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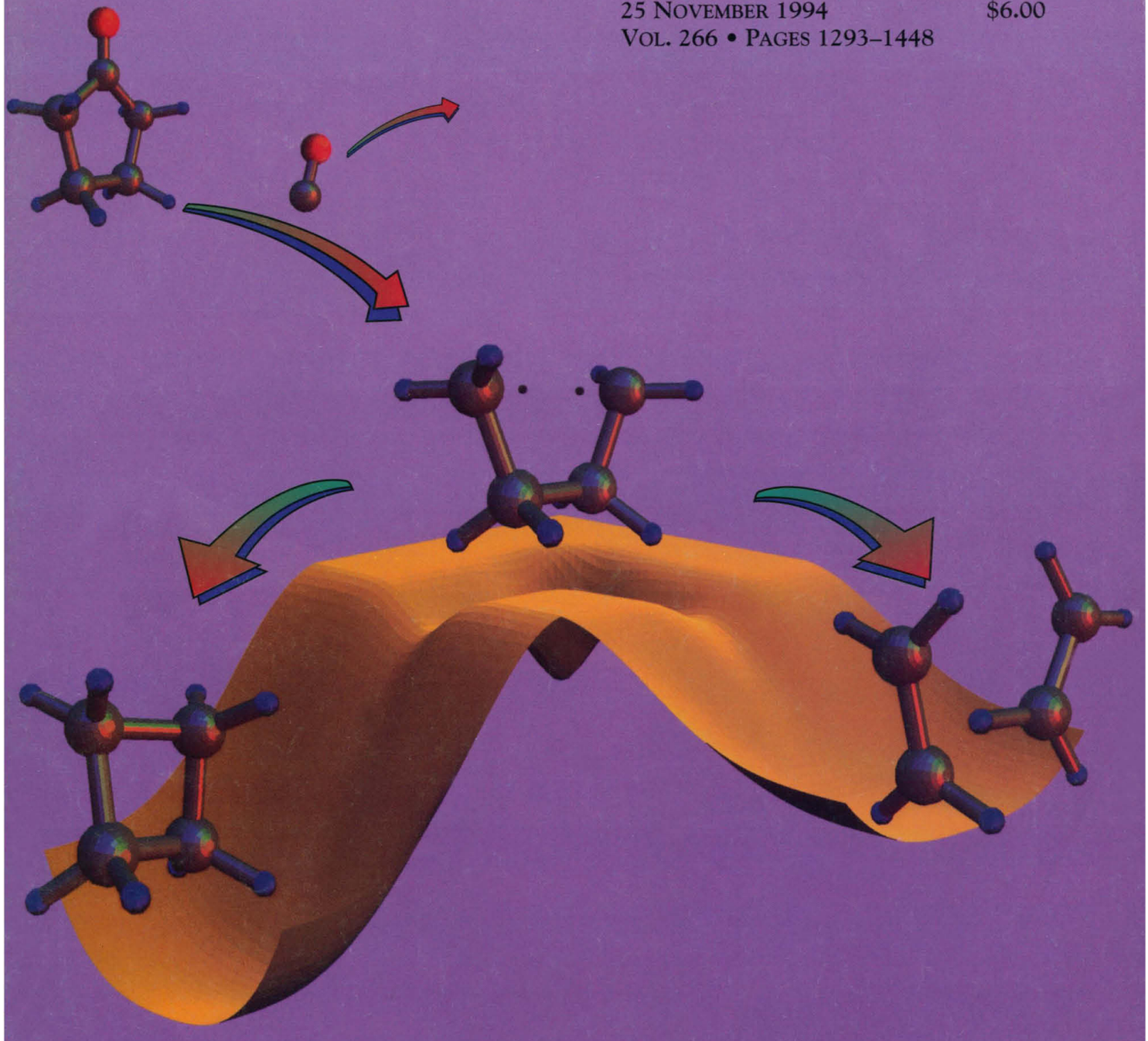

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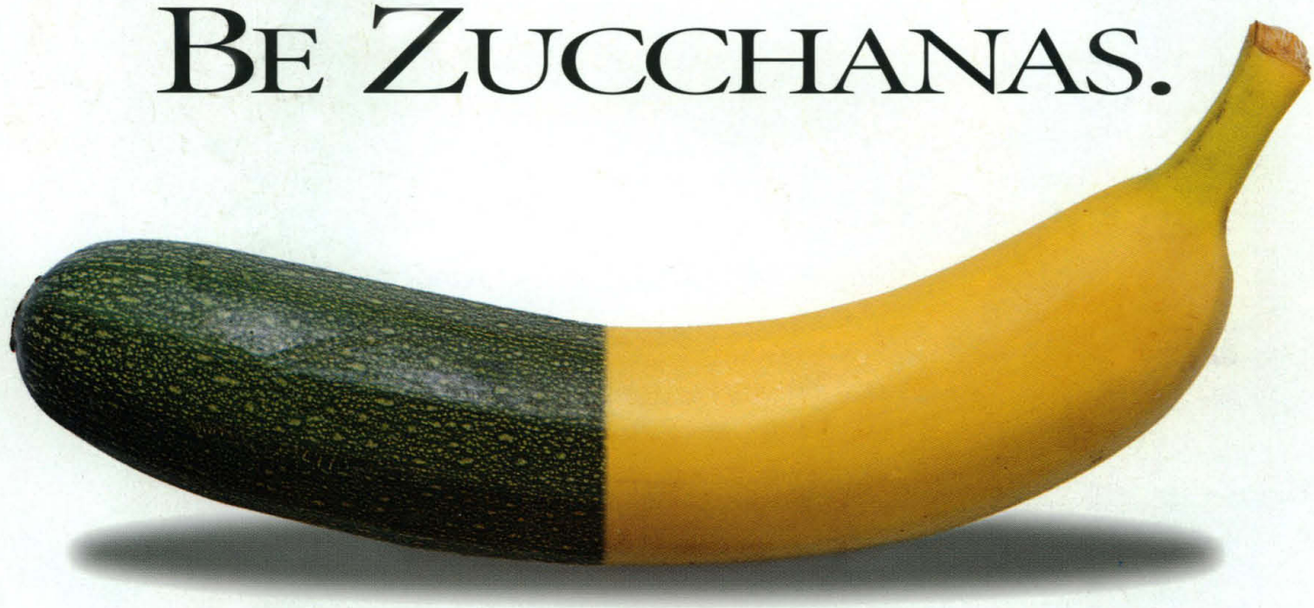

