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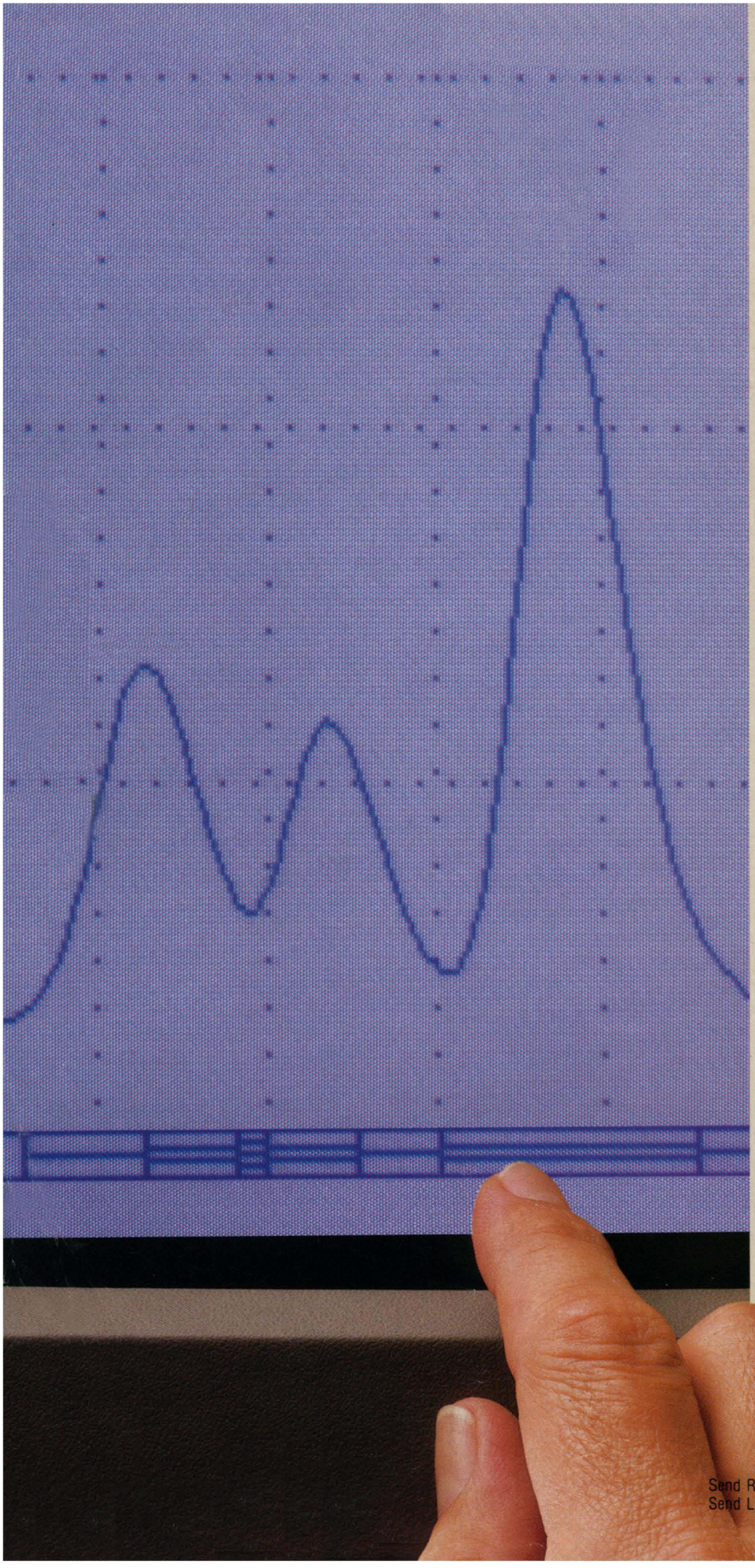
5 October 1990 $3.50
Vol. 250 ■ Pages 1–180

Advances in Instrumentation



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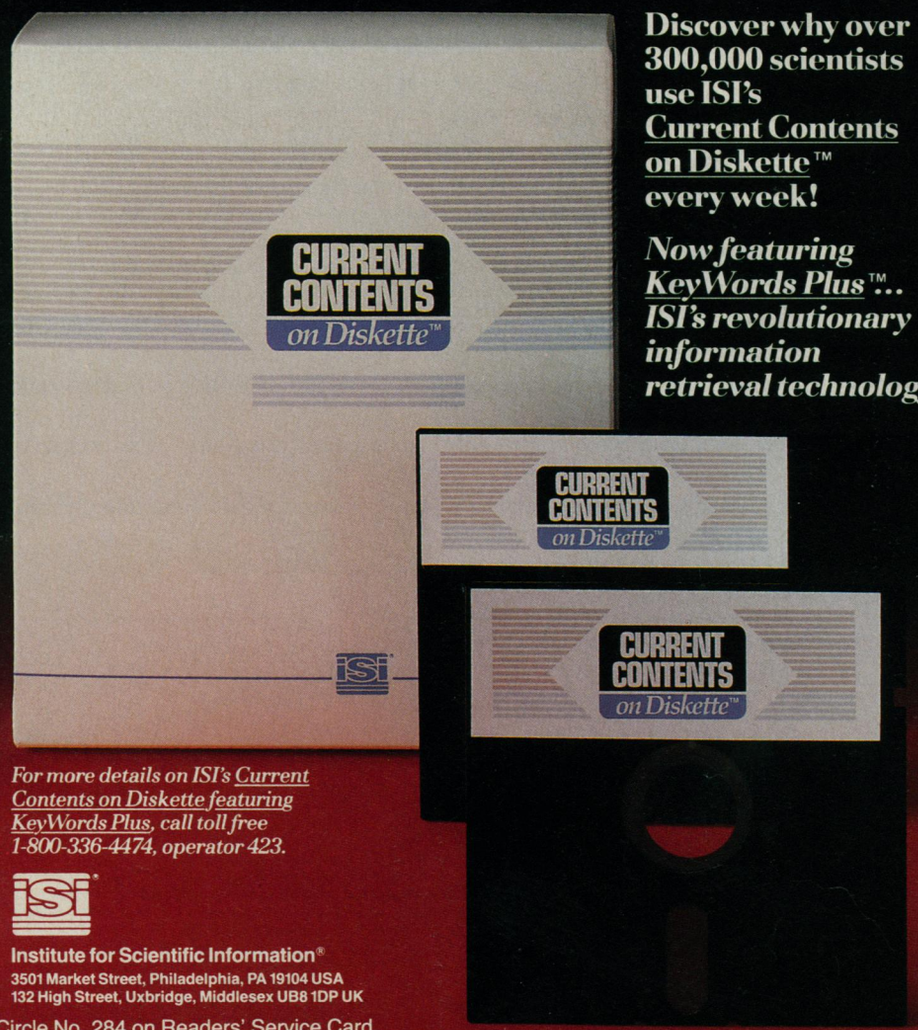

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SCIENCE

ISSN 0036-8075
5 OCTOBER 1990
VOLUME 250
NUMBER 4977

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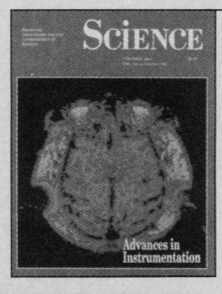

COVER Magnetic resonance image of a transverse slice of a monkey head through the eyes showing contrast based on blood microcirculation. This image was obtained from signals of tissue water, whose magnetic resonance properties were modified by a vascular contrast agent, 15 seconds after injection. See page 53. [Visualization by Geoffrey Sobering, In Vivo Nuclear Magnetic Resonance Research Center, National Institutes of Health]

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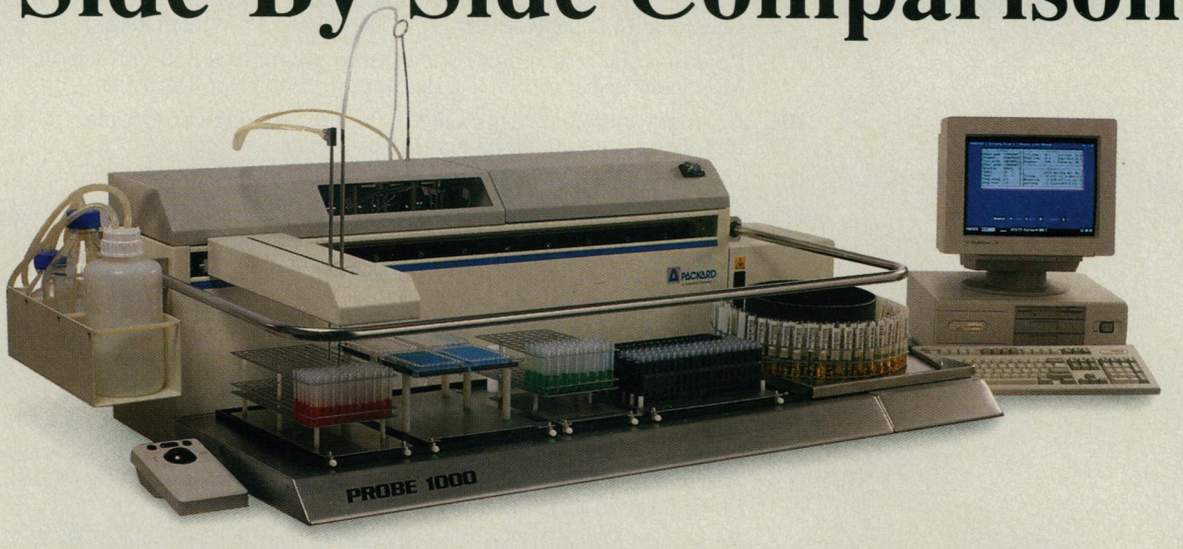

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Plants and ploidy

THE number of chromosomes present in animal cells (the "ploidy") is typically twice the number present in the sperm and in the egg, the animal's germ cells. And, except in specific cell types, animal cells do not tolerate multiple ploidy conditions. This is not true of plant cells. Multiploidy has been found in a variety of plants, and its prevalence suggests that it may serve an adaptive function. For example, ice plants and certain other succulents have been found to have 1, 2, 4, 8, 16, 32, and 64 times the haploid number of chromosomes (the number in the germ cells) in cell nuclei (page 99). The extent of multiploidy was both tissue-specific and dependent on the developmental stage of the tissue. Because the plants that showed this pattern were all succulents with small genomes, that is, the total amount of DNA per haploid genome is small, De Rocher *et al.* speculate that a multiploid small genome may help such plants adapt to arid environments just as presence of a large genome may be helpful to other desert-dwelling plants.

Fossil clues to algal origins

In arctic Canada fossils from organisms closely related to contemporary seaweeds have been discovered in rocks that date back some 750 to 1250 million years (page 104). Many morphologic features and a distinctive cellular pattern that reflects the mode of cell division of the Somerset Island fossils are much like those characteristic of extant red algae of the genus *Bangia*. Butterfield *et al.* discuss the implications of these fossils both for understanding the evolution of the Rhodophyta (of which the bangiophytes are one class) and for the formulation of broader phylogenetic schemes. These fossils add to the mounting evidence that diversification of multicellular algae was well under way long before the radiation of large animals was occurring some 600 million years ago.

Not-so-hot spots

NOT all the hot spots—areas like Hawaii and Yellowstone where there is enhanced volcanic activity—on the earth's surface may be associated with thermal plumes in the earth's mantle; instead, some may result from chemically aberrant, water-enriched regions of the mantle that tend to melt at lower temperatures than do water-poor regions (page 107). Thus, some hot spots might be considered wet spots. Calculations by Bonatti indicate that the Azores hot spot (AHS) complex in the Mid-Atlantic Ridge (MAR) might be one such wet spot. Mantle rocks in the AHS did not equilibrate at higher temperatures than rocks elsewhere along the MAR as might be expected if a mantle plume were present at depth. Also, the AHS mantle has an anomalous mineral composition—abundant in the large ion lithophile elements and rare earths—that suggests interaction with or influx of mantle fluids into the region. Water enrichment would promote melting and could have produced the doming and excess volcanism that are common to some "hot spots."

Controlling river blindness

THE drug ivermectin, which has been used successfully for the treatment of onchocerciasis or "river blindness" in individuals infected with *Onchocerca volvulus*, now appears to also slow the spread of disease in an endemic area (page 116). This observation could lead to new treatment strategies in such areas—parts of Africa and South and Central America—for this devastating disease. River blindness is transmitted by black flies; it is characterized by skin rashes, eye lesions, impaired vision, and ultimately blindness. Taylor *et al.* report that when ivermectin was given to the eligible population of a Liberian rubber plantation—more than half of the individuals over age 12—there was a dramatic reduction in just 2 years in the incidence of new cases in children. (On this plantation, which has a population of some 14,000 people, most people are infected with *Onchocerca volvulus* by age 20.) Ivermectin was found to reduce the parasite "burden" in the skin of infected individuals; because this reduces the number of infectious agents available to fly vectors, it could directly account for the reduction in the number of new cases.

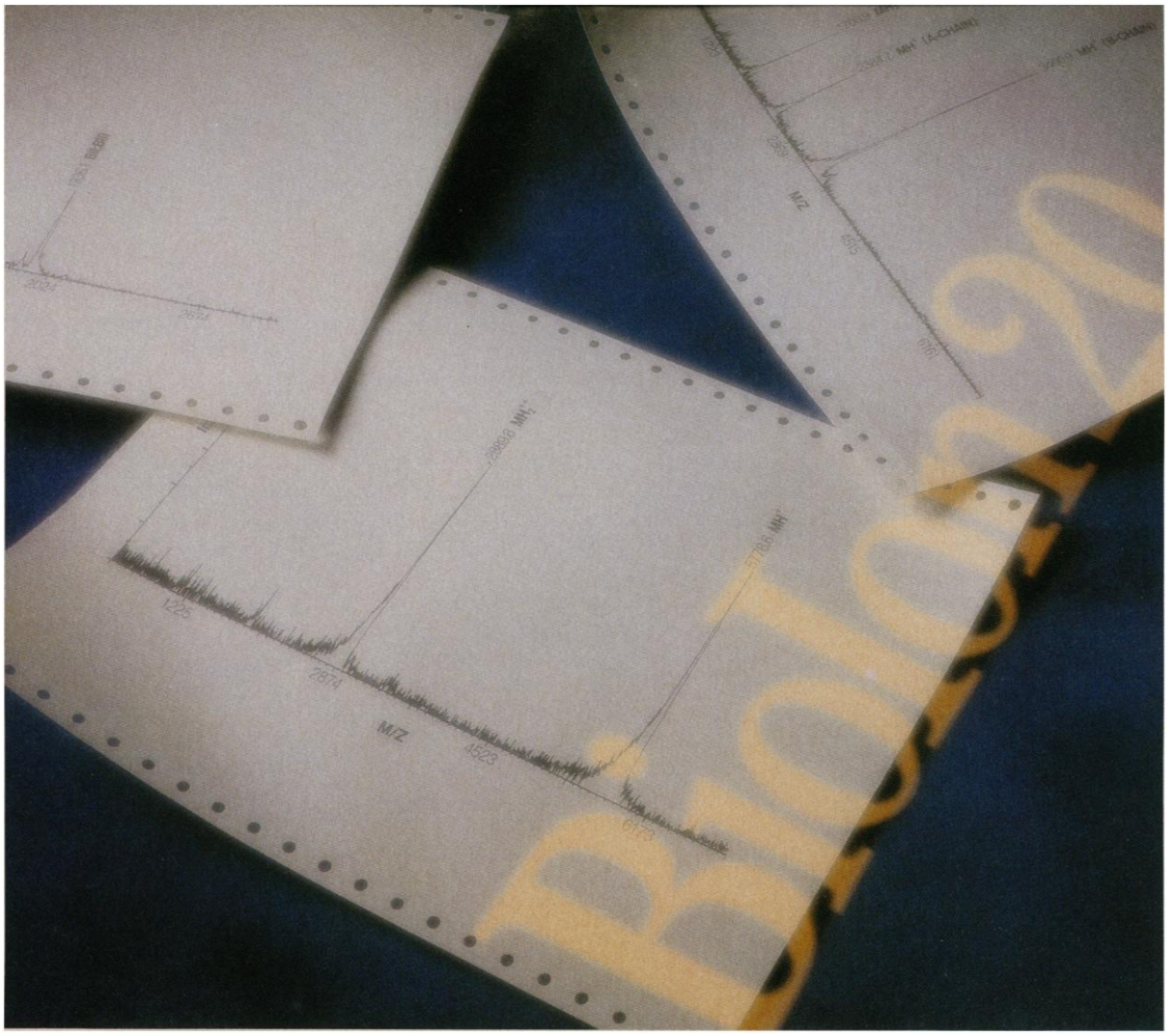
Blindsight

PEOPLE who are blind because their cerebral cortex is damaged sometimes have "blindsight": they may process visual stimuli that they cannot actually see. A physiologic explanation for blindsight may now be at hand (page 118). In mammals, it has been thought that vision is mediated entirely by the geniculostriate pathway in the cortex and that the phylogenetically older retinotectal pathway, which serves in other vertebrates, is vestigial. However, studies by Rafal *et al.* show that, in the absence of a functioning geniculostriate pathway, functioning by the retinotectal pathway can be detected. Individuals who lacked vision in half their visual field as a result of strokes were tested: would their responsiveness to a visual stimulus in the normal half of the field be affected by distracting visual stimuli in the apparently blind half of the field? It was. The required oculomotor response driven by the retinotectal pathway—an abrupt eye movement from one point to another—was slowed by the distractor even though the subjects never actually "saw" the distracting stimulus.

