12 September 1980 • Vol. 209 • No. 4462 $1.50

SCIENCE

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

PRELIMINARY PROGRAM
AAAS Annual Meeting

"The TJ-6 is an excellent product. We're delighted we have one." "It's ... centrifuge. Nothing ev... with it." "You folks have ... the TJ-6. We're very happ... the colorful tube adapters. ..., and a welcome change fr... It's a remarkably quiet-runn... recommend a TJ-6 to any..." "The lift-out bowl alone... TJ-6 is an excellent p... have one." "It's a very ...ing ever seems to to... ...lks have done a fine ... ...ry happy with ours." "W... ...adapters. They're easy to... ...ange from previous types... ...quiet-running

The Beckman TJ-6 Centrifuge. Everyone says great things about it.

The TJ-6 is the most popular centrifuge ever introduced, whether it's the refrigerated or non-refrigerated version.

Users appreciate how quiet it is. They like the removable bowl that makes cleaning a snap. They like the colorful adapters which bring a new practicality and ease of handling to table-top centrifuges.

Owners are delighted with the TJ-6's excellent reliability. And if there is a problem, they know there are hundreds of Beckman service representatives nationwide—at least one in every major city in the U.S. and Canada.

Send for Brochure SB-490 for a full description of this superior table-top centrifuge. Write to:

Beckman Instruments, Inc., Spinco Division, 1117 California Avenue, Palo Alto, CA 94304.

BECKMAN

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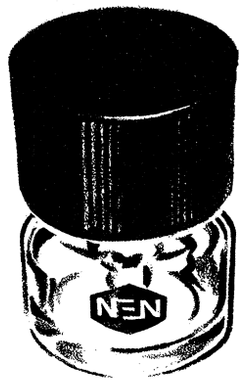


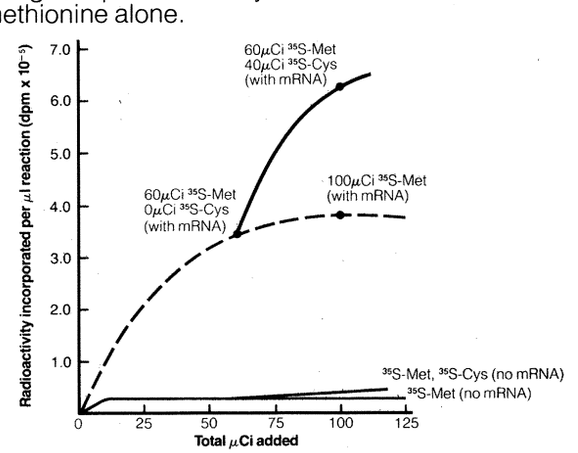
Our Biological Testing Lab tests our products in the real world of biological systems.

More than anything else, New England Nuclear owes its leadership in radiochemicals to the quality standards of highest specific activity and radiochemical purity that were set from the beginning. Perhaps less known is our program, now several years running, to test some of our most widely used compounds for effectiveness in the biological systems you're investigating. This testing is the ongoing work of our Biological Testing Laboratory.

The benefits to our customers from this program take various forms: Increased incorporation of labeled amino acids into proteins of interest; more precise radiochemical stability measurements; the ability to measure degradative enzymes using labeled substrates.

Often our testing leads to new criteria for product specifications. For example, we subject our dNTPs, [α-^{32}P] to nick translation assays to demonstrate that they exceed stated minimum incorporation levels.

A recent investigation conducted in our Biological Testing Laboratory using methionine, L-[^{35}S]- and cysteine, L-[^{35}S]- together in a cell-free translation system resulted in proteins of higher specific radioactivity than can be achieved using either labeled amino acid alone. Shown below are the results of an experiment in which up to 60μCi methionine was added to a cell-free reticulocyte lysate system containing rabbit globin mRNA. To the system was then added either cysteine or more methionine. The globin synthesized in the presence of both labeled amino acids is shown to be of higher specific activity than is attained with methionine alone.



Our "translation grade" methionine and cysteine, L-[^{35}S]- have been tested with the modified procedure in our cell-free translation kits, and are guaranteed to incorporate into protein.

