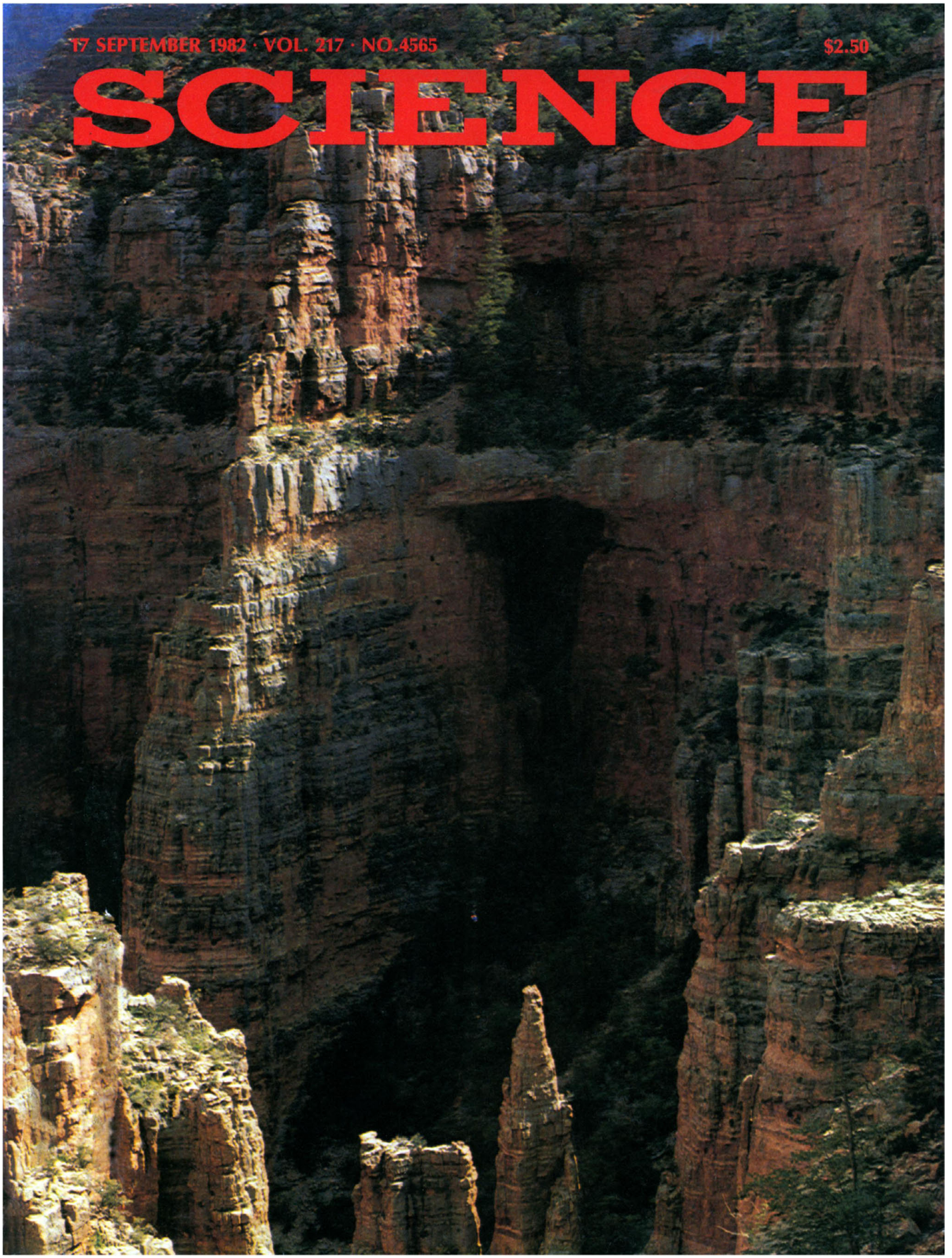
17 SEPTEMBER 1982 · VOL. 217 · NO.4565

$2.50

SCIENCE



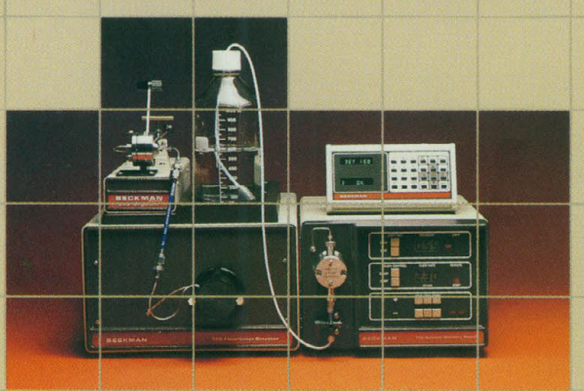
OBJECTIVE:

Cut sample run time up to 70%
Cut solvent use as much as 80%
Only Beckman HPLC can do both!

Beckman's 341 Systems are the versatile tools that cut your HPLC sample run times by as much as 70%. Or deliver solvent savings of 80%.

Separations in seconds

Just imagine being able to more than *triple* the number of samples your lab can run in a day. Better yet, triple your output with the same staff you have now! Beckman's 341 High Speed System can do all this because it gives you separations in seconds instead of minutes.



Solvent savings to 80%

Now imagine being able to run your separations using less than a fifth of the solvent you normally use. The 341 μLC™ System with the new Ultrasphere® 2.0mm ID column can cut your solvent costs as much as 80% while improving detectability of small samples by up to 100%.

Beckman gives you both

Only Beckman HPLC gives you *both* these dramatic savings. Separation times cut by as much as 70%. Solvent use cut by 80%. Beckman can give you all this without sacrificing either sensitivity or reproducibility.

Strong claims? You bet! And your Beckman representative can show you applications specifics and chromatograms to back them up. Or contact us directly. Beckman Instruments, Inc., Scientific Instruments Division, 1716 Fourth Street, Berkeley, CA 94710 (415) 524-4606.

BECKMAN

Circle No. 287 on Readers' Service Card

Monoclonal Antibody SCREENING SYSTEMS

for murine immunoglobulins

They save time —

The ELISA method employed yields a rapid and dramatic color development in the presence of positive clones. It's faster than conventional RIA and can be used with visual, manual spectrophotometric, or fully automated processing.

