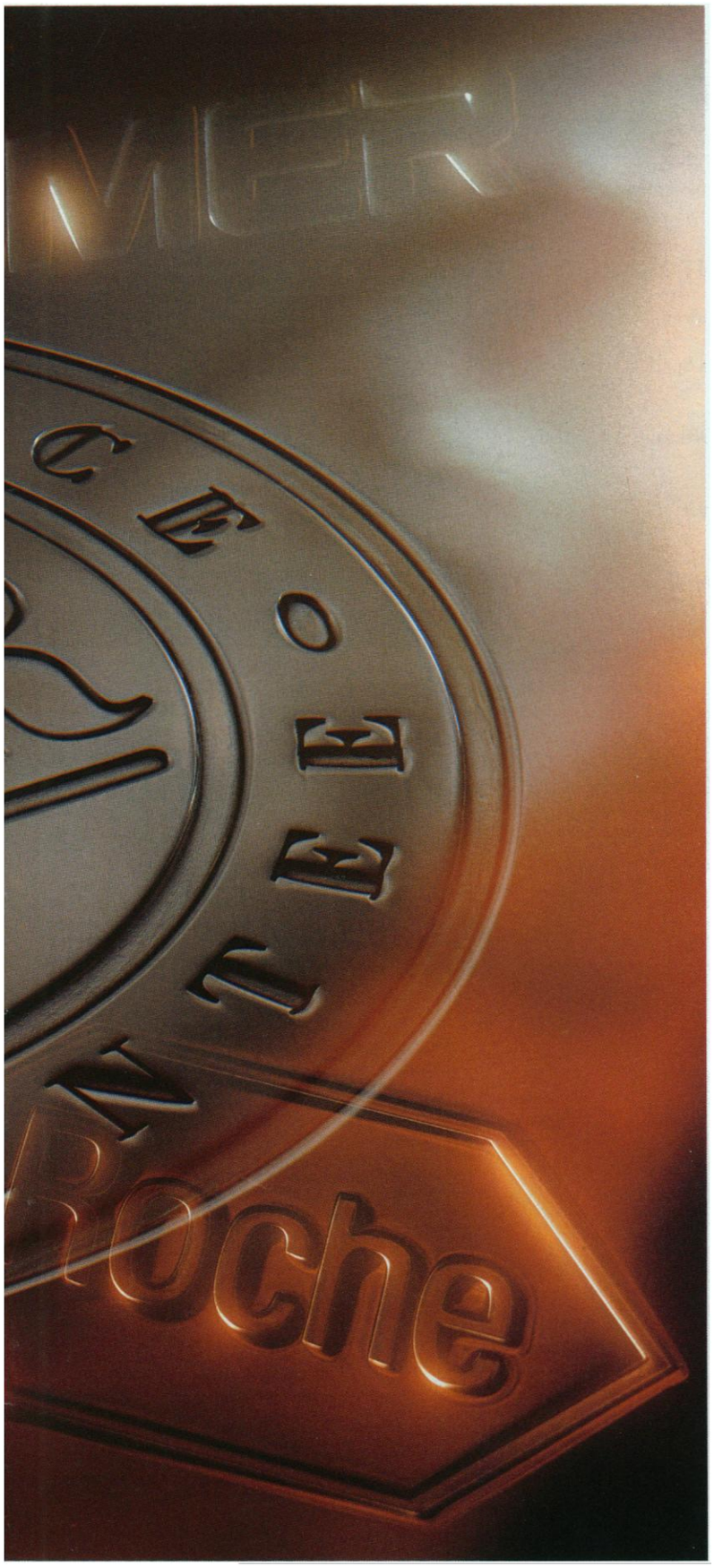

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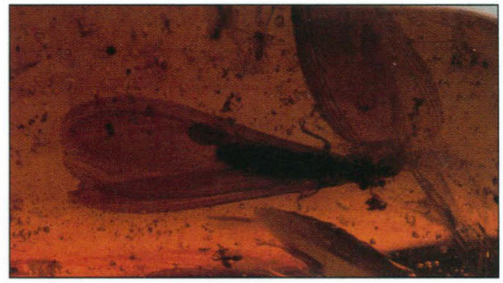
1852
Everglades in peril

NEWS AND COMMENT

RESEARCH NEWS



1860 & 1933
Analysis of ancient DNA

1965
AAAS Meetings
AAAS*93
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DEPARTMENTS

COVER

Atomic force micrograph of a living cell, showing filamentous actin and other internal cellular structures. The ability of the atomic force microscope to "see" inside living cells, coupled with its potential for very high resolution imaging, may make this and related instruments powerful tools for molecular cell biology. See page 1944 and the special section on instrumentation beginning on page 1885. [Micrograph: E. Henderson]

ARTICLES

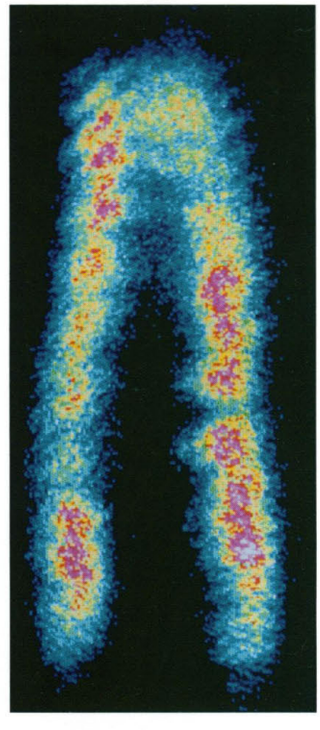
INSTRUMENTATION

RESEARCH ARTICLE

REPORTS

1894

Spectroscopic subtleties: for other advances in instrumentation, see pages 1885 to 1917



◩ Indicates accompanying feature

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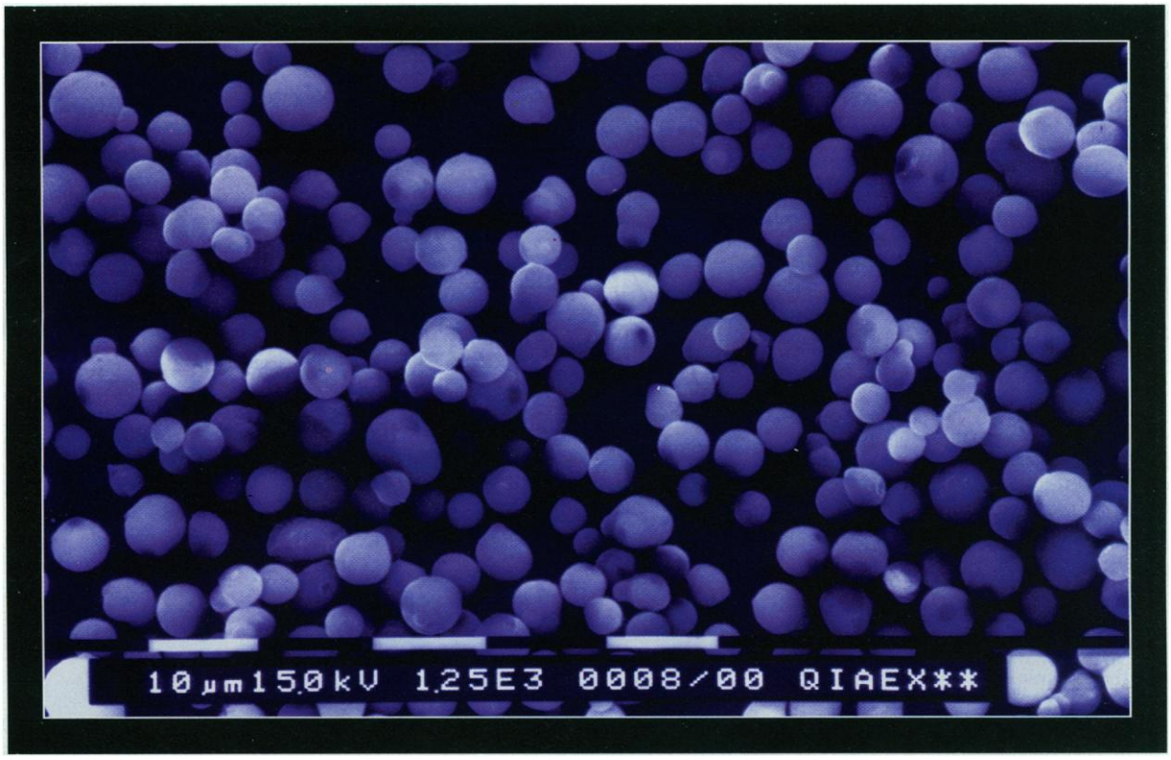

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DNA size	Amount DNA (µg)	Recovery (%)
ds DNA		
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6.6 kb	1.30 µg	90%
1440 bp	0.80 µg	92%
517 bp	0.90 µg	94%
396 bp	0.14 µg	83%
	0.06 µg	84%
75 bp	0.13 µg	75%
44 bp	0.02 µg	72%

DNA size, DNA amount vs. recovery with **QIAEX**. *Recoveries of ^{32}P end-labeled DNA fragments purified with* **QIAEX** *›Gel Extraction‹ Kit determined by scintillation counting.*

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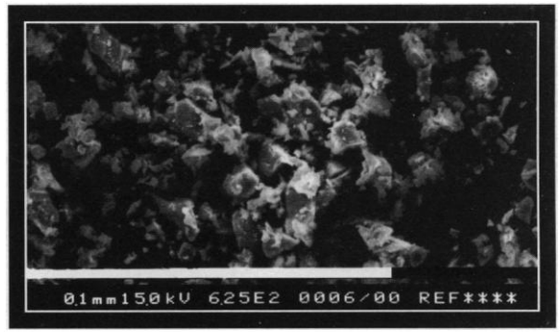

Scanning electron micrograph of powdered glass.

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edited by PHIL SZUROMI

Comet conundrum

Comets are routinely defined as comprising a mixture of frozen gases, refractory grains, and carbonaceous matter. Now, a comet lacking the latter has been observed. Fink (p. 1926) reports on spectroscopic observations of comet Yanaka (1988r), which shows the usual signatures of oxygen and NH_2 radicals but lacks the typical CN or C_2 emission of its fellows. According to Fink, the deviant comet is either an unusual product of our solar system or an interstellar interloper. If the former, then assumptions about the early solar system need to be revisited. If the body is from beyond the solar system, future space probes could visit the comet and sample a bit of the interstellar medium.

Reckoning our relatives

Phylogenetic relations among humans, African apes, and orangutans and the early evolution of hominids has been controversial; molecular data suggests that the apes and humans form a clade distinct from the orangs, whereas interpretations based on morphology have united the apes and orangs. Begun (p. 1929) describes a late Miocene hominid (5 to 11 million years ago) of the genus *Dryopithecus* from north-central Hungary that shows primitive features that appear to be similar to those in *Gorilla*; chimps (genus *Pan*) and humans show derived characteristics. This evidence supports the phylogeny of a distinct ape-human clade and suggests that chimps and humans are more closely related to each other than to any other living primate. These relations are discussed further by Gibbons (p. 1864).

