20 July 1979 • Vol. 205 • No. 4403 $1.50

SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Beckman and Altex. Because HPLC shouldn't separate sales and service from performance.

Now, when you rely on Beckman for High Performance Liquid Chromatography, you get the best in sales and service as well as equipment. At Beckman, service means technical support for you. We teach you how to operate your system; we help you develop programs tailored to meet the specific needs of your lab; we even help you eliminate down time by showing you how to service your own instruments.

Because you're buying the Beckman line of HPLC systems, you know you are getting state-of-the-art equipment. Like our four new understandable systems with "Distributed Intelligence"... models 322, 332, 320, 330.

With Beckman, if you don't need a complete system, our modules' stand-alone capability lets you select just the equipment you need. Put together our smart components for a fully automated package.

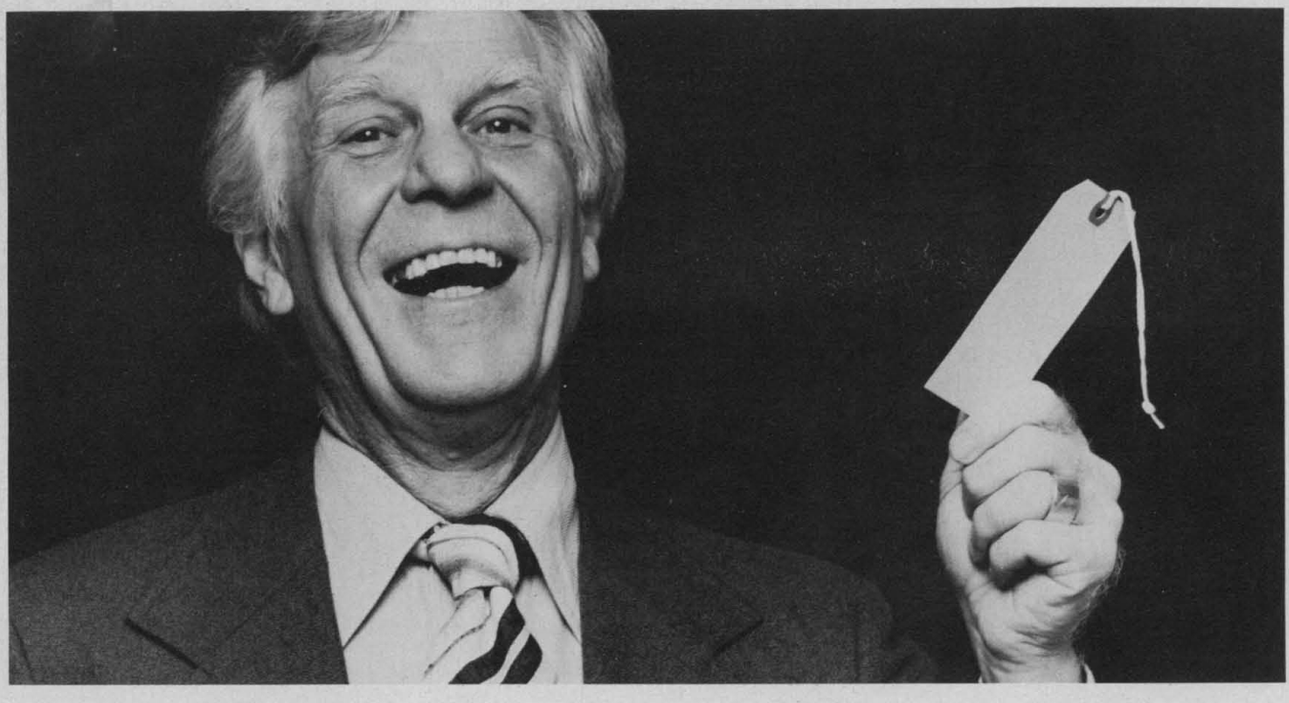
We offer the only modular microprocessor. It can be added at any time to a Beckman HPLC System to provide complete programmable automation. Choose from our two pumps, both offering the best performance-to-price ratio in the world. Model 100A with its pressure flow feedback and high pressure capability is the recognized leader in the industry. Our innovative Model 110A is compact and features single-piston technology. Our new line features extremely efficient maximum coverage columns and injectors with a unique four port design.

When it comes to liquid chromatography, separate the wheat from the chaff. Pick the company that offers high performance in every way—sales, service and equipment. Choose Beckman.

For more information, contact your local representative or the Scientific Instruments Division, Beckman Instruments, Inc., P.O. Box C-19600, Irvine, California 92713.

BECKMAN

Circle No. 106 on Readers' Service Card



If you can't believe the price tag, pretend they're $500 more.

The no-nonsense balances from Fisher.

In Spring 1976 we introduced our first **it-can't-be-a-balance** balance.

Today there's a whole family of Fisher/Ainsworth electronic toploaders, including a compact printing balance and the lab world's first battery-pack portable. Plus our two newsmaking microprocessor-controlled **M** models. Each a remarkably rugged lightweight instrument. With single touchbar operation (instant tare, instant sample readout on LED display). And so **modestly priced** they've made a whole generation of lab people re-think their concept of what a balance can be!

Fisher/Ainsworth toploaders. Solid examples of American electronic technology, innovative manufacturing, and sound value.

Say **No!** to inflation. Say **Yes!** to savings. Up to 50% per balance. Send for product data today.

Model	A-50	A-200	A-200BP battery-operated	A-200BCD printing balance	M-300	M-300DR dual-range	A-2000
Capacity	50g	200g	200g	200g	300g	30/300g	2000g
Readability	0.001g	0.01g	0.01g	0.01g	0.01g	0.001/.01g	0.1g
Catalog no.	1-913-265	1-913-260	1-913-261	1-913-262	1-913-252	1-913-253	1-913-267
U.S. price	$1395	$895	$1195	$1695	$995	$1495	$1195

We Know Laboratories.

Fisher Scientific Company
711 Forbes Avenue
Pittsburgh, Pennsylvania 15219
(412) 562-8543

Circle No. 116 on Readers' Service Card

ISSN 0036-8075

20 July 1979

Volume 205, No. 4403

SCIENCE

SCIENCE is published weekly on Friday, except the last week in December, by the American Association for the Advancement of Science, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Second-class postage (publication No. 484460) paid at Washington, D.C., and at an additional entry. Now combined with **The Scientific Monthly®**. Domestic individual membership and subscription (51 issues): $34. Domestic institutional subscription (51 issues): $70. Foreign postage extra: Canada $12, other (surface mail) $15, air-surface via Amsterdam $40. First class, airmail, school-year, and student rates on request. Single copies $1.50 ($2 by mail); back issues $2.50 ($3 by mail); classroom rates on request. **Change of address:** allow 6 weeks, giving old and new addresses and seven-digit account number. **Postmaster:** Send Form 3579 to *Science*, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. *Science* is indexed in the *Reader's Guide to Periodical Literature* and in several specialized indexes.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

REPORTS

COVER

Three-year-old viable female offspring of a male gibbon (*Hylobates moloch*) and a female siamang (*Symphalangus syndactylus*). This is the first known hybrid of apes. The general coloration and hair pattern resemble that of the siamang; however, the siamang throat sac is absent. See page 308. [Sister Moore, Atlanta, Georgia]

The friendly desktop computer system...

Now, even more problem Introducing HP's

Here's the power to solve big problems combined with traditional desktop-computer friendliness. Our new System 45B is a neat, powerful problem solving package that can put as much as 449K bytes of Read/Write memory right on your desk. And you can use it all.

Analysis of Variance

solving power at your fingertips. new System 45B.

The operating system (120K bytes) resides in its own ROM, which means the entire Read/Write memory (56K to 449K bytes, depending on the option you choose) is available for your programs and data. And since System 45B is friendly and easy to use, it puts you in charge of solving your problems. It has no complicated start-up procedure, no operating system to load and no compiling to do.

