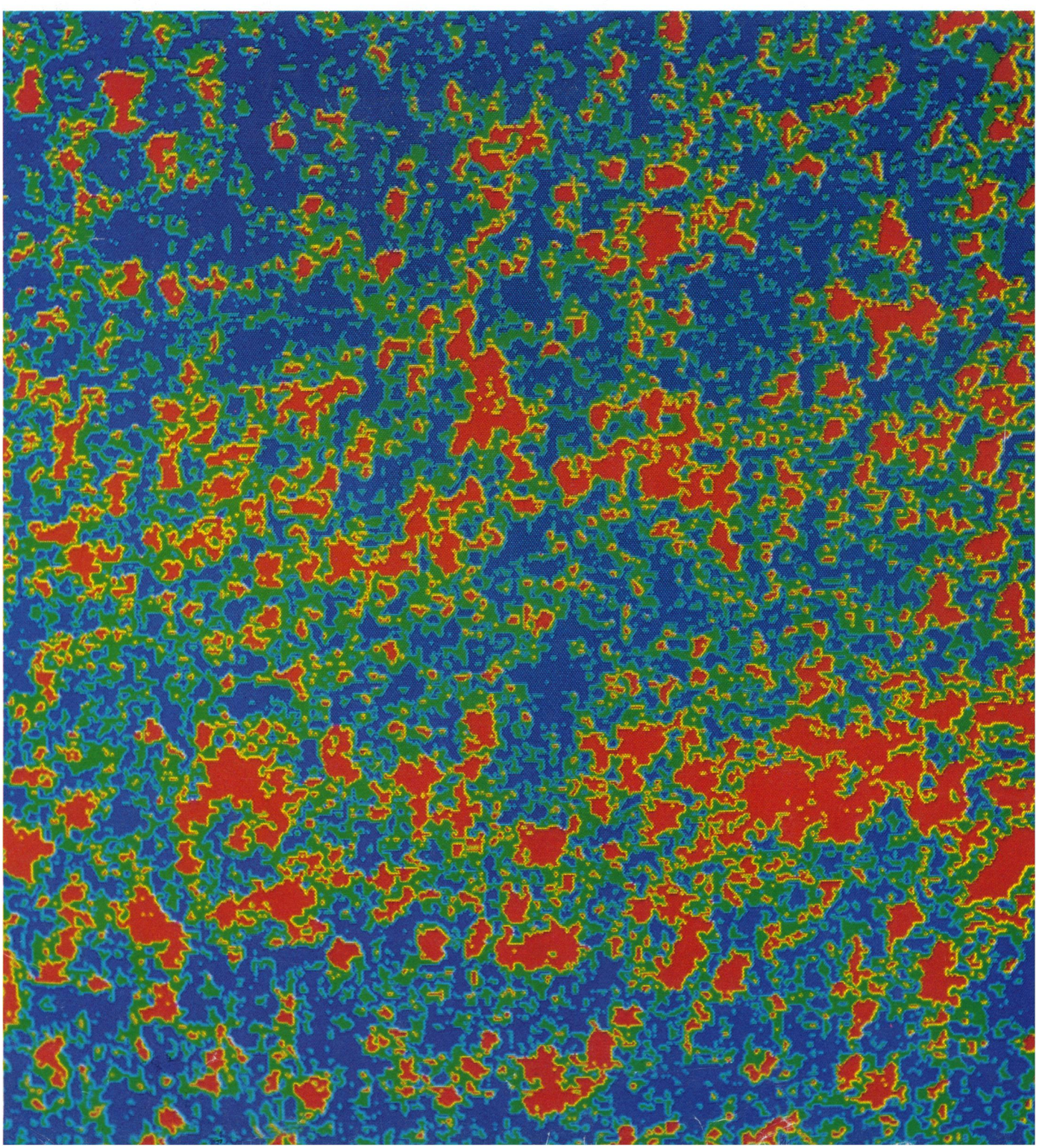
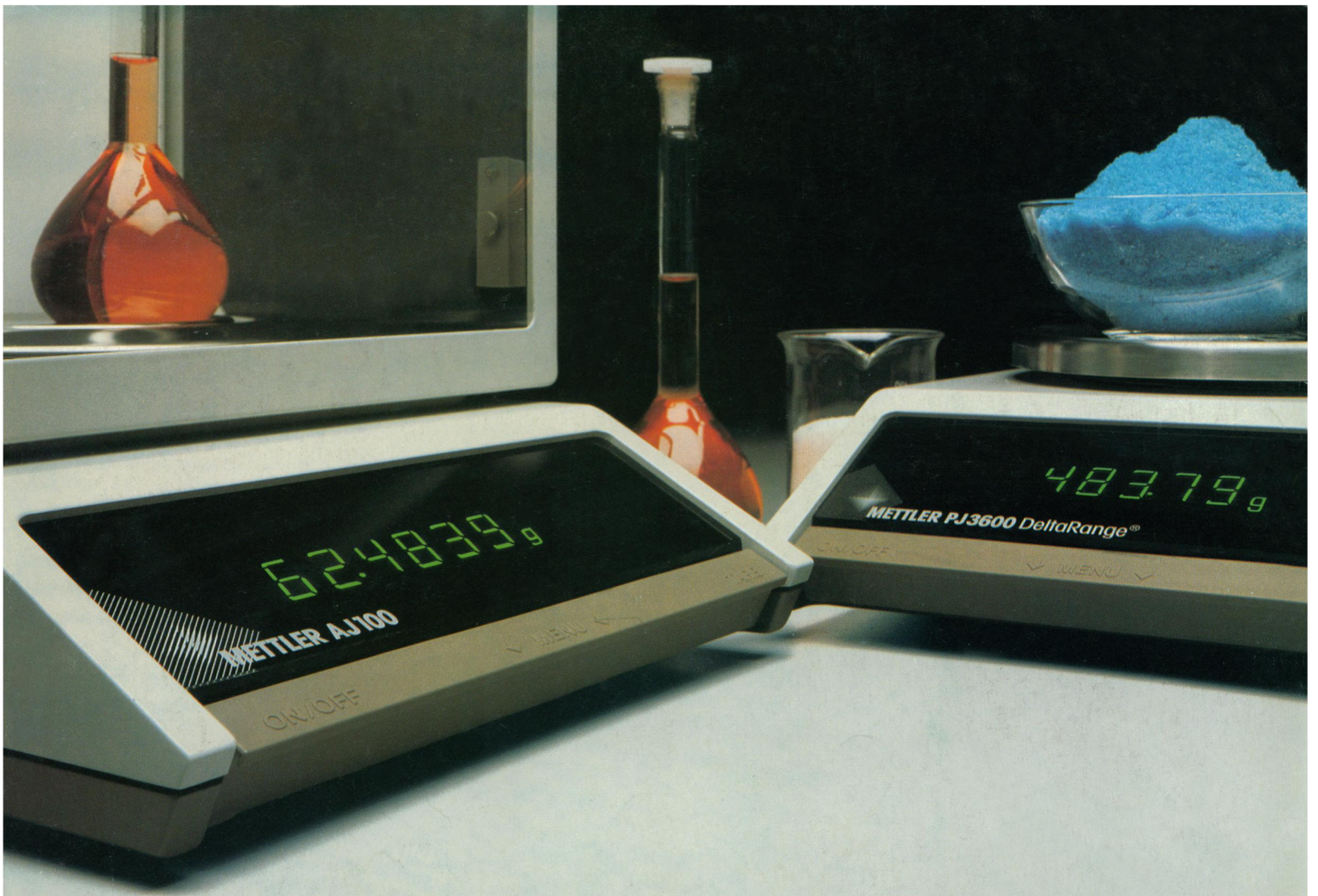
American Association for the Advancement of Science

SCIENCE

20 February 1987 $2.50
Vol. 235 ■ Pages 821–944



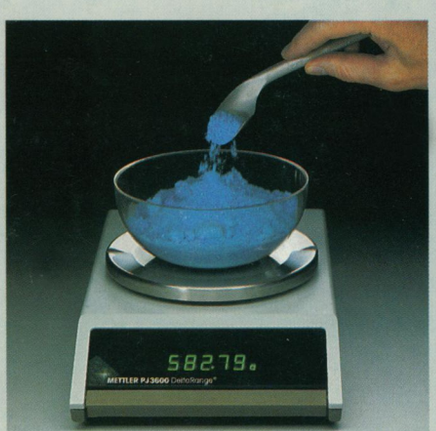


Introducing the Basic Balances from METTLER. When all you need is the weight.

The new METTLER J Series

When all you need is the weight, METTLER's new J Series delivers results as only METTLER can. They're built in the METTLER tradition – but brought to you at a new low price, because we took out applications features you may never need. It's designed for users who only need a basic balance, but demand the performance of a METTLER.

Built with METTLER quality. Backed by METTLER service. Bringing confidence to your work. It's an extra balance to increase productivity in your laboratory. It's a back-up balance to help you through a heavy workload. Or it's an easy-to-use electronic balance for the classroom. It's METTLER's basic balance. The J Series – seven new precision balances with capacities from 310 g to 6000 g, readabilities from 0.001 g to 0.1 g, and one new analytical with a 110 g capacity, readability to 0.1 mg.



For complete information and a copy of our J Series brochure call 1-800-METTLER, in New Jersey (609) 448-3000 or write Mettler Instrument Corporation, Box 71, Hightstown, NJ 08520.

We understand.
Precisely.

