

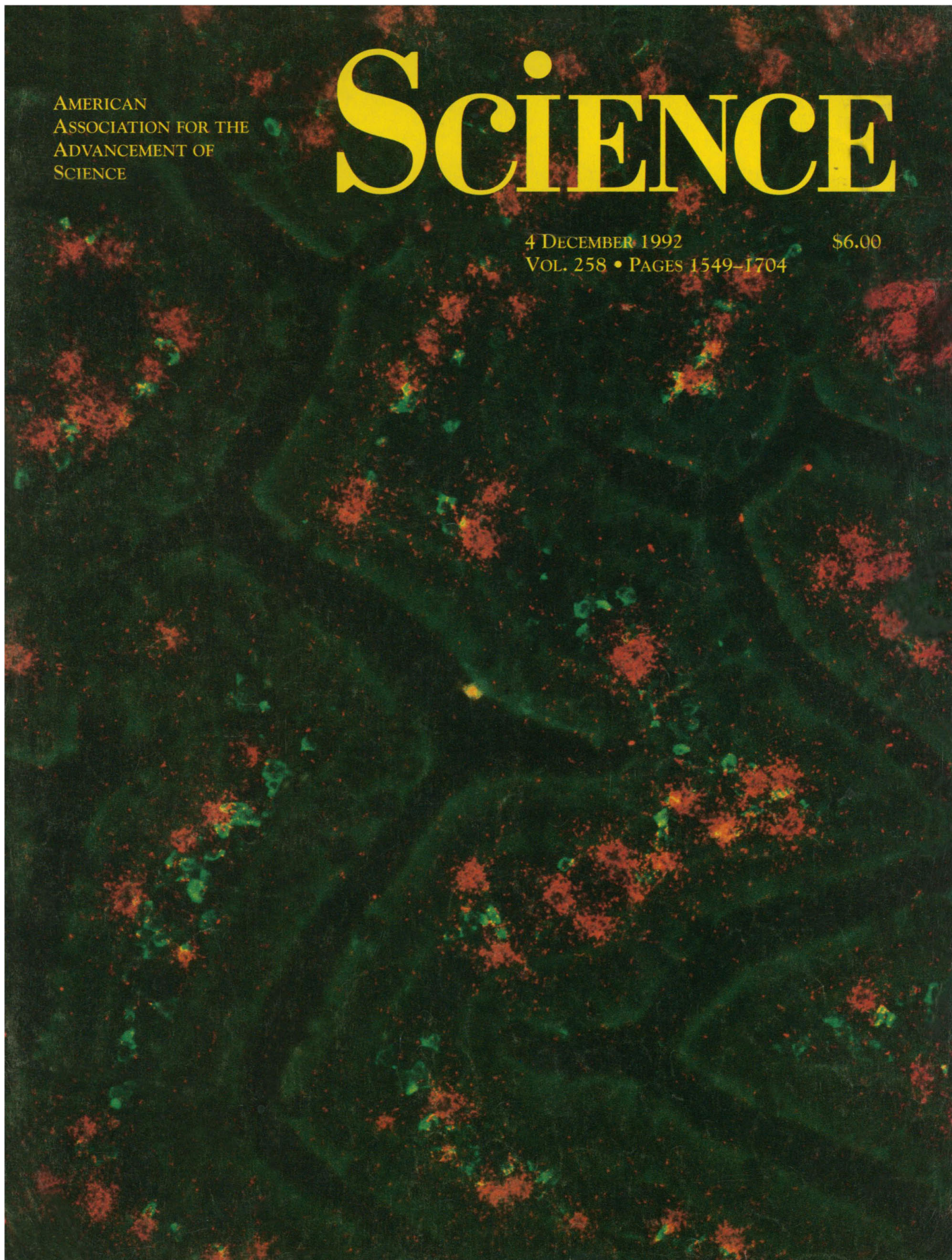
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COVER

The lamina propria of the rat duodenum, showing immune cells that unexpectedly express targets for anti-ulcer drugs. Plasmacytes that produce immunoglobulin G are shown in green, and cells that express M1 acetylcholine receptors are red; scattered immunoglob-

ulin G-producing cells that also express M1 acetylcholine receptors are shown in yellow. See page 1662 and the News report on page 1579. [Photo: Ricardo Dreyfuss]

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Structure of Src homology 3 (SH3) domain

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Signs of a large paleoearthquake near Puget Sound

■ Indicates accompanying feature

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Continental collisions

The variations of the strontium (Sr) isotopic content of seawater through time, preserved in carbonate rocks, provides information on the rates and nature of several geologic processes. However, as Edmond explains (p. 1594), the largest relative increases in radiogenic Sr in the oceans reflect the effects of Himalayan-style continent-continent collisions. Metamorphism and partial melting during such collisions caused some remobilization of radiogenic Sr into minerals that weather rapidly.

