1 March 1985 • Vol. 227 • 4690

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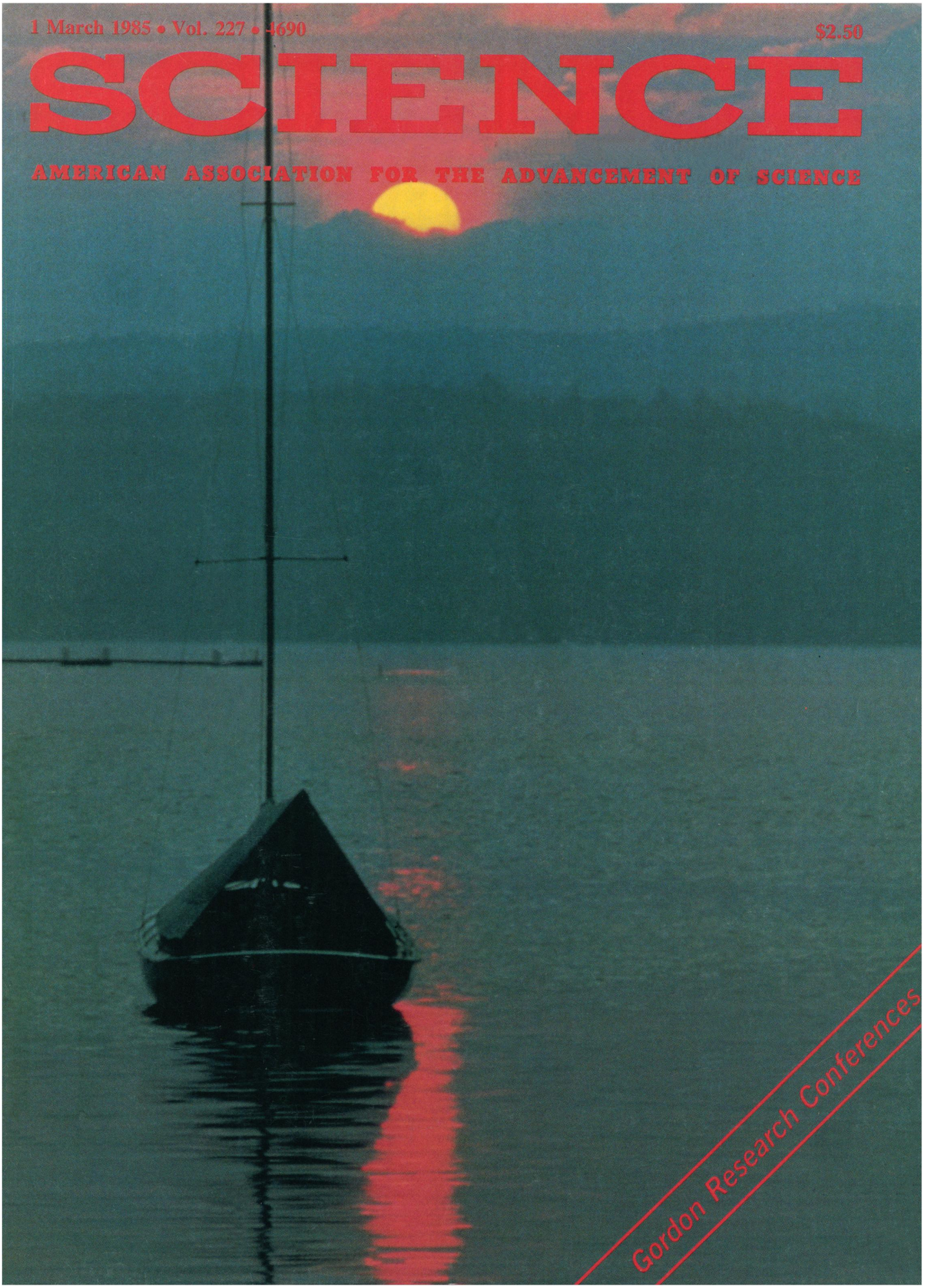

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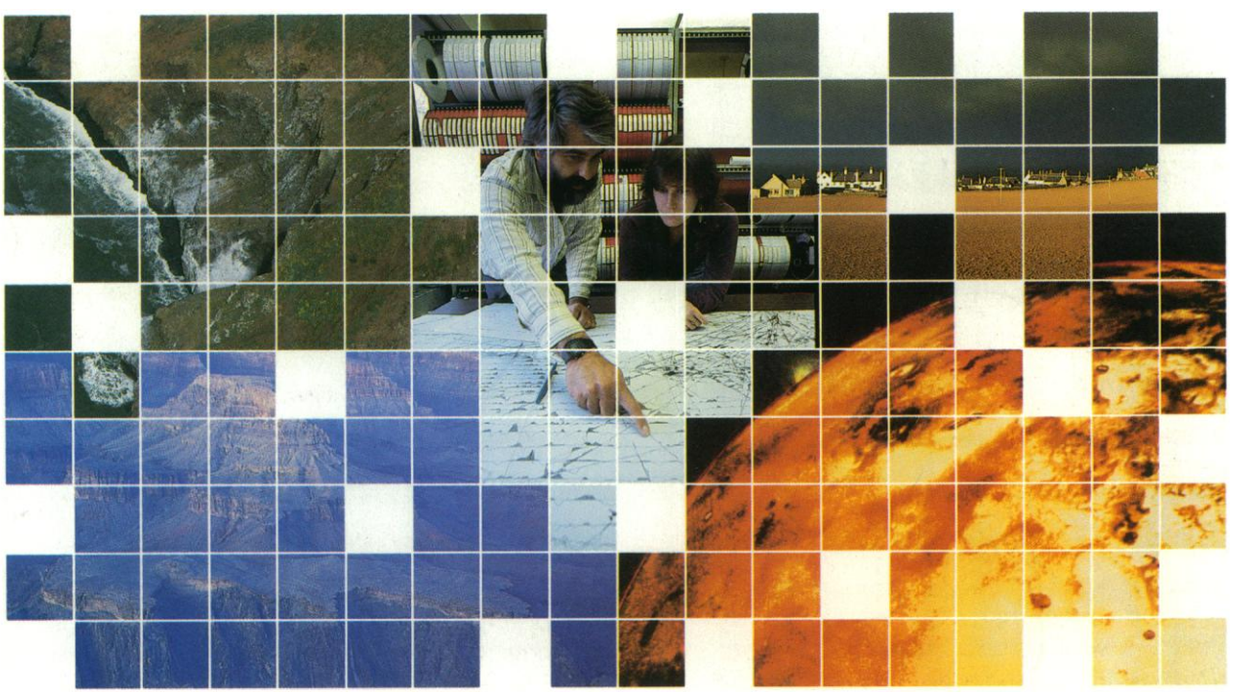
PLANET EARTH is an introductory geoscience course and PBS prime-time television series offered by the Annenberg/CPB Project in Spring 1986. This high quality and animated resource may be used as a complete course, enrichment component for an existing course, or as required out-of-classroom viewing. The curriculum is validated by expert panels from the National Academy of Sciences. For a free preview packet and other information on how you can tailor this exciting and versatile material for your students, call **1-800-LEARNER.**