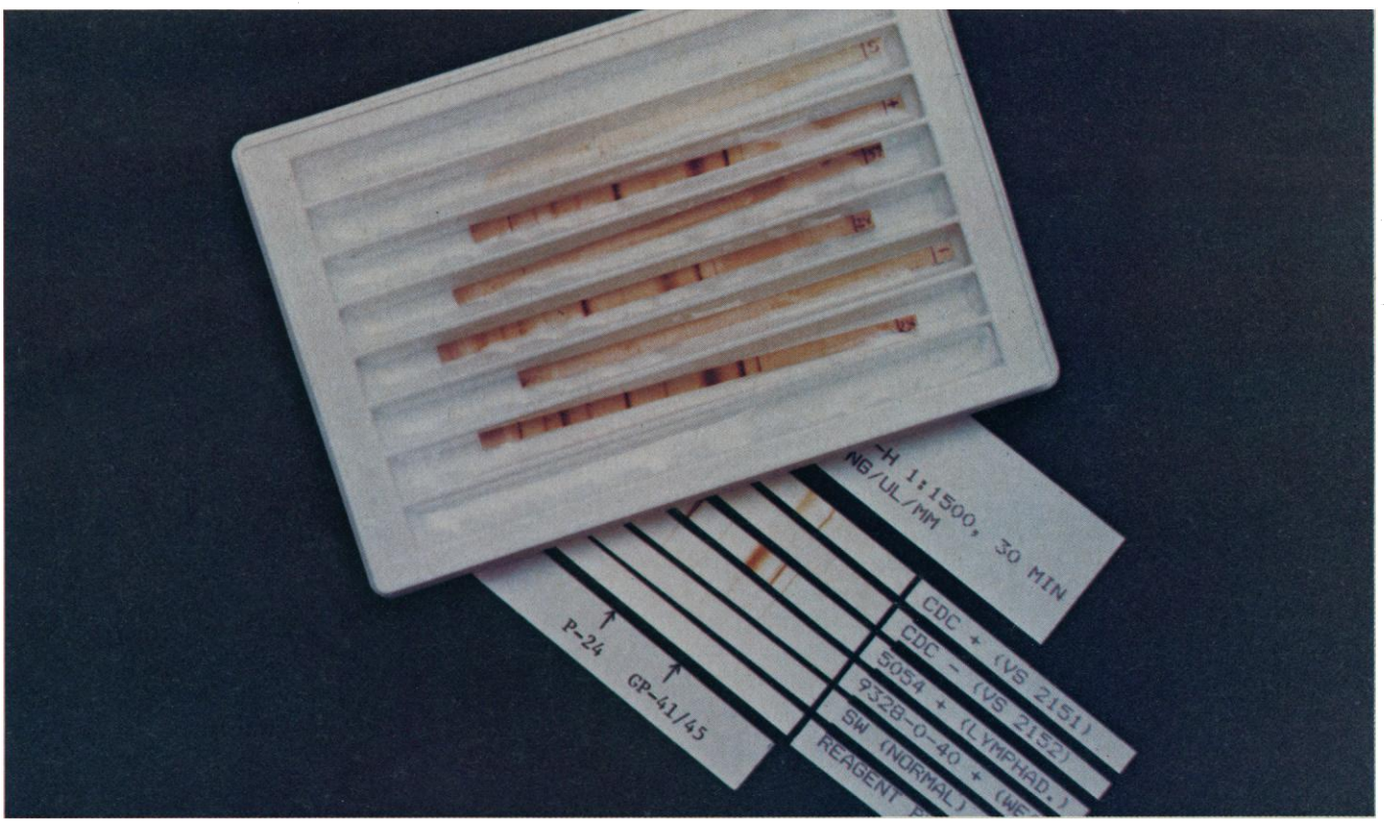
METTLER

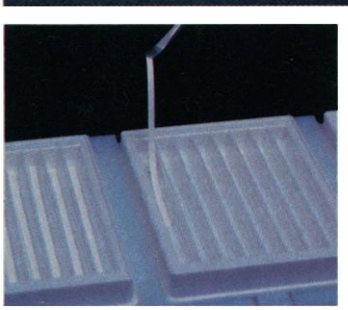
Circle No. 156 on Readers' Service Card

6665.72

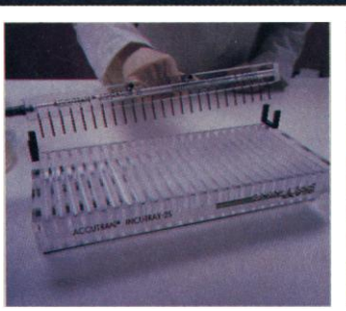
PROOF POSITIVE.

The S&S Accutran™ System optimizes the accuracy of "western" blot immunoassay procedures.

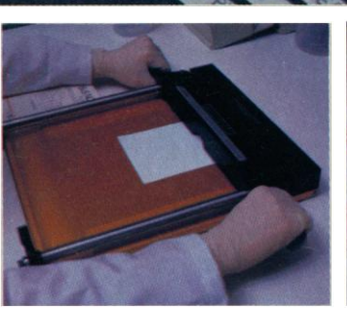




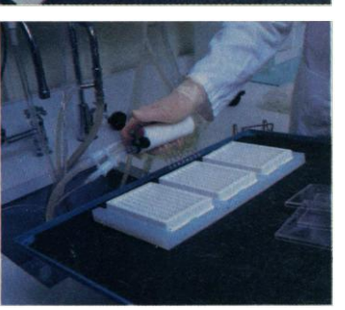
Disposable incubation trays—non-protein-binding surface; minimal volumes needed to cover small strips.



Incutray and Aspirator-25—for incubating/processing larger strips.



Membrane strip cutter—precise cutting of up to 65 strips in less than one minute.



Immuno-strip washer—time-saving aspiration/delivery system.

S&S brings you the first system designed to increase the speed, accuracy and productivity of western blot testing. Whatever components you choose, you'll find they will fit into your operations smoothly.

Whether you're doing mass testing or research, whether you work with 'mini' gels or large gels, whether your needs dictate disposable or reusable accessories—there are one or more Accutran products to make your job easier and more efficient.

Put the Accutran System to the test in your lab. The first time you use it, you'll have proof positive that it's indispensable.

Call or write for further information.

Schleicher & Schuell

Schleicher & Schuell, Inc., Keene, NH 03431 • 800-245-4024 • 603-352-3810

Schleicher & Schuell GmbH, D-3354 Dassel, West Germany • Schleicher & Schuell AG, CH-8714 Feldbach ZH, Switzerland

Schleicher & Schuell Nederland BV, 5201 AH 's-Hertogenbosch, The Netherlands

Circle No. 148 on Readers' Service Card

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SCIENCE

ISSN 0036-8075
20 FEBRUARY 1987
VOLUME 235
NUMBER 4791

■ **SCIENCE is published weekly on Friday, except the last week in December, and with an extra issue in February by the American Association for the Advancement of Science, 1333 H Street, NW, Washington, DC 20005.** Second-class postage (publication No. 484460) paid at Washington, DC, and at an additional entry. Now combined with **The Scientific Monthly®** Domestic individual membership and subscription (51 issues): $65. Domestic institutional subscription (51 issues): $98. Foreign postage extra: Canada $32, 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 $4 ($4.50 by mail); Biotechnology issue, $5.50 ($6 by mail); classroom rates on request; Guide to Biotechnology Products and Instruments $16 ($17 by mail). **Change of address:** allow 6 weeks, giving old and new addresses and seven-digit account number. **Postmaster:** Send Form 3579 to *Science*, 1333 H Street, NW, Washington, DC 20005. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

■ The 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 improve 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.

COVER A color graphic display of an optical density scan of prefrontal cortex from a cynomolgus monkey, hybridized with an RNA probe transcribed from complementary DNA clone λAm4 coding for Alzheimer β amyloid polypeptide. Each color represents an optical density range of grain clusters, with red as highest, green as intermediate, and blue as lowest density. See page 873. [Graphic provided by John H. Morrison, Gerald A. Higgins, David A. Lewis, and Michael C. Wilson, Scripps Clinic and Research Foundation, La Jolla, CA 92037; and Sina Bahmanyar, Dmitry Goldgaber, S. K. Shankar, and D. Carleton Gajdusek, National Institutes of Health, Bethesda, MD 20205; computer software (E.M.M.A.) by Warren Young and Mark Shin, Scripps Clinic and Research Foundation]

The compact new HBI Micro Centrifuge. Take it for a spin. You'll love it.

The new HBI Micro Centrifuge really lives up to its name. Smaller than the width of this page and weighing only 12 pounds, it can easily be carried into a cold room, another lab, or anywhere you need it.

Despite its truly compact dimensions, it accelerates smoothly and quietly to 13,000 max. rpm (13,400 x g) in just 10 seconds. Its top-mounted, autoclavable rotor is far easier to load, empty or clean than rotors in wells, as on other microcentrifuges. Convenient features include dual speed selector, safety lid lock, 10-min. timer, pulse switch and open lid light. Interchangeable adaptor plates accept 12 × 1.5, 14 × 0.75 and 18 × 0.4mL micro test tubes and B-D Microtainer* Tubes.

Last but not least, you'll love its price. Need more information? Call toll-free: 1-800-631-1369 (in NJ, 201-843-2320) or write: HBI, 244 Saddle River Road, Saddle Brook, NJ 07662-6001.

*Microtainer is a trademark of Becton Dickinson and Company.

For unique laboratory equipment
HAAKE BUCHLER INSTRUMENTS, INC.

HBI

Circle No. 127 on Readers' Service Card

(Shown actual size!)

Visit us at Pittsburgh Conference, Booths 18000-18009

This Week in
SCIENCE

Seabed resources

WATER covers three-quarters of the earth, making the seafloor an obvious potential source of minerals and other materials now mined onshore (page 853). But, based on the economics of extracting materials from the seabed as well as the apparent long-term supplies of land resources, Broadus predicts that seabed mining is not likely to be widespread in the near future. Technologic know-how cannot yet solve many of the mining problems specific to the deep sea. And, resource extraction is, in general, more expensive at greater depths. (Sometimes, however, if a deposit is large and rich enough, the payoff may be worth the expenditure; offshore gas and oil deposits are examples of this.) Interestingly, despite the evidence that seabed mining is not usually cost-effective, interest remains high in it; in part this reflects international tensions over who has rights to the sea and its resources. Important spinoffs from seabed exploration include new approaches for locating resources on land and insights into the geochemistry and geophysics of the earth.

