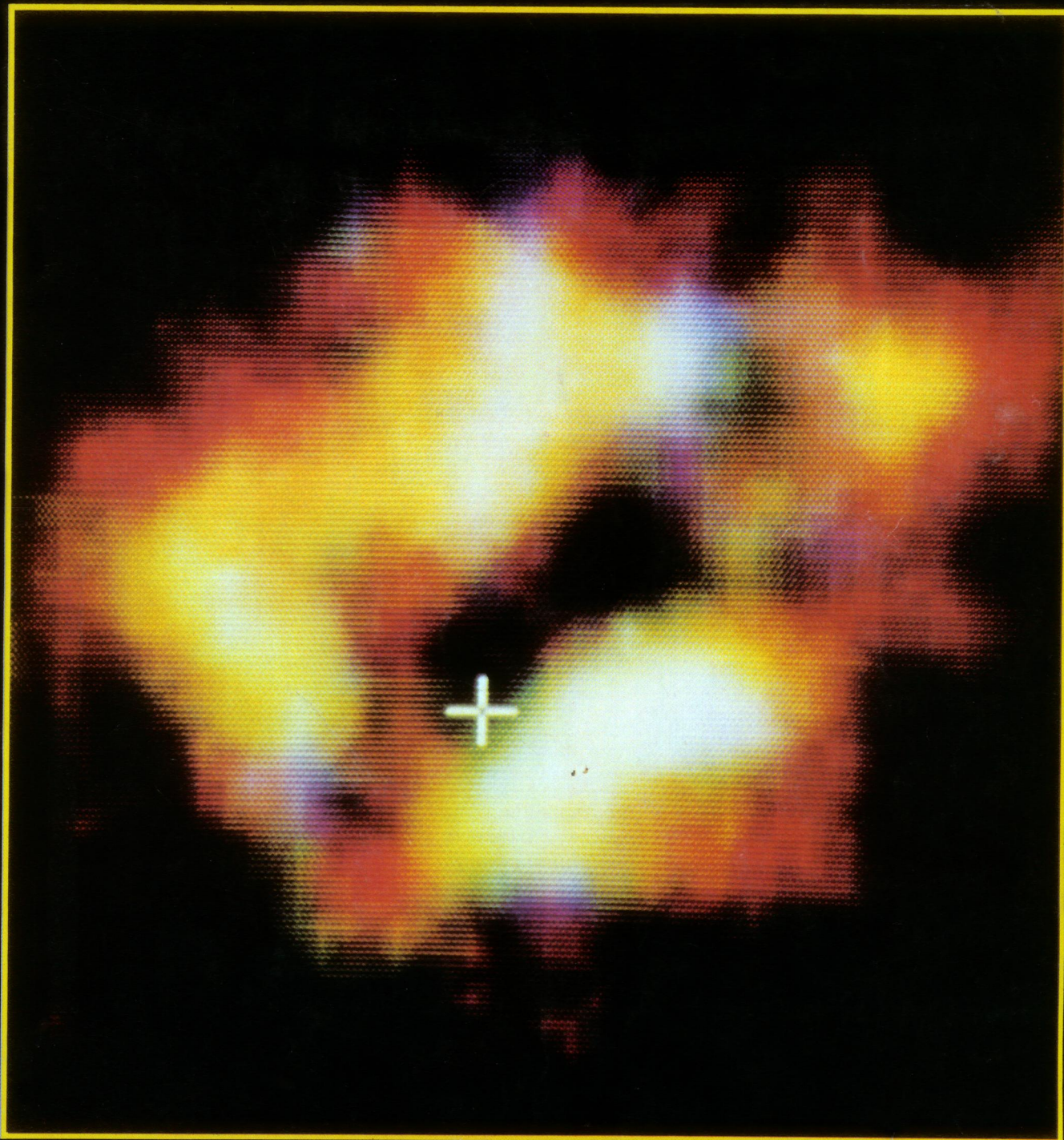


25 May 1984 • Vol. 224 • No. 4651

\$2.50

SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE





New TL-100 THE IDEAL ULTRACENTRIFUGE FOR SMALL SAMPLES.

The TL-100 Tabletop Ultracentrifuge is another first from Beckman. This 100,000 rpm instrument generates forces to 436,000 *g*, yet takes up no more lab space than a spectrophotometer!

It uses a solid-state, thermoelectric refrigeration system to achieve operating temperatures as low as 2°C.

Five different rotors hold microtubes from 0.2 mL to 2.2-mL. Fixed angle, swinging bucket and vertical tube rotors make the TL-100 ideal for a

broad range of ultracentrifuge applications such as gradient separations, isolation of plasmid DNA, molecular weight determinations and binding studies. For virtually any application that uses small sample volumes, the TL-100 is your best choice.

Microprocessor control keeps operation simple. Ten program memories let you repeat runs easily. Direct, brushless induction drive gets rotors to speed fast and has few wear points, so maintenance costs are minimized.

The TL-100 has ten acceleration and deceleration rates, so

you can achieve a gentle start and stop to protect shallow gradients. You can even connect your TL-100 to a personal computer for state-of-the-art lab management.

All this and more in an ultracentrifuge that fits on a standard 24-inch laboratory benchtop! For complete details, write to: Beckman Instruments, Inc., 1050 Page Mill Road, Palo Alto, CA 94304; or Beckman Instruments International, S.A., P.O. Box 76, 1211 Geneva 6, Switzerland.



BECKMAN

Circle No. 148 on Readers' Service Card



Let the NEN advantage in molecular biology work for you.

The NEN advantage is the superior performance you get from products at the forefront of biotechnology. In molecular biology especially we offer a variety of innovative products in response to your specific needs. Here are three examples.

Pretested research systems—

We offer three new systems: C-Tailing and Cloning, Southern Cross/Restriction Mapping, and Wheat Germ Translation. That makes 16 systems pioneered by NEN to bring convenience and reproducibility to molecular biology studies.

Autoradiography Enhancers—

We continue to lead the industry with EN³HANCE™ and ENLIGHTNING™, the enhancers that drastically reduce processing time.

³⁵S-Nucleotides

Perhaps the best example of our commitment to biotechnology is our ³⁵S-nucleotides, pioneered by NEN as a superior alternative to the conventional use of ³²P.

The technical and safety advantages of using ³⁵S are widely recognized, and we are collaborating with the research community to develop further applications.

Let the NEN advantage work for you. Ask your NEN Technical Representative to give you more information about these and our other problem-solving products for molecular biology.

 **New England Nuclear®**



New England Nuclear, 549 Albany St., Boston, MA 02118, Toll-Free 800-225-1572, In Mass. and International 617-482-9595, Telex: 94-0996
Europe: NEN Chemicals GmbH, D-6072 Dreieich, W. Germany, Postfach 401240, Tel: (06103) 803-0, Order Entry: (06103) 803113 Telex: 4-17993 NEN D
DuPont Canada (NEN Products): 2453 46th Avenue, Lachine, Quebec H8T 3C9, Tel: 514-636-4971, Telex: 05-821808 © 1984 NEN

Circle No. 266 on Readers' Service Card

LETTERS	The New Refuseniks: <i>C. Anfinsen et al.</i> ; Plutonium Policy: <i>R. L. Ottinger</i> ; Field Access: <i>I. L. Horowitz</i> ; <i>K. Prewitt</i>	794
EDITORIAL	Defense R&D Priorities.....	821
ARTICLES	The Formation of Stellar Systems from Interstellar Molecular Clouds: <i>R. D. Gehrz, D. C. Black, P. M. Solomon</i>	823
	Cyclic AMP Receptor Protein: Role in Transcription Activation: <i>B. de Crombrughe, S. Bushy, H. Buc</i>	831
	Light-Regulated Expression of a Pea Ribulose-1,5-Bisphosphate Carboxylase Small Subunit Gene in Transformed Plant Cells: <i>R. Broglie et al.</i>	838
	Expression Cloning of Human EGF Receptor Complementary DNA: Gene Amplification and Three Related Messenger RNA Products in A431 Cells: <i>C. R. Lin et al.</i>	843
NEWS AND COMMENT	Tentative Agent Orange Settlement Reached.....	849
	Can Fish Quota Save the Whales?.....	850
	EPA Regulators Take on the Delaney Clause.....	851
	New Directions for TVA?.....	852
	Judge Says Atom Tests Caused Cancer.....	853
	<i>Briefing:</i> House Committee Bars Plutonium Transfers; Medical School Dean Chosen to Head FDA: A "Death Knell" for Acid Rain Bill in 1984; Sakharov Hunger Strike Casts Doubt on NAS Plans; Obsolete Equipment; White House Enters Fray on DNA Regulation.....	854
	NAS Elects New Members.....	856
RESEARCH NEWS	Nuclear Squeeze at Lawrence Berkeley Lab.....	857
	An Impact but No Volcano.....	858
	More Progress on the T Cell Receptor.....	859
	Man the Scavenger.....	861

BOARD OF DIRECTORS

E. MARGARET BURBIDGE Retiring President, Chairman	ANNA J. HARRISON President	DAVID A. HAMBURG President-Elect	ROBERT W. BERLINER LAWRENCE BOGORAD	NANCIE L. GONZALEZ WALTER E. MASSEY
--	-------------------------------	-------------------------------------	--	--

CHAIRMEN AND SECRETARIES OF AAAS SECTIONS

MATHEMATICS (A) Lipman Bers Lynn Arthur Steen	PHYSICS (B) James A. Krumhansl Rolf M. Sinclair	CHEMISTRY (C) Murray Goodman William L. Jolly	ASTRONOMY (D) Paul W. Hodge Donat G. Wentzel
PSYCHOLOGY (J) Janet T. Spence Bert F. Green	SOCIAL, ECONOMIC, AND POLITICAL SCIENCES (K) Kenneth J. Arrow David L. Sills	HISTORY AND PHILOSOPHY OF SCIENCE (L) Daniel J. Kevles David L. Hull	ENGINEERING (M) Eric A. Walker W. Edward Lear
EDUCATION (Q) Hans O. Andersen Roger G. Olstad	DENTISTRY (R) Erling Johansen Harold M. Fullmer	PHARMACEUTICAL SCIENCES (S) Stanley A. Kaplan David A. Knapp	INFORMATION, COMPUTING, AND COMMUNICATION Robert Lee Chartrand Madeline M. Henderson

DIVISIONS

ARCTIC DIVISION		PACIFIC DIVISION		SOUTHWESTERN AND ROCKY MOUNTAIN DIVISION	
John Davies President	Gunter E. Weller Executive Secretary	Barbara Wright President	Alan E. Leviton Executive Director	Charles E. Holley, Jr. President	M. Michelle Baer Executive Director

SCIENCE is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Second-class postage (publication No. 484460) paid at Washington, D.C., and at an additional entry. Now combined with **The Scientific Monthly**. Copyright © 1984 by the American Association for the Advancement of Science. Domestic individual membership and subscription (51 issues): \$56. Domestic institutional subscription (51 issues): \$93. Foreign postage extra: Canada \$24, other (surface mail) \$27, air-surface via Amsterdam \$65. First class, airmail, school-year, and student rates on request. Single copies \$2.50 (\$3 by mail); back issues \$3 (\$3.50 by mail); Biotechnology issue, \$5 (\$5.50 by mail); classroom rates on request. **Change of address:** allow 6 weeks, giving old and new addresses and seven-digit account number. Authorization to photocopy material for internal or personal use under circumstances not falling within the fair use provisions of the Copyright Act is granted by AAAS to libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$1 per copy plus \$0.10 per page is paid directly to CCC, 21 Congress Street, Salem, Massachusetts 01970. The identification code for *Science* is 0036-8075/83 \$1 + .10. **Postmaster:** Send Form 3579 to *Science*, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

BOOK REVIEWS	The Very Early Universe, reviewed by A. P. Lightman; Lakes of the Warm Belt and Lake Chad, J. M. Melack; Springs of Scientific Creativity, R. G. Olson; The Deer Wars, A. R. E. Sinclair; Books Received	863
REPORTS	Mineralogic Evidence for an Impact Event at the Cretaceous-Tertiary Boundary: B. F. Bohor et al.	867
	Seismic Potential Revealed by Surface Folding: 1983 Coalinga, California, Earthquake: R. S. Stein and G. C. P. King	869
	Chondrites: A Trace Fossil Indicator of Anoxia in Sediments: R. G. Bromley and A. A. Ekdale	872
	Inhibition of Plant Microtubule Polymerization in vitro by the Phosphoric Amide Herbicide Amiprophos-Methyl: L. C. Morejohn and D. E. Fosket	874
	Estrogen Receptor Analysis by Flow Cytometry: N. T. Van et al.	876
	Vitamin D ₃ -Resistant Fibroblasts Have Immunoassayable 1,25-Dihydroxyvitamin D ₃ Receptors: J. W. Pike et al.	879
	The Structural Gene for Tetanus Neurotoxin Is on a Plasmid: C. W. Finn, Jr., et al.	881
	Reactive Metabolites from the Bioactivation of Toxic Methylfurans: V. Ravindranath, L. T. Burka, M. R. Boyd	884
	Synthesis of Compounds with Properties of Leukotrienes C ₄ and D ₄ in Gerbil Brains After Ischemia and Reperfusion: M. A. Moskowitz et al.	886
	Synthetic Competitive Antagonists of Corticotropin-Releasing Factor: Effect on ACTH Secretion in the Rat: J. Rivier, C. Rivier, W. Vale	889
	Genetic Influences in Criminal Convictions: Evidence from an Adoption Cohort: S. A. Mednick, W. F. Gabrielli, Jr., B. Hutchings	891
	Directional Specificity in the Regeneration of Lamprey Spinal Axons: H. S. Yin, S. A. Mackler, M. E. Selzer	894
	Prenatal Alcohol Exposure Alters Adult Expression of Sexually Dimorphic Behavior in the Rat: R. F. McGivern et al.	896
	Vasoactive Intestinal Polypeptide-Like Substance: The Potential Transmitter for Cerebral Vasodilation: T. J-F. Lee, A. Saito, I. Berezin	898
	Forebrain Lesions Disrupt Development But Not Maintenance of Song in Passerine Birds: S. W. Bottjer, E. A. Miesner, A. P. Arnold	901
	Decreased Oxidation of Labeled Glucose by Dissociated Brain Cells in the Presence of Fetal Bovine Serum: J. T. Tildon and J. H. Stevenson	903
	Technical Comments: Atmospheric Dispersion of Pesticide Vapors: Analytical Methods Questioned: B. B. Hicks et al.; D. D. Reible; D. E. Glatfelter, A. W. Taylor, W. H. Zoller	905

HY NELKIN
SAWYER

SHEILA E. WIDNALL
HARRIET ZUCKERMAN

WILLIAM T. GOLDEN
Treasurer

WILLIAM D. CAREY
Executive Officer

PHY AND GEOGRAPHY (E)
Merriam
as Dutro, Jr.

IL SCIENCES (N)
Kretschmer
n E. Rhoads

TICS (U)
E. Moses
J. Wegman

BIOLOGICAL SCIENCES (G)
Charlotte P. Mangum
Walter Chavin

AGRICULTURE (O)
Leo M. Walsh
Coyt T. Wilson

ATMOSPHERIC AND HYDROSPHERIC (W)
Hans A. Panofsky
Bernice Ackerman

ANTHROPOLOGY (H)
Richard A. Gould
Priscilla Reining

INDUSTRIAL SCIENCE (P)
Nat C. Robertson
Robert L. Stern

GENERAL (X)
Lora M. Shields
Rodney W. Nichols

COVER

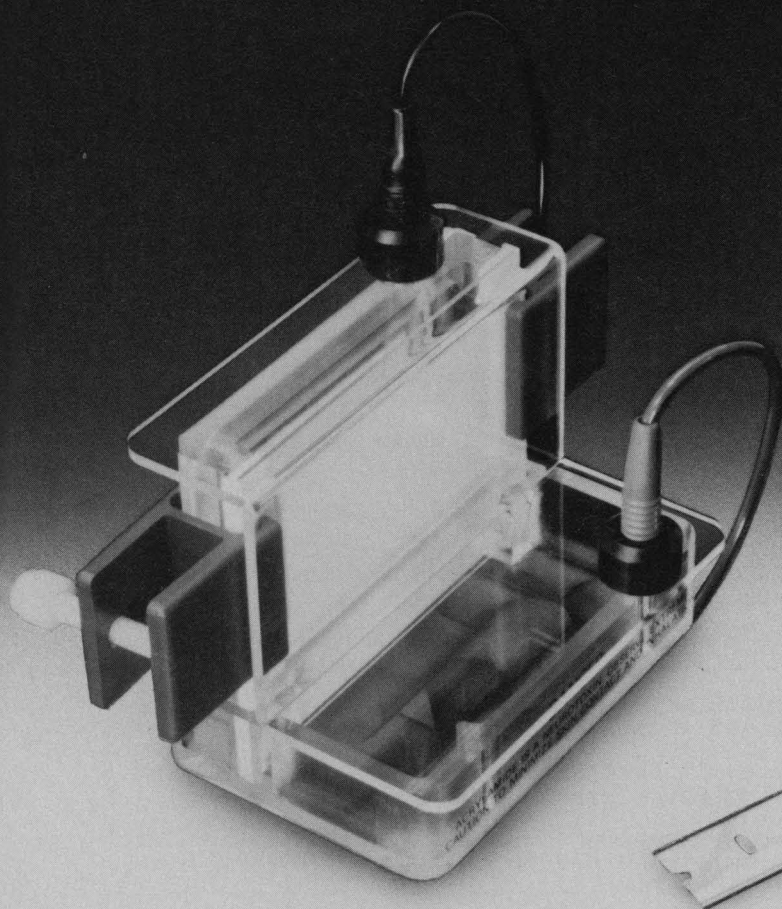
False color infrared image produced by displaying 5-, 10-, and 20-micrometer images on the blue, green, and red guns of a cathode-ray tube showing a newborn star in the core of the W3 Molecular Cloud. The shell-like structure is produced as a luminous young central star, visible at 2 (white star), and dissipates its protostellar cocoon through radiation and stellar wind pressure. The dark central hole indicates a low-density region swept clean by the stellar wind; reddening around the outside of the shell indicates cooler outlying dust grains. The region is invisible to optical telescopes. (North is at the top; east is to the left.) See page 823 [R. D. Gehrz, G. L. Grasdale, and J. A. Hackwell, Wyoming Infrared Observatory]

American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to foster scientific freedom and responsibility, to promote the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.

The Hoefer "Mighty Small" Is Mighty Fast!

A Slab Gel Electrophoresis unit
you can hold
in the palm of your hand.

Gives you excellent
resolution in thirty minutes.



The secret is the gel sandwich:

- One side, a glass lantern slide 3.25 x 4 inches.
- The other side, a notched alumina plate fitted against the upper buffer pod for even heat distribution.
- Between the two, unique T-shaped spacers for exact, effortless alignment.

Assembly is quick and easy.

The sandwich is held in place with two safe polypropylene clamps.

Run the unit for as little as thirty minutes to produce gels with flat, side by side sample lanes. **No Smile!**

An accessory multiple gel caster enables you to cast 10 gels at a time, single concentration or gradient. You can pour a week's supply of gels and store in the refrigerator.

Like every Hoefer product, the Mighty Small is designed to be safe. Ideal for the research laboratory and the classroom.