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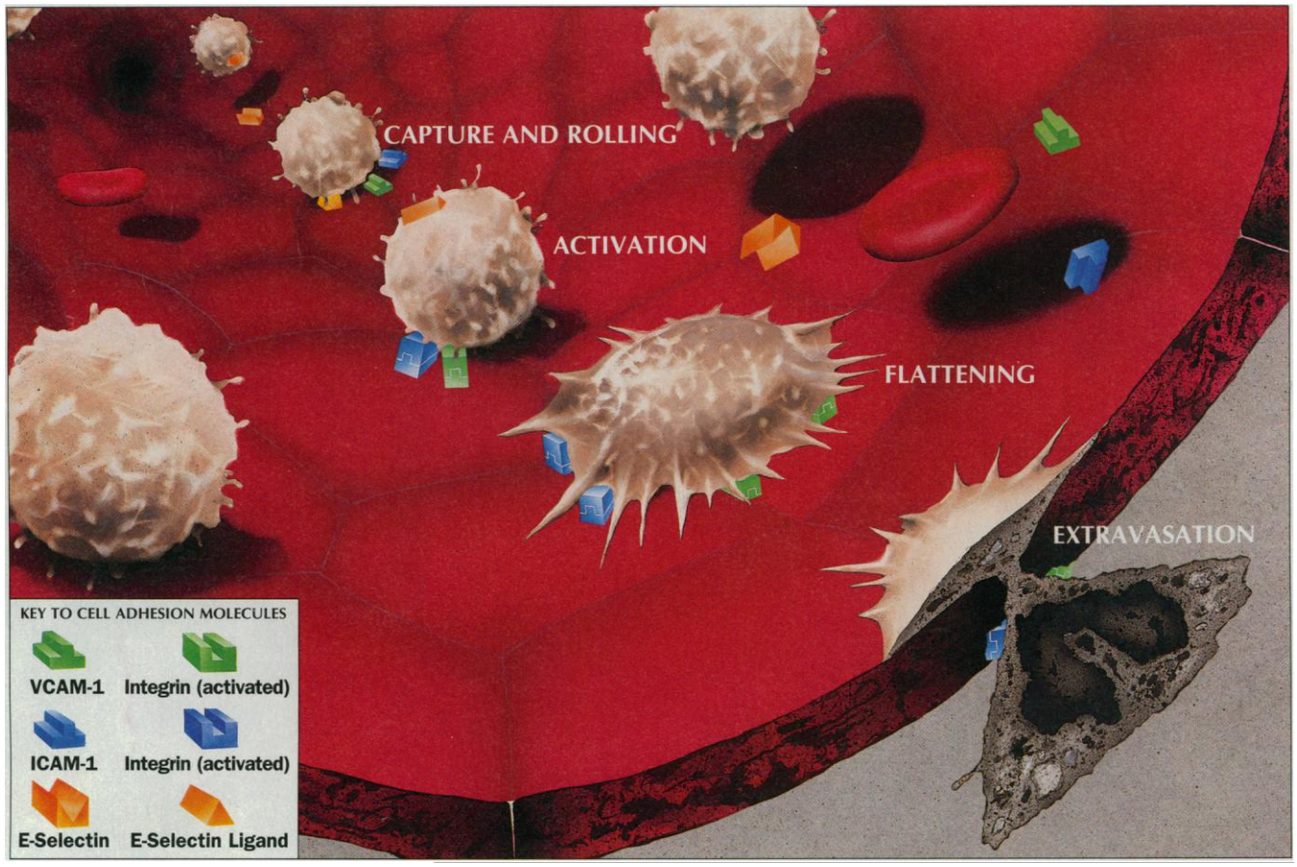

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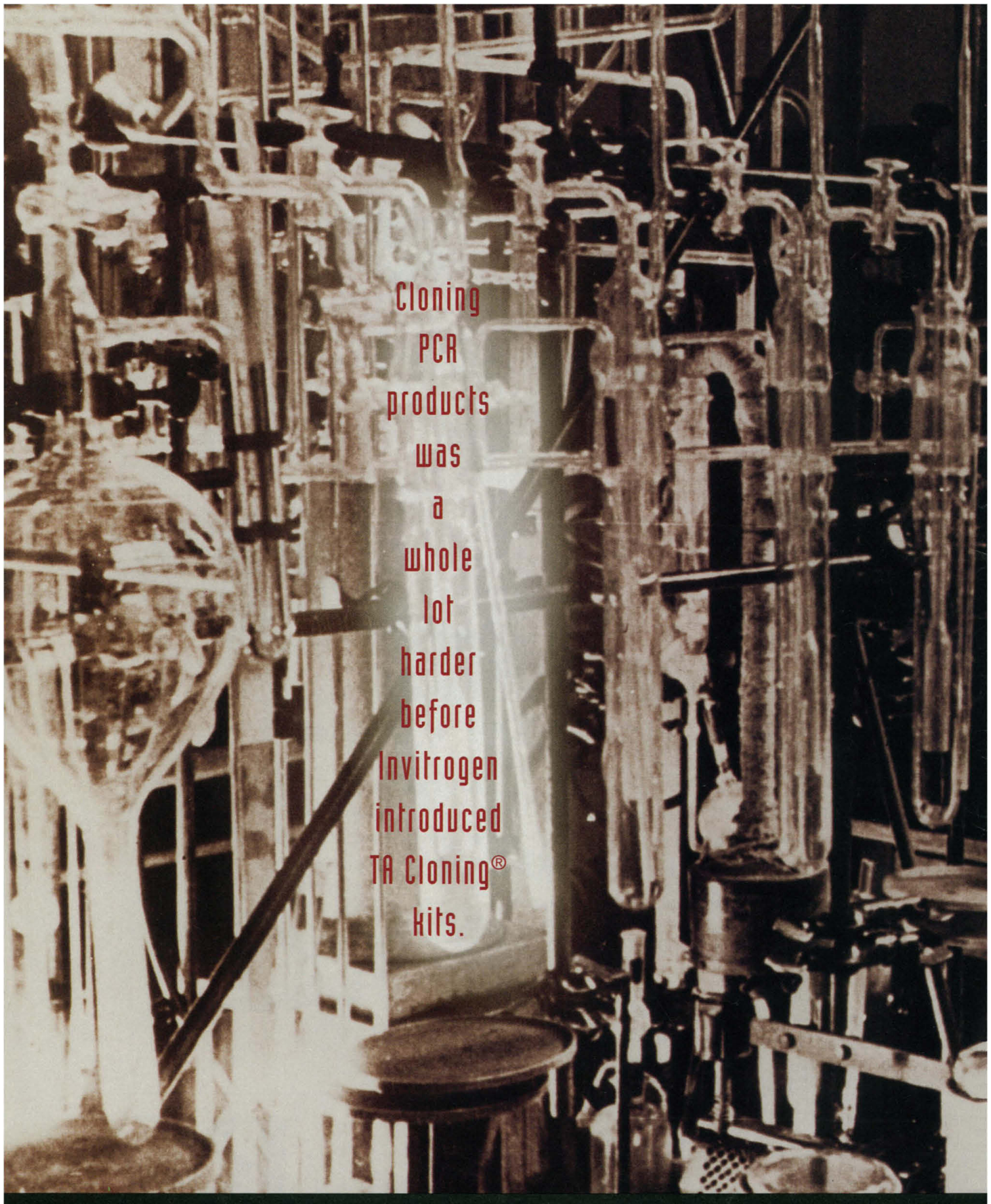

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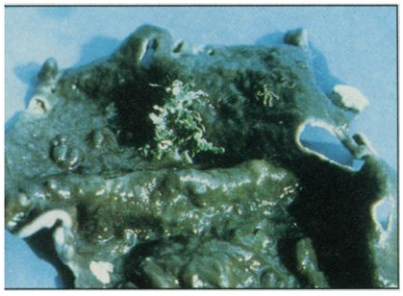

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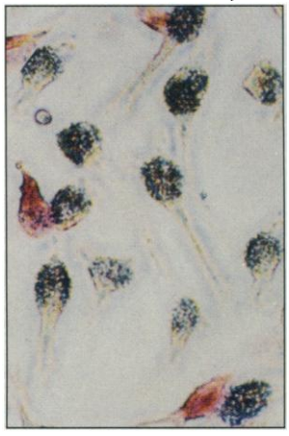