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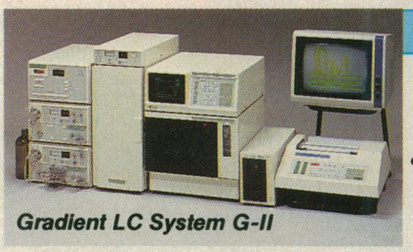
Perfect Quality LC.



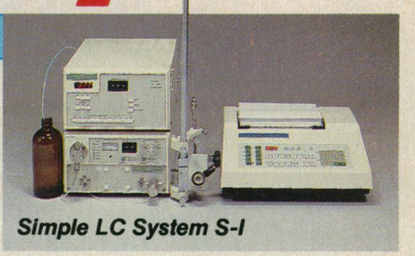
Gradient LC System G-II

Gradient

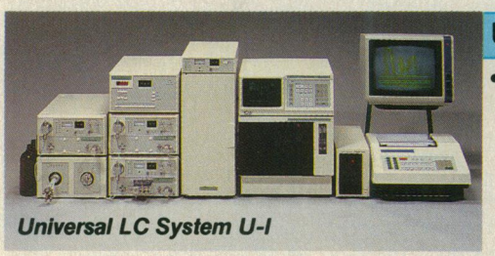
- *Complete automation of binary gradient LC*

Simple

- *Simple and low cost yet high performance*



Simple LC System S-I



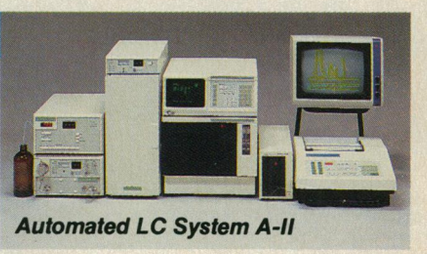
Universal LC System U-I

Universal

- *Complete automation of ternary gradient LC as well as low and high pressure valve control*

Automated

- *Complete automation of isocratic LC*



Automated LC System A-II

UV Spectrophotometric Detector SPD-6A, UV-VIS Spectrophotometric Detector SPD-6AV

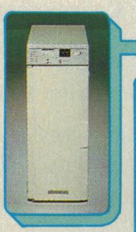
- *SPD-6A has wavelength range of 195 – 350nm and SPD-6AV of 195 – 700nm*

System Controller SCL-6A

- *Complete control of LC module as well as external devices*
- *Menu driven control of parameters*

High Performance Liquid Pump LC-6A

- *Capable of stable flow rate between 0.01 — 9.9ml/min*

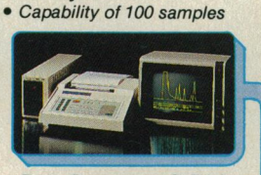


Column Oven CTO-6A

- *Temperature control up to 99° C*

Auto Injector SIL-6A

- *Capability of 100 samples*



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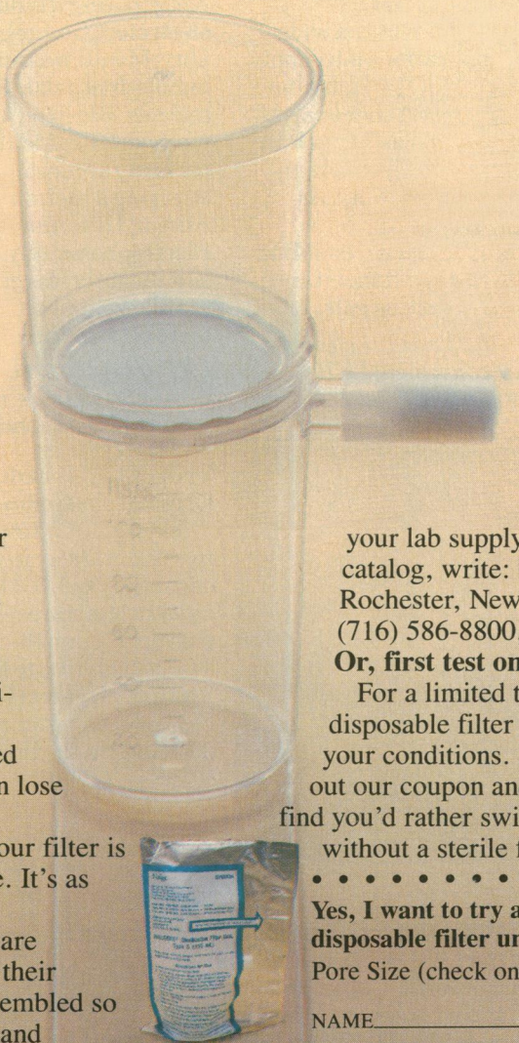
COVER

Lake Sunapee, New Hampshire, vicinity in which Gordon Research Conferences will take place (summer of 1985). See page 1067 for details about the conferences. [Photo courtesy of the State of New Hampshire]

Sick of fighting fragile filter membranes?

Nalgene® disposable filter units. When you don't want to be caught without a filter.