For more information on the **Hoefer Mighty Small** or a copy of our new **83-84 catalog** write or **phone:**

In Calif.: 415-282-2307

Outside Calif.: **800-227-4750**

Outside USA: **TELEX 470778**

**HOEFER
SCIENTIFIC
INSTRUMENTS**

P.O. Box 77387

San Francisco, California 94107 USA

molecularware™

...from CAPPEL and WORTHINGTON



CAPPEL

Affinity Purified Antibodies —
F(ab')₂ Fragments; Conjugated
to: Fluorescein, Rhodamine,
Rhodamine X, Texas Red™,
Peroxidase, Alkaline
Phosphatase, and Biotin.



WORTHINGTON

Research Enzymes —
Deoxyribonuclease I & II, DNA
Polymerases, Exonuclease III,
Micrococcal Nuclease,
Nuclease S, Phosphatase,
Phosphodiesterase,
Polynucleotide Kinase and
Ligase, Ribonuclease A & T₁, RNA
Polymerases, Terminal
Transferase, Restriction Enzymes.



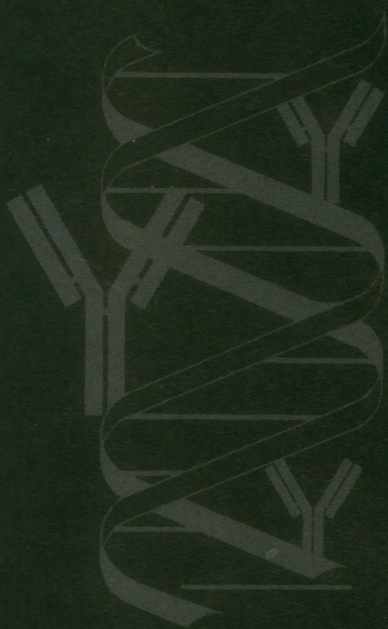
CAPPEL

Monoclonal Antibodies —
to: Human Immunoglobulins,
Platelets, HLA Antigens, β -hCG,
 α_1 -Antitrypsin, Factor VIII Related
Antigen, Herpes I & Herpes II,
Prothrombin, Mouse
Immunoglobulins.



WORTHINGTON

Nucleic Acids —
Deoxyribonucleic Acids,
Ribonucleic Acids, Cloning
Vectors, Linkers, Converters, M-13
Sequencing Primer.



Molecularware, from Cappel and Worthington — tools for molecular level research... for fluorescent and enzyme immunoassay, for recombinant DNA modification, tissue dissociation, protein structure studies, cell surface research... and more.

CooperBiomedical, a trusted name that stands for high quality products and fast reliable service is committed to the development of improved methods for the genetic engineer and molecular biologist. Through Cappel and Worthington products, CooperBiomedical is able to provide strong technical support, informative publications, complete customer service and a full range of molecular tools for research.

Molecularware, from Cappel and Worthington, tools for molecular research... For more information call Technical Service toll-free 800/523-7620.

COOPERBiomedical

Scientific Division

CooperBiomedical, Inc.

One Technology Court

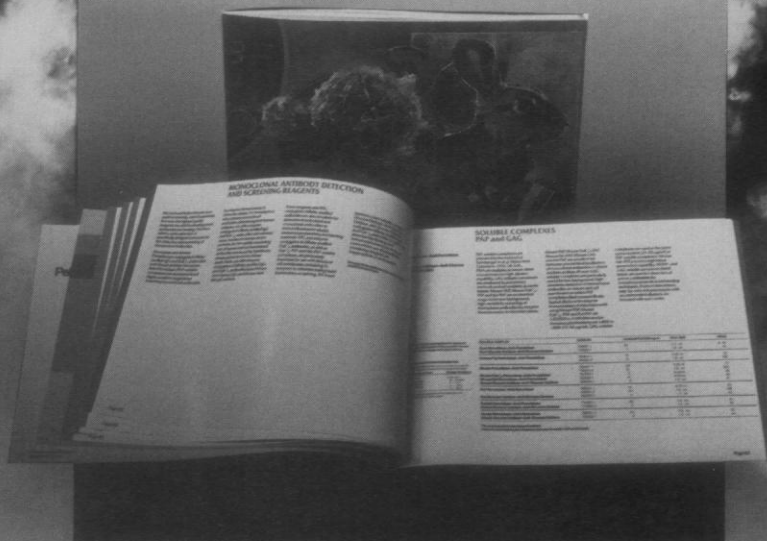
Malvern, PA 19355 Telex: 831937

Molecularware is a Trademark of CooperBiomedical
Texas Red is a Trademark of Molecular Probes

Circle No. 215 on Readers' Service Card

Frontiers in Biomedical Research Has Arrived!

Announcing an exciting publishing event
in the field of biomedical research.



A new catalog that's much more than a catalog from Pel-Freez.

The future is arriving at break-neck speed. Cell fusion, genetic engineering, molecular biology are expanding the frontiers of biomedical research at an exponential rate.

For over thirty years, we at Pel-Freez have shared a commitment to the future with biomedical researchers across the country. That's why we are extremely proud to announce the publication of our new catalog—*Frontiers in Biomedical Research*.

Exciting, unique format—easy to read, easy to use.

To meet the challenge of the future, you often need more than just a listing of products. You need a product's origin or species, processing technique and even in some cases, how to use it most effectively. You get all this in *Frontiers in Biomedical Research*—and all at your fingertips. No more cross-referencing or time-consuming phone calls.

Over 2,000 important products for today's researcher.

Frontiers in Biomedical Research contains comprehensive, up-to-date information on monoclonal antibodies, affinity-purified antibodies including soluble complexes and mouse-host antisera, custom antisera service, purified proteins, rabbit complement and HLA products, and animal bloods and tissues.

Pel-Freez makes major commitments to immunology.

Our job is to deliver the products and up-to-the-minute information you need to do your job. *Frontiers in Biomedical Research* contains a significant number of new products representing additional major commitments to the field of immunology: a complete line of monoclonal antibody detection and screening agents, PAP and GAG soluble complexes and an expanded line of conjugated immunochemical products. Also histocompatibility and rabbit complement products.

A resource you can count on from an established source you've come to trust.

Frontiers in Biomedical Research is not like any catalog you've ever seen or used. In the hands of a competent biomedical researcher, it is an invaluable resource that delivers a complete and current line of biomedical products.

Our thirty years of customer service have taught us a few good lessons. Convenience, consistency, reliability—they're all here in *Frontiers in Biomedical Research*.

Order your free copy today!

Why wait?

Use our toll-free number and your copy will be in the mail today.

Call 1-800-643-3426.

(In Arkansas, call collect:
1-501-636-2244.)

Pel-Freez®
BIOLOGICALS

P.O. Box 68
Rogers, AR 72756
TWX: 910-720-7849

Circle No. 237 on Readers' Service Card



WHEN THE FILTER IS THE TEST...

What is retained on the filter surface is often more critical than what passes through the filter. For those sensitive applications where the filter is the test, membrane filters must meet strict criteria such as: binding and wetting uniformity, extractables content and, in some cases, surface characteristics for efficient colony growth. Millipore offers membrane discs, sheets, and rolls that meet your requirements.

For example, Millipore Type HAHY hybridization membranes are optimized for Southern blotting. Millipore Type HATF membranes are low in toxicity for cell growth where cell viability is critical. Other Millipore membrane filters have specific binding characteristics for radioassays. The benefits of Millipore laboratory filter products have been well documented and are referenced in hundreds of technical articles in leading scientific journals.

For a copy of our Filter Selection Wall Chart and information on technical and professional articles from our computerized data-bank, contact Millipore Technical Services toll-free at **800-225-1380** (In Massachusetts, dial **617-275-9200**) or write Millipore Corporation, Bedford, MA 01730.



CHOOSE MILLIPORE MEMBRANE FILTERS



Circle No. 177 on Readers' Service Card

With the Guyed Tower step into

Exxon's engineers developed a series of innovations to turn theory into reality.

It has been called a technological breakthrough. The completed structure stands taller than the Empire State Building. It employs engineering techniques never before used in production platforms. And it will make oil and gas recovery from deep waters more economically feasible in the future.

It is the guyed tower—a new kind of drilling and production platform. And it is now operating 110 miles southeast of New Orleans in 1,000 feet of water.

The Leading Edge of Technology.

When Bob Rugeley of Exxon USA's Southeastern Production Division and his engineering team were given the assignment of putting the unique tower in place, they found themselves at the leading edge of deepwater technology. There were no precedents to guide them. Nothing like this had ever been done before.

Instead of a conventional structure that depended on brute strength to withstand Gulf hurricanes, Offshore Plat-

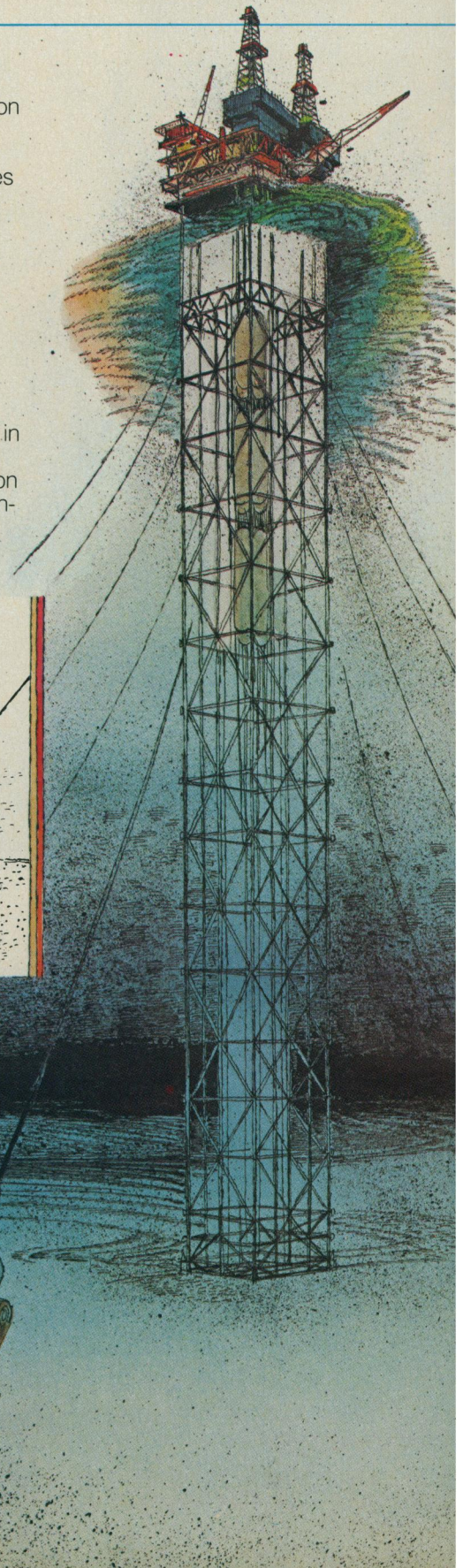
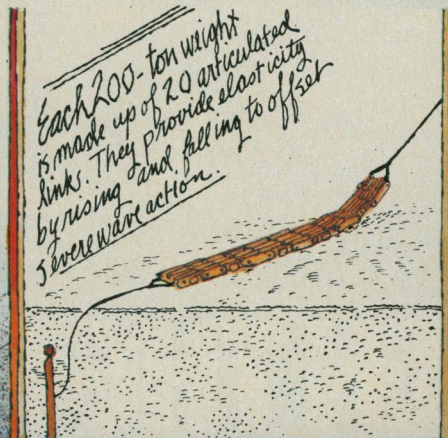
form Design engineers at Exxon USA developed a resilient tower following a concept pioneered by Exxon Production Research Company.

Such a slender shape anchored to the seabed and stabilized with guylines could make production from deep waters more economical than with a conventional platform.

Pinpoint Positioning In Deep Water.

Specially designed equipment became the norm rather than the exception.

The derrick barge that was involved in setting the tower in place was a first. Instead of cumbersome anchors, Exxon engineers opted for a dynamic positioning system using computer-controlled



Exxon takes a giant deeper water.

usters at all four corners to keep the vessel precisely on location. Specially designed equipment was needed to lower the guylines into place to the seafloor and to drive the 72-inch-diameter piles which anchor them. Twenty 3,400-foot guylines were attached to the tower, each with a designed breaking strength of almost 3 million pounds. But a full-fledged Gulf hurricane is an awesome force. Considering this, Exxon engineers developed limp weights, similar to segments in a bicycle chain and weighing 200 tons each, which are incorporated in the guylines to provide elasticity. This system keeps the deck virtually motionless most of the time. However, in a severe hurricane, it allows it to sway as much as 50 feet.

More Steel Than The Brooklyn Bridge.

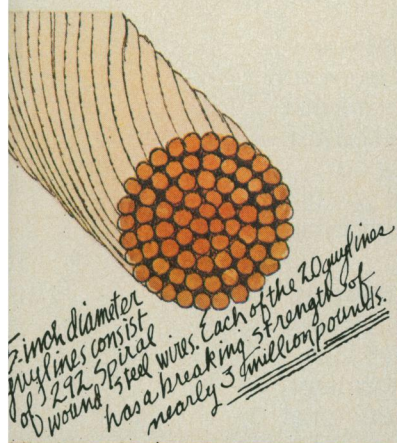
At Harbor Island, Texas, building the tower was a formidable task.

With 15 miles of welding and more steel than the Brooklyn Bridge, it became the largest offshore structure ever assembled as a single unit. Then came the problems of transportation and installation.

Exxon engineers modified a barge nearly as long as two football fields to carry the mammoth launch weight of 27,000 tons over 400 miles of open sea. Then, instead of the normal launch off the end of the barge, they had to provide for a unique side-launch—a 10-second operation that took months to prepare.

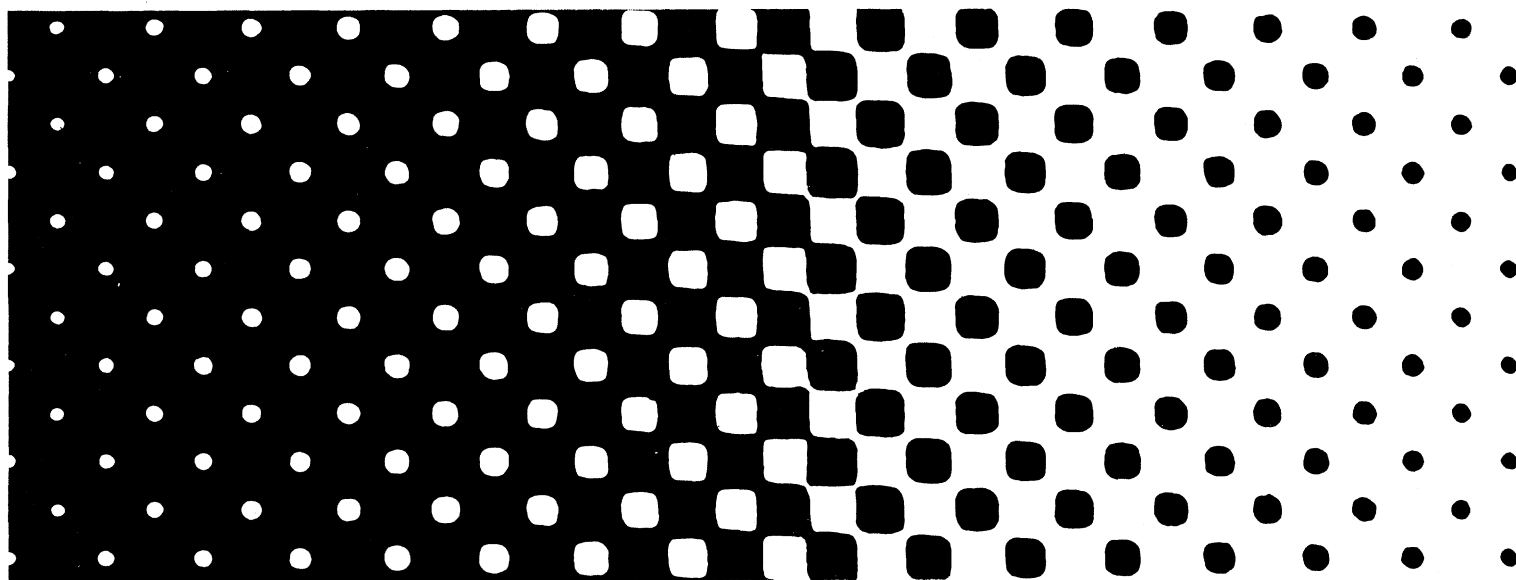
Today the job is done... the enormous structure has been placed in position and on target in 1,000 feet of Gulf water with all guylines connected. Drilling equipment has been installed, the first of 54 wells has been drilled and oil is being piped to shore.

This premier installation is far from the limit of the guyed tower's potential. Our new technology will make it more practical to recover oil in waters as deep as 2,000 feet or more in the years to come.



Bob Rugerley and his team successfully placed the tower within 5 ft of its intended target on the seafloor.





Why BMB reverse transcriptase will reverse your thinking.

If working with reverse transcriptase has been a series of reverses for you, maybe you've been depending on an undependable source. BMB has four good reasons why we should be your source for reverse transcriptase (AMV):

Purity. You get only the enzyme reaction you want, because BMB reverse transcriptase is stringently tested to assure its freedom from DNase and RNase.

Reliability. You get the results you expect. BMB reverse transcriptase is tested for full-copy cDNA synthesis with globin mRNA.

Activity. You get the reaction kinetics you need, because BMB reverse transcriptase activity is defined in units you can depend on (incorporation of 1 nmol dTMP in 10 minutes).

Service. You get the materials you want and the help you want *when* you want them, because BMB knows that the quality of our service can be just as important as the quality of our products. When we promise you quality biochemicals, helpful service, and fast delivery—we deliver.

For further information on this new preparation of reverse transcriptase, call BMB toll-free at 800-428-5433.

Our Technical Services Department will be happy to send you additional information and answer all your questions. And if you don't yet have a copy of our 1984/85 biochemicals catalog, we'll be glad to send you one.

BMB...committed to your growing needs in biotechnology.

Boehringer Mannheim Biochemicals

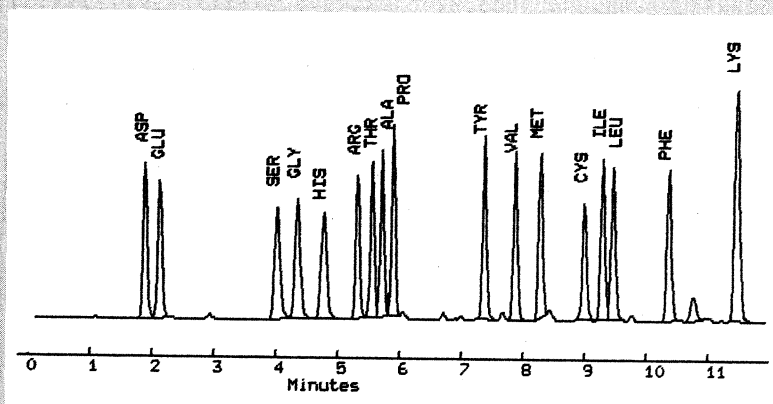
7941 Castleway Drive
P.O. Box 50816
Indianapolis, IN 46250
Tel: 317-849-9350

800-428-5433 toll-free



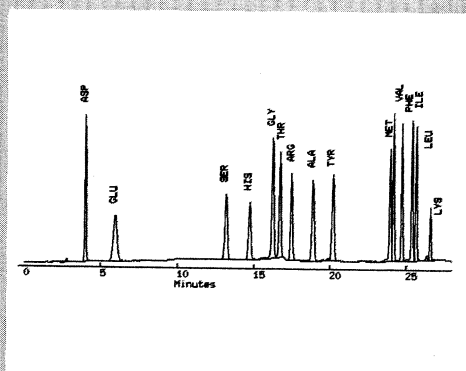
Waters™ HPLC Systems for Amino Acid Analysis.