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COVER

The valleys and mountains shown (potential energy surface) describe the femtosecond journey of a chemical reaction: the addition of ethylene or cleavage of cyclobutane. The dynamics describe one of the most fundamental processes in chemistry—the making and breaking of a covalent bond. The transient structures are frozen on the femtosecond time scale, and their existence elucidates the non-concerted nature of the mechanism. See page 1359 and the Perspective on page 1338. [Illustration: S. Pedersen]

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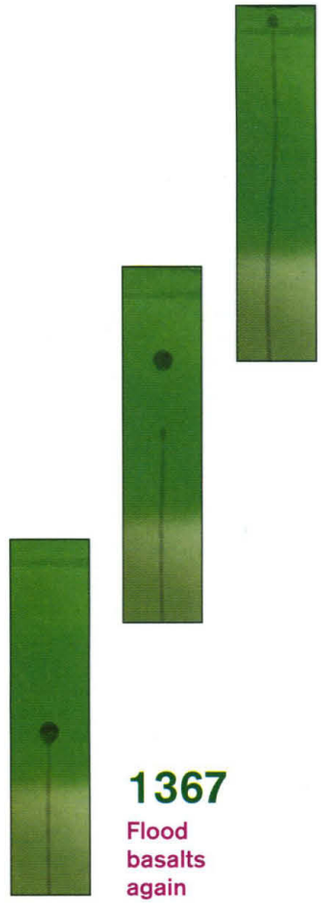

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Flood basalts again

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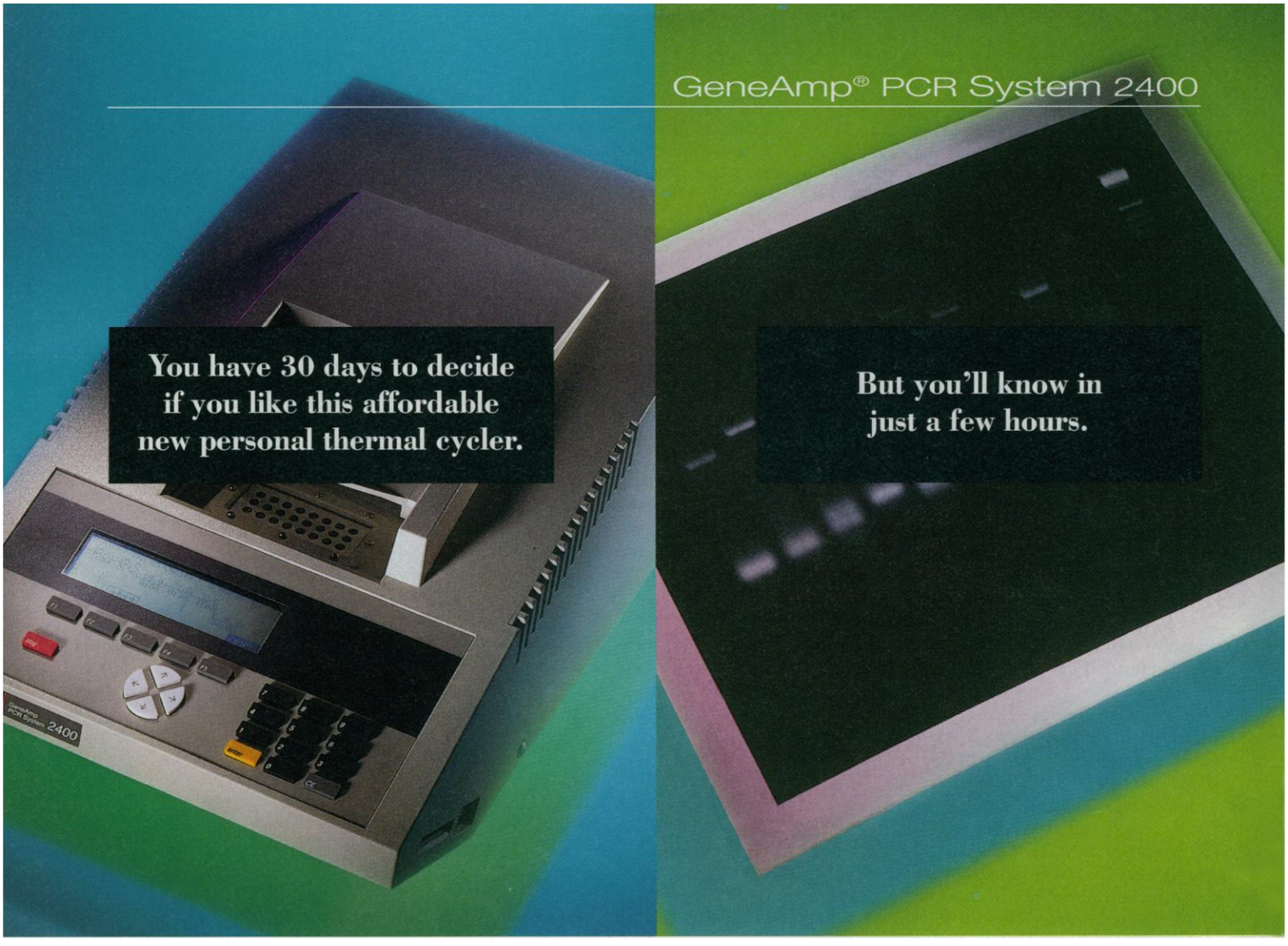

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THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Picking and choosing

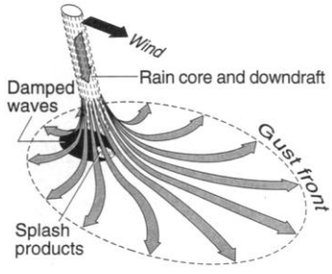
Molecular beams can be used to prepare small, weakly bound clusters of species such as He, H_2, or D_2 that are held together by van der Waals forces. Studies of the properties of such fragile clusters can provide insight into several questions, such as the relative roles of pairwise interactions versus multibody effects, but the methods normally used to analyze more stable clusters fragment these species. Schöllkopf and Toennies (p. 1145) show that transmission gratings can be used to select and identify clusters of a given mass nondestructively.

Magnetic composite

One route to new materials is to introduce compounds at low densities into layered materials to form intercalated porous networks of interconnecting pillars. Shpeizer *et al.* (p. 1357) swelled the layers of zirconium phosphate with organic amines and then reacted this material with nickel hydroxyacetate. The resulting composite, in which the nickel atoms are bridged by hydroxyl and acetate groups, is paramagnetic; heating the composite to 400°C creates a ferromagnetic material with a three-tiered nickel oxide structure between the zirconium phosphate layers.

Calming the waters

Sailors have reported that rain can actually calm the wave action of the sea. Theoretical models and small-scale experimental studies have yet to provide a conclusive picture for such wave damping. Atlas (p. 1364) analyzes synthetic aperture radar images of a storm off Cape Hatteras, North Carolina, and shows that an echo-free hole caused by wave damping can be associated with intense rainfall.



Doubleheader

Flood basalt provinces, which represent the eruption of enormous volumes of basaltic magma, have been suggested to derive from large plumes in the mantle. Bercovici and Mahoney (p. 1367) note that some basalt provinces show two episodes of magmatism separated by several tens of millions of years. They present laboratory data and a theoretical model showing that the passage of an initial plume through the transition zone between the upper and lower mantle causes the plume to separate from its trailing conduit. A second plume can then form from the tail, leading to a second outpouring of lava.