Self, nonself

THE immune system can discriminate what is foreign from what is self (page 865). Peptides of foreign antigens bind to cells on which they become physically associated with class II molecules on the surface; the peptides are presented to and activate antigen-responsive T cells, and eventually immune responsiveness or tolerance results. Guillet *et al.* found that peptides of diverse antigens can bind to the same class II molecule; such peptides had regions of homology with each other and with their associated class II molecule. Avid binding in vitro between a peptide and a class II molecule that appeared, in previous studies, not to be a permissible combination suggested that, although sometimes unresponsiveness may occur if peptides find no suitable class II molecules, at other times unresponsiveness may occur if antigen-responsive T cells are missing from the host's repertoire; a hole in the T cell population of mice was indeed found. The studies suggest that, for a peptide to be immunogenic, its homology (structural or functional) with class II molecules must be sufficient for binding but not so exact that, when associated with the class II molecule, the complex looks like self. Marx discusses research on self, nonself discrimination and the implications of the hypotheses engendered by these data for explaining how the immune system works (page 843).

Alzheimer's disease

SIGNIFICANT progress has been made toward defining biochemical and genetic processes that contribute to the development of Alzheimer's disease, which causes progressive loss of ability to function both mentally and physically (pages 873, 877, 880, and 885). There is no cure or treatment and in the most heavily afflicted groups the prevalence is greater than 5%. In the brains of victims, degenerating axons of nerve cells surround deposits of amyloid protein and form tangled masses. Similar "neuritic plaques" are deposited in brains of Down syndrome victims and aging animals (Selkoe *et al.*); these plaques may form by a common mechanism. The DNA encoding amyloid has been isolated, cloned, and characterized (Goldgaber *et al.* and Tanzi *et al.*). It was used to study where the amyloid gene was expressed in Alzheimer's and Down syndrome brains and to map the chromosomal location of the gene in Alzheimer's disease (to chromosome 21). Several families were studied in which Alzheimer's is inherited; the genetic defect mapped to chromosome 21 (St George-Hyslop *et al.*). (In addition, chromosome 21 is associated with Down syndrome.) Whether the amyloid gene and the Alzheimer's gene are the same or only close on the chromosome is yet to be determined. Barnes elaborates on the significance of this research, the techniques used, and issues that remain for associating pathology with a genetic factor (page 846).

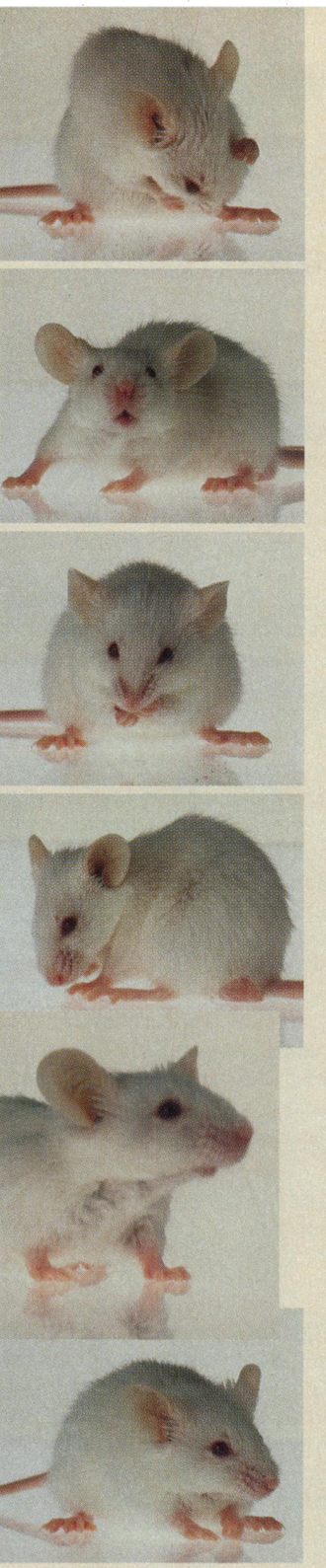
Dangerous combination

EPILEPTICS who take valproic acid (VPA) in conjunction with phenobarbital to control convulsions are at greater risk of experiencing liver damage and death than are those who receive VPA alone (page 890). The damage is thought to be caused by a metabolic product of VPA, Δ^4-VPA; Rettie *et al.* investigated why more of this metabolite is generated during combination therapy. In vitro, when VPA was incubated with microsomal preparations from rats that had been treated with phenobarbital, large quantities of Δ^4-VPA were produced; parent VPA was converted to Δ^4-VPA by an enzyme from microsomes induced by phenobarbital. Epileptics who are treated with combination therapies need close scrutiny so that signs of liver damage can be detected early and reversed.

Reversing resistance

PARASITES causing malaria have been treated effectively with the drug chloroquine, but, increasingly, isolates appear that are resistant to this drug (page 899). Often, multiple-drug resistance develops both to chloroquine and to other drugs not structurally related to it. Such resistance may result from active transport of drugs out of the cell, such that buildup of toxic levels of drug in the cytoplasm is precluded. If transport could be blocked, keeping a drug within the cell, the cytotoxic effect of a drug might be restored. Martin *et al.* evaluated how verapamil affected chloroquine-resistant malaria parasites; in tumor cells, which can also develop multiple-drug resistance, verapamil interferes with drug effluxes. Verapamil was found to make chloroquine-resistant parasites sensitive; whether the channel-blocking effect or some other activity of verapamil is involved has not yet been determined.

Each MAb is unique.

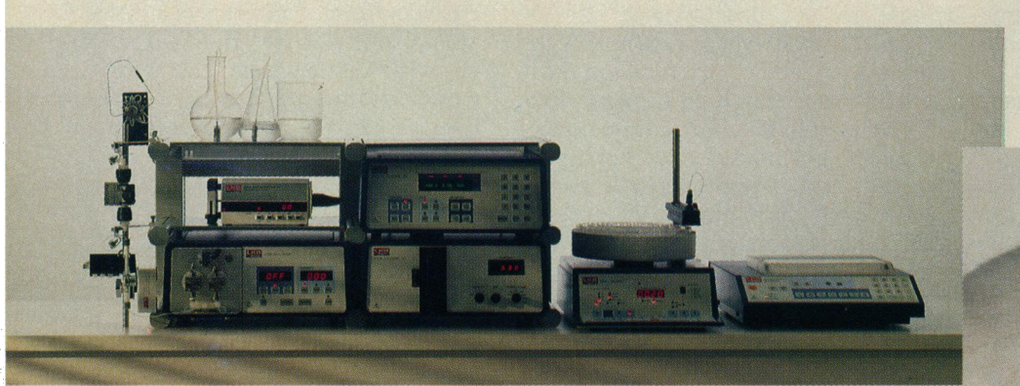


There are nearly as many problems associated with the purification of monoclonals as there are monoclonals. So when you need to purify a particular MAb, you need a system customized to meet your specific needs.

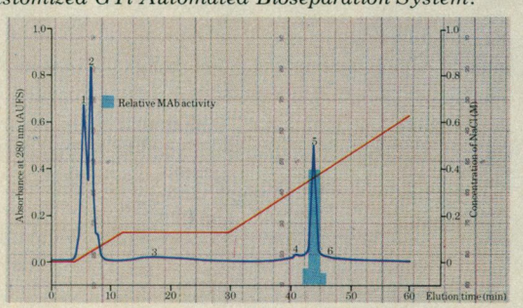
That's why LKB has developed the GTi MAb System. It's a highly flexible, modular HPLC system that can be tailored for virtually any MAb purification performed on a laboratory scale. Ideal for the separation of μg to mg samples, a customized GTi System guarantees high purity, high yield and maximum retention of bioactivity. For optimal purification strategies, your system can be fitted with GlasPac gel filtration, ion exchange or hydrophobic interaction columns.

Furthermore, when your purification requires several chromatographic steps, why not program the Controller to automatically transfer your MAbs from one column to another? Or when you want to scale up, simply program for automatic repetitive injection? A GTi System can be programmed to run 24 hours a day and includes the advanced HeliRac fraction collector to safely receive every drop of your valuable MAb.

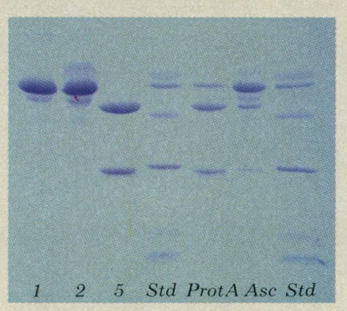
Not only can LKB offer a customized MAb system installation and service, but also complete quality control. Our purity performance check, for example, is done by electrofocusing on an LKB Multiphor System. For evidence of what a GTi System can do for you, simply call or write to your LKB representative.



A customized GTi Automated Bioseparation System.



Purification of IgG_1 monoclonal antibody from mouse ascites fluid.



Purity check by electrophoresis.

LKB

Chromatography Division

LKB-Produkter AB, Box 305, S-161 26 Bromma, Sweden, Tel. 08-799 80 00, telex 10492

Antwerp (03)218 93 35 • **Athens-Middle East** + 30 (1) 894 73 96 • **Beijing** 89 06 21 • **Copenhagen** (01) 29 50 44 • **HongKong** (852) 5-814 84 21
London (01) 657 88 22 • **Lucerne** (041) 57 44 57 • **Madras** (044) 45 28 74 • **Moscow** (095) 255-6984 • **Munich** (089) 85 830 • **Paris** (01) 64 46 36 36
Rome (06) 39 90 33 • **Sao Paulo** (011) 578 41 38 • **Stockholm** (08) 764 75 50 • **Tokyo** (03) 293-5141 • **Turku** (021) 678 111 • **Vienna** + 43 (222) 92 16 07
Washington (301) 963 3200 • **Zoetermeer** (079) 31 92 01 Over 60 qualified representatives throughout the world.