Now analyze primary and secondary amino acids with one picomole sensitivity.

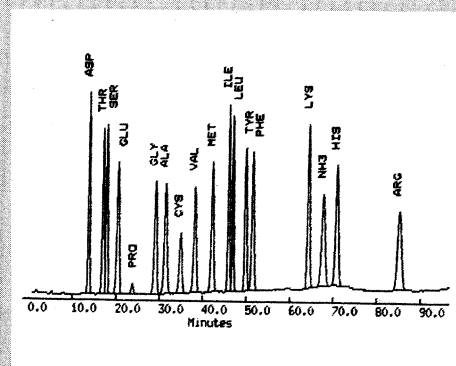


Introducing Waters high-speed PICO-TAG™ method. This innovative pre-column derivatization method is pre-packaged for guaranteed results. In 15 minutes, you can run a complete compositional analysis from as little as 100 nanograms of protein, with a detection limit of one picomole. Waters provides the complete methodology, plus reagents, buffers, column, Waters HPLC System and PICO-TAG Work Station.

With Waters Systems, choose the method that best meets your needs.



Waters AUTO-TAG™ OPA fully automated derivatization method. This exclusive method offers fully automated pre-column derivatization, separation and data reduction for high sensitivity analysis of primary amino acids. Perfect for process monitoring of amino acids in fermentation broths and cell cultures.



Classical Ion Exchange method with better quantitation. Waters improves this high resolution method with raw chromatographic data storage and re-integration capability for better quantitation, and full documentation of method, chromatography and integration.

More than offering just a choice of methodologies, Waters helps you get results.

For more information, contact Waters Life Science Dept., 34 Maple Street, Milford, MA 01757, 617-478-2000 (X 2665).

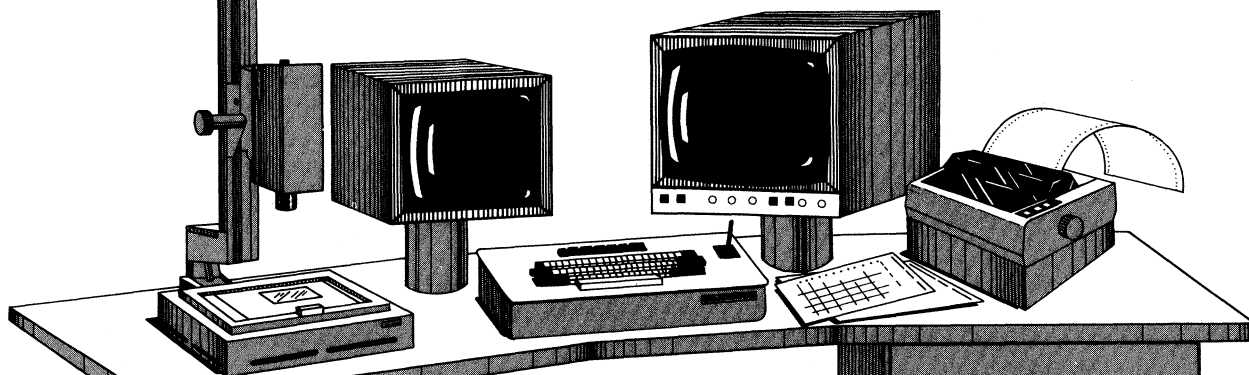
MILLIPORE
Waters Products Division

See us at A.S.B.C., St. Louis—Booth J 24-32.

Circle No. 242 on Readers' Service Card



BIOMEDICAL IMAGE ANALYSIS



New Complete Application Software for:

- Cell Counting and Sizing
- Area and Density Statistics
- Image Comparison
- Calibration of Size and Brightness



For more information call or write:

LogE/Spatial Data Systems Inc.

Box 978, 420 South Fairview Avenue, Goleta, California 93116 Tel: (805) 967-2383 • Telex: 658336 LogE Goleta

HARDWARE FEATURES:

- Resolution 640 x 480 x 9-bits
- Color Display Option
- Real-Time Processing Option
- Film or Microscope Image Input

Circle No. 209 on Readers' Service Card



SciCalc™ - A Revolutionary Software Tool for the Laboratory Sciences

Introducing **SciCalc™**, a computer program that does for laboratory science what the word processor did for writing and the electronic spreadsheet did for business planning.

Features include:

- Propagation of error through all calculations
- Convenient and general (linear and non-linear) least squares
- Data entry
- Plotting
- Data storage
- On-line help
- Data reduction
- Convenient macros

Available for: IBM PC and all compatibles (MS-DOS) \$495
 Apple DOS \$495
 DEC VAX/VMS \$1500

SciCalc™
 is only available from:

BioComp, Inc.
 P.O. Box 35235
 Los Angeles, CA 90035
 (213) 652-9087

Name _____
 Institution _____ Phone _____
 Street _____
 City _____ State _____ Zip _____

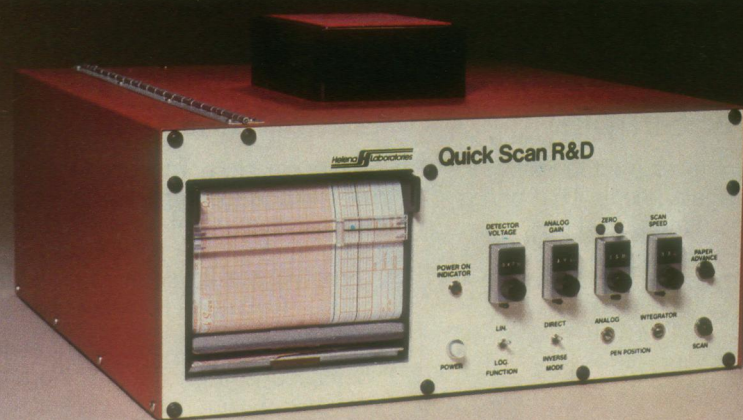
☐ **My check/P.O. is enclosed**
 (Add \$5 handling & Calif. tax if applicable)

☐ **Please send more information**

SV1.84

THE ONLY UNRESTRICTED DENSITOMETER

Quick Scan R&D



The densitometer needs of the researcher and the clinician are sometimes light years apart. Why should you compromise your work because most available densitometers are too restricted? Look at the truly unrestricted densitometer, the Quick Scan R&D, designed with your needs in mind.

HELENA LABORATORIES

CAT. 1023

HELENA LABORATORIES

Quick Scan

Quick Scan

- **Resolution** — Excellent resolution using the tungsten and mercury-converter light sources. Eliminates background noise so common with lasers and many low energy scanners.

- **Wavelength range** — Scans throughout the visible spectrum, and at 254 nm, 280 nm and 366 nm. Optional modifications at other UV settings. Not limited to a single wavelength.

- **Interchangeable scanning modes** — Scans by visible transmission or reflectance, fluorescence reflectance and ultraviolet absorption. Designed on a modular basis, all components of the optics system

can be quickly and easily interchanged.

- **Ethyidium bromide stains** — The only commercially available densitometer capable of the direct fluorescence quantitation required for DNA studies. A modification of the standard optics provides excellent results.

- **Focusing optics** — Permits you to make adjustments dependent upon the thickness of the gel being scanned; increases resolution.

- **Variable detector voltage** — Allows adjustment of the sensitivity of the photomultiplier tube for precise

scanning even with high intensity backgrounds.

- **Variable scan speed** — Adjustable from 0 to 1.5 cm/sec, this provides optimal resolution of small, tightly packed peaks, and the built-in integrator allows for simplified pattern quantitation.

- **Independent offset zero and gain** — Allows expansion of small peaks for accurate and reproducible quantitation and better pattern visualization.

Helena Laboratories
1530 Lindbergh Drive P.O. Box 752
Beaumont, Texas 77704-0752

To see just how unrestricted the Quick Scan R&D really is, call John Tessier or Kerry Franks today to arrange for an in-lab demonstration. Call toll free 800-231-5663. In Texas call 800-392-3126. In Hawaii, Alaska and Puerto Rico call 800-231-4678.

HELENA HAS THE ANSWERS

Circle No. 219 on Readers' Service Card

INTRODUCING

Centricon™

THE INGENUOUS NEW DISPOSABLE
MICROCONCENTRATOR

1. Fast

Pipette your 1-2ml sample into the top reservoir and spin in a centrifuge. That concentrates the sample down to 25-40 μ l in less than one hour—with no danger of spinning to dryness.

2. Simple

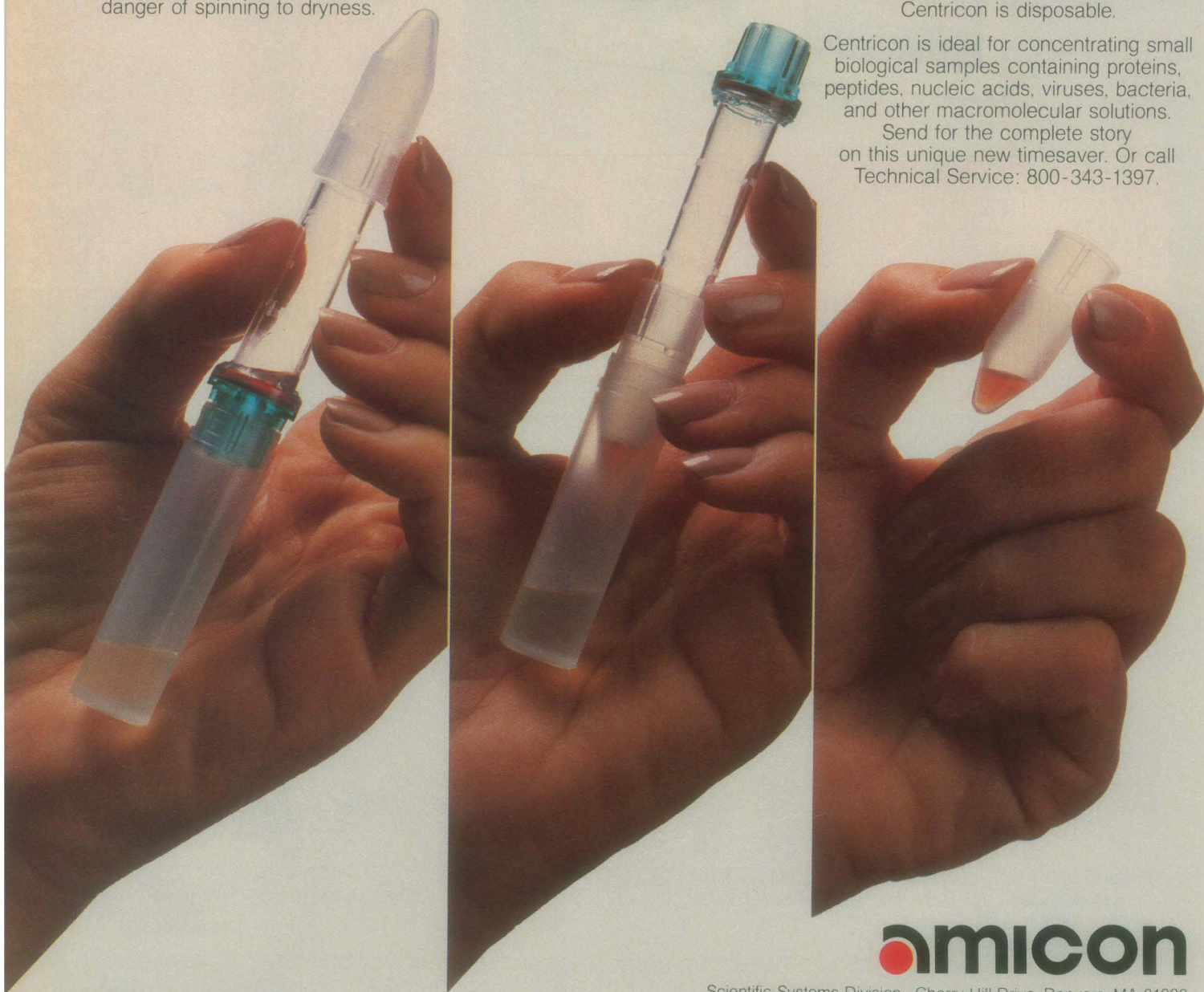
Then invert the top half and spin again briefly. That brings your retentate out where you want it—perfectly accessible in the cone-shaped cup.

3. Efficient

You get high recovery. Desalting or buffer exchange is performed in the same Centricon simultaneously with concentration. And all with no special equipment, no awkward procedures, no cleanup. Centricon is disposable.

Centricon is ideal for concentrating small biological samples containing proteins, peptides, nucleic acids, viruses, bacteria, and other macromolecular solutions.

Send for the complete story on this unique new timesaver. Or call Technical Service: 800-343-1397.



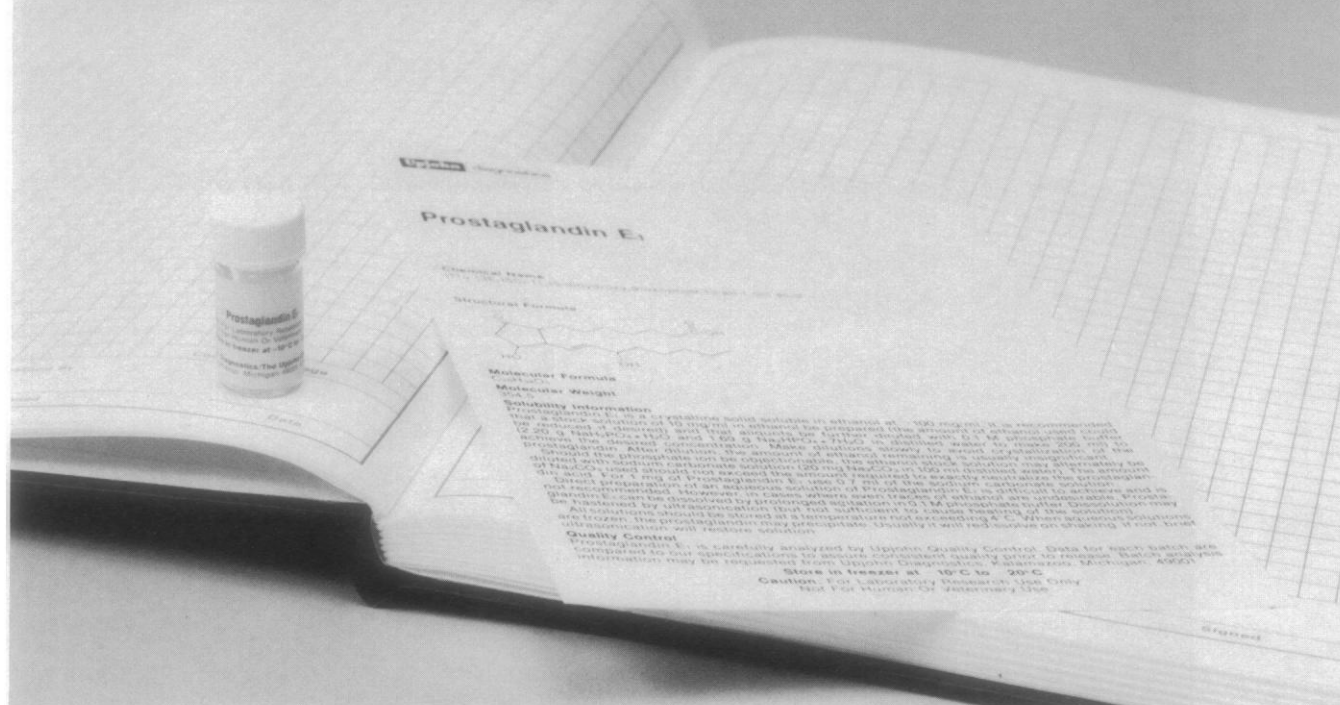
Patent Pending

amicon

Scientific Systems Division Cherry Hill Drive, Danvers, MA 01923
To order call: 800-343-0696 (In MA and international: 617-777-4550)

Visit Amicon at ASBC Booth K1-K5
Circle No. 216 on Readers' Service Card

Quality research demands quality prostaglandins



For results you can trust, trust your research to quality Upjohn Diagnostics' prostaglandins

Upjohn Diagnostics, research pioneer and leading manufacturer of quality prostaglandins, offers dependably pure prostaglandins that scores of researchers worldwide have come to trust in critical investi-

gations. In fact, Upjohn Diagnostics' prostaglandins were used by 1982 Nobel Prize winners in Physiology and Medicine.

And now, Upjohn Diagnostics has added seven new compounds to its already comprehensive line. You now have eighteen quality Upjohn Diag-

nostics' prostaglandins to choose from . . . the most extensive choice from a single manufacturer.

Add a new pricing structure, and you have even more reason for selecting Upjohn Diagnostics' prostaglandins . . . because using the very best doesn't have to cost more.

Upjohn Diagnostics' Quality Prostaglandins

Description	Cost/10 mg	Description	Cost/10 mg
PGA ₁	\$135	13,14-diH-15-keto-PGF ₂ α . . .	200
PGA ₂	135	9,11-dideoxy-9 α,11 α-epoxymethane-PGF ₂ α . . .	200
PGB ₁	135	9,11-dideoxy-11 α,9 α-epoxymethane-PGF ₂ α . . .	400
PGB ₂	135	16,16-dimethyl-PGE ₂	200
PGD ₂	200	6,15-diketo-13,14-dihydro-PGF ₁ α	200
PGE ₁	135	Thromboxane B ₂	400
PGE ₂	135	Thromboxane B ₂ Antiserum (100 tube vial)	40
PGF ₁ α	135		
PGF ₂ α Tromethamine	135		
PGI ₂ (Prostacyclin) Na Salt	400		
6-keto PGF ₁ α	200		
13,14-diH-15-keto-PGE ₂	200		

Free Reprint Available

A comprehensive 15-page report — "Prostaglandins and the arachidonic acid cascade" — providing a detailed history, description, and present and potential uses of prostaglandins is now available. For your free copy, circle Reader Service No. 162

For full information, write or call Upjohn Diagnostics, Kalamazoo, MI 49001, 616-385-7111.

For laboratory research use only. Not for human or veterinary clinical use.

(UD83-047) February, 1983

Upjohn diagnostics
A Division of The Upjohn Company

You Only Need One Flow Cytometer.

...because what I need

for my research
is a state-of-the-art
flow cytometer
that gives me freedom
of choice.

I need an instrument
that doesn't limit my
ability to explore new
directions in research.
That's why I have the

CYTOFLUOROGRAF* II Flow Cytometer;

it gives me:

Superior resolution along
with accurate and stable cell
sorting exclusively with the
new ORTHO T/Q Flow Cell.

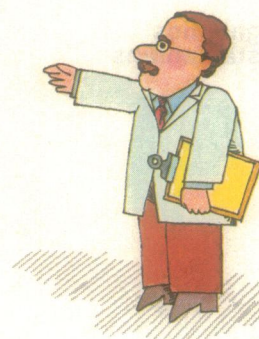
Real-time data analysis with
mass storage and instant
protocol set-up using the new
2140 or 2151 Data Handlers.

