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Q & A	208
Rapid File 1.2	221
R-Base System V 1.1	428
Reflex 1.14	86
Thinktank	146

GRAPHICS

Generic CADD	58
Graph-in-the-box	57
Grasp 3.0	74
Harvard Graphics	238
In-A-Vision	298
Microsoft Chart 3.0	248
Newsroom Pro	49
PFS Graph	105
Print Shop	39
Print Shop Companion	30
Printmagic	45
Sign Master	158
VP Graphics	75

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Basic Compiler 5.36	\$268
Macro Assembler 5.0	96
Pascal Compiler	188
Quick C	58
RM Basic	450
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Turbo Basic 1.1	60
Turbo C	60
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Turbo Tutor 4.0	60

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Gem Desk Top	37
Harvard Total Project Manager	378
Timelink Plus III	37

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Javelin	83
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Multiplan	118
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Quattro	128
Swift & Easy	37
Swiftcalc PC w/Sideways	42
VP Planner	55

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DOS Rx	\$60
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Genifer	213
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Memory Mate	52
Norton Utilities-Advanced	83
PC Tools Deluxe	59
Quick Index III	111
Runtime	112
Sideways	41
Turbo Lightning	57
Windows	63

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Celebrity	67
Easy	74
Filemover	45
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Multimate Adv. II	278
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Q & A Write	118
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Volkswriter Dlx Plus	74
WordPerfect	198
Word Finder	45

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Blue Start	33
Clickart Publications	37
Colormate	56
Decision Map	108
Dollars & Sense	112
Double Helix	273
Easy 3D	112
In Talk 3.0	146
Laser Author	44
Lazerstart 2.5	71
MAC Vision	224
Mainstreet Filer	75
Microsoft Chart	78
Microsoft Excel	296
Microsoft Works	198
Microsoft Multiplan	118
Power Point	228
Printworks for MAC	56
Quartet	37
Runtime	112
Spellswell	53
Timelink	18
Turbo Pascal	74
Turbo Tutor	52
Typing Tutor IV	44
Voila	75
Word Finder	44
Write Now	131

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7 This Week in *Science*

Editorial

9 Korean Research and Development

Letters

11 HIV Infection in the Laboratory: C. H. FOX, AND M. COTTLER-FOX;
W. A. BLATTNER ■ Historiographic Distinctions: R. J. RICHARDS; J. C. GREENE ■
Private Research and "Psychological Well-Being": D. M. BOWDEN ■ Census
Undercount Recommendation: T. WRIGHT

News & Comment

17 Budget Crunch Stalls Super Collider
18 Mars Mania and NASA
19 *Biomedical Briefing*: Institutes Proposed for Deafness, Rehabilitation ■ It Matters
How You Slice the Pie ■ Hammer Seeks \$1 Billion to Cure Cancer ■ Kennedy
Suggests NIH Foundation
20 New Spy Satellites Urged for Verification
21 EPA Bars Use of Nazi Data
22 Hopes Recede for Early Ban on Chemical Arms ■ A French "Joker in the Pack"
24 *Briefing*: Du Pont Backs Phaseout of CFCs ■ Wilson to Leave Cornell ■ Ecstasy
Returns to Schedule I ■ Italy Back in Space

Research News

25 Superconductors' Material Problems
27 Diet and Health in China
28 Troubled Times Ahead for Telescope-Makers ■ Bigness: Why and How ■
A European Behemoth

Articles

35 'Ain Ghazal: A Major Neolithic Settlement in Central Jordan: A. H. SIMMONS,
I. KÖHLER-ROLLEFSON, G. O. ROLLEFSON, R. MANDEL, Z. KAFABI
40 Molecular/Organic Ferromagnets: J. S. MILLER, A. J. EPSTEIN, W. M. REIFF
47 Computers in Molecular Biology: Current Applications and Emerging Trends:
C. DELISI

Research Articles

53 The Neural Cell Adhesion Molecule (NCAM) as a Regulator of Cell-Cell
Interactions: U. RUTISHAUSER, A. ACHESON, A. K. HALL, D. M. MANN,
J. SUNSHINE

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COVER Pre-Pottery Neolithic B statuary from 'Ain Ghazal, Jordan. See page 35. [Conserved by Mrs. K. Tubb, Institute of Archaeology, University of London. Photo by Peter Dorrell and Stuart Laidlaw, courtesy of Institute of Archaeology, University of London]

