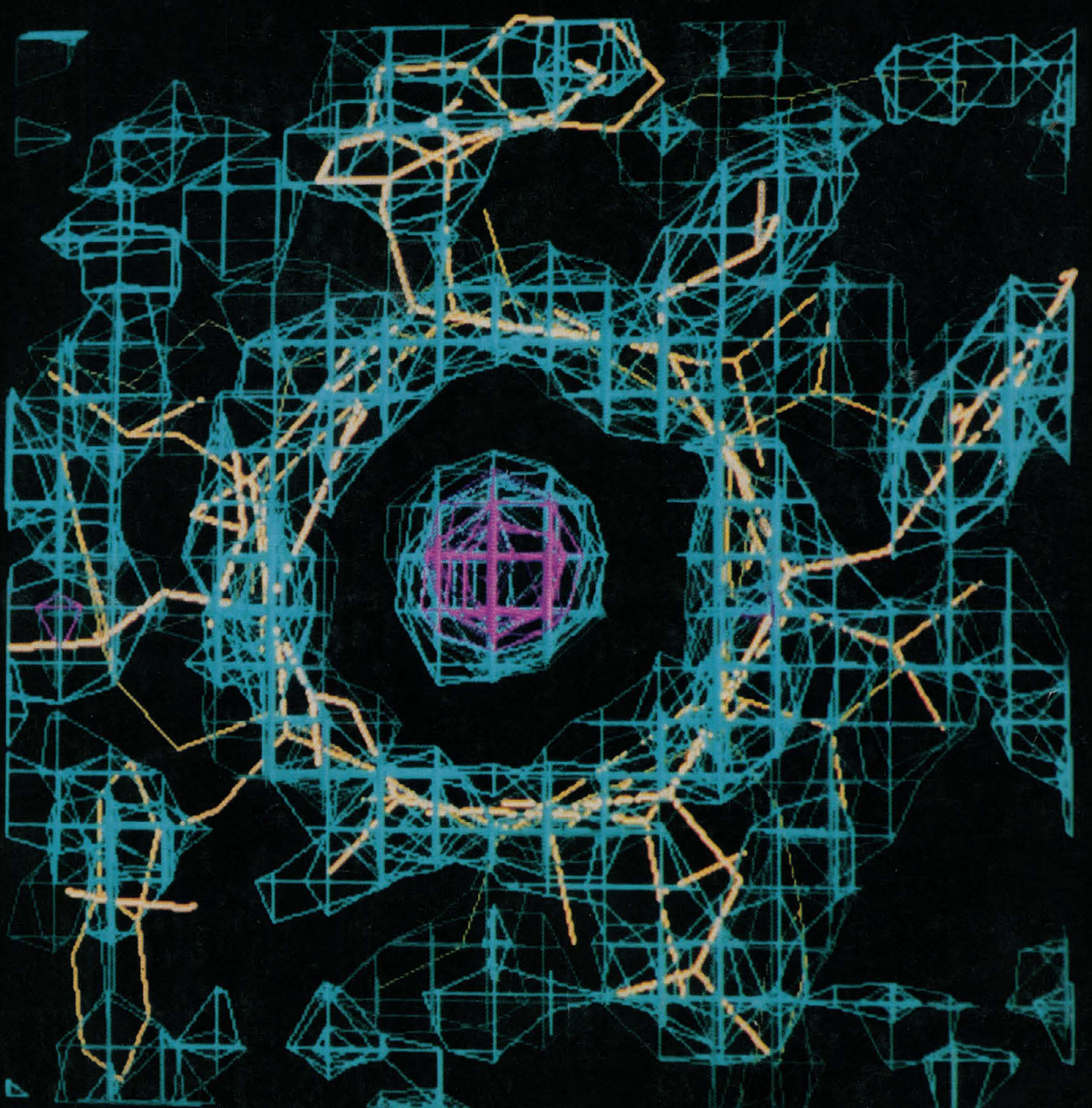
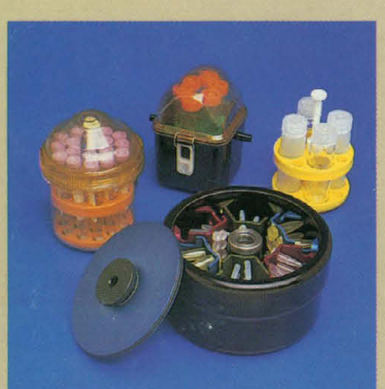
American Association for the Advancement of Science

SCIENCE

8 July 1988 $3.00
Vol. 241 ■ Pages 133–264



More Innovations from Beckman Your Complete Centrifugation Source



Biocontainment.

For extra protection when spinning pathogenic materials: Aerosolve® Cannisters for the GP's and TJ-6's with racks for eight different tube types; Bowl Rotor with sealed lid for the Microfuge 12; clear plastic covers for the buckets of AccuSpin AH-4 Rotor. All are designed to contain aerosols if tubes break during centrifugation.

Beckman is more than the world's premier ultracentrifuge company. Beckman has become the pacesetter for *all* types of centrifugation.

With the new general purpose GP tabletop and floor model centrifuges—an instant success with their large capacity (up to three liters) and high performance (3750 rpm/3200 *g*). And they're the only compact centrifuges that can spin 250-mL conical bottles.

With the workhorse TJ-6 tabletop. Like the GP, it's available refrigerated or unrefrigerated and can spin horizontal and fixed angle rotors, tube racks, microtest plates, blood bag cups. Great versatility, at new low prices!

With the refrigerated AccuSpin™ FR tabletop that has digital speed, time and temperature controls for unmatched accuracy and precision.

With microcentrifuges that have been spinning away in labs around the world since 1960. Our newest star performer: the economical Microfuge® E with momentary button for "mini-spins." Two other Microfuge models with advanced features and controls also are available.

And, no matter which of these centrifuge types you choose, there is an aerosol protection system for it. Extra safety when working with infectious materials. (See photo inset.)

More originals from Beckman! All designed, manufactured, tested, sold, warranted and serviced by Beckman, the complete centrifuge company.

Contact Beckman Instruments, Inc., Spinco Division, 1050 Page Mill Road, Palo Alto, CA 94304, U.S.A. (1-800-742-2345). Offices worldwide.

BECKMAN

A SMITHKLINE BECKMAN COMPANY

Circle No. 55 on Readers' Service Card

Creativity in plastics...

to simplify your biomedical lab needs

(A) Parafilm Dispensers- Available in 2" and 4" sizes, CAT# 400031, 400032 - These dispensers will hold a full 250 ft. roll of Parafilm©. They may be wall mounted (hardware included) or used on the bench. The outer dimensions are 225 mmL x 60mmW (2") or 120mmW (4") (additional cutting edge is included). The Parafilm can be dispensed and cut with one hand, eliminating the need for scissors.

(B) StrataCooler - CAT# 400001 - The StrataCooler can be used to prolong the life of expensive enzymes in two ways; 1) by maintaining them at a constant -20°C in your freezer; 2) by maintaining them on your bench top for 2 hours at -20°C to -15°C. StrataCooler provides protection for enzymes stored in frost free freezers.

(C-1) Mini Agarose Gel Electrophoresis Box CAT# 400042 - The gel bed is constructed of U.V. transparent acrylic to allow easy viewing of the test sample without removing the gel. The platinum current wire is embedded in the acrylic with silicone to make the connection extremely corrosion resistent. Exterior dimensions are 170mmL x 87mmW x 48mmH. Gel bed is 88mmL x 75mmW. Power supply leads and a safety top are included, as well as three gel combs, and a support bridge.