You've just put a sterile membrane in your freshly autoclaved filter holder. You're ready to filter with a sterile set-up. Or are you?

Was the autoclave cycle just a little too short? Did the membrane pick up contaminants when you inserted it in the holder? Maybe. And when sterility is compromised your culture can be contaminated. You can lose months of valuable time.

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Because Nalgene disposable filter units are sterilized and tested before we ship them, their sterility is guaranteed. And they're preassembled so you never have to worry about handling—and possibly contaminating—membranes. We monitor sterility for you so you can concentrate on more important things.

Nalgene disposable filter units are available in 3 convenient sizes: 30 mL (with membranes in 0.20 and 0.45 pore sizes), 115 mL (in membrane pore sizes of 0.20, 0.45 and 0.80), or 500 mL (in membrane pore sizes of 0.20 and 0.45). To order call your lab supply dealer. For our current catalog, write: Nalge Company, Box 365, Rochester, New York 14602. Telephone: (716) 586-8800, Telex: 97-8242.

Or, first test one yourself—FREE.

For a limited time you can try a Nalgene disposable filter unit in your lab—under your conditions. All you have to do is fill out our coupon and return it to us. You may find you'd rather switch than get caught without a sterile filter when you need one.

Yes, I want to try a 115 mL Nalgene disposable filter unit.

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Only with the new LKB Horizontal El

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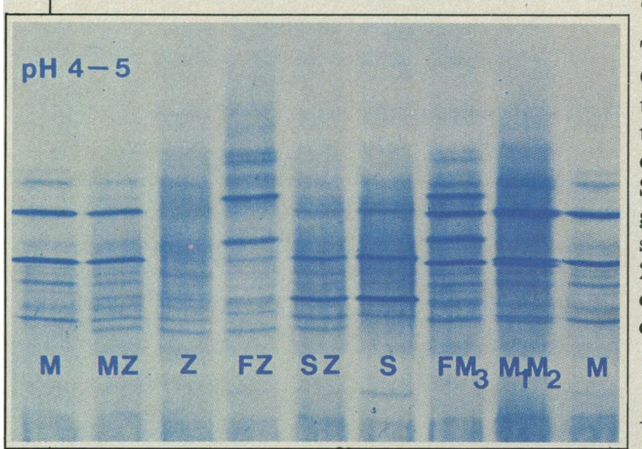
READY-TO-USE GELS FOR MAXIMUM CONVENIENCE

All the owner of the LKB Horizontal Electrophoresis System needs to cover a wide range of electrofocusing applications is a supply of the popular and successful LKB Ampholine PAGplates. These allow the researcher to avoid the time and trouble involved in casting gels in the laboratory, while guaranteeing both high resolution and excellent reproducibility. As many as 96 samples can be separated simultaneously on a single PAGplate, enabling users with high workloads to spend their time screening samples instead of casting gels.

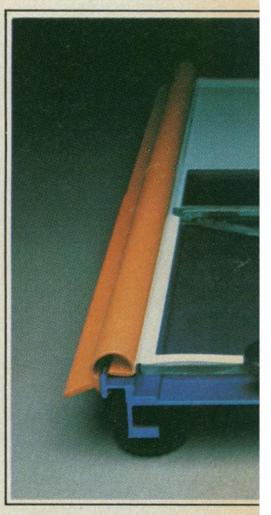
Eight phenotypes of α_1-antitrypsin are clearly identified using one of the convenient LKB Ampholine PAGplates ▼



ULTRATHIN GELS FOR MAXIMUM ECONOMY

Anticipating the need for less expensive electrofocusing gels, LKB developed the new UltroMould: a simple device designed to cast bubble-free gels as thin as 0.1mm in less than 30 seconds. Based on a patented sliding plate method, UltroMould is easy to use, producing perfectly accurate and uniform gels and ensuring a high standard of reproducibility. Adding UltroMould to the LKB Horizontal Electrophoresis System means that significantly less gel solution and smaller sample volumes are required, resulting in far more economical electrofocusing.

LKB UltroMould casts bubble-free ultrathin gels in only 30 seconds, making gel casting quicker, easier and more certain ▶



THICK GELS FOR MAXIMUM CAPACITY

Original electrofocusing techniques used thicker gels, and even today you may still wish to work this way in order to achieve higher capacity. The LKB Horizontal Electrofocusing System lets you easily cast and run Ampholine gels up to 2 mm thick, allowing much greater sample volumes to be analyzed successfully. The 2 mm thick gels are also ideal if you are new to electrofocusing and are following a procedure described in the literature.

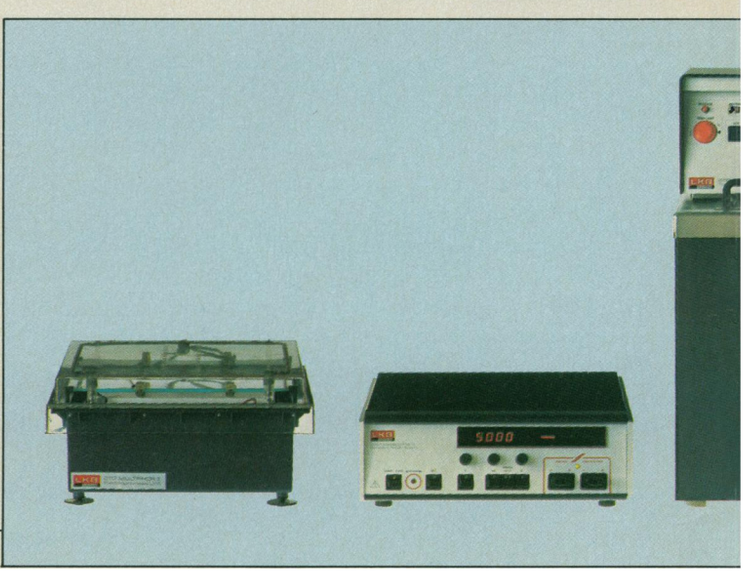
After the thick gel has been cast, the sample is introduced with the help of the sample application foil ▶

This is one in a series of advertisements describing the unrivalled versatility of the LKB Horizontal Electrophoresis System. For further information about analytical electrofocusing, and the many other applications of the system, send today for our brochure.