They avoid trouble —

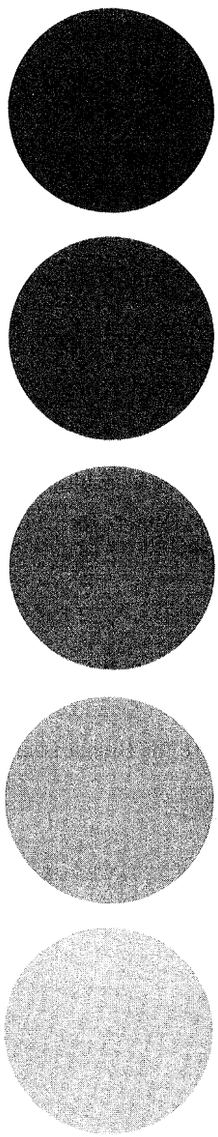
Our reagents are pretested and optimized in each screening system to prevent unwanted variables from spoiling your results.

They're complete and ready to use —

Detailed protocol and specific titer information are provided with the pretested components:

Enzyme-conjugated second antibody
Color development agent
Dilution buffer
Washing buffer
Substrate buffer

Our technical bulletin illustrates how easy it is to use the ELISA method. Send for it.



Horseradish Peroxidase

Protein A-HRP conjugate system *New*
NEI-608 (~20,000 assays)

Sheep $F(ab')_2$ anti-mouse Ig-conjugate system
NEI-601 (~10,000 assays)

Goat anti-mouse Ig-conjugate system
NEI-602 (~20,000 assays)

Alkaline Phosphatase

Sheep $F(ab')_2$ anti-mouse Ig-conjugate system
NEI-603 (~10,000 assays)

Sheep anti-mouse Ig-conjugate system
NEI-604 (~20,000 assays)

β-Galactosidase

Sheep $F(ab')_2$ anti-mouse Ig-conjugate system
NEI-606 (~10,000 assays)

Goat anti-mouse Ig-conjugate system
NEI-605 (~20,000 assays)

Not for use in humans or clinical diagnosis.

New England Nuclear, 549 Albany Street, Boston, MA 02118
Call toll free: 800-225-1572, Telex: 94-0996
Mass. and Internat'l: 617-482-9595
Europe: NEN Chemicals GmbH, D-6072, W. Germany
Postfach 401240, Tel. (06103) 803-0, Telex: 4-17993 NEN D
NEN Canada: 2453 46th Avenue, Lachine, Que. H8T 3C9
Tel. 514-636-4971, Telex: 05-821808

NEN New England Nuclear®
a Du Pont company

Circle No. 283 on Readers' Service Card

LEADER IN BIOTECHNOLOGY

ISSN 0036-8075

17 September 1982

Volume 217, No. 4565

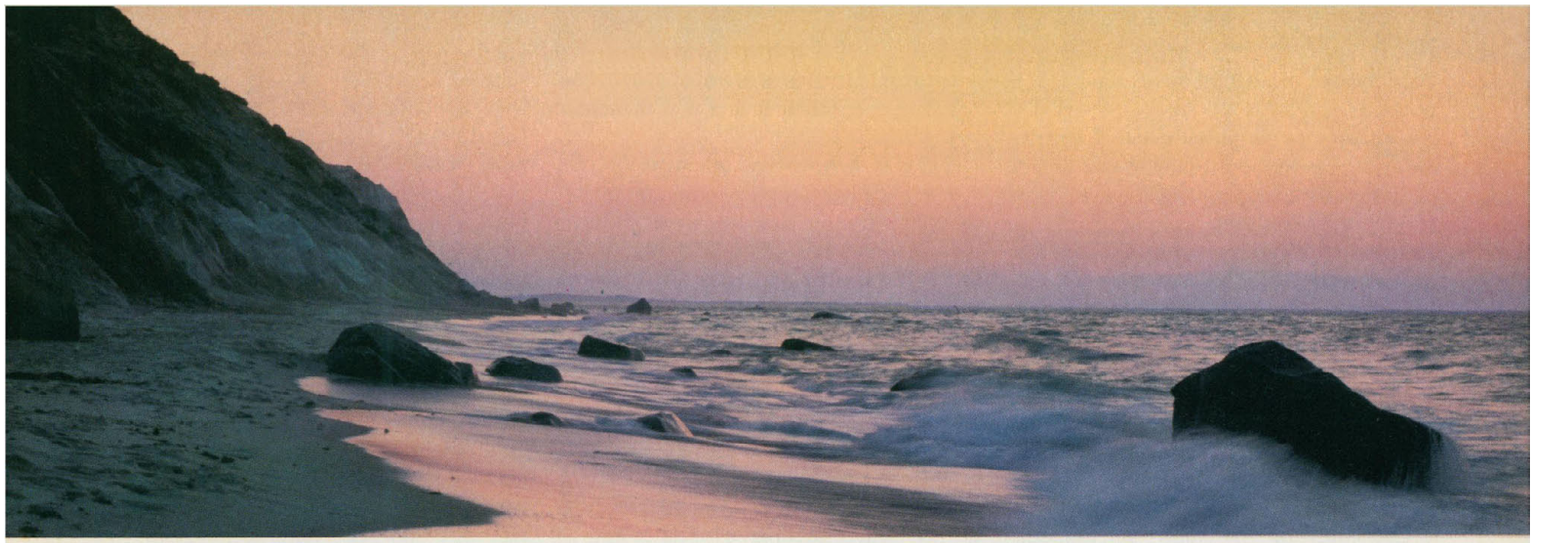
SCIENCE

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 Science Monthly**® Copyright © 1982 by the American Association for the Advancement of Science. Domestic individual membership and subscription (51 issues): $48. Domestic institutional subscription (51 issues): $85. Foreign postage extra: Canada $24, other (surface mail) $27, air-surface via Amsterdam $55. First class, airmail, school-year, and student rates on request. Single copies $2.50 ($3 by mail); back issues $3 ($3.50 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

COVER

Solution sculpture in the Redwall limestone of the Grand Canyon, Arizona. Changes in ground water flow have produced many dry caves in this substrate which are excellent for the preservation of organic Pleistocene fossils such as packrat middens. Twenty-six of 53 fossil middens from the eastern Grand Canyon were collected from caves in this substrate. See page 1142. [Kenneth Cole, Department of Geosciences, University of Arizona, Tucson 85721]



WATCHING THE RED TIDE COULD CURE JET LAG.