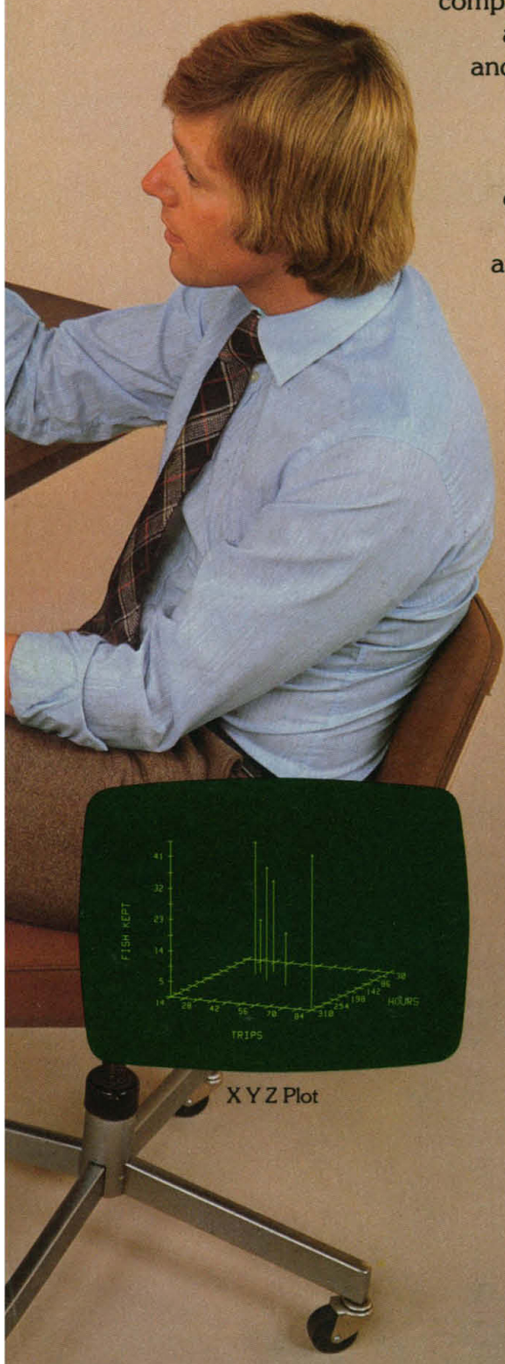
System 45B gives you powerful graphics capabilities: plotting, digitizing, charts, graphs, histograms, window plotting and more. It lets you add a wide range of plug-compatible HP peripherals such as the HP cartridge disc drive (7906M/S) and the 4-color HP plotter (9872A) shown. With the System 45B and its full line of input, storage and output peripherals, you can configure a system that will solve today's big problems and adapt to your needs in the future.

To help you fully utilize the power and versatility of the System 45B, an extensive array of software is available, including new programs in the areas of statistical and numerical analysis, engineering design, structural engineering and business management.

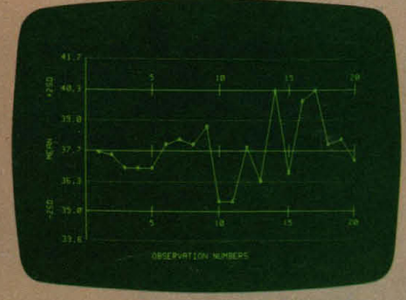
Because it uses HP Enhanced BASIC language, System 45B provides a conversational style of problem solving that lets you interact with the system in a way that parallels human communication. Beginner or experienced programmer, you'll find HP Enhanced BASIC as friendly as it is powerful.

For more information on how the new System 45B can put problem-solving power and flexibility at your fingertips, call the HP Literature Center toll-free day or night. The number is 1-800-821-3777. Extension 131 (Alaska and Hawaii included). (In Missouri, call 1-800-892-7655, Extension 131.) Or, call your nearest HP office for a demonstration.

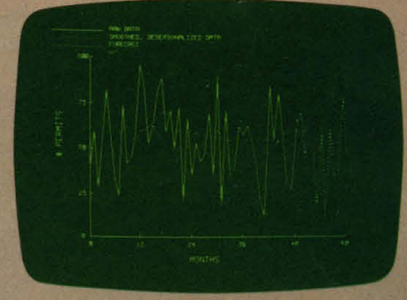
OEM discounts available.



XYZ Plot



Levey-Jennings Plot



Statistical Forecasting

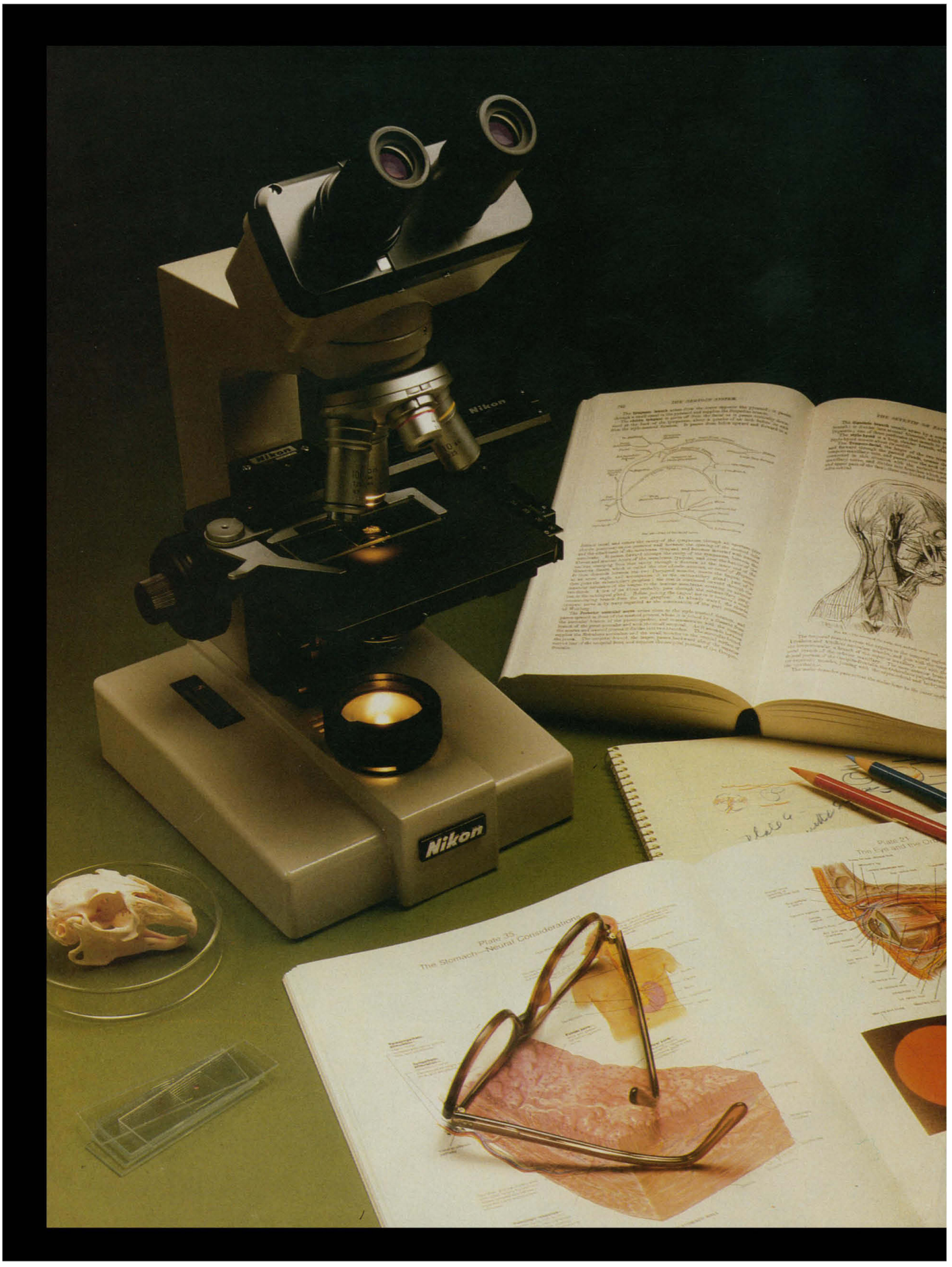
HEWLETT hp PACKARD

3404 E. Harmony Road, Fort Collins, Colorado 80525

For assistance in U.S. call: Washington (301) 948-6370, Chicago (312) 255-9800, Atlanta (404) 955-1500, Los Angeles (213) 877-1282. In Canada call: Mississauga, Ontario (416) 678-9430. Ask for an HP Desktop Computer representative.