(C-2) Agarose Gel Electrophoresis Box CAT# 400048 - This agarose electrophoresis box is similar to our mini-gel box but can accommodate two gel combs side by side. Exterior dimensions are 170mmL x 170mmW x 48mmH. Gel bed is 160mmW x 88mmL. Power supply leads and a safety top are included, as well as three gel combs, and a support bridge.

(D) Gel Scoops - Size: 3" (70mm) Wide, 6"(150mm) Wide - CAT# 400057, 400052 This scoop is constructed of U.V. transparent acrylic and has a beveled edge to facilitate transfer of gels from electrophoresis box to U.V. monitor without breakage. The outer dimensions, excluding the handle, are: 70mm x 90mm and 150mm x 110mm.

(E) Radioactivity Shield - Size: 14-1/2"W x 21"H, 17"W x 21"H - CAT# 400020, 400021 - It is constructed of one-half inch, shatter resistant, acrylic for maximum protection. This radiation shield has a back-sloped top piece for comfortable viewing without exposure to radiation. Unit is supported by acrylic side bars with cut outs which allow a convenient working position. Two widths are available to allow you to choose the size most comfortable for your needs.

(F) Radioactivity Transport Box - CAT# 400010 This is a heavy-duty, one-half inch, closed cylinder which shields the researcher from radiation when transporting radioactive substances. The top and bottom interlock for a secure closing. Interior dimensions are 90mmH x 64mmD. Each box comes with a rack that will hold seven microfuge tubes.

Inquire about other creative lab plasticware from

STRATAGENE
Where Satisfaction Multiplies

Stratagene Cloning Systems
11099 North Torrey Pines Road • La Jolla, CA 92037
Ordering: 800-424-5444
Technical Services: 800-548-1113
FAX: 619-535-5430

Distributors: Integrated Sciences, 212 Willoughby Road, P.O. Box 928, Crows Nest NSW 2065, Australia, Telephone: (02)436 2611, Telex: (790)176482 (Medspe), FAX: (02)4364442/**Epignost Ges.m.b.H.,** Herrenstrasse 2, 4020 Linz, Austria, Telephone: 27 84 01-283DW, Telex: (847)02 1132/mayho a, FAX: 0732 81431 15/**BioMega Diagnostics,** 10900 Rue Hamon, Montreal, Quebec, Canada H3M 3A2, Telephone: 514 331 7520, Telex: 05826655/**Ozyme,** 31 Rue Des Fougeres, 78310 Maurepas, France, Telephone: (1)30647234, Telex: (842)699470F, FAX: (33)30573860/**Mallet SA,** BP 10278, 95704 Roissy CDG, France, Telephone: 93653480, Telex: 470977, FAX: 93652271/**Maagar Supply Services,** Kiryat Weizman, Rehovot 76110, Israel, Telephone: 011 972 8 474537 or (08)464911, Telex: 922361579, FAX: (972)8461461/**AMS Biotechnologia (Italia),** Sansovino 8.20133, Milano, Italy, Telephone: 02206251, Telex: 335661/**T&B Technologie s.r.l.,** Via Tasso, 4281A, 80127 Napoli, Italy, Telephone: 39-81-659021/658033, Telex: 720573 TETSUD/ **Funakoshi Pharmaceutical Co., Ltd.,** 2-3 Surugadai, Kanda, Chiyoda-Ku, Tokyo, Japan, Telephone: 03 293 2352, Telex: 78128489 FUNA, FAX: 81-3-295-5545/**Toyobo Co. Ltd.,** Tsuruga Enzyme Plant, 10-24 Toyo-Cho, Tsuruga-Shi, Fukui-Ken, 914 Japan, Telephone: (0770)25 6883, Telex: 78163465/**Westburg,** P.O. Box 214, NL-3830 AE Leusden, The Netherlands, Telephone: 033 95 00 94, Telex: (844)79406, FAX: 033948044/ **AMS Biotechnologia (Portugal), Lda.**, See AMS Biotechnologia (Espagna), S.A. /**Applied Biotech PTE Ltd.,** 100 Beach Rd, HEX 17-06 Shaw Towers, Singapore, Telephone: 2937400, Telex: RS 55787 APPBIO, FAX: (65)2983537/**AMS Biotechnologia (Espagna), S.A.,** Calle Argensola.6(4-5), Madrid 28004, Spain, Telephone: 20 85693, Telex: 41663 CTNE E, FAX: 4103108/**Intermedica,** P.O. Box 30182, 10425 Stockholm, Sweden, Telephone: 011 972 8 474537 or (08)749-59-40(nat), Telex: (854)12442 ATTN: Scanmedica /**Genofit, S.A.,** 110 Chemin Du-Pont, Du-Centenaire, C.P. 239, 1212 Grand Lancy-1, Switzerland, Telephone: 0111 41 22 71 4444, Telex: 845423082, FAX: 4122713128/**Northumbria Biologicals Ltd.,** South Nelson Industrial Estate, Cramlington, Northumberland, United Kingdom NE23 9HL, Telephone: (0670) 732992, Telex: 851538239 NBL G/**Genofit GMBH,** Rathausstrasse 11, D 6900 Heidelberg, Republic of West Germany, Telephone: 0049622137601, Telex: (841)461149, FAX: 00496221372470 /**AH Diagnostics,** Hallssti 29, 8000 Aarhus C, Denmark, Telephone: 06201206, FAX: 6110157

Circle No. 71 on Readers' Service Card

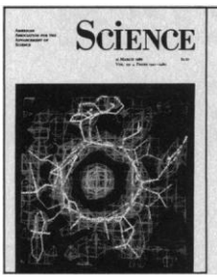
AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

SCIENCE

ISSN 0036-8075
8 JULY 1988
VOLUME 241
NUMBER 4862

■ **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): $70. Domestic institutional subscription (51 issues): $110. Foreign postage extra: Canada $32, other (surface mail) $32, air-surface via Amsterdam $85. First class, airmail, school-year, and student rates on request. Single copies $3.00 ($3.50 by mail); back issues $4.50 ($5.00 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. 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*, 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 The gramicidin pore. The molecular structure (yellow) of the gramicidin pore is superimposed on a section of the electron density map derived from gramicidin/cesium crystals. The higher density contours (magenta) correspond to the ion ligands (cesiums and chlorides) located in the center of the pore. The lower density (blue) contours are from the polypeptide chains. See page 182. [B. A. Wallace and K. Ravikumar, Rensselaer Polytechnic Institute, Troy, NY 12180-3590]

Reports

Book Reviews

Products & Materials

FROM 1 GOOD IDEA TO 9 MILLION BASE PAIRS

Good ideas have a way of growing.

Today a good new idea—Pulsaphor™ pulsed-field gel (PFG) electrophoresis—has taken root and eliminated the difficulties that separation of large DNA molecules has previously posed. Separation of up to 9 million base pairs, with ultra-high resolution, is now a growing reality.

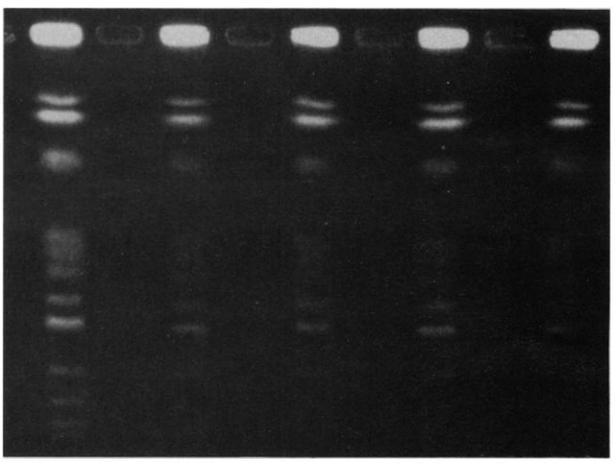
How so? PFG electrophoresis uses two alternating electric fields, applied at different angles for different time periods, to stretch coiled molecules across a horizontal plane. Agarose gel block embedding, using whole cells, protects the vital integrity of the DNA molecules. Novel enzymes and reagents are then employed to digest the chromosomal proteins and other cell components.