Assembly of the RNA splicing complex

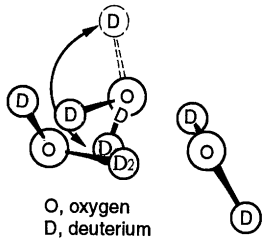
After RNA is transcribed, the noncoding intron sequences are removed and the coding exon sequences are joined together during splicing. Several small nuclear ribonucleoproteins, or snRNPs, help form the splicing complex, or spliceosome. Wassarman and Steitz (p. 1918) have mapped out some of the structural and temporal interactions between the snRNPs U1, U2, U4-U6, and U5 from HeLa cells with precursor messenger RNA from adenovirus in cross-linking studies that made use of a psoralen derivative that could be reversibly attached and detached with ultraviolet light. A model for the association events suggests that several steps occur prior to the cleavage event. The U6 snRNP may be analogous to group II self-splicing introns.

Ancient DNA

Amber, the fossilized resin of trees, can contain inclusions of insects and plants in a near perfect state of preservation. Such fossils provide opportunities to extract and amplify ancient DNA for evaluation of phylogenetic relations derived solely from morphology of fossils or analysis of extant species. DeSalle *et al.* (p. 1933) amplified fragments of mitochondrial (16S rDNA) and nuclear (18S rDNA) genes from the termite *Mastotermes electrodominicus* preserved in amber that is 25 to 30 million years old. The analysis shows that termites are monophyletic. Morell discusses other aspects of the analysis of ancient DNA (p. 1860).

Chiral water clusters

Spectroscopic investigations of water trimers reveal patterns of hydrogen bonding that produce left- and right-handed forms. These enantiomers interconvert through quantum tunneling of hydrogen atoms to different hydrogen-bonding sites. Pugliano and Saykally (p. 1937) used a molecular beam to form the water trimers and far-infrared laser absorption spectroscopy to map out the rotational, vibrational, and tunneling bands that led to the structural assignment. Similar transient chiral complexes may be of importance in



understanding the properties of liquid water.

Oral hypertension drugs

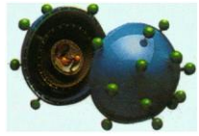
A number of therapeutic strategies are based on the inhibition of enzymes, and one approach for developing inhibitors is to synthesize molecules based on peptides. One difficulty has been that such drugs often have low oral bioavailabilities; only a few percent of the drug is absorbed. Kleinert *et al.* (p. 1940) report on the development of a peptide-based renin inhibitor that appears to have high bioavailability (greater than 50% in dogs). Renin inhibitors are used to control hypertension, as this enzyme catalyzes the rate-limiting step in the synthesis of the hormone angiotensin II.

Atomic force microscopy of living cells

Many of the dynamic processes that occur in cells cannot be resolved with optical microscopes, and the sample preparation required for taking advantage of the higher resolution of electron microscopes precludes studying these processes in living samples. Henderson *et al.* (p. 1944; cover) have used the atomic force microscope (AFM), which can produce image profiles of surfaces with up to atomic resolution, to study the assembly of elements of the cytoskeleton, actin filaments, in living glial cells. The authors discuss mechanisms for how the filaments, which lie below the cell membrane, might be imaged by the tip of the AFM. Imaging "soft" surfaces with the AFM is discussed in a review by Radmacher *et al.* (p. 1900) in this special issue on Instrumentation (pp. 1885 to 1917).

Alternative splicing and zinc finger proteins

The utility of a single gene may be expanded during development by the generation of several protein isoforms through alternative messenger RNA splicing. Hsu *et al.* (p. 1946) and Gogos *et al.* (p. 1951) describe multiple forms of a *Drosophila* zinc finger transcription factor, CF2, produced from differentially spliced mRNA. The splicing specifically affects the number of zinc fingers in the CF2 protein isoforms which in turn alters the DNA binding specificity for each isoform. Because these alternative forms are produced at variable times during development and in different tissues, the CF2 gene encodes multiple transcription factors, each with potentially different sets of target genes due to their particular DNA binding specificities.



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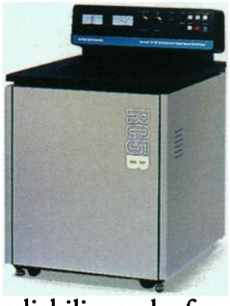

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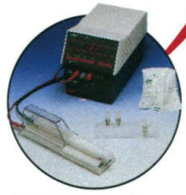

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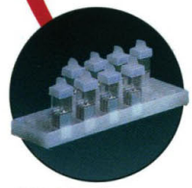

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* Tang, D., DeVit, M., and Johnston, S.A., *Nature*, **356**, 152-154 (1992). Biolistic is a registered trademark of the DuPont Company.

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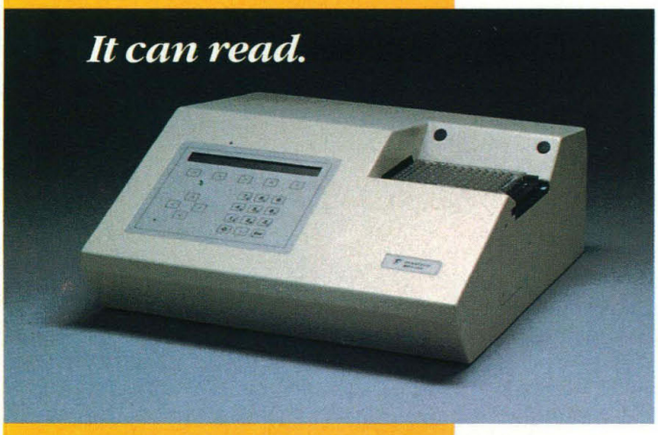

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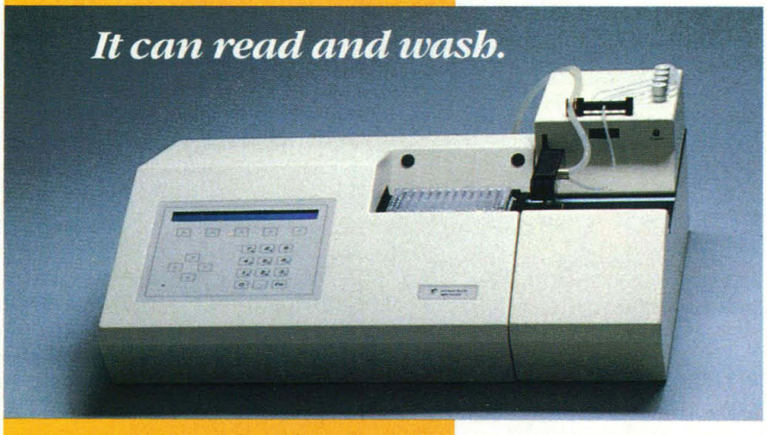

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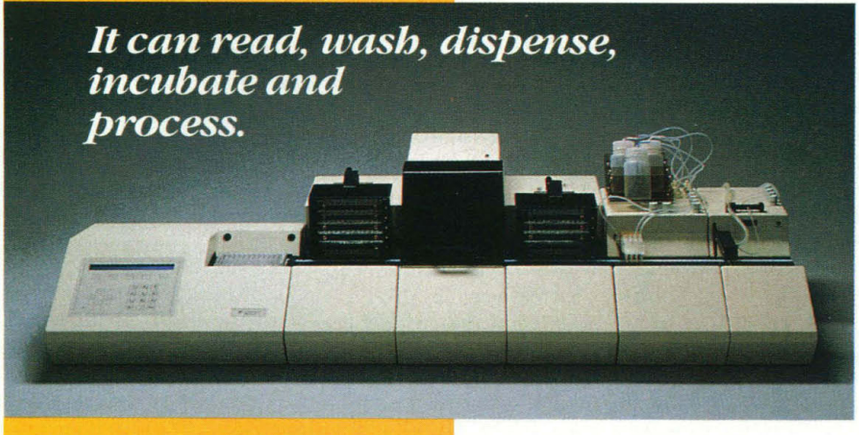

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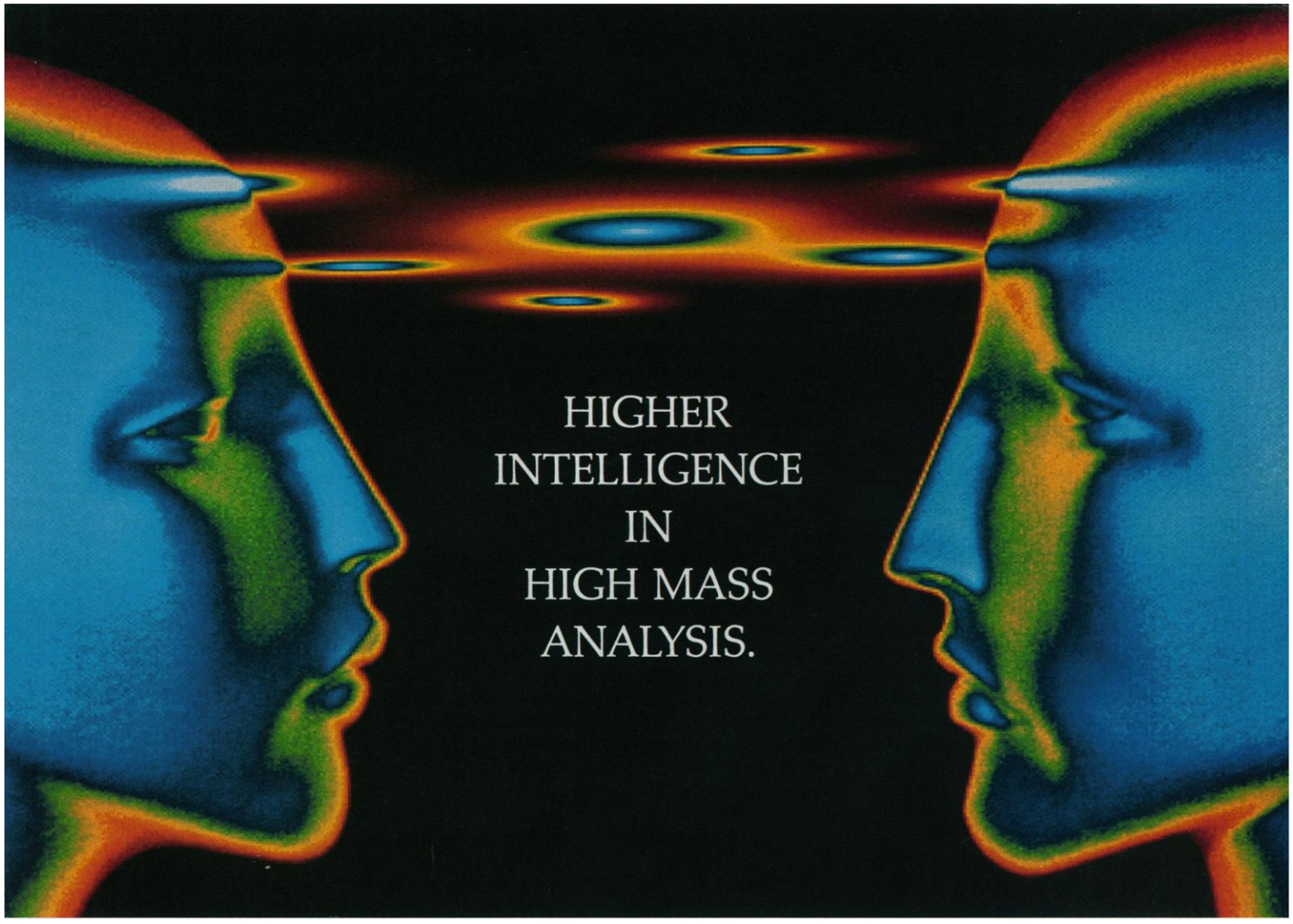