Planetary photochemistry

Diacetylene may be the ozone of the outer planets: the largest hydrocarbon identified in planetary atmospheres, it shields the planetary surface from ultraviolet radiation and, like ozone, it is photochemically active. In the laboratory, Bandy *et al.* (p. 1630) have studied the primary photoproducts of C_4H_2 by mass spectrometry after laser excitation. Unexpected fragments such as C_6H_2 and C_8H_3 , produced when a ground-state diacetylene combines with one that is photoexcited, have been found. Such species may be responsible for the generation of even larger hydrocarbons. The results may require a reexamination of the models for the atmospheres of Uranus, Neptune, and Pluto.

Materials from bacteria

Bacterial cell walls contain polymers with ionizable groups that can bind metal ions. Mendelson (p. 1633) precipitated *Bacillus subtilis* cells with copper, calcium, or iron ions to form precipitates that could be drawn into fibers. The threads can be dried

Glucocorticoid receptor pathway

When adrenal steroid hormones bind to the glucocorticoid receptor (GR), the complex moves through the cell into the nucleus. There it binds to specific DNA sequences (glucocorticoid response elements) and participates in the regulation of transcription. As a means of elucidating the interaction of GR with other proteins during such regulation, Yoshinaga *et al.* (p. 1598) studied the effect of the yeast cell-type switching proteins SWI1, SWI2, and SWI3, which regulate transcription of many yeast genes, on rat GR expressed in yeast. In strains with mutations in the genes for these proteins, GR could not activate transcription, although mutations in certain chromatin (*sin*) genes could relieve the requirement for SWI1. The data further indicate that the receptor directly interacts with the SWI proteins, providing a handhold in the chain of events between the signal and the activation of target genes.

to produce stiff, brittle materials called bionites. These materials can be manipulated further; for example, the iron form can be heated to form a black magnetic material.

Carbon clusters

When doped with alkali metals such as potassium or rubidium, solid C_{60} is a superconductor. The dopant donates electrons into the lowest unoccupied molecular orbital of C_{60} . Fullerenes doped with calcium—an alkaline earth element—are also superconductors, but the electronic structure appears to be different. Haddon *et al.* (p. 1636) describe resistivity measurements in the calcium-doped materials and Wertheim *et al.* (p. 1638) discuss photoemission studies that taken together indicate sequential filling of two unoccupied bands as the dopant concentration increases. The properties of metallo-carbohedrenes, in particular Ti_8C_{12} , are also of interest. Reddy *et al.* (p. 1640) calculated the electronic, magnetic, and geometric properties of this unusually stable structure. The molecule is a distorted dodecahedron, and there is little interaction between titanium atoms.

Warmer waters

The largest expanse of warm water on Earth, the Western Pacific Warm Pool, covers approximately 10 million square kilometers in the equatorial Pacific south of New Guinea. It plays an important role in climate, including possibly in the early development of El Niño events. Yan *et al.* (p. 1643) used satellite observations of sea-surface temperatures to track changes in the warm pool during the past 10 years. The size and mean temperature of the warm pool increased from 1983 to 1987 but have fluctuated since then.

Lung cancer and drug resistance

Treatment of small cell lung cancer tumors is initially very responsive to chemotherapy, but relapse almost always occurs because of multidrug resistance. Multidrug resistance is usually associated with the transmembrane transport protein, P-glycoprotein, which pumps drug molecules out of cells, but in these tumors this protein is rarely overexpressed. Cole *et al.* (p. 1650) cloned a protein, designated

multidrug resistance-associated protein (MRP), from a drug-resistant lung cell cancer cell line that does not overexpress P-glycoprotein. The sequence of MRP indicates that it, like P-glycoprotein, is a member of the adenosine triphosphate-binding cassette (ABC) superfamily, but that it may be more closely related to the cystic fibrosis transmembrane conductance regulator (CFTR) protein.

Binding site of SH3

Many cytoplasmic proteins that participate in signal transduction contain a 55- to 75-amino acid domain called the Src homology 3 (SH3) region. Yu *et al.* (p. 1665) used multidimensional nuclear magnetic resonance spectroscopy to determine the solution structure of the SH3 domain of the tyrosine kinase Src. A hydrophobic-rich binding site was revealed by the structure of this domain in complex with a proline-rich peptide ligand.

A measure of stability

Although class I major histocompatibility complex (MHC) molecules bind peptides in a cell and transport them to the cell surface, complexes lacking peptide can also form. Fahnestock *et al.* (p. 1658) measured the thermal stability of empty and peptide-bound forms of a secreted form of the murine H-2K^d molecule assembled from separated heavy and light chains. The results suggest that, at physiological temperatures, peptide binding conferred more than 4 kilocalories per mole of stabilization, but that 75 percent of the empty complexes are in the folded form.