Controlling the cell cycle in yeast

The cyclin-dependent kinases (Cdks) are critical regulators of the progression through the cell cycle in eukayotic cells. To be activated, the kinases must associate with cyclins at specific stages of the cell cycle. In mammalian cells, several Cdks have been identified, but in yeast only a single Cdk had been implicated in cell cycle control. Measday *et al.* (p. 1391) and Espinoza *et al.* (p. 1388) have shown that a second Cdk, called PHO85, participates in the regulation of the cell cycle in budding yeast. The two groups have found that two different cyclins associate with PHO85 and that the complexes appear to function in passage through the G_1 phase of the cell cycle. PHO85 can also bind a third cyclin, PHO80, and that complex functions in the response of yeast to extracellular concentrations of phosphate. Thus, a single Cdk participates in control of phosphate metabolism and of the cell cycle, and thus may coordinate progression through the cell cycle with responses to environmental conditions.

Getting specific

Methods for transferring genes into humans ideally would be tissue-specific. Kasahara *et al.* (p. 1373; see news story by Barinaga, p. 1326) engineered a specific receptor ligand, erythropoetin (EPO), into the viral envelope of the ecotropic Moloney murine leukemia virus, a retrovirus that does not infect humans. This vector becomes much more infectious toward murine cells bearing the EPO receptor and can infect human cells bearing the EPO receptor.

Damage control

The *GADD45* gene, originally identified as a target gene activated by the tumor suppressor p53, is induced by DNA damage and is associated with growth suppression. Smith *et al.* (p. 1376; see news story by Marx, p. 1321) report that the product of this gene, Gadd45, binds to proliferating cell nuclear antigen, a protein involved in DNA replication and repair, and stimulates DNA excision repair in vitro. Overexpression of Gadd45 in cultured cells suppresses their entry into S phase. Thus, Gadd45 may serve as a link between the p53 cell cycle checkpoint and DNA repair.

Moving lymphocytes

Chemokines are cytokines that induce chemotaxis, or directed movement, in cells. Two classes of chemokines are known; Kelner *et al.* (p. 1395) have found a third distinct class that appears to be specific for lymphocytes. Lymphotactin was found by screening a complementary DNA library generated from activated mouse progenitor T cells. It lacks two of the four cysteine residues that characterize other chemokines.

Double duty

Some introns of the group II type can catalyze their own excision, that is, removal from a messenger RNA of an intervening sequence and joining of the RNA sequences on either side of the intron. Two transesterifications must proceed with the same stereochemistry at phosphorus centers, indicating that the two steps are not simply the forward and reverse modes of one catalytic center. Chanfreau and Jacquier (p. 1383) use chemical modification and substitution to examine the importance of bases and backbone atoms in the two reactions. Several components are essential for both steps and appear to be clustered, and their contribution to catalysis does not stem from participation in binding of the substrate sequence or from stabilization of the active structure. These results provide support for the view that a single catalytic site rearranges its components so as to facilitate both steps of the splicing reaction.

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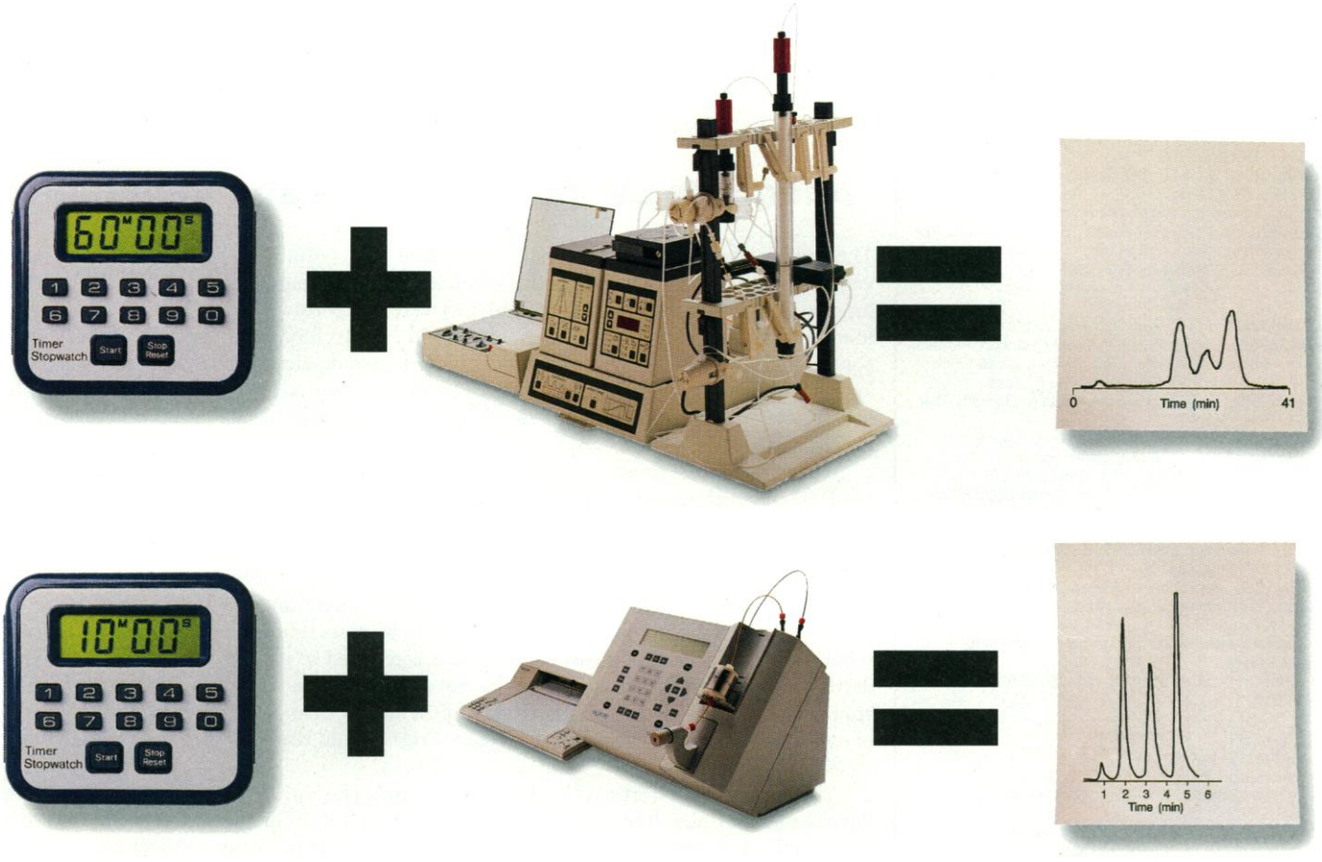