In one way, you resemble the small organism that causes red tide.

You both have a biological clock that goes through a complete cycle every twenty-four hours. And it is this clock that causes jet lag.

The difference between you and red tide is that it's a lot easier to watch the red tide's biological clock.

Every twenty-four hours, it glows. Which makes it an ideal subject for finding out what makes the body clock tick. You pop some red tide in a test tube. Do something to it. And see if what you've done changes the time when it glows.

Simple enough in concept.

Not so simple to execute.

In fact, it was taking researchers at Harvard University's Biological Laboratories days to analyze a single run of a single experiment with a single test tube of red tide. (Among other problems, the chart recorder printout stretched out for fifty feet.)

So they don't do it that way any more.

A DAS Series 500 data acquisition and control system with an Apple II microcomputer does it for them. It takes over 16,000 measurements every second. Tests 30 separate test tubes of red tide every 15 minutes. Reduces and analyzes all the data. And runs the entire experiment. Nonstop. For weeks on end.

Which is absolutely amazing. For it proves that anyone with $5,000 can now afford to buy the computer and the data acquisition system they need to do computer-based research. Without building (and rebuilding) a whole slew of black boxes.

The DAS Series 500 is a universal, modular system for measurement and control in science and industry. With up to 300 analog inputs. Up to 60 analog outputs. Direct transducer connection. Programmable signal conditioning. Digital I/O (including AC control). And a real time clock. You pick out the modules that do what you want, and simply plug them into the system. And since the Series 500 comes with a comprehensive software package, including a library of high speed functions, you can sew together a complete program with a few BASIC or Pascal statements and get on with your research.

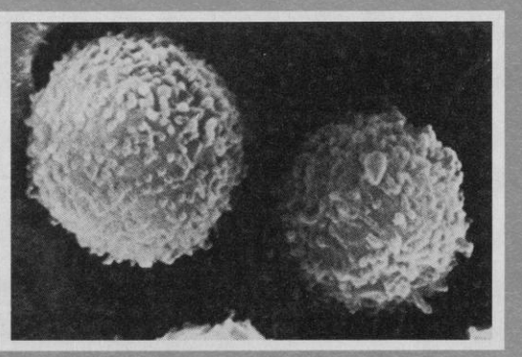
To find out how you can use the DAS Series 500 to computerize your research, call 617-423-7691. Or write us at Data Acquisition Systems Inc., 349 Congress Street, Boston, Massachusetts 02210.

You may discover that computer-based researchers can now concentrate on research. Instead of computers.

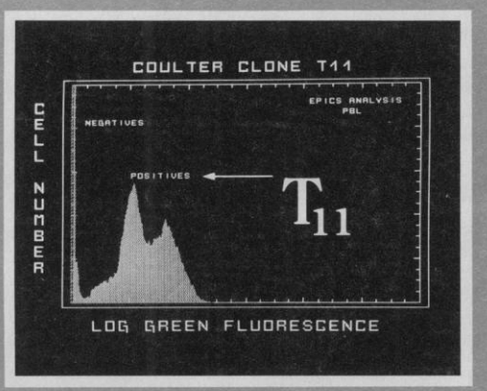
das

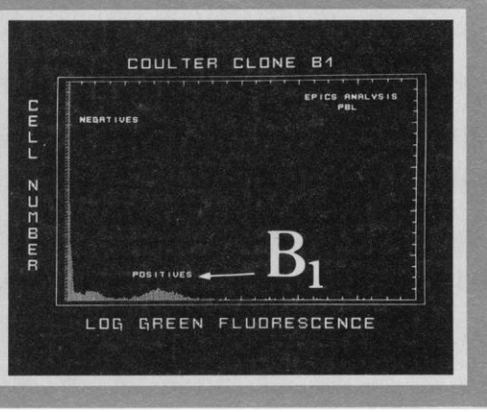
Circle No. 265 on Readers' Service Card

T cell or B cell?



COULTER CLONE™ can tell you!





Unprecedented specificity. Highest labeling density. Lowest non-specific background.

Now you can study:

- T and B lymphocyte subclassifications
- Suppressor/helper ratios
- Immune deficiencies, such as; agammaglobulinemia, infectious mononucleosis, Herpes zoster, and measles.
- Autoimmune disorders, such as; systemic lupus erythematosus, multiple sclerosis, graft or transplant rejections, hemolytic anemias, and juvenile rheumatoid arthritis.
- Non-Hodgkins lymphomas
- Monocytic and granulocytic leukemias
- Subgroups of lymphoblastic leukemias
- Multiple myeloma
- Surface and cytoplasmic immunoglobulins

. . . and much more

Call toll free 800-327-6531 (Ex. 288 for information; call toll free 800-327-3778 to order.) Or complete and return the coupon.

COULTER IMMUNOLOGY
440 W 20th Street Hialeah, Florida 33010
a division of Coulter Corporation

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

T_{11}, T_8, T_6, T_4, B_1, B_2, I_2, J_5, Mo2, IgD, IgG, IgM, Kappa, Lambda, GAM-FITC

Name

Lab

Street Address

City

State, Zip

Phone S-17

For research only, not for diagnosis.

Circle No. 161 on Readers' Service Card

A simpler, more sensitive way to measure Collagenase activity.

Now you can achieve new levels of sensitivity and put your confidence in a proven system. New England Nuclear has developed an exclusive system for detecting and measuring bacterial and mammalian-like collagenases in biological samples.