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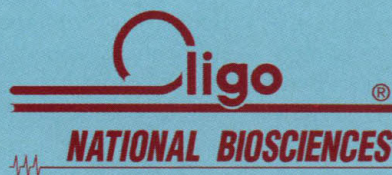
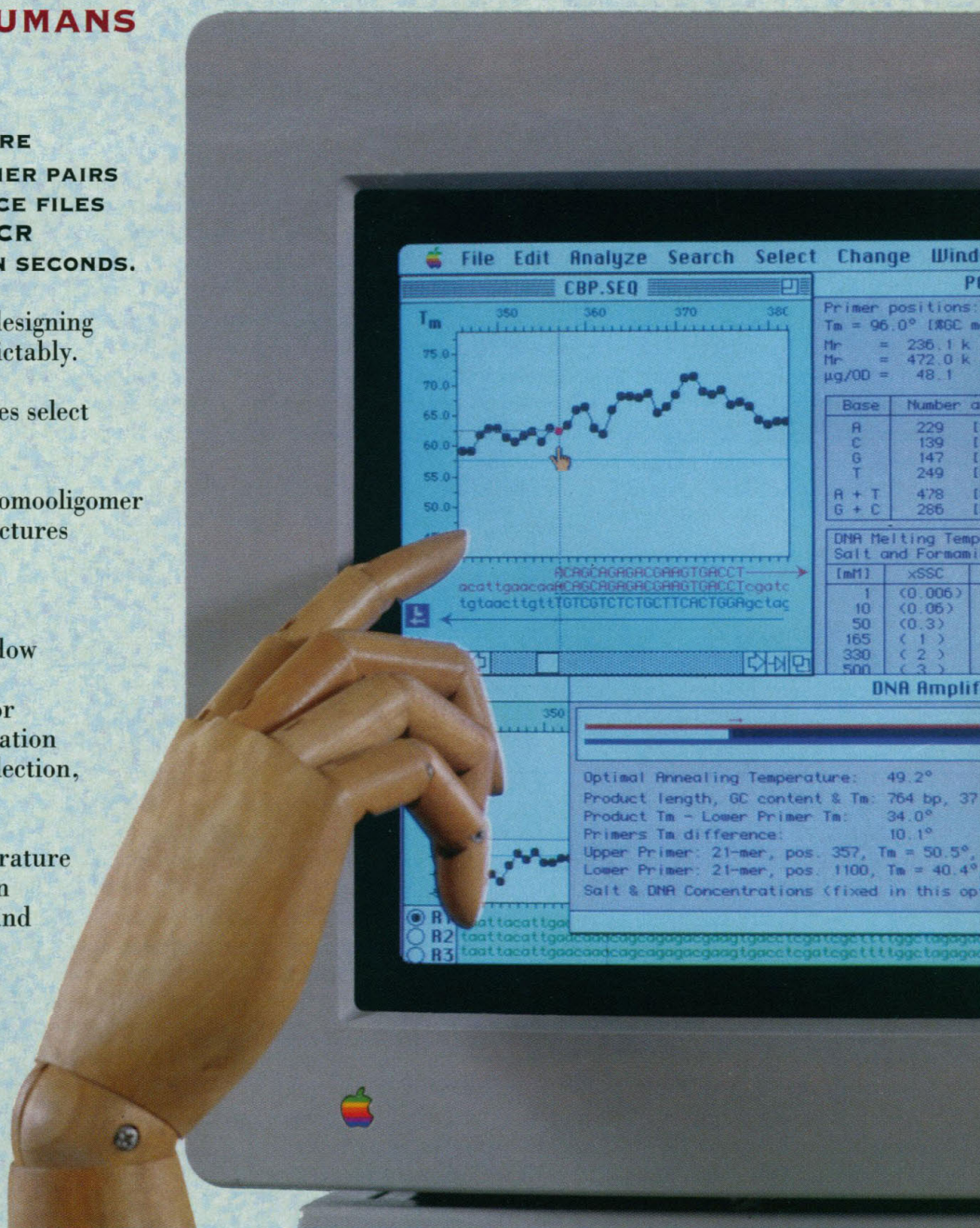
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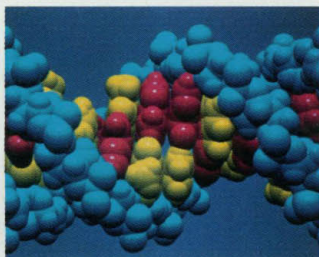
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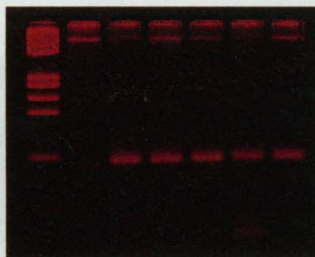
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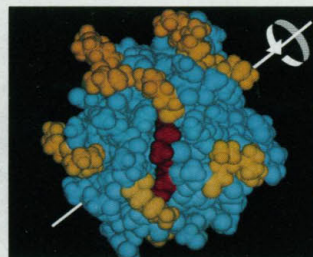
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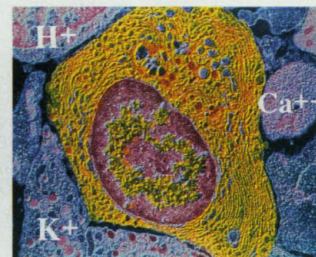
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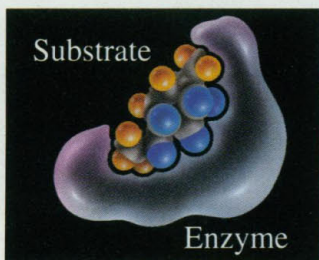
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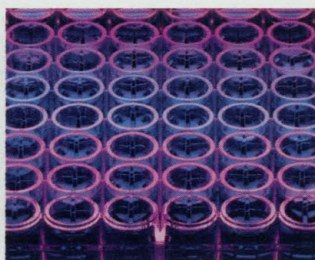
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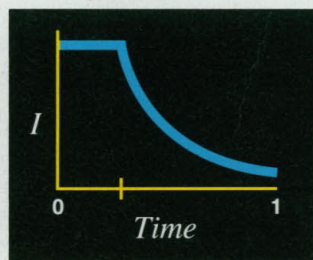
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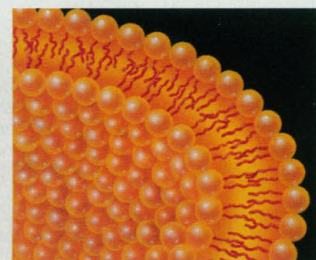
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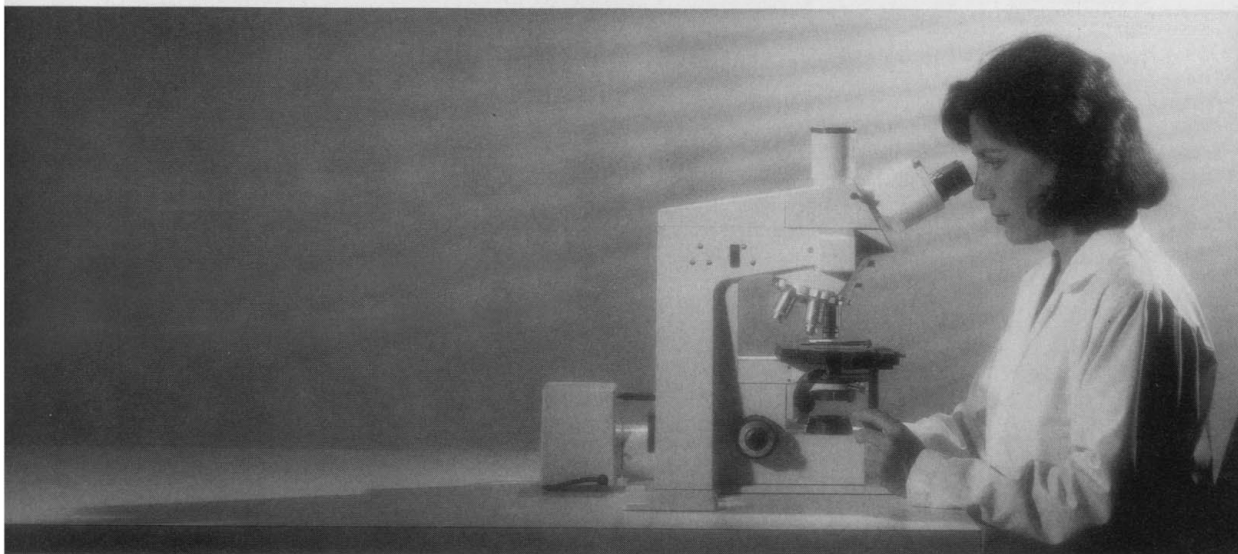