409/25

Circle No. 101 on Readers' Service Card


Nikon
Nikon
Nikon
Plate 35
The Stomach—Neural Considerations
Plate 21
The Eye and the Orbit

Instructors in today's universities and teaching labs are engaged in influencing a critical element of our common future. The scientists, doctors and researchers of tomorrow. The day has long since passed when these special students could learn with scaled-down instruments. The difficulty of the challenges they face, the elusive nature of the answers they seek, demand sophisticated instruments equal to the quest.

Now, with a single stunning innovation, Nikon has produced an unprecedented advance in microscope technology. Called CF optics, it's a development so revolutionary that it represents far more than a refinement. It stands as nothing less than an entirely new standard of light microscope performance. A standard against which all others will be measured.

To achieve this dramatic breakthrough, Nikon engineers combined a new, extra-low dispersion glass with an ingenious concept in optical design to virtually eliminate chromatic aberration. The Nikon CF system delivers unparalleled resolution, color fidelity, flatness of field and image brightness. In fact, CF optics bring to Nikon resolving power closely approaching theoretical limits.

Today's students need the ultimate. Nikon. The difference between seeing and not seeing. Knowing and not knowing.

For further information on the entire line of Nikon instruments for scientific education, contact: Nikon Incorporated, Instrument Division, Ehrenreich Photo-Optical Industries Inc. • 623 Stewart Avenue, Garden City, NY 11530. (516) 222-0200.

Look to *Nikon*
ニコンとご用命下さい
Blicken Sie auf Nikon

Circle No. 138 on Readers' Service Card

IN SCIENTIFIC EDUCATION, LOOK TO NIKON.

I **OPTIPHOT MICROSCOPE WITH HFM** — New research microscope featuring revolutionary CF optics for unsurpassed resolution and contrast. Accepts full line of Nikon accessories. Shown here with the advanced, computer controlled HFM camera system for consistently correct exposures — automatically.

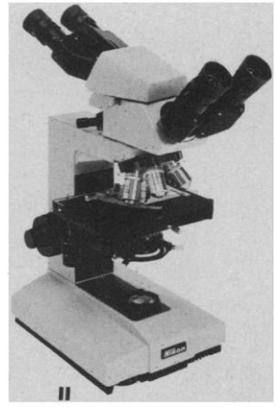
II **LABOPHOT MICROSCOPE WITH TEACHING HEAD** — Laboratory microscope featuring unsurpassed CF optics, designed with special attentions to reliability and simplicity of operation. Teaching head accepts standard binocular or trinocular body tubes, features 360° independent rotation, and white or green illuminated arrow pointers.

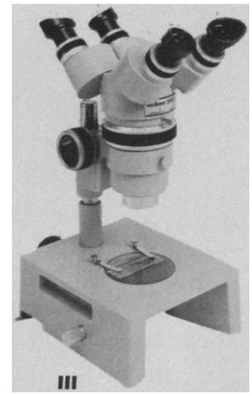
III **SMZ-10 ZOOM STEREO MICROSCOPE WITH TEACHING HEAD** — High resolution zoom stereo microscope with the ability to photograph actual stereo pairs by the simple touch of a lever. Features a continuous zoom over a wide magnification range. Teaching head allows simultaneous observation. Each viewer sees an erect, unreversed image.

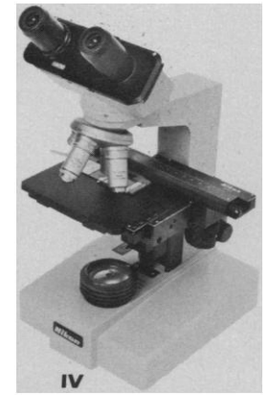
IV **SC MICROSCOPE** — Sturdy microscope ideal for student or laboratory use. New optical design with field-flattening optical system provides higher contrast images with superior resolution. A variable solid state illuminator provides brilliant, even lighting. Also available with a prealigned Hoffman Modulation Contrast System.

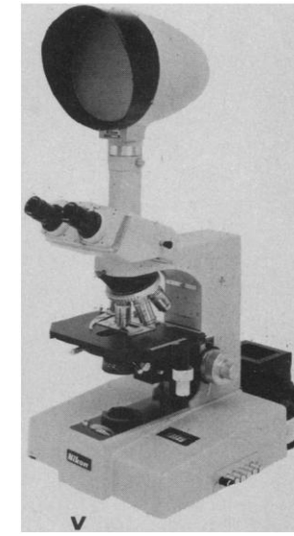
V **BIOPHOT MICROSCOPE WITH PROJECTION HEAD** — Designed to meet the most demanding requirements of the researcher and photomicrographer, it offers CF optics and unexcelled ease of operation. The image quality must be seen to be believed. Projection Head with high resolution 6" screen includes PS CF 10X eyepiece.