New ORTHO* *Ultrasense*
Optics for Maximum Sensitivity
with lower laser power.

Modular components designed
for flexibility. They let
me upgrade my instrument
as my research needs change.

Compatibility with optimized
ORTHO-MUNE* Monoclonal
Antibodies and full service
technical support to develop
my applications.

Exceptional versatility for
applications in immunology,
cell kinetics, microbiology
and cell biology.



With the ORTHO SPECTRUM III and CYTOFLUOROGRAF II,
we've designed "no compromise" flow cytometers that
are optimized to meet the demands of *your* laboratory. Now,
you needn't compromise with an instrument that does
less than you want nor accept unnecessary (and expensive)

That's Why Ortho Makes Two.

...because what I need

for my clinical research is an easy-to-use flow cytometer that gives me accurate answers...and fast. I need an instrument

that's a closed system for handling infectious samples, and one that many laboratory technologists can operate. That's why I have the

ORTHO SPECTRUM III* Laser Flow Cytometry System;

it gives me:

Lower operating costs with an optical design that eliminates the need for high-power lasers.

Maximum sensitivity with ORTHO *Ultrasec Optics* for analyzing low-level fluorescence and small particles such as platelets.

Analysis of 500 samples/day with minimal operator intervention using ORTHO *Quicksip Fluidics*.

Reproducible and accurate, absolute cell counts delivered time after time because a constant volume is analyzed.

Compatibility with optimized ORTHO-MUNE Monoclonal Antibodies and full service technical support to develop my applications.

Fast set-up and rapid data analysis with "user friendly," floppy disk software.



options designed for somebody else's research. For further information about Ortho flow cytometers and how they can help your research or clinical investigation, call 800-225-9855 or circle the appropriate reader service number.



Ortho Diagnostic Systems Inc.
Raritan, New Jersey 08869

Circle No. 161 on Readers' Service Card

Ortho Diagnostic Systems: at the leading edge in flow cytometry

From the innovators in electro-blotting, a powerful new high performance system.

Bio-Rad's new electro-blot system offers unprecedented power, resolution, and simplicity of operation. The key performers in the new system are the Trans-Blot® Cell and Model 250/2.5 Power Supply. Together, they provide a level of performance previously unobtainable.

New Trans-Blot Cell

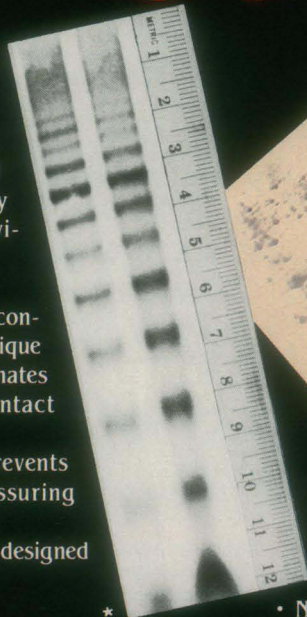
- Accommodates 3 gel cassettes with convenient handles for easy removal. A unique gel cassette clamping system eliminates slippage, and provides positive contact between membrane and gel.
- One-piece molded construction prevents leaking and increases strength, assuring many years of use.
- Removable platinum electrode cards designed for easy cleaning.
- High efficiency cooling coil.

New 250-Volt, 2.5 Amp Power Supply

- Constant voltage, continuously adjustable from 0-250 volts, 0-2.5 amps.

*Photo courtesy of William Garrard and David Gross,
University of Texas Health Science Center, Dallas TX.

Circle No. 172 on Readers' Service Card



- Capable of supplying power for even the most demanding blotting experiments. No other supply can provide both high amps and volts simultaneously.
- Digital meter, regulated output and fan cooled, for easy viewing, performance and reliability.
- Dual outputs wired in parallel allow running of 2 blots simultaneously.
- Overload protected.
- Conforms to all relevant safety standards to protect operator.

New detection systems and transfer membranes

Completing the system, Bio-Rad offers

- Two rapid ways to perform Immun-Blot™ non-isotopic picogram level detection using affinity purified Goat anti-Mouse and Goat anti-Rabbit horseradish Peroxidase conjugates.
 - New nylon-based membrane, Zeta-Probe™ for efficient Western, Southern and Northern electro-blotting.
 - All needed reagents, membranes and supplies, as well as comprehensive applications data and protocols.
- Contact us for details.

BIO-RAD

Bio-Rad Laboratories
2200 Wright Ave., Richmond, CA 94804
(415) 234-4130

Also in Rockville Centre, NY, Australia, Austria,
Canada, England, Germany, Italy, Japan,
The Netherlands and Switzerland.

See us at the American Society of Biological Chemists AAI Booth S-3



The Cetus Pro/Pette™ System.

It's the hands-off solution to more productive laboratories.



Computerized flexibility you never had before.

All the Pro/Pette System functions are selected through a hand-held controller that is a dedicated part of the instrument, not an expensive add-on. The controller has a simple keyboard and alphanumeric display. To select a program, or custom-design your own, you simply answer a short series of computer-generated questions. There's no programming knowledge required. It takes less than one minute to set up a procedure that could save you hours of tedious manual pipetting. Stored procedures can be re-called without re-entering them.

Give your staff a helping hand.

The Cetus Pro/Pette System frees your skilled technologists to focus on complex analyses, not manual drudgery. Install it in your lab and increase productivity overnight.

Tedious, error-prone, labor intensive manual pipetting just became obsolete. Now there's the Cetus Pro/Pette System. The first computerized pipettor designed specifically for biological procedures in microtitration trays. Regardless of the kind of testing you do:

- Bioassay screening for interferons and lymphokines.
- Monoclonal antibody research.
- Antibiotic screening.
- Enzyme-based microtitration assays.
- Serology testing or
- White blood cell research.

The Pro/Pette System precisely picks up and ejects a row of sterilized, disposable tips after each

mixing, replica plating, serial dilution and plate filling or aspiration cycle. You can work with 1 or 12 wells per row simultaneously, filling an entire well plate in as little as 12 seconds. A typical serial dilution takes just one minute.

The Pro/Pette System lets you test in volume ranges from 1 μ l to 200 μ l—in one μ l increments—with absolutely no sample carry-over when you change tips.

I'm ready to automate the microtitration pipetting in my lab.

☐ Please have a representative contact me for a demonstration.

☐ Please send me more information on the Pro/Pette System.

Name

Title

Phone

Institution or Company Name

Laboratory Name

Address

City

State

Zip Code

A-2

 **cetus**

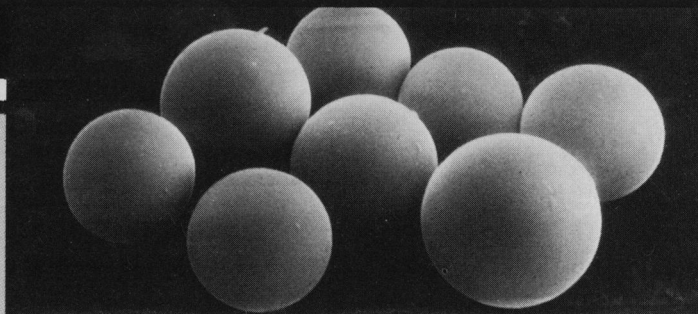
CETUS INSTRUMENT SYSTEMS
1400 53rd St., Emeryville, CA 94608

© 1984 Cetus Corporation, Patent Pending

CALL CETUS TODAY FOR A DEMONSTRATION 1-800-CETUS CO. (In CA 1-800-232-3887)

VYDAC™

COMPLEMENTARY REVERSE PHASE MATERIALS NO RESEARCH LAB CAN AFFORD TO BE WITHOUT.



SEM photomicrograph
of VYDAC HS silica.

VYDAC TP 300 Angstroms
Spherical Silica based reverse phase

and/or

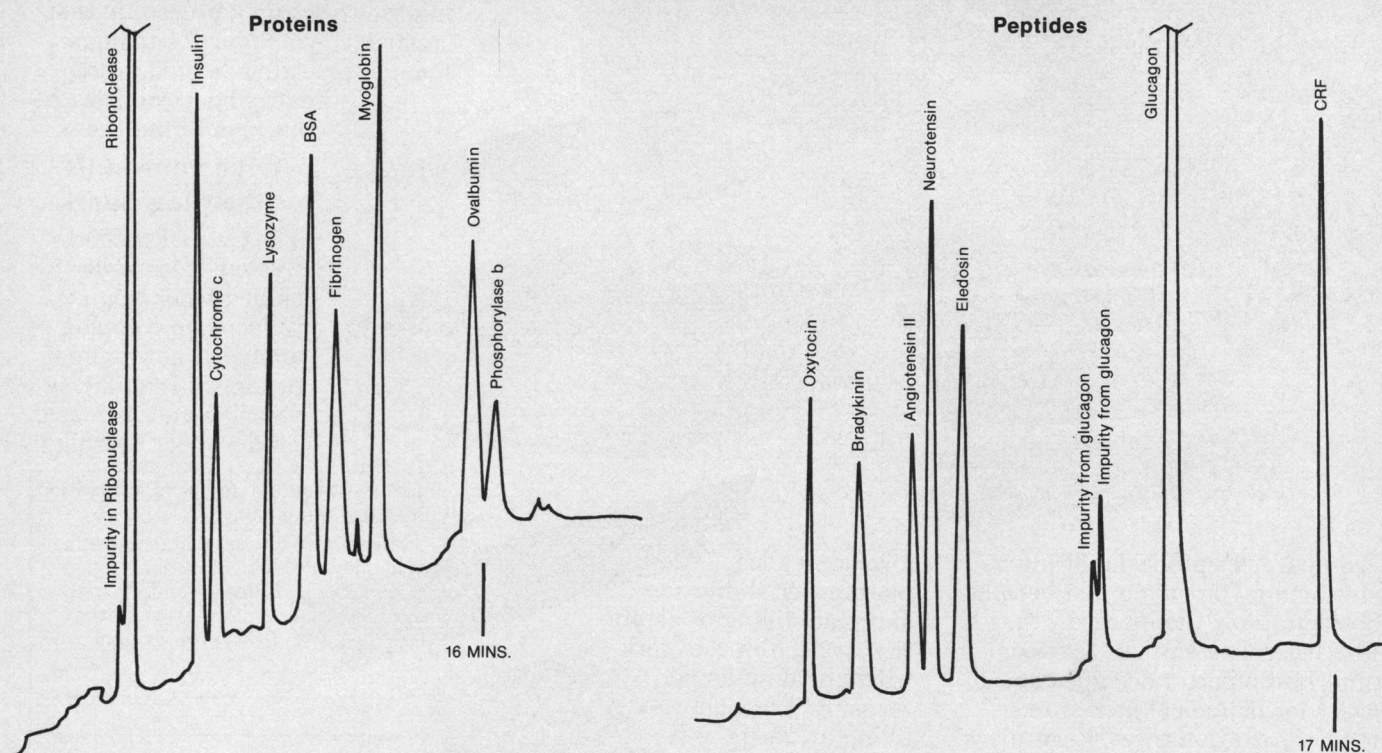
VYDAC HS 80 Angstroms
Spherical Silica based reverse phase

Applications

Polyaromatic hydrocarbons
Vitamins D₂ and D₃
Large Peptides
Proteins
Anti-oxidants in plastics
Vitamin A Isomers

Applications

Nucleosides, purines, pyrimidines
Catecholamines
Small Peptides
Vitamin Bs and C
Organic Acids



Only the Separations Group offers C₁₈ reverse phase materials bonded to distinctly different spherical silica substrates yielding uniquely different selectivities for the HPLC chromatographer.

For your free copy of our "Comprehensive Guide to Reverse Phase Materials for HPLC," contact the Separations Group. Do not hesitate to call collect.

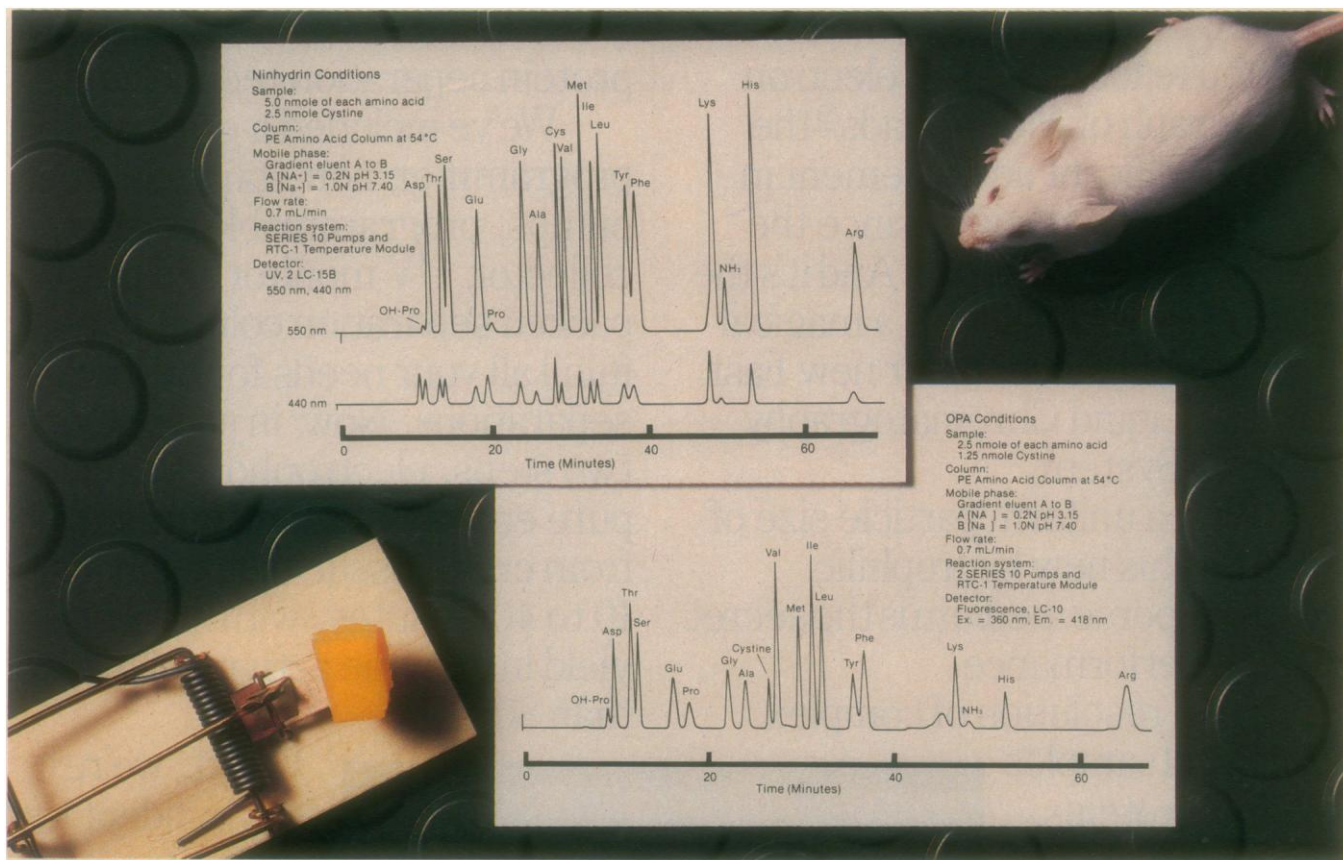
THE SEPARATIONS GROUP

MANUFACTURERS OF VYDAC

Box 867 • 16695 Spruce St. • Hesperia, CA 92345 USA
Telephone (619) 244-6107

SPHERICAL SILICAS and separation materials for high performance liquid chromatography since 1971

In amino acids analysis, Perkin-Elmer brings you not one, but two better mousetraps.



Now there are two better and more cost-efficient ways to beat a path to amino acids analysis. Both are new systems from Perkin-Elmer. One configured for OPA, the other for ninhydrin. Each is more flexible and far less expensive than dedicated amino acids analyzers. With no sacrifice in performance. And they're backed by Perkin-Elmer's worldwide support capabilities.

You can build a complete HPLC system, including your choice of the new Perkin-Elmer amino acids analysis modules, the Series 4 LC solvent delivery system, and a Perkin-Elmer data system matched

to your needs. Or add one of the new amino acids analysis modules to your existing Series 4 LC solvent delivery system. And by changing just one fitting, the system is now available to answer all your Liquid Chromatography needs.

Use these modules to solve a wide range of separation and detection problems, from the simple to the most complex. The sensitivity, linearity and precision of these new modules meets or exceeds the performance of expensive dedicated systems. You can easily detect subnanomole amino acids in protein hydrolyzates, as little as two

picomoles with the OPA system.

We believe we've built two better ways to perform amino acids analysis. If that doesn't trap your attention, the details in our Product Bulletin will. Call your Perkin-Elmer representative at 1-800-762-4000 and request Product Bulletin L-808.

Perkin-Elmer Corp., Main Ave. (MS-12),
 Norwalk, CT 06856 U.S.A.
 Tel: (203) 762-1000. Telex 965-954.

Bodenseewerk Perkin-Elmer & Co., GmbH,
 Postfach 1120, 7770 Ueberlingen,
 Federal Republic of Germany.
 Tel: (07551) 811.

Perkin-Elmer Ltd., Post Office Lane,
 Beaconsfield, Bucks HP9 1QA, England.
 Tel: Beaconsfield (049 46) 6161.

PERKIN-ELMER

The science and computer company.
 Where solutions come first.

Circle No. 204 on Readers' Service Card

Pure Magic.

You're looking at an electron micrograph of MonoBeads®—the most significant advancement in separation technology since the discovery of Sephadex®. And it's the MonoBeads which give a magical high performance to our new Fast Protein Liquid Chromatography (FPLC) System.

With a uniform particle size of 9.8 µm, this new hydrophilic, monodisperse medium is the secret of high performance.

High resolution of complex biological samples such as proteins, peptides, enzymes, monoclonal antibodies and polynucleotides can now be conjured up with typical separation times of 10-20 minutes.

When we had perfected the separation media, we turned our attention to the instrumentation. And we designed a system which represents the state of the art in

protein separation technology.

We've included a gradient programmer, non-stainless steel pumps, programmable fraction collector, UV monitor and pre-packed separation columns to fulfill all your needs for biological separations. Now, in just one or two steps, electrophoretically pure enzymes can be purified from crude tissue extract in just 10 to 40 minutes, with an overall yield in enzyme activity of greater than 80%.



A small selection of the substances which have already been studied using the FPLC System.

Bacitracin.	Tryptic peptides.	L-amino acid
Monoclonal	Haemoglobin A _{1c}	oxidase
antibodies.	Haemoglobin	isozymes.
Serum proteins.	chains.	Restriction
Urine proteins.	Insulins.	enzymes.
Synthetic	NADP.	Labile citrate
oligonucleotides.	Venoms.	synthase.
Viral proteins.	Pollen extracts.	Placental
Membrane	Ovalbumin.	homogenate.
proteins.	Gc-globulin.	Steroids.

Pharmacia products will be on display at the ASBC Show-Booths M22, M24, M26, M28, M30 & M32

Pharmacia Fine Chemicals
800 Centennial Avenue
Piscataway, New Jersey 08854
Telephone: (201) 457-8068 or call your local representative.

In fact, we're so confident that we invite you to try out any biological sample, in aqueous or organic solution, so that you can see for yourself just how magical our new FPLC System would be for you.



The Pharmacia FPLC System.
Pure Magic. Pure Logic.