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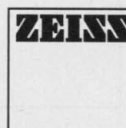
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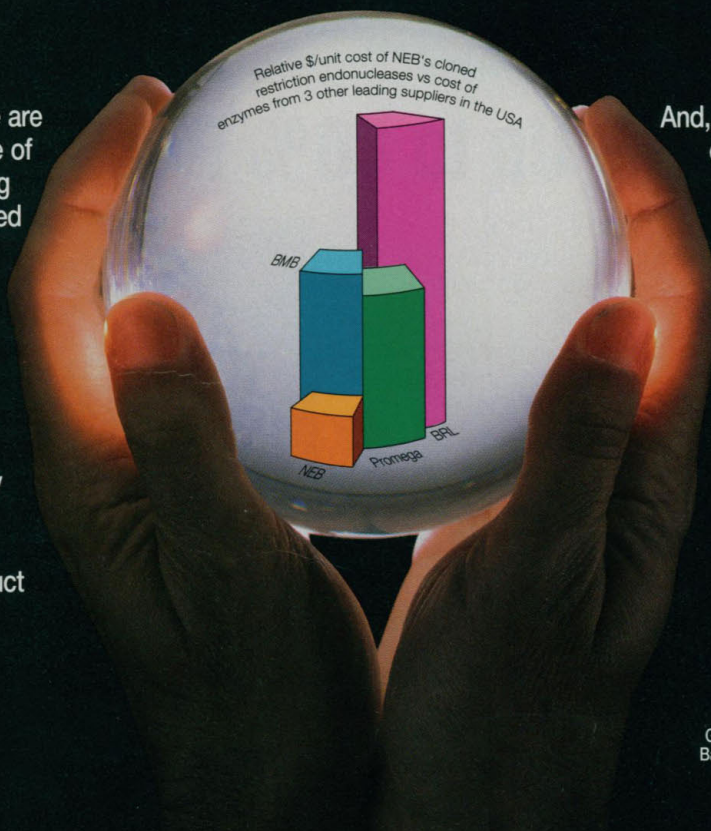
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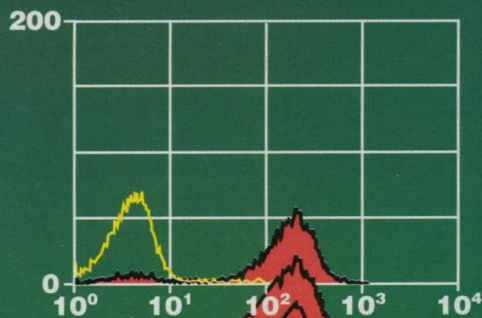
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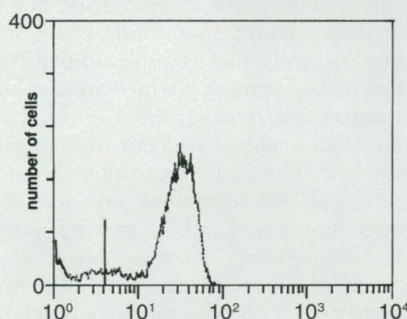