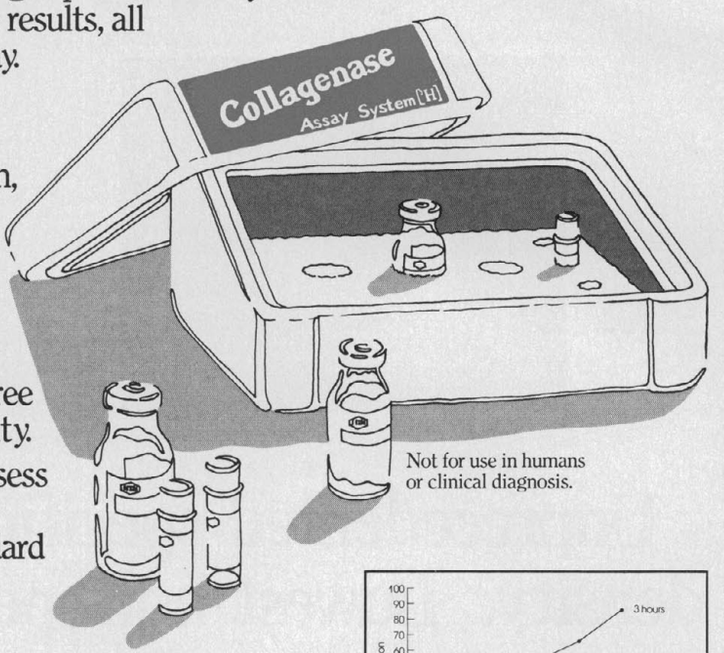
The highly sensitive assay is based on quantitation of soluble radioactive products released by collagenase digestion of NEN's high specific activity substrate. To assure you of reliable, reproducible results, all components are pretested in a complete assay.

Collagenase System [^{3}H]

The system includes tritiated Type I collagen, an optimized buffer containing calcium, as well as control bacterial and vertebrate collagenases. The control enzymes are provided to verify proper functioning of the system and permit construction of standard curves. Both cleave native collagen and are free of contaminating non-specific protease activity.

With each lot of systems our biochemists assess collagenolytic activity in a control reaction. Copies of the resulting gel analysis and standard curves accompany each system.

Circle No. 288 on Readers' Service Card

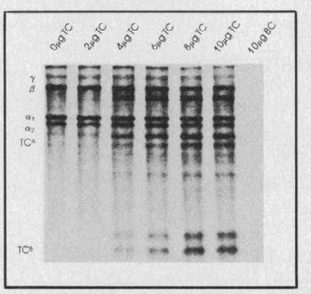


Not for use in humans or clinical diagnosis.

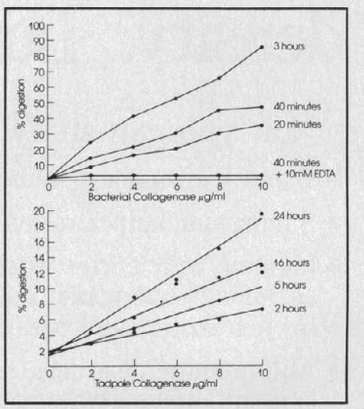
Other pretested systems from NEN

Calmodulin [^{125}I] RIA Kit
β-Endorphin [^{125}I] RIA Kit
β-Lipotropin [^{125}I] RIA Kit
PGE_2 [^{125}I] RIA Kit
6-Keto-$PGF_{1\alpha}$[^{125}I] and [^{3}H] RIA Kits
TXB_2 [^{125}I] and [^{3}H] RIA Kits
Promegestone [^{3}H] RIA Pak

Circle No. 305 on Readers' Service Card



Gel analysis showing products released from tritiated collagen after 24 hours of incubation with either tadpole (TC) or bacterial (BC) collagenase.



Digestion of tritiated collagen by varying quantities of purified bacterial and tadpole collagenases.

New England Nuclear
549 Albany Street, Boston, MA 02118
Call toll free: 800-225-1572, Telex: 94-0996
Mass. and Internat'l: 617-482-9595
Europe: NEN Chemicals GmbH, D-6072, W. Germany
Postfach 401240, Tel. (06103) 803-0, Telex 4-17993 NEN D
NEN Canada: 2453 46th Avenue, Lachine, Que H8T 3C9
Tel. 514-636-4971, Telex 05-821808

NEN New England Nuclear®
a Du Pont company

CORNING

NEW ORANGE BLEND

Come grow with KC Biological.

We joined the big orange line of Corning, one of the most trusted names in tissue culture for well over 60 years.

You have come to know Corning orange as quality in tissue culture ware. Come to know KC Biological as the newest orange, to nurture hybridoma cells and all your other cultures.

You get our nutrients, pure and precisely to specification. We can ship you over 200 formulas, made right from stock, some within 24 hours of your order. We will custom formulate for you.

Quality and service, since 1971, have helped our name blossom worldwide in the tissue culture market.

Phone for free trial. We will be happy to send you some of our product to evaluate. Call to discuss your specific needs. 1-800-255-6032.

Kansas customers call collect, 1-913-888-5020. One trial per laboratory. Offer good until December 31, 1982.

Share our nutrients among your associates. See how pure, fresh oranges from KC Biological can help all your tissue cultures flourish.

FREE TREAT

Send for our catalog
and some sweets
to remember us by.
Attach this orange to your
letterhead with your name and address.
Or, call the number listed above.

☐ send catalog and sweets
☐ send representative and sweets
☐ tell me about free trial

Limited to U.S. and Canada
KC Biological P.O. Box 14848
Lenexa, Kansas 66215

BP-09-82-SR

FREE TRIAL

KCBiological

A Subsidiary of Corning Glass Works

Circle No. 275 on Readers' Service Card

The Third Annual International Congress For

INTERFERON RESEARCH

November 1-3, 1982—Miami, Florida
Omni International Hotel

Chaired By
William E. Stewart II
of the
University of South Florida
School of Medicine

The Third International Congress for INTERFERON RESEARCH, organized by Scherago Associates in cooperation with the Journal of Interferon Research.*

Interferon research has greatly proliferated, and the synthesis of Interferon has added a new dimension to recent developments and clinical trials. This Congress provides the major forum for both current research and clinical work and the new areas of application will be presented.