THE LKB SYSTEM

Only LKB can offer the research scientist a complete, integrated system in which each component works with and complements all the others. Based on the new and improved Multiphor II, the system also includes a 5KV power supply, thermostatic circulator, laser densitometer and data evaluation software.
In addition to the instrumentation, LKB provides a range of 18 major kits plus a complete programme of high quality chemicals, supplies and accessories, backed by the full worldwide support of the market leader in electrophoresis and electrofocusing.

LKB – the electrophoresis experts.

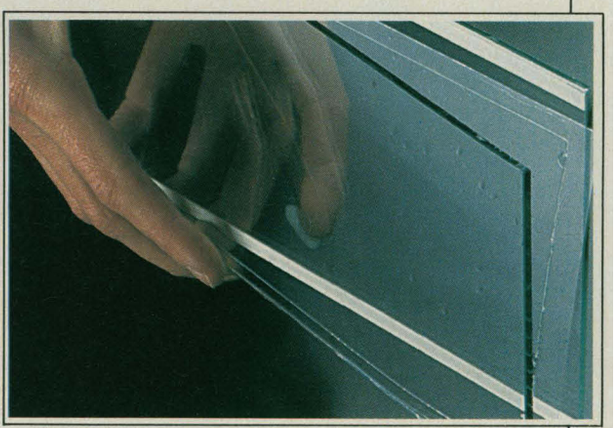


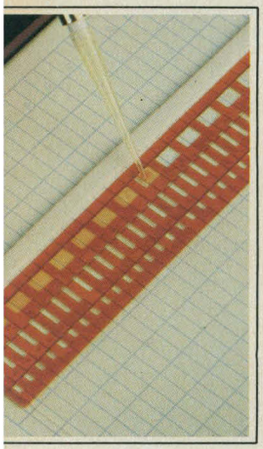
ectrophoresis System do you also get...

analytical electrofocusing

AGAROSE GELS FOR MAXIMUM POROSITY
Another of the many options available to the user of the LKB Horizontal Electrophoresis System is the application of Agarose electrofocusing gels. LKB supplies extremely pure agaroses, carefully developed for electrofocusing, and the original capillary casting method simplifies the task of producing 0.5 mm gels on GelBond Film backing sheets. Agarose is non-toxic and easy to handle and the entire analysis procedure, including casting and running, is very rapid.

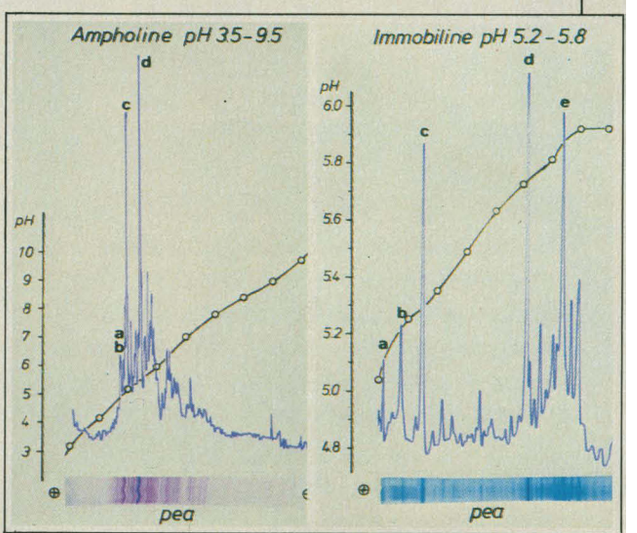
Separating the GelBond Film from the glass plate gives a 0.5 mm agarose gel, firmly attached to its support and ready to use ▶

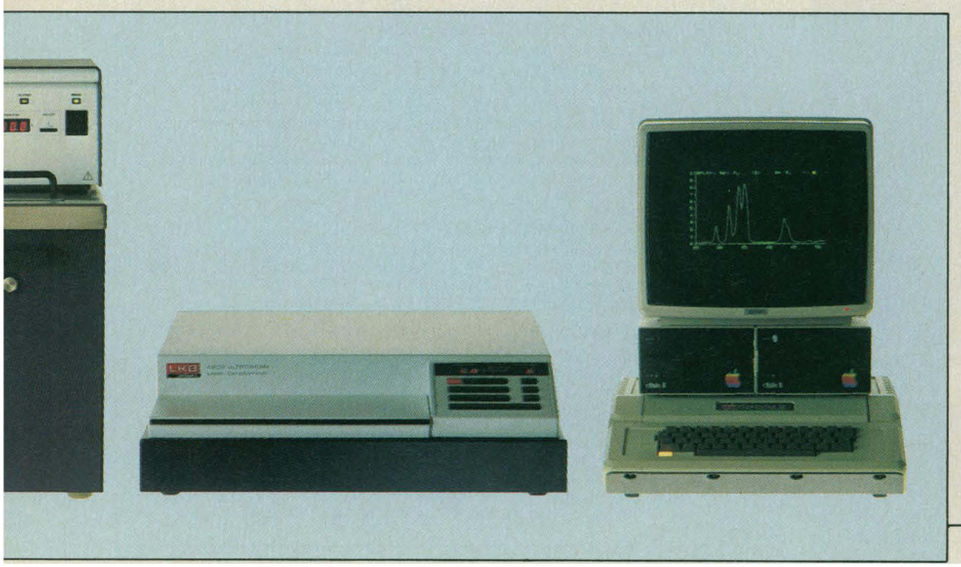




IMMOBILINE GELS FOR MAXIMUM RESOLUTION
The unique LKB Immobiline System is significantly different to traditional gels in that its pH gradient is an integral part of the gel. The system is designed to allow the user to select a pH gradient as wide as 3.0 pH units, or as narrow as 0.1 pH units, anywhere in the range 3.6 to 9.5. This tailoring of the gradient to suit specific applications permits extremely high resolution to be achieved with the LKB Horizontal Electrophoresis System. Stable and reproducible linear gradients having a slope as low as 0.01 pH units/cm are possible, allowing you to separate proteins whose pI values differ by as little as 0.001 pH units.