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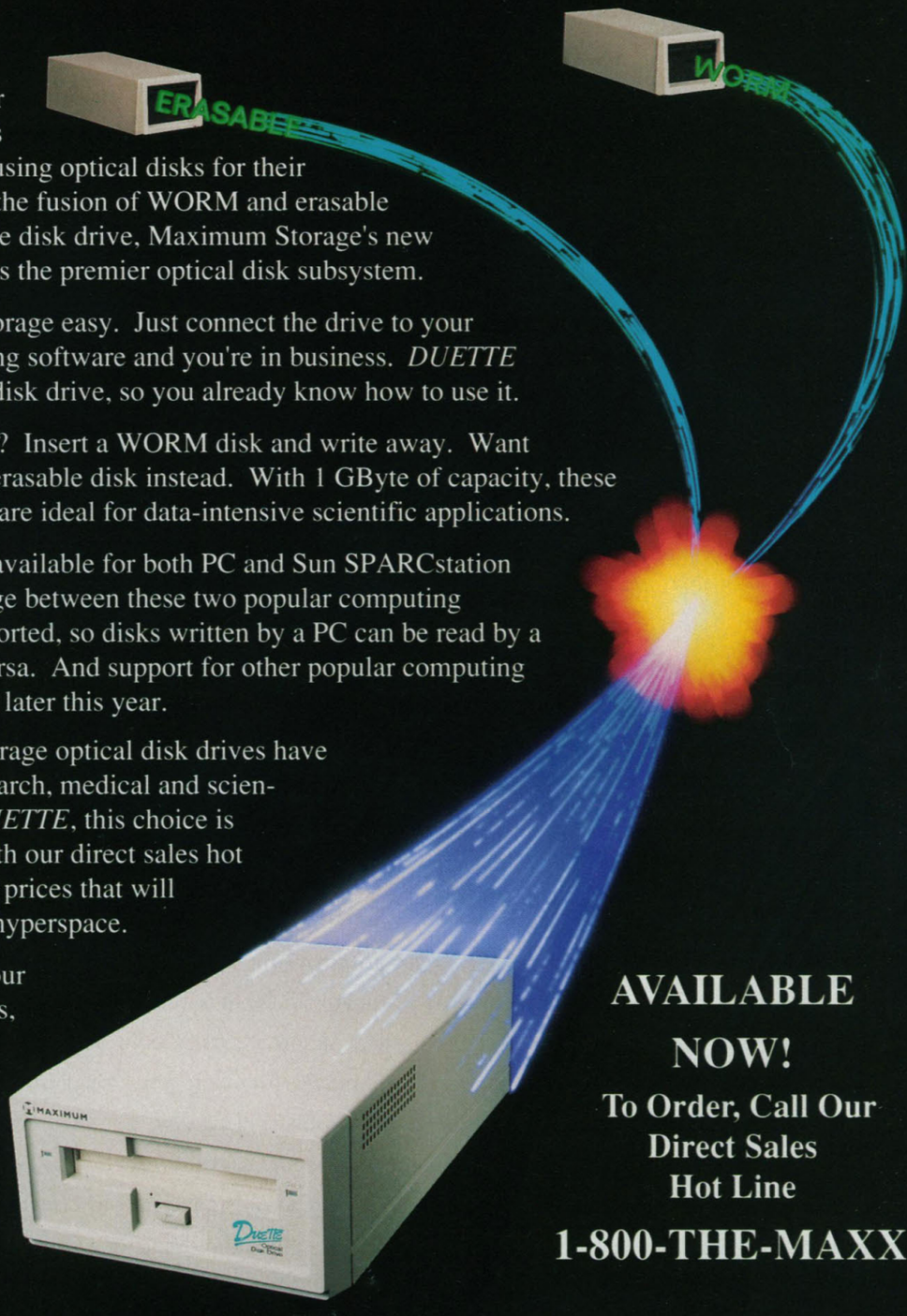

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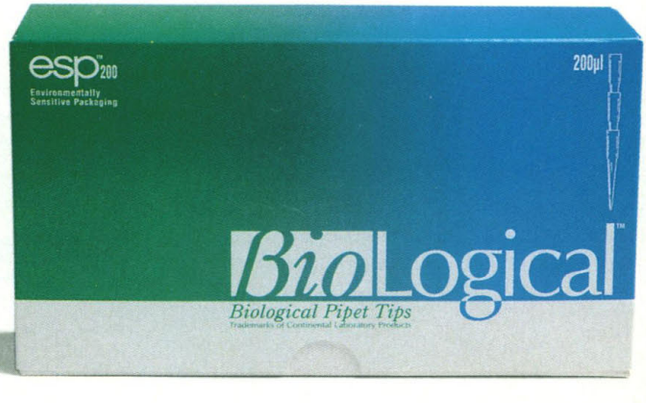

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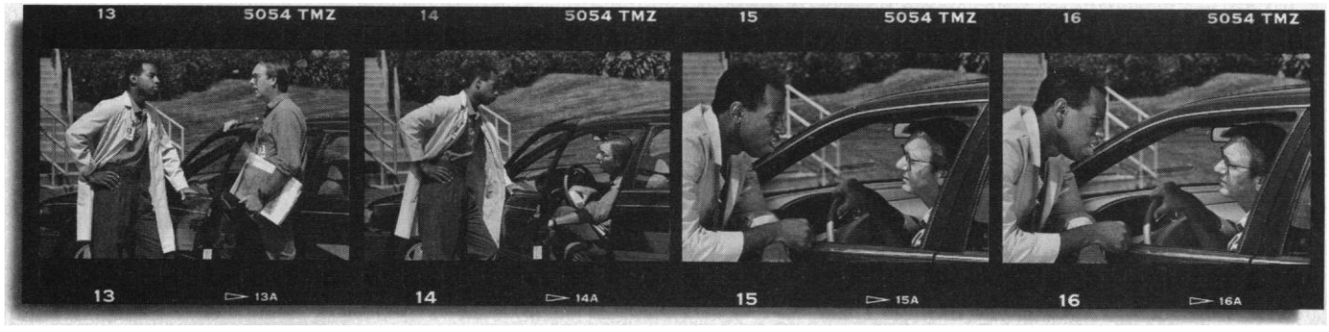

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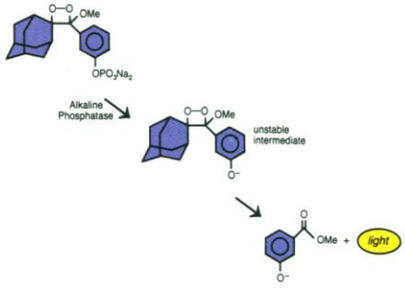
Scientists reluctant to incorporate nonradioactive labeling and detection into their research techniques have historically accused nonradioactive products of lacking sufficient levels of sensitivity. However, recent technological advancements — chemiluminescent detection, to be exact — have allowed select products to meet or exceed the sensitivity levels achievable with ^{32}P labeling and detection.

New information identifies ideal techniques for nonradioactive labeling and detection.

Those products, part of the Genius™ System with Lumi-Phos™ 530 from Boehringer Mannheim, guarantee detection of 0.1 pg of target nucleic acid in less than one hour. In addition, they allow detection of single-copy genes in human DNA in less than 30 minutes when used in Southern blotting techniques.



Molecular structure of the active ingredient in Lumi-Phos 530

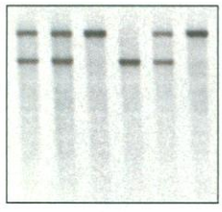
The Genius products rely on the very same procedures already used for radioactive labeling, yet provide results not just hours earlier, but *days* earlier.

Results can be recorded on X-ray film and, because the chemiluminescence lasts more than 48 hours, multiple exposures are possible. Those films can be easily scanned and quantified by densitometry.

Southern blotting: single-copy gene detection in 30 minutes

The accepted wait for accurate single-copy gene detection using ^{32}P labeled probes has always been one to three days. Now identical results can be achieved in 30 minutes with the Genius System and its chemiluminescent substrate.

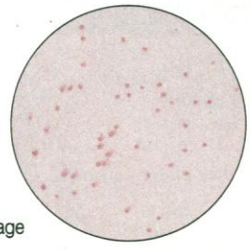
In addition, the probes are stable, allowing researchers to reuse them multiple times without relabeling. Furthermore, Southern blots developed with the Genius System can be repeatedly stripped and reprobed using the same procedures as the older radioactive method.



Human genomic Southern blot (RFLP) showing chemiluminescent detection of single-copy genes following a 2.5 minute X-ray film exposure

Library screening: positive colonies visible in one hour

Using probes labeled with the Genius System, researchers are detecting positive colonies and plaques within one hour versus the overnight exposures required with radioactive techniques.

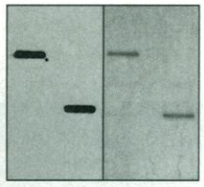


Colorimetric detection of recombinant lambda gt 10 phage

Because the Genius System can use DNA, RNA or oligonucleotide probes, many research needs can be met with a single system. Probe labeling utilizes the same techniques currently employed to prepare radioactive probes, and multiple filters can be processed simultaneously.

Dot blots: guaranteed results in under one hour

With exposure times reduced from overnight to 30-60 minutes, critical answers are relayed quickly, helping research progress as soon as possible.



Comparison of slot blot hybridizations using Genius-labeled oligonucleotide probe (left panel, 60 minute film exposure) and ^{32}P-labeled probe (right panel, overnight film exposure)

Performance is guaranteed as the Genius System products are function tested in dot blot (also referred to as slot blot) assays.

The unique digoxigenin-labeled probes are stable for at least one year and can be reused multiple times, offering savings in terms of the time and money normally spent relabeling decayed radioactive probes. By using the same probe, experimental variables are reduced and reproducibility between experiments is provided.

0.1 pg DNA Guaranteed

Technique-specific information and bibliography available upon request

To receive additional information about the Genius System products, their applications and specifications, or to receive a bibliography of publication references, call Boehringer Mannheim at **800-428-5433**.

If you would like to speak directly with a specialist about your individual research needs, call **800-262-4911**.