Reports

- 60 Short-Lived s-Process Gamma-Ray Lines in Type II Supernovae: M. J. HARRIS
- 62 Molecular-Level Control over Surface Order in Self-Assembled Monolayer Films of Thiols on Gold: C. D. BAIN AND G. M. WHITESIDES
- 64 HIV-1 Reverse Transcriptase Is a Target for Cytotoxic T Lymphocytes in Infected Individuals: B. D. WALKER, C. FLEXNER, T. J. PARADIS, T. C. FULLER, M. S. HIRSCH, R. T. SCHOOLEY, B. MOSS
- 66 The Nasotemporal Division in Primate Retina: The Neural Bases of Macular Sparing and Splitting: A. G. LEVENTHAL, S. J. AULT, D. J. VITEK
- 68 A Mutation in the Catalytic Subunit of cAMP-Dependent Protein Kinase That Disrupts Regulation: L. R. LEVIN, J. KURET, K. E. JOHNSON, S. POWERS, S. CAMERON, T. MICHAELI, M. WIGLER, M. J. ZOLLER
- 70 Tat Protein from Human Immunodeficiency Virus Forms a Metal-Linked Dimer: A. D. FRANKEL, D. S. BREDDT, C. O. PABO
- 74 Molecular Basis for the Influence of Muscle Length on Myocardial Performance: A. BABU, E. SONNENBLICK, J. GULATI
- 76 Cone Cell-Specific Genes Expressed in Retinoblastoma: E. BOGENMANN, M. A. LOCHRIE, M. I. SIMON
- 78 Mussel Growth Supported by Methane as Sole Carbon and Energy Source: S. C. CARY, C. R. FISHER, H. FELBECK
- 80 Biologic Features of HIV-1 That Correlate with Virulence in the Host: C. CHENG-MAYER, D. SETO, M. TATENO, J. A. LEVY

AAAS News

- 83 Members Help Museums Fulfill Mission: P. S. CURLIN ■ Listing of Women in Science Groups Gets Update ■ 1988 *Science Education Directory* Available ■ Role Models Sought ■ New Art Show Opens ■ Ethics in Graduate Education Studied ■ Insured Members Enjoy Cost Savings ■ Coming Soon—AAAS Member Survey ■ AAAS, Harvard Hold Science Policy Workshop ■ Ethics Report Begins Publication ■ Obituaries

Book Reviews

- 86 Method and Theory for Activity Area Research, *reviewed by* C. KRAMER ■ The Archaeology of Western Iran, H. J. NISSEN ■ The African Frontier, E. COLSON ■ Books Received

Products & Materials

- 93 Plotting and Analysis Software ■ Cryogenic Refrigerators ■ Data Acquisition and Control System ■ Apparatus to Recover Samples ■ Universal File Translator ■ Nucleic Acid Preparation ■ Assay Calculation Software ■ Ultraviolet Detector ■ Literature

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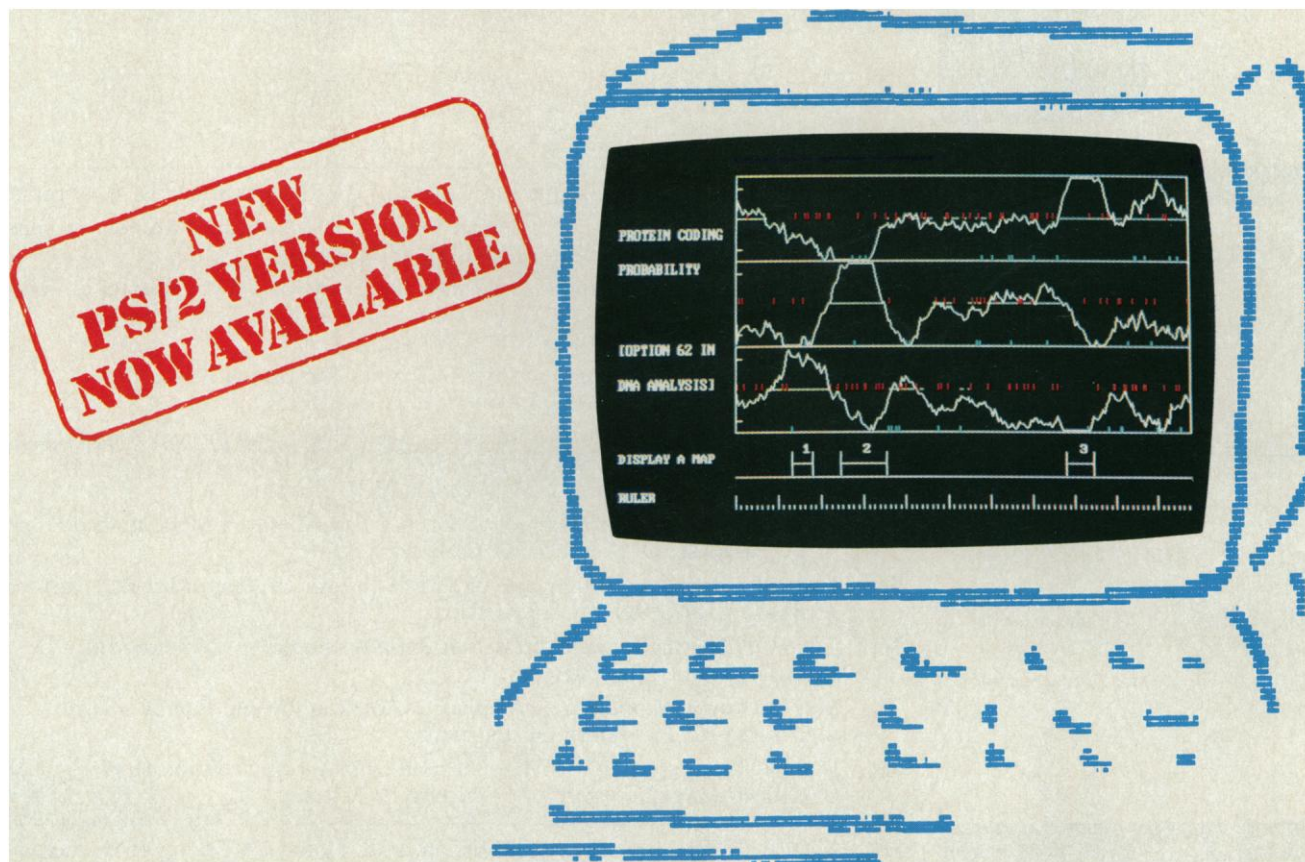
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This Week in SCIENCE