Circle No. 208 on Readers' Service Card

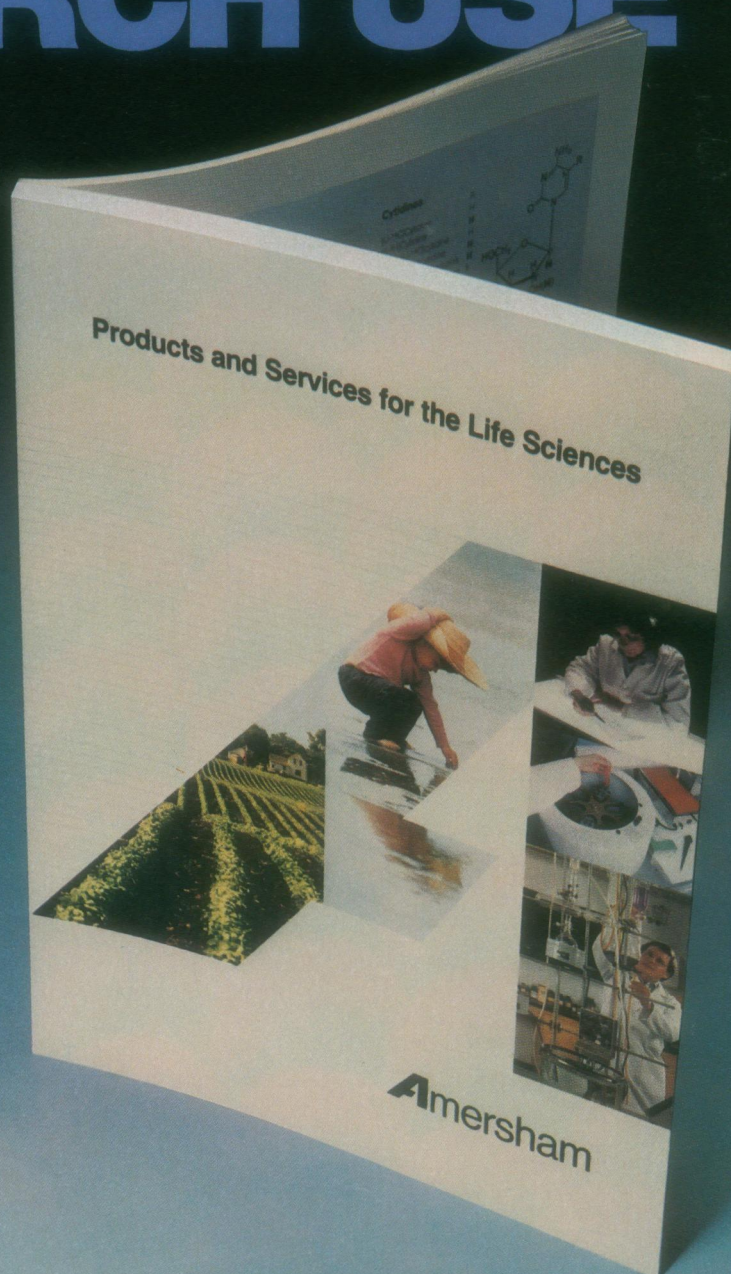


Scanning electron micrograph of MonoBeads

A major revolution is taking shape these days in medical institutions, research laboratories and universities around the world. The catalyst is the work of the researcher who is solving the most intricate mysteries presented by the life sciences.

Amersham is proud to be playing a major role in this revolution. Our commitment to it: providing total product and services packages that enhance the molecular biology, immunology, biomedical and clinical research in which you are involved.

FOR RESEARCH USE ONLY



Whatever your area of life sciences research... we believe you will find the new Amersham catalog a valuable reference tool. Ask for your free copy today.

Amersham Corporation

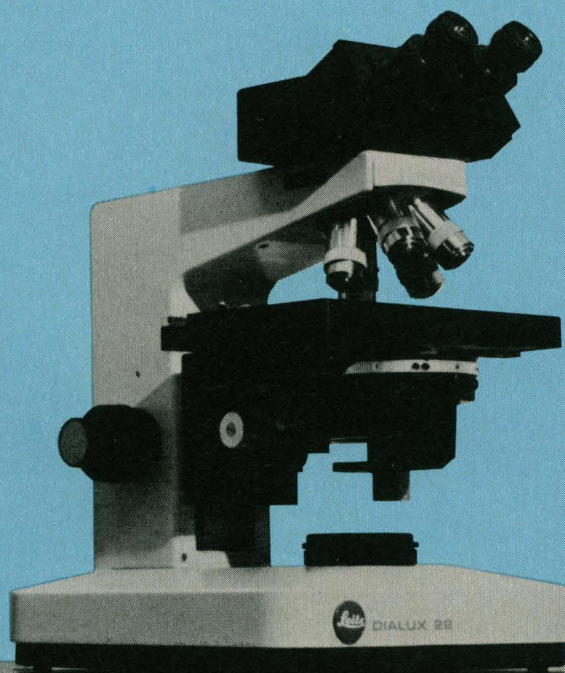
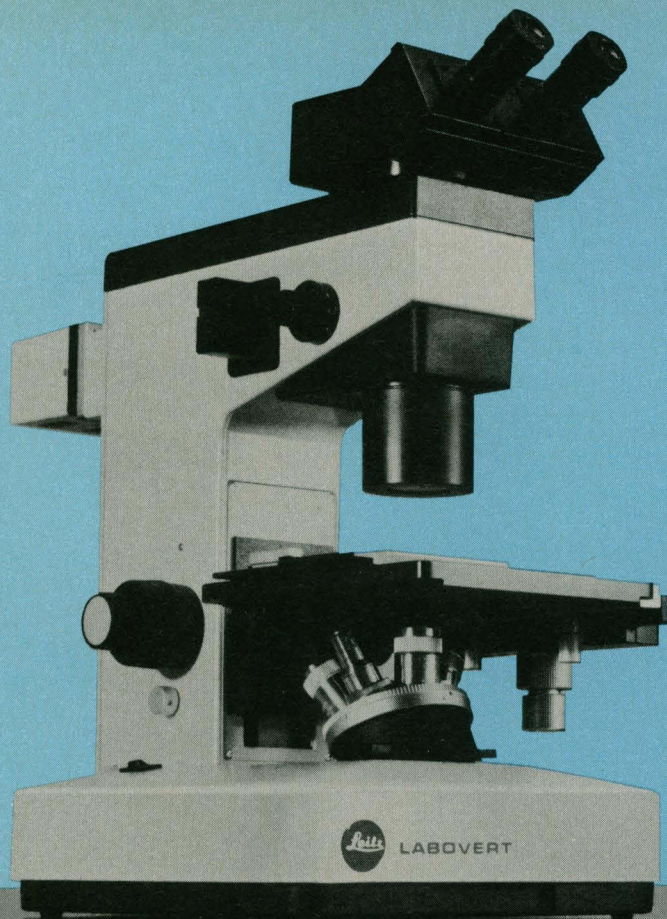
2636 South Clearbrook Drive, Arlington Heights, IL 60005
(800) 323-9750 (Toll Free) or (312) 364-7100

Amersham Canada Limited

505 Iroquois Shore Road, Oakville ONT L6H 2R3 (800) 268-5061 or (416) 842-2720

Circle No. 240 on Readers' Service Card

Amersham



All microscopes should be created upright... even inverted microscopes!

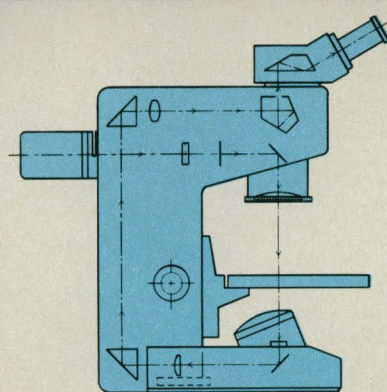
The new Leitz Labovert revolutionizes inverted microscopy. Its unique upright design is an exceptional innovation offering unprecedented convenience and ease of operation in an inverted microscope.

Users no longer have to reach around the microscope's body or up in the air as with conventional inverted microscopes. The controls for focussing and stage travel are exactly where human anatomy dictates they should be. The stage is in full view and easily accessible for loading. Just like an upright microscope.

The Labovert scores many other firsts. The lamp housing, an annoying source of stray light and heat, has been removed from the working space. High performance optics (field of view up to 22.5mm), condensers with long working distance (up to 95mm) and a formidable array of peripheral equipment adapt the Labovert to almost any application.

Innovators expect their ideas to be copied — but you can't improve on a true Leitz original. If you need an inverted microscope, you will want to compare the Labovert with all others.

For more information or a demonstration of the Labovert call or write E. Leitz Inc., Rockleigh, NJ 07647, (201) 767-1100.



*The Reinheimer Principle
Illuminating and Image Forming
Beams Cross at a Point in Space*

Leitz Innovates Others Imitate

**Leitz Means
Precision.
World Wide.**



R-3013

Circle No. 235 on Readers' Service Card

**NEW FROM
COULTER**



QUICK WHOLE BLOOD KIT SPECIFIC/T&B CELLS

This new kit from Coulter offers you high specificity—it is the only kit with both T & B specific monoclonal antibodies. It is fast (ready to read in 25-30 minutes), flexible (suitable for use with a fluorescent microscope or EPICS® or other flow cytometers) and complete (it's the only kit with everything

you need for 25 tests, including control).

It has built-in Q.C....identifiable morphology that correlates with the standard differential. It has quality reagents; modern processing techniques, with guaranteed high brightness, specificity, purity, and lot-to-lot uniformity.

MORE GOOD THINGS (FROM COULTER ONLY)

- The only specific B cell markers, B1 and B2.
- The only specific Monocyte/Macrophage Marker, MO2.
- The original specific J5 (CALLA) Marker.
- Unique Activation Markers such as (ia like) i2 and iLR2.
- High Titer MCA to Human Immunoglobulins including iGC, iGD, iGM, iGE.
- A World Class Reference Developing Reagent, GAM-FITC.

Also of interest are monoclonal antibodies both unconjugated and conjugated with fluorescein and biotin labeling with the highest affinity, labeling density and specificity. They are packaged for your needs in 25, 50, 100 test sizes. Discounts available on multiple 100 test sizes. Coulter also offers a comprehensive line of T Cell Markers, including T1, T3, T4, T6, T8, T11 and TQ1. And also mouse iGC and iGM controls specially-formulated for background determination in MCA reagent applications.

COMING FROM COULTER

- A Myeloid Series ■ T Cell—Lytic Series
- T Cell Markers—for special applications
- More B Cells ■ Highly-specific Natural Killer Cell markers ■ Plasma Cell markers
- More activation markers ■ More CALLA markers ■ Whole Blood Kit—T4/T8
- Biotin-Avidin Peroxidase Kit—T11/B1.
- Subclasses of Human Gamma Immunoglobulins

- AIDS Typing Kit
- Acute Leukemia Typing Kit
- All purpose Calibrator—Microscope, EPICS, etc.

For research use only; not for diagnostic or therapeutic use. EPICS and COULTER CLONE are registered trademarks of Coulter Corporation.

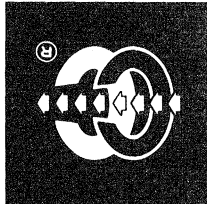
Circle No. 275 on Readers' Service Card

COULTER CLONE®

reagents...

Bringing Significant Developments to the Surface.

To order a Whole Blood T & B kit or for information on our other Monoclonal Antibodies and Reagents, please call:
(800) 327-3778 (outside Florida)
(800) 432-6518 (inside Florida—Ext. 289)
or write to:
COULTER IMMUNOLOGY
A Division of Coulter Corporation
440 West 20th Street
Hialeah, Florida 33010



COULTER IMMUNOLOGY
A Division of Coulter Corp.
440 West 20th Street
Hialeah, Florida 33010

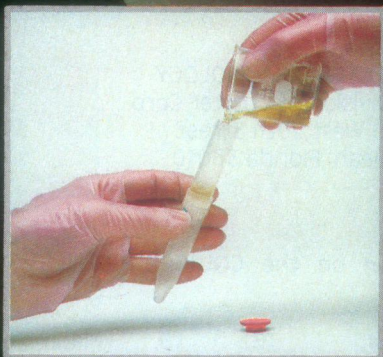
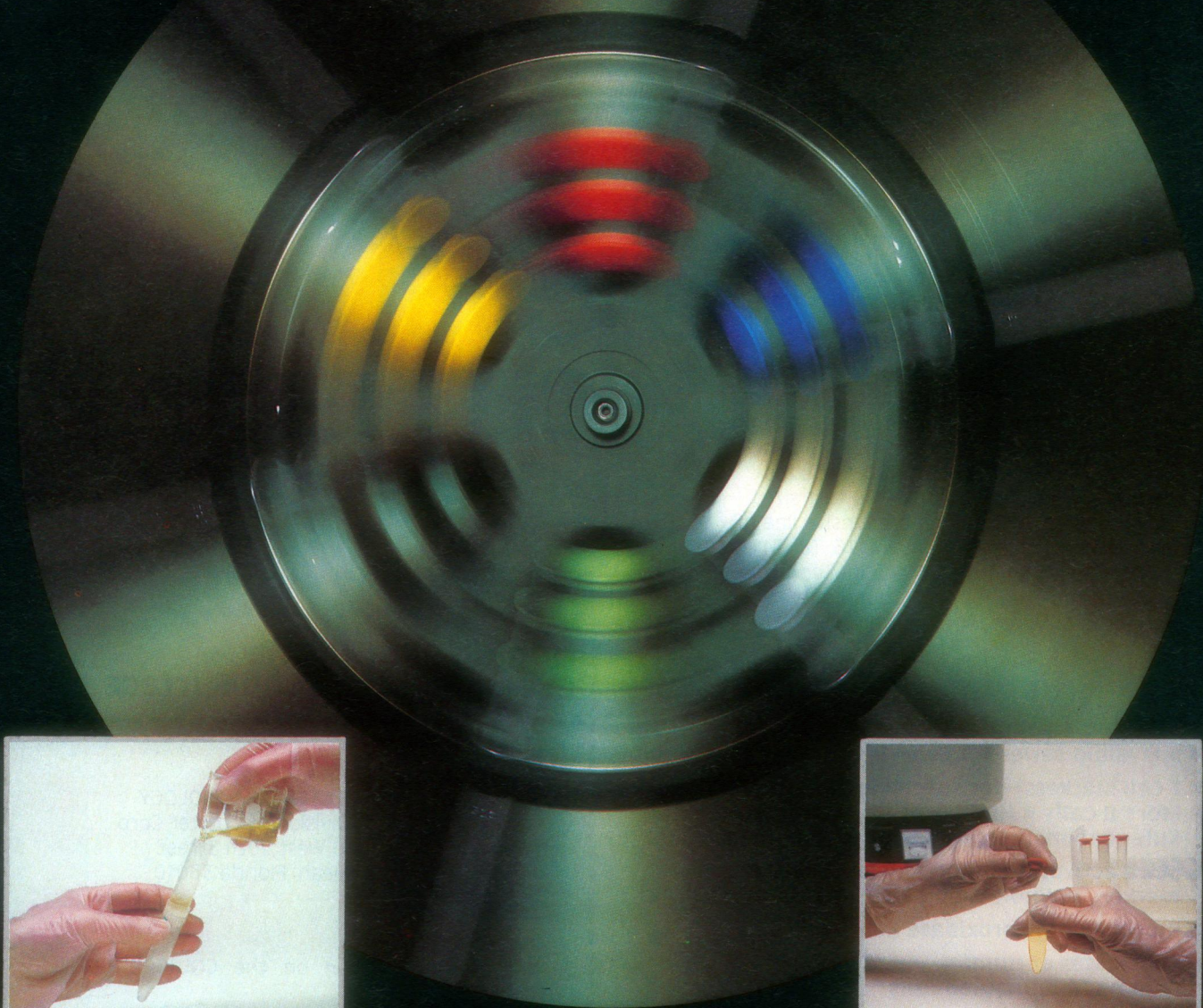
Send more information on the COULTER CLONES® I've circled.

T1,	T3,	T4,	T6,	T8,	T11,
B1,	B2,	B4,	i2,	iLR2,	MO1,
MO2,	MY4,	MY7,	MY8,	MY9,	J5,
J13,	TQ1,	iGD,	iGC,	iGM,	GAM-FITC,
GAM-BIOTIN, Kappa, Lambda, Typing Kits					

NAME
TITLE
ORGANIZATION
DEPT.
STREET ADDRESS
CITY/STATE
ZIP
TELEPHONE
EXT.

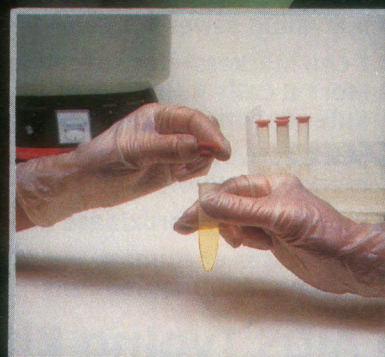
S&S CENTREX™

The revolution in microfiltration.



1. Fill

2. Spin



3. Recover

All-new centrifugal filtration system.
Less than 15 microliters hold-up volume.

- Maximum recovery
- Disposable
- 20 µl to 5 ml
- For aqueous or organic samples
- Color-coded for easy identification
- Pre-assembled, pre-sterilized

Contact S&S for technical data and a selection guide.

See us at ASBC show Booth #B6 and #B8

Circle No. 283 on Readers' Service Card

Schleicher & Schuell
Innovators in Separation Science

Schleicher & Schuell, Inc., 543 Washington Street, Keene N.H. 03431. Phone: (603) 352-3810
Schleicher & Schuell GmbH, D-3354 Dassel, West Germany • Schleicher & Schuell AG, CH-8714 Feldbach ZH, Switzerland
Schleicher & Schuell Nederland BV, 's-Hertogenbosch, The Netherlands

A simple, three hour quality control test shows this canine cell line is contaminated with human cells.



Be sure to inquire about our individual reagents and accessories.



A Cell of a Mess that's Easy to Avoid

A single contaminating cell can turn a whole culture into a tissue of lies...man turns into mouse...dog turns into man.

Until now, running quality control on cell lines has been time consuming and expensive. Karyotyping requires an expert working several days with costly equipment to render a somewhat subjective judgement of cell purity.

Now you can monitor cell contamination quickly, surely, inexpensively with Corning's new Authentikit™ System.

Simple isoenzyme electrophoresis gives you a definitive, hardcopy answer in three hours in eight simple steps learned easily even by those *not* familiar with electrophoresis...for much less than the cost of a typical karyotyping.

All you need is simple, routine equipment and one of our kits to authenticate four cell lines.

Don't cell yourself short.

Call us at 800-255-3232 to discuss your particular cell quality control. Or, write for literature and a journal reprint pack.

Corning Medical and Scientific, 333 Coney St., East Walpole, MA 02032.