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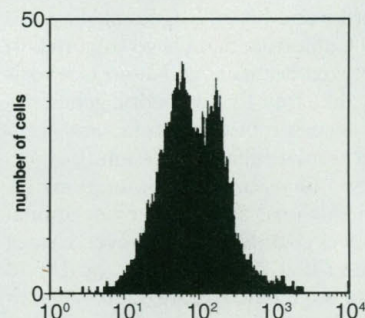
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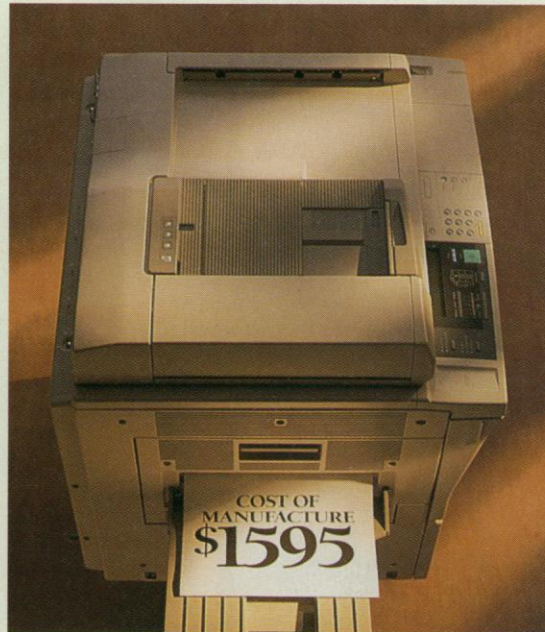