Control of the pulse time predetermines the size of molecular separations. Control of the electric field shape increases the resolution by sharpening the separated bands. The result is not only high-resolution separation of large molecules, but also dramatically improved resolution in the separation of smaller DNA fragments.

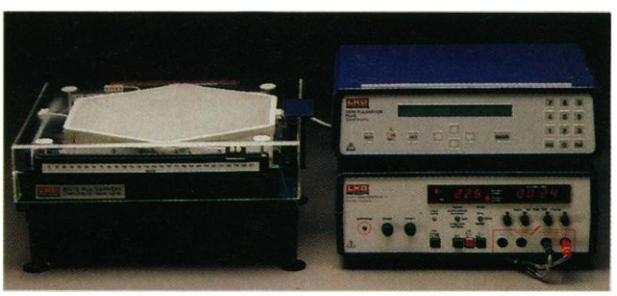
***NEW!* The new Pulsaphor Plus Control Unit permits programming of the precise pulse and run times that will produce straight lanes for clear, accurate analysis. And up to 9 separate run procedures can be stored in memory for future separations.**

***NEW!* Choose between two electrode kits, the conventional point electrodes or the new hexagonal kit, for the flexibility to run present and future variations of the PFG method.**

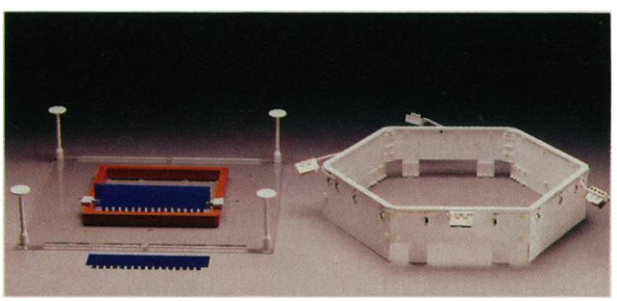
Think about it. Nine million base pairs from one basic idea! Contact your nearest Pharmacia LKB representative today and ask about PFG and Pulsaphor Plus. It's a good idea that you can grow with.



STRAIGHT LANE SEPARATION OF *S. CEREVISIAE* STRAIN CF 22 USING THE NEW HEXAGONAL ELECTRODE KIT.



THE PULSAPHOR SYSTEM INCLUDES AN ELECTROPHORESIS UNIT, POWER SUPPLY AND CONTROL UNIT.



THE NEW HEXAGONAL ELECTRODE ARRAY COMBINES HIGH RESOLUTION PFG AND LARGE SCREENING CAPACITY.

Pharmacia UNITED IN SEPARATION LKB

Pharmacia LKB Biotechnology Inc. Piscataway, New Jersey 08854, Information: (800) 526-3618, In NJ: (201) 457-8000.

Circle No. 42 on Readers' Service Card

Ocean actions and animal roads

THE formation of food webs in the ocean near reefs, islands, and headlands is greatly affected by local fronts; these fronts are boundaries between two different water masses and are generated by interaction of local currents with local topography (page 177). Wolanski and Hamner explain how fronts, formed for example by boundary mixing or the interaction of warm lagoon waters with colder shelf waters, affect the distribution of organisms and particulates throughout the water column. Rather than dispersing floating eggs, larvae, and plankton as do currents in the open sea, locally formed eddies and jets redistribute sediments and sweep together floating particulate materials, concentrating them. Zoocurrents or "animal roads" form, and these concentrations of plankton and other animals help to define the boundaries, direction, and size of local flows. The physical phenomena operating around ocean topographic features concentrate organisms that are low on the food chain and therefore also the larger animals—fishes, whales, and sea birds—that eat the food sources assembled there.

El Niño predictions

WARMING trends in the southern Pacific Ocean—El Niño events—have had devastating effects on animals and plants in the sea and on land and may be linked to changing mid-latitude weather patterns. Since the destructive El Niño of 1982 and 1983, efforts have intensified for finding ways of forecasting future El Niño events. The most recent El Niño occurred in 1986 and 1987, and its buildup and some of its features were predicted fairly successfully by three different numerical models (page 192). One, a statistical model, considered how atmospheric patterns evolve; the second was based on the response of the tropical Pacific Ocean to wind stress; and the third simulated the evolution of an El Niño by coupling atmosphere and ocean data. Barnett *et al.* point out that all three models apparently owe their successes to a fundamental reliance on tropical wind data: atmospheric circulation patterns, which affect sea level pressure and sea surface temperature, vary on a large scale and with low frequency and provide a reliable signal that an El Niño event is on the way.

Earthquake record in tree rings

THERE does not appear to be enough regularity in the recurrence interval of great earthquakes in the Mojave segment of the San Andreas fault for accurate prediction of when the next large earthquake there will occur (page 196). Jacoby *et al.* report that tree ring data in cores and stumps of Jeffrey pines, white firs, and incense cedars growing near the fault zone provide evidence of a major trauma to trees along the fault in the winter of 1812–1813. On 12 December 1812, the San Juan Capistrano earthquake occurred; its source was previously thought to be a coastal fault but now appears attributable to a major rupture (magnitude >7) of the San Andreas fault. Nine trees growing within 20 meters of the fault suffered severe trauma: all had greatly suppressed growth for years, two lost their crowns, and four took about 50 years to fully recover. The fault slippage probably severed major roots of these trees, impeding for decades food and water uptake. Radiocarbon data and historic information indicate that the segment's previous great earthquake had occurred about 330 years earlier; only 44 years later, in 1857, another large earthquake was felt. Thus, if future large ruptures of the fault are to be forecast, a better understanding of how stress builds up and is released will be needed.