Comparison of traditional electrofocusing and LKB Immobiline System (courtesy of Dr A Görg et al, Technische Universität, München) ▶





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An International Symposium

Biotechnology in Plant Science: Relevance to Agriculture in the Eighties

Cornell University, Ithaca, N.Y.

June 23–27, 1985

The Cornell University Biotechnology Program has organized this symposium to explore recent advances in biotechnology in the plant sciences and to assess their potential for application to plant breeding and to agribusiness. Patent, environmental, and regulatory issues will also be considered. Plenary session speakers have been selected by a program committee; poster sessions will be open to all participants.

Plenary Sessions

TISSUE CULTURE: REGENERATION EVENTS

Chair: KEITH WALKER, Plant Genetics, Inc.
Speakers: DWIGHT TOMES, Pioneer Hi-Bred International, Inc., Opportunities and limitations of the genotypic influence on establishment and plant regeneration from callus and cell cultures of crop species; TOM HODGES, Purdue University, Regeneration of maize; DAVID STUART, Plant Genetics, Inc., Physiology of development in regenerating cell cultures of alfalfa and celery; JAMES DUNWELL, John Innes Institute, Embryogenesis from pollen *in vitro*

TISSUE CULTURE: GENETIC EVENTS

Chair: Otto Schieder, Free University, Berlin
Speakers: WILLIAM SCOWCROFT, CSIRO, Canberra, Somaclonal variation: Impact on plant biology and breeding strategies; EDWARD COCKING, University of Nottingham, Somatic hybridization: Implications for agriculture; DENES DUDITS, Institute of Genetics, Szeged, Partial transfer of the nuclear genome by protoplast fusion and uptake of isolated chromosomes; MAUREEN HANSON, Cornell University, Organelle segregation and recombination following protoplast fusion

TISSUE CULTURE: LARGE SCALE

Chair: Michael Shuler, Cornell University
Speakers: PETER STEPONKUS, Cornell University, Fundamental aspects of chryoinjury as related to chryopreservation; PHILIP AMMIRATO, Columbia University and DNA Plant Technology Corp., Strategies for large-scale manipulation of somatic embryos in suspension cultures; DONALD DOUGALL, University of Tennessee, Chemicals from plant cell cultures: Yields and variation; MICHAEL SHULER, Cornell University, Bioreactor consideration for chemical production from plant cell tissue culture; MAMORU TABATA, Kyoto University, Production of shikonin by plant cell cultures

PLANT TRANSFORMATION

Chair: ROBERT FRALEY, Monsanto Co.
Speakers: ROBERT FRALEY, Monsanto Co., Perspectives on plant transformation: Research and commercial applications; BRUNO GRONENBORN, Max-Planck Institute, Cologne, Development of CaMV-based plant transformation vectors; STEPHEN ROGERS, Monsanto Co., Expression of introduced genes in transformed plants; NAM-HAI CHUA, Rockefeller University, DNA sequences involved in the constitutive and regulated expression of plant genes; JOZEF SCHELL, Max-Planck Institute, Cologne, New developments in plant transformation technology: Its application to monocots and cellular organelles

GENES FOR TRANSFORMATION

Chair: BEN BURR, Brookhaven National Laboratory
Speakers: RICHARD BROGLIE, Rockefeller University, Regulation of chitinase gene expression by ethylene in response to plant stress; JUNE NASRALLAH, Cornell University, Self-incompatibility alleles of *Brassica;* STEVEN DELLAPORTA, Cold Spring Harbor Laboratory, The use of transposon tagging to isolate genes from maize; ROGER BEACHY, Washington University, Application of gene transfer technology to the study of viral pathogenesis and induced immunity

PLANT MOLECULAR BIOLOGY AND AGRICHEMICALS

Chair: ROBERT GOODMAN, Calgene, Inc.
Speakers: ROBERT GOODMAN, Calgene, Inc., Strategies and issues in the application of genetic engineering to future uses of agrichemicals; DALE SHANER, American Cyanamid, Co., Mechanism of action of the imidazolinones and cell culture selection of tolerant corn; LAURENS METS, University of Chicago, Prospects for genetic modification for resistance in plants to triazine herbicides; CARL FALCO, E. I. du Pont de Nemours & Co., Molecular genetics of sulfonyl urea herbicide activity; WILLIAM HIATT, Calgene, Inc., Expression in plants of a bacterial gene encoding resistance to the herbicide glyphosate

Panel Discussions

PLANT MOLECULAR BIOLOGY AND PLANT BREEDING

Conveners: VERNON GRACEN, Cornell University; VIRGINIA WALBOT, Stanford University
Panel Members: TED BINGHAM, University of Wisconsin; PETER DAY, Plant Breeding Institute, Cambridge; JOHN GAEDELMAN, University of Minnesota; STEVE TANKSLEY, New Mexico State University; ARTHUR WEISSINGER, Pioneer Hi-Bred International, Inc.