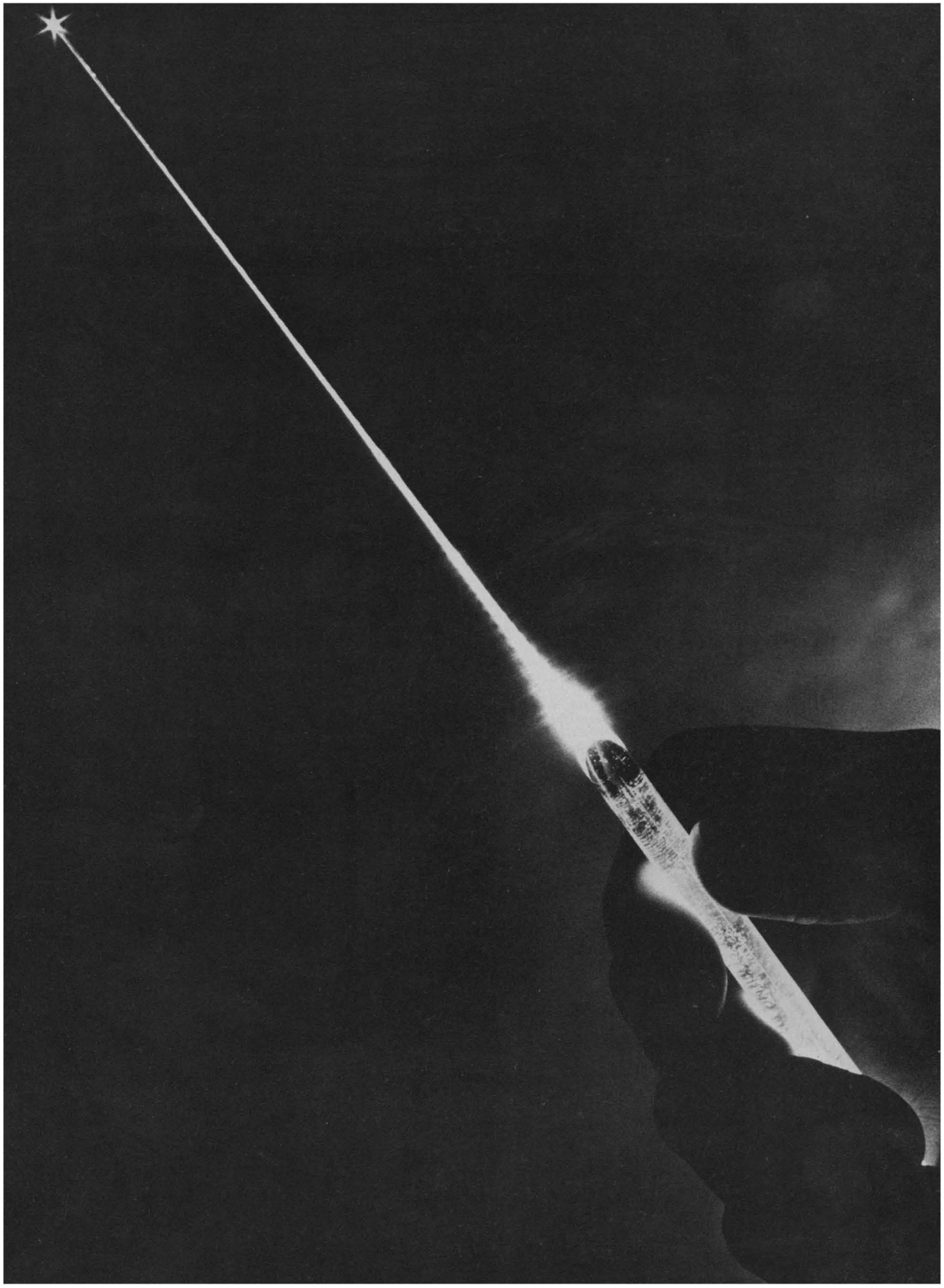

I


II


III


IV


V



Why this one-of-a-kind invention didn't end up as the only one of its kind.

Every new invention needs another new invention—the one that can mass-produce it at an affordable cost.

For example, Bell Labs invented a process for making the glass rods from which hair-thin fibers used in lightwave communications can be drawn. The fibers have far greater capacity than conventional copper wires, so they'll help keep costs down. In fact, they've been carrying voice, data, and video signals under city streets for about two years in a Bell System demonstration.

But standard lightwave systems will require *miles* of the fiber, produced at low cost and to specifications nothing short of microscopic.

That's where Western Electric's Engineering Research Center comes in.

A Unique Center

The Center is devoted exclusively to manufacturing research.

Here, a highly trained team of scientists and engineers probe fundamental questions about materials and processes. They provide Western Electric factories with pre-tested,

proven ways to manufacture products based on the latest technology coming out of the laboratory.

For example, while Bell Labs scientists were inventing new glass fibers, Western Electric engineers and scientists were tackling the manufacturing problems involved.

The fibers had to be drawn from molten glass at high speeds, with less than a 1% deviation in diameter.

But how do you control a "thread" of glass being spun at rates up to 15 feet per second?

Scientists and engineers at the Center discovered that laser light beamed onto the fiber cast a characteristic pattern.

By correlating the pattern to the fiber's diameter, they were able to build a monitoring system into the fiber drawing machinery. It measures the fiber 1000 times per second, automatically adjusting production to keep the diameter constant.

The system works so well that in all the miles of fiber produced by Western Electric, the diameter varies by no more than 30-millionths of an inch.

The Key to the Future

In the Bell System, technology is the key to keeping costs down. It is the key to constantly improving your phone service.

And Western Electric's Engineering Research Center is an essential link between the ideas of the laboratory and the realities of the factory.

So your Bell Telephone Company can make the best one-of-a-kind inventions a part of your phone service.

Keeping your communications system the best in the world.

Western Electric

RESEARCH & DEVELOPMENT
AAAS REPORT SERIES

Research and Development: AAAS Reports are a series of books aimed at promoting a clearer understanding of R&D funding and policy issues among the scientific, technological, and public policy communities and those responsible for policy and funding decisions on R&D.

• Now Available •

Research and Development: AAAS Report IV

AAAS Report IV, the most recent book in the series, addresses the budgetary and policy issues facing U.S. R&D issues which are shaping the scale and quality of U.S. science and technology. The initial sections of **AAAS Report IV** examine the R&D recommendations and policies associated with the President's FY 1980 budget. Additional sections update the data and policy outlook on R&D in industry and, in a further broadening of the scope of the R&D series, examine various international aspects of R&D and identify some of the key issues in the international arena. Prepared by Willis H. Shapley and Don I. Phillips. ISBN 0-87168-243-5; 1979, xviii + 141 pages, paperbound. $6.50*

• Also Available •

Research & Development: AAAS Report III

AAAS Report III expands the scope of the series beyond federal R&D analysis to cover R&D in industry and a discussion of the impact of R&D on the U.S. economy. Prepared by Willis H. Shapley and Don I. Phillips. ISBN 0-87168-236-2; 1978, xiv + 122 pages, paperbound. $5.00*

Research & Development in the Federal Budget: FY 1978

AAAS Report II takes a closer look at the congressional role in R&D budgeting and suggests a new conceptual basis for R&D budget decisions. Prepared by Willis H. Shapley, Don I. Phillips, and Herbert Roback. ISBN 0-87168-231-1; 1977, xii + 148 pages, paperbound. $5.00*

Research & Development in the Federal Budget: FY 1977

AAAS Report I provides a detailed exposition of the federal budget process for R&D and of policy issues of continuing concern to the R&D community. Prepared by Willis H. Shapley, ISBN 0-87168-228-1; 1976, ix + 100 pages, paperbound. $5.00*

Research & Development Colloquium Proceedings

Proceedings from the annual colloquia on research and development contain the text of all speeches and in-depth summaries of the subsequent panel discussions. (Quantities are limited.)

R&D Colloquium Proceedings 1979, ca. 150 pgs., app., paper. (Companion volume to **AAAS Report IV)** available Sept. 1979. $6.50*

R&D Colloquium Proceedings 1978, v + 178 pgs., app., paper. (Companion volume to **AAAS Report III)** $5.00*

R&D Colloquium Proceedings 1977, v + 130 pgs., app., paper. (Companion volume to **AAAS Report II)** $5.00*

R&D Colloquium Proceedings 1976, vi + 136 pgs., app., paper. (Companion volume to **AAAS Report I)** $5.00*

To order your copy(s) of the above R&D Reports and Proceedings please fill in the coupon below and mail today. All orders under $10.00 must be accompanied by remittance. AAAS Members discount honored on prepaid orders only.*

ORDER FORM — Please send me the following **R&D Reports** and **Colloquium Proceedings:**

____ R&D Report IV, 1980 — $ 6.50	____ Colloquium Proceedings 1979 — $ 6.50
____ R&D Report III, 1979 — $ 5.00	____ Colloquium Proceedings 1978 — $ 5.00
____ R&D Report II, 1978 — $ 5.00	____ Colloquium Proceedings 1977 — $ 5.00
____ R&D Report I, 1977 — $ 5.00	____ Colloquium Proceedings 1976 — $ 5.00
____ All four R&D Reports — $20.00	____ All Four Proceedings — $20.00

____ The entire R&D Series (8 publications) — $36.00

Send R&D Reports and Proceedings to:

Name_____

Address_____

_____

_____

Total amount of order ..... $_____

10% Member discount* ..... $_____

☐ amount enclosed ..... $_____

☐ amount to be billed ..... $_____

Mail Order Form To:
AAAS, Department L-I
1515 Massachusetts Ave., N.W., Washington, D.C. 20005

*AAAS Members entitled to a 10% discount on prepaid orders only.

☐ Please send me information on additional AAAS publications

Please allow 6-8 weeks for delivery of order

HITACHI HV-9017

Hitachi's Lightest, Easiest-Operating Microscope Color TV Camera Ever!

When it comes to color cameras for videomicrography, less can be more. And the amazing new Hitachi HV-9017 is a perfect example. Weighing a mere 3½ lbs. and measuring less than 8″ long, the HV-9017 combines easy-handling compactness with professional image quality.

Inside the HV-9017 is a 1-inch FIC Vidicon tube that produces images of strikingly true-to-life color. Operational simplicity, too, is an HV-9017 trademark. There are no complicated adjustments to be made, no registration procedure required, and color temperature correction is easily achieved at the turn of a knob. Additional HV-9017 design features include:

- Internal color sync generator for self-contained use.
- Optional module accepts external drives for system integration.
- Built-in color bar generator.
- Excellent low light sensitivity.
- Rounded corners permit easy draping for a sterile operating field.
- Signal to noise ratio better than 40dB.
- Accepts C-mount lenses for off-microscope use.