■ RUTH LEVY GUYER

Instrumentation

New instruments for studying the atmosphere, the deep earth, and molecular species in between them are the subjects of six articles (beginning on page 53) and the editorial (page 9) in this special issue.



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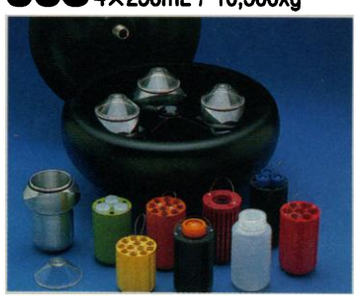

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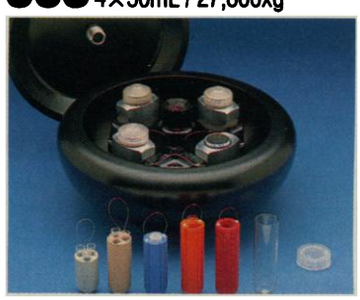

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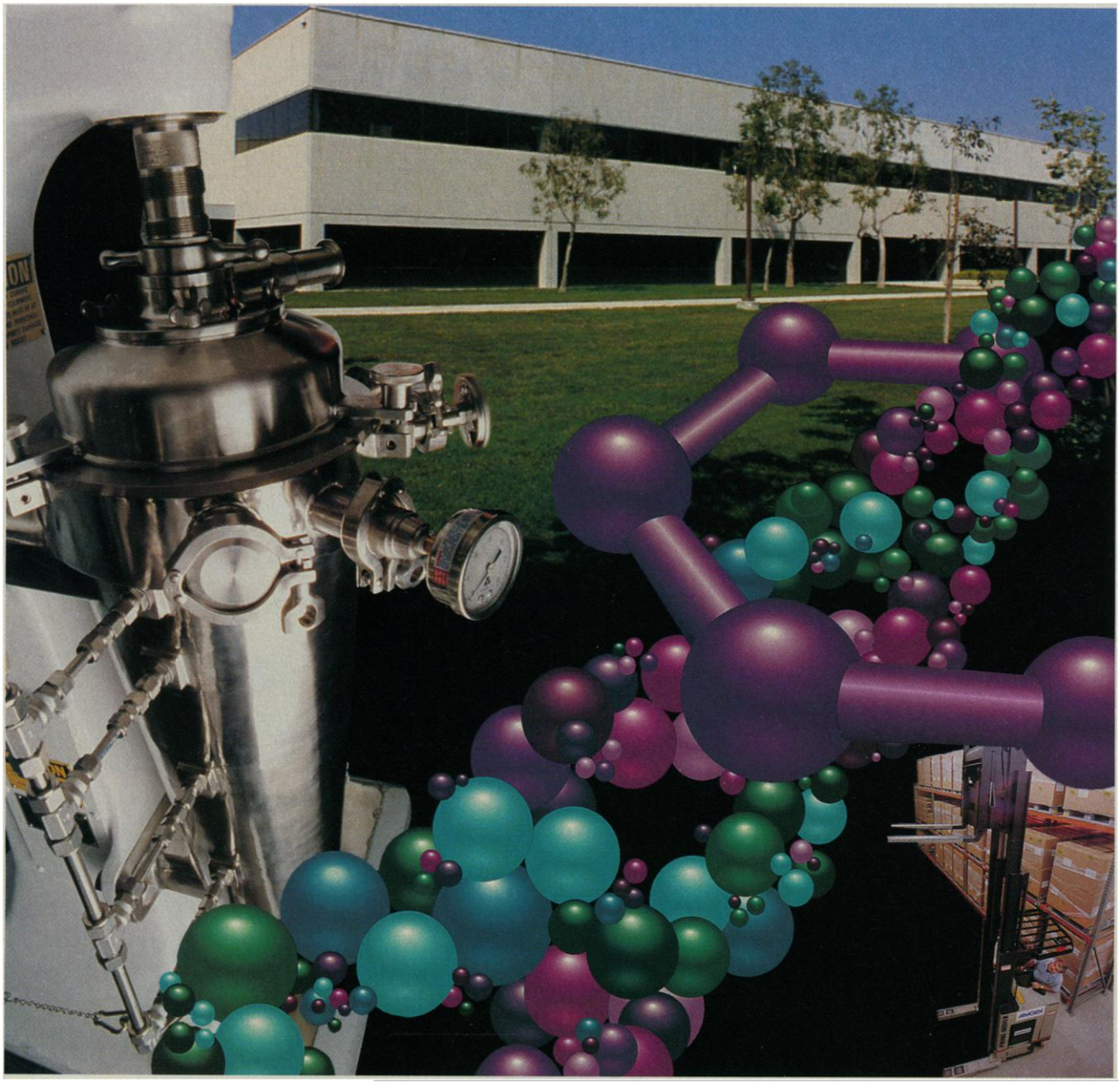

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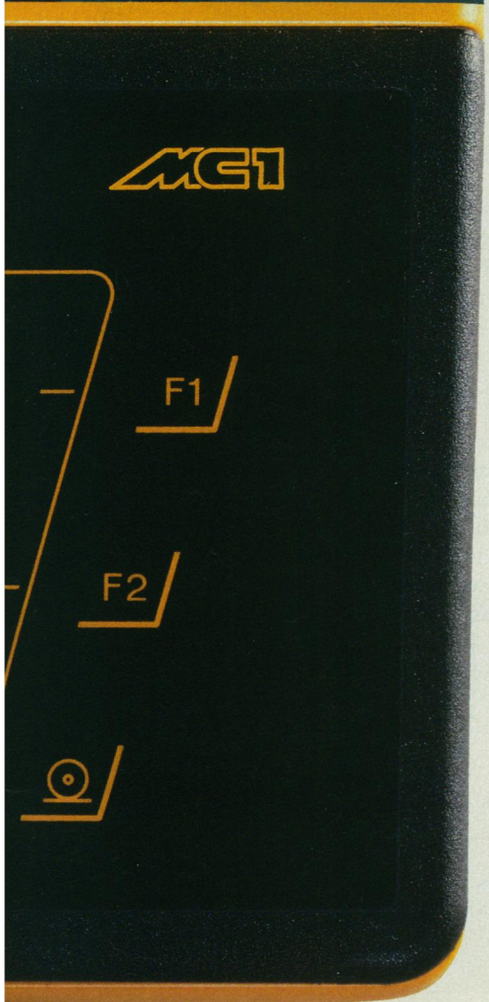

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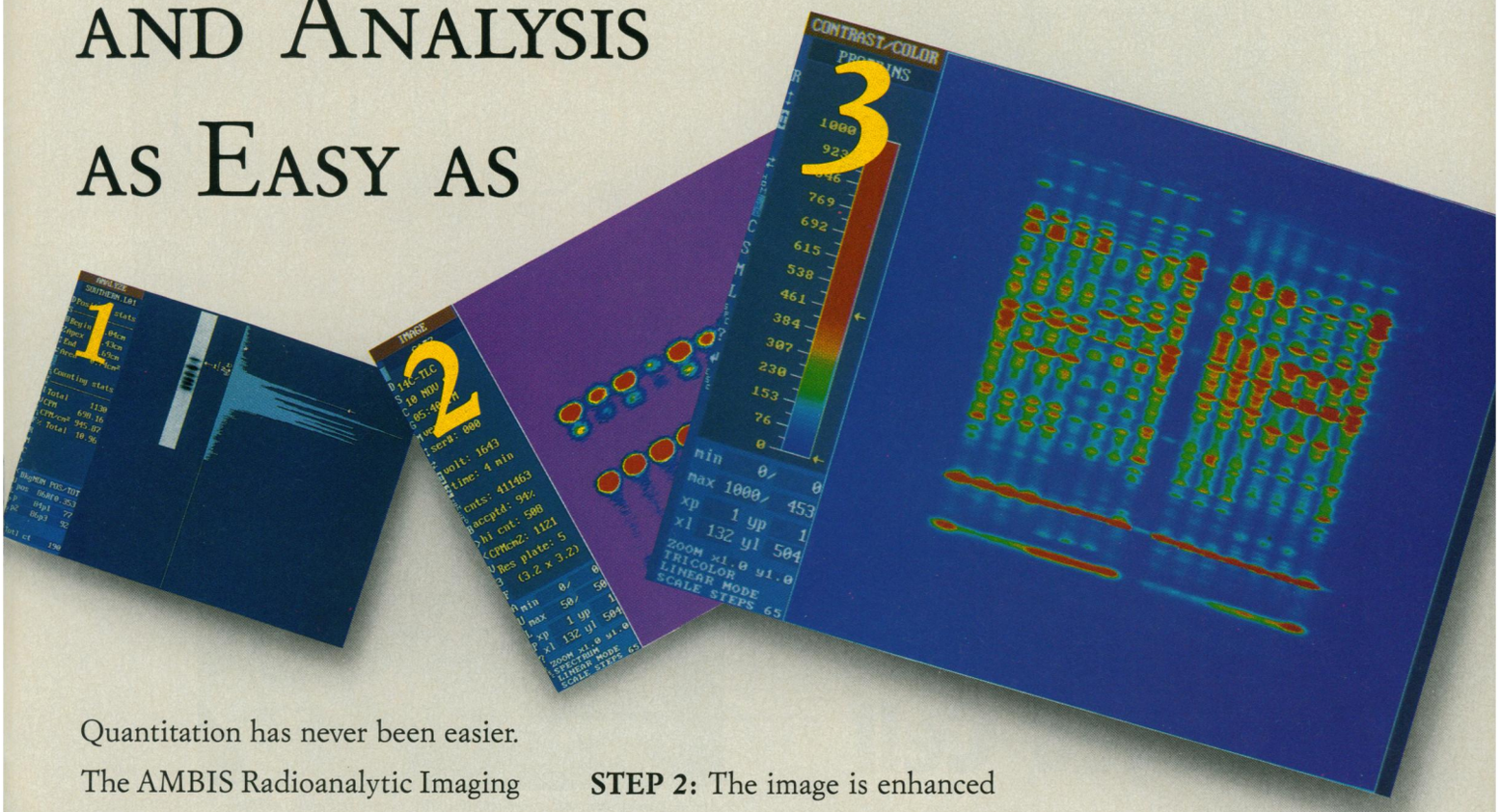

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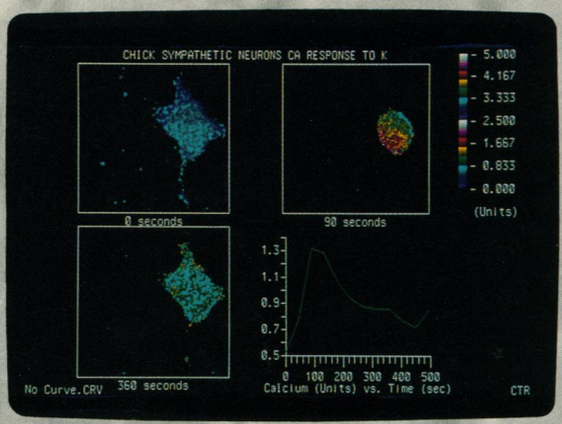
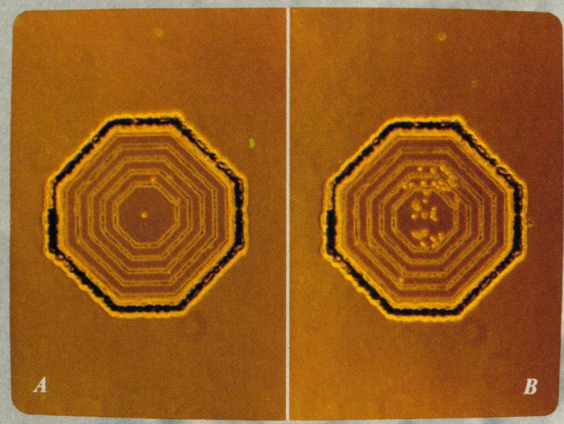
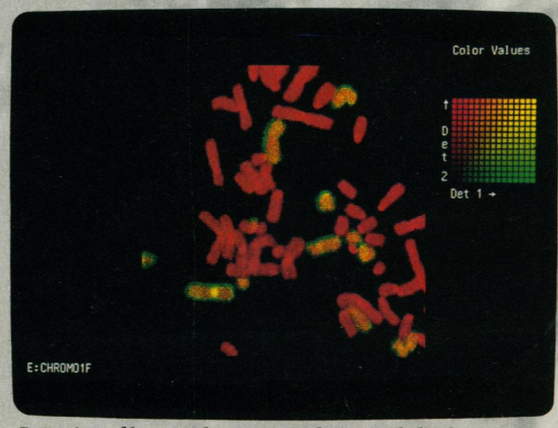


Confocal quantitation and localization of Ca^{2+} using the ACAS 570. *Ca^{2+} response to potassium is shown as a function of time in a 1μ confocal optical slice of an Indo-1 labeled chick sympathetic neuron. (Courtesy of Dr. Arun R. Wakade, Dept. of Pharmacology, Wayne State Univ.)*



Attached cell sorting using the ACAS "Cookie-Cutter"™ technique. *A) CHO cell isolated in culture. B) Cell out-growth after two days. (Courtesy of Dr. Margaret Wade, Meridian Instruments, Inc.)*



Detection of human chromosomes by* in situ *hybridization using the ACAS 570. *Mouse/human hybrid cell culture labeled with fluorescein-human DNA and propidium iodide. Displayed as a dual-label overlay image. (Courtesy of Dr. Roger A. Schultz, Molecular Genetics Laboratory, Univ. of Maryland.)*

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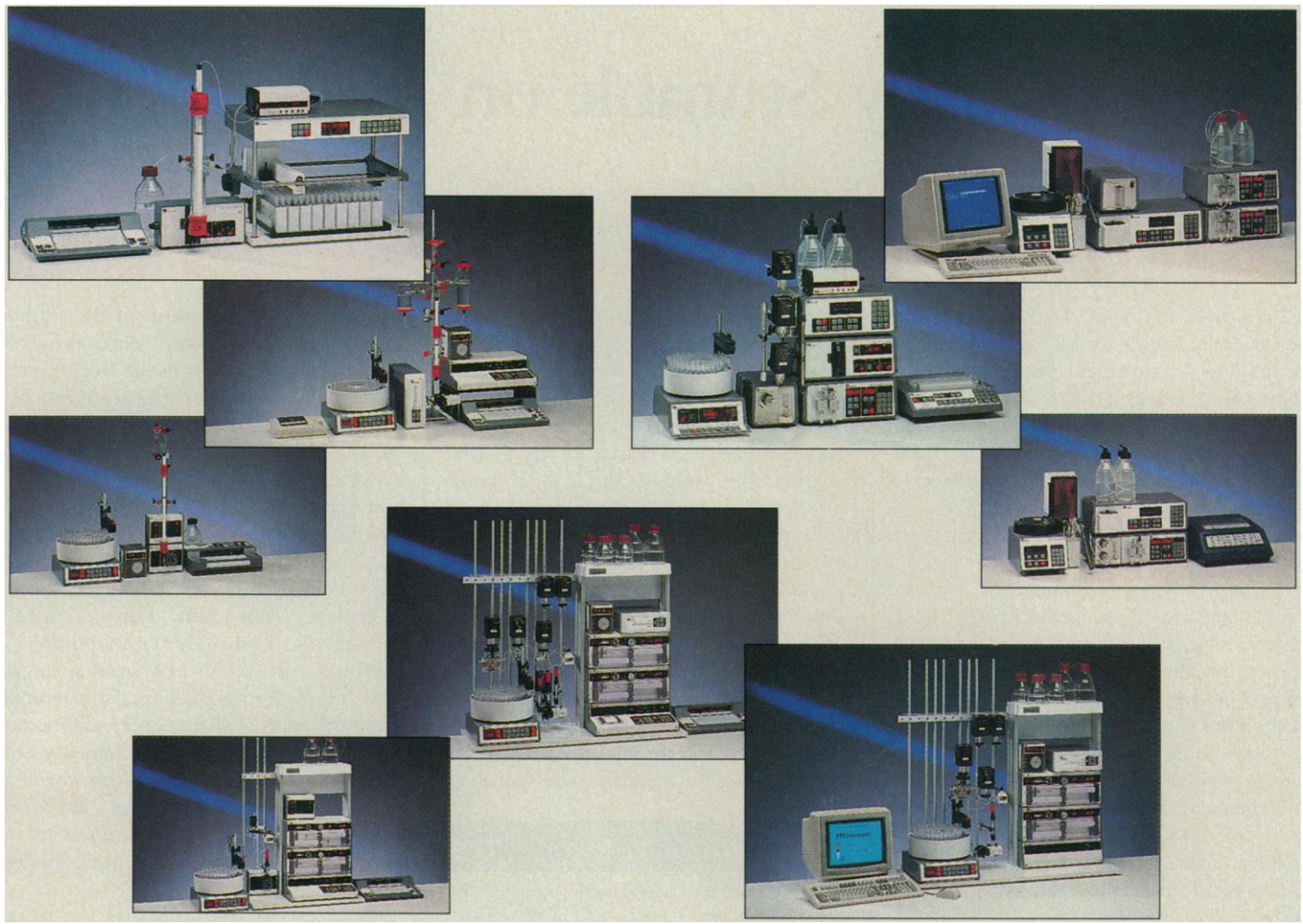