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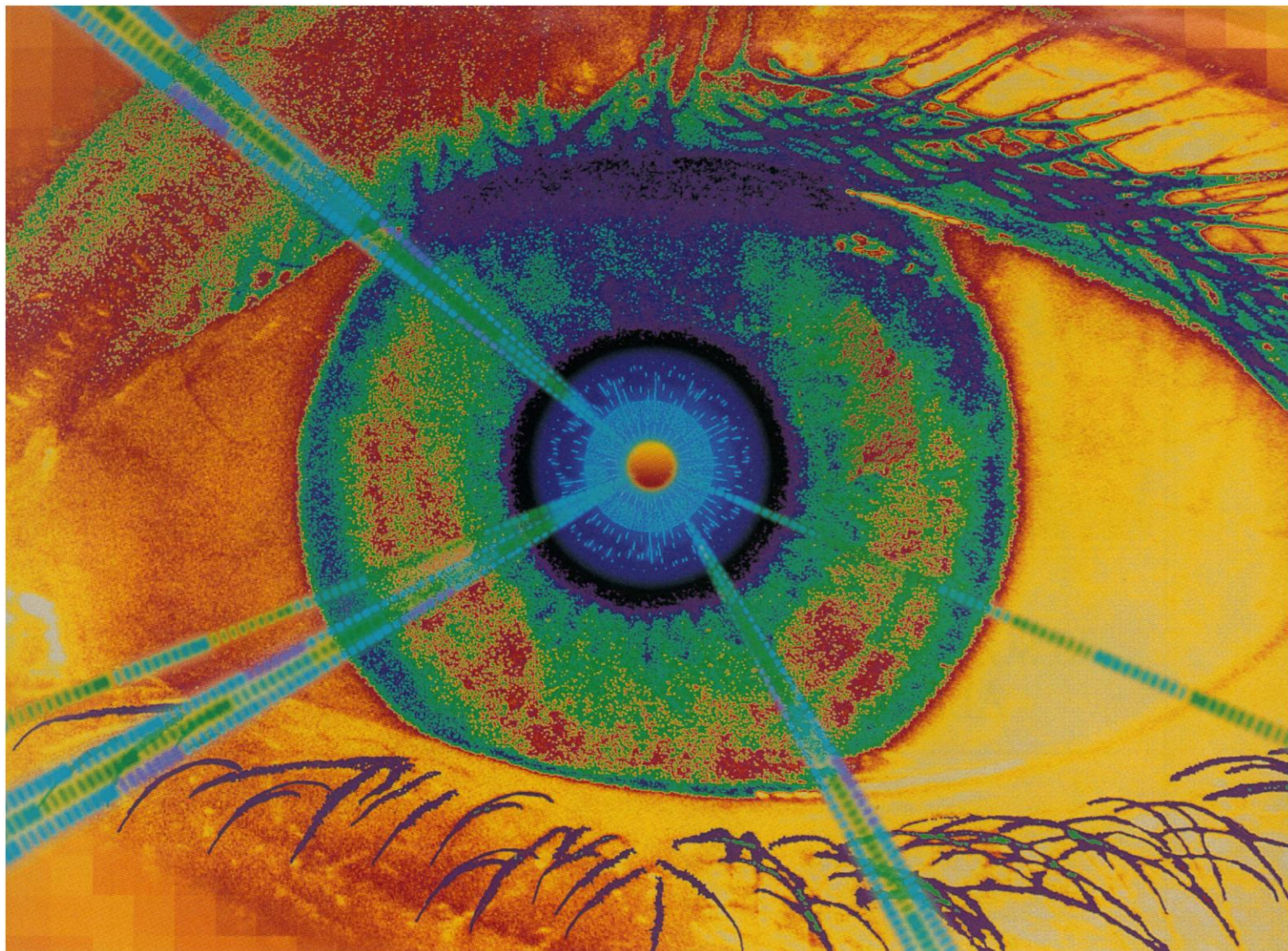
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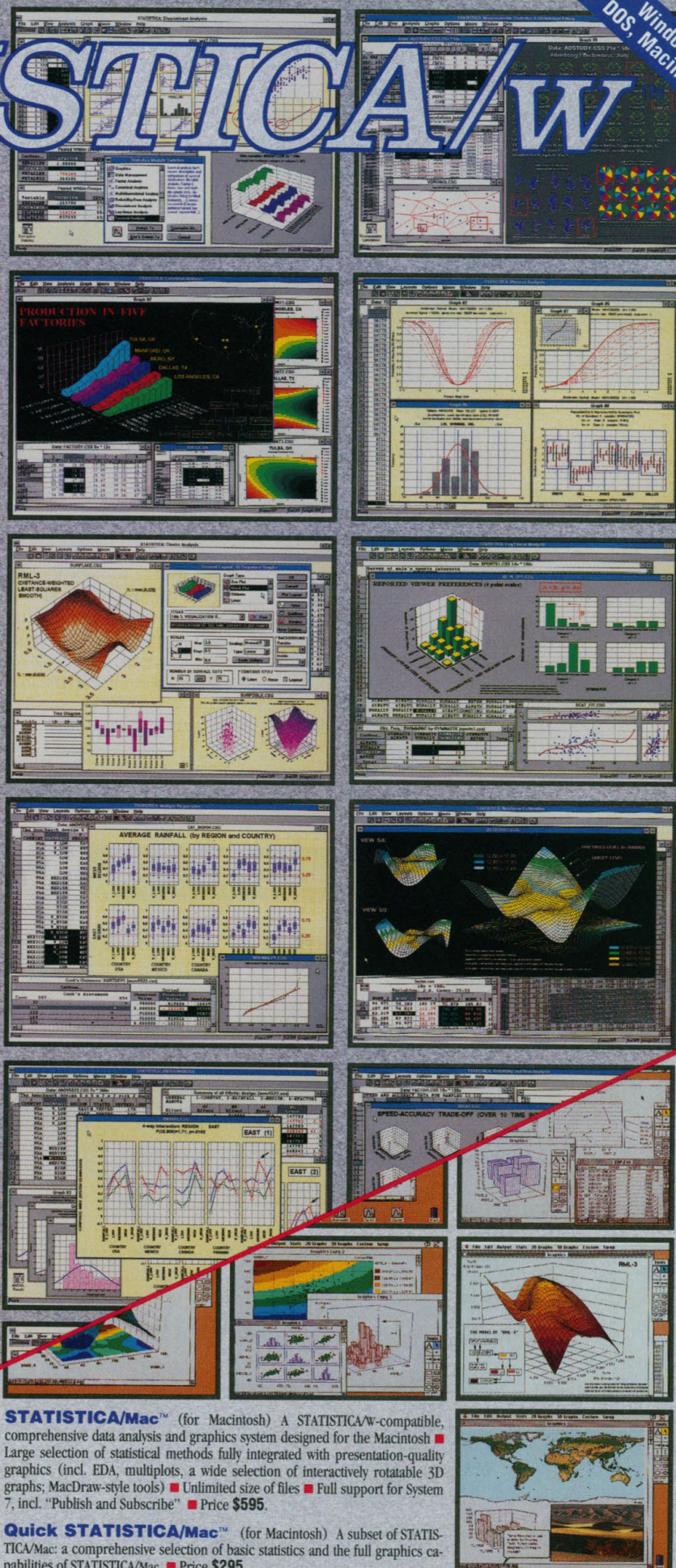