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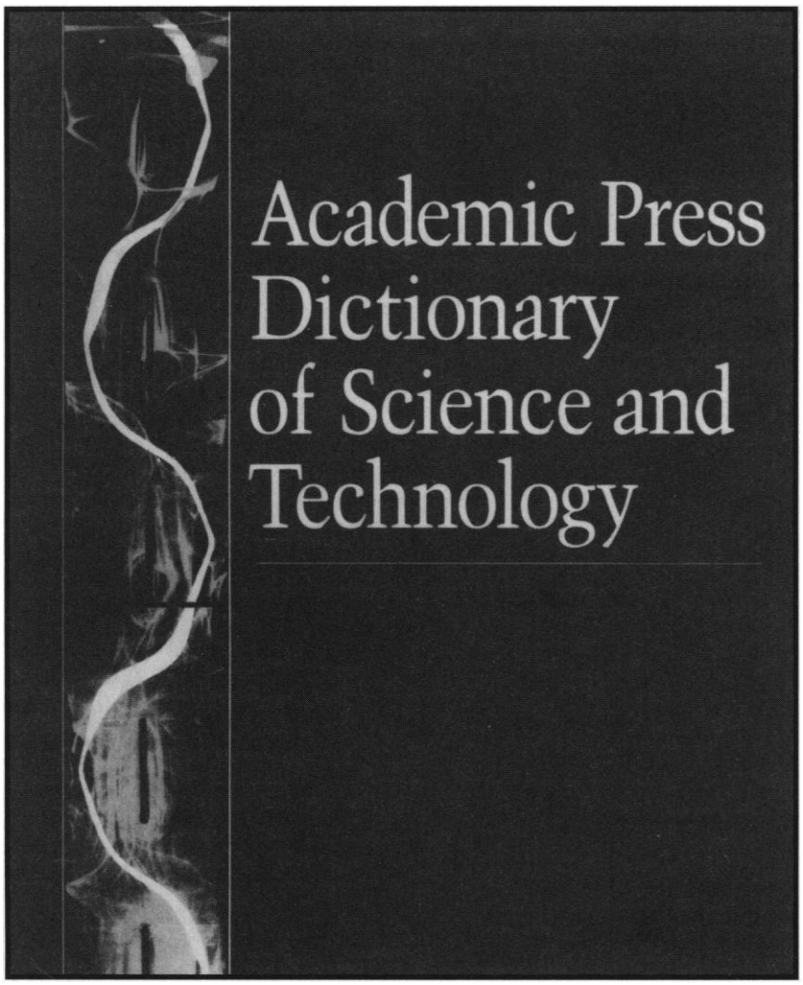

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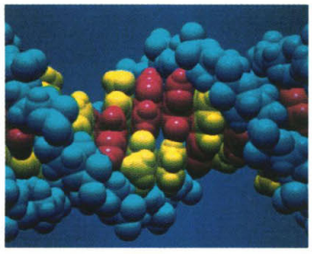
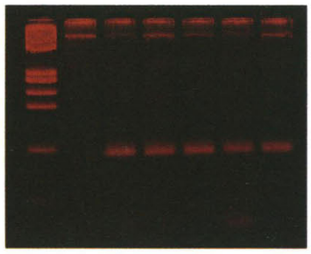


DNA Quantitation



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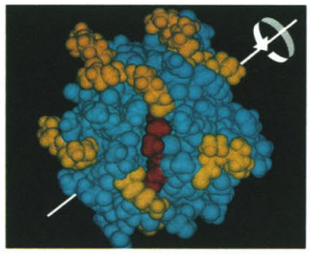
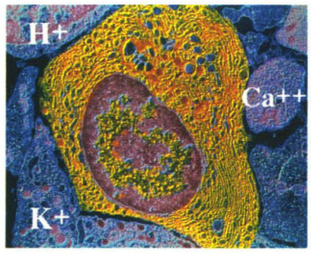
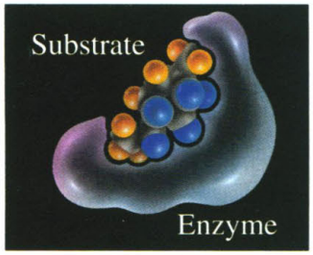


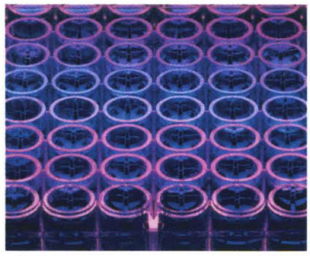
Macromolecular Anisotropy Measurements



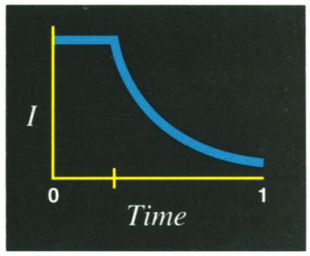
Intracellular Ion Determinations



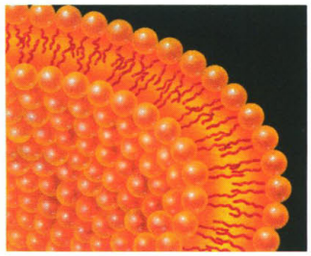
Enzyme Kinetic Analysis



Microplate Assays



Stopped-Flow Kinetic Analysis



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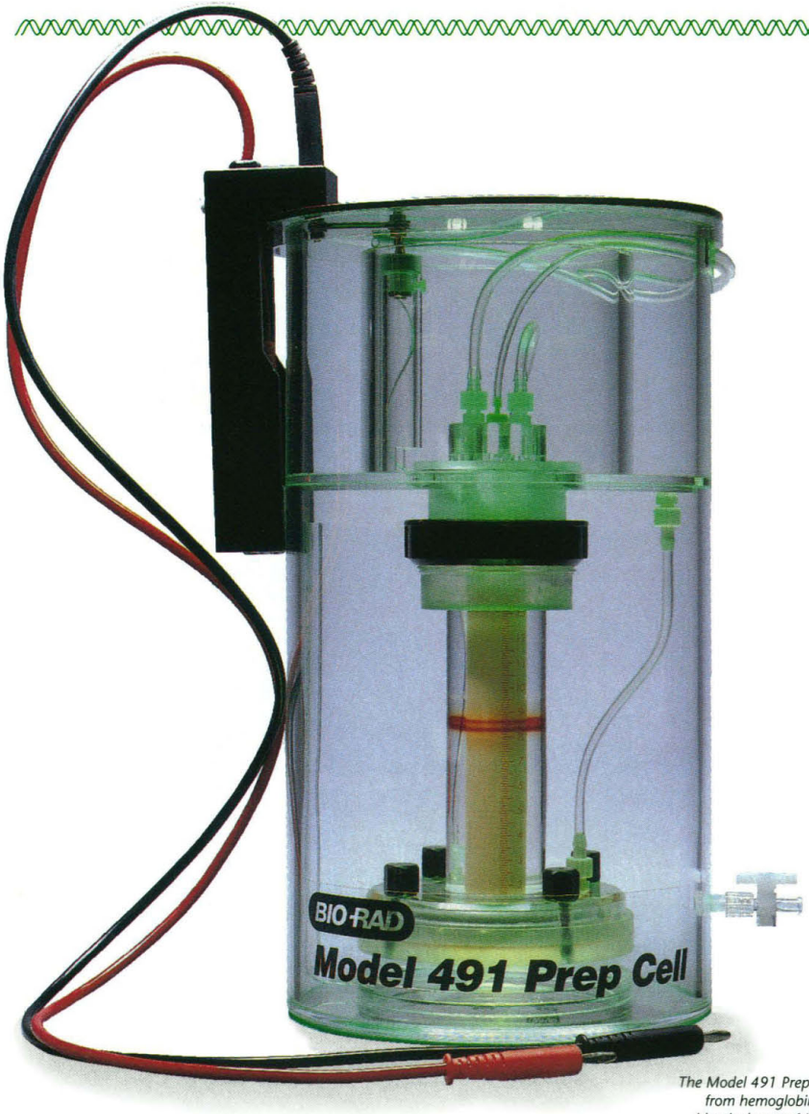

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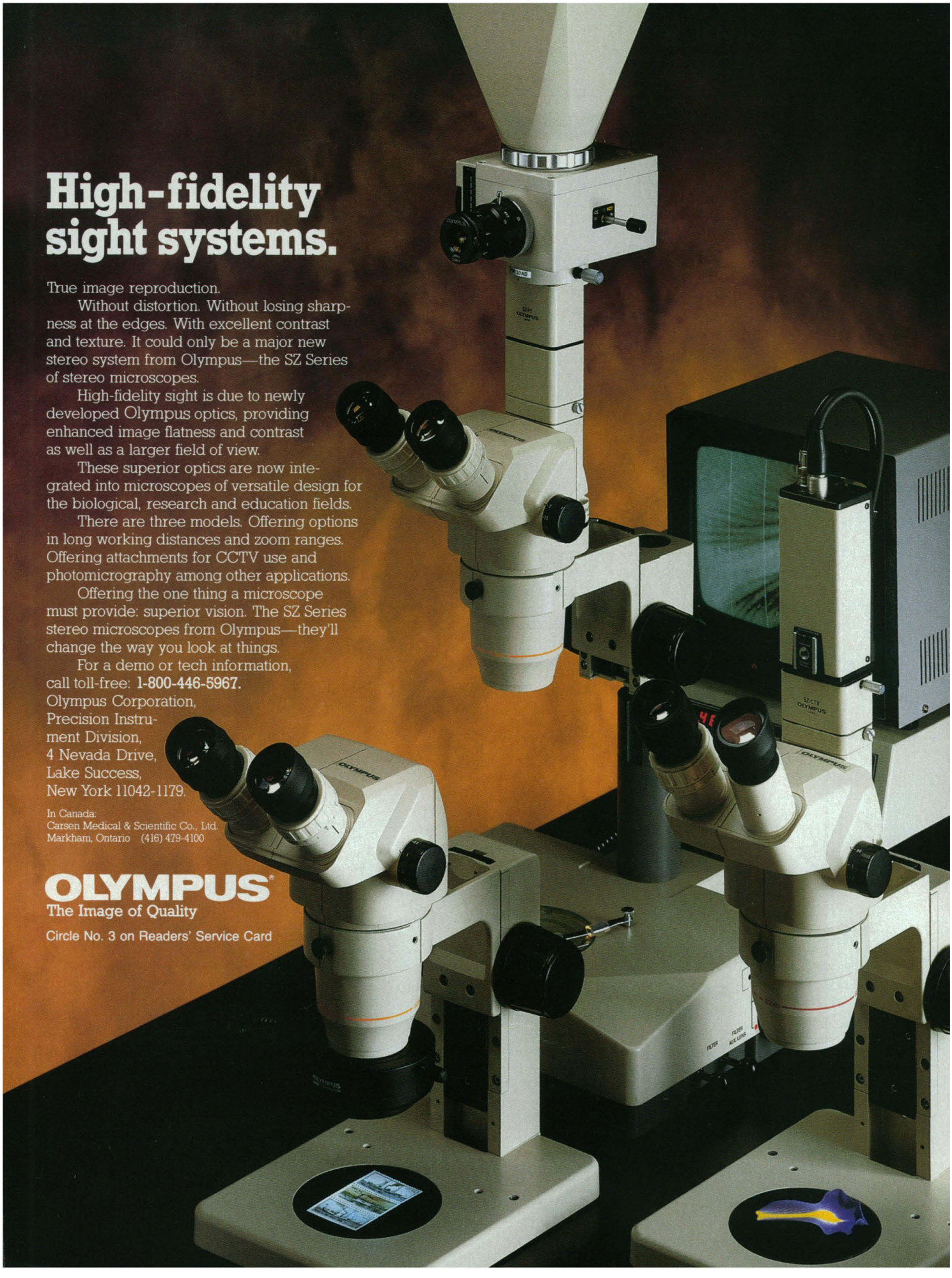
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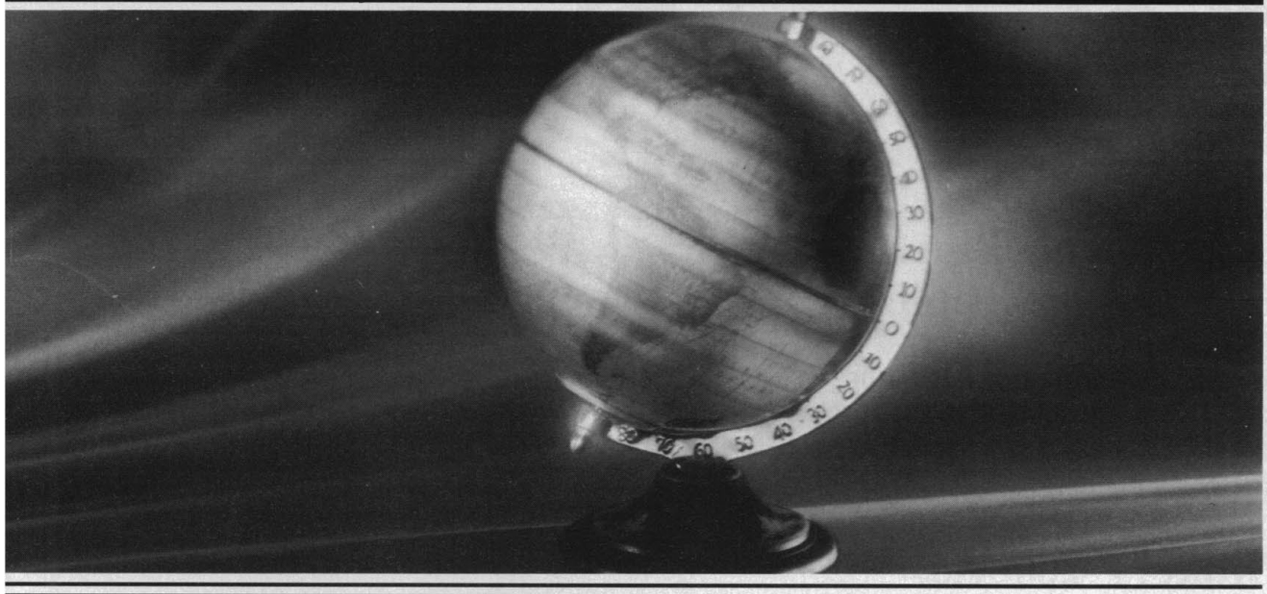