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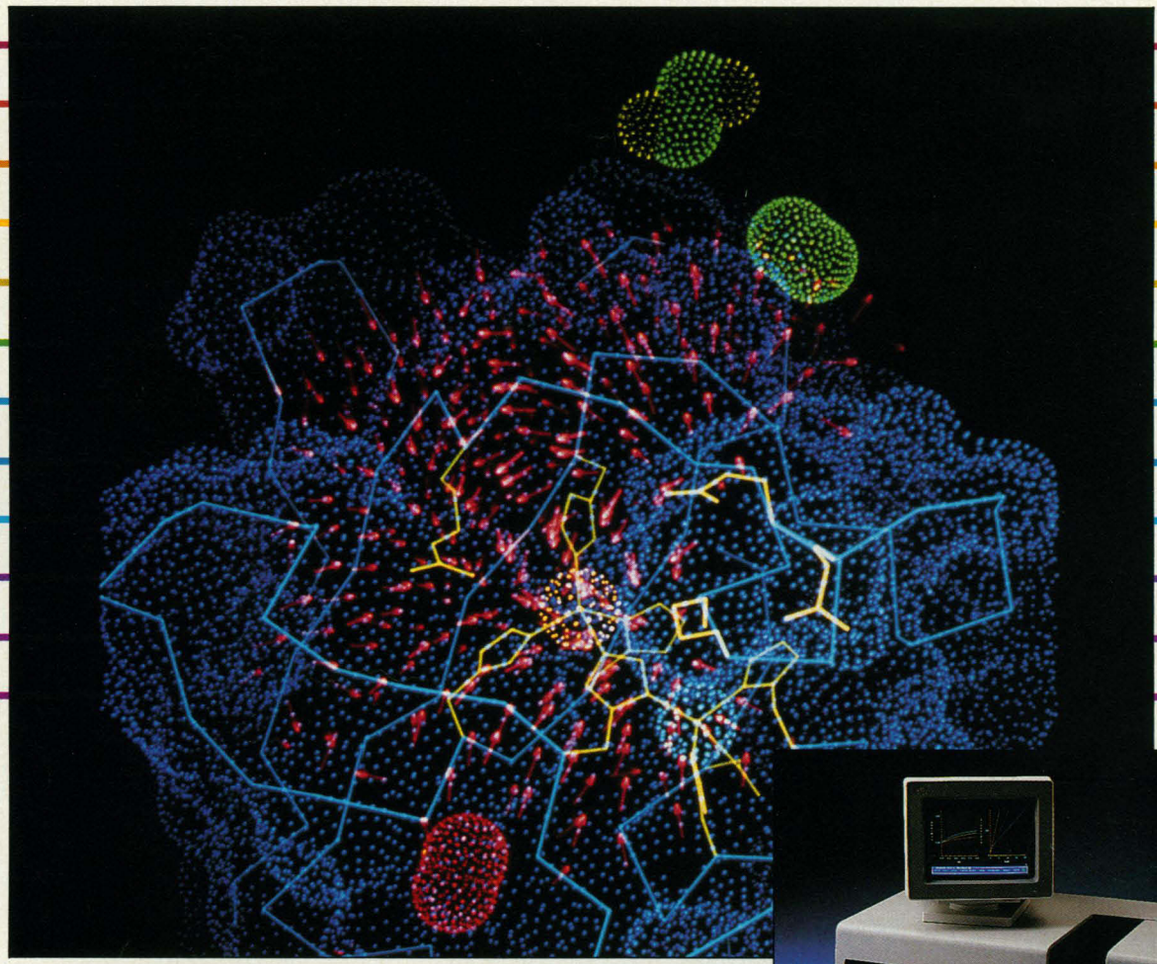

Superoxide dismutase image by John A. Tainer, Ph.D. Research Institute of Scripps Clinic

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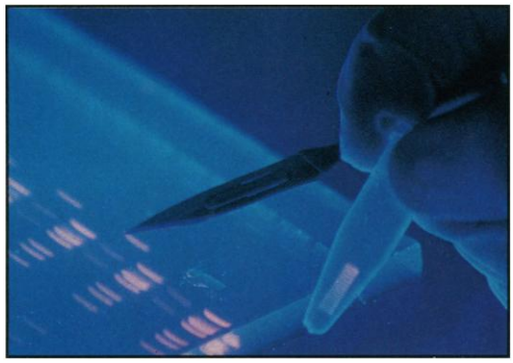

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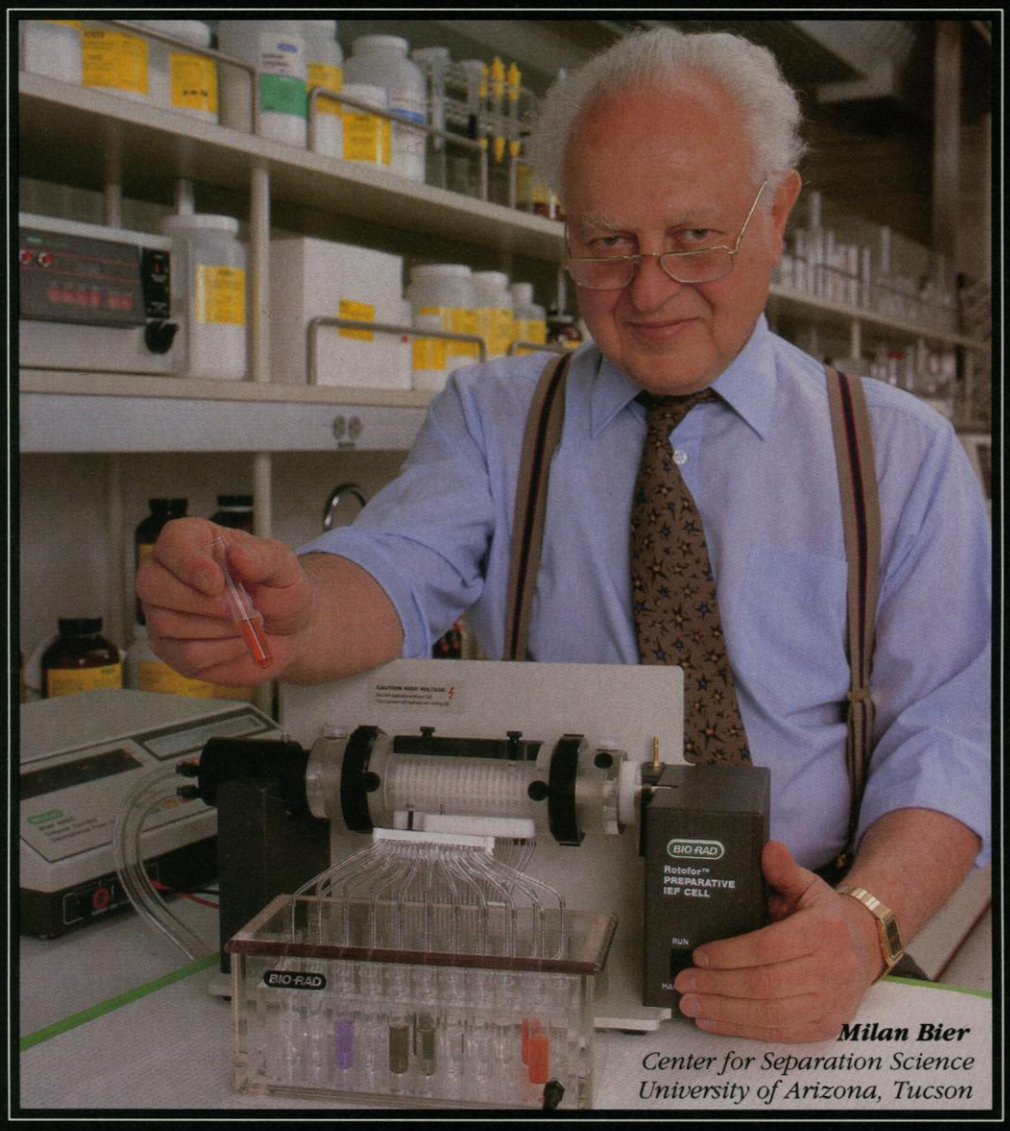

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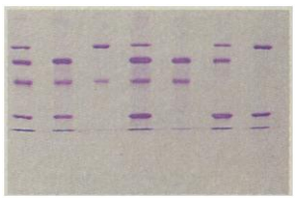

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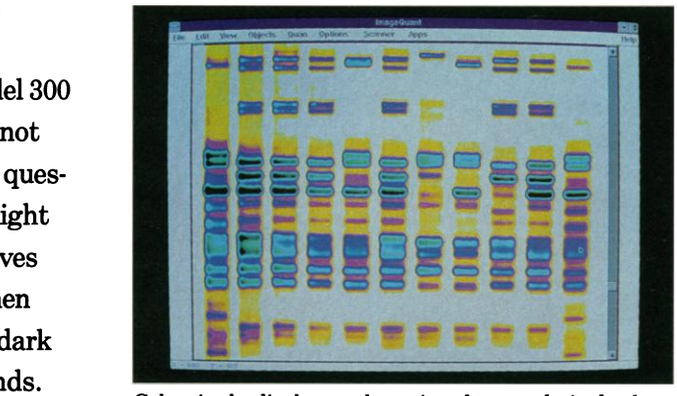

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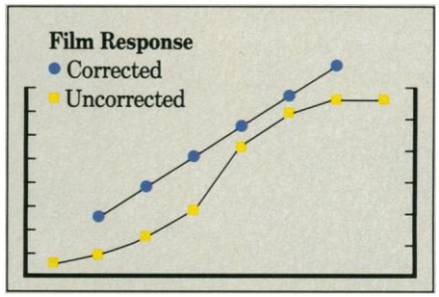

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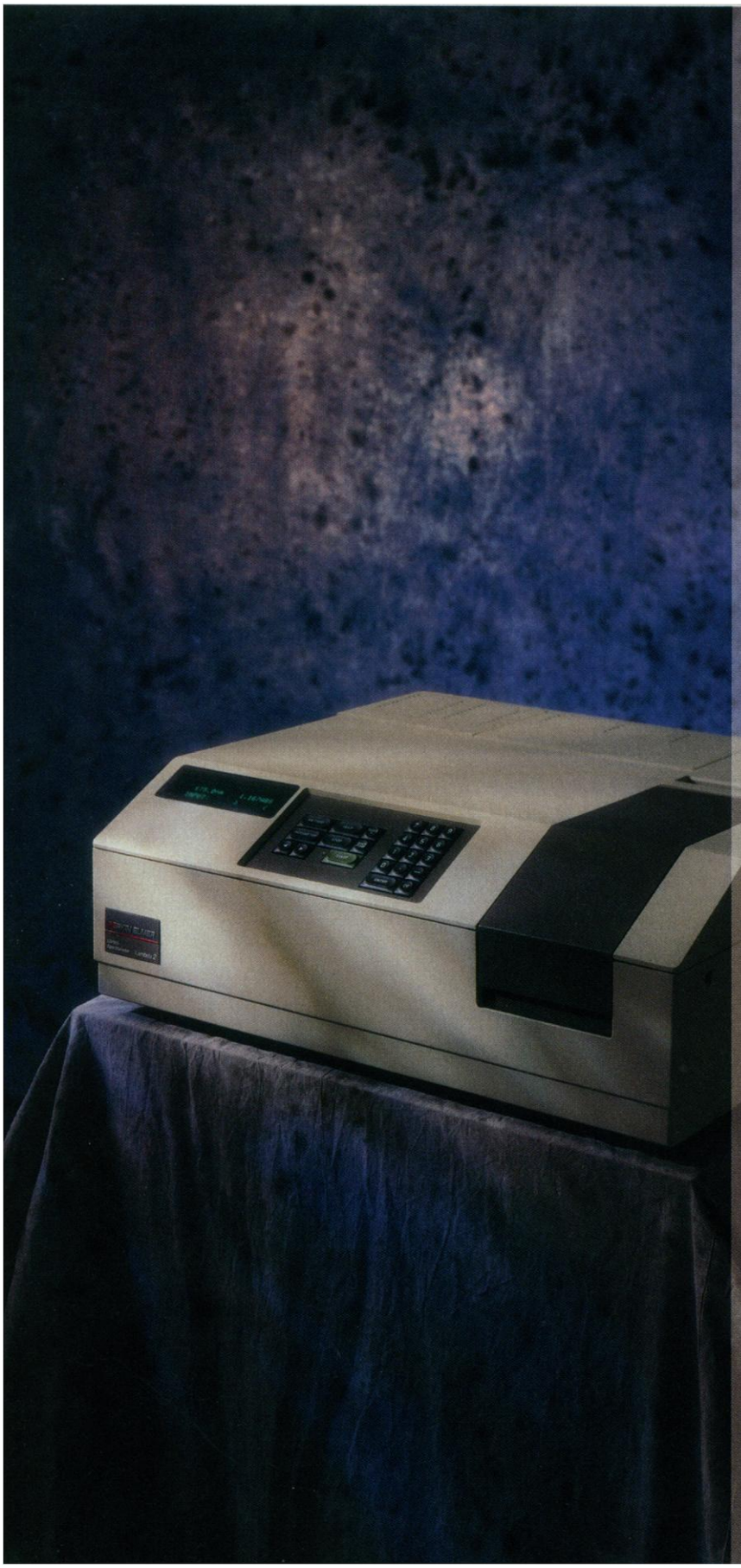

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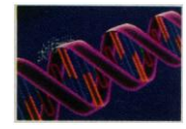

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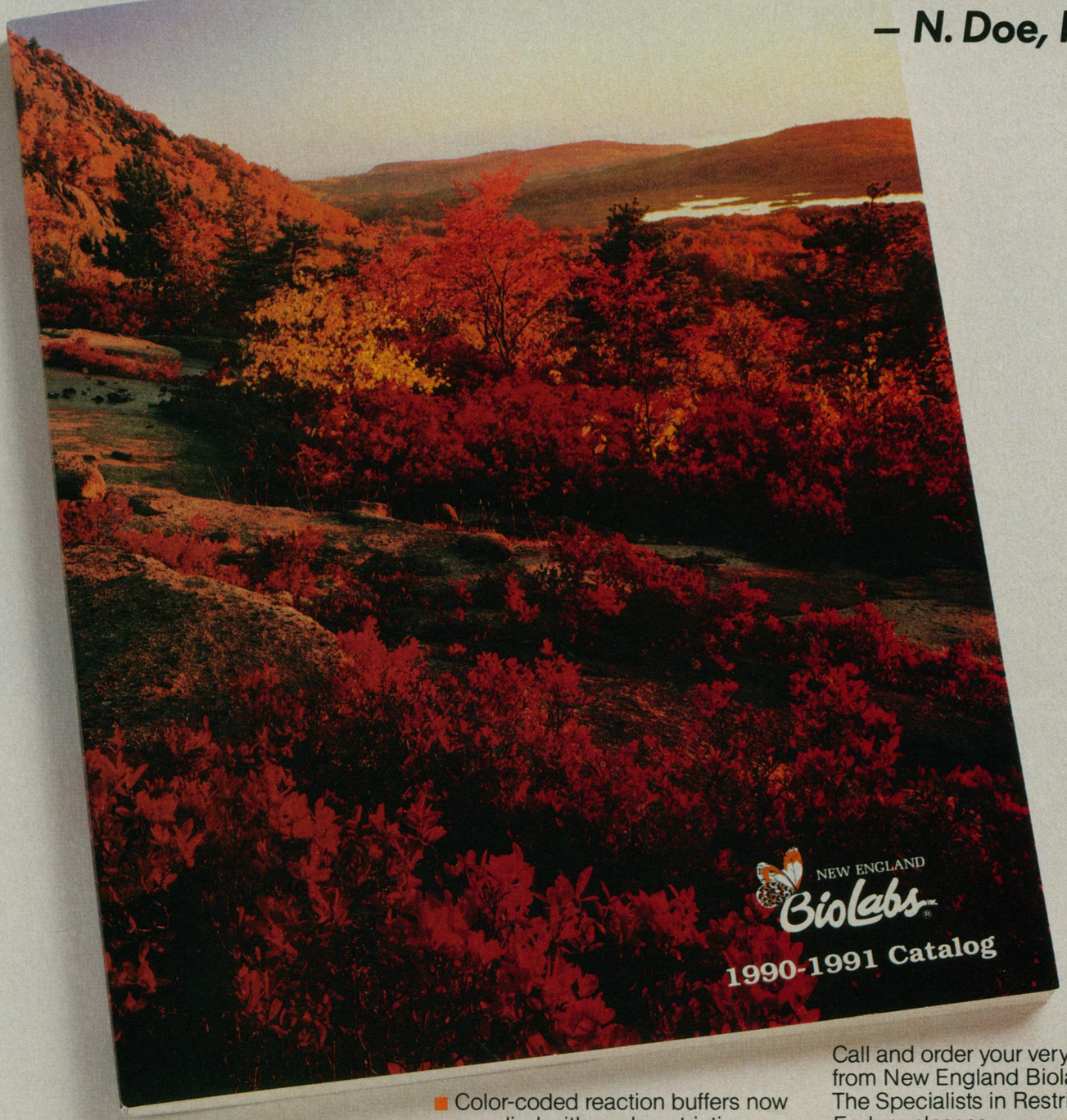