The Most Trusted Tools Of Science

CORNING

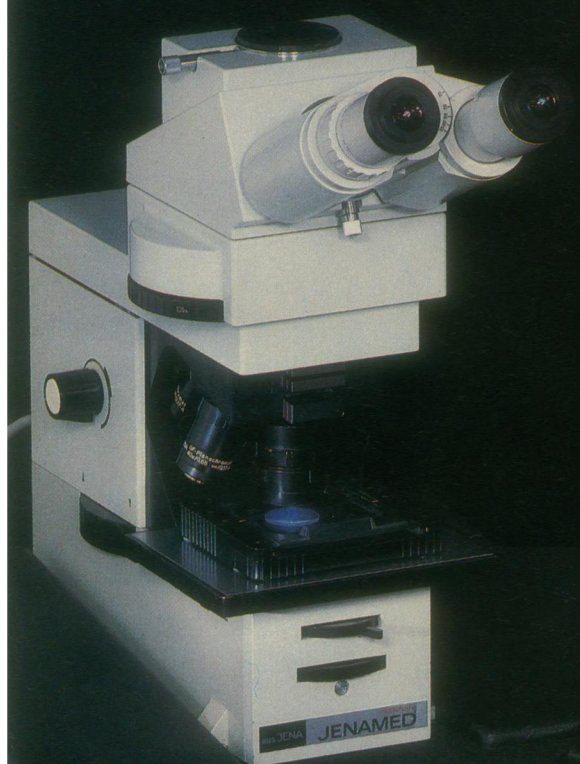


JENA

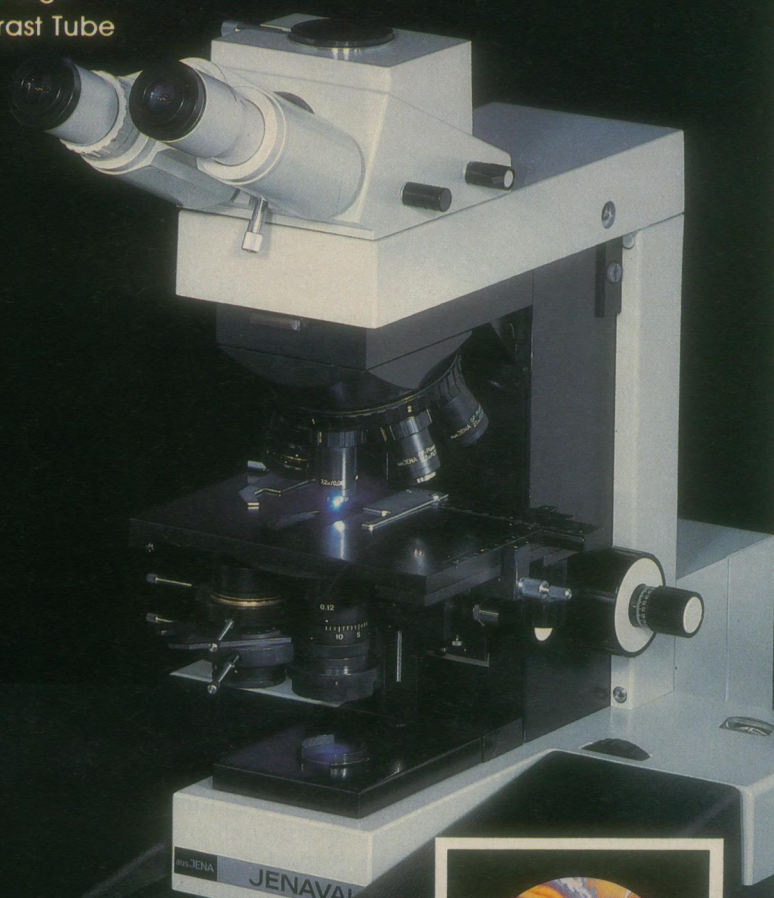
Two new superbly designed and crafted microscopes from
the world's oldest and largest Manufacturer.

Latest state of the art design offers you these features:

- Infinity Corrected CF optics
- 250 mm Super Wide Field
- Ergonomic design comfort
- Magnification changer 0.8, 1.0 and 1.25x
- 1x Magnification Objective
- Dry 100x objective
- Oil H.I. 25, 50, & 100x objectives
- Object Marker
- Incident Fluorescence
- Phase Contrast
- Differential Interference-Contrast DIC
- Soft Image
- Contrast Tube
- 5 Choices of Illuminators
- 5 Choices of Condensers
- Rotating Mechanical Stage
- Autofocus Cassette



JENAMED



JENAVAL

For complete details
just call or send card.

Now 50 Dealers in Major Cities

 **SEILER** INSTRUMENT & MFG. CO., INC.

170 East Kirkham, St. Louis, MO 63119 (314) 968-2282

For JENAMED circle RS# 90 on RS card
For JENAVAL circle RS# 91 on RS card

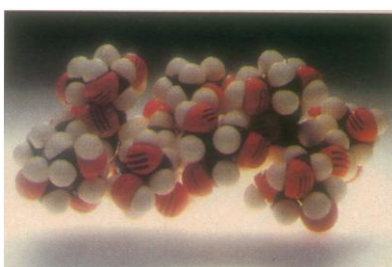
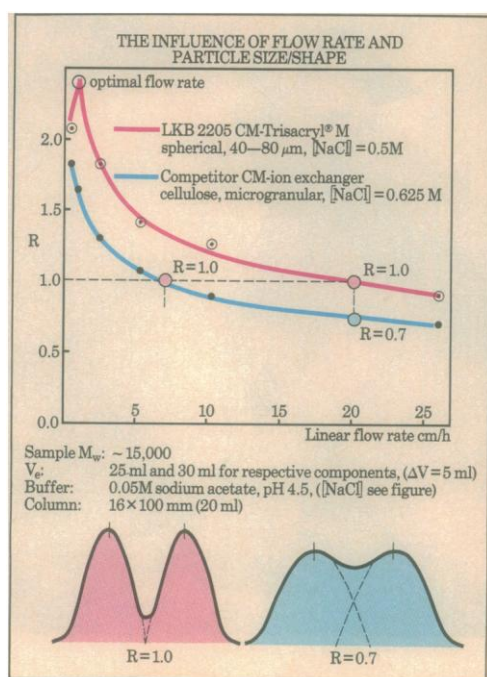


JENA

Birthplace of Modern Optics

Say goodbye to soft gels

Trisacryl separates better and faster



The built-in magic of matrix engineering gives you form, porosity, strength and hydrophilic behaviour. Just pure chemistry. Hard. Inert.

Synthetic. The ultimate support — Trisacryl®. Whether for Affinity, Ion Exchange or Gel Filtration, Trisacryl is engineered to give you better results — guaranteed!

Get the facts in our new catalogue and give yourself a whole new scenario of problem-free chromatography.

Trisacryl is developed and manufactured by **IBF** Pointet-Girard (Rhône Poulenc Group)



Head office: LKB-Produkter AB, Box 305, S-161 26 Bromma, Sweden. Tel 08-98 00 40, telex 10492

Main US sales office: LKB Instruments, Inc. 9319 Gaither Road, Gaithersburg, Maryland 20877. Tel. 301-963-3200, telex 909870 (dom.), 64634 (intern.)

UK sales office: LKB Instruments Ltd., 232 Addington Road, S. Croydon, Surrey CR2 8YD, England. Tel 01-657 8822, telex 264414

Other sales offices in: Antwerp, Athens (for Middle East), Bangkok, Copenhagen, Lucerne, Madras, Moscow, Munich, Paris, Rome, Turku, Vienna, Zoetermeer

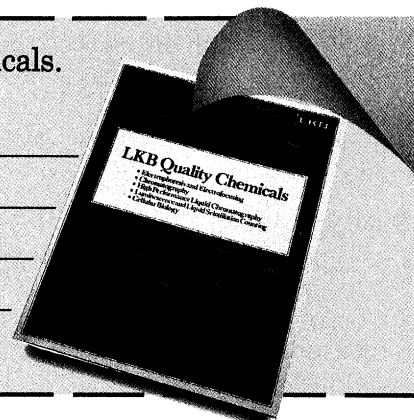
Yes! Please send me your new catalogue of chromatography chemicals.

Name _____

Company/Institution _____

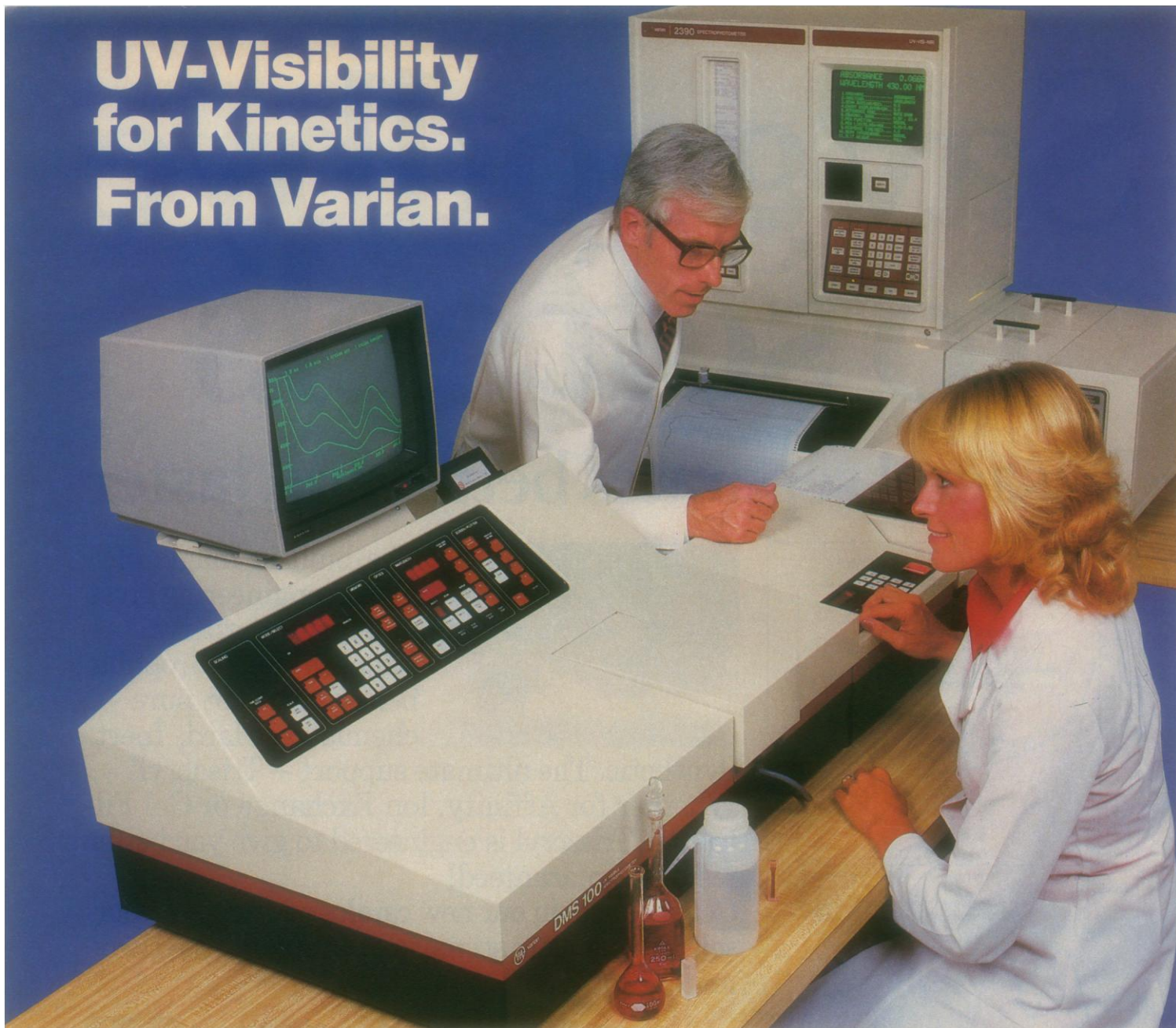
Department _____

Address _____



Circle No. 24 on Readers' Service Card

UV-Visibility for Kinetics. From Varian.



Since its introduction, the DMS 100 Spectrophotometer has enjoyed unprecedented popularity, because it simply offers more analytical possibilities for your instrument investment dollar. Scientists like the way the DMS 100 displays a spectrum on the video screen in real time; the way it stores spectral information in its capacious memory for later retrieval; and its intelligent cell changer.

The DMS 100 with the cell changer lets you

- signal-average for each cell
- monitor cell temperature
- print out absorbance, slope, standard deviation, and temperature

But if you need

- accurate measurement of differences less than 0.010 Abs
- plots of temperature versus absorbance
- measurement of highly absorbing, scattering samples

you need the ultrahigh-performance Varian-Cary 2200 UV-Vis Spectrophotometer.



Computer compatibility? Of course!

The DMS 100 interfaces with the Varian DS 15 Data Station, and the 2200 with the Apple IIe* to form completely automatic UV-Vis systems.

Circle Reader Service Number **250** for more information; circle No. **251** to discuss your UV-Vis needs with a Varian representative.

For immediate assistance contact: Florham
Park NJ (201) 822-3700 • Park Ridge IL
(312) 825-7772 • Sugar Land TX (713) 491-7330
• Georgetown, Ontario (416) 457-4130.
Or write 611 Hansen Way, Palo Alto, CA 94303
In Europe: Steinhäuserstrasse, CH-6300 Zug,
Switzerland

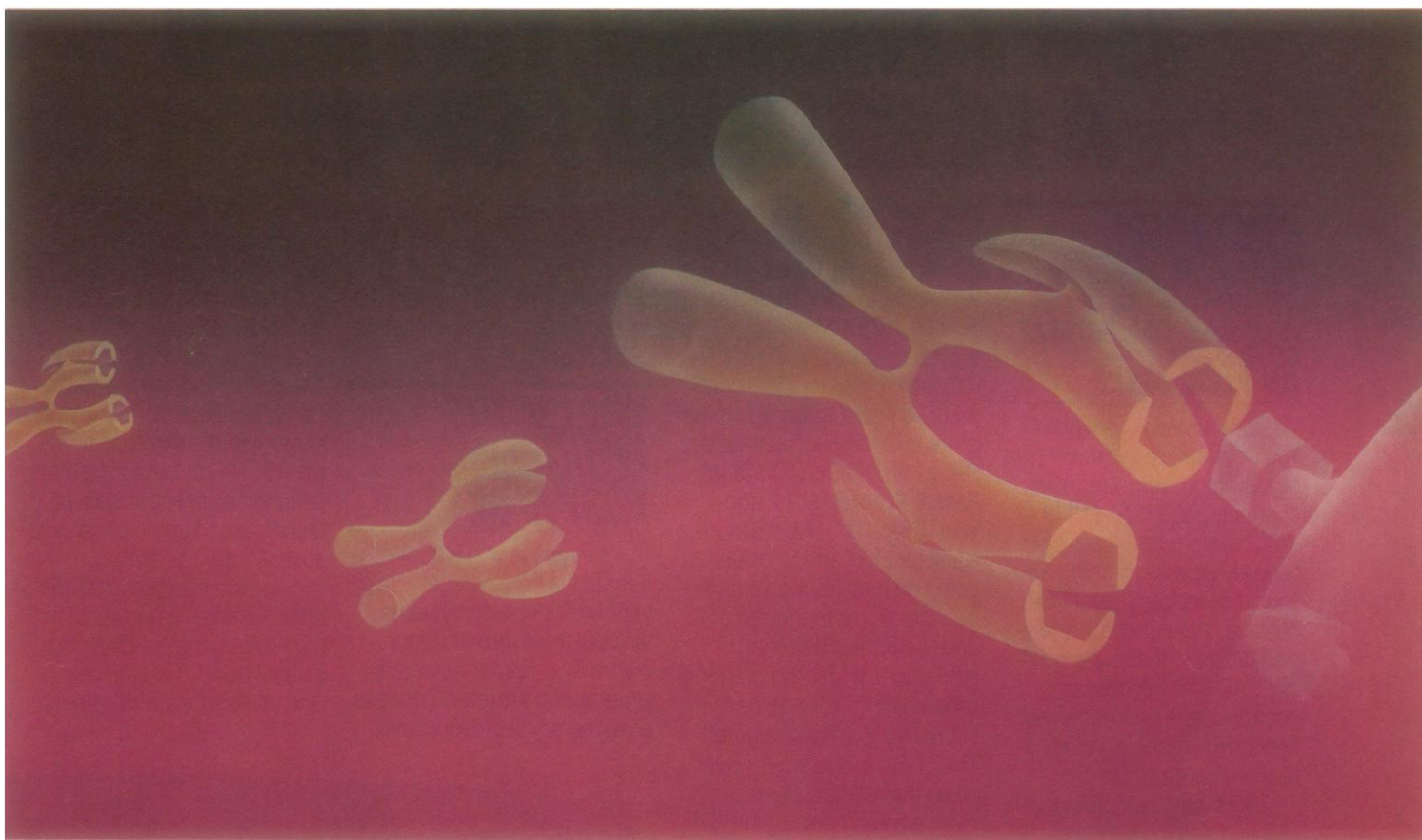
**Intelligent Automation...
from Varian**



B

M

B



Your laboratory is no place to experiment.

Today, you have to keep ahead just to keep up. When you know where you're going, you don't want any unexpected detours: there simply isn't time.

The only variables in your experiments should be those you introduce by design. To help assure that the results you get are the results you were aiming for, BMB sets—and meets—the highest standards for purity, activity, specificity: in short, for *reliability*.

Immunochemicals to rely on.

We meet a wide range of the immunobiologist's needs. If your work encompasses hybridoma screening,

cell sorting, or enzyme immunoassay, BMB gives you sealed-in reliability in:

- ☐ Affinity-purified antibodies
- ☐ Second antibodies
- ☐ Enzyme immunoassay reagents
- ☐ Monoclonal antibodies
- ☐ Protein A reagents

You can rely on BMB for service, too: knowledgeable, responsive customer support; prompt, safe deliveries; and competitive pricing. Send for our 1984/85 biochemicals catalog. And to discuss any of our products, call BMB Technical Services.

Let BMB help. After all, your experiments don't have to be trials.

BMB...committed to your growing needs in biotechnology.

Boehringer Mannheim Biochemicals

7941 Castleway Drive
P.O. Box 50816
Indianapolis, IN 46250
Tel: 317-849-9350

800-428-5433 toll-free



BMB-4002A

Circle No. 244 on Readers' Service Card

WHEN A PERSONAL COMPUTER ISN'T ENOUGH, YOU NEED A PERSONAL PDP-11.

NOW YOU CAN HAVE DIGITAL'S PERSONAL PDP-11'S RUNNING PDP-11 AND VAX-COMPATIBLE SOFTWARE ON YOUR DESK.

You know who you are. You've been doing a major part of your work using a terminal connected to a PDP-11™ or VAX™ system. Your applications are as wide-ranging as your knowledge. Theoretical physics, real-time data analysis, statistics, financial modeling, CAD/CAM, process control — there's very little that's beyond the reach of your professional experience.

Like most users, you're very satisfied with the services you've been getting from your PDP-11. You've come to rely on them, in fact. And you're not willing to give them up for just a personal computer. What you really want is a full-powered minicomputer dedicated exclusively to your work.

If you're this type of user, Digital has exactly the computers you need: the Professional™ 300 Series, our personal PDP-11's. They're engineered to give you the minicomputer power and sophistication you've come to expect — in a personal computer size, and at a personal computer price.

RICH PDP-11 DEVELOPMENT ENVIRONMENTS AT YOUR COMMAND.

Digital's Professional 300 Series, the best-engineered desktop systems for computer-experienced professionals, offer you a choice of minicomputer-

powered operating systems.