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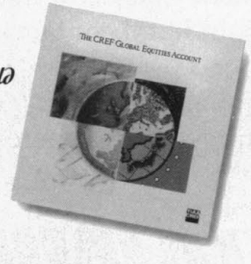

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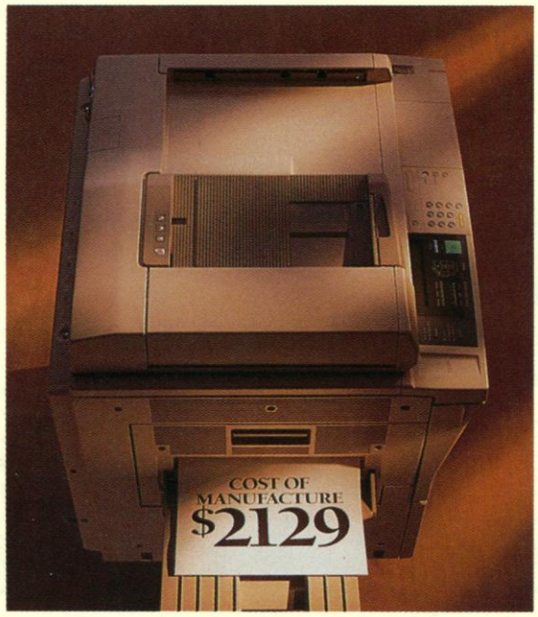
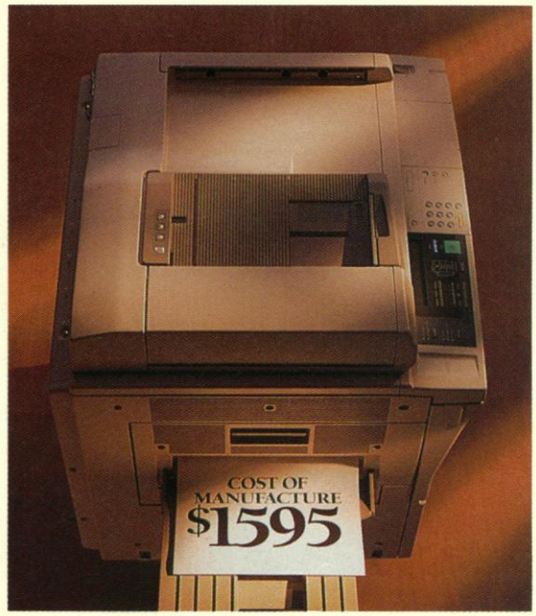


Without Design Of Experiments



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How far will Science's editorial team go to get to the bottom of a news story? To the ends of the Earth . . . as Senior Writer Joseph Palca did when he accompanied a National Science Foundation team to the South Pole last November. Palca was after hot science, and the weather played its part when temperatures hit a balmy 40° below. This allowed the NSF team to brief Palca—and, by extension, Science's readers—on astronomers' latest plans for astrophysical observations, climatologists' most recent probings of the polar cap to get at the Earth's historical talent for blowing hot and cold, and ozone hole aficionados' newest numbers.

Just what you expect from Science; the journal that finds news that's hot even when it's 40° below.

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F. Sherwood Rowland, *AAAS☆93 Chair*
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President, Electronic Frontiers Foundation

Seminars

- Phosphatases and Kinases
- Mapping the Human Brain
- Human Obesity
- Integrating Ethics into College Science & Engineering Curricula

Program Tracks

- Perspectives on Human Genetics
- Confronting AIDS
- Biology: Cells and Bugs
- Medical Research and Society
- Social Psychology and Neuroscience
- Future Chemistry: From Carbon to Silicon
- Measuring the Matter and Energy of the Universe
- Earth's Ever-Changing Atmosphere
- Causing and Coping with Environmental Change
- Agricultural Biotechnology: Plant Protection and Production
- Science and Corporate Enterprise
- Examining and Reforming the Economic System
- Science, Ethics, and the Law
- Communicating Science to the Public
- Information Technology and the Changing Face of Science
- Mathematics: Concepts and Computations
- International Cooperation and Human Survival
- Science for Everyone
- Science & Religion: Examining Both
- Anthropology: Dynamics of Human History
- International Science Issues
- Improving Formal Science Education

AAAS☆93

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Seminars

Separate registration and fee required. See Advance Registration Form, page 1974.

Phosphatases & Kinases

Seminar Organizer: Shirif Shenolikar, *Duke Univ*; Anthony R. Means, *Duke Univ*

Protein Phosphorylation in Signal Transduction (Wed am). Chair: Tony Hunter, *Salk Institute*

Growth-Regulated Protein Kinases (Wed pm). Chair: Anthony R. Means, *Duke Univ*

Protein Phosphorylation and Gene Transcription (Thurs am). Chair: Michael G. Rosenfeld, *Univ of California-San Diego*

Structure and Function of Protein Kinases (Thurs pm). Chair: Bruce E. Kemp, *Univ of Melbourne*

Protein (Serine/Theronine) Phosphatases (Fri am). Chair: Patricia W. Cohen, *Univ of Dundee*

Protein (Tyrosine) Phosphatases (Fri pm). Chair: Jack E. Dixon, *Univ of Michigan*

Mapping the Human Brain

Seminar Organizer: Joseph B. Martin, *Univ of Calif-San Francisco*

Brain Mapping: Understanding Neurodegenerative Diseases: Alzheimer's Disease (Sun am). Chair: Joseph B. Martin

Perceiving the World: An Exploration of the Senses (Sun pm). Chair: David Van Essen; *Calif Inst of Tech*

Memory and Learning: Lessons from Models (Mon am). Chair: Marcus Raichle, *Washington Univ*

Mapping Strategies (Mon pm). Chairs: Constance Pechura, *Inst of Med*; Joseph B. Martin

Human Obesity: Current Status of Scientific and Clinical Progress

Seminar Organizers: David Allison, *Columbia Univ College of Physicians and Surgeons*; F. Xavier Pi-Sunyer, *American Diabetes Association*

Basic Science (Fri am)

Etiology (Fri pm)

Health and Treatment (Sat am/pm)

Integrating Ethics into College Science and Engineering Curricula

Seminar Organizer: Stephanie Bird, *MIT*; Penny Gilmer, *Florida State Univ*

Major Ethical Issues in Science and Engineering (Wed pm)

Concurrent Sessions (Wed pm): Animals in Research ✦ Human Subjects in Research ✦ Authorship and Intellectual Property ✦ Conflict of Interest ✦ Data Selection/Research Design ✦ Privacy and Confidentiality ✦ Misconduct and Whistleblowing ✦ Safety in Design ✦ Discrimination and Sexual Harassment ✦ Implications of Funding Sources for Research

Panel on Professional Ethics and Codes of Ethics (Thurs am)

Concurrent Sessions with Disciplinary Focus (Thurs am): Physical Sciences ✦ Life Sciences ✦ Social Sciences ✦ Information Sciences ✦ Engineering

Demonstrations (Thurs pm)

Closing Panel (Thurs pm)

Symposia Tracks and Sessions

Listed below are the symposia sessions and their organizers, within each track.

Perspectives on Human Genetics

Ethical and Religious Dimensions of Genetic Science and Medicine (Fri am/pm)
J. Robert Nelson, *Texas Medical Ctr*

The Ethical and Legal Aspects of Genetic Testing (Sat am/pm)
Gilbert Omenn, *Univ of Washington*; Deborah Runkle, *AAAS*

Genetic and Molecular Analysis of Homosexuality/Sexuality (Sun am)
Cassandra L. Smith, *Univ of California-Berkeley*; Richard Pillard, *Boston Univ Med Ctr*

Determinants and Consequences of Human Inbreeding: A Global Perspective (Sun pm)
L.B. Jorde, *Univ of Utah Sch of Medicine*; A.H. Bittles, *King's College*

Knots in Biology/Chemistry (Mon am; second session Mon pm in Mathematics track)
Louis H. Kauffman, *Univ of Illinois-Chicago*

Statistics and Molecular Biology (Mon pm)
Herman Chernoff, *Harvard Univ*

Confronting AIDS

Science Confronts AIDS (Fri am/pm)
William A. Haseltine, *Dana-Farber Cancer Inst*; Prem Mohan, *Univ of Illinois-Chicago*

Mucosal Immunity: The First Line of Defense Against AIDS? (Sat am)
John S. Greenspan, *Univ of California-San Francisco*; David Archibald, *Univ of Maryland-Baltimore*

AIDS: Development Impacts in High-Incidence Countries (Sat pm)
Hiram Larew, *U.S. AID*; John Daly, *U.S. AID*

Hematopoeitic Growth Factors and Their Receptors (Sun am)
David G. Nathan, *Children's Hospital, Boston*

Biology: Cells and Bugs

Mitosis (Sun pm)
Robert Palazzo, *Univ of Kansas/Woods Hole MBL*

Cilioprotist Diversity, Evolution, and Ecology: New Technology and New Ideas (Mon am)
Linda A. Hufnagel, *Univ of Rhode Island*

The Boston Tradition of Insect Research (Mon pm)
John Law, *Univ of Arizona*; William Telfer, *Univ of Pennsylvania*

Molecular Aspects of Microbial Adhesion (Tue am)
John S. Greenspan, *Univ of California-San Francisco*; Ronald J. Gibbons, *Forsyth Dental Ctr*