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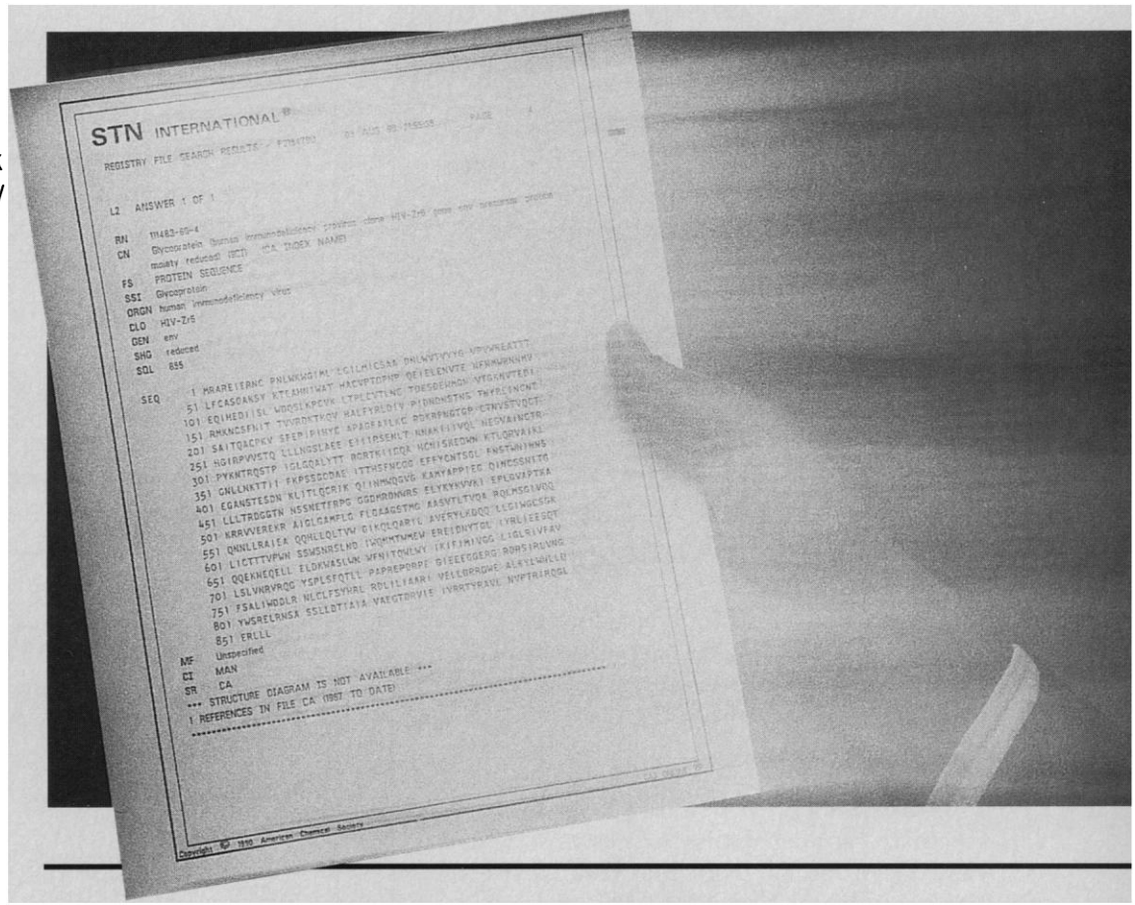

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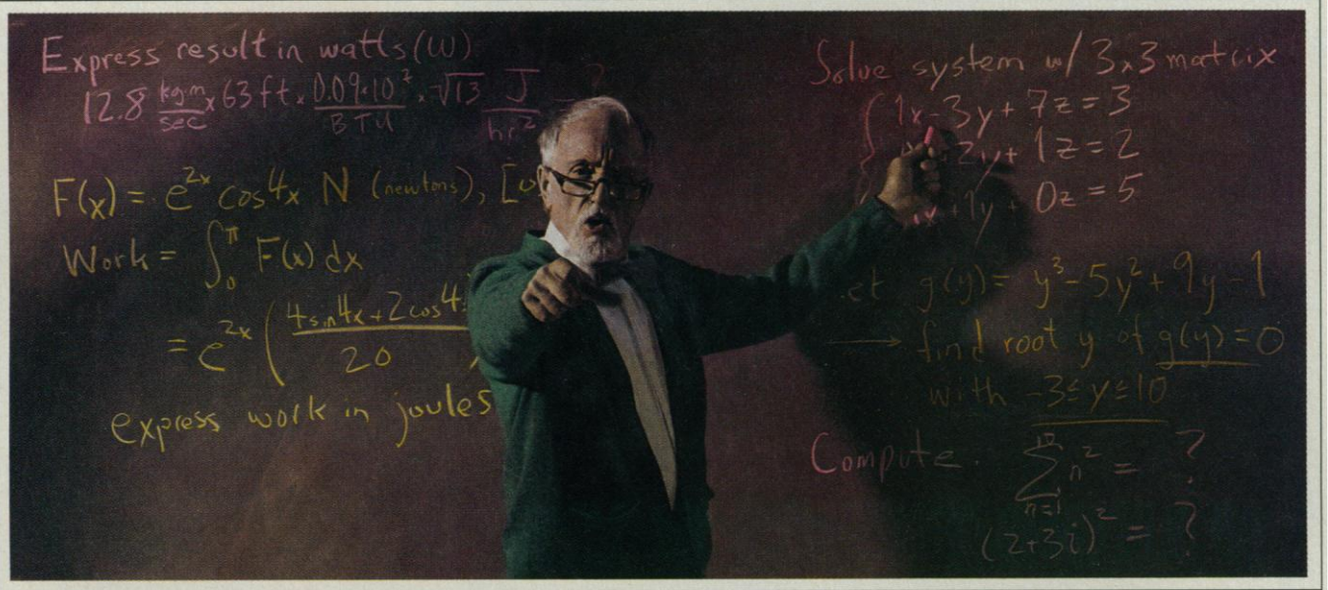

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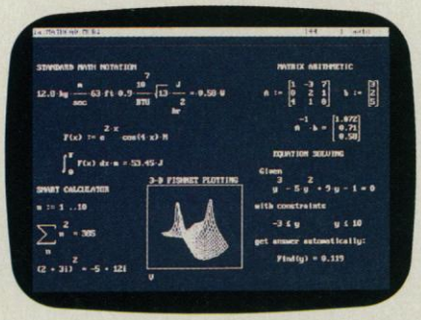

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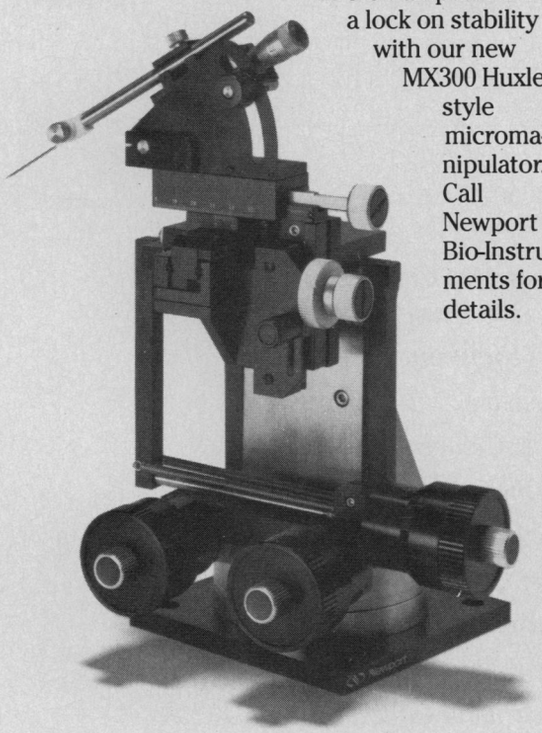

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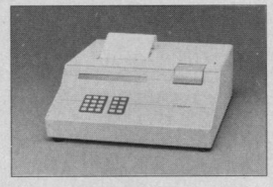

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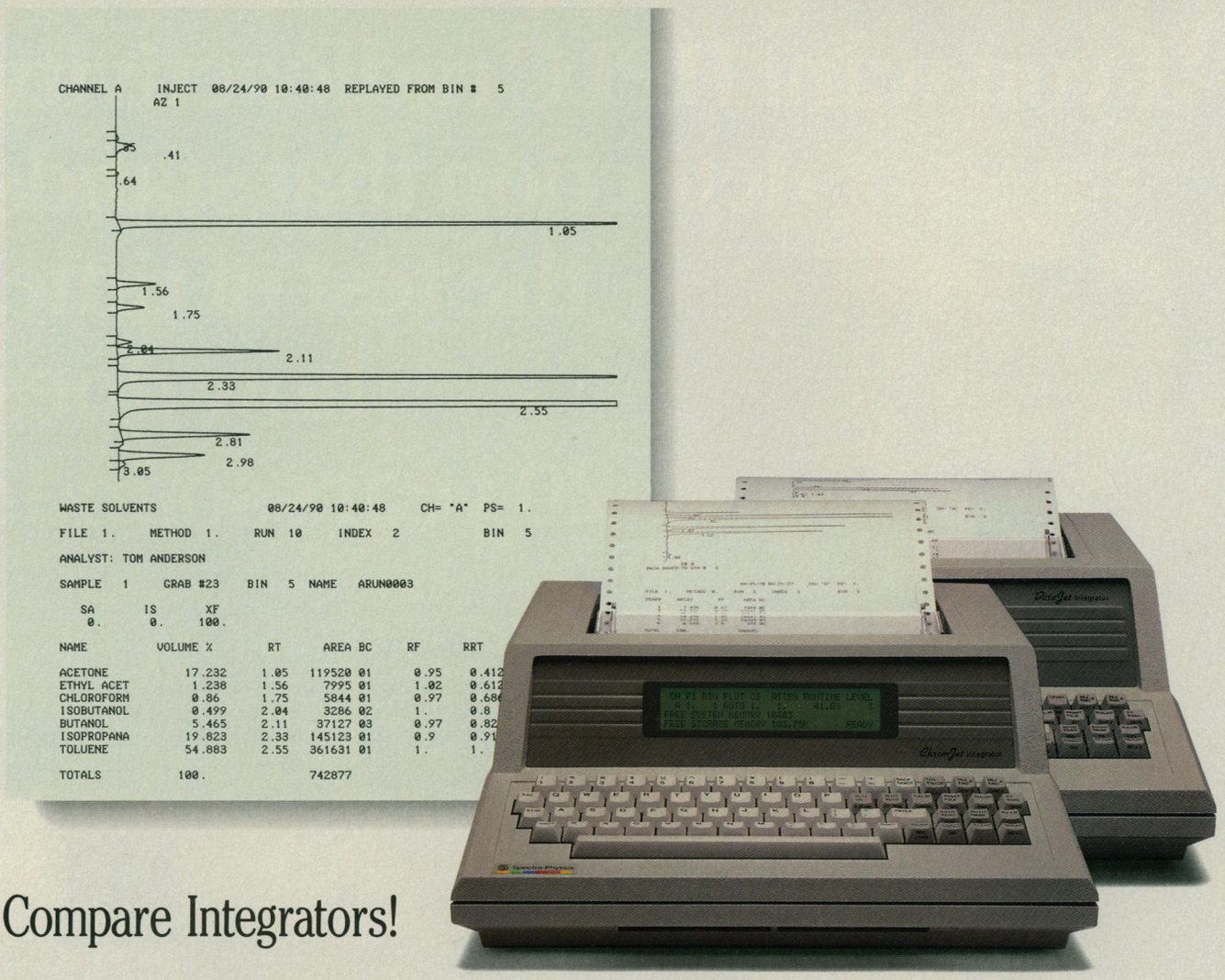

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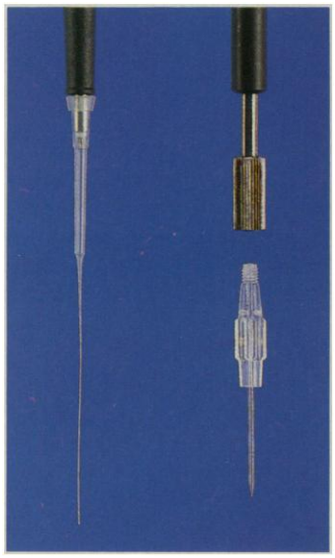

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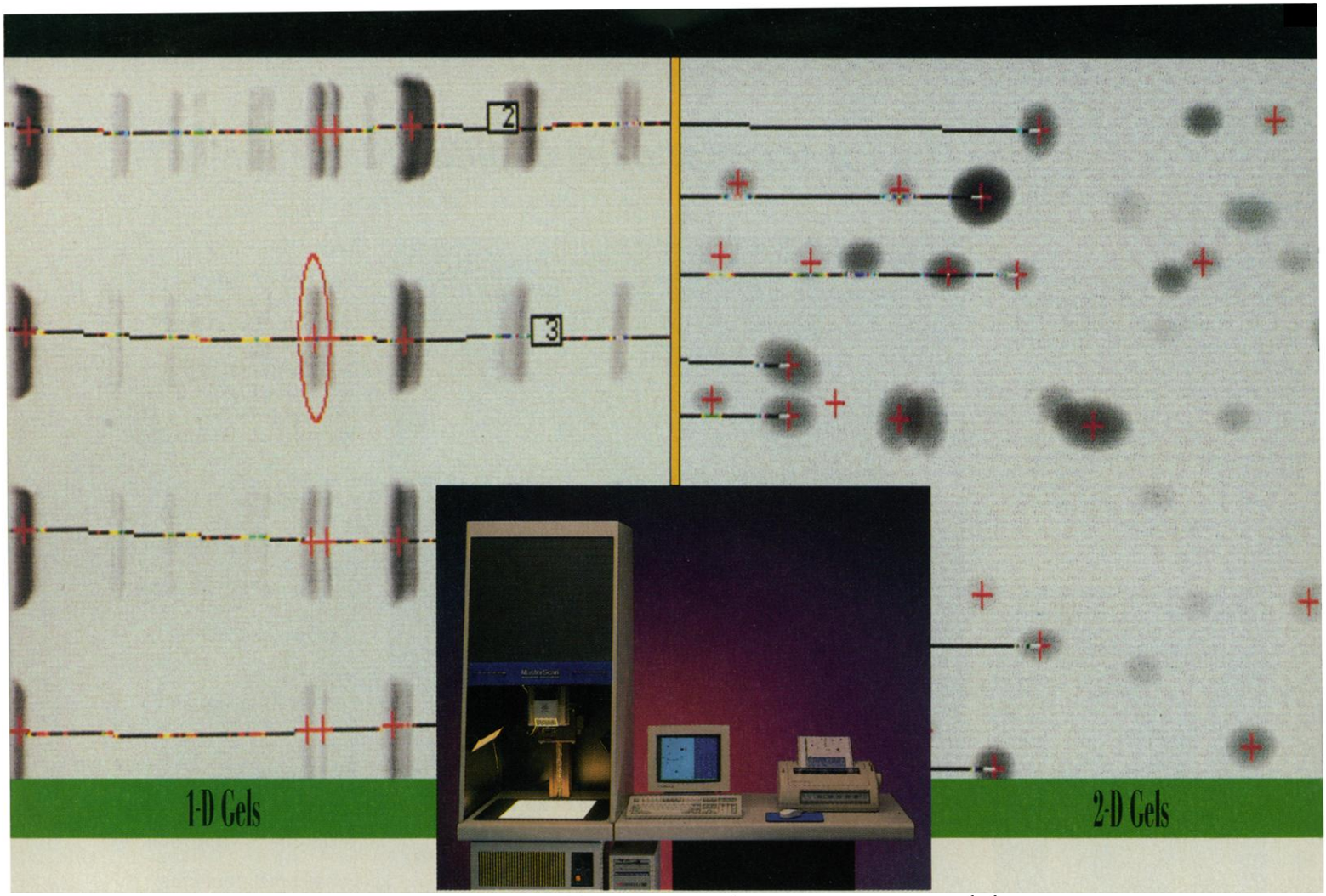

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Gordon Research Conferences

Alexander M. Cruickshank

The Winter Gordon Research Conferences will be held 7 January to 8 March 1991 at the Doubletree Hotel (telephone: 805-643-6000), 2055 Harbor Boulevard, Ventura, California, and 7 January to 22 February and 4 to 8 March 1991 at the Casa Sirena Marina Hotel (telephone: 800-228-6026), 3605 Peninsula Road, Oxnard, California.

Spring Conferences will also be held in San Miniato, Italy, from 28 April to 10 May 1991.