Spring of the gazelles

AIN Ghazal, the "spring of the gazelles," was a Jordanian village that rode out one of the major stages in human cultural development—the shift that took place during the Neolithic period from the hunter-gatherer way of life to a life based on an economy centered on crop and animal domestication (page 35). The 30-acre archeologic site at 'Ain Ghazal was exposed in 1974 during road construction near Amman, but excavation only began there in 1982. The site is proving to be especially important for refining concepts about life in the late Neolithic. The large village was occupied more or less continuously for about 2000 years, starting around 7200 B.C. and ending around 5500 B.C. The earliest occupation appears to have been the most prosperous one: food sources included domesticated and wild animals and plants; architecture, art, and ritual behavior were elaborately developed (cover). Later, the diversity of foods narrowed, the land was depleted (overuse, an unstable landscape, and the region's marginal rainfall probably contributed to this), the standard of living declined, and the village became impoverished. Simmons *et al.* speculate that pastoralism may then have proved a more viable way of life (as it still is in parts of the Near East) and that the villagers wandered away from the settlement at 'Ain Ghazal, finally abandoning it altogether.

Cell-cell adhesion molecules

CELL adhesion molecules are surface constituents that help cells recognize and interact with each other (page 53). Among the most abundant of these in the nervous system is the neural cell adhesion molecule (NCAM). After cells are brought together by NCAM, the large negatively charged polysialic acid (PSA) component (that may make up as much as a third of the molecule's mass) may regulate signal transmission. Rutishauser *et al.* propose that interactions between surface molecules in general may be

regulated by NCAM. When the PSA content is high, cell-cell contact might be impeded sterically or electrostatically. In the extreme, a thin screen of PSA may form around the cell much as a protective or selective barrier forms around some bacteria and eggs. When PSA is limited, better membrane contact between cells may be established and cell-cell interactions facilitated; cells very early in development and cells in adult tissues have relatively low amounts of PSA. Thus the PSA content will determine whether NCAM has a positive or negative effect on cellular communications.

Reverse transcriptase as immunogen

THE AIDS virus HIV-1 is hidden inside host cells; thus a successful defense against HIV-1 might be met by killer cells that can attack the sequestered virus in the harboring cell (page 64). Walker *et al.* found that people infected with HIV-1 have certain killer T cells that react against reverse transcriptase, an enzyme that signals the presence of this retrovirus. Virus-infected cells express reverse transcriptase in conjunction with major histocompatibility antigens. The killer cells, which have distinct antigens (CD3 and CD8) on their surfaces, must recognize reverse transcriptase in the context of their own major histocompatibility antigens. In most other viral systems, CD3⁺CD8⁺ cells have killer functions and facilitate recovery from viral infections. Although a protective or ameliorative effect of CD3⁺CD8⁺ killer cells in AIDS infections has not yet been established, it is possible that a vaccine containing reverse transcriptase might induce cells (and perhaps also antibodies) that would slow or halt the progression of the disease.

Trigger of muscle contractions

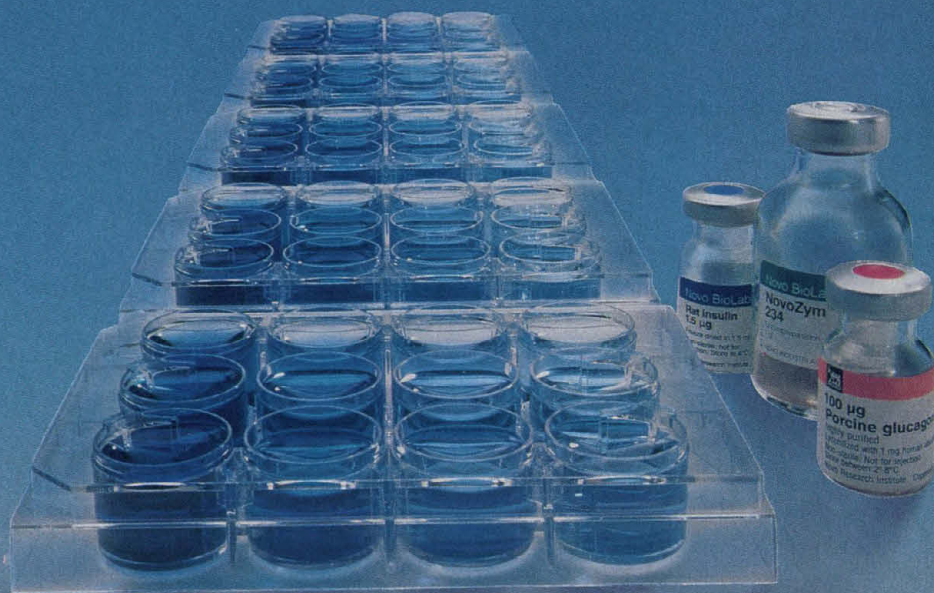
TROPONIN C is a calcium-sensitive constituent of muscle; it is part of a complex of proteins that trig-