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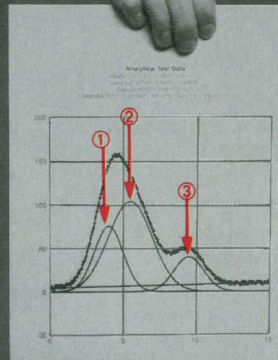
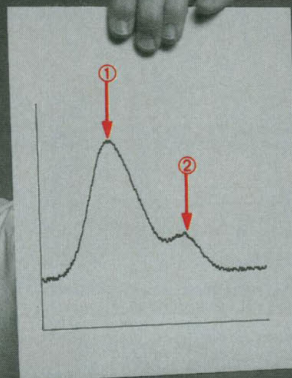
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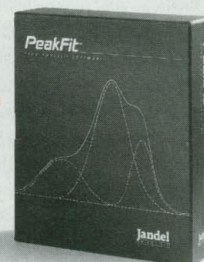
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SOME OF THE INTERNATIONAL MEETINGS SCHEDULED FOR 1993 ARE:

*"Experimental and Clinical
Precancerous Lesions: Approaches to
Cancer Prevention and Early
Diagnosis"*

P. Marks (USA) and R. Weil (CH)
Montreux (CH), March 29-31

*"Molecular Diagnosis and Monitoring
of Leukaemia and Lymphoma"*

F. Grignani (I)
Perugia (I), April 15-17

"Molecular Basis of Inflammation"

J. Navarro (USA)
Heidelberg (D), April 21-23

"Metabolism in the Female Life Cycle"

M.P. Diamond and F. Naftolin (USA)
Taormina (I), May 17-18

*"Recent Advances on Monoclonal
Gammopathies and Related
Malignancies"*

B. Barlogie (USA) and F. Dammacco (I)
Evian (F), June 3-5

"Inhibin and Inhibin-Related Proteins"

H.G. Burger (AUS)
Siena (I), June 17-18

*"Cell and Molecular Biology of the
Testis"*

M.L. Dufau (USA) and A. Isidori (I)
Majorca (E), September 13-14

*"GTPase-Controlled Molecular
Machines"*

D. Corda, S. Garattini and A. Luini (I)
S. Maria Imbaro (I), Sept. 22-25

"Developmental Endocrinology"

M.L. Aubert and P.C. Sizonenko (CH)
Geneva (CH), Sept. 30 - Oct. 2

*"The Challenge of Biotechnology: from
Laboratory Diagnosis to Clinical
Therapy"*

S.A. Aaronson (USA) and R. Verna (I)
Rome (I), October 11-12

*"Molecular Basis of Endocrine
Diseases"*

C. Pavía (E)
Barcelona (E), November 18-19

Gordon Research Conferences

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"Biodegradable Polymers"

San Miniato (I), May 2-7

*"Biological Structure and Gene
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Volterra (I), May 2-7

"Organic Superconductors"

Il' Ciocco (I), May 9-14

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As a complementary characterization technique to Edman Protein Sequencing — Apolipoprotein AI mutation Arg60 causes autosomal dominant amyloidosis; Ludwig Institute, London, UK; *Proc. Natl. Acad. Sci., USA*, **89**, 7389-7393 (1992).

Characterization of recombinant proteins — Analysis of recombinant human ciliary neurotrophic factor (CNTF) by laser desorption time of flight mass spectrometry; Regeneron Pharmaceuticals, NY; presented at the Sixth Protein Society Symposium.

Verification of synthetic peptides, looking for deletions, additions and protecting groups that have not been removed — Optimized solid phase peptide

synthesis of a 41 amino acid residue peptide sequence of GP41 envelope glycoprotein with significant high sensitivity against HIV-1 antibody positive sera; University of Tübingen, Germany; presented at the 22nd European Peptide Symposium.

Characterization of variant proteins — Characterization of lysyl oxidase and TRAMP, distinct proteins that co-purify from porcine skin; Edinburgh University, UK; *Matrix*, in press.

Monitoring of enzymatic and chemical reactions — Studying advanced glycation processes using matrix assisted laser desorption; C.N.R. Padova, Italy, Policlinico University, Italy and Finnigan MAT, presented at Sixth Protein Society Symposium.