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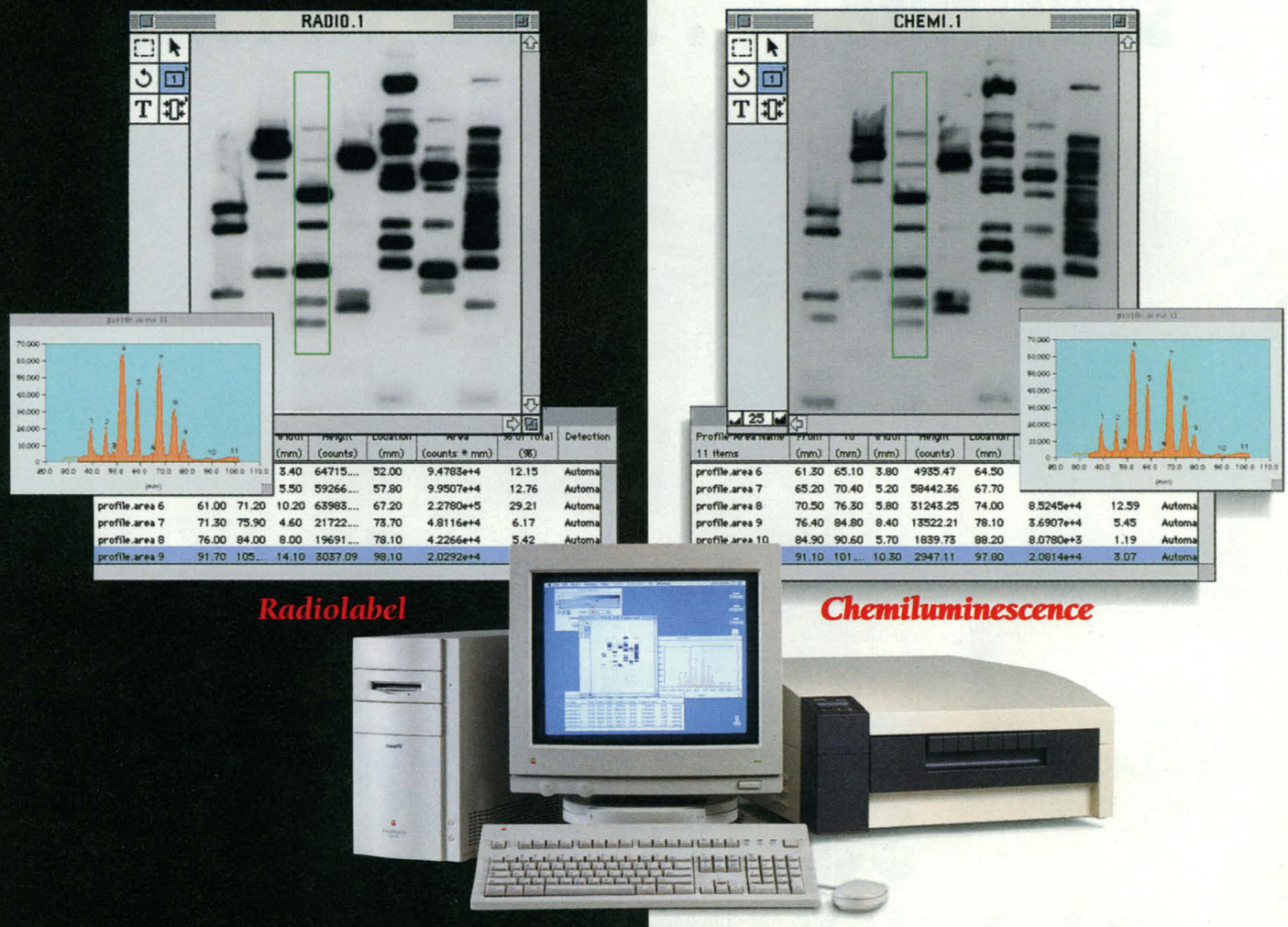

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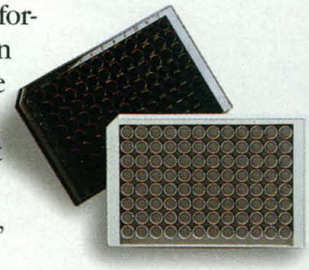

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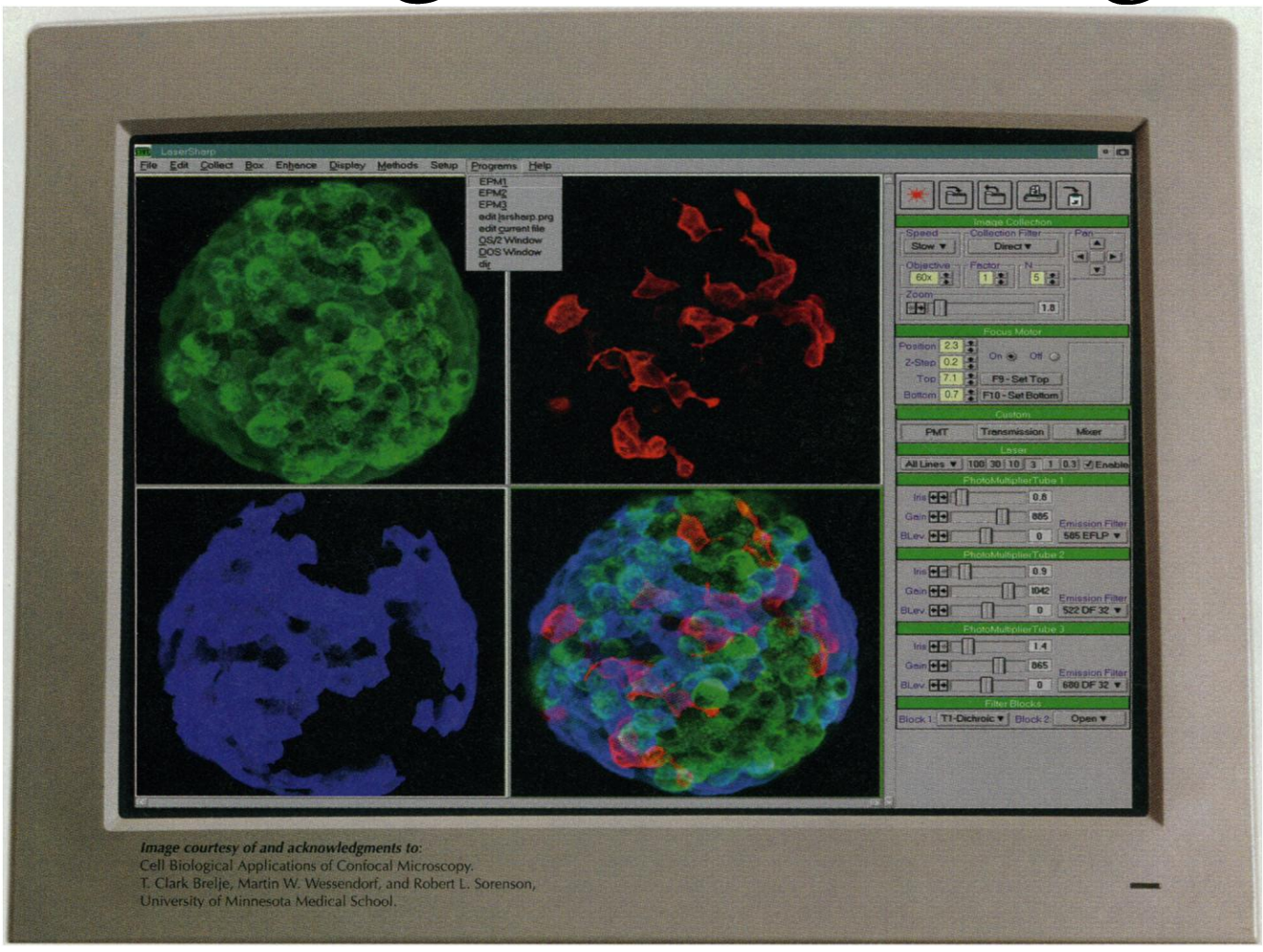