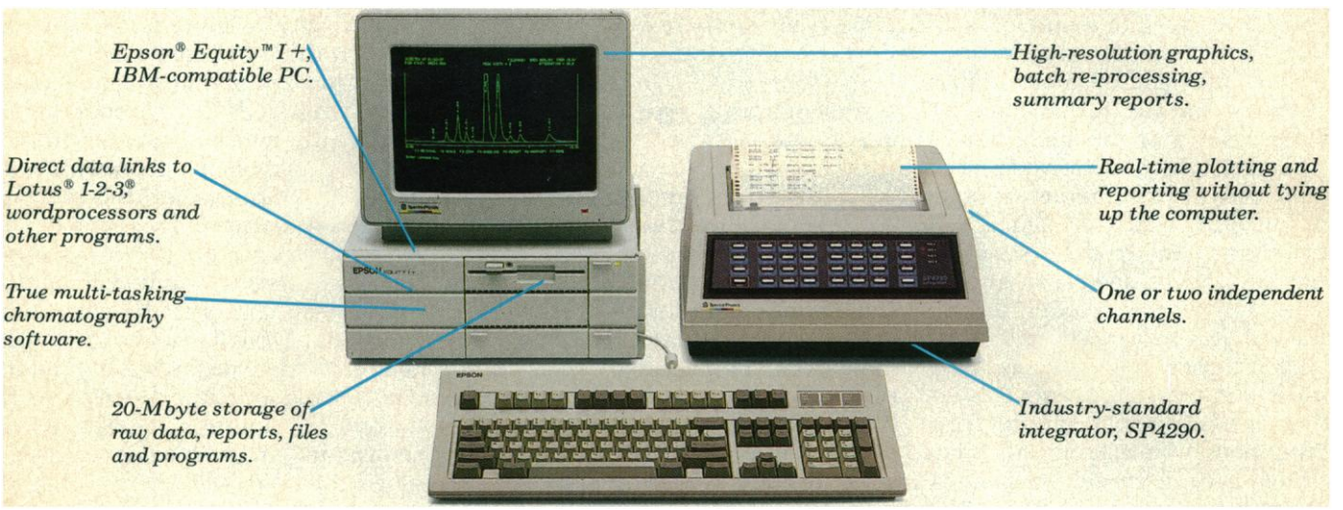
New retroviral protein

A new retroviral protein has been identified; produced by a gene tentatively named *sid*, the protein is found in amounts equivalent to those of some of the protein products of the *gag* gene (page 199). Henderson *et al.* purified and sequenced Sid from a virus that causes immunodeficiency disease in macaques. The amino acid sequence of the protein closely corresponds to the predicted sequence for the product of the X-ORF genetic region. X-ORF is found in the genomes of a number of related simian viruses and in the type 2 human immunodeficiency virus (HIV-2); it is not found in HIV-1, the human immunodeficiency virus most commonly associated with AIDS. With antibodies, Sid-like proteins were detected in a number of simian viruses and in HIV-2, but not in HIV-1. Diagnostic antibodies, nucleic acid probes, and other reagents based on Sid and X-ORF may thus be important in further distinguishing among the immunodeficiency viruses. Although the function of Sid is not known, its strong binding to single-stranded nucleic acids in vitro suggests that it may be an RNA-binding protein.

Protein source for Alzheimer's plaques

IN Alzheimer's disease, pathologic lesions called plaques form in the brain and appear to interfere with normal brain functioning. These plaques have amyloid β protein and inorganic aluminosilicate at their core, and this is surrounded by a disorganized mass of fibrous nervous tissue. The source of the amyloid β protein may now have been identified: the protein resembles heparan sulfate proteoglycans (HSPG) (page 223). These HSPGs, which are cell-surface and extracellular-matrix molecules, are the most common proteoglycans in the nervous system. Schubert *et al.* show that the amyloid β protein precursor and the core protein of HSPG have strong sequence homologies, react with the same antibodies, and yield some of the same digestion products. During normal turnover, cells internalize and degrade HSPGs, and the pieces are then released; the core proteins of plaques are possibly incompletely degraded HSPG molecules.

It Takes only $4500 to Own the WINner.™



When it comes to chromatography workstations, you don't always get what you pay for. Unless you pick the WINner.

The WINner is a new and complete Workstation/INtegrator for chromatographers who want a complete solution at a completely affordable price.

With the WINner, you get an IBM-compatible Epson Equity computer, a 20-Mbyte hard disk, and Spectra-Physics' industry-standard integrator, the SP4290.

You also get a full complement of laboratory-proven Spectra-Physics chromatography applications software, high-resolution graphics, and direct data transfer to Lotus and other general purpose programs.

But what really puts the WINner out in front of its competition is the way it works. The WINner gives you true multi-tasking with continuous real-time plots and reports, from one or two data channels, right at your chromatographs. At the same time, the computer is always available for other tasks. And you never miss a run or lose data.

Best of all, you get it all—for $4,500.*

So if you're looking for a chromatography workstation to put your money on, go with the WINner. It's a sure thing.

In the U.S., call toll free 800-424-7666. Spectra-Physics Autolab Division, 3333 North First Street, San Jose, CA 95134. In Europe, contact Spectra-Physics, GmbH, Siemensstrasse 20, D-6100, Darmstadt-Kranichstein, Fed. Rep. Germany.

*Price for U.S. only. For prices outside the U.S.A., contact your Spectra-Physics representative.

Spectra-Physics

Discover the Quality

Epson is a registered trademark of Epson Corporation. Equity is a trademark of Epson America, Inc. IBM is a registered trademark of International Business Machines Corporation. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation.

SCIENCE

8 JULY 1988
VOLUME 241
NUMBER 4862

Influencing Congress: Ten Commandments

At the 1988 New Orleans meeting of the American Physical Society, William Brinkman of AT&T Bell Labs, Harold Hanson of the House Science, Space and Technology Committee, and I gave talks on the funding of physics in the 1990s. Our talks were different in style and approach, but there was one main message that each of us stressed. The divisiveness resulting from one subfield of physics attacking others was hurting the cause of support for physics as a whole, and, for that matter, was hurting the case for the support of science and technology overall. We all emphasized the need to make the case for support of science to both the executive and legislative branches of government, but with some caveats and guidelines. Hanson offered "Ten Commandments for Academics Who Want to Influence Congress." These useful guidelines are presented below for those who might need them.

Thou shalt know thy congressman: get to know the congressman or senator from your district or state on a personal basis. Get close enough to him that he knows your name and who you are and what organization, laboratory, or school you are with.

Thou shalt know about thy congressman: get to know about him so that you don't commit a faux pas that will damage your basic cause. For example, don't rail against pork-barrel politics when you are there trying to bring home a little bacon of your own. It is not likely that the congressman will share all of your political views. However, the only voting record that counts, at the time, is the one he will make on the issue you are pressing.

Thou shalt not limit visitations to crisis situations: make sure that some of the visits are just attitude-enhancing efforts. Visit often for a "hi" and a handshake. The influence you have will fall off inversely as some high power of the length of time between visits.

Thou shalt know the congressman's staff people: all congressmen need help in dealing with a vast plethora of problems. It is the congressman's staff that supply that help. Educating the staff may be as significant as educating the congressman, and staffers can usually give you more time that the congressman can.

Thou shalt have a focused and concise message: the congressman has even less disposable time than you do, so don't overburden him with detail and don't protract the session. There may be no points to be gained by finishing on schedule, but there are definitely points to be lost by not finishing in the time you've been allotted.

Thou shalt not commit effrontery toward someone else's project: be positive about your own shtick, and do not attack another program gratuitously. Congressmen will have to make choices, but they don't appreciate academic intellectuals urging them to scuttle programs to which they are committed.

Thou shalt visit the congressman in his district: when he's not in Washington politicking, he's in his district politicking, and there are ways of showing him at home that there are real votes involved. Also consider volunteering a few hours of your time (or a relative's time) for envelope-stuffing and making phone calls.

Thou shalt get to know who the key congressmen are: know who they are in terms of major committee assignments and make informed liaisons with other scientists who are in the districts served by these key congressmen.

Thou shalt accept a turn-down or set-back graciously: recognize that when the congressman votes contrary to your urging, it won't be because he is ignorant or uninformed. Perhaps his philosophical priorities are different from yours, and, of course, it may be that political considerations dictate a certain vote.

Thou shalt not do thy lobbying like a lobbyist: your competitors for the congressman's attention and vote are professionals with beaucoup bucks at their disposal. Therefore you should forget about inviting him to lunch—or any other blandishments. Just know your facts. Be as straight as you know how to be in making your case, and don't underestimate what the congressman may already know about your problem.