gers the contractions of muscles during muscle activation (page 74). Babu *et al.* have found that there is an intrinsic difference in the activities of troponin C molecules taken from two different types of muscle, one (cardiac muscle) that is involved in sustained, regular pumping actions and the other (skeletal muscle) that makes fast-twitch responses. Segments of heart ventricle muscles were stripped of native troponin C and reloaded with either heart or skeletal troponin C. The response to calcium was greater for cardiac muscle than it was for skeletal muscle of the same length, and, as has been previously documented, the relation of length to calcium sensitivity was greater in heart than in skeletal troponin C. Troponin C may thus be the molecular factor in Starling's law of the heart, which states that the bigger the ventricle at the end of diastole the greater will be its contraction and its accompanying output of blood.

Retinoblastoma origin

RETINOBLASTOMAS, which are tumors that grow inside the eye, were known to consist of cells of neuroectodermal origin, but exactly what cells they came from has been unclear (page 76). A study by Bogenmann *et al.* now establishes that retinoblastoma cells are derivatives of cells that normally give rise to retinal cones; earlier morphologic studies had ruled out an origin for retinoblastomas from fully differentiated cones. In the eye, the cone cells, along with rod cells, are responsible for color vision; they make photopigments and each has a distinctive form of the protein transducin. In experiments in culture, the retinoblastoma cells produced the photopigments and the transducin that are found in cones; they did not produce rhodopsin or the rod-specific form of transducin even though they carried the genes encoding these proteins. Besides being of value for clarifying many of the properties of retinoblastomas, this cell system may be useful for understanding how cone cells grow and how genes are expressed in them.

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Research and Development in South Korea

The newly industrialized countries of east Asia are continuing to increase their favorable balance of trade with the United States. In 1987 it was \$37.7 billion versus \$30.3 billion in 1986. At one time, their exports were largely labor-intensive items, but increasingly they are competitive in high-technology products. This is especially true of South Korea, which has achieved a remarkable rate of industrialization.

At the conclusion of World War II, there were only 40 people trained in science and engineering in South Korea. The Korean War that ended in 1953 was devastating. Even with some recovery, the gross national product of Korea in 1962 was only \$2.3 billion (1980 dollars), and the GNP per capita was \$87. In 1986 the GNP was \$94 billion. More than 40,000 professional people are now employed in research and development. Many electronic devices are being produced and exported, including computers and 256K random-access memory chips. Shipbuilding is sophisticated and computer-controlled. Steelmaking facilities are among the most modern and competitive in the world today. Seven nuclear power reactors are in operation, two are under construction, and two are being designed and will be built by a Korean company.

Key to the rapid progress and a continuing momentum has been future-oriented governmental policies that have been implemented by private initiative. Beginning in 1962, a national plan for development was formulated that emphasized import substitution and exports of labor-intensive products. In the plan, the need to increase national capabilities in science and engineering was also recognized. In 1964 and shortly thereafter, Donald Hornig, the then U.S. presidential science adviser, and the Battelle Memorial Institute were helpful, aiding in crystallizing a Korean view that, for a developing country, the choice of appropriate technology can be properly made only when the importing country itself has the capability to make relevant decisions and to negotiate with the transferring country.

From the mid-1970s, the availability of trained scientists and engineers made feasible full-scale development of the heavy and chemical industries. Much of the technology that was employed came from foreign sources. But the pattern followed was to master the production process and then to move gradually into more sophisticated technology. In the early years, the Koreans were reluctant to enter joint ventures, but, as their expertise developed, participation increased greatly after 1980.

An extreme example of gradualism in taking on new technology is with respect to nuclear power reactors. The first three were obtained as turnkey products of foreign companies. However, Koreans were present in engineering studies and design work starting in 1970. Koreans participated actively in design and construction of the next six reactors, which again were the responsibility of foreign contractors. Simultaneously, Korea conducted intensive nuclear power engineering training programs. The Koreans have emphasized the need for safety and reliability in their nuclear power plants, but they feel sufficiently confident in their abilities that they will design and build two power reactors to be completed in 1996. At that time, 37 percent of the nation's electric power will come from nuclear energy.