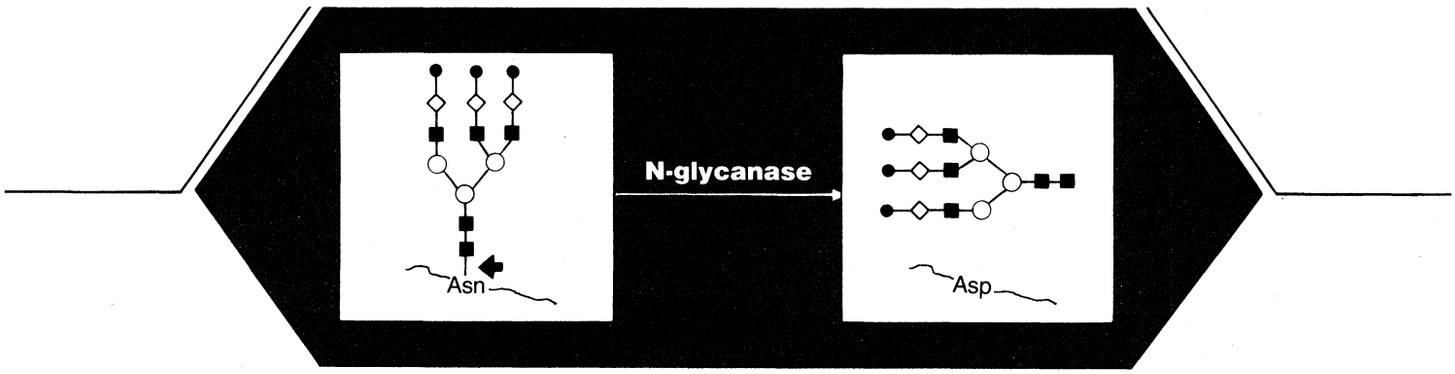
AGRICULTURAL BIOTECHNOLOGY AND INDUSTRY

Convener: NICHOLAS FREY, Pioneer Hi-Bred International, Inc.
Panel Members: MARTIN ALEXANDER, Cornell Unversity; DONALD BROWN, Carnegie Institute of Washington; RALPH HARDY, Cornell University and BioTechnica International, Inc.; RENÉ TEGTMEYER, U.S. Patent Office; TOM TOLBERT, Monsanto Co.

The proceedings of the symposium will be published by Academic Press. Registration fee, which includes the proceedings is $135 if received before June 3, 1985; $165 thereafter. To receive details of the program, registration materials, and abstract forms, contact Biotechnology Program, Cornell University, Box 547 Baker Laboratory, Ithaca, NY 14853-1301. (607) 256-2300.

NEW FOR GLYCOPROTEIN RESEARCH FROM genzyme

N-glycanase



N-glycanase (Peptide: N-glycosidase F) hydrolyzes the Asn-GlcNAc linkages of glycoproteins to yield:

- Carbohydrate-free intact protein
- Intact oligosaccharides

N-glycanase is:

- Protease-free
- Endo- and exoglycosidase-free

N-glycanase has broad specificity:

GLYCOPEPTIDES	Genzyme N-glycanase	Endo F	Endo H
Ovalbumin, High Mannose	+	+	+
Ovalbumin, Hybrid, with GlcNAc β1→4Man	+	–	+
Ovalbumin, Hybrid, without GlcNAc β1→4Man	+	+	+
Ovomucoid Hybrids	+	+	–
Biantennary Complex	+	+	–
Triantennary Complex	+	–	–
Tetraantennary Complex	+	–	–

Personal communication, Tarentino and Plummer

N-glycanase allows:

- Accurate molecular weight determination of deglycosylated proteins
- Structural analysis of oligosaccharides
- Analysis of glycoprotein function

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BIOSYSTEMS UPDATE

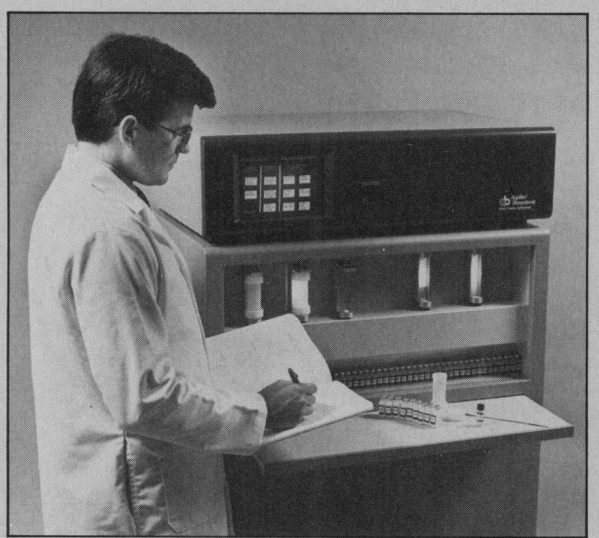
The advanced method for peptide synthesis: Pre-formed Symmetric Anhydrides

Fast, Economical, High Yields

The Model 430A Peptide Synthesizer consistently delivers unprecedented efficiency and economy. It is the first automated instrument-reagent system that optimally forms *t*-Boc amino acid symmetric anhydrides.

Symmetric anhydrides eliminate or suppress random and most non-random coupling failures. In addition, faster, more economical syntheses are achieved because the need to do double couplings for most amino acids is eliminated.

High stepwise yields are routine; complete cycles take less than an hour and typically consume less than 250 mL of reagents.



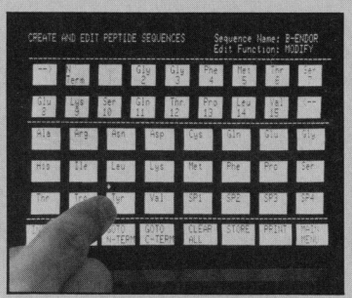
The Model 430A Peptide Synthesizer delivers consistently higher yields of far purer crude product at a substantially lower cost per cycle than instruments employing conventional methods which are not optimized for each amino acid.

Unique, Optimized Chemistry

Each protected amino acid, sealed in powder form in an individual cartridge, is dissolved and activated automatically just before coupling. All functions of the synthesis cycle are uniquely specified for the various amino acids. The Model 430A is available with three reaction vessels for sequential syntheses of different peptides.

Easy, Touchscreen Control

The Model 430A is simple to operate with its touchscreen control, yet can accommodate multiple methods for the experienced peptide chemist. There is no computer lan-



Peptide Sequence Editor—one of the convenient touchscreen menus that provides the user with complete control, plus the flexibility to modify existing protocols or write new ones to accommodate different pre-activation methods including FMOC.

guage to learn—no complicated control panel or keyboard to master. Pre-programmed algorithms automatically integrate each synthesis cycle for the shortest time, even when new protocols are created.

A Complete Instrument-Reagent System

High purity PAM and BHA resins, and a full line of quality amino acids, reagents and solvents are integral components of the 430A system for consistently superior performance. Complete user support includes the assistance of Applied Biosystems scientists and a worldwide network of trained service engineers.