—ALVIN W. TRIVELPIECE

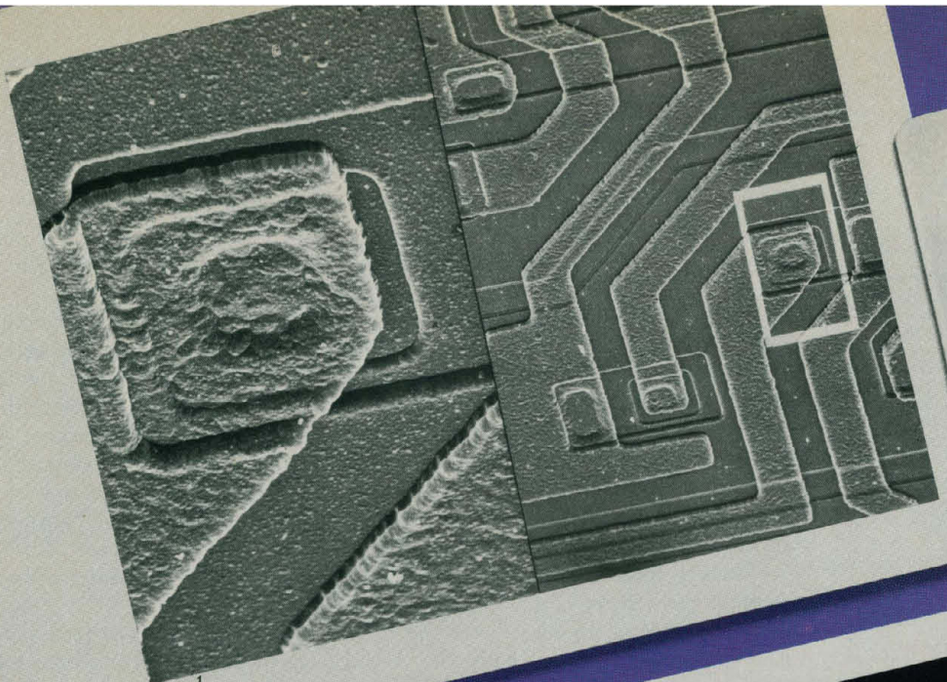
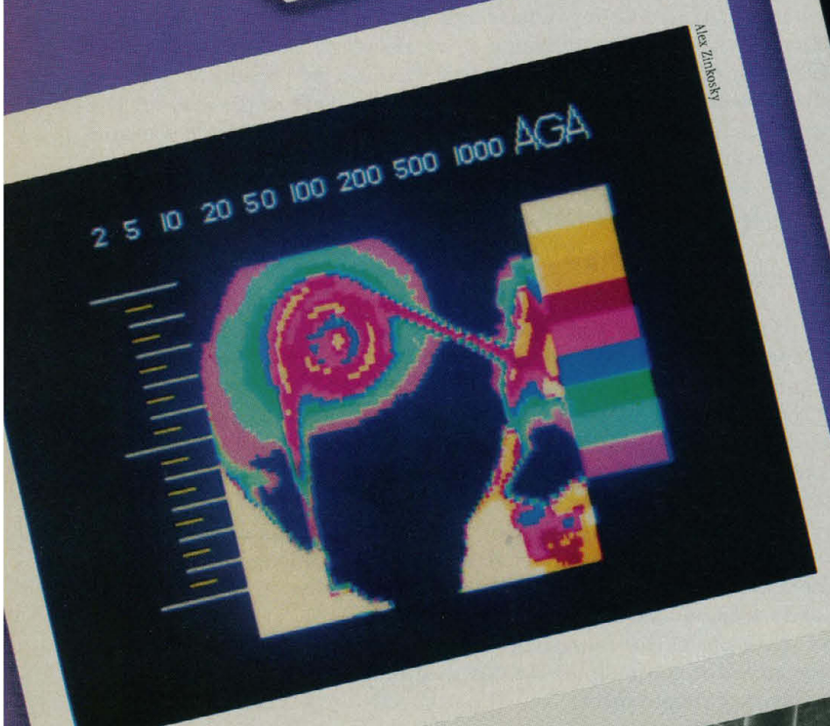


Fig. 1

Fig. 2



Alex Zinkosky

Fig. 3

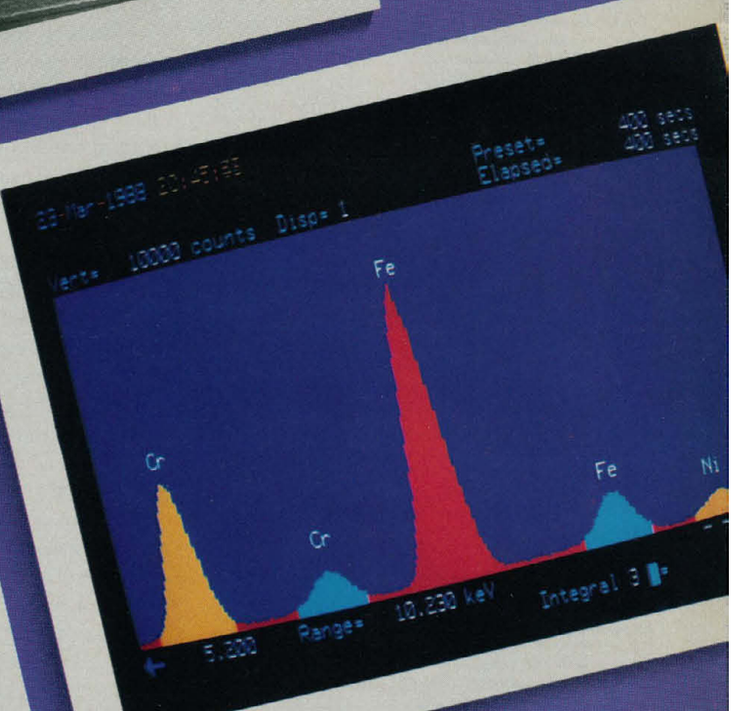


Fig. 4

Fig. 5

How to develop new products.

There's no faster, easier way to document, review, analyze or present your R&D findings than with Polaroid instant images. The images on the left were created in seconds using Polaroid instant films and imaging systems. They show just a few of the many ways that Polaroid can help you develop and research new products.

PolaPan Type 52 sheet film was used to capture this split-field S.E.M. of an integrated circuit (Fig. 1). This black and white, fine grain print film offers a wide tonal range and provides superb detail.

To capture the subtle color differentiations in this CAD/CAM image of a ball bearing (Fig. 2), new High Contrast PolaChrome 35mm Instant Slide Film was used. New High Contrast PolaChrome provides bright, high quality, color slides in minutes for presentation or documentation.

The longevity test of an alternator operating in excessive heat (Fig. 3) was taken from a thermography system using the Polaroid FreezeFrame Video Image Recorder and color AutoFilm Type 339.