Translation Grade Amino Acids

Guaranteed to incorporate into protein
Methionine, L-[^{35}S]-
>800Ci/mmol
Aqueous solution containing 10μmol of 2-mercaptoethanol per ml, shipped in dry ice
NEG-009T 1mCi 5mCi

Guaranteed to incorporate into protein
Cysteine, L-[^{35}S]-
>600Ci/mmol
10mM dithiothreitol in water, shipped in dry ice
NEG-022T 1mCi 5mCi

Biological testing has also enabled us to guarantee incorporation levels of our Leucine, L-[3,4,5-^{3}H(N)]- when used in our cell-free translation system.
Leucine, L-[3,4,5-^{3}H(N)]-
>110Ci/mmol
0.01N HCl
NET-460 250μCi 1mCi 5mCi

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Complete Cell-Free Translation Systems

Methionine, [^{35}S]- **Reticulocyte Lysate Translation System**
NEK-001

Leucine, [3,4,5-^{3}H(N)]- **Reticulocyte Lysate Translation System**
NEK-002

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Not for use in humans or clinical diagnosis.

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AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Skyline view of Toronto with CN Tower. *See page 1221, Preliminary Program* of the AAAS Annual Meeting, 3–8 January 1981. [Courtesy of CN Tower, Toronto, Ontario, Canada]

BREAK THE GLASS

You get accuracy.

When you switch to Nalgene labware, you get all the advantages of unbreakability without sacrificing accuracy. For example, Nalgene burets and PMP volumetric flasks are individually calibrated, easy to read (no meniscus), and non-wetting, so that total delivery of contents is assured. Burets meet the same federal specifications for accuracy as those established for glass.

You get transparency.

When clarity is an important factor, you'll find Nalgene labware that's right for the job. Our acrylic burets, for example, are crystal clear, and Nalgene PMP volumetric flasks and beakers have the clarity you want and need.

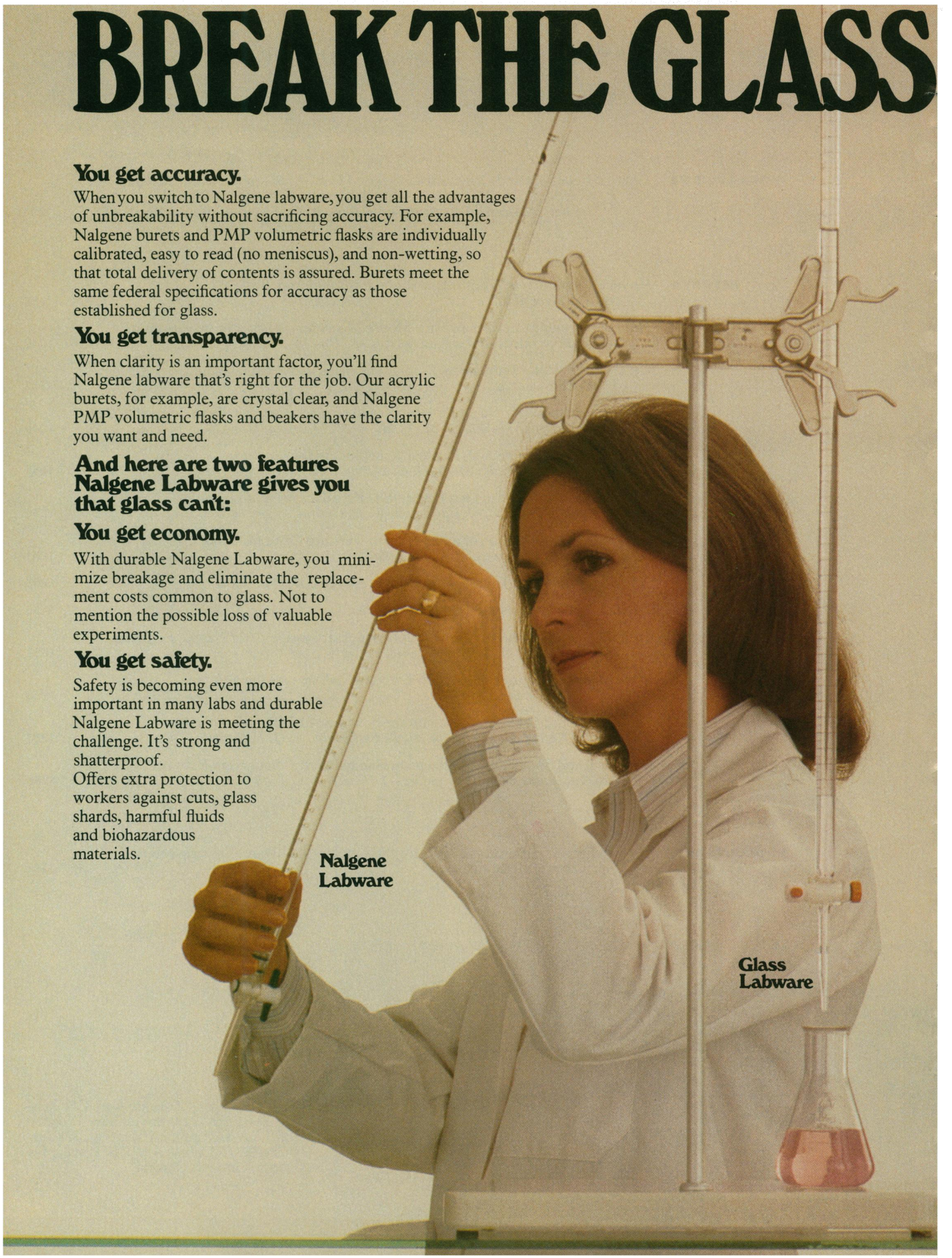
And here are two features Nalgene Labware gives you that glass can't:

You get economy.