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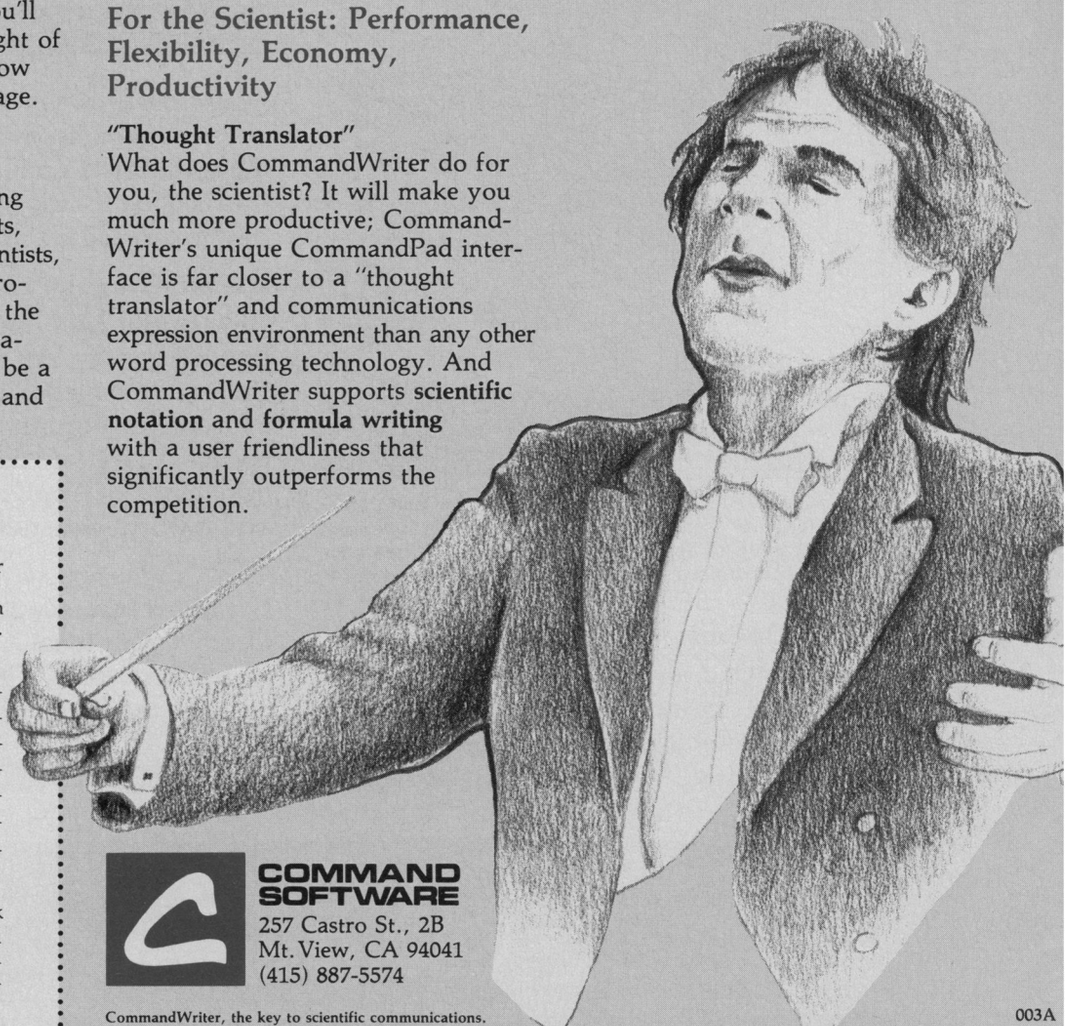

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established. We are informed by the then-director of the major adoption agency that adoptive parents were not told of the existence of any sibling to the child they had adopted" (*4*). It seems clear that there was no correlation in rearing SES, adoptive fathers' income, or neighborhood for the members of the sibling pairs. They were placed independently. Thus Moses' concern is without empirical basis.

Moses raises one final point: in analyses which stretch over several generations he fears that changes in conviction rates over the years might produce artifactual correlations between convictions of the adoptees and the biological and adoptive parents. It is also true that during this timespan this area of the world was faced with the Great Depression, World War II, and industrialization. It is conceivable that the influence of genetic factors might interact with or be affected by these social upheavals as well as the changes in conviction rates. We examined this possibility in an earlier publication (*6*). The analyses reported for the entire cohort were repeated for each of five shorter intervals: 1924–1928, 1929–1933, 1934–1938, 1939–1943, and 1944–1947. "The results were virtually identical for all of these periods and virtually identical to the analyses of the total sample. The changes across these years did not interact with the relationships between biological parent and adoptee crime" (*6*).

As in any area of science, this research project does not stand or fall alone. What is ultimately most important about a research result is its replicability. There is a considerable literature on the genetics of antisocial behavior (*7*).

1) Eleven twin studies from 1929 to the present have uniformly shown much higher rates of concordance for convictions or arrests for identical than for fraternal twins. Christiansen, in a study of a total population of twins (n = 3586 pairs), found 52 percent concordance for criminal convictions for identical (male-male) pairs and 22 percent concordance for (male-male) fraternal twin pairs (*8*).

2) Two U.S. adoption studies show concordance between crime in biological parents and crime in their adopted-away offspring (*9*). An investigation of crime in a major Swedish adoptee cohort (*10*) yields findings that agree with ours in just about every detail. These authors point out that "there are no genes for criminality, but only genes coding for structural proteins and enzymes that influence metabolic, hormonal, and other physiological processes, which may indirectly modify the risk of 'criminal' behavior in particular environments."

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7. S. A. Mednick *et al.*, in *Human Development: An Interactional Perspective*, D. Magnusson and V. Allen, Eds. (Academic Press, New York, 1983).
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Jumping Frog Genes

In the article "Frog genes jump species" (Research News, 23 Nov., p. 955), Roger Lewin describes the second and more likely origin of the *Rana ridibunda* individuals with mitochondrial DNA of an *R. lessonae* type as being a cross between an *R. lessonae* female and an *R. ridibunda* male. However, this cross would produce an *R. esculenta* hybrid, as described previously in the article. The original authors refer (*1*) to a cross between an *R. esculenta* female and an *R. ridibunda* male.