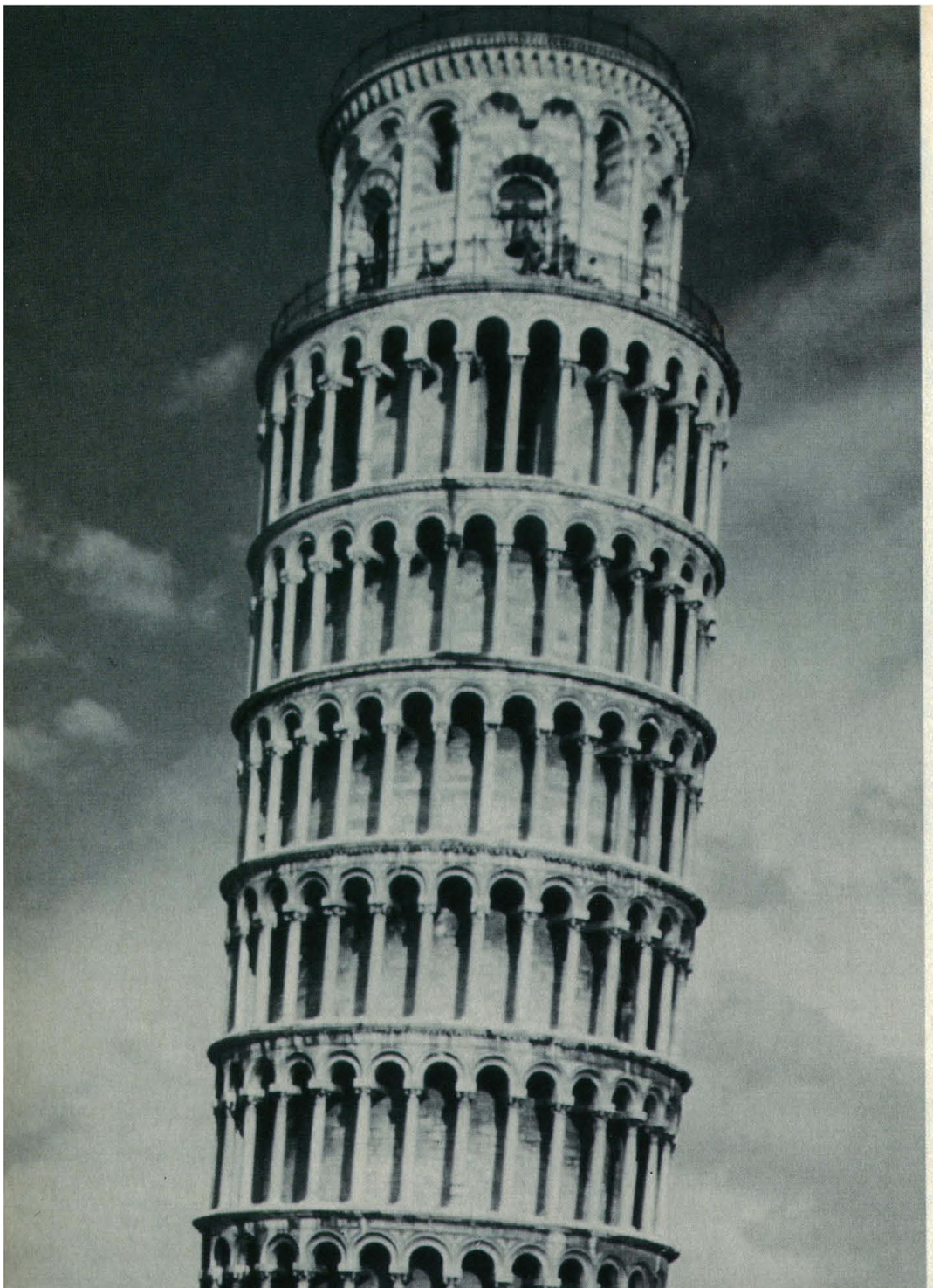
An x-ray spectrum to determine the composition of a stainless steel specimen (Fig. 4) was taken from an energy dispersive analyzer using the Polaroid DS-34 Direct Screen Camera and Polacolor ER Type 669 film.

This S.E.M. image of a heart valve, magnified 18× (Fig. 5), is on Type 55 instant film. This black and white sheet film provides both a positive and negative to make high quality, professional images.

In color or black and white. In prints, 35mm slides, or overhead transparencies. In house. In seconds. If you have a research and development application Polaroid has a solution to help you document your findings. And you get it all A.S.A.P.–As Soon As Polaroid instant images. For a complete brochure about Polaroid instant imaging solutions for the R&D field, or for a free consultation, call **1-800-343-5000.** Or write, Polaroid Corporation, Dept. 693, P.O. Box 5011, Clifton, N.J. 07015.

A.S.A.P.
As Soon As Polaroid

Polaroid



The last thing the world needs is something else that won't hold up.

They say nothing lasts forever.

Which may not be entirely true.

Consider for a moment a lab balance like our METTLER PM.

It's built to be precise. (An ingenious feature called "electronic calibration" makes sure a PM is very precise.)

And it's built to be simple to use. (An even more ingenious feature called "DeltaTrac" helps you see what you're doing, making it very simple to use.)

But more importantly, a PM is built to stay precise and simple to use.

Why do you suppose we give each PM such a rugged housing?

Or back it with more service than you may ever need?

Or why in the world do you think we subject it to over 100 hours of tests before you're allowed to subject it to one minute of use?

The truth is, we have a rough idea of what you'll eventually put a PM through. So we simply try to put a PM through it first.

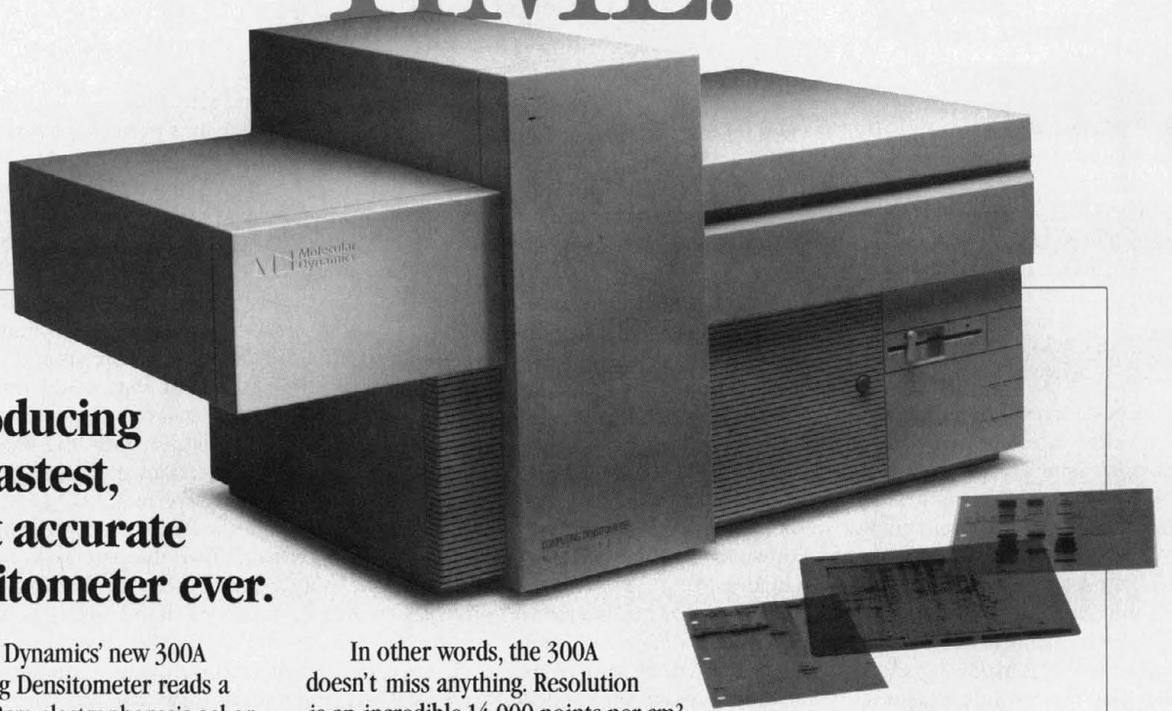
To find out more, call us at 1-800-METTLER.

Here's to a long, full life.

Circle No. 83 on Readers' Service Card

METTLER

IT'S ABOUT TIME.



Introducing the fastest, most accurate densitometer ever.

Molecular Dynamics' new 300A Computing Densitometer reads a 36cm x 42cm electrophoresis gel or film in less than 3 minutes. That's 500-1000 times faster than most other densitometers on the market.

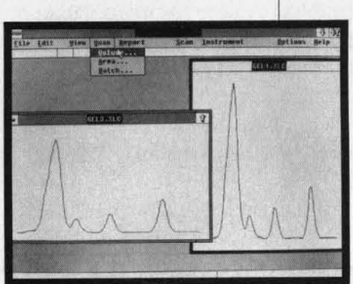
And the same technological breakthrough that gives the Model 300A its speed gives it unequaled dynamic range.

The 300A scans the entire sample area in both directions — not just a "representative" line. A proprietary, high-efficiency light collection system measures virtually all the light that passes through the sample. And since the light comes from a high-intensity laser, accuracy is better than 1% — even on the darkest spots.

In other words, the 300A doesn't miss anything. Resolution is an incredible 14,000 points per cm². The density at each point is measured with 12-bit precision (4096 density levels). And all this information is stored safely on the high-capacity disk drive of a built-in computer.