For more details, contact your nearest Hitachi Denshi dealer or write to us.

HITACHI
Hitachi Denshi America, Ltd.

Executive Office: 175 Crossways Park West, Woodbury, N.Y. 11797, (516) 921-7200. Offices in: Chicago (312) 344-4020; Los Angeles (213) 328-2110; Dallas (214) 233-7623; Atlanta (404) 451-9453; Denver (303) 344-3156; Seattle (206) 575-1680.

From the graphics leader

Two new desktop computers. By Tektronix.

Faster processing. Finer detail. Both as easy as they look.

From the innovator of desktop graphics: The easiest computers that ever gave a graphic answer.

One built for size. Both built for speed. Both featuring unexcelled user convenience from any point of view.

The new 4052 has speed on its mind. It is designed around an advanced microprocessor that provides vastly increased computational speed. Including built-in binary loader and matrix functions, it brings to the lab researcher, statistician and business analyst new power and memory capacity.

The new 4054 is the first desktop computer with a 19-inch display. Information density is 16 times greater than our own 4051 desktop computer. It brings personal processing convenience to the engineer. The designer. To anyone who needs graphics precision down to the last detail.

Best of all, they're built to look easy. Learn easily. To make sense. Graphically-enhanced BASIC; contoured; typewriter-like keyboard; 100% software compatibility among all computers in the series, plus our full complement of peripherals—all combine with the inherent simplicity of graphics to make your problem-solving personal, powerful, and easy.

Call our toll-free answering service at 1-800-547-1512 (in Oregon, call 644-9051 collect). Or write:

Tektronix, Inc.
Information Display Division
P.O. Box 500
Beaverton, OR 97077
(503) 682-3411

Tektronix International, Inc.
European Marketing Centre
Post Box 827
1180 AV Amstelveen
The Netherlands
Tel. 020-471146

Tektronix®
COMMITTED TO EXCELLENCE

Circle No. 14 on Readers' Service Card

AAAS–Newcomb Cleveland Prize
To Be Awarded for an Article or a Report Published in *Science*

The AAAS–Newcomb Cleveland Prize is awarded annually to the author of an outstanding paper published in *Science* from August through July. This competition year starts with the 4 August 1978 issue of *Science* and ends with that of 27 July 1979. The value of the prize is $5000; the winner also receives a bronze medal.

Reports and Articles that include original research data, theories, or syntheses and are fundamental contributions to basic knowledge or technical achievements of far-reaching consequence are eligible for consideration for the prize. The paper must be a first-time publication of the author's own work. Reference to pertinent earlier work by the author may be included to give perspective.

Throughout the year, readers are invited to nominate papers appearing in the Reports or Articles sections. Nominations must be typed, and the following information provided: the title of the paper, issue in which it was published, author's name, and a brief statement of justification for nomination. Nominations should be submitted to AAAS–Newcomb Cleveland Prize, AAAS, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Final selection will rest with a panel of distinguished scientists appointed by the Board of Directors.

The award will be presented at a session of the annual meeting. In cases of multiple authorship, the prize will be divided equally between or among the authors.

Deadline for nominations: postmarked 15 August 1979

Nomination Form
AAAS–Newcomb Cleveland Prize

AUTHOR: _____

TITLE: _____

_____

DATE PUBLISHED: _____

JUSTIFICATION: _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

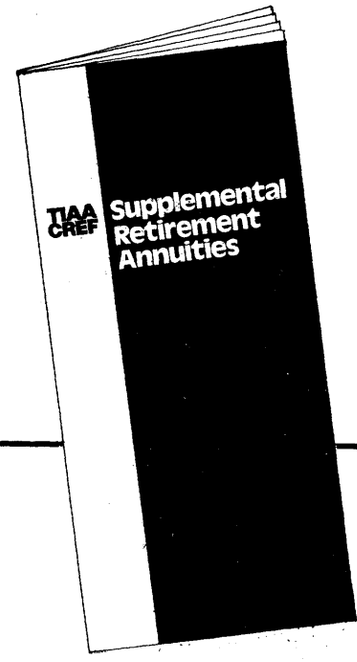
_____

_____

_____

(Continue on additional sheet, if necessary)
Machine reproduction of this form may be used.

TIAA-CREF Supplemental Retirement Annuities



for tax-deferred annuity programs

Supplemental Retirement Annuities (SRA's) are new forms of TIAA and CREF contracts designed expressly for use by persons who want to set aside tax-deferred retirement funds over and above amounts being accumulated under their institution's basic retirement plan. They are available for employees of colleges, universities, private schools and certain other nonprofit educational organizations with tax-deferred annuity (salary-or-annuity option) programs. Through a properly drawn agreement with their institution, staff members may divert part of their compensation before taxes to the purchase of these new contracts.

And SRA's are cashable at any time. This means that if the money accumulated by salary reduction is needed before retirement, the SRA contracts can be surrendered for their cash value. Benefits, whether payable in cash or as income, are taxable as ordinary income when received.

For more information and answers to questions send for your copy of the booklet on Supplemental Retirement Annuities.

Send me a booklet describing
TIAA-CREF Supplemental Retirement Annuities.

TIAA CREF

Name _____
Date of Birth

Address _____
Street

_____
City State Zip

Nonprofit
Employer _____

Teachers Insurance and Annuity Association
730 Third Avenue, New York, New York 10017

wi

LETTERS

Peer Review at ADAMHA

We appreciate the *Science* follow-up "Peer review comes to ADAMHA" (News and Comment, 11 May, p. 601) on the changes in peer review recently instituted by the Alcohol, Drug Abuse, and Mental Health Administration. Although the article presents many events correctly, misinterpretations and errors create some confusion.

The author is correct in stating that, soon after my appointment as administrator in 1977, I viewed as one of my most important tasks the installing of a more rigorous grants review process independent of the program staff. He also is correct in reporting that the centralization of peer review in the ADAMHA institutes represents a modification of my initial proposal. But he fails to add that I am fully in accord with the changes adoped, believing firmly that they embody the principle of appropriate independence of the review process from program management.

The title "Peer review comes to ADAMHA" implies that peer review is new to ADAMHA. In fact, the ADAMHA institutes have employed peer review throughout their history. The agency's organizational predecessor—the National Institute of Mental Health (NIMH)—was a part of the National Institutes of Health (NIH) until 1967. After 1967, NIMH, as well as the National Institute on Alcohol Abuse and Alcoholism and the National Institute on Drug Abuse when they were established, continued to subject grant applications to peer review. However, the review committees and the review process were managed in some 30 program branches and ten divisions within the three institutes. It was this feature of the system that was changed by the reorganization.

The purpose of the new system is to provide for the independent review of grant applications by peer review groups organized and staffed in a separate organizational element in the office of each institute director. The review for scientific and technical merit of grant applications is carried out in the review organizations. The peer review groups make recommendations on the merits of individual grant applications and assign priority scores. These applications are later reviewed by the national advisory council of each institute. Grants recommended for approval by these statutory bodies *may* be awarded by the staff scientists and program managers who make funding decisions, taking into account the

priority scores, current priorities, and available funds. The statement that " . . . the new system attempts to insulate the research funding offices within ADAMHA from the staff scientists and program managers" is totally erroneous.

Furthermore, it is not true that until recently employees of the ADAMHA institutes were allowed to sit on committees that approved extramural projects. Agency employees have never been appointed to such review groups, and even federal employees from other agencies are restricted by ADAMHA policy to no more than one per committee, a provision used infrequently.

The article's inaccurate account of the prior ADAMHA peer review system and of the changes that were recently made are misleading. The author's apparent inclination to conjure up intrigue where none existed is unfortunate; for example, in using the term "scheme" to describe the reorganization of peer review. His allegation of "egregious cases of cronyism" at the National Institute on Drug Abuse is unfounded. The few contracts under review were found to involve the *appearance*, not the practice, of cronyism.