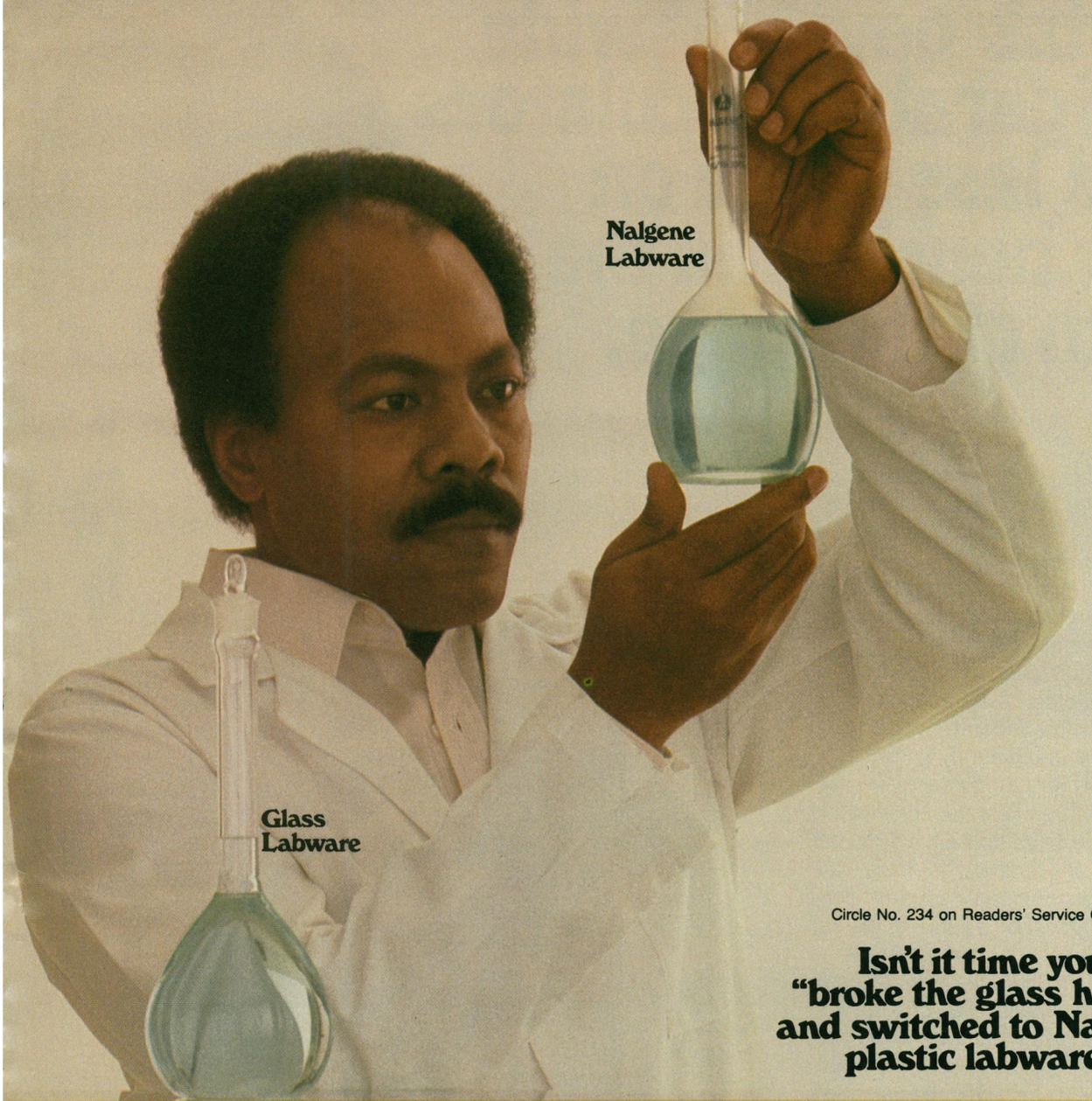
With durable Nalgene Labware, you minimize breakage and eliminate the replacement costs common to glass. Not to mention the possible loss of valuable experiments.