Which brings up another point. The Model 300A puts you in control of data processing. Powerful analysis tools let you measure peak areas and volumes quickly. You choose the data display format: color contour maps, 3-D projections or electrophoretograms. If you need statistical analysis, Microsoft WINDOWS™ software makes it easy to transfer results into programs such as EXCEL.

The new Model 300A Computing Densitometer. It's about time. And a whole lot more.



To find out about the Model 300A, call or write for our new booklet, *How to Choose a Densitometer.* It only takes a couple of minutes to read. In the long run, you'll save a lot of time.

240 Santa Ana Court, Sunnyvale, California 94086 · 408/773-1222

Molecular Dynamics

Innovative Optical Systems for Molecular Biology

(WINDOWS is a trademark of Microsoft Corp.)

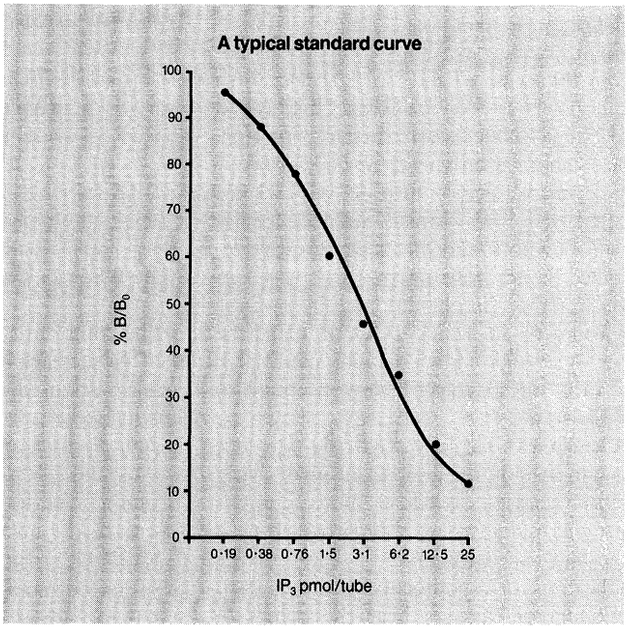
Circle No. 53 on Readers' Service Card

Phosphoinositide assays

A unique quantitative assay

D-*myo*-Inositol 1,4,5-trisphosphate (IP_3) [^{3}H] **assay system** TRK.1000

- Utilizes a high specific activity tritiated tracer together with a specific IP_3 binding protein.
- Specific for the 1,4,5-isomer.
- Allows rapid and accurate measurement of IP_3 in cells and tissues.



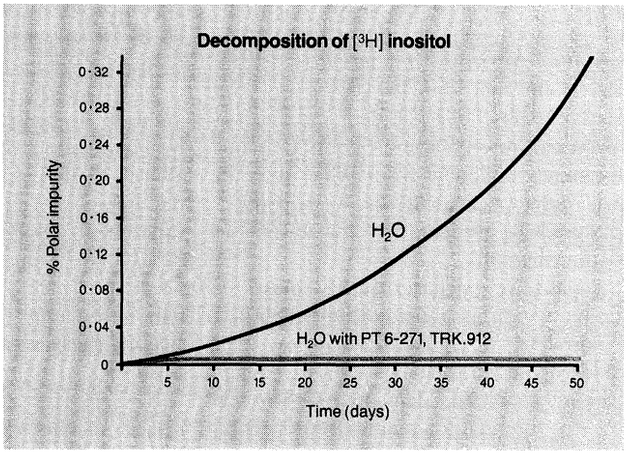
Novel inositol products

Two new tritiated inositol products specially developed to give 'low blanks' in phosphoinositide turnover assays.

myo-[2-^{3}H] **Inositol with PT 6-271**
370-740GBq/mmol, 10-20Ci/mmol, TRK.911

myo-[^{3}H] **Inositol with PT 6-271**
2.96-4.44TBq/mmol, 80-120Ci/mmol, TRK.912

- Contain PT 6-271 — a polymer specially developed to continuously remove radiolytic decomposition products which gives low blanks (less than 0.005%) in assays measuring phosphoinositide turnover.
- Supplied in solution in water — no removal of interfering organic solvents is required and the products may be used straight from the vial.



Convenient sample preparation in phosphoinositide assays

Amprep™ minicolumns provide a convenient alternative to Dowex ion-exchange resins.

Amprep SAX minicolumns (100mg) RPN.1908

- Rapid separations
- Good recoveries
- Small elution volumes

For further information on these products or to obtain your 'inositol lipid metabolism' wallchart please contact your local Amersham office.

Amersham International plc
Amersham UK

Amersham

UK Sales Aylesbury (0296) 395222 **Amersham Australia PTY Ltd** Sydney 888-2288 **Amersham Belgium SA/NV** Brussels (2) 538 9194
Amersham Buchler GmbH & Co KG Braunschweig West Germany (05307) 8080 **Amersham Canada Ltd** Ontario (416) 842 2720
Amersham Corporation Arlington Heights USA (312) 364 7100 **Amersham Denmark ApS** Birkerød (02) 82 0222 **Amersham France SA** Paris (1) 69.28.83.00
Amersham Japan Tokyo (03) 816 6161 **Amersham Nederland BV** Houten 03403 76660 **Amersham Norway** Sandvika (02) 54 63 18
Amersham Sweden AB Solna (8) 734 0800

Circle No. 48 on Readers' Service Card

(Continued from page 147)

Hunter-Gatherers and Humane Living

Thanks for Roger Lewin's interesting piece (Research News, 27 May, p. 1146) on Lee and DeVore's *Man the Hunter* (*1*) 20 years later. As organizer of the conference on which the book is based, I need to add a question.

The changing !Kung Bushmen indeed continue to provide important evidence of human behavior before the onset of "peasantry" 10,000 years ago. Perusal of *Man the Hunter* will show that among the peoples who survived peasantry and urbanization the North American Indians provide us with evidence incomparably richer than that of other continents. Everywhere else hunters-gatherers were squeezed out of favorable environments, while in North America the very extent and variety of virgin environments made it possible for the Indian peoples to resist domination by large peasant societies and to provide incomparable evidence of what we might have learned from their rich experience in humane living.

Since the brilliant success of our latest stages of evolution into a few competing hierarchical nation-states with lethal power might rather be an evolutionary trap, the question is whether we might still escape from it by applying what we might learn from the few surviving hunting-gathering peoples!

SOL TAX
Department of Anthropology, University of Chicago, 1126 East 59 Street, Chicago, IL 60637

REFERENCES

1. R. B. Lee and I. DeVore, Eds., *Man the Hunter* (Aldine, Chicago, IL, 1968).

DOD Lab Quality

As president of the Association of Engineers and Scientists, American Federation of Government Employees, Local 3176, at the U.S. Army's Materials Technology Laboratory in Watertown, Massachusetts, I wish to take exception to Daniel Charles' remarks regarding our facility in his article "Report asks upgrade of military R&D labs" (News & Comment, 25 Mar., p. 1484). The U.S. Army's Materials Technology Laboratory does *not* have a "bad reputation," as Charles states. It does have a fine collection of dedicated engineers and scientists working hard to fulfill their mission of providing advanced materials for the U.S. Army. This work has resulted in many significant contributions in the areas of lightweight equipment, armor, antiarmor penetrators, and numerous other aspects of materials science and engineering. The Materials Technology Laboratory's problem is the same as that of other Department of Defense laboratories, that is, the lack of competitive salaries that would allow us to attract and retain more of the outstanding scientists and engineers that are available. Massachusetts is an extremely competitive region for scientists and engineers.