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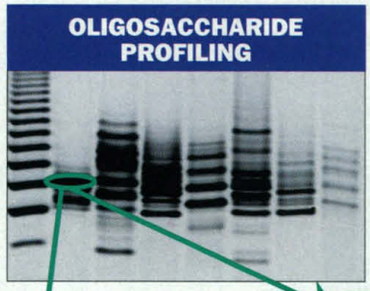

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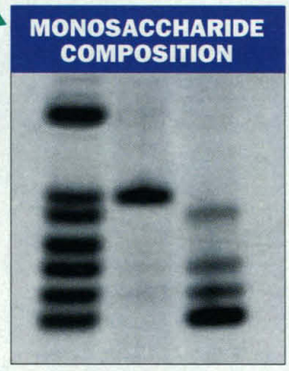
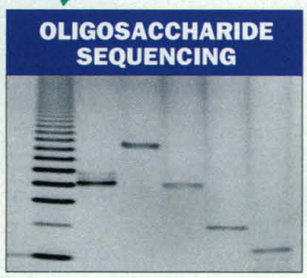


▶ **FACE gel showing the monosaccharide compositional analysis of a tri-sialylated, triantennary oligosaccharide**



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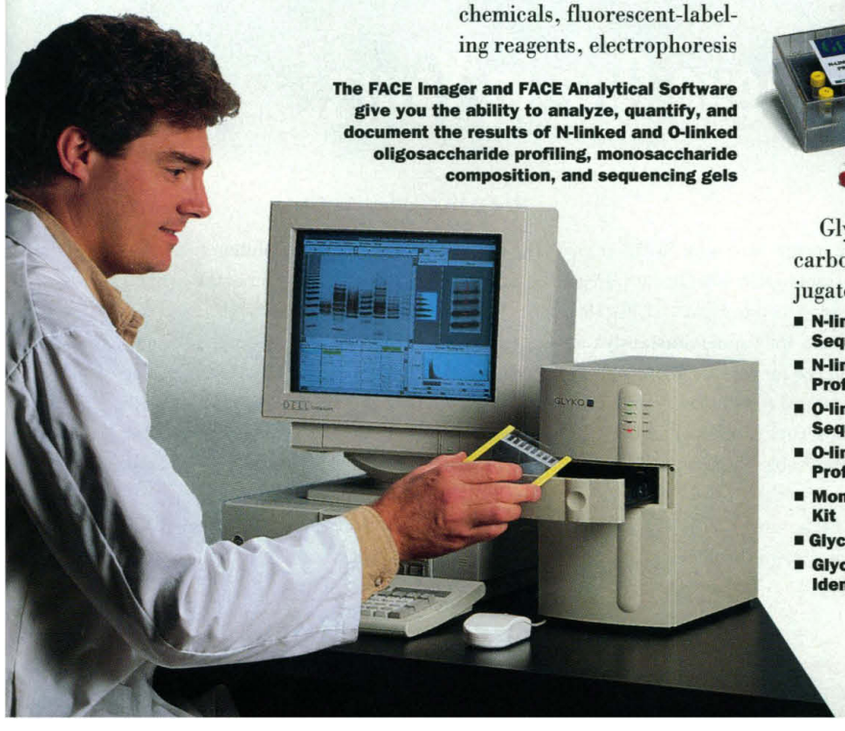

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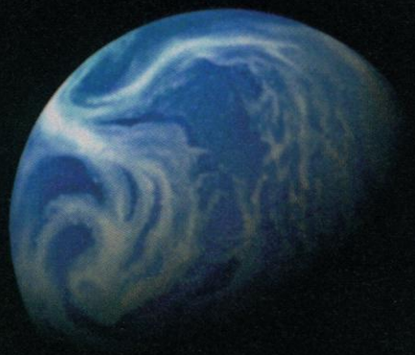

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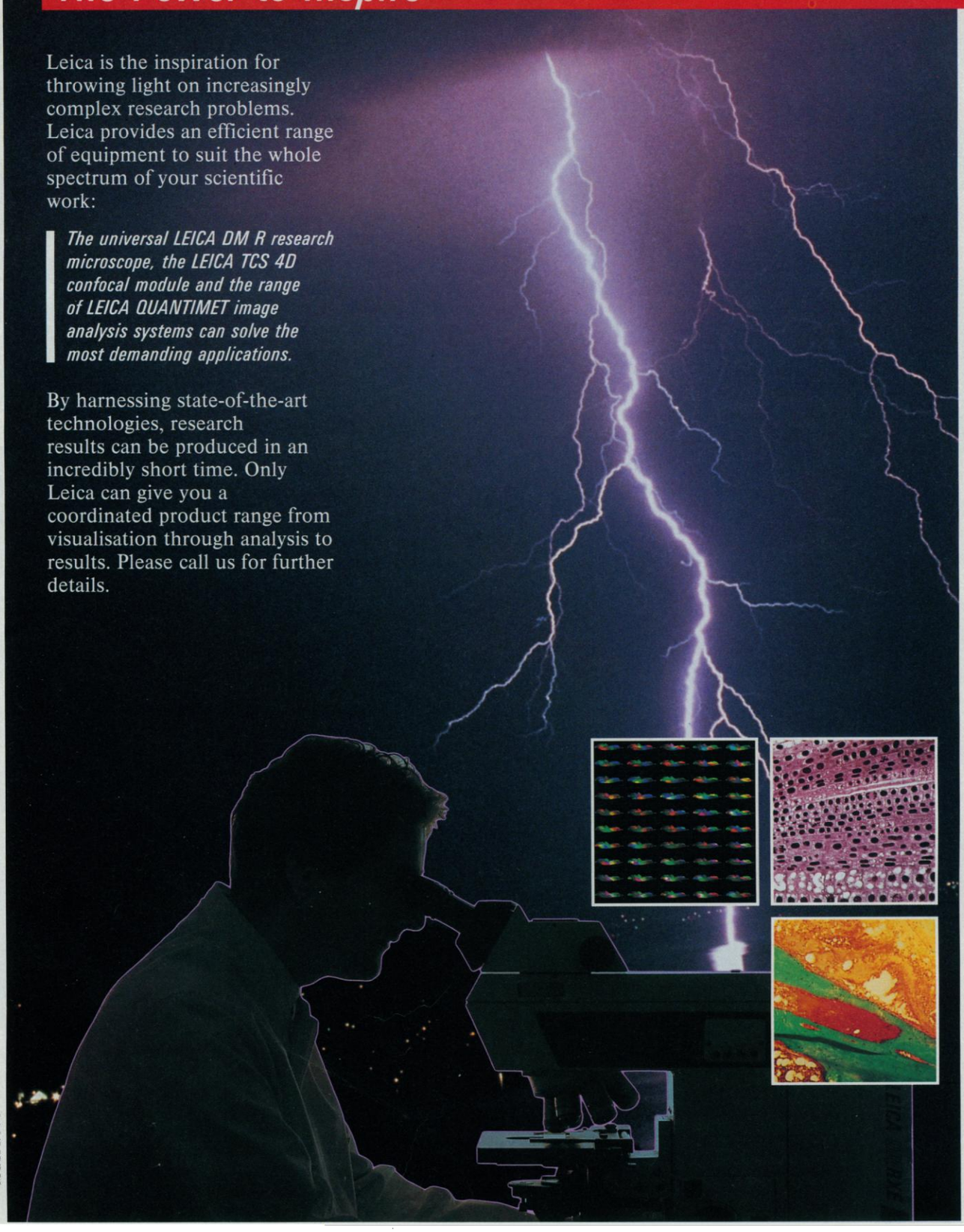