You get safety.

Safety is becoming even more important in many labs and durable Nalgene Labware is meeting the challenge. It's strong and shatterproof.
Offers extra protection to workers against cuts, glass shards, harmful fluids and biohazardous materials.



HABIT WITH NALGENE® PLASTIC LABWARE, YOU GET MORE THAN SAFETY AND ECONOMY.



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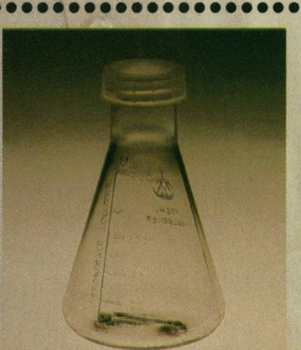
Isn't it time you "broke the glass habit" and switched to Nalgene plastic labware?

FREE

"BREAK THE GLASS HABIT"
Nalgene Flask

See how tough Nalgene Labware can do the job of glass in your lab. Fill out this coupon and we'll send you a 250-ml polycarbonate Erlenmeyer flask absolutely free. It's as clear as glass and features a convenient screw closure. Once you try it, we think you'll break the glass habit.

SYBRON | Nalge



Please send me a free Nalgene Erlenmeyer flask

Nalge Company
Division of Sybron Corporation
Nalgene Labware Department
P.O. Box 570, Rochester, New York 14602

S-9

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Company_____

Address_____

City_____

State_____ Zip_____

LE SHOWN ACTUAL SIZE. MEASURE YOUR SPACE WITH THIS PAGE TO SEE IF A LAUDA RM-3 WILL FIT.

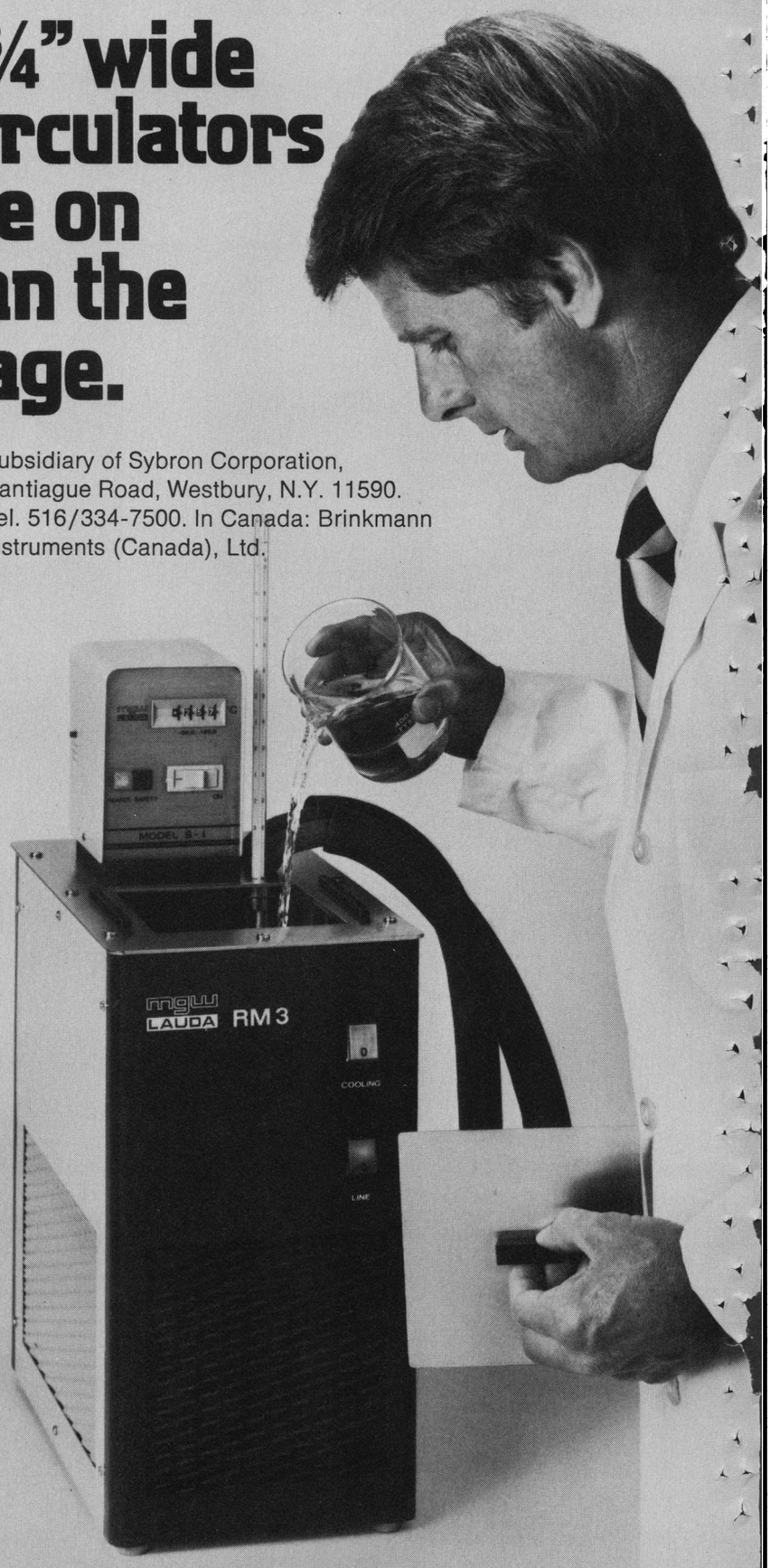
Lauda's new 7¾" wide refrigerated circulators need less space on your bench than the width of this page.