Characterization of glycoproteins and native oligosaccharides cleaved from glycoproteins — Glycobiology Institute, Oxford University, UK; *Glycoconjugate J.*, **9** 1-12 (1992).

Analysis of oligonucleotides — Matrix assisted laser desorption of oligonucleotides; California Institute of Technology; presented at 40th ASMS Conference on Mass Spectrometry.

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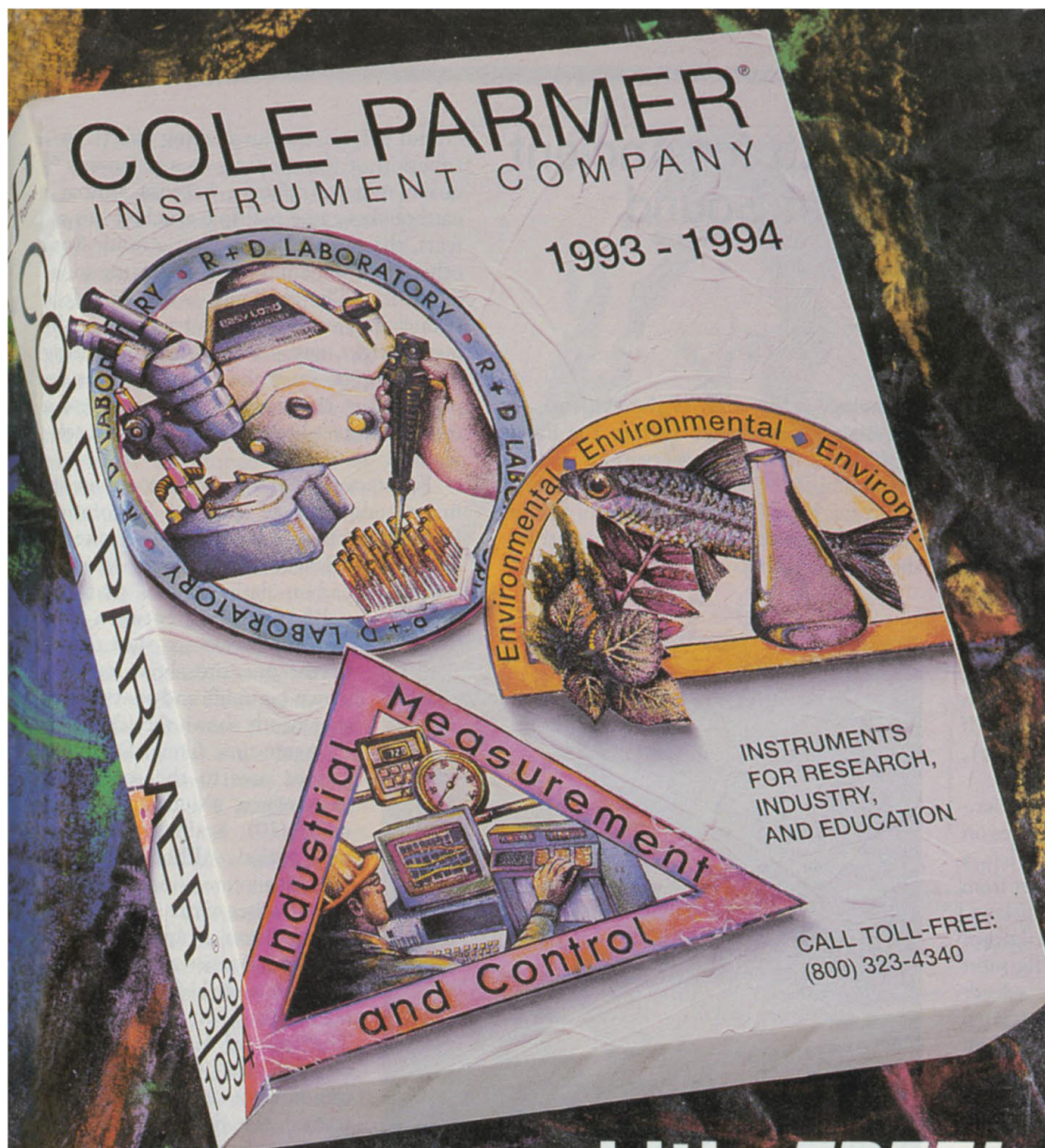
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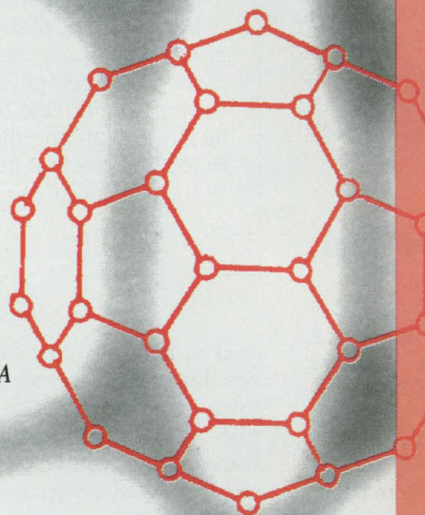
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