SCIENCE

20 FEBRUARY 1987
VOLUME 235
NUMBER 4791

United States Trade

Fundamental changes have occurred in this country's role in the world that have not been adequately recognized by many citizens. In a few short years, a wealthy creditor nation has become the number one debtor. The underlying reason is that the United States has largely lost its ability to compete successfully in international trade. Trends are most strikingly evident for the total of items other than energy. In 1980, our trade surplus in these was $51 billion. Then followed a steady drop to a deficit of about $136 billion in 1986. By far the major factor was an imbalance in trade of manufactured goods.

We have not paid much attention to low technology. A deficit in those items, which include cars, clothing, and steel, went from $16 billion in 1981 to $111 billion in 1985. More painful to our pride was performance in high-technology items. In 1981, high-tech exports were $59.6 billion, while imports were $31 billion. By 1985, exports had grown slowly to $68.4 billion, while imports had more than doubled to $64.8 billion. Were it not for exports of aircraft, we would have had a deficit in high-tech items.

A recently issued publication from the U.S. Department of Commerce is the source of these and much other data.* It also provides analyses of contributing factors. One that has often been cited was the high exchange rate of the dollar. However, more than half our imbalance is with nations such as Taiwan, whose currency moves up and down with the dollar. Moreover, during the last half of 1986, when the dollar had already weakened sharply against the yen and mark, our imbalance continued to worsen.

Another factor cited in the publication is comparatively limited gains in productivity in the United States. Manufacturing capabilities have been growing in both developed and developing countries, often at rates faster than in the United States. There has been technological progress in many countries. Gains have been particularly strong in Taiwan, South Korea, Hong Kong, and Singapore.

Other factors cited include high savings rates elsewhere, rising educational levels, and improved infrastructures. These conditions tend to support efficient high-quality manufacturing industries that produce both basic products and high-technology items. At the same time, wage rates are generally lower in many of the other countries.

The narrowing of longtime U.S. advantages in technology and manufacturing and the lower wages abroad have made it more difficult for many U.S. industries to compete from factories located in this country. This has led to changes in the strategies of some of the multinational companies. Some have de-emphasized exporting from the United States. They have increased the use of foreign countries as the sources of parts, both in manufactures destined for markets in the United States and for other nations. With U.S. manufacturing less competitive, they have put more emphasis on joint ventures abroad and on the licensing and sale of technology. These tendencies have been facilitated by faster international communication and transportation. One example quoted in the trade press involves a large automobile manufacturer. The body structure of one of its expensive cars is made in Italy. It is flown to the United States by air transport.

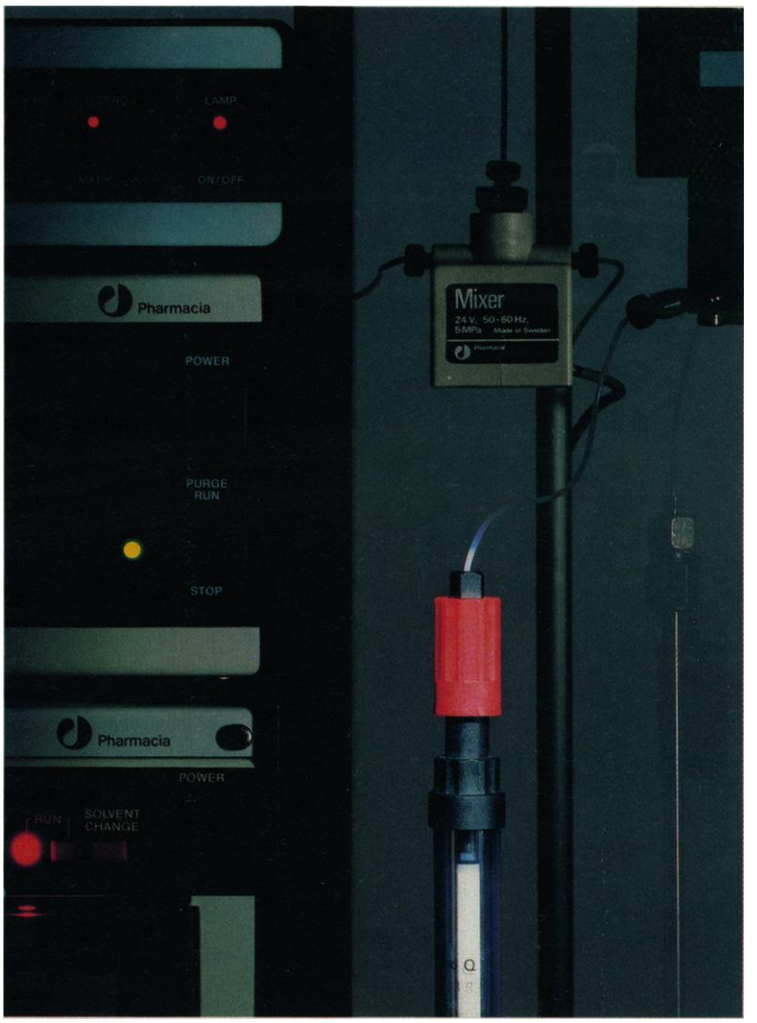
Some of our largest, hitherto most reputable companies obtain abroad many of the goods they distribute. They then place their nameplate on them. This practice has raised concerns that our manufacturing base may wither away, leaving the United States a nation of "hollow corporations" that perform only financial and marketing services.

The United States required nearly 70 years to attain a creditor position of $150 billion, reached in 1982. By the end of 1985, the United States had a net debtor status of $107 billion. As of now, the debtor status is about $250 billion. Some analysts project that the debtor position could approach or exceed $800 billion by 1990. As time goes on, the cost of servicing the debt will contribute to a further weakening of our position.

At present, the debts of the United States are denominated in dollars, and there are attractive investments here for foreigners. At some point, however, and in some way, we will find it necessary to deal with a disagreeable and changed status.—PHILIP H. ABELSON

*Department of Commerce, *United States Trade* (Washington, DC, October 1986).

FPLC– SETTING STANDARDS IN HPLC.



THE HEART OF THE FPLC® SYSTEM IS THE COLUMN, WHICH GIVES YOU THE ULTIMATE CHROMATOGRAPHY SOLUTION.

Why do so many researchers choose the FPLC® System to separate biomolecules?

It all began with a bold concept, a chromatography system which would overcome all the challenges of biomolecule separation. This concept became FPLC, a system designed by researchers for researchers. By combining our expertise in biochemistry, synthetic chemistry and instrumentation, we developed a system that meets the demands for biocompatibility, speed, high recovery and high resolution...a system that solves biomolecule separation problems.

FPLC has established a standard by which even other chromatography companies measure themselves. It is unique in the world of high performance chromatography, and has already contributed to the success of thousands of researchers.

As FPLC is so versatile, you can design a system to match your requirements. In a single system you can:

- **separate a wide range of biomolecules, from large macromolecular complexes down to amino acids**
- **scale-up from analytical to preparative level**
- **exercise manual or fully automated control of multi-step purification schemes**
- **combine the widest variety of standard and high performance techniques**

Central to our original idea, FPLC is designed to meet the changing needs of your research. Our commitment to the future of FPLC and your biomolecule separation is shown by our continual development of new instruments and high performance media. Contact your local Pharmacia representative for the latest information, including how you can use FPLC to separate small biomolecules.

WHERE ALL SCIENCE BEGINS. LIFE

Pharmacia products will be on display at ASM Meeting - Island Booth 2C

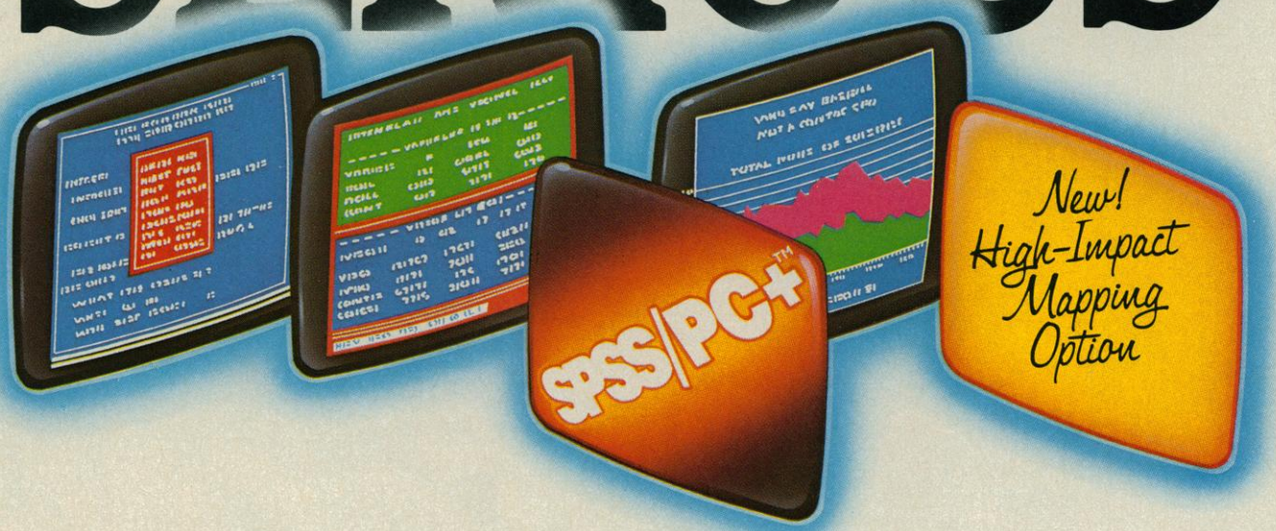
Pharmacia

Laboratory Separation Division
Piscataway, New Jersey 08854
Information: (800) 526-3618
In NJ: (201) 457-8000

Circle No. 108 on Readers' Service Card

GET SERIOUS

ASK ABOUT FREE 10MB Hardcard™ Option



...ABOUT ANALYZING YOUR DATA.