You wouldn't think a refrigerated constant temperature circulator could fit into bench space narrower than this page, but it's true. The new Lauda RM-3S and RM-3T are only 7¾ inches wide (and only 15 inches deep).

Despite their space-saving dimensions, these circulators provide all the features of full-size models. That makes them ideal for circulating liquid to jacketed glassware and other instruments (spectrophotometers, chromatography columns, electrophoresis equipment), as well as for applications requiring direct immersion.

Model RM-3S offers the convenience of digital temperature control; a flick of the finger dials in any temperature from —20° to 99.9°C. A platinum resistance sensor insures an accuracy of ±0.01° of the set temperature. A second, less accurate model, RM-3T, is equipped with a single temperature adjustment dial, and the temperature is controlled thermostatically to an accuracy of ±0.2° within the operating range of —20° to 100°C. Both models have 1,000 watt heaters, a 3-liter bath capacity, all stainless steel components contacting liquid, and are supplied with a bath cover and reading thermometer.

For literature on the compact RM-3 and the complete line of Lauda Circulators, write or call: Brinkmann Instruments, Inc., Subsidiary of Sybron Corporation, Cantiague Road, Westbury, N.Y. 11590. Tel. 516/334-7500. In Canada: Brinkmann Instruments (Canada), Ltd.



SYBRON | Brinkmann

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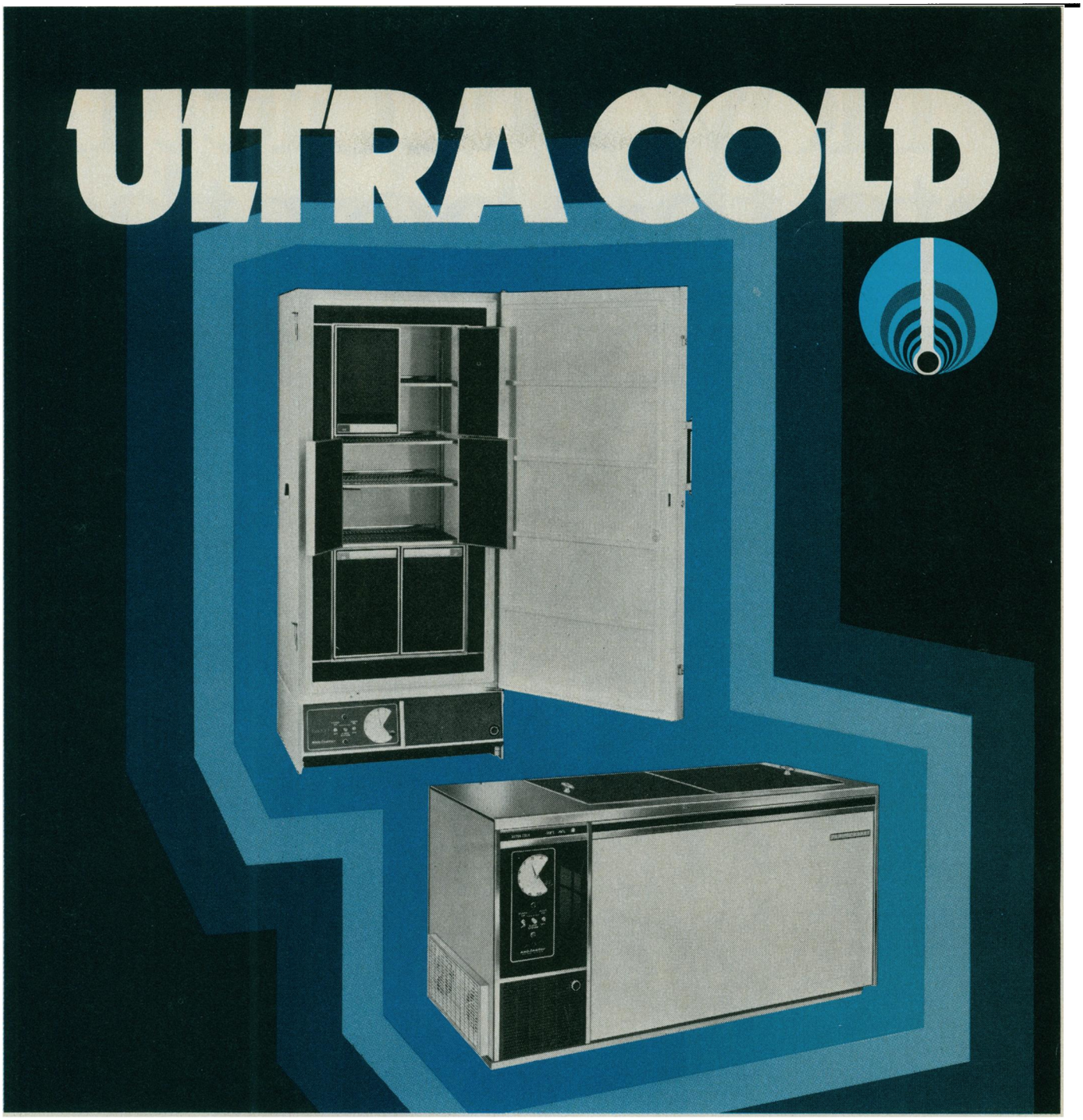