A major function of ADAMHA is the award of funds by means of grants and contracts for research, training, and services. The integrity and credibility of science in the United States depends upon the manner in which decisions are made as to the allocation of such monies. An objective, independent peer review system is essential. To treat such a serious subject in this fashion may be journalistically interesting and even titillating, but it is a disservice to *Science*'s readers.

GERALD L. KLERMAN
Alcohol, Drug Abuse, and Mental Health Administration, Rockville, Maryland 20857

Human Cancer: Radiation and Chemicals Compete

The widespread antinuclear alarm connected with the accident at Three Mile Island has its reflection in the title "BEIR report on radiation hazards comes unglued" (News and Comment, 8 June, p. 1062). In addition to this "ungluing" (*1*), my present concern is with the most laudable decision of the Department of Health, Education, and Welfare (HEW) to undertake extensive studies of public health effects of the accident.

According to the *New York Times* of

30 May, these studies, "unprecedented in this country," will be conducted in cooperation with the state of Pennsylvania. As explained by HEW Secretary Joseph A. Califano, Jr., the ultimate purpose of the studies is to create a data base for a variety of future studies. The focus of these studies is to be the relationship between health histories, such as leukemia and birth defects, and the irradiation exposure caused by the accident.

The particular point I wish to emphasize is that the reliability of studies of the kind mentioned requires that they include not only the details of exposure to radiation, but also the exposures to noxious chemical pollutants as studied by the Food and Drug Administration. Quite a few of them are mutagenic and/or carcinogenic. Obviously, if any such pollutants were present in the ambient air in the localities studied, without being monitored and without being included in the analysis, then their health effects would be ascribed to radiation. Hence the sense of this letter: When studying health effects of irradiation, include chemical pollutants.

Another warning of a statistician is, Beware of "spurious correlations!" That is, when studying populations exposed and cases of leukemia and so forth, do not use "rates"; use actual numbers of people and numbers of leukemias counted (*2*).

JERZY NEYMAN
Statistical Laboratory, University of California, Berkeley 94720

References

1. J. Neyman, *Science* **195**, 754 (1977).
2. ———, in *Proceedings of the Sixth Berkeley Symposium on Mathematical Statistics and Probability*, L. Le Cam, J. Neyman, E. L. Scott, Eds. (Univ. of California Press, Berkeley, 1972), vol. 6, pp. 575–589.

"Female Evanescence"

The most puzzling aspect of "Burt's missing ladies" (Letters, 8 June, p. 1035) is that their nonexistence went unnoticed by the relatively small and tightly knit research community of which they were ostensibly members. Surely Conway's colleagues in the psychology department at University College, London, could have been expected to comment when a paper published from their department was authored by someone unknown to them.

A possible explanation for this curious lack of response is that women scientists are very frequently overlooked by their colleagues, a recent case in point being the failure to nominate Candace Pert for a Lasker Award (*1*). As a psychologist of many talents, Burt undoubtedly recognized that the scientific community would not be at all disturbed by the evanescence of his female "collaborators" and that members of the psychology department at University College could safely be assumed to accept Conway as one of those invisible women to whom it was not necessary to pay attention.

LILLI S. HORNIG
MARTHA TOLPIN
JEANNE J. SPEIZER
Higher Education Resource Services, Wellesley College, Wellesley, Massachusetts 02181

References

1. J. Arehart-Treichel, *Sci. News* **115**, 120 (1979).

Energy: A Greater Risk?

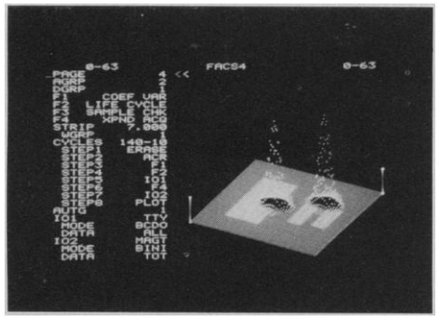
The rather lengthy critique by Holdren, Smith, and Morris (Letters, 11 May, p. 564) of Inhaber's article "Risk with energy from conventional and nonconventional sources" (23 Feb., p. 718) deserves comment, not so much for what it says but for what it doesn't say. There is undoubtedly value in ranking comparative risks of producing energy from conventional and nonconventional sources, particularly from the standpoint of determining where efforts may be most usefully directed to reduce prevailing risk levels. However, in terms of the magnitude of today's energy problem and its threat to national interests, such assessments appear somewhat akin to rearranging deck chairs on the *Titanic* as she glides through North Atlantic waters.

With our heavy and increasing dependence on foreign petroleum supplies, the United States is in a precarious position. As we have seen, these supplies can be interrupted and prices can be escalated with serious consequences. The loss of Iranian production provides a graphic example of the risks inherent in excessive dependence on foreign energy supplies. The consequences of the loss of another several million barrels a day of foreign oil supplies, for whatever reasons one might wish to postulate, would be far more serious. Such an event, rather than inconveniencing drivers and disrupting holiday and vacation plans, could begin to undermine the fundamental stability of our economy and the well-being of our population. Employment levels, adequacy of fuel supplies for home heating, and agricultural production could each, for example, be affected. These developments, in turn,

If you were designing a state-of-the-art cell sorter, which features would you need?

- ☐ Four parameter sorting—including two fluorescence, two scatter, fluorescence polarization, and two-parameter ratios
- ☐ Microcomputer-controlled sorting, with convenient keyboard operation of programmed functions
- ☐ Two-laser fluorescence analysis and sorting (as an option)
- ☐ Compensation for dual-fluorescence emission overlap
- ☐ Cell volume for analysis and sorting (as an option—forthcoming)
- ☐ Floppy disc mass data storage (as an option)
- ☐ Rapid recording of up to four parameters per cell, enabling analysis upon recall from storage (as an option)
- ☐ User programmability for analysis (as an option)
- ☐ Isometric correlated data display, as well as updating two-parameter dot plot and profile histograms
- ☐ Single knob fluid control with orifice and sample backflush
- ☐ Autoclavable and temperature-controllable sample handling
- ☐ Fluorescence sensitivity to 3,000 molecules; scatter sensitivity to 0.3 micron diameter
- ☐ Sorting to 5,000 cells per second
- ☐ Purities to 99%; recoveries to 90%

☐ **ALL OF THE ABOVE**



Introducing FACS IV

FACS IV...for per-cell analysis of fluorescence and size parameters used as criteria for physically isolating distinct, viable subpopulations. Worldwide FACS applications include research in:

- Cell kinetics
- Immune response
- Immunologic function
- DNA, RNA and protein
- Enzyme reactions
- Live/dead cell discrimination
- Chromosome analysis
- Cell surface structures

For additional information, including an extensive bibliography, call or write B-D FACS Systems.

BECTON DICKINSON

BECTON DICKINSON FACS SYSTEMS
500 Clyde Avenue, Mountain View, CA 94043
Telephone (415) 969-6633 • TWX 910 379 6624

Circle No. 189 on Readers' Service Card

could have profound effects on public health. Surely, these risks must transcend those which may be associated with the development of various domestic energy sources.

Not included, of course, is the jeopardy in which the security of our nation itself would be placed if we were deprived of substantial volumes of imported petroleum over an extended period.

The point is, we as a nation must move ahead aggressively with the development domestically of *both* conventional and nonconventional energy sources and reduce our reliance on imported petroleum. The seemingly endless discussions as to which energy source may be preferable or appear unacceptable and how best to tackle the problem are strictly counter to overall national interests. Time is short, and we must get our act together before it's too late. Many of us would like to see the scientific community in the vanguard of this effort.