You might be spreading your spreadsheet a little too thin. Or maybe you're starting from scratch. But if you're serious about data analysis, you're ready for SPSS/PC+™ – a full software family that brings you six high-powered ways to complete any data analysis task.

Enter it. SPSS/PC+ Data Entry™ takes the effort out of entering and correcting data.

Analyze it. The SPSS/PC+ Base Package provides a powerful array of statistical and reporting procedures.

Examine it. SPSS/PC+ Advanced Statistics™ lets you get more serious with your data.

Table it. SPSS/PC+ Tables™ produces presentation-ready tables instantly.

Chart it. SPSS/PC+ Graphics™ featuring Microsoft® Chart creates show-stopping graphs and charts.

Map it. SPSS/PC+ Mapping™ featuring MAP-MASTER™ – our latest option – creates maps where vast amounts of data can be summarized and presented in one, simple picture.

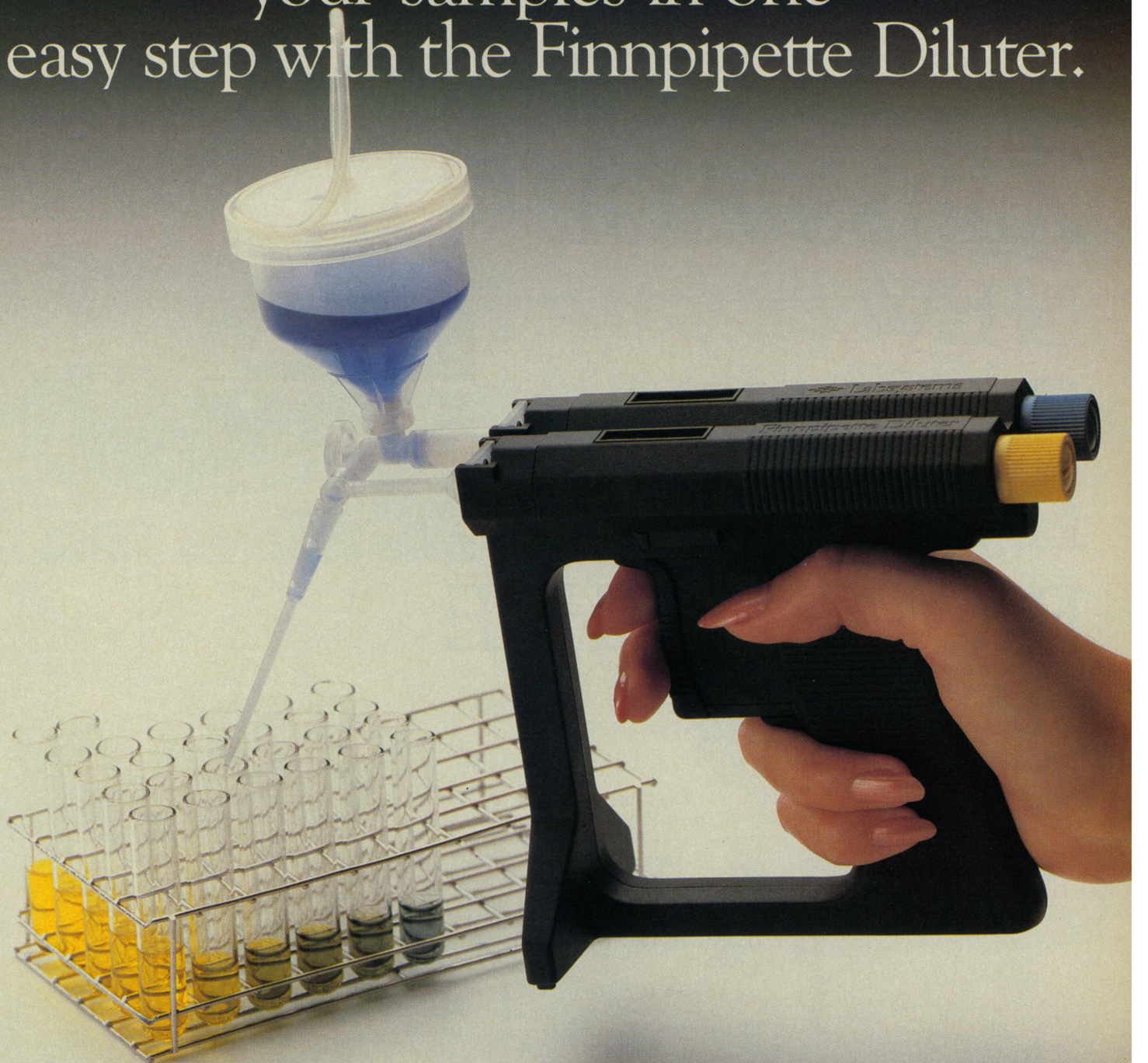
SPSS/PC+ products are being put to productive use by serious fact finders in business, government and education. For countless purposes such as market research. Wage and salary studies. Survey analysis. And quality control. Plus each product is superbly documented and supported by SPSS Inc., a leader in statistical software for nearly 20 years. While specially tailored customer support is available through the VALUE PLUS™ plan.

So if you're serious about data analysis, step up to SPSS/PC+. For details, contact our Marketing Department. **CALL 1/312/329-3500**

SPSS inc. SPSS Inc. • 444 North Michigan Avenue, Suite 3000 • Chicago, Illinois 60611
In Europe: SPSS Europe B.V. • P.O. Box 115 • 4200 AC Gorinchem, The Netherlands • Telephone: +31183036711 • TWX: 21019

Circle No. 168 on Readers' Service Card

Dispense and simultaneously dilute your samples in one easy step with the Finnpipette Diluter.



"Can't you find us an easier way to carry out sample dilutions?" was the plea from many of our customers. Using our experience gained over the last 15 years, we designed the Finnpipette Diluter. Compact and hand-held it costs one fifth the price of existing electronic devices. Once in use, the Diluter saves you even more – the one-step action cuts down operating time and the reusable dispensing unit means less disposables. Furthermore, you can use the Diluter in a whole host of applications – including immunoassays (RIA, EIA, FIA) haematology and all chemical dilutions. And since the head is autoclavable the Diluter is also ideal for microbiological and tissue culture work. Last but not least, you can use it as a diluent dispenser alone. Check out the details for yourself and call your nearest Labsystems subsidiary or distributor for a demonstration.

Finnpipette Diluter from Labsystems.

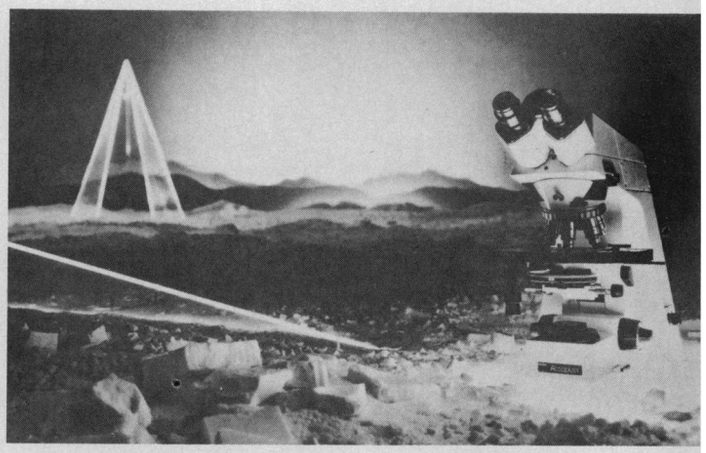
Labsystems Oy. P.O. Box 8, 00881 Helsinki, Finland, tel. int'l. +358-0-75821, telex 121949 labsy sf. Austria: Vienna, tel. 222-435901-0. Belgium: Antwerp, tel. 03-2312725. France: Paris, tel. 1-69079750. West Germany: Munich, tel. 089/502 6027-9. Italy: Milan, tel. 2-2827541. Japan: Tokyo, tel. 03-355-5630. The Netherlands: Waddinxveen, tel. 01828-10233. Spain: Barcelona, tel. 3-2106461. Sweden: Stockholm, tel. 08-931370. UK: London, tel. 0895-38421. USA: Chicago, tel. (Toll Free) 800-572-8270.

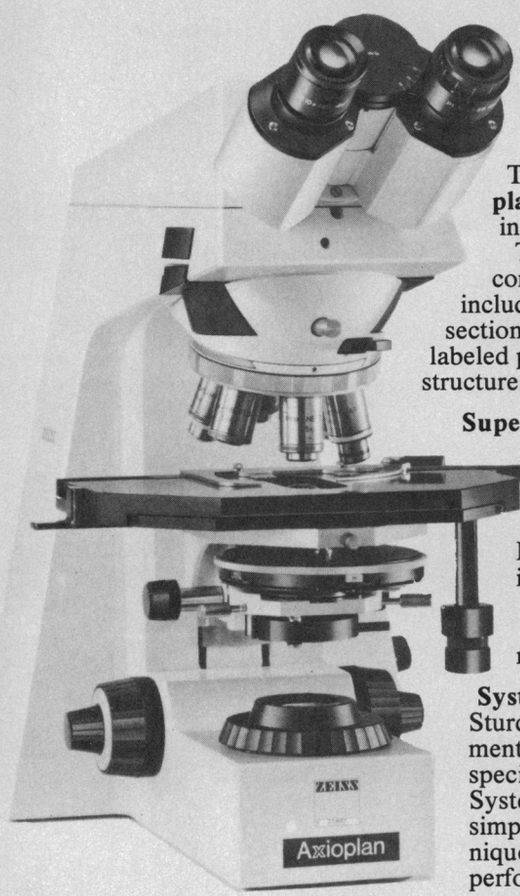
Please Stop at our Booth, at ASM Booth Number 1810-1811

Circle No. 191 on Readers' Service Card

AXIOPHOT PHOTOMICROSCOPE, AXIOPLAN UNIVERSAL MICROSCOPE

NOW-IN THE NEW ZEISS AGE-NEW INSIGHTS INTO BIOMEDICINE





The Zeiss **Axiophot*** and **Axioplan*** are new microscopes featuring ICS Optics and SI Design. They offer unprecedented convenience for all techniques, including the examination of tissue sections, smears, cultures, fluorescence-labeled proteins and birefringent structures.