First among these is P/OS,™ the Professional Operating System. A single-user, multi-tasking version of RSX-11M-PLUS,™ it gives you capabilities that far exceed typical personal computer software. Its complement of compiler languages includes BASIC 11, DIBOL, COBOL-81, Pascal, FORTRAN-77, and WHITESMITH C. What's more, a Native Tool Kit and a rich selection of editors, debuggers, task builders, forms management and sort utilities helps you achieve the high programming productivity you've come to expect from a minicomputer. The UCSD-p System™ is available as an alternative development environment under P/OS. Plus, P/OS lets you use Digital Classified Software, a portfolio of proven applications such as TK! Solver,™ a high-performance equation-solving tool, and RS/1,™ an industry-standard laboratory research system.

Next, there's PRO/RT-11,™ a single-user, multi-tasking, real-time version of the RT-11 operating system that's so popular in technical OEM PDP-11 applications. There's also the STANDARD MICRO MUMPS 300™ System. And for commercial applications there's the CTS 300™ system, which features RT-11 DIBOL portability.

VENIX,® a UNIX® V7M operating system complete with Berkeley 4.1 enhancements, has been optimized for

the Professional Series. It even includes a UNIX System 5 software license, demonstrating our commitment to keeping the Professional current with future UNIX directions.

MINICOMPUTER STRENGTH APPLICATIONS. ON THE SHELF. READY TO GO.

The reason we've engineered the Professional with a variety of operating systems isn't just to let you write your own minicomputer-powered programs. It's to let you access a vast library of proven, devel-

oped PDP-11 and VAX RSX programs, and run them independently on your Professional.

Many third-party PDP-11 and VAX RSX applications — or the ones you're using now — can be transported to your Professional. You can use the same files, the same commands. This puts an incredible variety of scientific, industrial, technical and commercial solutions at your disposal.

Just as important, you can attach a real-time interface to the Professional to adapt it for scientific and industrial use. And you'll have a wide variety

C Compiler is a trademark of Whitesmiths, Ltd. UCSD-p System is a trademark of SofTech Microsystems, Inc. TK! Solver is a trademark of Software Arts, Inc. STANDARD MICRO MUMPS 300 is a trademark of Creative Socio-Medics. VENIX is a trademark of Venturcom. UNIX is a trademark of Bell Laboratories, Inc. CP/M is a trademark of Digital Research, Inc. Professional 300 Series, PDP-11, VAX, P/OS, RSX-11M-PLUS, PRO/RT-11, ALL-IN-1, ASKIT, DECnet, VT, GIDIS, CTS-300, and IVIS are all trademarks of Digital Equipment Corporation.

of printers, plotters, and special purpose peripherals to choose from.

A TRUE DISTRIBUTED OFFICE WORKSTATION ON YOUR DESK.

The Professionals acknowledge the fact that you work in an office as well as in a lab, offering Pro Office Workstation, the Professionals' version of Digital's ALL-IN-1™ software, the best-engineered office automation system you can buy. Running in conjunction with a VAX host, ALL-IN-1 gives you word processing, automatic spelling verification, electronic filing, electronic mail, calendar management and more. And that can increase productivity organization-wide.

Office automation tools designed for independent use on your Professional include Digital's ASKIT™ software, which provides business

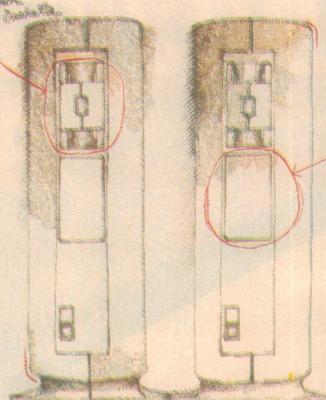
graphics, personal database, word processing and spreadsheet functions, plus a game. And with the optional CP/M® Softcard, you can run a variety of CP/M-80 packages on your Professional.

ETHERNET/DECNET LOCAL AREA NETWORKING TODAY.

The Professional 300 Series supports a variety of networking options. Foremost among these options is DECnet,™ which lets your Professional serve as a distributed workstation with PDP-11 and VAX processors. And, DECnet gives you a choice of local and wide-area communications devices, including 10 Mb/sec Ethernet, with full support for V2.0 standard (IEEE 802.3 specification); public packet-switched X.25 networks; and standard telephone lines.

And by virtue of its compatibility with PDP-11 and VAX RSX software and RMS file structures, the Professional lets you

download remote files from your PDP-11 or VAX to your Professional, all transparently to the user and the program. Or, if you wish, your Professional can



emulate Digital's VT™ terminals.

The Professional doesn't leave out the rest of the world, either. Device emulation includes IBM 3270, 2780/3780, 3277, and more.

THE LEADING GRAPHICS WORKSTATION IN ITS CLASS.

If you only want to portray simple X-Y values, lots of personal computers can do the job. But if you need a way to graphically display thousands of information variables, there's no finer tool available than a Professional. It gives you a palette of 4,096 colors to work with. State-of-the-art graphics architecture, like GIDIS,™ a virtual device interface, helps you design fast graphics for your programs, while allowing them to run independently of future hardware enhancements. Industry-standard graphics application interfaces are also available. And the Virtual Device Meta file capability lets you integrate text and graphics in a single file under P/OS 2.0. Just as important, the quality of Professional 300 graphics is unsurpassed. The bit mapped screen provides a

960 x 240 pixel resolution. And Digital's IVIS™ Interactive Video System is available for advanced program development.

BEST ENGINEERED MEANS ENGINEERED TO A PLAN.

The Professional 300 Series, like every Digital hardware and software product, is engineered to conform to an overall product plan. This means Digital systems are engineered to work together easily and expand inexpensively. Only Digital provides you with a single, integrated computing strategy from desk top to data center.

For more information on Digital's Professional 300 Series systems, the Professional 325 and the Professional 350, call 1-800-DIGITAL, ext. 690. Or send the coupon or write: Digital Equipment Corporation, Attn: Mr. Dennis Coady, 200 Baker Avenue, West Concord, Massachusetts 01742.

I'd like more information on Digital's Professional 300 Series, the Personal PDP-11's:

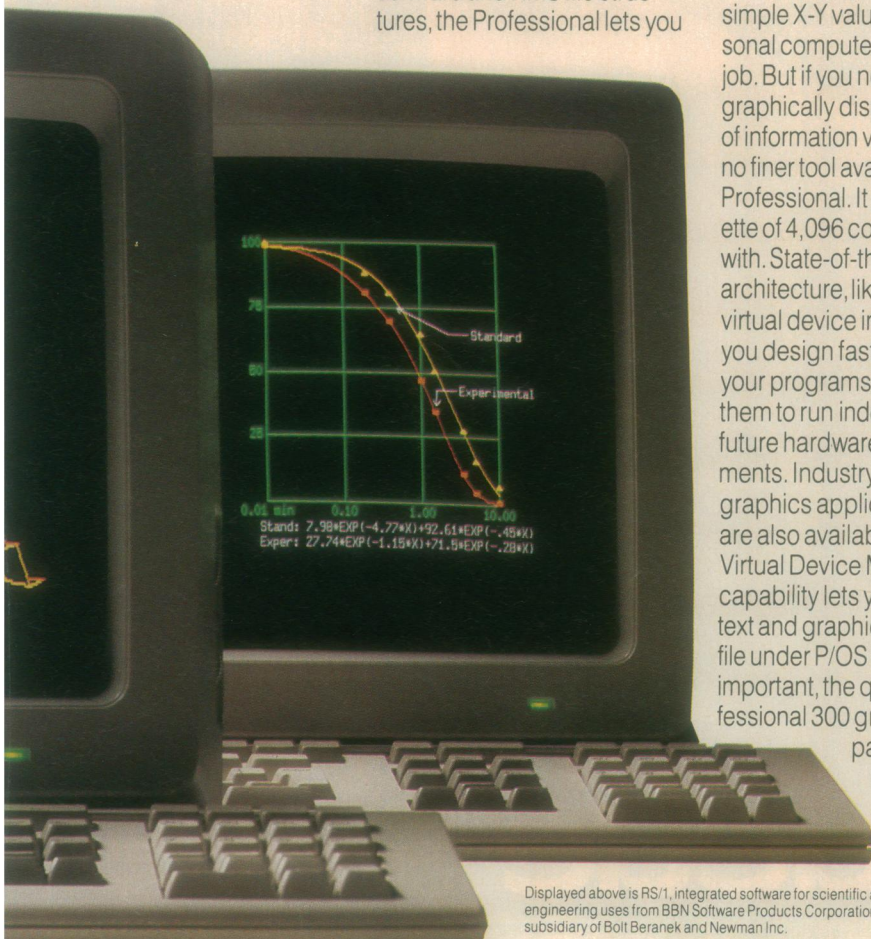
- ☐ Please send a copy of your new Professional Series Handbook.
- ☐ Please have a sales professional call with complete information.

Name _____
 Title _____
 Company _____
 Address _____
 City _____
 State _____ Zip _____
 Telephone _____ Ext. _____

Return to: Digital Equipment Corporation, Attn: Mr. Dennis Coady, 200 Baker Avenue, West Concord, MA 01742. Media Code: N.

THE BEST ENGINEERED COMPUTERS IN THE WORLD

digital™



Displayed above is RS/1, integrated software for scientific and engineering uses from BBN Software Products Corporation, a subsidiary of Bolt Beranek and Newman Inc.

BETTER CELL VIABILITY AT -100°C AND BELOW.

COLDER IS BETTER.

QUEUE CRYOSTAR™

Viability of stored cells increases dramatically with lower temperatures. As the evidence suggests, the colder the better.

That's why Queue Cryostar cryogenic preservation systems are built to operate comfortably at -100°C to -135°C .

Cryostar creates a precise top to bottom temperature uniformity that even liquid nitrogen vapor systems cannot achieve, and with quicker recovery at lower temperatures than conventional cascade freezers can deliver.

Our unmatched 25 month warranty makes Cryostar the most cost effective biological preservation system you can buy.

Need proof? Contact Queue for a literature portfolio with bibliography and comparative technical data on temperature uniformity and recovery.

Queue

Queue Systems Inc. Box 1901
Parkersburg, WV 26101 USA
Telephone 304/464-5400

Queue Systems International Telex 869424
Queue PKB

**The More You Understand
Cryogenic Preservation,
The Better We Look.**

Circle No. 18 on Readers' Service Card

© Copyright 1984 Queue Systems Inc.

FOR TODAY'S FACULTY AND COLLEGE STAFF MEMBERS* FROM 18 TO 80.

Whether you're thinking retirement or not, review the plan that provides for cash withdrawal and/or a lifetime income.

TIAA-CREF Supplemental Retirement Annuities (SRAs) offer you substantial flexibility including cash withdrawal and/or lifetime retirement income. You can even reduce your income taxes now!

You can begin contributions to an SRA at any age and begin benefits at any age up to age 71 unless you are still employed (then you can delay beginning benefits until age 80). For example, you could start contributions at age 25, and choose to begin benefits or withdraw cash at age 34, 40 or 50, regardless of your employment status.

Get your money at any time.

You can receive benefits as a lifetime income or over a fixed period of from 2 to 10 years. What's more, if you need it (even while employed by your current employer), you can withdraw all the money you have accumulated by surrendering your contracts. Or, you can withdraw \$1,000 or more every six months. There is never a cash surrender charge.

Contributions are tax-deferred, so you pay less income taxes now.

The federal income tax on your contributions is deferred until they are paid to you as benefits. So, you pay less tax now.

Changing employers? Take SRAs with you.

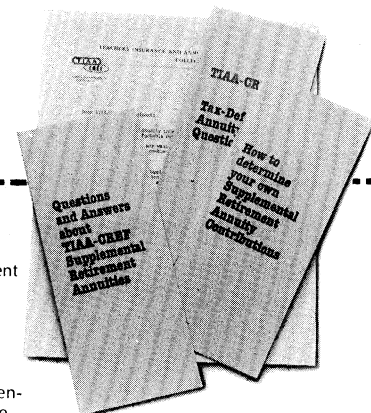
Since you own your Supplemental Retirement Annuities, you take them with you if you leave your current employer. You can make contributions through any institution that makes Supplemental Retirement Annuities available to staff members. Contributions can be as little as \$25 a month.

Full information.

Complete and mail the coupon for an SRA Information Kit today. You'll get full details about all the advantages SRAs have to offer, why this plan suits so many financial situations and age groups and how much you may contribute to the plan.

*TIAA-CREF provides annuities and other services for employees of colleges, universities, private schools and certain other nonprofit tax-exempt educational and research institutions.

**HELP YOURSELF TO A BRIGHTER FINANCIAL FUTURE
...SEND FOR A FREE INFORMATION KIT.**



Teachers Insurance and
Annuity Association of
America—College Retirement
Equities Fund
730 Third Avenue
New York, N.Y. 10017

Please send me full details about TIAA-CREF Supplemental Retirement Annuities, the flexible tax-deferred annuity plan that offers the opportunity to accumulate funds for additional retirement income and the option for cash withdrawal.

Name _____

Address _____

City _____

State _____ Zip _____ Date of Birth _____

Name of Institution _____

Please let us know if you are participating in a TIAA-CREF retirement plan at your institution. ☐ YES ☐ NO

S52584

SECOND INTERNATIONAL CONGRESS ON COMPUTERS IN SCIENCE

28 October - 1 November 1984

Washington Hilton, Washington DC

Chairman: Stephen R. Heller
Environmental Protection Agency, Washington DC 20460

THEME: Workstations for the Scientist

OPENING ADDRESS

Computer Education/Literacy for the Scientists – C.D. Martin, George Washington University, Washington, D.C.

SESSION TOPICS

Scientific Data Bases – L. Gevantman, National Bureau of Standards, Washington, D.C.
Computer Aided Molecular Design – R. Potenzzone Jr., American Cyanamid Co., Stamford, Conn.
Artificial Intelligence – P. Friedland, Stanford University, Stanford, CA.
Biological Workstations – P. Armstrong, Intelligenetics, Inc., Palo Alto, CA.
Management of the Electronic Laboratory – R. Dessy, Virginia Polytechnic Institute, Blacksburg, VA.
Laboratory Automation and Robotics – J. Lemanowicz, Exxon Research and Engineering, Annadale, N.J.
Workstation Hardware – Speaker to be announced.
Workshops – To be announced.

POSTER SESSIONS: WORKSTATION APPLICATIONS

Participants are invited to submit abstracts for the poster sessions. These abstracts will be reviewed up until the time of the meeting; however, only those accepted by 15 September 1984 will be listed in the conference program. For abstract forms contact address listed below.

SCICOMP EXHIBITION

A large exhibit of state of the art hardware, software and systems will also be part of the overall conference.

**Organized by Scherago Associates, Inc.
in conjunction with SCIENCE Magazine.**

Scherago Associates, Inc., 1515 Broadway, New York, NY 10036, (212) 730-1050

REGISTRATION FEES: Make checks payable to: Scherago Assoc., Inc., COMPUTERS IN SCIENCE

\$200 On-site registration – Received after June 15th
\$150 ADVANCE REGISTRATION – Received by June 15th
\$125 Group Registrations – 4 or more received *together* from same organization by June 15th
\$ 50 Student Registrations – *Must* have status confirmed in writing by department chairman.

- ☐ Please reserve _____ space(s): Registration Fee of \$ _____ enclosed.
☐ Please send EXHIBIT SPACE information.

Please Print

Name _____ Street _____
Dept. _____ City _____ State _____ Zip _____
Organization _____ Telephone: (_____) _____

Return to: Computers in Science, Scherago Associates, Inc., 1515 Broadway, New York, NY 10036, Tel: (212) 730-1050
All cancellations must be received in writing by Scherago Associates, Inc. no later than September 21, 1984 – no refunds will be given after this date.

How Much Time & Grief Has Two-Dimensional Gel Electrophoresis Cost You?

Vicker's ScanagelTM is an easy-to-use, stand alone instrument designed specifically to give the protein chemist fast, reliable analysis and comparison of 2-D electrophoresis gels.

Scanagel analyzes wet gels or autoradiographs of any size from 4 X 4 cm to 20 X 20 cm. The image processing software performs background corrections, maintains a data base on each gel and compares the matched and unmatched peaks between two gels.

To obtain more information call us at 1-800-VICKERS (in MA 617-324-0350) or see us at ASBC BOOTH K28.

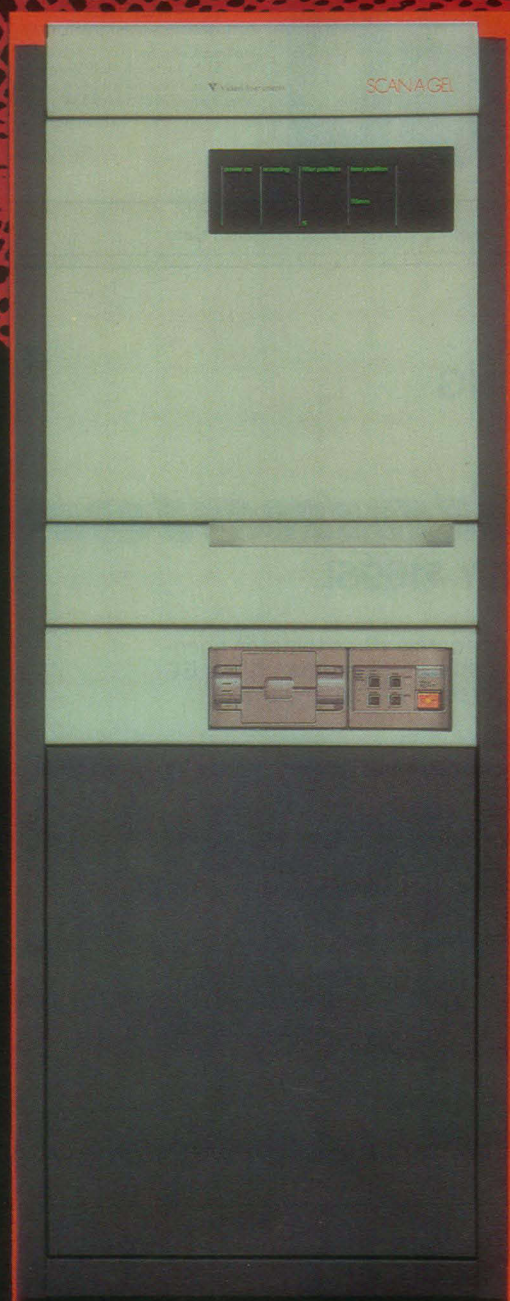
Output Is Menu Selectable:

Peak Lists

2-D Ellipse Plot

2-D Contour Plot

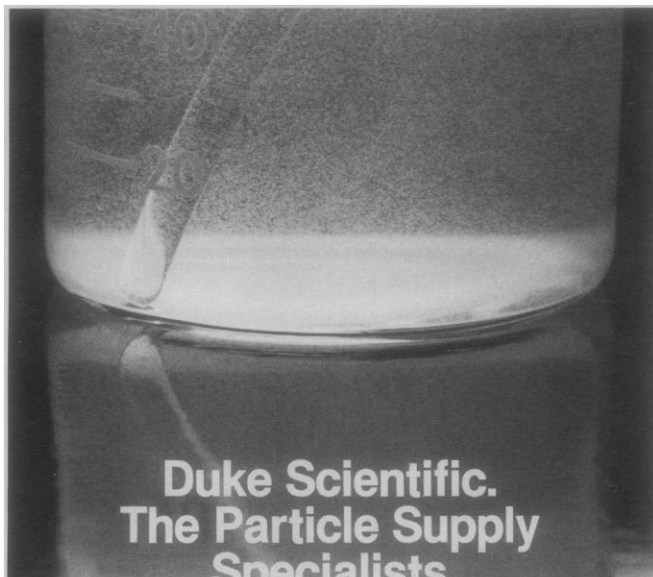
3-D Surface Plot



Vickers Instruments, Inc.