Kelvinator Ultra Cold refrigeration units offer dependable low temperature storage. Four models to choose from with many great convenience features and temperature ranges down to a chilly −90°C/−130°F.

The Ultra Cold Series 100 upright cabinets are available in two models with temperature ranges down to −85°C/−120°F. Both models feature 12 cu. ft./340 Liter capacity, automatic alarm system with rechargeable battery and dual wheel casters for mobility. The interior of the Series 100 cabinet contains five adjustable shelves, six gasketed inner doors and a 5cm/2" ID access porthole.

The Ultra Cold Series 500 chest type cabinets are available in two models with temperature ranges down to −90°C/130°F. Both models feature deluxe temperature control dial, automatic alarm system with rechargeable battery and convenient center hinged lid for easy access from both sides of unit. The low profile of the Series 500 cabinet, only 87cm/34", makes for easy loading and unloading of contents.

All Kelvinator Ultra Cold cabinets, both Series 100 and 500, are backed by our exclusive Five Year Compressor Warranty and Cabinet Exchange Program.*

When your refrigeration needs call for ultra-low temperature storage, remember Kelvinator . . . The leader in low temperature storage.

**Details of the Kelvinator Five Year Compressor Warranty and Cabinet Exchange Program are available by contacting Kelvinator Commercial Products, Manitowoc, Wisconsin.*

Kelvinator

Kelvinator Commercial Products
621 Quay Street
Manitowoc, Wisconsin 54220
TWX-910-260-3507 Phone 1-800-558-7627

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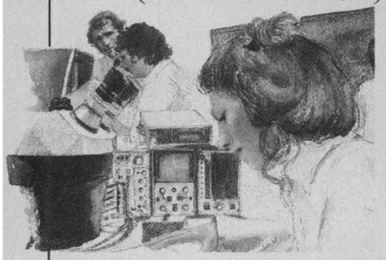
Circle No. 25 on Readers' Service Card

How Nicolet fits into this box than

Fitting more oscilloscope into a cubic foot took one big first step —the use of modern digital methods. Plus a lot of little steps such as recognizing what's *"oscilloscope,"* what's not, and keeping the *"not"* outside where it belongs. Here are some of the great things the digital method has made possible.

Resolution and Accuracy

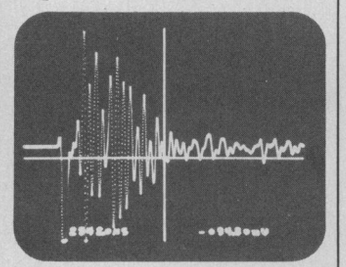
Scientists and engineers (thousands of them)