Medical Research and Society

Responsibilities of Institutions Toward Animals in Research (Fri am)
Lee Krulisch, *Scientists Ctr for Animal Welfare*; Richard J. Traystman, *Johns Hopkins Hospital Sch of Medicine*

Sex Bias in Research: Are Males and Females the Same? (Fri pm)
Jeri Sechzer, *Pace Univ*; Nancy Futrell, *Henry Ford Hospital*

Consequences for Women and Children Caught in the Web of Drug Abuse (Sat am)
Vijaya L. Melnick, *Ctr for Applied Research and Urban Policy*

Genetic and Cellular Mechanisms in Diabetes Mellitus (Sat pm)
C. Ronald Kahn, *Joslin Diabetes Ctr*

New Perspectives from the Anthropological Study of Aging and Well-Being (Sun am)
Otto von Mering, *Univ of Florida*

Blood Substitutes: Physiology, Chemistry, Physics, and Applications (Sun pm)
Gerald L. Pollack, *Michigan State Univ*

Targeting of Radioligands, Antibodies, and Immunotoxins in Diagnosis and Therapy (Mon am)
Ban An Khaw, *Northeastern Univ*; John L. Neumeyer, *Research Biochemicals*

Do Power Lines Cause Cancer? (Mon pm)
Leonard A. Sagan, *Electric Power Research Inst*

Social Psychology and Neuroscience

Knowledge Worth Having in the Decade of the Brain (Fri am/pm)
H. Rodney Holmes, *Univ of Chicago*

Emergence of Behavior in Coupled Neural Oscillators (Sat am)
Bard Ermentrout, *Univ of Pittsburgh*

Learning, Recognition, and Memory in Humans, Monkeys, and Models (Sat pm)
Stephen Grossberg, *Boston Univ*

Status Characteristics and Social Behavior (Sun am)
Murray Webster, *San Jose State Univ*

How Parenthood Effects One's Psychological Well-Being (Sun pm)
Walter R. Gove, *Vanderbilt Univ*

Psychoacoustics and Its Contemporary Applications (Mon am)
William Morris Hartmann, *Acoustical Society of America*; Logan E. Hargrove, *Acoustical Society of America*

Future Chemistry: From Carbon to Silicon

Fullerenes (Fri am/pm)
Richard E. Smalley, *Rice Univ*; Robert C. Haddon, *AT&T Bell Labs*

Chemical Communication in Biological Systems (Sat am/pm; Sun am). Organizer to be announced

Nanoengineering (Sun pm; Mon am/pm; Tue am)
Mark Reed, *Yale Univ*

Measuring the Matter and Energy of the Universe

Recent Advances in Atomic Physics and Atom Optics (Fri am)
Michael D. Crisp, *U.S. Dept of Energy*

Exploring the Frontiers of Nuclear Physics (Fri pm)
John W. Negele, *Massachusetts Inst of Technology*

Hot Results in High Energy Astrophysics (Sat am)
Harvey Tananbaum, *Harvard-Smithsonian Ctr for Astrophysics*; France Cordova, *Penn State Univ*

The Age of the Solar System (Sat pm)
Carolyn Porco, *Univ of Arizona*

The Age of Our Galaxy (Sun am)
Kenneth Janes, *Boston Univ*

The Age and Scale of the Universe (Sun pm)
Jacqueline Hewitt, *Massachusetts Inst of Technology*

The History and Philosophy of Cosmology (Mon am)
Alan Lightman, *Massachusetts Inst of Technology*

Time Key

am = 8:30 am – 11:30 am
pm = 2:30 pm – 5:30 pm

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The New Generation Telescopes: New Technology/New Science (Mon pm)
Wallace Ravven, *California Assoc for Research in Astronomy*; Jerry Nelson, *California Assoc for Research in Astronomy*

Revealing High Energy Phenomena in the Universe: The Hubble Space Telescope (Tue am)
Eric J. Chaisson, *Space Telescope Science Inst*

Earth's Ever-Changing Atmosphere

Lessons from the Younger Dryas (Fri am)
Wallace Broecker, *Columbia Univ*

Little Ice Age (Fri pm)
Malcolm Hughes, *Univ of Arizona*

Urban and Regional Ozone (Sat am/pm)
John Seinfeld, *Cal Tech*

Energy and Global Change (Sun am)
Robert Harriss, *Univ of New Hampshire*

Forests and Geophysical Systems (Sun pm)
Robert L. Randall, *RainForest ReGeneration Inst*

Climate Changes: What Astrophysics Can Tell Us (Mon am)
Sallie Baliunas, *Harvard-Smithsonian Ctr for Astrophysics*

Integrating Space-Derived Data in Global Change Monitoring Information (Mon pm)
Murray Felsher, *Amer Soc for Photogrammetry & Remote Sensing*; Stanley Morain, *Univ of New Mexico*

Causing and Coping with Environmental Change

Least-Cost Transportation (Fri am/pm)
John Barnett, *Rocky Mountain Inst*

The Economics of Biological Diversity (Fri am)
James Broadus, *Woods Hole Oceanographic Inst*; Gardner Brown, Jr., *Univ of Washington*

Ecosystem Valuation: Assigning Economic Values to Ecosystem Damage (Fri pm)
Frances Sharples, *Oak Ridge Natl Lab*; Glenn Suter, *Oak Ridge Natl Lab*

Cost and Value of Environmental Protection (Sat am)
Bonnie McCay, *Rutgers Univ*; William Isherwood, *Lawrence Livermore Natl Lab*

Human Dimensions of Environmental Change: Central and Eastern Europe (Sat pm)
Richard Andrews, *Univ of North Carolina*

The Science, Law, and Policy Conflicts Over Wetland Protection, 1989-1993 (Sun am)
Orie Loucks, *Miami, OH, Univ*

Lay-Professional Differences in Detecting Toxic Health Effects in Woburn, MA (Sun pm)
Philip Brown, *Brown Univ*

Human Dimensions of Energy and the Environment (Mon am)
Barbara Farhar, *Nat Renewable Energy Lab*

The Scientific Foundations of Environmental Ethics (Mon pm)
Kristin Shrader-Frechette, *Univ of South Florida*

Critical Renewable Resource Issues for the 21st Century (Tue am)
Norah Davis, *Renewable Natural Resources Fdn*; Robert Day, *Renewable Natural Resources Fdn*

Agricultural Biotechnology: Plant Protection and Production

Science, Agriculture, and Environment in the Former Soviet Union (Fri am/pm; Sat am)
Calvin O. Qualset, *Univ of California-Davis*; Michael Strauss, *AAAS*

Global Conservation of Plant Germplasm: Keys to Agreement and Cooperation (Sat pm)
Daniel Witmeyer, *Univ of Pittsburgh*

Transgenic Farming: Science and Policy Issues (Sun am/pm)
Sheldon Krimsky, *Tufts Univ*; Luise Light, *Inst for Science in Society*

Road Maps for the Commercialization of Genetically Engineered Plants and Microbes (Mon am)
Sivramiah Shantharam, *USDA*

Byproducts from Biotechnology: An Untapped Resource (Mon pm)
Rex Montgomery, *Univ of Iowa*

Developing Biological Control Agents: The Neem Tree Case Study (Tue am)
Cyrus M. McKell, *Weber State Univ*; Dale J. Hansen, *Agradyne Technologies*

Science and Corporate Enterprise

The Rise and Fall of the Massachusetts Miracle: Lessons Learned (Fri am)
Aviva Brecher, U.S. Dept of Transportation; Megan Jones, *Harvard Univ*

Workshops

Regulated Gene Expression and Chromosome Structure (Sat am/pm)
Sarah C.R. Elgin, *Washington Univ*

Super-Optimizing Analysis and All Fields of Science (Thurs am/pm)
Stuart Nagel, *Univ of Illinois*

Is Technology the Key to Economic Competitiveness? (Fri pm)
Aviva Brecher, *U.S. Dept of Transportation*; J. David Roessner, *Georgia Inst of Technology*

Technology Transfer from Federal Laboratories to Industry: Promise and Reality (Sat am)
Walter Baer, *RAND*; David Bodde, *Midwest Research Inst*

Organizational Impedance-Matching in Technology Transfer (Sat pm)
J. David Roessner, *Georgia Inst of Technology*

Can Computational Modeling Contribute to Industrial Competitiveness? (Sun am)
James Glimm, *State Univ of New York at Stony Brook*; Peter Castro, *Eastman Kodak*

Industrial Ecology and Global Change (Sun pm)
T.E. Graedel, *AT&T*; Theodore Schlie, *Lehigh Univ*

Industrial Ecology: New Approaches to Organizational Learning, Adaptation, and Change (Mon am)
Marietta L. Baba, *Wayne State Univ*; David Hartzband, *Digital Equipment Corp*

Measuring Equality of Opportunity in the Workplace (Mon pm)
Turkan K. Gardenier, *U.S. Equal Employment Opportunity Comm*

Improving the Efficiency of Research: Doing a Lot More with a Little More (Tue am)
Albert Teich, *AAAS*

Examining and Reforming the Economic System

The Prosperous Eighties and Rising Inequality: Who Won, Who Lost? (Fri am)
Valerie K. Oppenheimer, *Univ of California-Los Angeles*

Budget Deficits: Wolves, Termites, or Pussycats? (Fri pm)
Robert Eisner, *Northwestern Univ*

Socioeconomic Data Needs for the 21st Century (Sat am/pm)
Phyllis Moen, *Cornell Univ*; Timothy M. Smeeding, *Syracuse Univ*

Difficulties of Maintaining Efficient and Accountable Patterns of Financial Regulation (Sun am)
Edward J. Kane, *Ohio State Univ*

Adjusting the 1990 Census for Undercount: A Scientific and Political Controversy (Sun pm)
Jeffrey S. Passel, *Urban Inst*

Recent Revisionist Proposals Regarding the Subjective Expected-Utility Paradigm (Mon am)
Edward F. McClennen, *Bowling Green State Univ*

Science, Ethics, and the Law

Scientific Freedom and Responsibility: A Retrospective (Fri am)
Rachelle Hollander, *Nat Science Fdn*

Minority Perspectives on Values and Ethics in Science and Technology (Fri pm)
Mark S. Frankel, *AAAS*

Conceptualizing and Measuring Social and Economic Rights (Sat am)
Richard Claude, *Univ of Maryland*; Audrey Chapman, *AAAS*

Clear and Convincing Evidence: The Use of Testing to Measure Discrimination (Sat pm)
Michael Fix, *Urban Inst*

Analyzing and Redirecting Criminal Careers (Sun am)
Roland Chilton, *American Society of Criminology*

Environmental Protection and Human Rights (Sun pm)
John Bodley, *Washington State Univ*; Audrey Chapman, *AAAS*

Science and Technology in Environmental Policymaking (Mon am)
Mark Schaefer, *Carnegie Comm*; Maxine L. Rockoff, *Carnegie Comm*

Science and Technology in the Judicial Branch (Mon pm)
Helene Kaplan, *Skadden, Arps, Slate, Meagher & Flom*; Maxine L. Rockoff, *Carnegie Comm*

Information Flows in Negotiation and the Dispute Resolution Process (Tue am)
Henry Farber, *Princeton Univ*

Communicating Science to the Public

The Bad News Bearers: Press, Public, and Scientific Warnings (Fri am)
James Cornell, *Internat Science Writers Assoc*

On the Record: Scientific Advocacy in the News Media (Fri pm)
Stephen Push, *Nat Research Council*