Superb ICS Optics
Newly computed objectives with infinite image distance. Wide (25 mm) flat field of view for all microscope techniques. Brilliant, flawless image quality in both transmitted-light and incident-light fluorescence. Just one set of objectives for numerous contrasting methods.

Systems-Integrated Design
Sturdy stand with ergonomic arrangement of all controls. Ample space in specimen area for easy access. System-integrated components allow simple, fast restructuring for all techniques with consistent, optimized performance.

Fast, accurate documentation
Axiophot photomicroscope: the system with two 35 mm cameras and 4" x 5" large-format camera. Ideal for instant photography. Precise exposure control, reliable for all microscope techniques.

Axioplan universal microscope: photomicrograpy with the MC 63 S microscope camera. Both microscopes also with TV camera port.

For complete details on these exciting new microscopes, contact your Zeiss Dealer or call (914) 681-7754 for the name of the dealer nearest you.

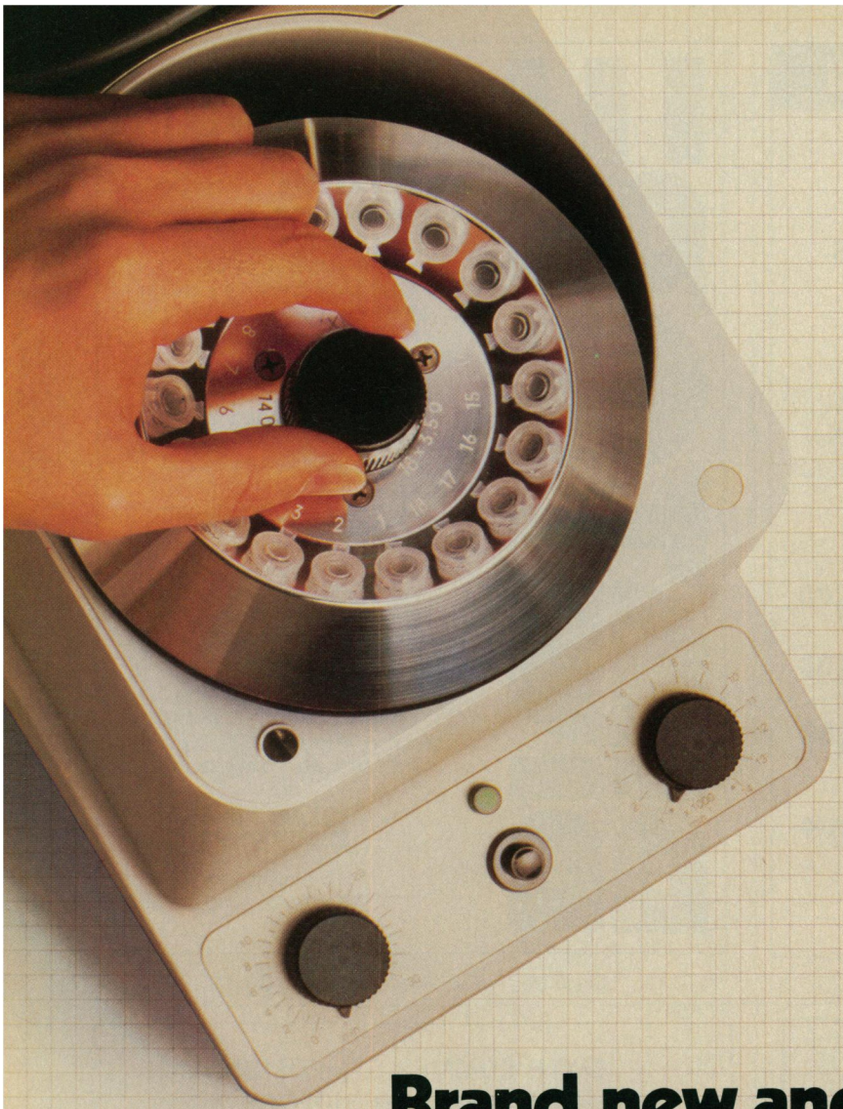
Carl Zeiss, Inc.
One Zeiss Drive
Thornwood, NY 10594

ZEISS
West Germany

The Pyramids of Zeiss: The New Geometry for Microscopes

*Trademark

For literature circle reader service number 97
For a demonstration circle reader service number 98



The new Eppendorf Micro Centrifuge.

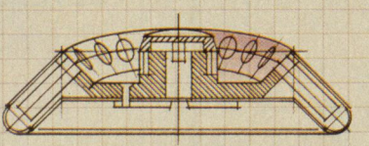
With 50% higher capacity, variable speed, quieter operation, and quick-release rotor.

Brand new and turning 18.

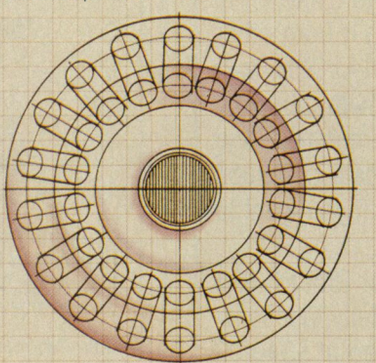
Higher capacity...plus.
The new *18-place* Model 5415 Micro Centrifuge gives you important operating advantages—with unique Eppendorf quality.

Versatile in use.
Model 5415 has a variable-speed motor that reaches a maximum of 14,000 rpm with an RCF of 16,000 x g; a 30-minute timer; and a momentary button for short spins. It accepts 1.5 mL, 500 µL, 400 µL, and 250 µL Eppendorf Microcentrifuge Tubes and blood collection microtubes, such as B-D Microtainer*Tubes.

New rotor design.
The enclosed rotor design reduces air turbulence for quieter operation. And the new quick-release feature lets you transport the rotor *with* tubes—especially convenient when the centrifuge is run in a cold room.



Enclosed rotor design reduces air turbulence and noise. Tubes are angled precisely at 45° to maximize pellet formation.



Quick-release feature allows the 18-position rotor to be easily transported even when loaded.

*Microtainer® Tubes is a registered trademark of Becton Dickinson and Company.

Safe and rugged.
The Eppendorf 5415 Micro Centrifuge is UL listed for safety. It's so rugged that an accidentally unbalanced load won't cause excessive vibration or motor damage.
For more information: call 800-645-3050; in New York, 516-334-7500. Or write Brinkmann Instruments, Inc., Cantiague Road, Westbury, NY 11590. (In Canada: 416-675-7911; 50 Galaxy Blvd., Rexdale, Ont. M9W 4Y5)

Specifications

Maximum speed	14,000 rpm
Maximum RCF	16,000 x g
Test-tube capacity	18
Time required for maximum speed	10 sec
Time required to stop	12 sec
Dimensions (L x W x H)	28 x 21 x 28.5 cm

See us at the 1987 Pittsburgh Conference Booths #6000–6015.

eppendorf
Shaping the future. **Brinkmann** INSTRUMENTS, INC.

BRK-5458

For literature circle reader service number 152
For a demonstration circle reader service number 153

2-D Gel Electrophoresis - Automated Analysis Turns the Problem of Data Overload into the Opportunity for Better Research

BioImage® has created VISAGE®, an instrument for analysis of 2-D separations that delivers the results your laboratory *demands*. We have been able to do this because...

WE LISTEN!

YOU SAID: I want to use the power of 2DE in my own lab but analyzing and managing so much data is a problem. I might be able to have my samples processed at an outside service company, but I would lose control of my research and it is not cost effective. Isn't there an analytical instrument that allows me to do it all in my own laboratory?

BIOIMAGE RESPONDED: Yes, you *do* have a choice. Bio Image developed VISAGE, a high speed machine-vision analytical instrument, to automatically acquire, store, and analyze digital images of 2DE patterns and give you data in a variety of formats. You don't have to follow any rigid formats for your separations. Your data remains in your control, safe in your lab.

YOU SAID: I am not a computer expert. How could I operate a computerized instrument as powerful as VISAGE?

BIOIMAGE RESPONDED: VISAGE's sophisticated machine-vision components are skillfully integrated into an easy to use instrument. Clear and logical menus specifically designed for 2DE analysis lead you through the analysis process to the answers. You simply point to your choice and the machine does the work.

YOU SAID: Can a machine vision instrument analyze complex 2DE patterns automatically and consistently?

BIOIMAGE RESPONDED: We use the latest machine-vision technology to develop 'intelligent' software packages which automatically identify peptide or nucleic acid spots in the 2DE pattern and automatically measure the precise location, size, and density of each one accurately and reproducibly.

YOU SAID: Can I rely on VISAGE to give me accurate quantification with so little operator input?

BIOIMAGE RESPONDED: VISAGE software algorithms apply mathematical criteria to identify spots, segment them, separate overlaps, and measure density. The quality of these routines coupled with the power of the MC68000 family of processors give a quantum leap in *quantitative performance* over any other system, computerized or manual. Independent tests indicate coefficients of variation of less than 5% for the VISAGE quantification routines.

YOU SAID: Some of my gels are dried, some are blotted, some wet in zip-lock bags; I also need to quantify lots of autoradiographs and fluorographs. Can an automated instrument handle all these formats?

BIOIMAGE RESPONDED: Yes, one instrument can. VISAGE is a laboratory instrument designed to process any 2DE format—any size, any stain, any film, even color silver stained gels! We even do reflective scans of opaque materials like nitrocellulose blotting membranes.