In 1966, the then Korean President Park Chung Hee said, "In modern times development of science and technology is one of the most important factors in determining national power. Science and technology which are driving forces in the cultural development of mankind have greatly contributed toward rapid economic growth and human welfare."

Korean policy continues to take the Park statement as a given. A nationwide science movement has been launched to promote public understanding of science and technology. The country held its first "technology promotion meeting" in January 1982, presided over by the president of Korea. Cabinet ministers and representatives from relevant segments of the administrative, business, and academic sectors attended. These meetings have been held quarterly. With that kind of example, it is not surprising that young Koreans are knowledgeable about science. One recent study (see News & Comment, 11 March, p. 1237), showed that 10-year-old Koreans were tied for first place with Japanese children in knowledge of science, whereas 10-year-old U.S. children ranked 8 in a field of 15.

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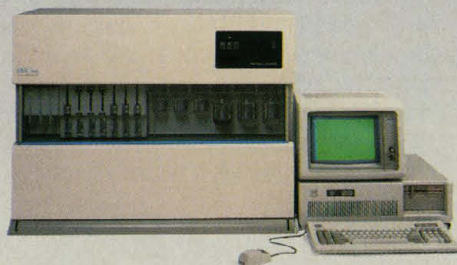
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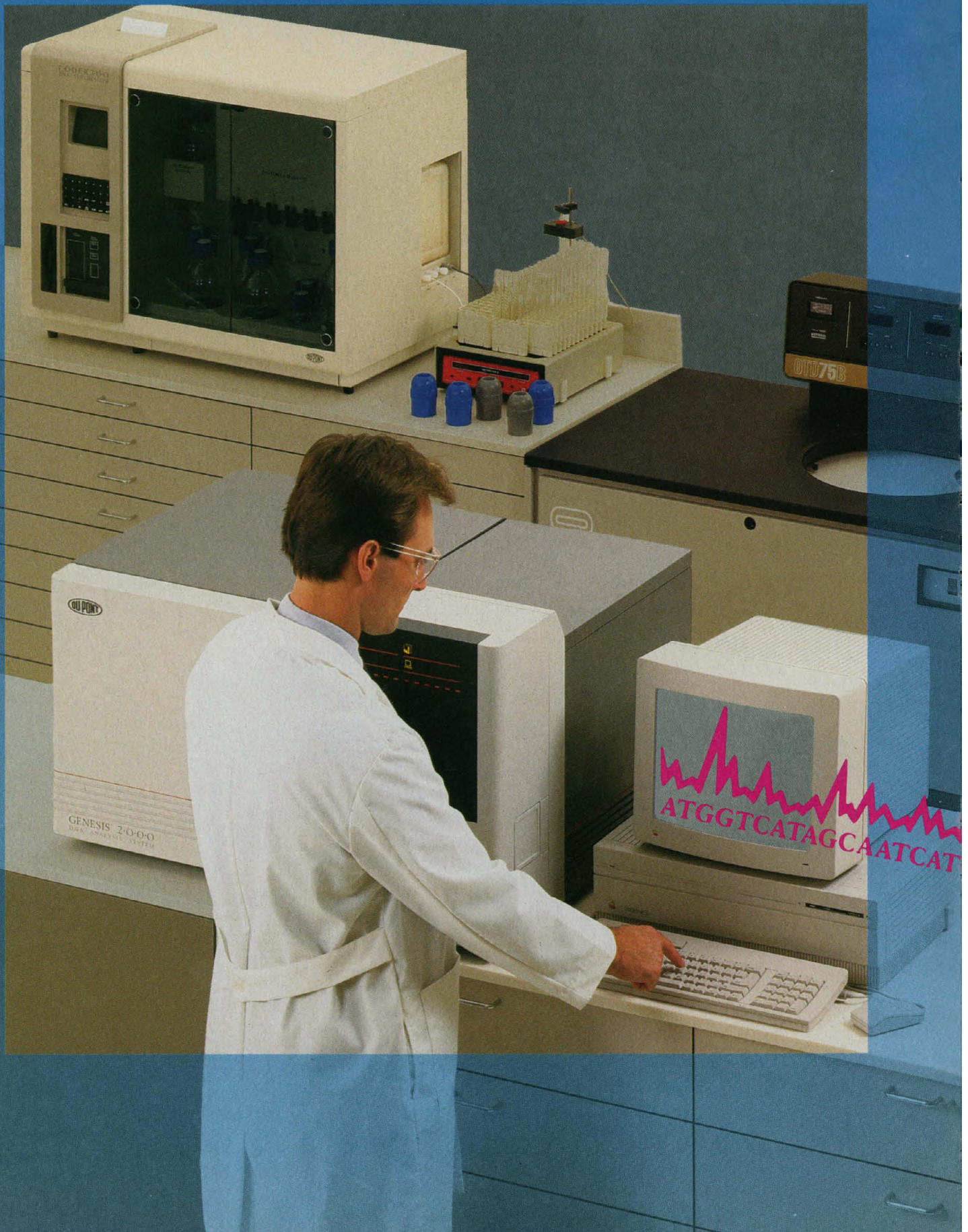
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The awards ceremony will be held at the National Academy of Sciences in Washington, D.C., on April 25, 1988, at 8 p.m.
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Symposium