Agricultural Sciences

Casa Sirena

W. E. Marshall, chair; S. W. Dumford, co-vice chair, R. M. Hollingworth, co-vice chair

27 January–1 February

Resistance of pests—host plant defenses

Incompatible interactions between rice and bacterial pathogens: J. Leach, discussion leader

R. Hammerschmidt, "Pathology, physiology and stability of induced and nonhost resistance to disease."

Resistance of pests—chemical control, pathogens

Copper resistance in plant pathogenic bacteria: D. Cooksey, discussion leader

T. J. Burr, "Antibiotic resistance in bacterial pathogens."

L. C. Davidse, "Fungicide resistance in the laboratory and in the field."

Resistance of pests—chemical control, insects

Molecular mechanisms of insecticide resistance: M. Whalon, discussion leader

B. Croft, "Pest control systems that conserve pesticide, pest-resistant plants and biological control."

Resistance of pests—biological control

Insect resistance to *Bacillus thuringiensis* toxins: W. McGaughey, discussion leader

R. T. Roush, "Strategies to manage insect resistance to *B.t.*"

D. Fischhoff, "Resistance management strategies for transgenic plants: An industry perspective."

Resistance of plants—stress

Integration of the molecular machinery for plant defense: C. Lamb, discussion leader

J. Ryals, "Molecular biology of systemic acquired resistance."

The author, director of the Gordon Research Conferences, is professor emeritus of chemistry, University of Rhode Island, Kingston 02281-0801.

Resistance of plants—stress

Proactive and retroactive managing of herbicide resistance: J. Gressel, discussion leader

J. Gronwald, "Target site resistance to the graminocide herbicides in grasses."

D. O'keefe, "Cytochrome P^{450} herbicide metabolism."

Resistance of plants—Crop ecosystem manipulation

Mechanisms of disease suppression by fluorescent pseudomonads introduced to control take-all of wheat: L. Thomashow, discussion leader

S. K. Farrand, "A strategy for manipulation of bacterial colonization of the rhizoplane by engineering nutritional selectivity."

Resistance of plants—pathogens

Characterization of pathogen avirulence genes: N. Keen, discussion leader

P. De Wit, "Cloning of an avirulence gene from the fungal pathogen *Clasdosporium fulvum*."

R. Innes, "*Pseudomonas syringae* pv. tomato genes determine avirulence on both arabidopsis and soybean."

Resistance of pests—chemical control, insects

Prerequisites for resistance management: G. Georghiou, discussion leader

I. Denholm, "The application of resistance management."

Panel discussion

W. Marshall, discussion leader

Banquet speaker: J. St. John, "New competitive funds for research on agriculture, food and environment."

Angiotensin

Casa Sirena

C. M. Ferrario, chair; J. G. Douglas, vice chair

17–22 February

Expression and regulation of tissue renin and other angiotensin I forming enzymes: O. Carretero, discussion leader

K. W. Gross, "Extrarenal renin expression."

D. F. Steiner, "Processing endopeptidases related to kex-2 in animal cells."

K. R. Lynch, "Molecular characterization of a brain angiotensinogen processing enzyme."

Renin mechanisms: J. D. Baxter, discussion leader

T. L. Reudelhuber, "Mechanisms of processing and sorting of prorenin and renin."

S. Nakanishi, "Transgenic hypertensive mice with extrarenal renin and angiotensinogen gene expression."

T. Inagami, "Importance of extrarenal renin angiotensin systems."

Alternate pathways of angiotensin metabolism: P. Corvol, discussion leader

D. J. Campbell, "Pathways of angiotensin metabolism in plasma and tissues."

S. Wilk, "Prolyl endopeptidase, glutamyl amino peptidase and angiotensin metabolism."

A. J. Turner, "Neutral endopeptidase and differentially glycosylated forms of ACE."

E. G. Erdos, "Conversion of angiotensin I by 'non-converting enzyme.' "

New frontiers in angiotensin II receptors and actions: K. J. Catt, discussion leader

R. C. Speth, "Angiotensin II receptor subtypes: Properties and activation pathways."

T. Balla, "New aspects of calcium-phosphoinositide signaling by angiotensin II and growth factors."

S. Hirose, "Biochemistry and molecular biology of the hepatic angiotensin II binding protein."

Functions of angiotensin systems: C. M. Ferrario, discussion leader

D. Felix, "Co-functions of vasopressin and angiotensins in hypothalamic pathways."

D. J. Reis, "Brainstem circuits through which angiotensin may regulate arterial pressure."

M. I. Phillips, "Physiology of brain angiotensin."

D. Ganten, "Brain renin: Endogenous or transgene? That's the question."

M. P. Printz, "CNS and the genetics of hypertension."

Adrenergic mechanisms and angiotensin interactions: R. M. Graham, discussion leader

D. Leszczyszyn, "Quantal release of catecholamines: Real time evaluations using single cell preparations."

K. Muntz, "Subcellular localization of receptors/G-proteins."

J. C. Garrison, "Interaction of angiotensin receptors and G-proteins."

Renin angiotensin inhibitors and their applications: M. C. Khosla, discussion leader

H. R. Brunner, "A comparison of angiotensin antagonists versus renin inhibitors and converting enzyme inhibitors—future directions and epilogue."

E. A. Tallant, "Identification of angiotensin receptor subtypes on neuronal and glial cells using receptor antagonists, cellular responses and angiotensin heptapeptides."

J. Weinstock, "Potent angiotensin II antagonists designed using a putative bioactive conformation of angiotensin II."

Receptors and functions for kidney angiotensin II receptors: Molecular biology, transport and electrophysiology: J. G. Douglas, discussion leader

N. R. Opazo, "Molecular biology of angiotensin II receptor."

M. T. Nelson, "The role of potassium and calcium channels in the dilations to neuropeptides, hyperpolarizing drugs and hypoxia."

S. Kremer, "Multiple signaling pathways for chloride channel regulation by vasoactive peptides in mesangial cells."

1991 Winter Schedule

	Doubletree Hotel	*Casa Sirena Marina Hotel*
7–11 January	Polymers	Quantitative Genetics and Biotechnology
14–18 January	Composites	Temperature Stress in Plants
21–25 January	Electrochemistry	Enzyme Organization and Cell Function
28 January–1 February	Metals in Biology	Agricultural Science
4–8 February	Protons and Membrane Reactions	Mammalian DNA Repair
11–15 February	Glycoproteins and Glycolipids	Fibronectin
18–22 February	Kallikreins and Kinins	Angiotensin
25 February–1 March	Superconductivity	
4–8 March	Structures, Energetics, and Reaction Dynamics of Gaseous Ions	Supramolecules and Assemblies

1991 Spring Schedule

	San Miniato, Italy
28 April–3 May	Biology of Aging
5–10 May	Polymer Waste Management

Biology of Aging

San Miniato, Italy

A. Richardson, chair; J. Papaconstantinou, vice chair

28 April–3 May

The study of aging with transgenic mice

J. Vijg, "The mutamouse: A new model for studying the role of somatic mutations in aging."

B. Bowman, "Use of transgenic mice to study age-related changes in the regulation of gene expression."

Y. Groner, "Transgenic-Cu/Zn-superoxide dismutase mice display clinical symptoms of Down syndrome including signs of premature aging."

C. Epstein, "Transgenic and trisomic mouse models for human trisomy 21."

Use of transgenic invertebrate models to study aging

J. Shepherd, "Transgenic *Drosophila* with increased life span."

T. Johnson, "Transgenic analyses of age-related genes in *Caenorhabditis elegans*."

M. Jazwinski, "Transgenic yeast with altered life spans."

Changes in genes expression in cellular senescence

L. Philipson, "The negative regulation of cell growth."

G. Stein, "Role of the retinoblastoma gene product and other cell cycle regulated proteins in cellular senescence."

R. Sager, "Role of HPV genes E6 and E7 in the immortalization of normal human mammary epithelial cells."

J. Smith, "Modification of gene expression by cellular aging."

Role of changes in growth factors in aging

S. Shall, "Altered responsiveness of senescent fibroblasts to growth factors and the potential role of ADP-ribosylation in cell senescence."

W. Weigle, "Effect of aging on lymphokines, lymphokine receptors, early activation antigens and T cell subsets."

Cell death and its possible relationship to aging

L. Fesus, "The role of transglutaminase-catalyzed cross-linking of proteins in the program of physiological cell death."

S. Orrenius, "Role of calcium-activated DNA fragmentation in cell death."

A. Columbano, "Cell proliferation and cell death in hepatocarcinogenesis."

D. Reed, "Role of oxidative stress, free-radicals and their inhibitors in the death of hepatocytes."

The role of free radicals in aging

J. R. Perez-Polo, "Nerve growth factor and its potential role in aging and protection against free radicals."

P. Cerutti, "The participation of oxidants and antioxidant defense in the regulation of cell proliferation."

A. Richardson, "The effect of dietary restriction on the expression of the antioxidant defense system."

Age-related changes in signal transduction

J. Meldolesi, "Signal transduction: A network of coordinated and cross-regulated events."

D. Lipschitz, "Age changes in calcium-dependent responses of neutrophils."

J. Joseph, "Loss of muscarinic agonist responsiveness in senescence: Putative second messenger involvement."

F. Crews, "Synaptic plasticity and excitatory signal transduction in the hippocampus."

Round-table discussion of basic research in aging: Past discoveries, present status, and future directions: R. Adelman, Chair

E. Masoro, V. Cristofalo, A. Macieira-Coelho, D. Knook, discussants

Effects of aging on transcription

J. Campisi, "Mechanisms regulating gene expression during cellular senescence."

K. Beyreuther, "Molecular biology of degenerative disorders of the CNS: Role of beta-A4 amyloid precursor gene."

F. Sierra, "Age-related changes in the regulation of T-kininogen transcription in rat liver."

J. Papaconstantinou, "The role of cis- and trans-acting factors in the age-related changes in the expression of acute phase proteins.

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Fixed Conference Fees—1991

California Conferences

Conferee (double occupancy—registration, room and meals) ($400 if postmarked 3 weeks prior to conference)	$450
Conferee (single occupancy—registration, room and meals) ($510 if postmarked 3 weeks prior to conference)	$560
Guest (double occupancy—room and meals) ($290 if postmarked 3 weeks prior to conference)	$340
Guest (single occupancy—room and meals) ($400 if postmarked 3 weeks prior to conference)	$450

European Conferences—San Miniato, Italy

Conferee (double occupancy—registration, room and meals) ($550 if postmarked 3 weeks prior to conference)	$600

There will be an extra charge for single rooms.

1) Full fixed fee charged regardless of time a conferee attends a conference.

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3) Children under 12 years of age are not permitted in the conference meeting rooms or conference dining rooms.

4) Cancellation: All but $40 of the fixed fee will be refunded if an approved application is canceled.

Composites

Doubletree Hotel

A. N. Gent, chair; R. S. Porter, vice chair

14–18 January

F. N. Kelley, discussion leader

W. X. Zukas, "Surface effects on epoxy cure reactions."

D. Plazek, "Physical changes in bisphenol a epoxy resins."

T. L. St. Clair; J. G. Williams, discussion leaders

J. Schultz, "Role of adhesion and interphase in fiber-matrix composites."

D. Matsumoto, "New toughness test methods for composites."

Sir G. Allen, discussion leader

W. Wu, "Cross-linking processes in bimodal thermoset resins."

J. Hedrick, "Fluorine-containing networks as resins for composite boards."

V. Altstadt, "Interlaminar fracture and damage tolerance."

E. P. Woo; R. J. Farris, discussion leaders

D. Allara, "Role of interactions and reactions at interfaces."

I. Lee David, "Microstructural constitutive theory for granular materials."

R. M. Ikeda, discussion leader

W. Shultz, "Fluorene resin composites."

A. Salem, "Thermoplastic matrix composites from cyclic resins."

B. C. Benicewicz, "Lipid crystal thermosets."

R. L. Powell, discussion leader

J. Kardos, "Suppression of voids during processing of composites."

H. Kia, "Parameters that affect the appearance of composites."

L. C. Yanyo, discussion leader

F. H. J. Maurer, "Role of the interphase in particulate composites."

H. Ishida, "Interphase engineering in composites."

N. Sato, "Deformation mechanism of composite interphase."

A. F. Yee, discussion leader

Short presentations by conferees

K. M. Liechti, discussion leader

R. Schapery, "Damage initiation and growth in composites."

H. Daniel Wagner, "Microcomposites as experimental models."

Electrochemistry

Doubletree Hotel

B. Parkinson, chair; R. Mark Wightman, vice chair

21–25 January

B. Miller, discussion leader

D. Cahen, "Controlled room-temperature creation of device structures via electromigration of native dopants in mixed ionic/semiconductors."

J. Switzer, "Atomic-level architecture of new materials: Electrodeposited ceramics."

R. McCreey, discussion leader

J. Pemberton, "Surface Raman spectroscopy of electrochemical interfaces."

G. Richmond, "SHG: The latest episode in the series 'as the electrode turns.' "

M. Spitler, discussion leader

F. Willig, "Electron transfer from electronically excited molecules to solid electrodes: Picosecond time-resolved experiments and new theoretical aspects."

L. Peter, "Kinetics and mechanisms of photoelectrochemical reactions."

A. Nozik, discussion leader

A. Fujishima, "New applications of photoelectrochemistry."

H. McConnell, "Development and application of a light addressable sensor."

D. Buttry, discussion leader

C. Korval, "Selective and energy efficient separation processes in membranes and thin films."

B. DeGrado, "Design of ion channel peptides."

R. Murray, discussion leader

J. Stickney, "Electrochemical atomic layer epitaxy."

J. Leddy, "Ion exchange polymers: Structure, transport, selectivity."

R. Robinson, "Microstructural changes at electrode surfaces studied by STM."

B. Schardt, "In situ atomic resolution scanning tunneling microscopy of electrode surfaces."

B. O'Grady, discussion leader

S. Gottesfeld, "Investigations of elementary interfacial and membrane processes in polymer electrolyte fuel cells."

K. Prater, "Practical aspects of solid polymer electrolyte fuel cell systems."

M. Wightman, discussion leader

Presentation by conference participants

M. Soriaga, discussion leader

J. Porter, "Electron tunneling at metal/liquid interfaces."

K. Mann, "Determination of structure/reactivity patterns in metal complexes by electrochemical methods."

Enzyme Organization and Cell Function

Doubletree Hotel

C. K. Mathews, chair; H. R. Knull, vice chair

21–25 January

Cell structure and function: J. Clegg, discussion leader

K. Porter, "Structure of the cytomatrix."

K. Luby-Phelps, "Physical chemistry of the cytomatrix."

L. Chen, "Localization of proteins in living cells."

Protein assembly and interactions: M. Savageau, discussion leader

S. Hemmingsen, "Chaperone proteins in chloroplast biogenesis."

P. Hensley, "Zinc fingers and protein-protein recognition."

Theoretical and kinetic analysis of enzyme organization: J. Keizer, discussion leader

J. Keizer, "Direct versus diffusion transfer of metabolites."

H. Kacser, "Control theory and pathway regulation."

J. Easterby, "Channeling and temporal enzyme responses."

O. Spivey, "NADH channeling as analyzed with complex I."

Protein interactions in DNA replication: L. McAllister-Henn, discussion leader

S. J. Benkovic, "Kinetic analysis of T4 DNA polymerase."

P. Von Hippel, "Assembly and function of the bacteriophage T4 DNA replication complex."

Multienzyme complexes: M. Deutscher, discussion leader

D. Yang, "Multienzyme complex of mammalian aminoacyl RNA synthetases."

J. Ricard, "Multienzyme complexes in the calvin cycle."

M. F. Dunn, "Linkage between covalent steps, allosteric interactions, and tunnel functions in tryptophan synthase."

Organelle biogenesis: G. R. Welch, discussion leader

W. Balch, "Interorganelle protein transport."

F. Hartl, "Protein transport and mitochondrial biogenesis."

Enzyme associations in carbohydrate metabolism: K. Storey, discussion leader

F. Clarke, "Interactions between glycolytic enzymes and actin."

J. Ovadi, "Fine modulation of dynamic protein associations."

R. Edstrom, "Scanning tunneling microscopic imaging and kinetic analysis of the muscle glycogenolysis regulatory network."

Non-invasive analysis of metabolism: D. Kell, discussion leader

D. Jones, "Intracellular metabolic gradients."

C. Malloy, "Analysis of metabolic pathways in vivo by ^{13}C NMR."

Enzyme organization in intermediary metabolism: P. Srere, discussion leader

A. Goldberg, "The mechanism and function of ATP-hydrolyzing proteases in bacterial and animal cells."

L. Schirch, "Enzyme interactions in folate coenzyme metabolism."

P. Srere, "Complexes of TCA cycle enzymes."

Fibronectin

Casa Sirena

M. Pierschbacher, chair, M. Ginsberg, vice chair

11–15 February

K. Yamada, discussion leader

R. Timpl, "Structural basis of cell binding to laminin."

M. Baron, "NMR of fibronectin structure."

D. Mosher, discussion leader

J. Schwarzbauer, "Fibronectin structures involved in matrix assembly."

J. McDonald, "Receptor-mediated matrix assembly."

E. Plow, discussion leader

A. Horowitz, "Ligand structures recognized by integrins."

J. Loftus, "Integrin structure involved in ligand recognition."

K. Burridge, "Integrin-based cytoskeletal assembly."

R. Hynes, discussion leader

L. Reichardt, "Nectins and integrins in neurobiology."

C. Damsky, "Modulation of nectins and integrins during implantation."

C. Buck, discussion leader

S. Santoro, "Collagen receptors on platelets and endothelial cells."

Z. Ruggeri, "von Willebrand factor—structure and receptors."

J. Brugge, "von-Willebrand factor—biosynthesis."

M. Hook, discussion leader

R. Isberg, "Bacterial invasion."

W. Frazier, "Thrombospondin."

S. Hakomori, discussion leader

V. Quaranta, "Epithelial integrins in cancer."

F. Giancotti, "Integrin phenotypes in cancer."

J. P. Theiry, "Control of adhesion and motility in carcinoma invasion and metastasis."

Invited short presentations, "Inhibitors of integrin function."