YOU SAID: I want to include a set of standards in my 2DE gel patterns. Can your instrument read the standards and compute charge and size for every spot?

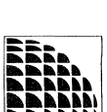
BIOIMAGE RESPONDED: The VISAGE Standards package allows you to specify any internal standards format for a gel (either commercial standards or standards that *you* have made for *your* specific application) and then computes the isoelectric point and molecular weight for each spot based on those values. The standards can be spots in the interior pattern, bands at the edge—even *random locations*—no geometric rigidity is demanded. VISAGE gives you complete flexibility.

YOU SAID: How can I be sure that your company will be able to support me in the years to come?

BIOIMAGE RESPONDED: BioImage is proud to be a member of the Kodak family of companies. Kodak is known the world over for customer service and total product support.

WE RESPOND! That's why BioImage is the leader.

Ask any of our customers. They are in some of the leading research and applications laboratories in the world.



Bio Image
A Kodak Company

For more information about VISAGE or our other intelligent lab instruments, see your BioImage representative or call (800) 624-5394 (in Michigan 313 971-7500).

Circle No. 157 on Readers' Service Card

The Seventh Annual DNA / HYBRIDOMA CONGRESSES

MARCH 1-4, 1987 • MOSCONE CENTER • SAN FRANCISCO

Organized by Scherago Associates, Inc. and Mary Ann Liebert, Inc., publishers

Co-chairmen – **DNA:** Walter L. Miller, Peter Gruss
HYBRIDOMA: Zenon Steplewski, Hilary Koprowski, Joseph Davie

KEYNOTE ADDRESS (Sunday p.m.) Stephen Goff, Columbia University, Alexander Rich, M.I.T.

ACQUIRED IMMUNE DEFICIENCY SYNDROME (AIDS)

Chairman: Erling Norrby, Karolinska Institutet, Stockholm, Sweden

(Monday a.m.)

IMMUNOPATHOPHYSIOLOGY OF AIDS
Luc Montagnier, Paris

HTLV-III AND OTHER FACTORS IN THE ORIGIN OF AIDS AND ASSOCIATED MALIGNANCIES
Robert C. Gallo, Bethesda

IMMUNOLOGIC AND MOLECULAR FEATURES OF HIV INFECTION
Jay A. Levy, San Francisco

MOLECULAR BIOLOGY OF IMMUNOSUPPRESSIVE RETROVIRUS
Simon Wain-Hobson, Paris

DEFINING THE VIRAL GENES FOR HTLV-III REPLICATION AND CYTOPATHOGENICITY
Flossie Wong-Staal, Bethesda

(Monday p.m.)

MOLECULAR BIOLOGY OF THE AIDS VIRUS
William Haseltine, Boston

RELATIVE IMMUNOGENICITY OF HTLV-III, HTLV-IV, AND STLV-III PROTEINS
Myron Essex, Boston

ENVELOPE PROPERTIES OF HIV
Robin Weiss, London

TARGETS FOR IMMUNE ATTACK IN RETRO VIRUSES ASSOCIATED WITH AIDS
Dani P. Bolognesi, Durham

USE OF VACCINIA VECTORS TO STUDY EXPRESSION AND IMMUNOGENICITY OF RETROVIRAL PROTEINS
Bernard Moss, Bethesda

DNA SESSIONS

CHROMATIN (Monday p.m.)
Chairman, Gary Felsenfeld

TRANSCRIPTION (Tuesday a.m.)
Chairman, George Khoury

INTRACELLULAR PROTEIN TARGETING (Tuesday p.m.)
Chairman, Harvey Lodish

NEUROBIOLOGY (Wednesday a.m.)
Chairman, James L. Roberts

DEVELOPMENTAL BIOLOGY (Wednesday p.m.)
Chairman, Peter Gruss

HYBRIDOMA SESSIONS

TRANSGENIC MICE AS TOOL IN IMMUNOLOGY (Tuesday a.m.)
Chairman, Davor Solter

ANTI-IDIOTYPE VACCINES (Tuesday p.m.)
Chairman, J. Donald Capra

THE USE OF HYBRIDOMAS IN DETERMINING CYTOKINE STRUCTURES AND FUNCTIONS (Wednesday a.m.)
Chairman, Robert Schreiber

ANTI-CARBOHYDRATE MAB'S IN THE STUDY OF GLYCOLIPID-MEDIATED CELLULAR EFFECTS (Wednesday a.m.)
Chairman, Jan Thurin

SUMMARY
Chairman, Joseph Davie

Working Group Meetings will meet in closed sessions. The consensus reached by working groups will be presented to the whole Congress.

IMMUNOTHERAPY
Chairman, Michael Mastrangelo

IMMUNODIAGNOSIS
Chairman, Edgar Haber

POSTER SESSION AND EXHIBITS

REGISTRATION FEES:
$450 On-site registration
$400 ADVANCE REGISTRATION – (Received by Jan. 15). $150 STUDENT REGISTRATION – Undergraduate, graduate students only. Conf. in writing. 4-7 registrations received together from same organization $300 each. 8-10 registrations received together from same organization $200 each. Larger group rates available upon request. Cancellations must be received in writing by February 1, 1987.

Attendance will be limited. Make checks payable to: **Scherago Associates, Inc.,** ***DNA / HYBRIDOMA*** **S-2-20**

☐ Please reserve _____ space(s): Registration Fee of $ _____ enclosed.

☐ Please send abstract form.

Name _____

Dept. _____ Organization _____

Street _____

City _____ State _____ Zip _____

Telephone: ( ) _____

Return to: ***DNA / HYBRIDOMA;*** **c/o Scherago Associates, Inc.,** 1515 Broadway, Dept. S-2-20, New York, NY 10036 • (212) 730-1050

CALL FOR PAPERS

THE 45th ANNUAL MEETING OF THE ELECTRON MICROSCOPY SOCIETY OF AMERICA

AUGUST 2 - 7, 1987 BALTIMORE, MD

Presidential Symposium

The Science of Imaging Contrast *(L. Hobbs)*

Biological Science Symposia

Molecular and Supramolecular Organization of Cytoskeletal Proteins *(U. Aebi)*
HVEM: New Approaches to Long-Standing Questions *(C.L. Rieder)*
New Techniques for the Analysis of Structure-Function Relationships in Neurons *(C. Wilson)*
New Frontiers in Biological Light Microscopy *(E.D. Salmon)*
TEM, SEM, and Microanalysis in Pathology *(J. Shelburne and V. Roggli)*

Joint Symposia

Recent Advances in Scanning EM *(O. Wells and R. Albrecht)*
Electron Microscopy and Crystallography in Polymer Science *(D. Dorset, L. Sawyer and E. Thomas)*

Physical Science Symposia

Interface Phenomena in Metals *(E. Hall and W. Clark)*
Compound Semiconductors *(J. Brown and T.S. Kuan)*
Applications of Diffraction in TEM *(J.A. Eades)*
Signal Processing and Image Simulation in Microscopy *(M.A. O'Keefe)*
Scanned Image Microscopy *(M. Isaacson)*

Technologist's Forum Symposium

Immunocytochemical Methods and Applications: TEM and SEM

THE DEADLINE FOR RECEIPT OF ALL PAPERS IS MARCH 16, 1987

CONTRIBUTED PAPERS ON SUBJECTS DEALING WITH MICROSCOPY AND RELATED MATTERS OF SPECIMEN PREPARATION AND IMAGE PROCESSING WILL BE WELCOME. Particular attention will be given at this meeting to scanning electron microscopy, cryoelectron microscopy, high voltage electron microscopy, and the relationship between light and electron microscopy.

FOR FURTHER INFORMATION CONTACT:

Program Chair
J. Richard McIntosh, PhD
Department of M.C.D. Biology
University of Colorado
Boulder, CO 80309-0347
Phone 303 492-8533

Circle No. 190 on Readers' Service Card

AMSTERDAM BIOTECHNOLOGY 87

15 - 18 June 1987

A commercial exhibition on biotechnology to be held in conjunction with the 4th European Congress on Biotechnology, **ECB 4.**

This congress will be attended by some 2000 biotechnologists.

Commercial exhibition and congress together show every promise of becoming a unique presentation of the state-of-the-art in biotechnology.

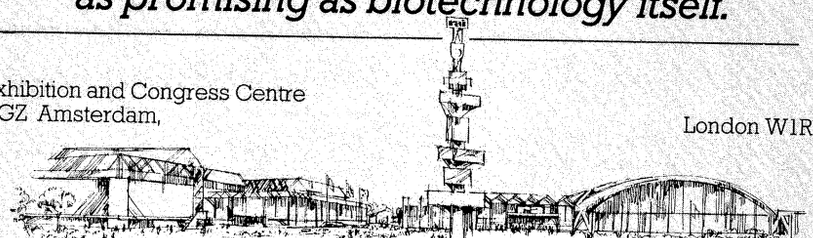
Both exhibition and congress will pay attention to all aspects of the entire, broad field of biotechnology.

This is why participation in AMSTERDAM BIOTECHNOLOGY 87 is interesting for a wide variety of companies and institutions.

Amsterdam Biotechnology 87
as promising as biotechnology itself.

Information
RAI International Exhibition and Congress Centre
Europaplein, 1078 GZ Amsterdam,
The Netherlands
Tel. 020-5411411,
telex 12443

London office
162 Regent Street
London W1R 7FD, Great Britain
Tel. 01-437 2175



INTERNATIONAL EXHIBITION AND CONGRESS CENTRE RAI AMSTERDAM

Call for Symposium Proposals

1988 AAAS Annual Meeting ✦ Boston ✦ 11 – 16 February

Please return this form no later than 1 April 1987 to:
AAAS Meetings Program; 1333 H Street, NW, Washington, DC 20005 • Telephone: (202) 326-6448

Principal Organizer (primary contact for correspondence):

Name _____

Affiliation _____

Mailing Address _____

_____

_____

_____

Telephone _____
(Area Code) (Number)

Co-Organizer (if applicable):

Name _____

Affiliation _____

Mailing Address _____

_____

_____

_____

Telephone _____
(Area Code) (Number)

Title of Proposed Symposium _____

_____

Proposed Sponsor(s)
(AAAS Section, Office, or Affiliate **only**) _____

No. of 3-hr. Sessions Requested _____

1. Speaker _____
   Affiliation _____
   Topic _____
2. Speaker _____
   Affiliation _____
   Topic _____
3. Speaker _____
   Affiliation _____
   Topic _____
4. Speaker _____
   Affiliation _____
   Topic _____
5. Speaker _____
   Affiliation _____
   Topic _____

Please attach synopsis of objectives of proposed symposium (approximately 200 words).