RAYMOND E. HINXMAN III
Association of Engineers and Scientists, American Federation of Government Employees, Local 3176, c/o U.S. Army Materials Technology Laboratory, 405 Arsenal Street, Watertown, MA 02172–0001

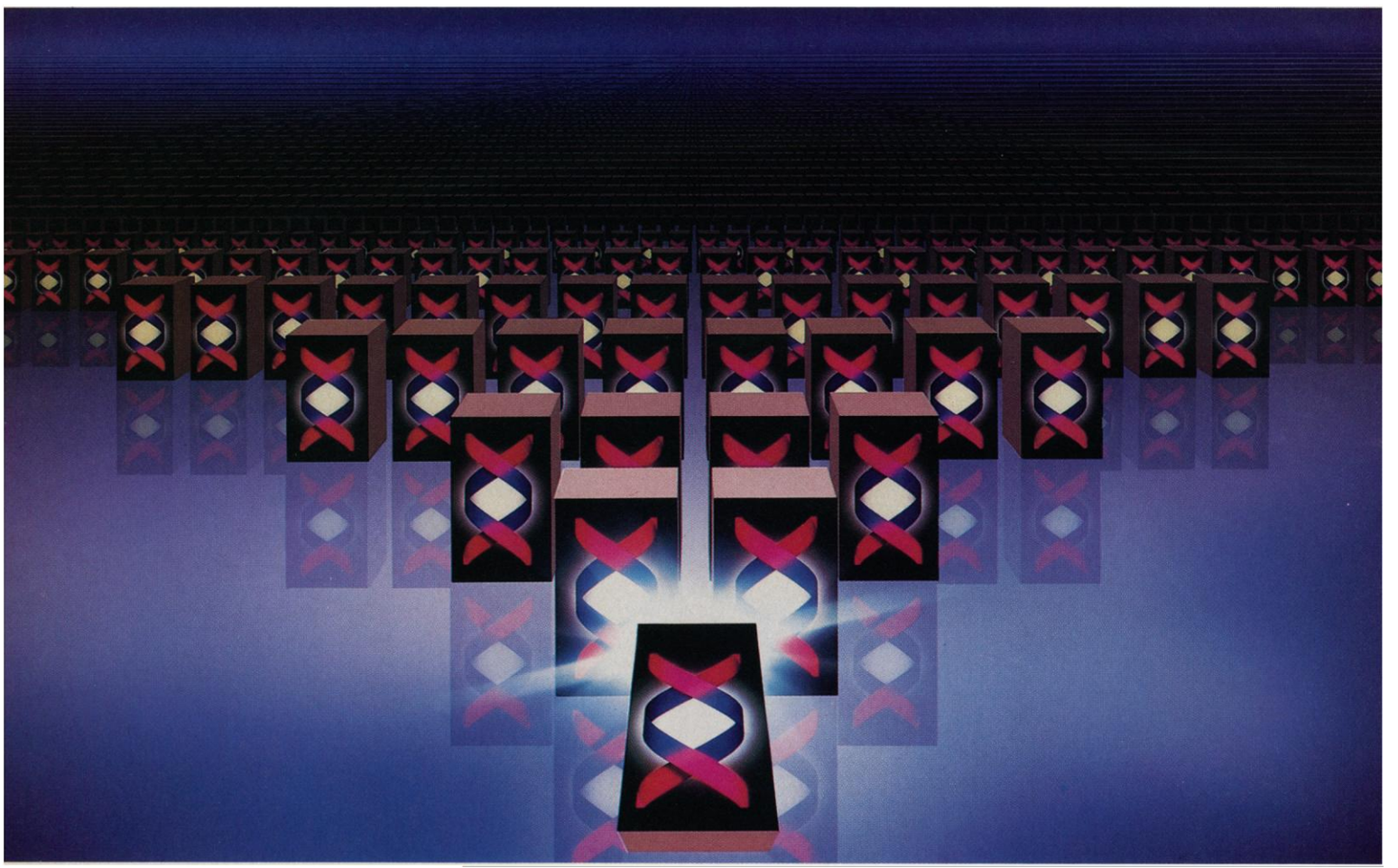
Erratum: The bibliographic listing that appeared at the head of the book review entitled "The militarization of physics" (15 Apr., p. 341) should have read *Historical Studies in the Physical and Biological Sciences, vol. 18, part 1*. The work in question is also known by the informal title "Cooperation or Cooptation? Science and the Military."

Erratum: The address given for Small Talk/V, Digitalk, Inc., in reference 2 of the software review "PC software for artificial intelligence applications" by Helmut Epp *et al.* (6 May, p. 824) was incorrect. It should have been 9841 Airport Boulevard, Los Angeles, CA 90045.

Circle No. 52 on Readers' Service Card

Circle No. 62 on Readers' Service Card

Amplify DNA in hours, not days, with the new DNA Amplification System.



A new amplification technique allows you to obtain microgram quantities of DNA from picogram amounts of starting material. This patented* procedure — called the Polymerase Chain Reaction (PCR™) — amplifies, *in vitro*, a target DNA sequence at least 100,000-fold in just hours instead of days. Developed by Cetus scientists, PCR represents a major breakthrough in molecular biology.

OPTIMIZE THE PCR ADVANTAGE

And now, Perkin-Elmer Cetus Instruments extends the PCR revolution with the introduction of a system that optimizes the technique's speed and efficiency. We call it the DNA Amplification System. All the tools you need to perform the PCR technique in your research laboratory.

GENEAMP™ KIT—THE ONLY PCR KIT

All the necessary high quality reagents optimized for the PCR technique, including the thermostable enzyme, *Taq* Polymerase. With one kit, you can perform 100 individual assays quickly and efficiently. Or, if you prefer, purchase *Taq* Polymerase separately.

DNA THERMAL CYCLER—AUTOMATE THE PCR TECHNIQUE

A sophisticated, yet easy-to-use, programmable temperature cycling instrument. Just place your sample in the instrument, program your cycle profile, and walk away.

To find out about our innovative products for DNA amplification, synthesis, purification, and quantitation, call your Perkin-Elmer Representative. For ordering information and technical support in the U.S., call 1-800-762-4001. For literature, call 1-800-762-4000.

Now, *Taq* Polymerase is available.

Perkin-Elmer Corp.
761 Main Avenue
Norwalk, CT 06859-0012 U.S.A.
Tel: (203) 762-1000

Bodenseewerk Perkin-Elmer & Co., GmbH
Postfach 1120
7770 Ueberlingen
Federal Republic of Germany.
Tel: (07551) 810

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

*PCR is covered by U.S. Patent No. 4,683,202 issued to Cetus Corporation. Patents pending on *Taq* Polymerase and its use. Patents in Europe and Japan applied for.

GeneAmp is a trademark of Perkin-Elmer Cetus Instruments.
PCR is a trademark of Cetus Corporation.

Circle No. 102 on Readers' Service Card

PERKIN ELMER CETUS

NARISHIGE USA's Reproducible Micro-Injector System

The name "Narishige" is recognized worldwide for high quality micromanipulators and micro-injectors. Now, Narishige USA brings the technology of cell injection to an impressive new level. With our remarkable IM-200 Micro-Injector you can make intracellular or extracellular injections, via digital settings of pressure and time over a wide range of volumes, with precision and reproducibility. Yet it's so simple that beginners can work with as much confidence and ease as experienced users. Best of all, the IM-200 is an exceptional value.

Narishige USA offers an extraordinary system for cell experimentation, of which the IM-200 is but one part. All equipment, including Micro-manipulators, Microinjectors, Microforges, Microgrinders and Micropipette Pullers can be purchased separately.

A growing micro-research community turns to Narishige USA whenever they need precision products. Should a question ever arise, Narishige USA will be there with expert telephone support. Call for a detailed brochure and the name of the dealer closest to you: **1-800-445-7914.**

Circle No. 46 on Readers' Service Card

NARISHIGE
USA

NARISHIGE USA, INC.

One Plaza Road, Greenvale, New York 11548
(516) 621-4588

(800) 445-7914