T. S. WYMAN
Maritime Relations, Chevron Shipping Company, 555 Market Street, San Francisco, California 94105

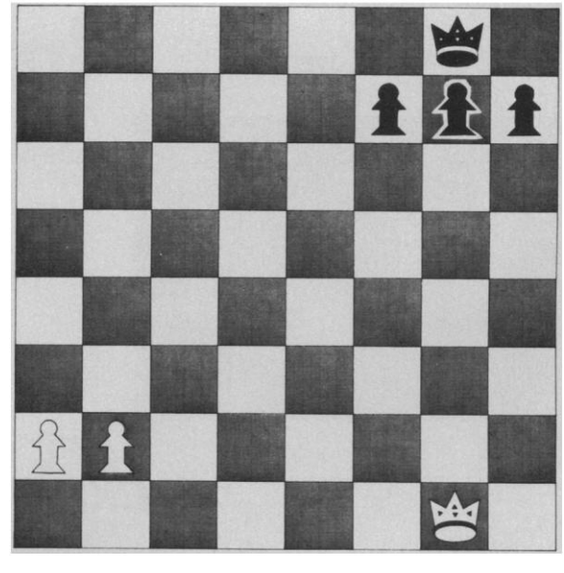
Heavy Crude Oil

Eliot Marshall's article "OPEC prices make heavy oil look profitable" (News and Comment, 22 June, p. 1283), which is concerned with the conference on Heavy Crude Oil and Tar Sands organized by the United Nations Institute for Training and Research (UNITAR), the U.S. Department of Energy (DOE), and the Alberta Oil Sands Technology and Research Administration (AOSTRA), contains a statement which, I believe, should be clarified. Referring to me he writes: "Apparently he found the major American oil companies inimical to his vision, for he said he consciously chose not to invite them. He did not explain further. The companies' Canadian affiliates and subsidiaries did attend, however."

There was no anti-American bias in the selection of the participants. The largest number of participants came from the United States. However, we wanted oil companies interested in attending to write papers and share their knowledge and experience with other participants at the conference. That principle was applied to companies from all of the industrial countries. We were especially interested in obtaining papers on the occurrence of heavy crude from the major international oil companies, because most of them have some knowledge of its occurrence in practically all countries of the world. We failed in this attempt; not one single paper was submitted by any of the oil compaines on the occurrence and potential of heavy crude for any country outside of Canada. The papers we had on occurrences were written by academics or government experts and were very incomplete, including the paper from the United States. A vice president of one company told me at an early stage of preparation for the conference that no company would be willing to release such data, and his observations proved correct. Finally, we compromised and accepted papers from such companies dealing with other aspects of heavy crude and tar sands. Thus, in effect, all companies interested in the conference were able to participate. There were only two European companies who refused to write any papers, and they did not attend.

JOSEPH BARNEA
United Nations Institute for Training and Research, New York 10017

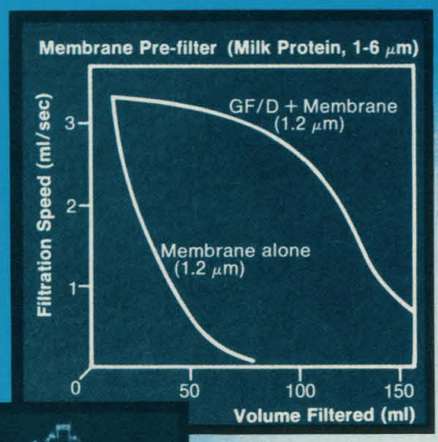
Erratum: In the Research News article "Tournament competition fuels computer chess" (29 June, p. 1396), the figure was reproduced incorrectly. Black has a third pawn on the black square immediately in front of the black king. The figure and its legend are reproduced herewith.



One limitation of full-width search methods in computer chess is called the horizon effect. A human easily sees that white, although it has one less pawn, can win the game by advancing its leftmost pawn across the board, whereupon it is promoted, by the rules of chess, to a queen. The computer, if it does not search enough moves into the future, will not see this outcome and will be excessively concerned about black's apparent material advantage. [*Drawing by Eleanor Warner*]

Whatman

LAB ASSISTANTS

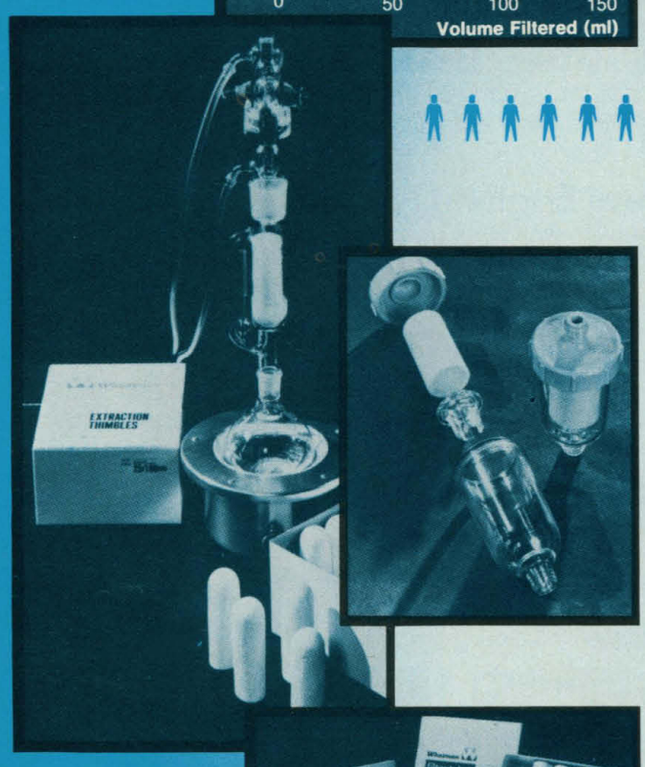


Prefilters

If you're using membranes or other relatively low capacity filters, you can more than double filtered volume by using a Grade GF/D Glass Microfibre® prefilter. The correct GF/D sizes related to membrane sizes are:

Membrane dia.	GF/D dia.	Membrane dia.	GF/D dia.
13 mm	1.0 cm	47 mm (Ger.)	4.0 cm
25 mm	2.0 cm	100 mm	9.0 cm
47 mm (USA)	3.5 cm	293 mm	25.7 cm

® Registered trademark of Balston Ltd.



Extraction Thimbles

These are seamless, high purity cellulose thimbles available in single or double thickness. Used for extraction of organic compounds from reaction mixtures, fat analysis in meats, and many other applications. Sizes to fit most Soxhlet extractors.

In-Line Filter Units

Gamma-12. Small, high efficiency units with disposable/replaceable filter tubes. Tubes give effective filtration over range 0.3 μm to 25.0 μm (liquids) and penetration ratings from 0.0001% to 90% (gases). Housing withstands line pressures to 200 psi. Autoclavable. Wide application. Inexpensive.

Filter Tubes

Small, convenient, disposable units. Retention in liquids of 2 μm. High wet strength, high loading capacity. Immerse in liquid or gas to be filtered. Very high flow rates. Ideal for clarifying solutions and solvents. Pure resin-bonded borosilicate glass. Inexpensive. Discard to avoid contamination after long use.

Benchkote®

For use on lab benches to protect against spillage of solvents, toxic liquids, pathogens, radiochemicals. High purity, highly absorbent paper backed with polyethylene film. Can reduce breakage of expensive lab glass. For lining fume hoods, animal cages, etc. Widely used to recover expensive spilled materials. Cuts clean-up time.

® Registered trademark of Whatman Ltd.

All available through your laboratory supply dealer or call: **Whatman Inc.** ■ 9 Bridewell Place, Clifton, New Jersey 07014 ■ (201) 777-4825.

Circle No. 145 on Readers' Service Card

20 July 1979, Volume 205, Number 4403 **SCIENCE**

Control of Federal Publications

Hearings have begun this month on H.R. 4572. In its present form, this bill (designed to revise Title 44 of the U.S. Code) would place government scientific and technical publications under the control of a politically appointed board. The bill should be amended to provide more safeguards for a process that is essential to the free flow of information in our society. Scientists and educators throughout the nation should examine this issue promptly and thoroughly.