Neurochemical Pharmacology 1988, A Tribute to B. B. Brodie

April 29–30, 1988

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P. Shore (Santa Fe, NM)
*B.B. Brodie and the Beginning of
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I. TRANSMITTERS
Chairman: **A. Pletscher** (Basel, Switzerland)

A. Carlsson (Göteborg, Sweden)
*Role of dopamine in mental and motor
functions*

T. Hökfelt (Stockholm, Sweden)
Multiple messengers and neurotransmission

E.G. Erdos (Chicago, IL)
*Enkephalinase-endoropeptidase 24.11: a
multipurpose enzyme outside the CNS*

G. Di Chiara (Cagliari, Italy)
*Brain dialysis in freely moving rats: a tool in
neurochemical pharmacology*

J. Meldolesi (Milan, Italy)
*Receptor-triggered release of Ca^{2+} from
intracellular storage organelles in the
cytosol: studies in neurons and
neurosecretory cells*

S. Spector (Nutley, NJ)
*Physiologic role for the endogenous codeine
and morphine*

II. TRANSMITTER FUNCTION
Chairman: **R. Kuntzman** (Nutley, NJ)

S. Garattini (Milan, Italy)
Role of 5 HT in the control of food intake

G.L. Gessa (Cagliari, Italy)
*Physiological role of oxytocin in copulatory
behavior*

R.P. Maickel (West Lafayette, IN)
*Brain biogenic amine systems in responding
to stress*

L. Manara (Milan, Italy)
*New developments in beta-adrenergic
mediated control of intestinal motility*

B. Weiss (Philadelphia, PA)
*Behavioral, biochemical, and molecular
biological correlates of dopaminergic
responses*

G.A. Krishna (Bethesda, MD)
*Mechanism of MPTP-induced Parkinson's
disease at the cellular and subcellular levels*

J.J. Burns (Nutley, NJ)
My years with B.B. Brodie

April 30, 1988

III. RECEPTOR MODULATION
Chairman: **V. Mutt** (Stockholm, Sweden)

H. Loh (San Francisco, CA)
*Recent studies on membrane opioid
receptors*

N.H. Neff (Columbus, OH)
Neurochemical pharmacology of retina

M.L. Barbaccia (Washington, DC)
*Modulation of serotonergic transmission by
novel putative endocoids: its possible impact
in psychiatric research*

K.J. Kellar (Washington, DC)
*Nicotinic cholinergic receptors in brain:
regulation and function*

A. Guidotti (Washington, DC)
*Allosteric regulation at the GABA receptor/
ionophore complex*

I. Hanbauer (Bethesda, MD)
*Endogenous modulator for Ca^{2+} channel
activity*

G. Sedvall (Stockholm, Sweden)
*Determination of neuroreceptor
characteristics in the living human brain by
positron emission tomography*

IV. SIGNAL TRANSDUCTION
Chairman: **R. Paoletti** (Milan, Italy)

S. Udenfriend (Nutley, NJ)
*Biogenesis of phosphatidylinositol glycosyl
(PI-G tailed) membrane proteins*

J. Axelrod (Bethesda, MD)
*Receptor mediated activation of
phospholipase A_2 via G proteins:
arachidonic acid and its metabolites as
second messengers*