Public Environmental Awareness: Strategies for Communication (Sat am/pm)
Marcel LaFollette, *George Washington Univ*

Whither Dioxin: Media and the Uncertain Nature of Science (Sun am)
Sharon M. Friedman, *Lehigh Univ*; Sharon Dunwoody, *Univ of Wisconsin*

Ignorance and Science: Emerging Perspectives (Sun pm)
S. Holly Stocking, *Indiana Univ*

Science Television and Science Literacy: Watching and Learning (Mon am)
Richard Hudson, *Newton's Apple*; Paula Apsell, *NOVA*

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Writing Science Books for One's Peers and for the General Public: What's Involved? (Mon pm)
Susan Rabiner, *Basic Books*

Public Understanding of Environmental Science Concepts: Crossnational Studies (Tue am)
Jon D. Miller, *Chicago Academy of Sciences*

Information Technology and the Changing Face of Science

Scientific Computing: Towards the Knowledge Navigator (Fri am/pm)
Katherine Baum, *Graduate Women in Science and Research*

Department of Energy's High-Performance Research Centers (Fri am)
Carl Edward Oliver, *Oak Ridge Nat Lab*; Bonnie C. Carroll, *CENDI*

The Computer Science and Telecommunications Board and the HPCC Program (Fri pm)
Herb Lin, *Computer Science and Telecommunications Board*

International Scientific Data Cooperation: Issues and Experience (Sat am)
Barbara Mihalas, *Univ of Illinois*; Bonnie Carroll, *CENDI*

Adaptive Computation and Artificial Worlds (Sat pm)
Rolf Sinclair, *NSF*; L.M. Simmons, *Santa Fe Inst*

Electronic Dissemination of Scientific and Technical Information (Sun am)
Toni Carbo Bearman, *Univ of Pittsburgh*; Dana Scott, *Carnegie Mellon Univ*

Advances in Data Management for the Scientist and Engineer (Sun pm; Mon am/pm; Tue am)
Maria Zemankova, *Nat Science Fdn*; Bonnie Carroll, *CENDI*

Data Location and Acquisition Using Wide Area Information Servers and Internet (Tue am)
Timothy Gauslin, *U.S. Geological Survey*

Mathematics: Concepts and Computations

How Mathematicians Think (Fri am)
Karen V.H. Parshall, *Univ of Virginia*; Judith V. Grabiner, *Pitzer College*

The Mathematics of Everyday Language (Fri pm)
Keith Devlin, *Colby College*

Randomized Algorithms in Pure Mathematics (Sat am)
Peter Winkler, *Bellcore*

Symbolic Computation: Its Impact on Mathematics and Science (Sat pm)
Zaven Karian, *Denison Univ*

Statistical, Methodological, and Substantive Aspects of Meta-Analysis (Sun am)
Robert Rosenthal, *Harvard Univ*; Jessica Utts, *Univ of California-Davis*

Interdisciplinary Curricula in Mathematics, Statistics, and Science (Sun pm)
Turkan K. Gardenier, *U.S. Equal Employment Opportunity Comm*

Operations Research and Mathematics (Mon am)
Carl Harris, *George Mason Univ*

Knots in Mathematics/Physics (Mon pm; first session Mon am in Human Genetics track)
Louis H. Kauffman, *Univ of Illinois-Chicago*

Contemporary Methods of Numerical Computation and Analysis (Tue am)
Douglas Arnold, *Penn State Univ*

International Cooperation and Human Survival

Meeting Security Challenges in the Soviet Successor States and Yugoslavia (Fri am)
Jonathan Dean, *Union of Concerned Scientists*

Advanced Weaponry in the Developing World (Fri pm)
Eric H. Arnett, *AAAS*

U.S. Nuclear Weapons and the Future of Deterrence (Sat am)
Eric Arnett, *AAAS*

Theater Missile Defense: Technical and Political Challenges (Sat pm)
W. Thomas Wander, *AAAS*

Conflict Resolution and Confidence Building in Regions of Tension (Sun am)
Michael Krepon, *Henry L. Stimson Ctr*

Battlefield of the Future: Requirements and Technologies for Tomorrow's Conflicts (Sun pm)
Charles Zraket, *Harvard Univ*; Betty Kirk, *AAAS*

Energy and Security: Future Sources of Tension and Potential Conflict (Mon am)
Peter Gleick, *Pacific Inst for Studies in Development*; Betty Kirk, *AAAS*

Conversion from Defense to Civilian Goals: Human and Economic Impacts (Mon pm)
Frank X. Werber, *USDA*; Robert L. Stern, *Consultant*

Science for Everyone

The Objectivity Crisis: Rethinking the Role of Science in Society (Fri am)
Daniel Sarewitz, *House Comm on Science, Space, and Technology*; George E. Brown, Jr., *U.S. House of Representatives*

Frontiers of the Physical Sciences (Sun am/pm)
Rolf Sinclair, *Nat Science Fdn*

Science Is Fun! (Sat am)
Bassam Shakhashiri, *Univ of Wisconsin*

Discoveries of Natural Coding in Music Linguistics and Musicality (Mon am/pm)
Manfred Clynes, *Univ of California-Berkeley*

Science for the Naked Eye, XX (Mon am/pm)
Rolf M. Sinclair, *Nat Science Fdn*

Handedness in the Scientific Domain (Mon pm)
Kurt Mislow, *Princeton Univ*

Science and Religion: Examining Both

What Is Life? Origin and Evolution (Sat am)
Cyril Ponnamperuma, *Univ of Maryland*; Lynn Margulis, *Univ of Massachusetts*

Scientific Resources for a Global Religious Myth (Sat pm)
Loyal D. Rue, *Luther College*; Ursula Goodenough, *Washington Univ*

The Religious Significance of Big Bang Cosmology (Sun am)
Robert John Russell, *Graduate Theological Union*

Oil and Water? Institutional Interactions Between Science and Religion (Sun pm)
James B. Miller, *United Campus Ministry, Pittsburgh*

Anthropology: Dynamics of Human History

The End of Eve? Fossil Evidence from Africa (Fri am/pm)
Milford H. Wolpoff, *Univ of Michigan*

The Origin and Dispersal of Maize in the Americas (Sat am)
Nikolaas J. van der Merwe, *Harvard Univ*

South American Hunters and Gatherers (Sat pm)
Anna Roosevelt, *Field Museum of Natural History*

The Los Angeles Riots: Who, What, Why, and Now What? (Sun am)
Stephen Maack, *California State Univ*

Ethnomathematics (Sun pm)
Chandler Davis, *Univ of Toronto*

Models of Biocultural Evolution: Understanding Human Social & Moral Development (Mon am/pm)
Philip Hefner, *Chicago Ctr for Religion and Science*; William Irons, *Northwestern Univ*

Evolution Medicine: New Directions and Perspectives (Mon pm/Tue am)
James McKenna, *Pomona College*; E.O. Smith, *Emory Univ*

International Science Issues

Environment and Development After UNCED: The Road from Rio (Fri pm)
Robert Randall, *Rainforest ReGeneration Inst*; Harry Tollerton, *American Assoc of Engineering Societies*

Technology Management in Japan (Sat am/pm)
Robert Cutler, *Japan Soc for Science Policy & Research Management*

Improving Formal Science Education

International Comparative Test Scores: Precollege Science Education in Selected Countries (Fri am)
Barbara B. Mandula, *Comm for the Nat Insts for the Environment*; Iris Rotberg, *Rand Corp*

Developing Human Potential in Science and Engineering (Fri pm)
Franklin Hamilton, *Florida A&M Univ*; George Campbell, Jr., *NACME, Inc*

Teaching Large University Classes (Sun am)
Amy Chang, *Amer Socy for Microbiology*

History and Philosophy of Science as Aids to Science Teaching (Sun pm)
Michael Ruse, *Univ of Guelph*

Women in Science, Engineering, and Mathematics: Research and Institutional Change (Mon am)
Cinda Davis, *Univ of Michigan*; Carol Hollenshead, *Univ of Michigan*

Mentoring and How It Impacts on Women in Science, Engineering, and Mathematics (Mon pm)
Catherine Didion, *Assn for Women in Science*

Technology for Special Needs on Campus: Service, Research, Education (Mon pm)
Michael J. Rosen, *Massachusetts Inst of Technology*; Virginia W. Stern, *AAAS*

Undergraduate Involvement in Research: Professional Training in Science and Engineering (Tue am)
Rolf M. Sinclair, *Nat Science Fdn*

Designing Engineering Curriculum for a Diverse Student Body (Tue am)
Caroline Whitbeck, *Massachusetts Inst of Technology*

Register Now!
Use the form on page 1974.

AAAS☆93

Science Education Reform in America

Special one-day symposium

Plenary Session
(Sat 8:30 am – 11:00 am)

Science and Mathematics Education Reform ✦ Jon D. Miller, *Chicago Academy of Sciences*

Concurrent Sessions
(Sat Noon – 2:30 pm)

Project 2061 ✦ Frances Gatz, *Project 2061, AAAS*

Educational Initiatives of the American Chemical Society ✦ Alvin L. Kwiram, *Univ of Washington*

The New Antievolutionism ✦ Eugenie C. Scott, *Nat Ctr for Science Education*

Conceptions of Giftedness and Implications for Educational Policy ✦ Thomas J. Tighe, *Univ of Connecticut*; Joseph S. Renzulli, *Univ of Connecticut*

SUPERQUEST: A National Computational Science Competition for High Schools ✦ Linda Callahan, *Cornell Theory Ctr*; Helen Doerr, *Cornell Theory Ctr*

Designing a Science Curriculum for Middle School Students ✦ Bernard Zubrowski, *Boston Children's Museum*

Concurrent Sessions
(Sat 2:45 pm – 5:15 pm)

Project 2061 ✦ Frances Gatz, *AAAS*

Using Video for Teacher Training in Physical Science ✦ Lynn Cadwallader, *WGBH-Boston*

Sociology as Social Science in the High School Curriculum ✦ Carla B. Howery, *American Sociological Assoc*

Redesigning Math, Science, and Foreign Language Education Through Telecommunications and the New Media ✦ Harry Barnes, *CLASC*; Arlene Krebs, *New Orbit Communications*

Applications of Science Instruction R&D for LEP Students to Instruction for All Students ✦ Frank X. Sutman, *Nat Science Fdn*

Biological Science in the Public Domain ✦ Michael Ruse, *Univ of Guelph*

Hotel Reservation Form

AAAS☆93 ✧ 11–16 February 1993 ✧ Boston

Send confirmation to:

Name _____ (last name) (first name)

Institution/company _____ (if part of address)

Address _____

City/state/zip/country _____

Phone _____ Fax _____

Other occupant(s) of room _____ (name)

_____ (name) / _____ (name)

Special housing needs: ❑ Wheelchair-accessible room ❑ Nonsmoking room

❑ Other _____

Late Arrivals (after 4 pm) must be guaranteed with a deposit for the first night plus 9.7% occupancy tax, either by a major credit card or check (payable to the appropriate hotel).

❑ Check enclosed ❑ Credit card _____ (credit card company)

Credit card # |_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

Exp. date _____ Signature _____

✦ **Reservations must be received at the appropriate hotel by 18 January 1993.** (Housing requests received after this date are conditional on room availability.)

✦ Reservation changes and cancellations must be made directly with the hotel.

✦ Children under 18 stay free in same room as parents.