Instructions: AAAS members are invited to submit symposium proposals for the next Annual Meeting in Boston, 11–16 February 1988. Please complete the form above, attach a "Synopsis of Objectives" (about 200 words), and send it to us **no later than 1 April 1987.**

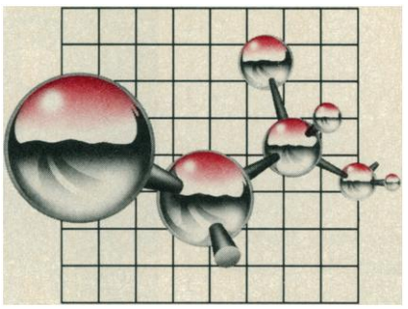
We are particularly interested in symposia dealing with the latest developments in science and technology, and the implications of these developments for society. Coordinated contributed paper sessions are also welcome; inquire for details with this submission.

All symposium proposals are subject to review. If the information submitted is inadequate for reviewing, the proposal will be returned. Endorsement (sponsorship) by a AAAS Section Committee expedites the review process. It is therefore in the interest of the proposer to **send a copy** of the proposal to the appropriate Section Secretary (see "AAAS News" section in *Science*, first issue of each month, for names) for endorsement at the same time the original is sent to the AAAS Meetings Office.

Speakers should *not* be confirmed at this time; however, sufficient information about probable speakers and their topics should be provided to allow for evaluation of the proposal. Please note that AAAS does not pay honoraria to speakers.

Some Deadlines: June—You will be notified about the acceptability of your proposal. **July**—Preliminary programs with confirmed speakers are due. **September**—Final program copy, suitable for publication, is due.

August 9-13, 1987
San Diego, California



First Symposium of the Protein Society

The Protein Society
A scholarly society of scientists interested in the structure and function of proteins. The purpose of the society is fundamental; to foster discussion and interaction among scientists interested in all aspects of protein structure and function. The society already has over 700 members covering a broad spectrum of the different disciplines bearing on protein structure and function.

Interaction among many types of investigators utilizing the myriad of approaches and techniques to probe protein molecules is essential. The Protein Society ensures these interactions will occur by providing regular opportunities for protein scientists to meet and exchange ideas and findings.

Full Membership
Individuals holding a doctoral degree or equivalent experience with a demonstrated interest in the structure and function of proteins. *$50, 2 yrs.*

Associate Membership
Individuals with an interest in proteins not qualifying for full membership. *$25, 2 yrs.*

Corporate Membership
Commercial/Industrial companies interested in fostering a synergistic involvement of industry in protein chemistry. *$1500, 2 yrs.*

The Second Symposium–
San Diego, August 9-13, 1987
The first biannual symposium of the Protein Society.

Location
The second San Diego symposium is the first opportunity for the membership of the Protein Society to meet and interact. The program of this first meeting is designed to attract a variety of individuals representing all the differing aspects of protein research.

The program committee under the chairmanship of Professor Jack Richards of CalTech is made up of expertise in all disciplines of protein structure and function enforcing the purpose of the Protein Society.

The symposium program is made up of plenary sessions focusing on major impact topics of general interest.

Dr. Eisenberg of UCLA and Dr. Huber of the Max Planck Institute will open the meeting. The meeting will close with plenary lectures from Dr. Würtrich of ETH, Zurich and Dr. Hood of CalTech.

To facilitate interaction among protein chemists from all aspects of the science, the remainder of the program is given over to minisymposia and poster presentations on the following topics:

Session Topics and Invited Speakers for San Diego '87
1. 3D Structure: Theory Folding and Dynamics.
   (Baldwin, Goddard, Rose)
2. MicroAnalytical Strategies: Structural Analysis and Micro Purification.
   (Simpson, Kent, Beiman)
3. Protein Kinases: Biological Control of Protein Function.
   (Walsh, Ullrich)
4. Protein/Nucleic Acid Interactions.
   (Altman, McPherson)
5. Studies with Synthetic Peptides and Proteins.
   (Kaiser, Degrado, Lerner, Richards)
6. Photoreceptors as Signal Transducers.
   (Khorana, Zucker)
7. Expression, Processing and Secretion.
   (Varshavsky, Beckwith, Wickner)
8. Mutagenic Studies of Protein Function: Design and Selection.
   (Schimmel, Shortle, Winters)
9. New Developments in Instrumentation, Chemicals and Accessories for the Protein Chemistry Lab.

Stein and Moore Award and Symposium
Part of the program will be used to honor the recipient of the first Stein and Moore award in the form of a half day symposium. The subject and the speakers taking part will be selected by the recipient of the award. Announcement of the awardee and the subject to be presented will be made in the spring of 1987. The award, to be presented biannually by the Protein Society will recognize significant achievement in protein research. In addition to the symposium, the awardee will receive $5000 and a commemorative plaque presented at a banquet which will feature Dan Koshland as an after dinner speaker.

Sample Workshop
All registrants will be invited to participate in a workshop designed to demonstrate the variety of modern techniques available for the study of protein structure and function.

Scientific Exhibition
Leading manufacturers of scientific instrumentation and techniques relevant to protein research will be represented.

Symposium Registration
$275—Full Members
$150—Associate Members
$330—Non Members
$180—Students

Symposium Announcement and Call for Papers is scheduled to go out January '87
If you are interested in becoming a member of the Protein Society or attending the San Diego Symposium of the Protein Society, please circle number 186 on the reader information card, or contact the Protein Society directly:

The Protein Society
Ralph Bradshaw
UC Irvine
Department of Biological Chemistry
California College of Medicine
Irvine, CA 92717
714/856-6236

First Symposium
American Protein Chemists
September, 1985
San Diego, California
Second Symposium
The Protein Society
August 9-13, 1987

Environmentalism and Equity

Distributional Conflicts in Environmental-Resource Policy. ALLAN SCHNAIBERG, NICHOLAS WATTS, and KLAUS ZIMMERMANN, Eds. St. Martin's, New York, 1986. xii, 455 pp., illus. $45. From a symposium, Berlin, F.R.G., March 1984.

Is the environment strictly a quality-of-life issue for upper-middle-class backpackers and gardeners? Do the poor, who suffer greater ill effects of environmental depredation in the workplace and at home, constitute a hidden cache of environmentalists? Will business people and workers form a coalition to eliminate environmental regulations that inhibit economic growth and take away jobs? Can environmental regulation benefit all members of society equally by protecting present and future generations from the consequences of past, present, and future depredations?

This book attempts to reconcile these conflicting questions by addressing issues of distribution and equity involved in environmental policy making in the United States and western Europe. The examination includes an economic and political analysis of the differential effects of environmental regulation, an evaluation of the meaning of public opinion data on environmental consciousness, and consideration of business, labor, state, and generational perspectives on environmental issues. A diversity of provocative models exist, but, as Schnaiberg notes, there are insufficient data to test them adequately. A useful follow-up to this volume would be a short, focused account of the available data sets and their lacunae and recommendations for remedying defects.

I can recommend this book to anyone interested in exposure to the "state of the art" of social science analysis of environmental policy. As an outcome of a conference sponsored by the Volkswagenwerk Foundation, this volume has many of the benefits (geographical and interdisciplinary diversity) and a few of the costs (repetition) of conference documents. A variety of social science points of view are represented, from economics, sociology, and political science. The political spectrum is more narrowly represented, from moderate to left-liberal. No outright Gaians or Reaganites were invited. The major findings, both expected and unexpected, are:

1) Despite significant differences in regulatory approach there is little difference in regulatory outcome among the United States, France, and Germany. The United States espouses strong principles in law that are whittled down in administrative and judicial practice. Legal requirements for elaborate technical procedures and the construction of large-scale data bases slow implementation. In Europe, on the other hand, relatively loose and informal administrative procedures operated by a technical cadre are strengthened in practice as a result of scientific evidence, often gained free-rider from U.S. environmental agency research and from local experience with disasters.

2) A new group of environmental policy theorists, emphasizing market mechanisms over traditional regulatory standards, gained ascendance in the discipline of economics in the '70s. Backed by the attack of sectors of the corporate world on environmental regulation, holders of this view gained influential positions in U.S. federal environmental agencies during the early '80s. Reformulating much of the policy debate in terms of markets and property rights, they put their theories into practice in the form of bubble concepts that allow entrepreneurs to buy and sell pollution rights.

3) Identifiable human-caused disaster, whether experienced at first or at second hand, is the most salient factor in developing environmental consciousness. The environmental movement has created broad political support for environmental regulation that transcends class differences by conceptualizing the effects of deleterious industrial processes on the environment, identifying the sources of human causation, and publicizing them through the mass media.

4) Contrary to the expectations of some social science researchers, environmental consciousness has not declined. Indeed, it is broadly spread across the social spectrum and comes close to constituting a consensus. The working class strongly supports environmental regulation despite expectations of opposition due to threat of job loss. Blacks are more likely than whites to support tougher environmental regulations.

5) U.S. industry's protestations about environmental add-ons to the cost of production often hide unwillingness to modernize plants and equipment. Environmental regulations requiring changes in production processes are sometimes used as an excuse to close plants that management intended to close for other reasons, for example, to