Program Topics Will Include

- Interferon inducers.
- Induction mechanisms.
- Genetics of interferon production.
- Isolation, purification, and characterization of interferons.
- Messenger RNA's and products.
- Progress in interferon cloning.
- Purification characterization, and modification of interferons.
- Genetics of interferon actions.
- Mechanisms of antiviral actions.
- Immuno-modulatory actions of interferons.
- In vivo studies on pharmacology of interferons and their antitumor and antiviral actions in animals and in man.
- Results of clinical studies.

Published by Mary Ann Liebert Inc., Publishers, New York, New York.

Regular Registration: $350
Student Registration: $175
Attendance will be limited to approximately 800.

☐ Please reserve _____ space(s): Registration fee must be included.
Make checks payable to Interferon Congress, Scherago Associates, Inc.

☐ Please send Exhibit Space Prospectus.

Name _____

Dept. _____

Organization _____

Street _____

City _____ State/Country _____ Zip _____

Telephone: (____) _____

Return to: **E.R. Ruffing, Scherago Associates, Inc.**
1515 Broadway, New York, N.Y. 10036
Tel: (212) 730-1050

S

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

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

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

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

Get your money at any time.

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

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

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

Changing employers? Take SRAs with you.

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

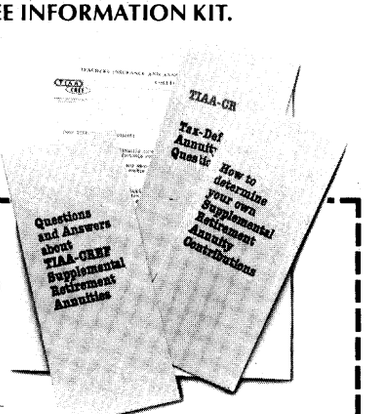
Full information.

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

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

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

TIAA CREF



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

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

Name_____

Address_____

City_____

State_____ Zip_____ Date of Birth_____

Name of Institution_____

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

S91782

Science Magazine in cooperation with Scherago Associates announces The First Annual Conference on

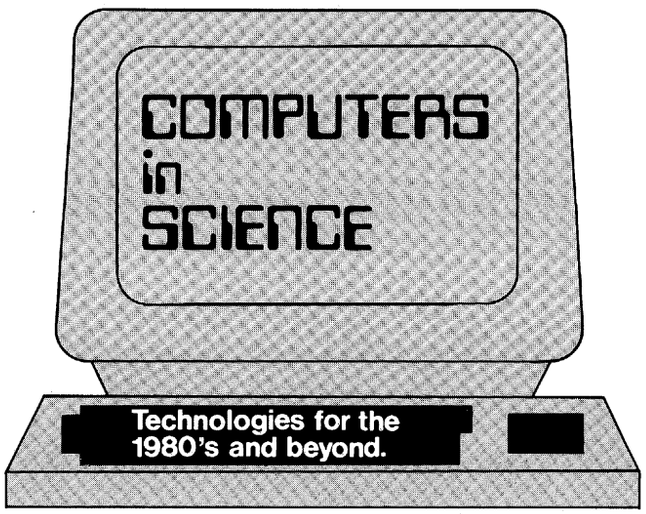
COMPUTERS IN SCIENCE

December 6-9, 1982

Conrad Hilton, Chicago, Illinois

Chairman: Dr. Dennis Smith, Group Leader, Discovery Research Systems, Lederle Laboratories

Vice Chairman: Dr. Peter Friedland, Research Associate, Dept. of Computer Science, Stanford University



The conference's primary objective is to provide information on how changing computational technologies will influence future scientific research. Sessions will examine state of the art applications of existing technologies to specific areas of research as well as the impact of new developments on scientific research in the decades ahead.

Each conference day is devoted to a specific topic with lectures and presentations providing in-depth coverage of the subject:

- **Tuesday, December 7th — Products of the Technological Revolution: Building Blocks of Future Computer Systems.** A look at the underlying technology of future computer systems, emphasizing hardware developments and their role in providing powerful, distributed systems.
- **Wednesday, December 8th — Computational Systems: Man/Machine Synergism and the Conduct of Scientific Research.** Discussion on building useful research and development systems, focusing on the interaction of scientists with computers.
- **Thursday, December 9th — Scientific Communication and Collaboration: Conducting Research in the New Computational Environment.** An examination of the influence of computers, on how research is conducted, covering scientific collaboration, communication, resource sharing and the sociology of research in a new computational environment.

On Monday, December 6th, the day immediately preceding the main conference three Tutorials will be presented on the subjects of hardware, software, and communication technology. The Tutorials will provide intensive instruction on these subjects to provide a background for the main conference sessions to follow.

In addition, comprehensive exposition of equipment and software used in scientific computer applications will run concurrently with the conference. Company technical personnel will be on hand to assist attendees and to give demonstrations. Contributed papers in the form of posters or demonstrations are invited. Please check registration form to receive Tutorial information and/or Abstract forms where indicated.

Tuesday, December 7th — Morning lectures:

Microelectronics — Dr. Gordon Moore, Chairman of the Board/CEO, Intel Corp.

Personal Computers — Dr. Adele Goldberg, Principal Scientist/Area Manager, Software Concepts Group, Xerox Palo Alto Research Center

Local Area Networks — Dr. Robert M. Metcalfe, Chairman of the Board, 3COM Corp.

Shared Resources — Dr. C. Gordon Bell, Vice President of Engineering, Digital Equipment Corp.