M. Helmer, discussion leader

T. Springer, "Cellular regulation of the avidity of the LFA-1 integrin."

S. Shaw, "T-cell adhesion molecules: Adhesion activation and differentiation."

Glycoproteins and Glycolipids

Doubletree Hotel

R. Kornfeld, chair; J. Baenziger, vice chair

11–15 February

Organization and function of ER and Golgi: J. Paulson, discussion leader

R. Scheckman, "ER to Golgi transport in yeast."

M. J. Gething, "BiP and protein folding in the ER."

J. Lippincott-Schwartz, "Brefeldin A and Golgi/ER recycling."

Biosynthesis and processing of glycoproteins: C. Hirshberg, discussion leader

P. Robbins, "Assembly of Dol-*P*-*P*-oligosaccharides in yeast."

M. Lehrman, "Cloning of GlcNAc phosphotransferase for Dol-*P*-*P*-GlcNAc synthesis in animal cells."

Specificity of glycosyl transferases: H. Schachter, discussion leader

S. Kornfeld, "Basis of specificity of GlcNAc phosphotransferase for lysosomal enzymes."

J. Baenziger, "Specificity of the Gal NAc transferase for pituitary hormones."

J. Shaper, "Spliced forms of galactosyl transferase."

Synthesis and function of sialic acid containing oligosaccharides: R. Troy, discussion leader

A. Varki, "Sialic acid synthesis in animal cells."

Y. Inoue, "Biogenesis of oligosialyl and oligoKDN chains on fish egg glycoproteins."

Function of lectins: S. Barondes, discussion leader

S. Rosen, "The lymphocyte homing receptor."

J. Wang, "Nuclear lectins."

S. Normark, "Molecular biology of lectins on bacterial pili."

Glycolipid sorting and function: K. Sandhoff, discussion leader

R. Pagano, "Glycolipids as Golgi markers."

G. van Meer, "Glycolipids sorting in polarized cells."

Oligosaccharides in development: R. Cummings, discussion leader

S. Hakomori, "Oligosaccharide to oligosaccharides interactions."

B. Shur, "Role of galactosyl transferase in fertilization."

J. Lowe, "Molecular genetics of ABO system."

Disorders of oligosaccharide metabolism in disease: S. Kornfeld, discussion leader

K. Simonovich and J. Dennis, "Altered O-linked oligosaccharide synthesis in Wiskottaldrich syndrome."

M. Fukuda, "Defective oligosaccharide processing in HEMPAS syndrome

Phosphoinositol glycan anchors: G. Hart, discussion leader

G. Hart, "Biosynthesis of phosphoinositol glycans."

S. Turco, "Phosphoinositol glycans in the parasite *Leischmania*."

E. Rodriguez-Boulan, "Sorting of phosphoinositol glycan anchored proteins in polarized cells."

Kallikreins and Kinins

Doubletree Hotel

L. M. Greenbaum, chair; A. G. Scicli, vice chair

18–22 February

L. M. Greenbaum, discussion leader

R. M. Burch, "B_2 receptor antagonists as potential therapeutic agents."

D. Regoli, "Kinins and tachykinin receptor antagonists—new directions and approaches."

J. M. Stewart, "The present status of bradykinin antagonists."

B. A. Scholkens, "New bradykinin antagonists—in vitro and in vivo studies."

A. Nasjletti, discussion leader

J. Staszewska-Woolley, "Reflex functions of the kallikrein-kinin receptor system in dog epicardium."

R. J. Roman, "The regulation of renal function by kinins."

N. L. Baenziger, "B_2 receptor diversity: Pathophysiologic implications."

O. A. Carretero, discussion leader

F. Gauthier, "Protein products of the rat kallikrein gene family."

R. W. Colman, "HMW kininogen interaction sites."

P. D'orleans-Juste, "Mediators of the cellular response to B_1 and B_2 kinin receptors activation."

J. D. Shore, "Linkage between plasminogen activation and intrinsic coagulation pathway."

H. Fritz, discussion leader

W. Muller-Esterl, "Anti-idiotypic approach to characterize the kinin receptor."

E. Howard, "Reduction of T-kininogen RNA levels by dexamethasone in inflammation."

A. G. Scicli, "Direct contractile activity of a new member of kallikrein proteases."

H. Moriya, discussion leader

R. MacDonald, "Evolution and expression of the rat kallikrein gene family."

J. A. Clements, "Tissue-specific expression and hormonal regulation of glandular kallikreins."

B. J. Morris, "The human kallikrein gene family, tissue-specific expression."

T. W. Kurtz, "Linkage analysis of kallikrein gene polymorphisms and blood pressure in experimental hypertension."

H. Margolius, discussion leader

D. Proud, "Kinins in the respiratory tract."

W. Linz, "Kinins may contribute to the ameliorative effects of ACE inhibitors during reperfusion ischemia."

K. Shimamoto, "Renal kallikrein-kinin system in prehypertensive stage of essential hypertension."

R. K. Mayfield, "Kallikreins and kinins in renal diseases."

A. G. Scicli, discussion leader

K. D. Bhoola, "The role of the kallikrein-kinin system in leukocytes."

P. J. Privitera, "Kallikreins and kinins in the CNS."

E. G. Erdos, discussion leader

J. A. Nadel, "Neutral endopeptidase modulates neurogenic inflammation."

R. Skidgel, "Neutrophil and platelet metabolism of tachykinins and kinins."

V. Kon, "Endothelin in disease."

Mammalian DNA Repair

Casa Sirena

R. B. Setlow, chair; J. E. Cleaver, vice chair

4–8 February

Mutational specificity of DNA alterations: D. Brash, discussion leader

R. Fuchs, "DNA structure and mutational specificity."

V. Maher, "DNA function and mutational specificity."

M. Seidman, "Cell physiology and mutational specificity."

Biological monitoring of damage and repair in humans: F. Kadlubar, discussion leader

A. Weston, "Interindividual variability in carcinogen-DNA adduct formation."

E. Reed, "Susceptibility to cis-platinum-DNA damage and repair and its relation to therapeutic efficacy."

Enzyme-induced chromosomal damage and repair: R. Julian Preston, discussion leader

R. Julian Preston, "Introduction."

W. Vielmetter, "Nonhomologous DNA end-to-end joining."

W. Morgan, "Endonuclease damage, repair and chromosomal aberrations."

Gene specific repair: V. Bohr, discussion leader

M. Smerdon, "DNA repair, transcription and nucleosome structure."

L. Mullenders, "Mutagenesis and preferential repair after UV."

Repair by cell extracts: M. Lambert, discussion leader

R. Wood, "Proteins involved in extract-mediated excision."

G. Chu, "XPE binding factor and recognition of damage."

M. Lambert, "Chromatin-associated endonucleases and damaged nucleosomal DNA."

Repair genes in heterologous systems: L. Samson, discussion leader

S. Mitra, "Expression of mammalian alkylation repair proteins in *Escherichia coli*."

L. Prakash, "Structure, function and conservation of repair genes in eukaryotes."

Role of poly (ADP-ribose) in repair: M. Smulson, discussion leader

M. Jacobson, "Induction—a link between niacin nutrition and repair."

T. Sugimura, "Modulation of DNA polymerase beta."

F. Althaus, "A protein shuttle mechanism in repair."

G. de Murcia, "DNA binding domain, structural and function aspects."

DNA repair of UV damage to skin: B. Sutherland, discussion leader

R. Lev, "Induction and repair rates of damage in chronically irradiated marsupial skin."

P. Strickland, "Repair of solar radiation–induced photoproducts in human skin."

Repair deficient and hypertensive diseases: J. Cleaver, discussion leader

H. E. Anathaswamy, "Basal cell nevus syndrome."

J. M. Vos, "Cloning Fanconi anemia and XP genes."

G. Weeda, "Cloning XP-B/cockayne syndrome/ERCC3 genes."

R. A. Gatti, "Ataxia telangiectasia."

Persons interested in presenting a poster should contact R. B. Setlow, Biology Department, Brookhaven National Laboratory, Upton, NY 11973 (FAX: 516-282-3407).

Metals in Biology

Doubletree Hotel

J. Barton, chair; J. Coleman, vice chair

28 January–1 February

Metal nucleic acid interactions

P. Dervan, "Design of sequence-specific DNA-cleaving metalloproteins."

S. Lippard, "The binding of platinum compounds to DNA."

T. Tullius, "Making 'images' of DNA and DNA-protein complexes with the Fenton reaction of Fe(II) EDTA and hydrogen peroxide."

S. Hecht, "Polynucleotide degradation by metallobleomycins."

Metal binding proteins and peptides

D. Winge, "TBA."

Functional models for metalloenzymes: K. Karlin, discussion leader

J. Groves, "Biocompatible catalysis: Membrane mediated communication between synthetic metalloporphyrins and redox enzymes."

R. Breslow, "Metal ions in mimics and hydrolysis enzymes."

L. Que, "Dioxygen binding and activation at diiron centers."

J. Chen, "Hydrolyzing phosphate diesters with metal complexes."

Metals and gene regulation

J. Coleman, "The structure of zinc-containing fungal transcription factors: A binuclear zinc complex."

R. Klevit, "Structure of mutant zinc finger domains and implications for DNA binding."

Electron transfer and water oxidation: H. Gray, discussion leader

T. Meyer, "Oxidation of water by metal complexes."

R. Crabtree, "Structural and functional modeling of the water oxidizing center of PSII."

T. Vanngard, "Studies of the binding of manganese and chloride to photosystem II."

Sequestering metals

E. Stiefel, "Bacterioferritin"

K. Raymond, "Biomimetic sequestering agents for iron and vanadium."

Engineering metal sites in proteins

C. Craik, "The regulation of serine protease activity by a metal switch."

D. Seebach, "TBA."

C. Meares, "Protein cleavage with metal chelates."

Hot results in bioinorganic chemistry: J. Halpern, discussion leader

W. Newton, "Altered MoFe proteins of *Azobacter vinelandii* nitrogenasa."

D. C. Rees, "Crystallographic studies of notrogenase iron protein."

B. Burgess, "The MoFe protein of *Azotobacter* notrogenase."

J. T. Bolin, "TBA."

Polymer Waste Management

San Miniato, Italy

S. J. Huang, chair; R. W. Lenz, vice chair

5–10 May

Recycling

A. Apicella, T. Tomacsak, M. Shaw, A. Garton, K. Wagoner, speakers

Incineration and pyrolysis

W. Kaminsky, R. Graulich, G. Rasmussen, speakers

Environment and photodegradation

A. C. Albertsson, B. Gordon, C. David, G. Swift, speakers

Biodegradation

D. Kaplan, E. Chillini, speakers

Microbial polymers

R. C. Fuller, Y. Doi, R. Marchessault, R. Gross, speakers

Degradable polymer blends

E. Albizzati, R. Wool, C. Bastiolo, speakers

Regulation and policy

S. Grag, A. Guerrini, C. Battistoni, speakers

Polymers

Doubletree Hotel

A. D. English, chair; M. A. Winnik, vice chair

6–11 January

Novel polymer architecture

R. S. Irwin, "Influence of macromolecular conformation on physical properties of aramids."

D. J. Brunelle, "Synthesis and polymerization of cyclic oligomeric carbonates."

R. D. Miller, "Spectroscopy of polysilanes."

Theory

M. Blanco, "The modeling and property estimation of amorphous polymers in the bulk."

K. S. Schweizer, "Microscopic theories of the structure and thermodynamics of polymer liquids."

U. Suter, "An atomistic view of diffusion of gases through glassy polymers."

Polymer dynamics

H. W. Spiess, "Elucidating the structure and dynamics of polymers by two- and three-dimensional solid-state NMR."

E. T. Samulski, "NMR studies of oriented fluid polymer phases."

Short topics and invited posters

B. B. Sauer, "Neutron reflection and spectroscopic ellipsometry studies of buried polymer interfaces."

P. J. Phillips, "New crystalline forms of DNA."

Polymer solutions

M. S. Wolfe, "Structure and rheology of swellable microgels."

J. Odell, "Molecular solutions in extensional flows."

R. H. Colby, "Linear viscoelasticity of polymer solutions."

Creation of macroscopic order on polymeric systems

J. C. Wittmann, "Thin highly oriented polymer films produced by mechanical deposition and their use as orienting substrates."

H. W. Schmidt, "Orientation of functional guest molecules in ordered polymer systems."

Structure/property relationships

M. Kobayashi, "Effects of conformational and configurational structures of thermodynamic and mechanical properties of crystalline polymers."

A. S. Hay, "New synthetic approaches to high-performance polymers."

R. Simha, "Thermal and pressure properties of polymers and their mixtures: A unified approach."

Surfaces and interfaces

J. T. Koberstein, "Interphase partitioning in multiconstituent polymers."

Quantitative Genetics and Biotechnology

Casa Sirena

J. W. Dudley, chair; F. D. Enfield, vice chair

7–11 January

J. W. Dudley, discussion leader

C. W. Stuber, "Molecular marker information and heterosis."

M. Lee, "Identification of QTL's for second brood corn borer resistance."

M. Edwards, "Computer simulation of marker-assisted selection."

T. B. Bailey, Jr., discussion leader

G. R. Johnson, "Use of molecular markers in corn breeding."

W. Bridges, "Statistical problems in use of molecular markers."

B. Weir, discussion leader

E. Lander, "QTL mapping methodology."

R. C. Elston, "Mapping QTL's in humans."

A. E. Freeman, "Results in domestic animals."

C. S. Levings, III, "The corn mitochondrial genome."

R. T. Fraley, "The pesticide resistance story."

R. Beachy, "Viral cross-protection in transgenic plants."

S. Wessler, "Transposon tagging."

E. J. Eisen, discussion leader

J. Robl, "Nuclear transplantation in animals."

J. Gibson, "How to incorporate transgenics into animal breeding."

J. Nigai, discussion leader

K. Guise, "Transgenic fish-growth hormones."

D. Salter, "Poultry disease resistance genes."

J. Clark, "Expression of foreign genes in milk."

F. D. Enfield, discussion leader

J. Doebly, "Molecular markers and evolution of maize."

O. R. Taylor, "Introgression in honey bees measured by molecular markers."

C. F. Sing, discussion leader

E. Boerwinkle, "Genotype X environment interaction for genes affecting lipid metabolism."

J. Hixon, "Quantitative genetics in humans and primates."

Protons and Membrane Reactions

Doubletree Hotel

J. K. Lanyi, chair; S. Scheiner, vice chair

4–8 February

Proton transfer in structurally well-defined systems: M. Kasha, chair

J. Brauman, J. Kraut, F. Menger, speakers

Proton conduction in lipid bilayers: D. W. Deamer, chair

B. Honig, M. Gutman, P. Cullis, speakers

Ion conduction in channels formed by small peptides: M. Montal, chair

J. Rosenbusch, E. Barnard, N. B. Gilula, W. Cramer, speakers

Proton transfer in energy-transducing proteins I: R. D. Simoni, chair

B. Bowman, M. Lewis, R. Wagner, K. Altendorf, speakers

Proton transfer in energy-transducing proteins II (redox systems): A. R. Crofts, chair

K. Schulten, M. Wikstrom, C. Wraight, speakers

Proton transfer in energy-transducing proteins III (rhodopsins): D. Oesterhelt, chair

J. Nagle, R. Henderson, K. Gerwert, speakers

J. K. Lanyi, discussant

Protonmotive force: T. A. Krulwich, chair

H. Rottenberg, H. Terada, R. Dilley, speakers

M. Gutman, discussant

Proton-coupled membrane transport systems: H. R. Kaback, chair

C. Manoil, P. Henderson, S. Schu'diner, speakers

Membrane bioenergetics with ions other than protons: P. Dimroth, chair

R. K. Thauer, R. Blostein, J. K. Lanyi, speakers

D. Oesterhelt, discussant

Structures, Energetics, and Reaction Dynamics of Gaseous Ions

Doubletree Hotel

C. Ng, chair; J. L. Beauchamp, vice chair

4–8 March

State-selected and state-to-state ion-molecular reactions. I: Laser methods: M. A. Smith, discussion leader

S. L. Anderson, "Multiphoton ionization studies of vibrational modes effects on polyatomic ion-molecule reactions."

S. R. Leone, "Laser studies of state-resolved ion velocity effect."

R. N. Zare, "Influence of vibrational excitation and collision energy on the ion-molecular reaction $NH_3 + ND_3$."

State-selected and state-to-state ion-molecule reactions. II: Photoelectron-photoion coincidence methods: P. M. Guyon, discussion leader

D. Gerlich. "Advanced application of the guided beam techniques: Beyond integral cross sections, below thermal energies, and state-to-state collisions."