Title 44 of the U.S. Code places primary responsibility for developing and administering policy for the printing and distribution of all government publications with the Joint Committee on Printing. The power of this statute has, in fact, been delegated (or relegated) to the staff of the Committee. It also defines the mission of the Government Printing Office (GPO) as that of providing all branches of government with printing, binding, and distribution services. The distribution function is managed by the office of the Superintendent of Documents, which operates 26 bookstores, a subscription and mail-order sales service, and a depository library and free distribution program.

Despite inefficiencies, this system has worked. One reason is that the executive agencies of government, in special situations and with Joint Committee approval, have developed their own printing and distribution mechanisms to serve the needs of their own constituencies.

In hearings that were held quietly in 1978, an Ad Hoc Advisory Committee reviewed the federal government's printing and distribution program. The hearings and the report* that ensued were soon followed by the introduction of H.R. 4572 to revise Title 44. If this bill were enacted into law, a powerful government monopoly could control the printing and distribution of all government and public documents. The bill would create a presidentially appointed seven-member board of directors, who would be responsible for developing and implementing a central, comprehensive, and unified policy for printing and distributing government publications. Four voting members would be chosen from the printing and reproduction industries, organized labor, the library community, and the information industries and three nonvoting members would represent the House, the Senate, and the Office of Management and Budget. No representation from science, education, or the humanities is suggested. The chairman of the board would have total authority to regulate the distribution of all government information, whether in printed, audiovisual, or machine-readable form, and to decide issues that are appealed. The board would control the GPO through its regulations. It would appoint two general managers: a Public Printer and a Superintendent of Documents. The interests of Congress would be protected by having its printing come under the jurisdiction of the House Administration and Senate Rules committees.

The proposed system would place executive agencies at the mercy of the politically appointed board members, whose regulation of the GPO would, in effect, give them control over all government publications. The National Technical Information Service of the Department of Commerce, which distributes government or public technical reports and documents on a self-sustaining basis, would be threatened by the proposed new system.

This control would extend to publications resulting from any research supported by a federal grant or contract. The provisions could be interpreted in such a way that board approval would be required for the use of grant funds to pay page charges. The public interest will not be well served if the executive agencies of government are compelled to seek the approval of a small but powerful board for the printing and distribution of documents and other informational materials related to the agencies' business.

—MARTIN M. CUMMINGS

**Federal Government Printing and Publishing: Policy Issues. Report of the Ad Hoc Advisory Committee on Revision of Title 44 to the Joint Committee on Printing, United States Congress* (Government Printing Office, Washington, D.C., 1979).

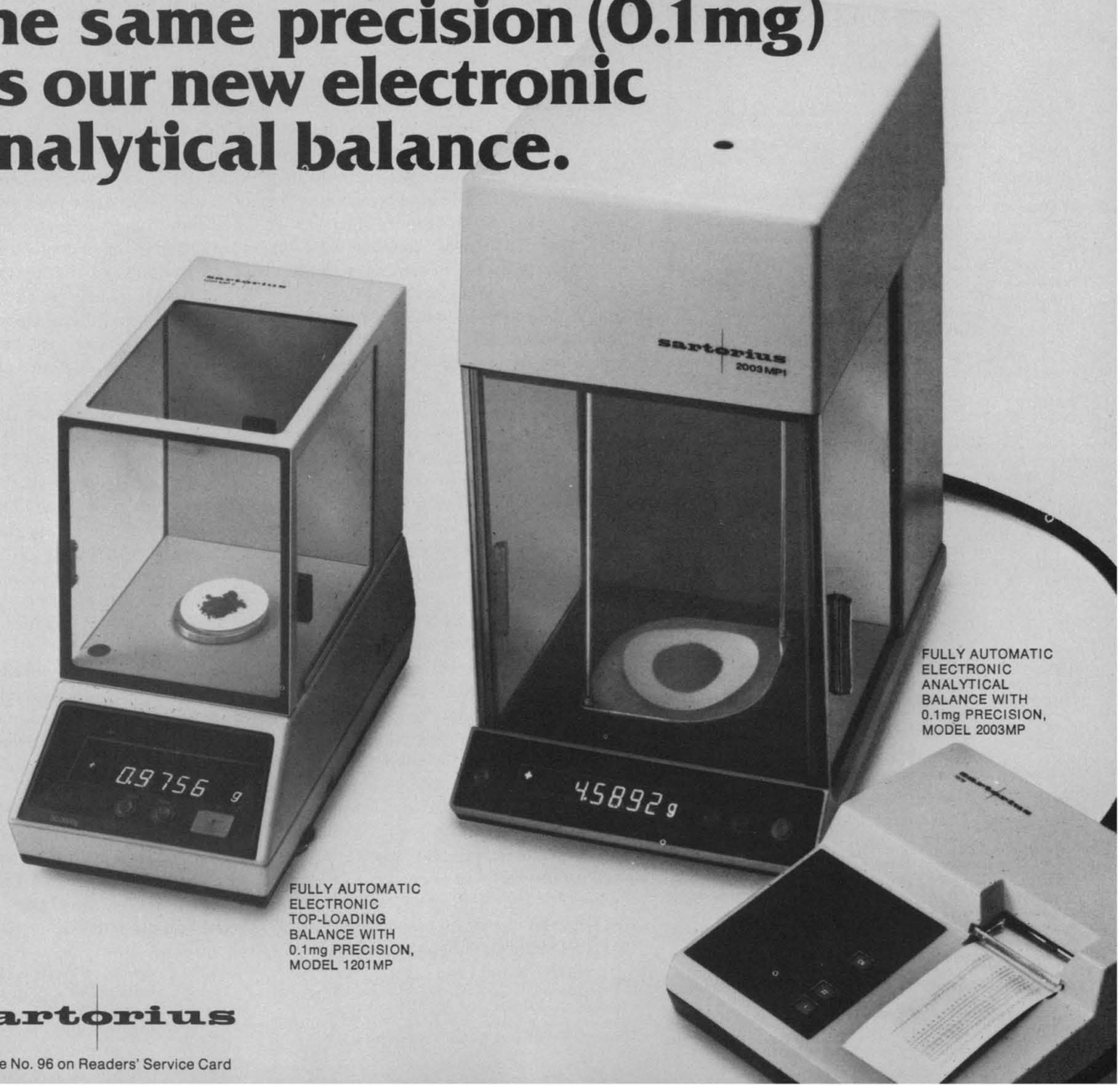
Now you can weigh with analytical precision (0.1mg) on a fully automatic electronic top-loader or on a fully automatic electronic suspended-pan balance, as the weighing situation or your personal preference dictates.

The new top-loader that weighs with analytical precision is our Model 1201MP. Compact and very affordable, this addition to our popular 1200 Series has a capacity of 30g and weighs to 0.1mg at the touch of a button. Its many advanced features include a built-in microprocessor, instant electronic taring, memory and weight recall, BCD output for printer connection, and a large, bright digital display with reading stability indicator. Pan access is provided from the top and both sides of the glass enclosed weighing chamber.

For 0.1mg precision in an electronic analytical balance, we offer our new Model 2003MP. Fully automatic push-button operation and other features are similar to our electronic top-loaders. In addition, a door-activated switch blocks display of the last digit except when both chamber doors are closed, thereby preventing air current-induced instability of the readout. With a capacity of 166g, larger pan and larger weighing chamber, the 2003MP is more versatile and somewhat more costly.

For literature write: Sartorius Balances, Division of Brinkmann Instruments, Inc., Cantiague Road, Westbury, N.Y. 11590.

Sartorius introduces an electronic top-loader with the same precision (0.1mg) as our new electronic analytical balance.



FULLY AUTOMATIC ELECTRONIC TOP-LOADING BALANCE WITH 0.1mg PRECISION, MODEL 1201MP

FULLY AUTOMATIC ELECTRONIC ANALYTICAL BALANCE WITH 0.1mg PRECISION, MODEL 2003MP

sartorius

Circle No. 96 on Readers' Service Card