Wednesday, December 8th — Morning Lectures:

Symbols and Software for Science — Prof. Edward A. Feigenbaum, Dept. of Computer Science, Stanford University

Methodology of Programming — Dr. Ira Goldstein, Manager, Application Technology Dept., Computer Research Center, Hewlett-Packard

Expert Systems/Artificial Intelligence — Prof. Bruce G. Buchanan, Dept. of Computer Science, Stanford University

Computer Graphics — Prof. Robert Langridge, Dept. of Pharmaceutical Chemistry, University of California, San Francisco

Thursday, December 9th — Morning Lectures:

General Perspectives — Dr. Ralph E. Gomory, IBM Vice President and Director of Research

Evolution of Computer Networks — Dr. Robert Kahn, Director, Information Processing Techniques, Defense Advance Research Projects Agency

Scientific Collaborations — Lynn Conway, Research Fellow/Manager, VLSI System Design Area, Xerox Palo Alto Research Center

Sociological Impact of Computing — Prof. J.C.R. Licklider, Laboratory for Computer Science, MIT

CONFERENCE REGISTRATION FORM

☐ Conference registration fee: $200
☐ Send Information on Tutorials
☐ Send Abstract Forms

Attendance will be limited.
Please reserve _____ space(s). Registration fees must be enclosed. Please make checks payable to "Computers in Science".

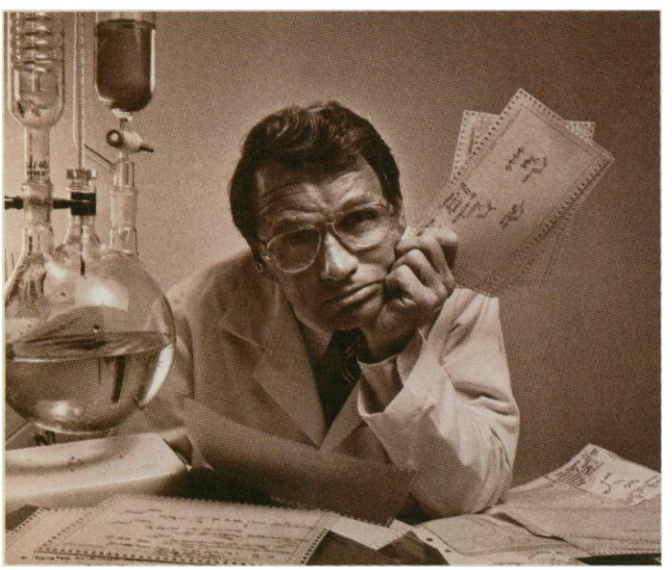
☐ Please send exhibit space prospectus.

Name _____
Affiliation _____
Street _____ City _____
State _____ Zip _____ Telephone _____

Return to: Computers in Science; Scherago Associates, Inc.; 1515 Broadway; New York, New York 10036.

Two ways to locate all the research your company's ever done on chemical reactions.

The slow way.



The fast way.

Announcing REACCS.

REACCS computer software can tell you whatever you need to know about your company's compounds and reactions, in minutes or even seconds.

There's no way notebooks, paper files or punch cards can do that.

With REACCS, you search a database by drawing structures on the computer terminal screen with a light pen.

You store information the same way.

REACCS displays reactions in traditional form with the arrow. It also highlights reacting centers and recognizes stereochemistry.

There is no need for outside timesharing. Protection of sensitive information is assured through built-in security tailored to your company's requirements.

Molecular Design has the most comprehensive line of chemical software programs available anywhere.

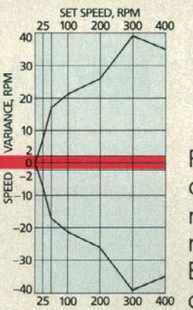
There's MACCS, which does with molecules what REACCS does with reactions.There are also programs for molecular modeling, quantitative structure-activity relationships, and structure elucidation.

For more information, please call or write.

Molecular Design Limited
1122 B Street, Hayward, CA 94541
Tel. (415) 581-1996. Telex 470631