I. Koyano, "State-selected ion-molecule reactions: Quenching, charge transfer, and chemical reactions of vibrationally excited ions."

Theoretical ion-molecule reaction dynamics: G. C. Shatz, discussion leader

M. Baer, "Accurate comparison of theoretical and experimental cross sections for charge and atom transfer reactions."

D. C. Clary, "Calculation of rate constants for ion-molecule reactions."

E. A. Gislason, "Theoretical studies of vibronic transitions in ion-molecule collisions."

State-selected organometallic ion chemistry. B. S. Freiser, discussion leader

P. B. Armentrout, "Effect of kinetic and electronic energies on organometallic ion chemistry."

M. T. Bowers, "State and size-selected reactivity of transition metal ions and cluster ions."

J. C. Weisshaar, "Electronic structure in state-specific reactivity of metal cations."

Photoionization and unimolecular dissociation of molecular ions.

T. Baer, discussion leader

J. Berkowitz, "VUV photoionization studies of free radicals: Determination of bond energies, geometric and electronic structures of neutrals and cations."

J. Hepburn, "Photoionization spectroscopy with coherent VUV lasers: Detailed dynamics of molecular autoionization."

E. W. Schlag, "Studies with size-selected molecular ions."

Ion molecular reaction dynamics by crossed-beam and ion beam methods: F. Linder, discussion leader

J. M. Farrar, "Laser probes of ion-neutral interactions."

J. H. Futrell, "Reaction dynamics of collision induced dissociation reactions of polyatomic ions."

P. van Koppen, "Kinetics, energetics, and mechanistic details of ground state atomic transition metal ions reacting with simple alkanes."

Organic, organometallic, and bioorganic ion chemistry. J. Brauman, discussion leader

R. N. McDonald, "Bond activation studies with $(OC)_3Mn^-$ and $(OC)_2Fe^-$."

R. McIver, Jr., "Slow unimolecular dissociation of alkali halide clusters and high mass peptide ions studied by FTMS."

R. Squires, "Flowing afterglow-triple quadrupole studies of carbenes and carbynes."

Theoretical organometallic ion chemistry. W. A. Goddard III, discussion leader

C. W. Bauschlicher, Jr., "Theoretical studies of metal ion ligand bonding."

E. A. Carter, "Spin-induced changes in transition metal ion chemistry."

J. F. Harrison, "Bonding and electronic distribution in positive ions containing a first row transition metal element."

Cluster ions. J. P. Maier, discussion leader

Y. T. Lee, "IR vibrational spectroscopy of molecular ions."

W. C. Lineberger, "Spectroscopy and time-resolved photofragmentation dynamics of large cluster ions."

K. Rademann, "Photoelectron spectroscopy and UV-Vis absorption spectroscopy of elemental clusters."

Abstracts of work for posters should be sent to Dr. Ng, Department of Chemistry, Iowa State University, Ames, IA 50011.

Superconductivity

Doubletree Hotel

A. M. Stacy, chair; G. Crabtree, vice chair

25 February–1 March

D. Johnston, discussion leader

D. Murphy, "Oxygen pressure—phase stability relationships in ternary copper oxides."

M. Alario y Franco, "Electron diffraction of superconducting and related materials."

C. Torardi, "Structure and bonding in the *p*-type cuprate superconductors: Electronic and steric effects."

K. Poeppelmeier, discussion leader

J. Burdett, "Electronic control of structure in high T_c oxides."

R. Greene, "Organic and oxide superconductors: An experimental comparison."

J. Clem, discussion leader

J. Clark, "Flux noise and pinning energies in high T_c superconductors."

R. Koch, "The vortex glass transition in high T_c superconductors."

D. Larbalestier, "Inter- and intra-grain weak links at flux pinning in single and bicrystals of 123 compounds."

Late News, D. Hinks, discussion leader

T. Geballe, discussion leader

D. Kaiser, "Twin boundaries, grain boundaries, and transformation strain effects in $YBa_2Cu_3O_{7-\delta}$."

U. Welp, "Superconducting and normal state properties of untwinned $YBa_2Cu_3O_{7-\delta}$."

M. Kirk, "Structure and superconducting properties of irradiation induced defects in $YBa_2Cu_3O_7$."

M. Klein, discussion leader

Z. Schlesinger, "Infrared studies of the superconducting energy gap and normal state dynamics."

C. Thomsen, "Determination of the superconducting gap by Raman scattering."

B. Maple, discussion leader

Z. Fisk, "Physics of 214 material."

J. Axe, "Structural phase transformations and superconductivity in La_2CuO_4."

M. Crawford, "Oxygen isotope effect and structural phase transitions in La_2CuO_4-based superconductors."

R. Soulen, discussion leader

M. Reeves, "Radiation effects in thin films of high-temperature superconductors."

D. Christen, "Superconductivity in epitaxial layers of high T_c materials."

R. Dynes, discussion leader

J. Zasadzinski, "High resolution tunneling spectroscopy in $Ba_{1-x}K_xBiO_3$ and $Nd_{2-x}Ce_xCuO_{4-y}$."

T. Hasegawa, "Scanning tunneling microscopy/spectroscopy (STM/STS) of high-temperature oxide superconductors."

P. Allen, "Phonons and high T_c superconductors."

Supramolecules and Assemblies

Casa Sirena

D. Fennell Evans, chair; J. Trend, vice chair

4–9 March

Bilayer interactions

E. Evans, "Entropy-driven forces and dynamic shape fluctuations in bimolecular surfaces."

H. Wennerstrom, "Repulsive forces between bilayers arising from surface protrusions."

P. Rand, "Curvation changes and molecular packing in phospholipid layers: Measured molecular dimensions, anisotropies and transition energetics."

Monday evening poster session

Polymer protein interactions

A. Parsegian, "Free energy of lipid and protein assembly."

E. Sackmann, "Epitactic coupling and friction within supported bilayers and potential applications on biosensors."

M. Caffrey, "Structure mesomorphism and time-resolved studies of biological liquid crystals and lipid membranes."

New characterization techniques

V. Elings, "Scanning probe microscopy—from atoms to microns."

R. Hamiman, "Applications of the environmental electron scanning microscope."

Polymeric surfactants

D. O'Brien "Two-dimensional polymerization."

T. Kunitake, "Facile template synthesis of ultrathin materials based in bilayer membranes."

A. Gast, "Scaling and swelling in star-like polymeric micelles."

Monolayers

S. Rice, "Structure of Langmuir monolayers."

H. Gaub, "Two-dimensional lipid crystal and macromolecular self-assemble processes imaged by AFM."

Micromulsions

B. Ninham, "Supraself-assembly from microemulsion through zeolites in new materials via mechanical alloying with novel surfactant technologies."

L. Luisi, "Self-replication of micelles and chemical autopoesis."

J. Fulton, "Micromulsion structure in near-critical and supercritical fluids."

C. Bunton, "Reactivity in aqueous micelles, retrospect and prospect."

Chemistry

R. Moss, "Dynamics of lipids in synthetic liposomes: Relating molecular structure of transbilayer migration."

F. Menger, "Groups of organic molecules that operate collectively."

D. Tirrell, "Control of chain folding in artificial proteins of periodic structure."

Temperature Stress in Plants

Casa Sirena

G. A. Thompson, chair; P. L. Steponkus, vice chair

14–18 January

Freezing injury: P. Steponkus, discussion leader

S. Fujikawa, "Effects of freezing on membrane ultrastructure."

C. Andrews, "Ice encasement injury to winter cereals."

B. Fowler, "Breeding for cold hardiness in winter cereals: Gene expression and inheritance."

Biotechnology of acclimation to freezing: S. Lindow, discussion leader

T. Chen, "Expression of a bacterial ice nucleation gene in transgenic plants and role in tolerance of ice formation."

P. Davies, "Expression of anti-freeze protein genes in plants."

Metabolic responses of plants to chilling temperatures: C. Guy, discussion leader

M. Thomashow, "Molecular genetics of cold acclimation in *Arabidopsis*."

F. Sarhan, "Protein synthesis during the induction of freezing tolerance."

L. Gusta, "Role of abscisic acid in cold acclimation."

Temperature effects on properties of lipids and proteins: P. Quinn, discussion leader

P. Low, "Thermostability of chloroplast membrane complexes."

B. McKersie, "Scavenging oxygen free radicals produced during low temperature stress."

High-temperature stress: R. Sinibaldi, discussion leader

Y. Sanchez, "The gene for thermotolerance in yeast."

L. Nover, "Regulation of the plant heat shock response."

R. Hallberg, "HSP60 in corn."

Role of lipids in chilling acclimation: J. Browse, discussion leader

S. Hugly, "Responses of lipid mutants of arabidopsis to chilling temperatures."

N. Murata, "Transformation with genes for lipid metabolism in relation to chilling sensitivity."

Sites of inhibition of photosynthesis by chilling: D. Ort, discussion leader

I. Terashima, "Dissociation of coupling factor induced by low temperature in chilling sensitive plants."

G. Sassenrath, "Impaired reductive activation of stromal biophosphatases in tomato following low-temperature exposure at high light."

Chilling and photoinhibition: N. Huner, discussion leader

H. Krause, "Reversible photoinhibition at chilling temperatures in unhardened and cold-acclimated spinach leaves."

A. Mattoo, "Photoregulation of turnover of the 32-kDa D_1 photosystem II protein."

Abstracts of work to be considered for posters should be sent to Dr. Carl Pike, Department of Biology, Franklin and Marshall College, P.O. Box 3003, Lancaster, PA 17604.

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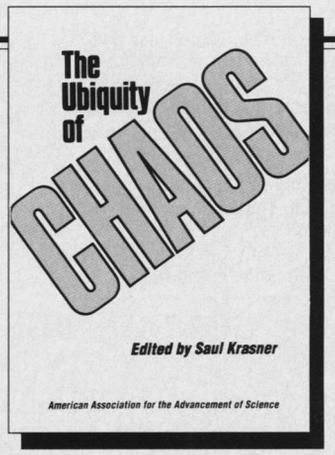

The Ubiquity of Chaos

Edited by Saul Krasner

The discovery of disordered, chaotic solutions to deterministic laws of nature has ignited widespread interest in the study of nonlinear dynamics. While such solutions should be predictable in principle, a certain nonlinearity in the laws governing them makes them so sensitive to initial conditions that classical predictability is impossible. Now, with the advent of sufficient computer power, it has been found that behind the apparent randomness lies great beauty and structural symmetry.

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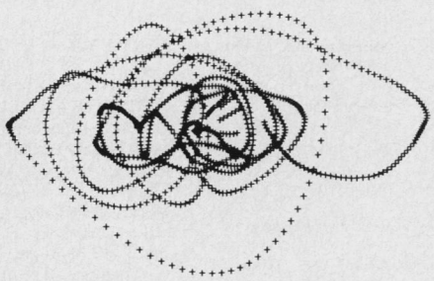

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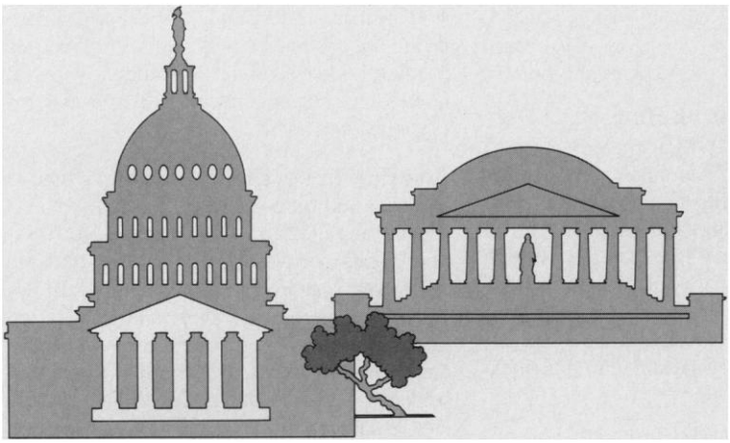

AAAS☆91

The AAAS Annual Meeting

Washington, DC; 14-19 February 1991

Plenary Lectures

George Bush, *President of the USA* (invited); **Walter Bodmer,** *Imperial Cancer Research Foundation, UK;* **Fang Li Zhi,** *Cambridge Univ., UK;* **Ricardo Giacconi,** *Space Technology Inst.;* **José Goldemberg,** *Secretary of Science and Technology, Brazil;* **Donald N. Langenberg,** *Univ. of Maryland;* **Kenneth R. Manning,** MIT; **Shosaku Numa,** *Kyoto Univ., Japan;* **Larry L. Smarr,** *National Center for Supercomputing Applications;* and six others.

Neuroscience Seminar

(3 days, 16-18 Feb.; additional fee required)

The Neurosciences: Challenges for the '90s: Twenty-six leading researchers will discuss their work in six areas of neuroscience that hold great promise for the 1990s. Sessions *(and presiders)* are as follows: Stimulus-Transcription Coupling in Neuronal Cells *(James I. Morgan);* Structure and Function of Potassium Channels *(Arthur M. Brown);* Olfaction and Taste *(Gordon M. Shepherd);* Activity-Dependent Plasticity in Development and Learning *(Carla J. Shatz);* Cognitive Processes *(Larry R. Squire);* Molecular Basis of Neurological Disease *(Joseph B. Martin).*

Short Courses

(1 day, 14 Feb.; additional fee required)

Sophisticated Uses of Simple Computers: Speakers will discuss some of the main uses of small computers to solve sophisticated research problems, citing specific examples. Then they will provide individualized, hands-on instruction using these examples.

Computers in Medical Imaging and Graphics: Speakers will discuss imaging components of interventional procedures as used by cardiologists and pulmonary and other specialists. Topics include digital fluoroscopy, stereo 3-D imaging, imaging in lithotripsy, imaging in basic cardiology, and imaging hardware for microscopic applications.

Symposia, Workshops & Technical Sessions

(Listed below are shortened titles of the 200+ symposia, workshops, and technical sessions.)

I Physical Sciences & Technology

General Physical Sciences: The Frontiers of the Physical Sciences: 1991

Computing; Communications: High-Performance Computing and Networking ✦ Computer Virus Legislation ✦ Electronic Publishing and the Science Library Crisis ✦ Information Technology in Support of Research: Activities of the National Libraries ✦ Scientific Communication and Research Productivity ✦ Robotics and Mathematics ✦ Stereo Computer Imaging and Analysis

Energy; Technology: U.S. Energy R&D Policy ✦ Energy Technologies: Developing Countries ✦ Advances in Solar Energy Technologies ✦ Engineering in Japan ✦ Science and Engineering Interactions Today ✦ Geophysical Imaging Systems: From Medical Microcosm to Outer Space ✦ New Technology for People with Disabilities

Physics; Chemistry: 75 Years of General Relativity ✦ Elementary Particle Physics ✦ Single Atom Quantum Mechanics ✦ Mathematics in Materials Sciences ✦ Chemistry Rediscovers Materials Science ✦ High-Temperature Superconductivity ✦ Musical Acoustics ✦ Revisionist's Kinetics: Nature's Throttle

Astronomy; Planetary Science: Cosmology: What We Know ✦ Environmental Threats to Astronomy ✦ Rationale for Human Exploration of Mars ✦ Human Exploration of Space

Geoscience; Climate: Global Warming ✦ Small-Island States and Sea-Level Rise ✦ Coastal Erosion Zone Management ✦ Climate in the U.S. Region ✦ Regional Climate Conditions: U.S. Impacts ✦ Rising Atmospheric CO_2 and the Terrestrial Carbon Cycle ✦ Earthquake Prediction/Validation

Global Change: Satellite Measurements for a Safe Environment ✦ Humankind in Global Change: Indicators and Prospects ✦ Science/Technology for Third World Development ✦ Science in Africa ✦ Effects of Human Activity on the Global Ecosystem ✦ The Resourceful Species: The Human Enterprise ✦ Resources to Minimize Global Warming, Air Pollution, and Energy Insecurity

Environment: Responsibilities of Scientists and Engineers in Environmental Debates ✦ Science: A Basis for Environmental Policy? ✦ Is Superfund Working? ✦ Oil and Gas: Outer Continental Shelf Environmental Issues ✦ Cleaning Up the Mess at the Nuclear Weapons Complex ✦ Assessing Impacts of Nuclear Waste Facilities ✦ Proof of Environmental Damages in Litigation ✦ Meta-Analysis and Risk Assessment

Popular Science: The Physics of Everyday Experience ✦ Chemistry Is Fun ✦ Science, Technology, and Espionage

II Life Sciences & Technology

General Life Sciences: Consciousness in Life

Molecular & Cellular Biology: The Developmental Biology Revolution ✦ Cellular Signaling ✦ Plant Genome Mapping ✦ Interactions of Topology and Science

Medical Sciences: Gene Therapy: Prospects and Societal Implications ✦ New Mo-

(continued on next page)