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June 25-30	**Catalysis** *Harold Kung*	**Parasitism** *Steve Beverly*	**3-D Electron Microscopy of Macromolecules** *Alasdair Steven*	**Lipid Metabolism** *Dennis R. Voelker*	**Carbohydrates** *Ole Hindsgaul*	**Developmental Biology** *Scott Fraser* *Cynthia Kenyon*
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July 23-28	**Elastomers** *Roderic P. Quirk*	**Solid State Studies in Ceramics** *Yet-Ming Chiang*	**Coatings and Films** *Charles E. Hoyle*	**Elastin and Elastic Fibers** *Charles Boyd*	**Nuclear Physics** *Baha Balautekin*	**Plant and Fungal Cytoskeleton** *Sue Wick*
July 30-Aug. 4	**Medicinal Chemistry** *Allen Krantz*	**Collagen** *Linda J. Sandell* *Klaus von der Mark*	**Statistics in Chemistry and Chemical Engineering** *Barry Wise*	**Hormone Action** *Pamela Mellon*	**Nonlinear Optics and Lasers** *Yaron Silberberg*	**Electronic Materials** *Mihal E. Gross*
August 6-11	**Metal and Semiconductor Clusters** *Robert L. Whetten*	**Hormonal Carcinogenesis** *Gerald R. Cunha*	**Analytical Chemistry** *Mary J. Wirth*	**Mechanisms of Toxicity** *Elaine Faustman*	**Quantitative Structure-Activity Relationships** *Robert S. Pearlman*	**Dynamics at Surfaces** *Richard Cavanagh*
August 13-18	**Complex Fluids** *William M. Gelbart*	**Hydrologic, Geochemical and Biological Processes in Forested Catchments** *Harry Hemond*		**Second Messengers and Protein Phosphorylation** *Heidi Hamm*	**Rock Deformation** *Terry E. Tullis*	**Barrier Function of Mammalian Skin** *Harry E. Boddé*

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The 1995 Spring, Summer and Fall Gordon Conferences will be held in Italy, New Hampshire, Rhode Island, Germany and Switzerland. The full programs and application for the GRC 1995 summer and fall Conferences will appear in the February 3, 1995 Science. ATTENDANCE IS LIMITED - IT IS RECOMMENDED THAT APPLICANTS APPLY IMMEDIATELY FOR EARLY CONSIDERATION BY CHAIR.

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Mechanisms of Membrane Transport Proteins *Ron Kopito*	**Magnetic Resonance** *Jacob Schaefer*	**Mycotoxins and Phycotoxins** *Daniel Baden*	**Optical Signal Processing and Holography** *W. Thomas Cathey*	**Polymers** *Dotseui Sogah*	**Molecular Mechanisms of Microbial Adhesion** *Elaine Tuomanen*
Physical Organic Chemistry *Paul Dowd*	**Atomic Physics** *Chris H. Greene*	**Electron Distribution and Chemical Bonding** *James W. Downs*	**Plasmid and Chromosome Dynamics** *David Helinski*	**Natural Products** *Rick Danheiser*	**Purines, Pyrimidines and Related Substances** *Victor E. Marquez*
Drug Metabolism *Deanne Dulik*	**Condensed Matter Physics** *Susan N. Coppersmith* *Sidney R. Nagel*	**Laser Diagnostics in Combustion** *Jean-Pierre Taran*	**Epitaxial Thin Films and Interfaces** *J. Murray Gibson*	**Gravitational Effects in Physico-Chemical Systems** *J. Iwan Alexander*	**Organometallic Chemistry** *Kenneth G. Moloy*
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Biocompatibility and Biomaterials *Buddy D. Ratner*	**Inorganic Chemistry** *Herbert D. Kaesz*	**Membranes: Materials and Processes** *Edward L. Cussler*	**Neurotrophins** *Moses Chao*	**Chemistry of Supramolecules and Assemblies** *David A. Tirrell*	**Reactive Polymers, Ion Exchangers and Adsorbents** *Peter A. Yarnell*
Fertilization and Activation of Development *Gregory S. Kopf*		**Physics and Chemistry of Matrix Isolated Species** *Lon B. Knight, Jr.*	**X-Ray Physics** *Ian Robinson*		**Molecular Genetics** *Lap-Chee Tsui*
Chemistry and Physics of Liquids *John Weeks*		**Red Cells** *Peter Agre*	**Molten Salts and Liquid Metals** *John E. Enderby*		**Cancer** *Jean Wang*
Epigenetics *Timothy Bestor* *Vicki L. Chandler*					**Angiogenesis and Microcirculation** *Rakesh K. Jain*

1995 European Conferences

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APR. 30-MAY 5
Angiotensin
Detlev Ganten

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Serge Daan

MAY 7-12
Biology of Aging
Olivia Pereira-Smith
James Smith

Catecholamines
Ian Creese

Irsee, Germany
SEPT. 17-22
Magnetic Nanostructures (New)
Stuart Parkin

SEPT. 24-29
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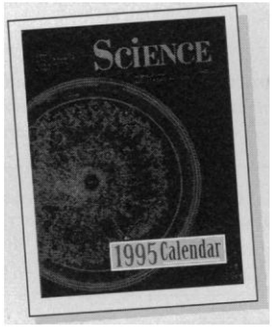