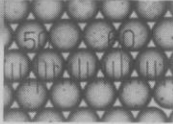
P.O. Box 99 Malden, MA 02148

Circle No. 227 on Readers' Service Card



**Duke Scientific.
The Particle Supply
Specialists**

If you are concerned with particle-size analysis, you should know about us. For more than 10 years, we have stocked a wide range of reference particles and microspheres for instrument checking, biotechnology and fluid mechanics. We have more products and expertise than any other source. Call us today for answers to your particle supply problems.

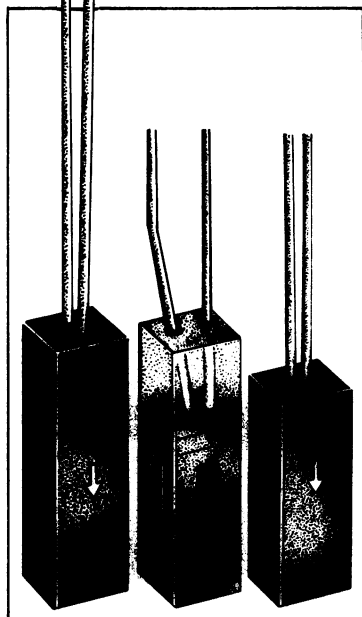


Duke Scientific Corporation

U.S.A., 2415 Embarcadero Way, Palo Alto, CA 94303, (415) 424-1100, Telex: 334490
Europe, Duke Scientific Europe, P.O. Box 594, Hilversum, Holland, 035-19587, Telex: 43084
Japan, Moritex Corporation, Tokyo, 03-476-1457, Telex: 0242-4563
Canada, Mono Research Laboratories Ltd., Shelburne, Ontario, (519) 925-6850, Telex: 0697796

Circle No. 260 on Readers' Service Card

HELLMA[®] HPLC



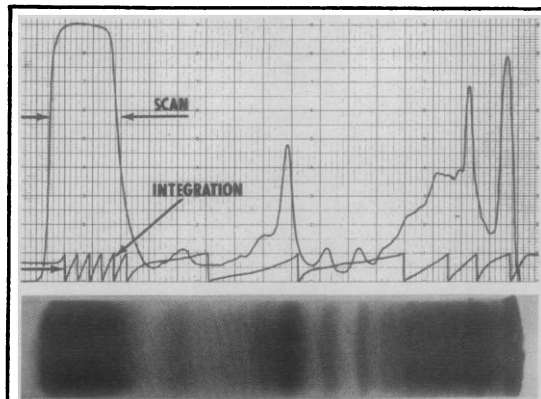
A complete line of Flow Cells capable of turning any spectrophotometer into an HPLC detector.

Deuterium Lamps available for every instrument.

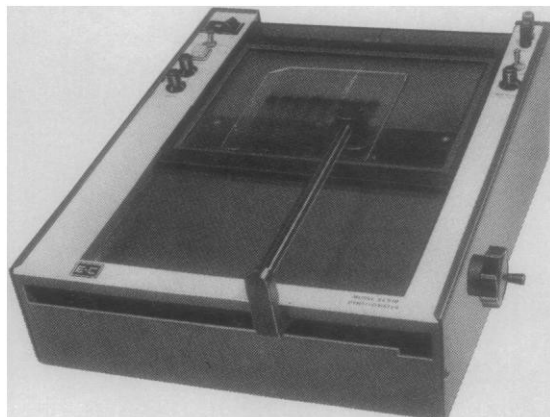
For 20 years...
HELLMA
tomorrow's designs today.

Hellma Cells, Inc.
Box 544, Borough Hall Station
Jamaica, New York 11424
Telephone (212) 544-9534

Circle No. 167 on Readers' Service Card



External recorder trace of densitometer scan and integrate signals



THIS SCANNING, INTEGRATING *Gel Densitometer* COSTS ONLY \$1695!

No other electrophoresis densitometer scanning in the visible light range can match the EC 910 for value and versatility — at any price.

Check these features:

- accepts whole slabs or columns
- electronic integration
- connects to all millivolt recorders
- two scan speeds for best resolution
- slit sizes from 0.1 mm for 50 micron resolution
- interchangeable filters in visible spectrum
- templates available for all supporting media
- compact, lightweight, solid state

Need proof? Send us a troublesome pattern. We'll scan and integrate it and return it to you with a complete report. For more information, call 1-800-624-2232 toll-free (in Florida, 1-800-282-7932).



E-C Apparatus Corp.
3831 Tyrone Blvd. N.,
St. Petersburg, Florida 33709
Telephone: 813-344-1644, Telex: 51-4736 HALA

OLYMPUS®

The Image of Quality

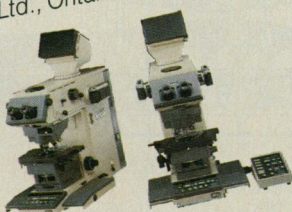
Introducing the New VANOX. A breakthrough in research capability.

The quality of any research microscope relies on the interrelationship of optical performance, computer intelligence and mechanical capability. For more than six decades, Olympus has dedicated itself to development of a unique fusion of these distinct disciplines.

Nowhere is this achievement better exemplified than in the all-new Vanox Research Microscope System. An innovative concept that builds into the System's models a broad range of skills and versatility traditionally requiring attachments, accessories and add-ons to limited-capability microscopes...all make the new Vanox the most significant contribution to research microscopes in over a decade.

Some of the built-in innovations include three photographic ports for cine, 35mm or large format cameras, auto-exposure with spot or integrated measurements, light balancing filters, choice of condensers and illuminators, including Koehler, and so much more that only a hands-on experience can attempt to show the breakthrough quality of the new Vanox models. Arrange a demonstration now by contacting Olympus Corporation, Precision Instrument Division, 4 Nevada Drive, Lake Success, NY 11042-1179. Or phone: East—(609) 482-1010; West—(415) 342-3384; Midwest—(913) 648-8323. In Canada: W. Carsen Co., Ltd., Ontario

OLYMPUS®



NEW VANOX

For a demonstration circle reader service number 136
For literature circle reader service number 221

Photomicroscope III

There's still nothing like it!

The 35mm camera is built in

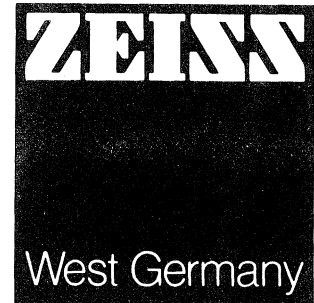
The schematic below shows why the Zeiss Photomicroscope is unique: it contains a completely integrated, fully automatic 35mm camera. You get great convenience in a compact and uncluttered microscope. The tube head is free to accept auxiliary documentation and observation equipment as well as photometers.

Quality service—Expert dealers.

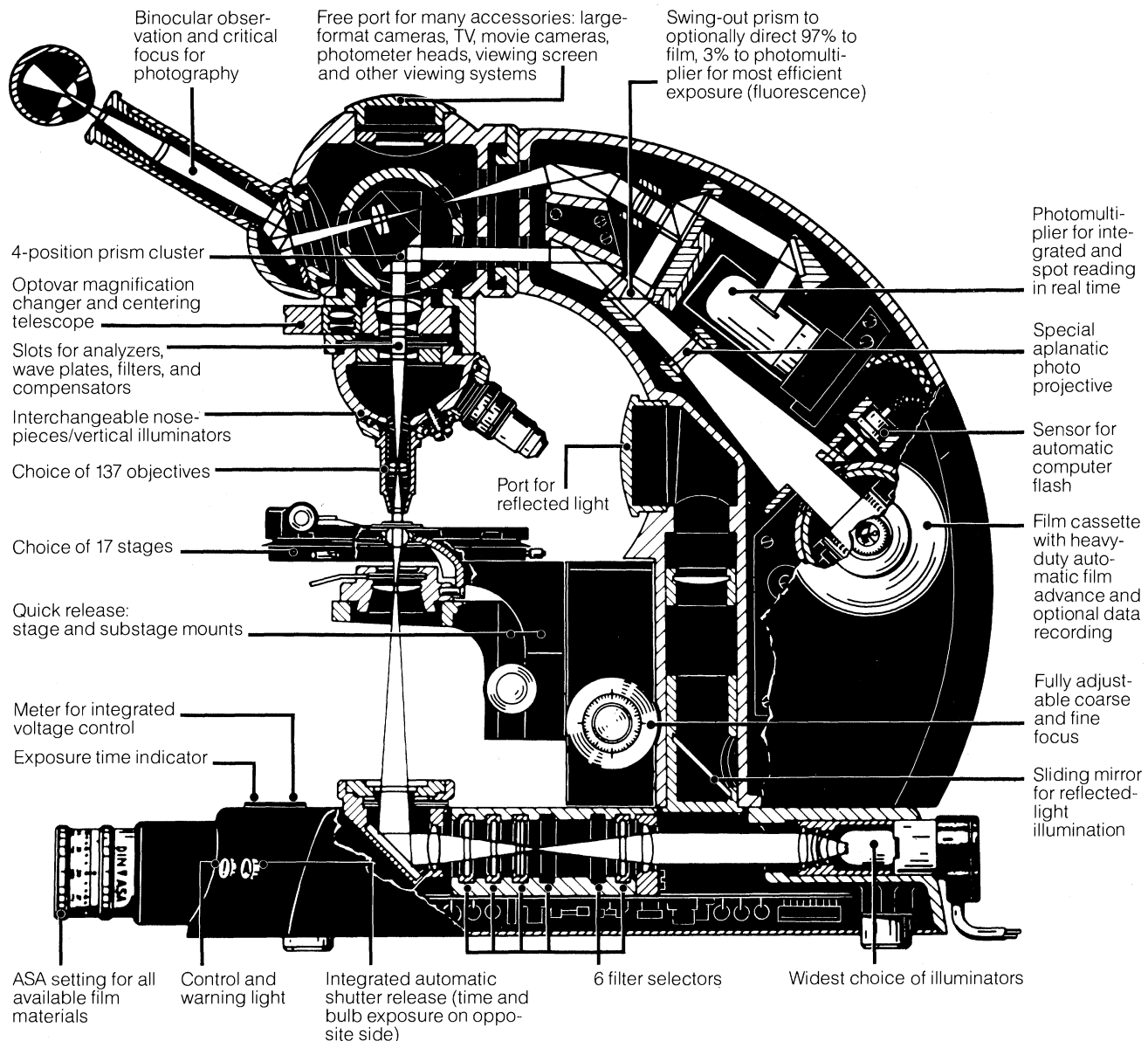
Everything you need for your research

Start with the optics. 137 objectives...Achromats, Planachromats, Neofluars, and the unmatched Planapochromats, which, along with the unique multiple-immersion, high-numerical-aperture Plan Neofluars, are ideal for brilliant fluorescence microscopy, too. From object to image, everything you need for every technique in transmitted and reflected light.

The great name in optics



Carl Zeiss, Inc., One Zeiss Drive, Thornwood, NY 10594
(914) 747-1800



AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Science serves its readers as a forum for the presentation and discussion of important issues related to the advancement of science, including the presentation of minority or conflicting points of view, rather than by publishing only material on which a consensus has been reached. Accordingly, all articles published in *Science*—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by the AAAS or the institutions with which the authors are affiliated.

Editorial Board

FREDERICK R. BLATTNER, BERNARD F. BURKE, ARNOLD DEMAIN, CHARLES L. DRAKE, ARTHUR F. FINDEIS, E. PETER GEIDUSCHEK, GYNN ISAAC, NEAL E. MILLER, FREDERICK MOSTELLER, ALLEN NEWELL, RUTH PATRICK, BRYANT W. ROSSITER, VERA C. RUBIN, WILLIAM P. SLICHTER, SOLOMON H. SNYDER, PAUL E. WAGGONER, JOHN WOOD

Publisher: WILLIAM D. CAREY
Associate Publisher: ROBERT V. ORMES

Editor: PHILIP H. ABELSON

Editorial Staff

Assistant Managing Editor: JOHN E. RINGLE
Production Editor: ELLEN E. MURPHY
Business Manager: HANS NUSSBAUM
News Editor: BARBARA J. CULLITON
News and Comment: COLIN NORMAN (deputy editor), JEFFREY L. FOX, CONSTANCE HOLDEN, ELIOT MARSHALL, R. JEFFREY SMITH, MARJORIE SUN, JOHN WALSH
European Correspondent: DAVID DICKSON
Contributing Writer: LUTHER J. CARTER
Research News: ROGER LEWIN (deputy editor), RICHARD A. KERR, GINA KOLATA, JEAN L. MARX, THOMAS H. MAUGH II, ARTHUR L. ROBINSON, M. MITCHELL WALDROP
Administrative Assistant, News: SCHERRAINE MACK;
Editorial Assistant, News: FANNIE GROOM
Senior Editors: ELEANORE BUTZ, MARY DORFMAN, RUTH KULSTAD
Associate Editors: MARTHA COLLINS, SYLVIA EBERHART, CAITILIN GORDON, LOIS SCHMITT
Assistant Editors: STEPHEN KEPPEL, LISA MCCULLOUGH, EDITH MEYERS
Book Reviews: KATHERINE LIVINGSTON, *Editor:* LINDA HEISERMAN, JANET KEGG
Letters: CHRISTINE GILBERT
Copy Editor: ISABELLA BOULDIN
Production: JOHN BAKER, HOLLY BISHOP, ELEANOR WARNER, JEAN ROCKWOOD, SHARON RYAN, BEVERLY SHIELDS
Covers, Reprints, and Permissions: GRAYCE FINGER, *Editor:* GERALDINE CRUMP, CORRINE HARRIS
Guide to Scientific Instruments: RICHARD G. SOMMER
Editorial Administrator: SUSAN ELLIOTT
Assistant to the Associate Publisher: ROSE LOWERY
Assistant to the Managing Editor: NANCY HARTNAGEL
Membership Recruitment: GWENDOLYN HUDDLE
Member and Subscription Records: ANN RAGLAND
EDITORIAL CORRESPONDENCE: 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Area code 202. General Editorial Office, 467-4350; Book Reviews, 467-4367; Guide to Scientific Instruments, 467-4480; News and Comment, 467-4430; Reprints and Permissions, 467-4483; Research News, 467-4321. Cable: Advancesci, Washington. For "Information for Contributors," write to the editorial office or see page xi, *Science*, 30 March 1984.
BUSINESS CORRESPONDENCE: Area Code 202. Membership and Subscriptions: 467-4417.

Advertising Representatives

Director: EARL J. SCHERAGO
Production Manager: GINA REILLY
Advertising Sales Manager: RICHARD L. CHARLES
Marketing Manager: HERBERT L. BURKLUND
Sales: NEW YORK, N.Y. 10036: Steve Hamburger, 1515 Broadway (212-730-1050); SCOTCH PLAINS, N.J. 07076: C. Richard Callis, 12 Unami Lane (201-889-4873); CHICAGO, ILL. 60611: Jack Ryan, Room 2107, 919 N. Michigan Ave. (312-337-4973); BEVERLY HILLS, CALIF. 90211: Winn Nance, 111 N. La Cienega Blvd. (213-657-2772); SAN JOSE, CALIF. 95112: Bob Brindley, 310 S. 16 St. (408-998-4690); DORSET, VT. 05251: Fred W. Diefenbach, Kent Hill Rd. (802-867-5581).
ADVERTISING CORRESPONDENCE: Tenth floor, 1515 Broadway, New York 10036 (212-730-1050).

Defense R&D Priorities

As the swollen and deficit-crippled federal budget for 1985 faces partisan wrangling in the glare of election-year politics, the bargaining process bears watching. With proposed budget authority for the Department of Defense at an all-time high under the Reagan dispensation, consensus politics will certainly lead to a significant cutback while a margin of real growth from the current year will be maintained.

The research and development component of the defense budget presents an inviting target. After all, a 27 percent increase (in current dollars, to be sure) on top of a comparable jump of 18 percent the year before, tends to concentrate attention. It is politically convenient to make a cut where it is least vexing to those who measure the adequacy of defense forces by counting slots and equipments and who put a higher value on near-term readiness than on investments in quality. Research and development equate, in this view, with discretionary spending and far-out fantasies.

What is missed in bundling the "R" together with the "D" in the Defense numbers is the striking dominance of support for development and the modesty of the allocations to research. The research (or 6.1) category, for example, is budgeted for a shaky 2 percent real growth, while the provision for exploratory development calls for a mere 1 percent. Taken together, these two categories of investment represent what is termed "technology base" effort, yet they draw slim rations in an otherwise aggressive budget for research and development. It is a curious outcome in resource allocation.

What would seem to be happening is that within the Department of Defense the respective services are allowed broad discretion in funneling expanding requirements into stipulated budget ceilings, and the claiming race puts hard requirements ahead of discretionary research. Yet, the rush to proceed with development while shortchanging the technology base reflects a trade-off decision that is fundamentally flawed. Nor can it be compensated for by specialized "star wars" research or by the generous buildup of basic research support in the budget of the National Science Foundation. Every annual budget is spattered with contradictions, to be sure, but one would not expect an administration so compulsively oriented toward enhancement of the national security to fail to protect investment in the technology base as the source of downstream assets.

More troubling is the probable fate of the trivial increment for the technology base in the 1985 budget. As Congress lunges at formulas for shaving deficits, the probability is that the defense budget will be handed a percentage cut. As this cut is applied throughout the national defense function, research and development will absorb their share. But given the dynamics of the process, the development shopping list is likely to be sheltered at the expense of the technology base, and, in the absence of intervention from the top, the outcome will be depleted investment in the technology base, a result that can only be termed imprudent and counterproductive.

As with everything else in the federal budget, the size and the mix of the defense budget is a political question. The growth of that budget and its constraining impact on other demands on insufficient resources invites controversy. Like most controversies, this one will be resolved by compromise. The execution of the settlement also matters, however, and it is at this stage of political action that the ox is gored. The coalitions that will spring to the rescue of military procurement and operational needs are unlikely to forgo short-term enhancements in order to spare investments in long-range and high-risk technology-base research, modest as the level of investment may be. Under the circumstances, it is high time to bring the Defense Science Board into the budget process.—WILLIAM D. CAREY

**Serum-Free Media
for Established Myeloma and Hybridoma Cell Lines**

HB 101^{*®}

FOR SP2/O-AG-14 AND
P3X63-AG8.653 PARENTAL MYELOMA
AND DERIVED HYBRIDOMAS.

HB 102[†]

FOR P3-NSI-AG-4-1 (NS-1)
PARENTAL MYELOMA
AND DERIVED HYBRIDOMAS.

HB 104[™]

- Optimized, serum-free for human-human hybridomas.
- Contains only three proteins, all of human origin.
- QC tested to meet therapeutic monoclonal production protocols.

For more information or to order, use our toll-free number:

800-772-4262



Hana Media, Inc.
A subsidiary of Hana Biologics, Inc.
626 Bancroft Way, Berkeley, California 94710
415-549-1066

*Patent pending.
†HB102 is modified
Kawamoto-Sato medium.