Circle No. 260 on Readers' Service Card

Bring An Exciting New Sameness To Your Culturing

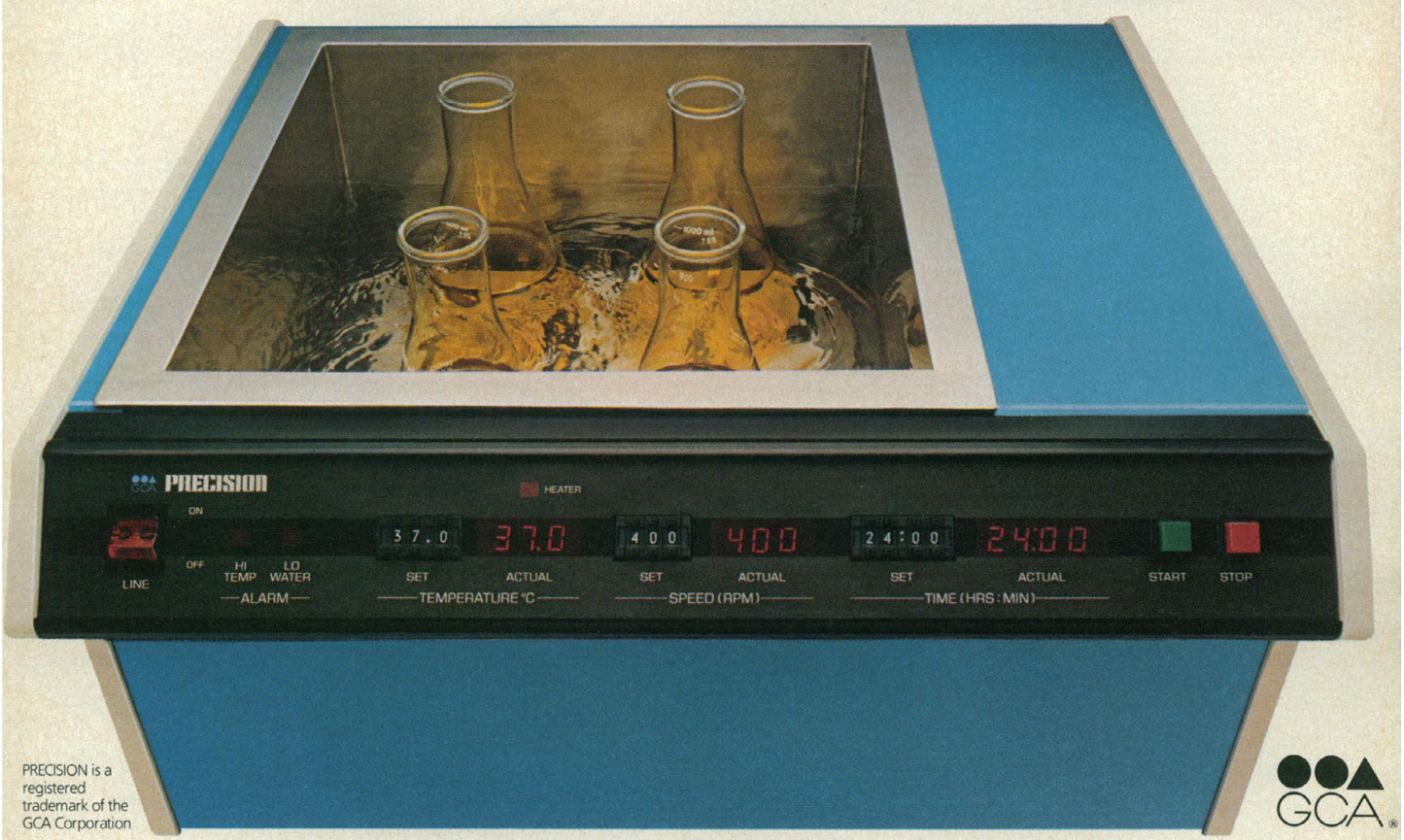


Red shows our speed control—± 2 RPM, full range. It's the most repeatable vortex ever. Black shows the leading competitor, as wide as ± 39 RPM. Our ± 0.25°C uniformity is twice as precise as anyone else.

Solid state. Self diagnostics. Voltage compensated speed control. Pushbutton digital settings. LED. Functional digital timer.

Write today for full details. Platform model also available. GCA/Precision Scientific Group, 3737 West Cortland Street, Chicago, Illinois 60647.

NEW PRECISION® ORBITALS



PRECISION is a registered trademark of the GCA Corporation

GCA®

Circle No. 274 on Readers' Service Card

Basic tools for tissue culture investigation:
Olympus Model CK
Inverted Biological Microscopes

Up to now, as a tissue culture investigator, you've adapted a microscope designed for another discipline to your use. In areas such as monoclonal antibodies, tissue typing and recombinant DNA, the CK offers a basic tool designed exclusively for you. With comfort and ease of operation.

The CK microscopes were conceived as the primary instruments for in vitro examination, without superfluous features so that it is reasonably priced. But without sacrificing capability, such as phase contrast.

Compare the Olympus CK models. Contact the Olympus Authorized Dealer listed in your Yellow Pages, or Precision Instrument Division, Olympus Corporation of America, 4 Nevada Drive, New Hyde Park, NY 11042.

In Canada, W. Carsen Co., Ltd., Ontario

OLYMPUS®

The Science Company

Circle No. 41 on Readers' Service Card

Now, Nalge makes analytical filtration a snap.

Easy as 1, 2, 3.

The new Nalgene® Analytical Filter Unit and Filter Funnel are the latest additions to our proven line of disposable filterware. Like Nalgene sterilization filter units, these analytical units are preassembled and presterilized, ready for immediate use.

After filtration, you can easily snap the cup of this analytical unit from its receiver. Then retrieve the membrane with sterile forceps for analysis or culturing. There's no cleaning, preparation, or sterilizing required. Uncomplicated design helps avoid error and contamination. Both the analytical filter unit and our new filter funnel are complete, disposable membrane filter systems, designed for your convenience.

Save time, trouble and money. You can order the Nalgene Analytical Filter Unit (Type A, Cat. No. 130) and Filter Funnel (Type AF, Cat. No. 140) from a single source—your lab supply dealer.

Free These are only two of our many new analytical and sterilization filter products. For complete information, ask for our latest Nalgene filterware literature. Contact your labware dealer or circle the reader service number below.

Nalge Company, Nalgene Labware Department, Box 365, Rochester, New York 14602

Nalgene Filter Products are intended for laboratory use only. Not for in vitro diagnosis or parenterals.

Circle No. 215 on Readers' Service Card

SYBRON | Nalge

17 September 1982, Volume 217, Number 4565 **SCIENCE**

Differing Values in Academia and Industry

Many universities are examining searchingly their relations with industry. The basic reason is financial. The academic community is nervous about federal funding of research. Some universities report that they have retained a satisfactory level of support, but half or more have not. Apprehension about federal support has been coupled with other financial problems of the universities brought on by recession and inflation.

In this environment it has become fashionable to look to industry as a possible source of funds. Already a number of universities have entered into contracts involving substantial sums, and additional arrangements will doubtless follow. In general, industry has not been devoting a sufficient sum to basic research within its own laboratories or elsewhere. It was treated to a lesson when a large number of companies were caught flat-footed by academic developments in molecular biology. Other sectors of industry have become concerned about future supplies of personnel trained in computer-related fields.

Despite an apparent basis for close cooperation between academia and industry, the likely outcome is far from a cure-all for the financial ills of the universities. The money spent by industry at universities is unlikely to top 10 percent of the federal funds they now receive. Close cooperation between universities and industry could lead to harmful tensions induced by competing value systems. Universities already have their share of such differences. The humanists look down on the engineers and vice versa; the various science departments usually have little interaction. However, the faculty share common goals in the pursuit of knowledge and in fostering the education of the young. Most of the faculty place these goals above that of attaining personal wealth.

The value system and the mode of conducting research and development in industry are quite different from those of academia. To survive, a company must make a profit. It must evolve with the changing times. And it must be well managed, with a clearly defined chain of command. The bankruptcy courts are very busy these days. Only the strong and nimble remain viable.

In industry, the pressure of the bottom line inevitably dictates policies with respect to R & D. The goal is not pursuit of knowledge; it is the attaining of proprietary advantage. Accordingly, research results obtained at industrial laboratories often go unpublished or are released slowly in the patent literature. In the university, fast publication of scientific findings is eagerly sought. Much of the activity in industry is conducted by interdisciplinary teams whose members are arbitrarily assigned to tasks. Projects may be suddenly terminated. Only a favored few in the typical industrial laboratory have the privilege of personally choosing a research area and sticking with it through discouraging phases of effort. This frenetic tempo is incompatible with the tempo of graduate training in the natural sciences. In their thesis research, it is essential that students pursue a line of inquiry patiently and in depth.