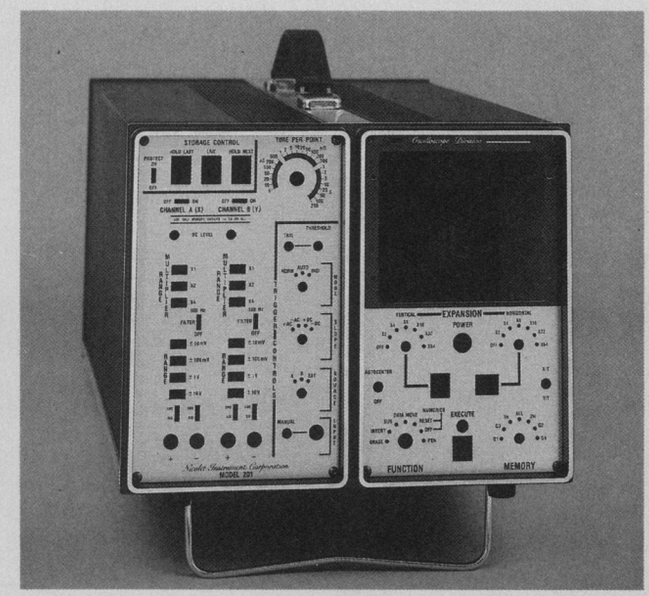


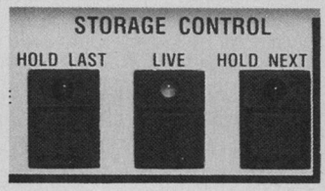
are delighted with the Explorers' 4000-line resolution, and accuracy literally an order of magnitude better than that of analog scopes and other digital scopes.

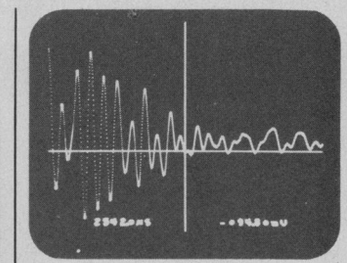
Super Storage

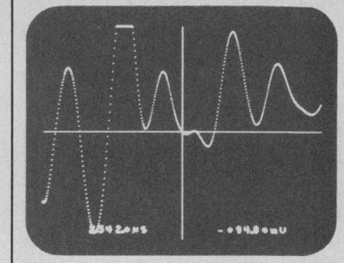
Users appreciate the Explorer's waveform storage. At equivalent writing rates of up to 50 cm/μsec an Explorer can clearly remember, every time, without fade or bloom, literally hundreds of times as much about signals as the finest analog storage scopes. Best of all, Explorers store waveforms with no hassle.





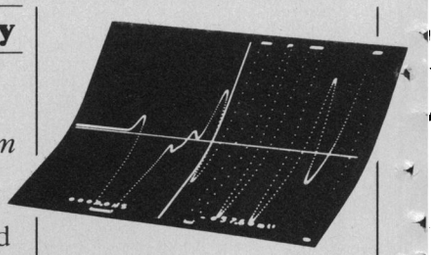


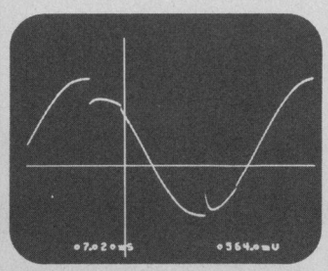


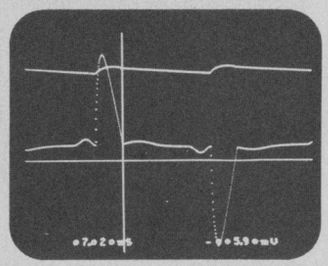


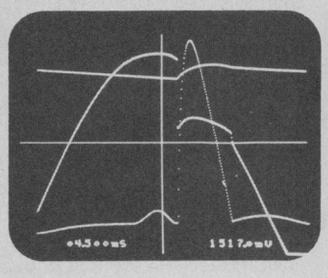
64X Zoom Display

Explorer users enjoy the convenient display that allows them to *zoom in* on details of interest. They also can superimpose "old" signals and live, "fresh" signals for extremely sensitive observation of differences or changes. They can superimpose two (or four) old waveforms, or two live waveforms. And zoom in on details with up to 64X digital display scale magnification.