✦ Check-in time is 4 pm; check-out time is 12 noon.

Room Rates:

Check appropriate box for your choice of hotel and room. Add 9.7% occupancy tax to rates shown.

Boston Marriott Copley Place
Attn: Reservations, 110 Huntington Avenue, Boston, MA 02116

❑ Single (1 person, 1 bed) ..... $ 99
❑ Double (2 persons, 1 bed) ..... $ 99
❑ Triple (3 persons, 2 beds) $109
❑ Quad (4 persons, 2 beds) $119

Sheraton Boston, Attn: Reservations, 39 Dalton Street, Boston, MA 02199
[Specify main hotel or tower]..... main / tower

❑ Single (1 person, 1 bed) ..... $105 / $125
❑ Double (2 persons, 1 bed) ..... $115 / $135
❑ Twin (2 persons, 2 beds) ..... $115 / $135
❑ Suite ..... $150 & up

Arrival & Departure:

List definite arrival/departure dates & times. Reservations are held until 4 pm. *Arrivals after 4 pm must be guaranteed with a deposit for one night plus tax.*

Arrival date _____ Time _____
Departure date _____ Time _____

Mailing Instructions:

Mail this form to the hotel of your choice (address above), with any necessary deposit.

Call for Poster Papers

The poster sessions at AAAS☆93 provide an informal, visually oriented way for you to present contributed papers to a multidisciplinary assembly of your peers.

If your poster abstract is accepted, you will be assigned to a poster session and provided with a 4' x 8' bulletin board on which to display graphics and text for two hours, during which you can discuss your work with interested colleagues. Poster sessions will be divided among life science, physical science, and social science topic areas. Accepted abstracts will also be published in the AAAS☆93 Program.

Instructions for Submitting Poster Abstracts

Deadline: Poster abstracts must be postmarked on or before November 6, 1992. Faxed abstracts will **not** be accepted.

Format: Refer to the sample below for instructions regarding capitalization, spacing, and proper abstract format. Type the text of the abstract to fit within a 5" square in the center of an 8.5" x 11" sheet of white paper. Use a typewriter or letter-quality printer. Use black ink for all hand lettering. Justify text, if possible. Do not double-space the body of the text. Do not underline. Below and to the left of the square, type the name, institution, and complete membership number (from *Science* mailing label) of the member or fellow endorsing the poster and obtain his/her signature.

Endorsement: A poster abstract will be considered only if it is endorsed by a AAAS member or fellow. Members may endorse their own abstract.

Topic Area (Life, Physical, or Social Science)

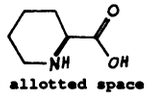
Type "Student Award Entry" if eligible

5"

5"

Poster Abstract Title in Upper and Lower Case Letters. PRESENTER'S NAME IN UPPER CASE (Institution Name in Upper and Lower Case Within Parentheses), Second Author Name in Upper and Lower Case (Institution Name), Additional Author Names (Institution Names).

Skip one line and type abstract. The full width of the column of typed material should be 5 inches (12.7 cm) and must not extend beyond that. The total length of the material, from top of title to bottom of citations, must not exceed 5 inches (12.7 cm). Abstracts that exceed these parameters will be returned. The entire submission should be of camera-ready quality so that it can be machine-scanned. Justify text, if possible. Avoid paragraphing. Any special symbols or signs that must be hand lettered should be rendered in reproducible black ink as clearly and carefully as possible, as in this example:



You may also use your allotted space for citations.*

*Skip one line and follow Science citation format.

Name of Presenter
Presenter's Institution
Presenters' Street Address
Presenter's City/State/Zip
Presenter's Country
Presenter's Phone Number
Presenter's Fax Number

Endorser's Name (Member, Fellow)
Endorser's Institution
Endorser's AAAS Membership Number
Endorser's Signature

If you do not know a member or fellow, check with your department or library to locate a local *Science* magazine subscriber.

Registration: The person presenting the poster must be registered to attend AAAS☆93, but may wait to register until notified that the abstract has been accepted.

Mailing Instructions: Mail one original plus three photocopies of the abstract flat, DO NOT BEND, to: AAAS☆93 Contributed Papers, AAAS Meetings Office, 1333 H St, NW, Washington, DC 20005. Only **one** poster abstract per first author may be submitted. Acceptances will be mailed in December.

Student Research Awards

To encourage the development of young scientists and to recognize their achievements in all fields of scientific research, AAAS will feature exceptional research by undergraduate and graduate students in a special poster session at AAAS☆93.

A panel of distinguished scientists will evaluate the student posters and award cash prizes for the top three presentations in each of three categories: life science, physical science, and social science.

Awards for each category are: 1st prize - $500; 2nd prize - $250; 3rd prize - $100. Winners will also receive a year's subscription to *Science*.

Students who wish to be considered for this distinction should type the words "Student Award Entry" above their poster abstract.

The following is one example of a winning student abstract from last year's meeting:

Physical Science

"Student Award Entry"

(e,2e) Spectroscopic Study on the Electron Momentum Densities of the Valence Orbitals in Hydrogen Selenide. C.K. SUBRAMANIAM (Univ of Maryland), M.A. Coplan, J.H. Moore, and J.A. Tossell (Univ of Maryland).

The momentum densities (MD) of the valence electrons in the gas phase atoms and molecules, along with the Fourier-transformed position space densities, give useful chemical information about such aspects as the dipole moment, reactivity, and bonding. The technique of (e,2e) spectroscopy has been successfully used to study the MDs of various gas phase atoms and molecules in the past (1). In the symmetric noncoplanar geometry of the (e,2e) experiment, the measured cross section, within the plane wave impulse approximation and the frozen orbital approximation, is directly proportional to the MD of the ejected electron in its initial state. We report the MDs for the valence orbitals of hydrogen selenide, using a multidetector (e,2e) spectrometer. The spectrometer has a momentum resolution of better than 0.05 a.u. and momentum range of 0 - 5 a.u. at an incident electron energy of 920 eV. The MDs near the zero momentum region, which carry all the useful chemical information, are probed with high precision.

1. K.T. Leung and C.E. Brion, J. Elec. Spec. Rel. Phenom. 35, 327 (1985).

Advance Registration Form

AAAS☆93 ✧ 11–16 February ✧ Boston

REGISTRANT INFORMATION (Please type or print)

First name (as you would like it to appear on your badge)

Last name (as you would like it to appear on your badge)

Institution/company (will appear on badge, subject to abbreviation)

Mailing address

City | State | Zip code

Country

Daytime phone number | Fax number

❑ Check here if you need special services due to a disability. (We'll call you before the meeting.)

Primary area of interest (check *one* box only):

- ❑ Agriculture
- ❑ Anthropology
- ❑ Astronomy
- ❑ Atmospheric & Hydrospheric Sciences
- ❑ Biological Sciences
- ❑ Chemistry
- ❑ Dentistry
- ❑ Education
- ❑ Engineering
- ❑ General Interest
- ❑ Geology & Geography
- ❑ History & Philosophy of Science
- ❑ Industrial Science
- ❑ Information, Computing, & Communication
- ❑ Mathematics
- ❑ Medical Sciences
- ❑ Pharmaceutical Sciences
- ❑ Physics
- ❑ Political, Economic, & Social Sciences
- ❑ Psychology
- ❑ Societal Impacts of Science
- ❑ Statistics

AAAS membership number (if member) _____
(appears above your name on *Science* subscription label)

If registering at student rate, check here ❑ and attach a copy of your student ID card.

If registering at postdoctoral or K-12 teacher rate, indicate the name and number of your chairperson or principal:

Chairperson/principal's name | Chairperson/principal's phone number

IMPORTANT FOOTNOTES

[1] **22 January deadline:** Registrations received after this date will not be processed, but you may register on site beginning 11 February. On-site rates are $30 higher than advance rates for Regular members/nonmembers, $10 higher for students, and $20 higher for all others. **One-day registration** (for all sessions *except* seminars) will be available to AAAS members ($90) and nonmembers ($120) on site only.

[2] **Special rates:** To qualify for the student rate, you must attach a copy of your student ID card. To qualify for the postdoctoral or K-12 teacher rate, you must provide the name and phone number of your department chairperson or principal in the space above. *Registrations received without appropriate verification will be charged at the Regular rates.*

[3] **Seminar/workshop fees:** "AAAS☆93 registrant" rates are *in addition to* (not in lieu of) the AAAS☆93 registration fees. "Non-registrant" rates are for those wishing to attend a seminar or workshop only — without registering for AAAS☆93. "Special" rates are applicable to students, postdocs, K-12 teachers, and retirees.

[4] **Membership dues** indicated herein are at 1992 rates, which are guaranteed through 16 February 1993 for registrants of AAAS☆93; $47 of dues are allocated to *Science.* Please allow 6-8 weeks for receipt of first issue of *Science.*

[5] **Cancellations** must be received in writing by 22 January 1993. *No refunds will be made for cancellations received after this date.* Refunds are subject to a $25 cancellation charge and will be processed after the meeting.

[6] **Checks** must be in United States currency and must be payable on a U.S. bank.

A B

AAAS★93 REGISTRATION FEES[1] (No seminars/workshops)

	AAAS member	Nonmember
Regular	❑$145	❑$195
Student[2]	❑$ 25	❑$ 45
Postdoctoral[2]	❑$ 50	❑$ 75
K–12 Teacher[2]	❑$ 50	❑$ 75
Retired	❑$ 50	❑$ 75

SEMINAR AND WORKSHOP FEES (Optional)

	AAAS☆93 registrant regular[3]	AAAS☆93 registrant special[3]	Non-registrant regular[3]	Non-registrant special[3]
Phosphatases & Kinases	❑$130	❑$95	❑$200	❑$100
Mapping the Human Brain	❑$130	❑$95	❑$200	❑$100
Human Obesity	❑$130	❑$95	❑$200	❑$100
Integrating Ethics	❑$100	❑$50	❑$100	❑$ 50
Regulated Gene Expression	❑$ 0	❑$ 0	❑$ 5	❑$ 5
Super-Optimizing Analysis	❑$ 10	❑$10	N/A	N/A
Science Education Reform	❑$ 0	❑$ 0	❑$ 30	❑$ 30

MEMBERSHIP DUES (Optional)

If you're not a AAAS member, you can join now by checking the appropriate box below — and take advantage of the discounted *member* registration fees above. You'll also get a year's subscription (51 issues) to the journal *Science*[4].

	USA (except CA)	California	Canada	International
Regular	❑ $87.00	❑ $95.08	❑ $146.59	❑ $182.00
Student	❑ $47.00	❑ $51.37	❑ $103.79	❑ $142.00
Postdoctoral	❑ $62.00	❑ $67.76	❑ $119.84	❑ $157.00
Retired	❑ $47.00	❑ $51.37	❑ $103.79	❑ $142.00

PAYMENT

Meeting registration fee[5] $ _____

Seminar or workshop fees[5] $ _____

Membership dues[4] (if joining now) $ _____

Total amount $ _____

❑ Check enclosed[6] ❑ VISA ❑ MasterCard
(no other cards accepted)

❑ Original institutional purchase order attached

Credit card number

Signature _____ Exp. date _____

MAILING INSTRUCTIONS (22 January deadline[1])

Mail to: AAAS☆93, P.O. Box 630285, Baltimore, MD 21263.
Or fax (credit card payments only) to 202-289-4021.