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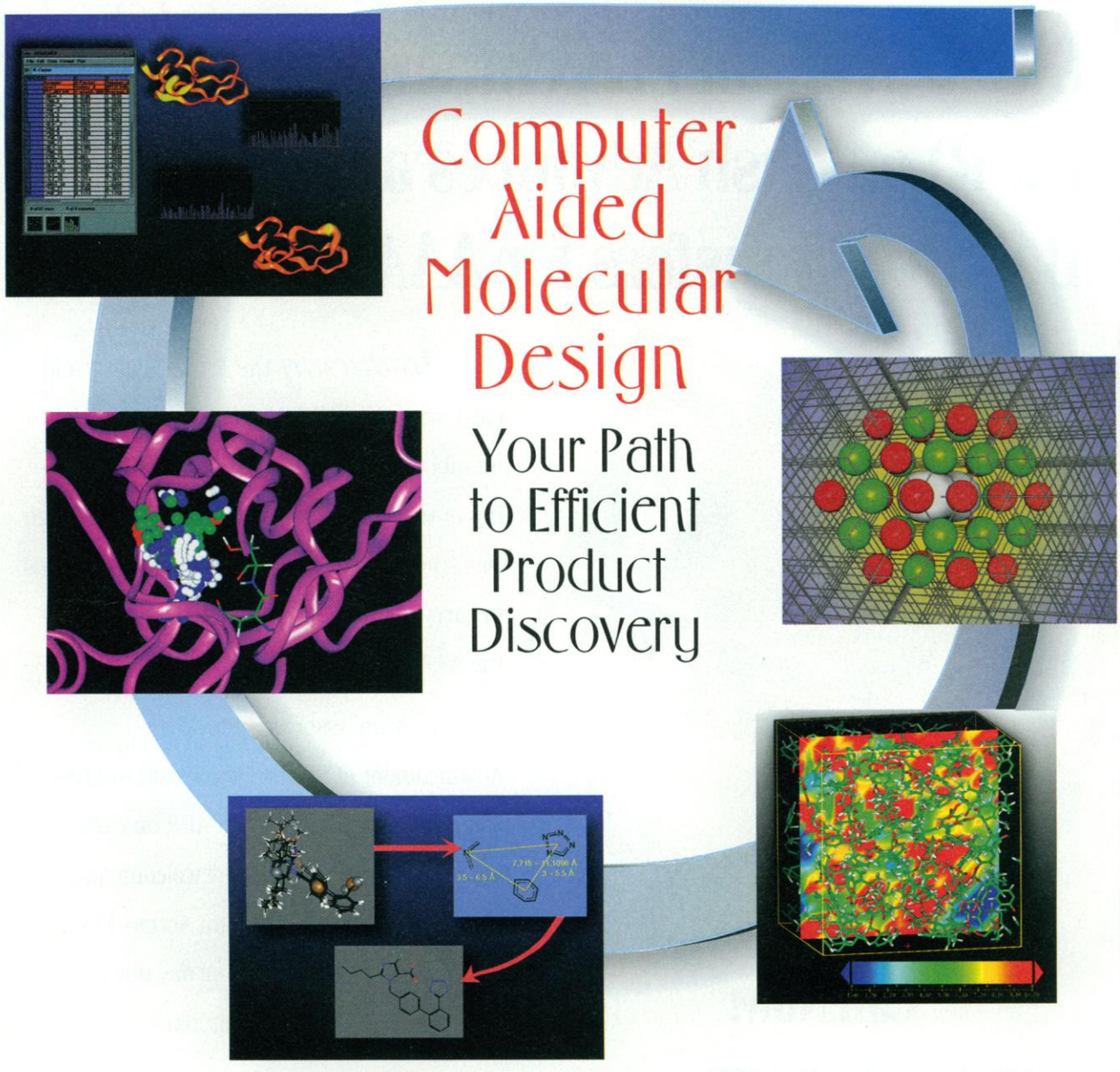

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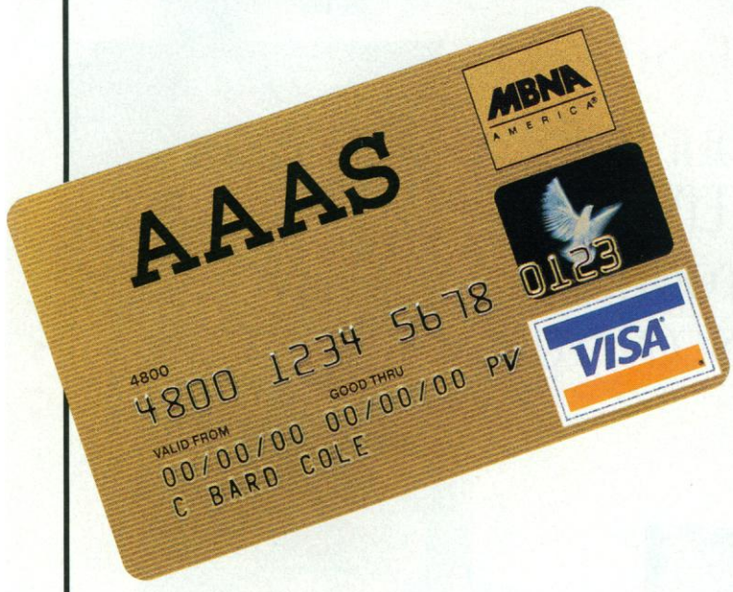

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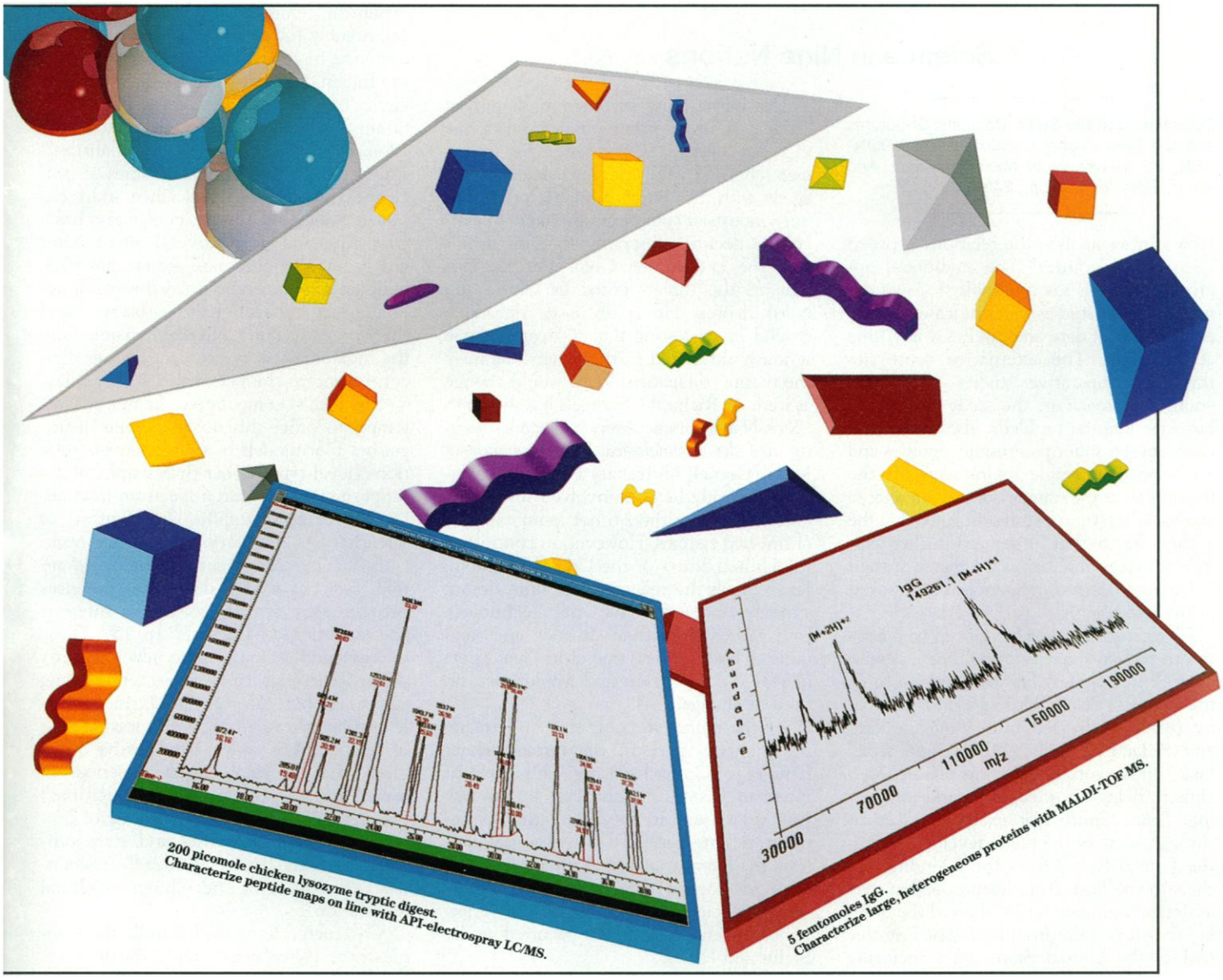

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