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Erratum: In the report "Antibodies to peptides detect new hepatitis B antigen: Serological correlation with hepatocellular carcinoma" by A. M. Moriarty, H. Alexander, G. B. Thornton, and R. A. Lerner (25 Jan., p. 429), the legend of table 1 should have begun, "Reactivity of human serum samples with peptide 99 and peptide 142," not "Reactivity of human liver samples. . . ."

1 March 1985, Volume 227, Number 4690 **SCIENCE**

Science Policy and Tight Budgets

Budgets are easy to develop when major increases are possible. When money is tight the choices are harder, and the results reveal more about priorities. How was the fiscal year 1986 budget for the National Science Foundation developed, and what does it say?

This budget reflects a particular world view: essentially that the nation faces tough economic competition and that our competitors are challenging our research preeminence in important fields. In response we must do whatever is necessary to maintain—and, where possible, to improve—the ability of our universities to do basic research in the most important areas.

This world view and NSF's general responsibility for the health of basic science and engineering led us to three major priorities: (i) programs that are most directly related to economic competitiveness, (ii) science and engineering infrastructure, and (iii) disciplines for which NSF has a special responsibility.

We are seeking a substantial increase for engineering, which will be allocated $170 million, up 13 percent. Much of this will be concentrated in engineering research centers, which will contribute directly to the research and personnel base that American industry needs to compete in world markets. For similar reasons, we also seek significant increases in biotechnology, earth sciences, and advanced materials research.

Infrastructure is the people, equipment, and instrumentation that are available for research. The people are by far the most important, so in science and engineering education we are emphasizing stability and the orderly rebuilding of quality programs. The budget is constant at $82 million. Graduate students and postdoctoral fellows supported on research funds will rise 4 percent to more than 14,000.

We will continue major support for equipment and instrumentation: a total of $271 million, up 13 percent. We will also continue the priority established in 1984 to provide access to supercomputers for academic researchers. In 1986 this will take almost $46 million, a 12 percent increase, but will provide opportunities to study entirely new classes of problems.

Finally, we are providing strong support for basic research, with emphasis on disciplines for which NSF has special responsibility because it is the major source of federal support. This category includes core mathematics, environmental biology, and social and economic sciences. All these receive substantial increases.

These increases will require decreases elsewhere. We have proposed them in areas no longer quite so timely or productive, or which should attract other support. These occur throughout NSF.

In addition to the quantitative changes, some things will be qualitatively different in 1986. We are continuing a strong effort to increase cooperation between universities and industry. This is especially true in several programs: engineering research centers, presidential young investigators, and science and engineering education.

We are also emphasizing large-scale coordinated research a bit more than in the past, although 70 percent of the funds in the research directorates will continue to go to individual investigators; this compares with an average of 73 percent in recent years.

Economic competitiveness, cooperation, and infrastructure are thus the major themes for NSF in 1986. In addressing them we continue to strengthen our research universities, which are ultimately our greatest resource in science and engineering. These are the right priorities for these times, and we can do well by them even with an austere budget.—ERICH BLOCH, *Director, National Science Foundation, Washington, D.C. 20550*

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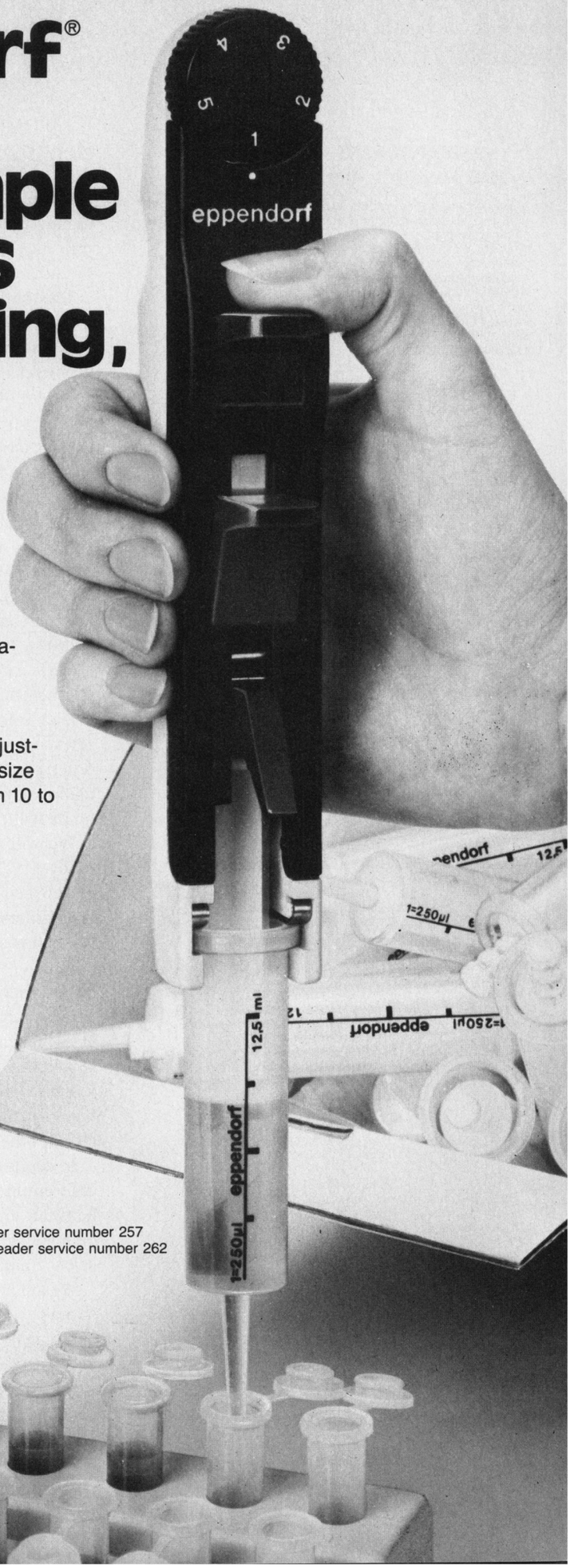

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