These examples of differing values and procedures make it obvious that close collaboration between academia and industry is likely to create new problems and tensions. That is not to say that cooperation is undesirable. One time-tested method of cooperation is that of consultation, preferably conducted off-campus. Professors spend at most an average of a day a week at this. They bring their expertise to industry and in turn learn of new developments and new job opportunities for their students.

However, some of the new arrangements between universities and industry come close to inserting an industrial enclave into the campus. It would be unfortunate if such examples were carelessly multiplied. Rather, emphasis should be placed on avoiding relationships that might damage the universities and their ability to carry out well their essential functions of undergraduate and graduate education.—PHILIP H. ABELSON

New, compact Series 1000 Electronic Balances from Sartorius... high-priced features for just $495 and $595.

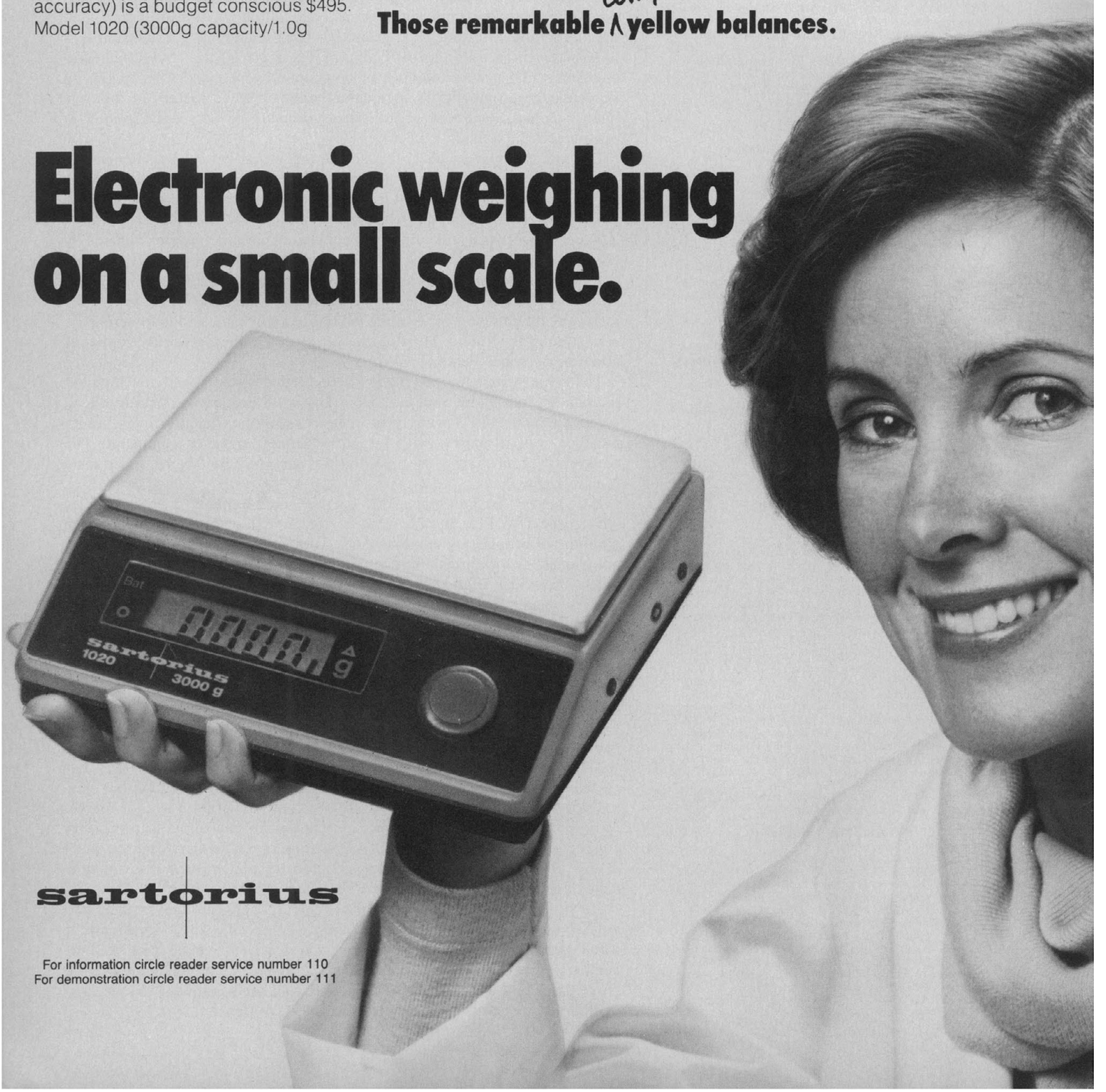
With the Series 1000, Sartorius has created two compact, portable, battery-powered electronic balances that incorporate many features found only on larger, higher-priced models.

Model 1003 (300g capacity/0.1g accuracy) is a budget conscious $495. Model 1020 (3000g capacity/1.0g accuracy) is just $595. Both of these small, rugged balances feature instant electronic taring over the entire weighing range. A fast liquid crystal display reads in grams or ounces at the flick of a switch. Oversized stainless steel pans facilitate weighing large or bulky objects. And both models have built-in protection against overloading damage, dust and spills, insuring trouble-free operation.

Series 1000 Models are ideal for use anywhere—in the lab, plant, classroom or in the field. They're extremely lightweight and can be operated on a standard nine-volt battery (or on line current with optional AC adapter.) Precision, electronic weighing on a small scale for a small price. For literature on the Series 1000, write Sartorius Balances, Brinkmann Instruments Co., Division of Sybron Corporation, Cantiague Road, Westbury, New York 11590; or call 516/334-7500.

Those remarkable compact yellow balances.

Electronic weighing on a small scale.



sartorius

For information circle reader service number 110
For demonstration circle reader service number 111