F. Sulser (Nashville, TN)
*From neurochemical to molecular
pharmacology of antidepressants*

F. Sjöqvist (Huddinge, Sweden)
*Towards optimal use of tricyclic
antidepressant drugs: the new
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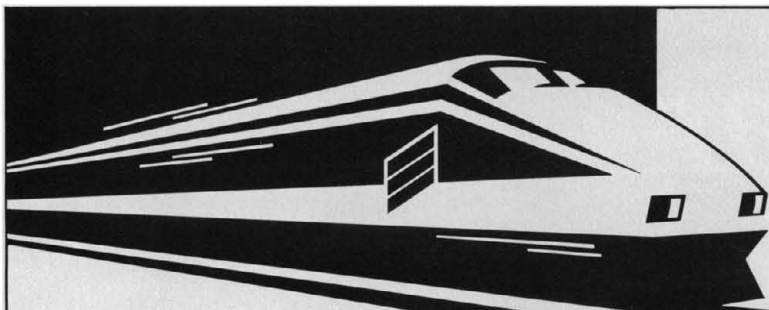
P. Greengard (New York, NY)
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E. Costa (Washington, DC)
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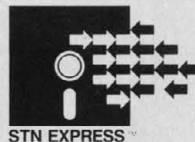
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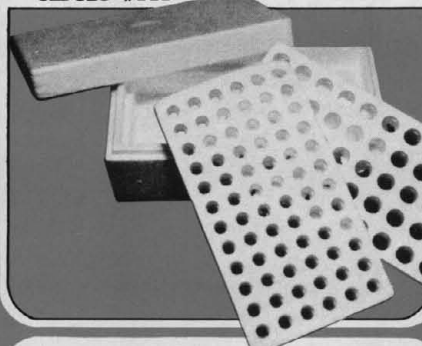