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lecular Insights into "Old" Genetic Disorders ✦ The Aging and Cancer Interface ✦ Molecular Determinants of Human Cancers ✦ RU486 ✦ Immunocontraception Prospects ✦ Controlling Infectious Diseases: New Aspects of Vaccines ✦ Medications for Brain/Behavior Disorders ✦ Scientific/Statistical Inferences in Modelling Animal Research

Health Care & Policy: U.S. Drug Approval in the United States ✦ AIDS: Research and Public Policy ✦ HIV/AIDS in Eastern Africa ✦ Modelling Geographic Diffusion of AIDS ✦ The Father and the Fetus: Facts and Fallacies ✦ Dentistry for the '90s ✦ Firearm Injury Prevention: Scientific/Public Policy Directions ✦ Balance and "Dizziness" ✦ Drug Development/Regulation via Pharmacokinetic/Pharmacodynamic Procedures

Agriculture: Economically Useful Plants for Developing Countries ✦ International Biosafety Policy and Practice ✦ Biological/Biotechnological Alternatives to Chemical Insecticides ✦ Pest Resistance and Sustainable Pest Management ✦ Knowledge-Based Systems in Agriculture and Aquaculture ✦ Value-Added Products from Agriculture ✦ Beneficial Uses of Pathogens ✦ Economic Potential for U.S. Aquaculture ✦ Bovine Somatotropin and the U.S. Dairy Industry

Ecology; Evolution: Defining Ecosystem Health: Science, Economics, or Ethics? ✦ Inheritance of Acquired Characteristics: Evolutionary Origins of New Significant Traits ✦ Crop Germplasm of the Americas ✦ Conserving Genetic Resources in Natural Habitats ✦ Nonrandom Evolution: Matter, Life, Mind ✦ Stakes in the Tropical Forests ✦ Science and Management of Large Marine Ecosystems ✦ Zoo Biology and Conservation ✦ Coastal Zone Management Policy ✦ Multiple-Use Ecosystem Management ✦ Tropical Biology: Past and Present

Biomedical Ethics: Cystic Fibrosis Carrier Screening: Ethical/Clinical Issues ✦ AIDS Clinical Trial Alternatives: Ethics/Methodology ✦ DNA-Based Identification Systems ✦ Human Genome Research: Ethical/Social Issues ✦ Scientists' Responsibilities in Socially Sensitive Research ✦ Agriculture Research Funds: Management and Accountability

Psychology; Neurobehavior: Reassessing Freud and Psychoanalysis ✦ Critical Periods: A Critical Examination ✦ Current Conceptions of Intelligence ✦ Critical Periods in Second Language Acquisition ✦ Cognitive Aging in the Intellectually Able ✦ Cults and the Courts: Use of "Brainwashing" Theory ✦ Effects of Fragrances on Behavior, Mood, and Physiology ✦ Evolution of Cognitive Functions in Ecological/Cultural Context ✦ Cognitive Equilibrium

III Social Sciences & Science Policy

General Social Sciences & Policy: Anthropology of Science and Scientists

Anthropology; Archaeology: Indigenous Peoples and the Rainforest: Science, Marketing, and Human Rights ✦ Evolution of Deception ✦ Evolutionary Interrelationships: Technology, Language, and Social Behavior ✦ Deterioration of Human Health in Economic and Political Development ✦ Ethnography of Drug Use in Traditional and Modern Societies ✦ Light Stable Isotopes: Scientific Uses ✦ Biomolecular Identification of the Species of Origin of Blood Residues on Artifacts

Demography; Political Science: Scientific/Technical Personnel in the '90s ✦ Consequences of the Rapidly Increasing Physician Supply ✦ Voting: Mathematical Foundations and Political Reality ✦ Scientists and Engineers in Emerging Markets ✦ Science Policy for Women in Science: Case Studies ✦ Women of Science: Secrets of Success

Sociology: Social Pathology of Large Cities ✦ Mental Health and Violence ✦ Family Violence and Child Abuse ✦ Drugs, Crime, and Violence ✦ Violence and Youth: Research and Prevention Programs ✦ Rural Recreation Enterprises

Economics; Competitiveness: Systematic Economic Analysis: Monopoly and Competition ✦ Research in Experimental Economics ✦ Sustainable Economic Development ✦ Manufacturing and the New Global Challenge ✦ Technology Transfer from the Laboratory to the Marketplace ✦ Mineral Resources in the '90s ✦ Health Care Quality ✦ Ecological Economics ✦ Economic Microsimulation and Public Policy

Science & International Security: Defense Technology and Policy After the Cold War ✦ Arms Control in a Radically Changed Environment ✦ Soviet Politics and National Security Policy ✦ Implications of Proliferating Advanced Weaponry ✦ Verifying/Implementing Arms Control Agreements in the '90s ✦ Chemical and Biological Weapons: Elimination or Proliferation ✦ Scientific Approaches to International Conflict Resolution ✦ Naval Forces and Arms Control ✦ Disposition of Fissile Materials

Science & Technology (S&T) Policy: Organization for S&T in the Executive, Legislature, and Judiciary ✦ Science Advice to National Leaders ✦ S&T Policy Issues ✦ National vs. International Roles of Universities ✦ Bringing Oz Into the Courtroom ✦ Mathematics and Public Policy ✦ International S&T Issues for the '90s ✦ Knowledge Synthesis: Ethical Imperative ✦ Improving Government Agencies ✦ Allocating Public Funds for Science ✦ Risk Perception and Public Policy ✦ Communicating with Policy Makers: Strategies for Scientists and Engineers ✦ Expert Witnesses: Giving Effective Testimony

History & Philosophy of Science: The Beginning and End of the World: Historical Perspectives ✦ Mathematics in Times of Social Upheaval ✦ Metaphors and Models in the Brain Sciences ✦ Creative Couples and Gender Complementarity ✦ AAAS in Public Affairs, 1848-1970 ✦ Measuring Similar Processes at Multiple Levels of Biological and Social Systems ✦ Neurobiology and Narrative: The Works of Walker Percy ✦ Technical Change and the 20th-Century State ✦ Testing Theories of Scientific Change ✦ Science in National Life: A Videohistory Workshop

Science & Technology Education: Public Understanding of Science: Cross-National Perspectives ✦ Science for the Nonscience Major ✦ Animals in K-12 Classrooms ✦ Science and the Media: Information Controls and Reporting ✦ Museums and Science: Ethics and Policy ✦ The Media & Math/Science Education ✦ Urban Initiative in Precollege Science and Math: A Model Program ✦ Successful Minority Math/Science Programs at Community Colleges ✦ Advocacy Journalism: Reporting on Sustainable Development ✦ Satellite Delivery of Education ✦ Improving the U.S. Educational System ✦ Scientist-Teacher Partnerships in Middle School S&T Education ✦ Project 2061 Curriculum Development Workshop: The Nature of Science and Evolution ✦ Progress in Public Understanding of Science ✦ Science in the '90s: A Hands-On Decade

Science & Technology Curricula: Science as Faith: Radical Constructivism ✦ State Models of Reform ✦ Curriculum Reform ✦ Assessment ✦ Reform in Science and Math Curricula: How They Relate ✦ NSF-Supported Innovations in Undergraduate Education ✦ Mathematics and Math Education ✦ Reform of Scope, Sequence, and Coordination — A Progress Report ✦ Using the Project 2061 Report to Redesign Science Curricula ✦ U.S. Science/Math Education: Longitudinal Study of American Youth ✦ Calculus Reform

Call for Poster Papers

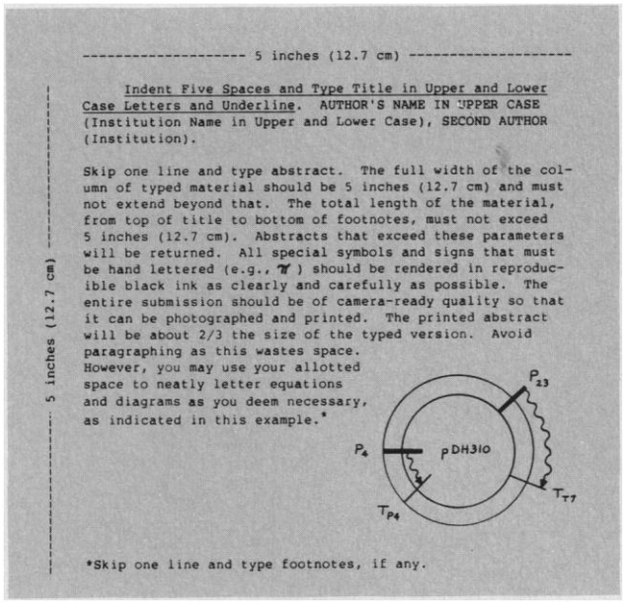
Poster sessions at **AAAS★91** provide an informal, visually oriented way for you to present a contributed paper to your peers. Appropriate topics include all of the physical, life, behavioral, and social sciences as well as topics related to the neuroscience seminar. If your abstract is accepted, you will be assigned to a poster session (based on general subject area) and provided with a bulletin board on which to display graphics and large, easy-to-read text for 90 minutes. Accepted abstracts will also be published and distributed to all meeting registrants.

Eligibility: An abstract for a poster presentation will be considered only if it is submitted or endorsed by a AAAS member or fellow. In addition, the presenter must be registered for **AAAS★91.** (Presenters of neuroscience seminar papers must also be registered for the neuroscience seminar.)

Abstracts: Type the text on plain white paper to fit within a 5" square. Use only a typewriter or letter-quality (not dot matrix) printer. Use black ink for all hand lettering. Indent, space, underline, and capitalize as in the example at right. Do not double-space the body of the text. Do not box or cut out the abstract.

Submission: Above the 5" square, type the name of the broad discipline that encompasses the subject matter and provide three index words to describe the area within that discipline (in the case of seminar papers, just indicate the seminar name). Below and to the left, type the name, address, and phone number of the person to be contacted regarding status and scheduling. Below and to the right, type the name, affiliation, and membership number (from *Science* mailing label) of the member or fellow endorsing the abstract, and provide his/her signature. Send original plus one copy no later than 2 November to: **Contributed Papers, AAAS Meetings Office, 1333 H Street, NW, Washington, DC 20005.**

Example



Deadline for Poster Session Abstracts: 2 November 1990

Invitation to Exhibit

If your organization provides products or services that would be of interest to AAAS members, or if you would like to publicize your latest advances in science and technology before a worldwide audience, you should exhibit at **AAAS★91.**

The AAAS Annual Meeting serves as an important public forum in which registrants share ideas and information with each other and (through extensive press coverage) with their colleagues around the world. By exhibiting, you can meet *face to face* with many of the more than 5,000 attendees — scientists, educators, and researchers from virtually every field of scientific inquiry, including the biological and medical sciences, the physical sciences, the social and behavioral sciences, technology, and science policy.

You can develop new customers or members, give demonstrations, introduce something new, publicize your successes, recruit qualified personnel, increase name recognition, and demonstrate your organization's commitment to the cause of advancing science.

Organizations that should exhibit:

- Publishers of books and journals
- Computer software and hardware companies
- On-line information services
- Scientific associations
- Equipment manufacturers

For complete details:

Call Stacy Weinberg at 202-326-6462, or write: AAAS Exhibition Office, 1333 H Street, NW, Room 815, Washington, DC 20005.

Discount Air Fares to Washington, DC

Fly United Airlines or Delta Air Lines to **AAAS★91** in Washington, DC, and save when you travel during 10–23 February 1991:

- **5% off** lowest published round-trip fares, subject to availability and qualifying conditions, and 5% off first class. (Not available in Canada.)
- **45%** off regular round-trip fares; no minimum stay necessary; 7 days advance purchase required. (In Canada, discount up to 35% only.)

These discounts are available only through the airlines' convention reservation desks. Certain restrictions may apply and seats are limited. For details, you or your travel agent should call one of the toll-free numbers below and give the appropriate convention code:

United Airlines: Convention Code 447JU
Call 7 days a week; 8:00am–11:00pm Eastern time
USA (incl. HI, AK) & Canada: 1-800-521-4041

Delta Air Lines: Convention Code R0030
Call 7 days a week; 8:00am–8:00pm Eastern time
USA (incl. HI, AK, PR): 1-800-241-6760
Canada: Call Delta locally

Advance Registration Form – AAAS☆91

AAAS Annual Meeting; Washington, DC
14–19 February 1991

Please print

Name of registrant _____
(last name) (first name)

Institution/company _____
(institution/company name will appear on badge)

Mailing address _____
(number / street)

_____
(city / state / zip / country)

Daytime telephone number _____

Name of spouse registrant _____
(if registering for meeting, see spouse registration fees at right)

Convention address _____
(hotel or phone number)

Circle days you will attend meeting: Thu Fri Sat Sun Mon Tue

[ ] Check here if you need special services due to a handicap.

[1] **11 January deadline:** Advance registrations received after this date cannot be processed; however, you may register on site, beginning 14 February, at the Sheraton Washington Hotel. On-site rates: regular member, $140; regular nonmember, $190; all others, same as advance rates.

[2] **Refund requests** must be made in writing to the address below by **5 February** and will be honored after the meeting. **No refunds will be made for cancellations received after this date.**

[3] **Special rates:** To qualify for student rates, you must attach a copy of your student ID card. (Student rates apply to full-time undergraduate and graduate students only.) To qualify for postdoctoral rates or high school teacher rates, you must attach a letter from your chairman confirming your status. **Registrations received without appropriate proof of status will be charged at the regular rates.**

[4] Regular nonmember 6-day (not 1-day) registration fee includes an introductory membership with 25 issues of *Science* (16 issues if mailed outside the USA).

Advance registration deadline: 11 JANUARY 1991

Mail this registration form to:

AAAS Annual Meeting Registration
P.O. Box 23320
Alexandria, VA 22304-9330

OFFICE USE ONLY
AMT PD _____
CHECK # _____
DEP. DATE _____
SOURCE: E F

I. Meeting Registration Fees[1]

Registrant	Six-day	One-day	Amount
Regular member	[ ] $110	[ ] $50	$ _____
Regular nonmember	[ ] $160[4]	[ ] $65	$ _____
Student member[3]	[ ] $ 10	[ ] $ 5	$ _____
Student nonmember[3]	[ ] $ 15	[ ] $ 5	$ _____
Postdoctoral member[3]	[ ] $ 30	[ ] $15	$ _____
Postdoctoral nonmember[3]	[ ] $ 40	[ ] $20	$ _____
HS teacher[3] or emeritus	[ ] $ 50	[ ] $25	$ _____
Spouse of registrant	[ ] $ 40	[ ] $20	$ _____

Important: *Students, postdocs, and high school teachers must attach proof of status.[3] Members must provide membership # below:*

_____
(appears above name on *Science* magazine label)

One-day registrants circle one: Thu Fri Sat Sun Mon Tue

II. Additional Fees

(Seminar and short course fees are in addition to, not in lieu of, the meeting registration fee.)

Neuroscience Seminar (16-18 February)
Regular [ ] $110
Grad student or postdoc [ ] $ 30 $ _____

Short Courses (14 February)
Regular [ ] $ 50
Grad student or postdoc [ ] $ 15 $ _____
Select one short course only:
[ ] Sophisticated Uses of Computers
[ ] Computers in Medical Imaging

TOTAL AMOUNT: $ _____

III. Payment [2]

[ ] check enclosed [ ] VISA [ ] MasterCard
(no other cards accepted)
[ ] original institutional purchase order attached

Card no. _____

Expires _____ Signature _____

Hotel Reservation Instructions

To make hotel reservations: Call the AAAS Housing Bureau, toll free, weekdays between 9:00 a.m. and 5:00 p.m., Eastern time, at the following numbers:

United States: 1-800-535-3336

Canada: 1-800-535-3356

Metropolitan Washington: 202-842-2930

Have the following information ready when you call: [1] Name of convention: "AAAS Annual Meeting"; [2] 1st, 2nd, and 3rd choice of hotel; [3] arrival/departure dates [4] number of rooms needed; [5] type of room (single, double, etc.); [6] number of persons in party; [7] arrival time; [8] credit card name, number, and expiration date; [9] names of all occupants of room; [10] your mailing address; [11] your telephone number; [12] any special needs due to a handicap.

Hearing-impaired and international attendees: Hearing-impaired attendees and those from outside the USA and Canada may send written requests containing the indicated information to: AAAS Housing Bureau, 1212 New York Ave., Washington, DC 20005, USA (FAX: 202-789-7037).

Hotel confirmations: Confirmations will be sent by the Housing Bureau. If you do not use a credit card, you must remit the deposit indicated on the confirmation within 15 days of its receipt. (No deposit is required if you use a credit card.) Your choice of hotel and/or room is subject to availability.

Changes/cancellations: Prior to 15 January, changes and cancellations must be made with the Housing Bureau. After this date, contact the appropriate hotel directly.

Hotels and rates:
Please add 11% DC sales tax and $1.50 room tax per night.

	Single	*Double*
Sheraton Washington	$110	$130
2660 Woodley Road, NW	$125	$145
(AAAS headquarters hotel)	$140	$160
Omni Shoreham	$105	$120
2500 Calvert Street, NW	$121	$136
(Across from Sheraton)	$134	$149
Dupont Plaza	$ 80	$ 90
1500 New Hampshire Ave., NW		
(One Metro stop from Sheraton)		

Hotel reservation deadline:
15 JANUARY 1991