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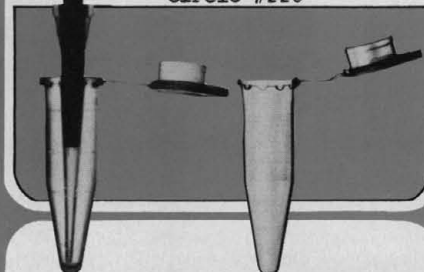
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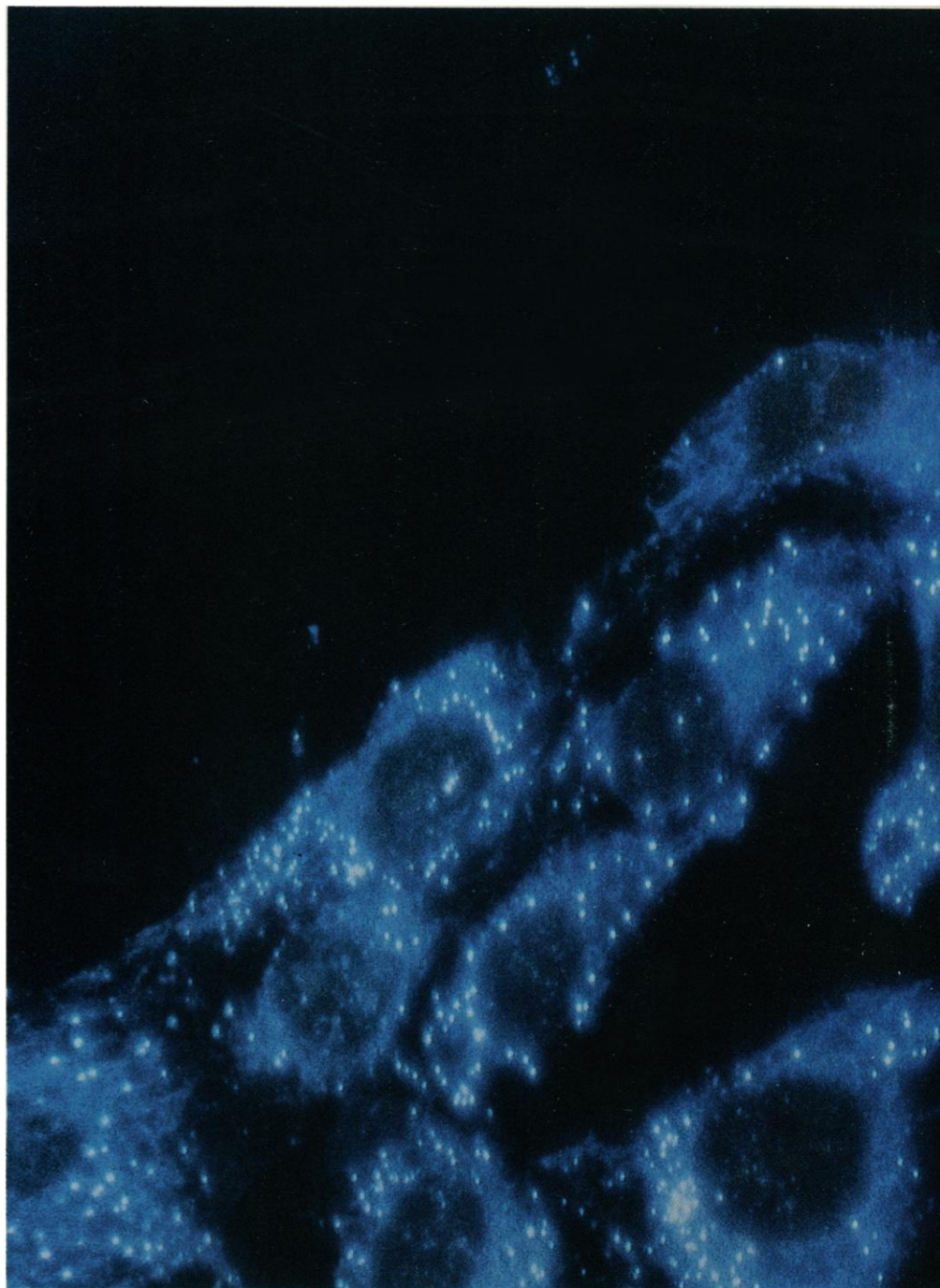
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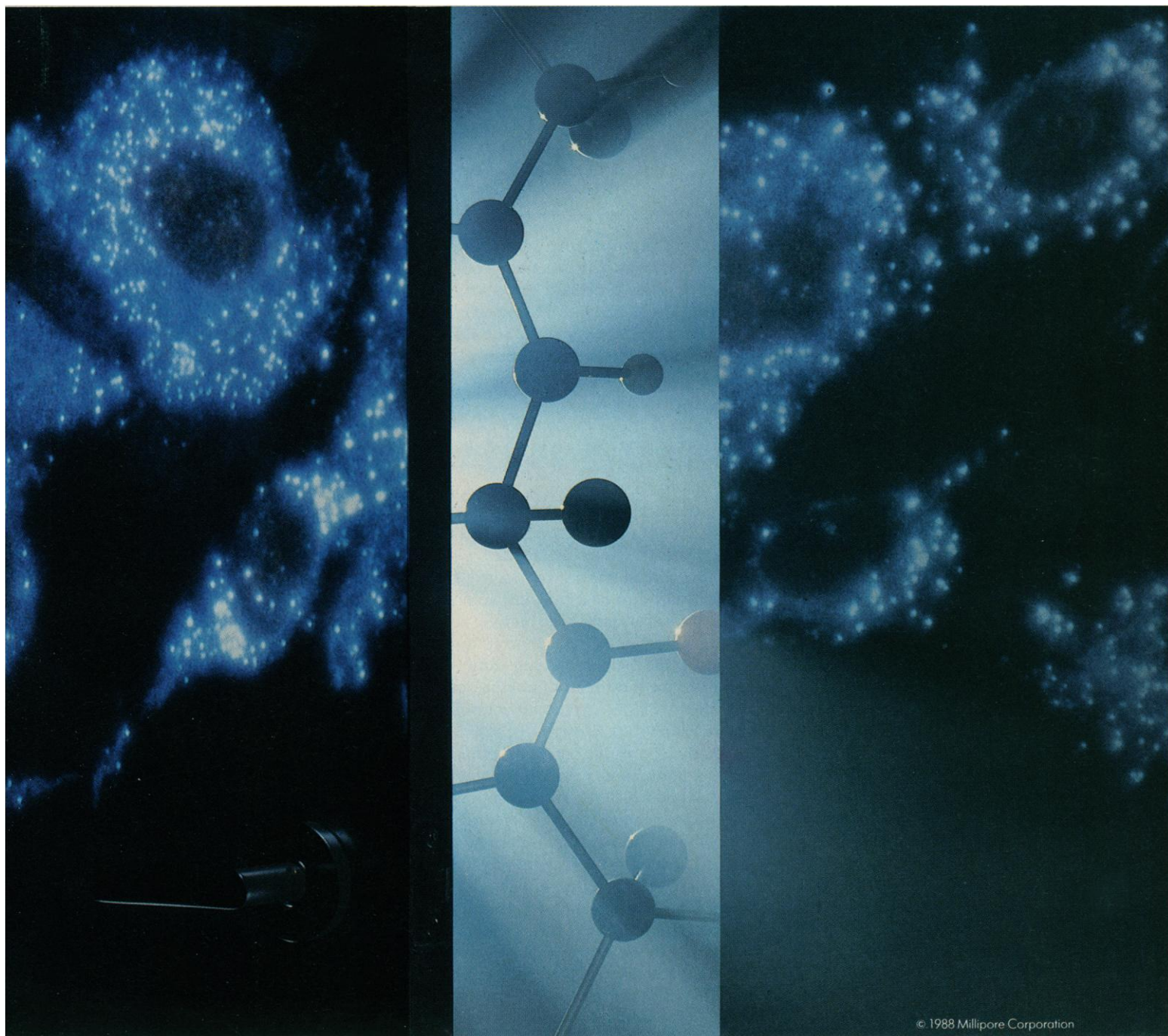
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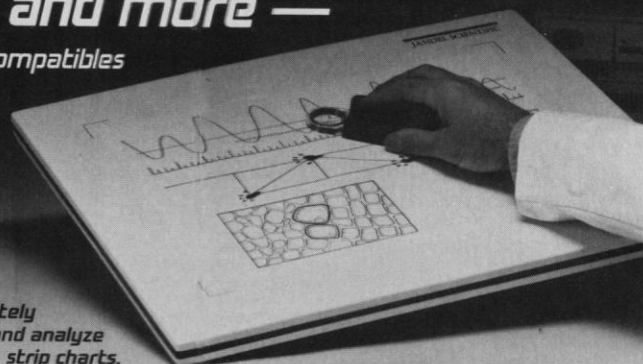
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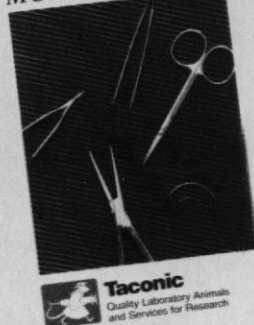
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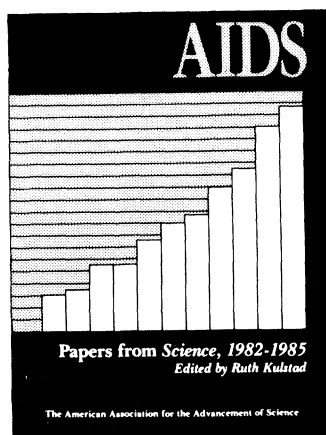
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