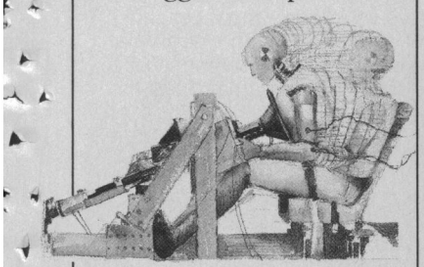




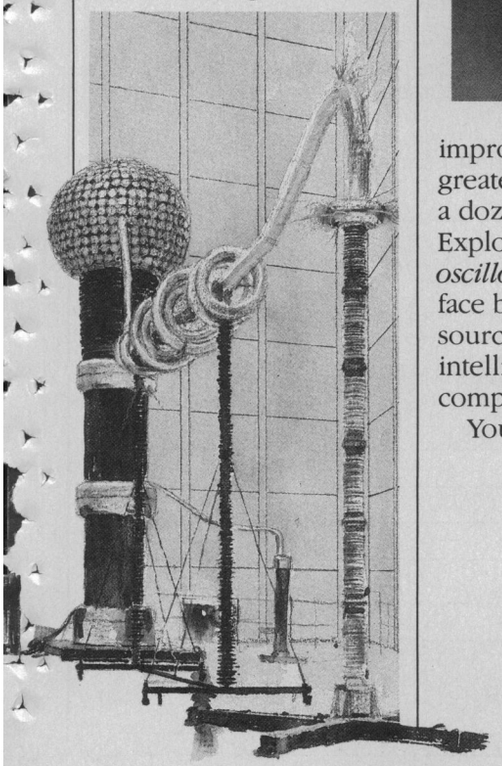
more oscilloscope anyone else.

They're Pure Oscilloscopes

The digital method results in other welcome improvements. Sweep speeds that range down to days in length to allow you to precisely measure very slow phenomena. Pre-trigger sweep start

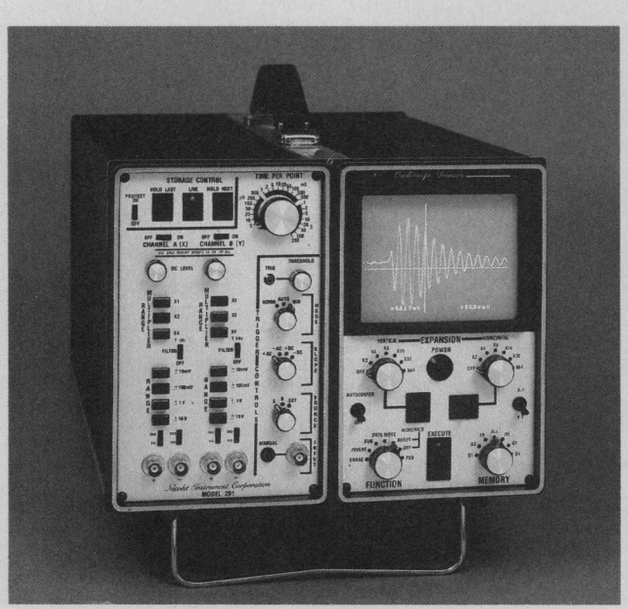


allows you to see what precedes an event as well as what follows. XY operation provides even greater precision



than servo-driven XY recorders, but at speeds a million times greater. Speeds as high as most analog XY oscilloscopes.

All of these are oscilloscope function improvements. The

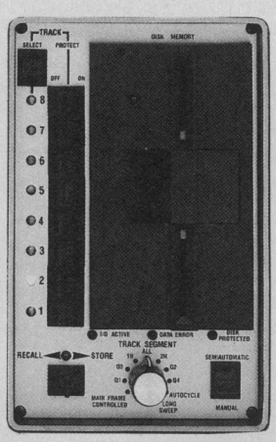


improvements include greater ease of use, for a dozen reasons. The Explorers are *"pure oscilloscope."* They interface between the signal source and the most intelligent and powerful computer in the world.

You.

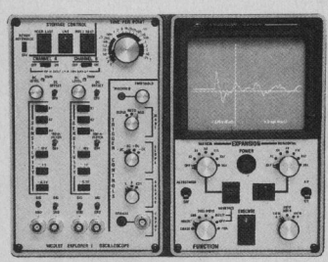
Disk Memory Option

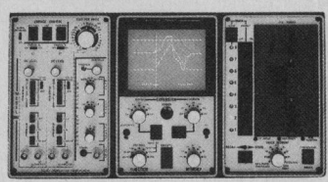
The optional, built-in disk memory can remember signals for years, storing as much data per disk as you could capture on thousands of photos. Disks are inexpensive and reusable, don't need developing, and store data at the touch of a button.



Matching Your Needs

You can choose the Explorer model that fits your measurement needs from a family of instruments, plug-ins and IEEE-488 or RS-232 options.





For More Details

To get complete information quickly, to discuss your application or to arrange a demonstration, call (608) 271-3333.

NICOLET INSTRUMENT CORPORATION
OSCILLOSCOPE DIVISION
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Madison, WI 53711
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WHY DO SO MANY PEOPLE BUY THE KIND OF PROTECTION THAT'S WRONG FOR THEM?

Because they don't clearly understand the difference between Term and Whole Life insurance . . . and that a Term policy can typically provide five to ten times as much immediate family protection for the same money!

As shown in the table below, a first year net outlay of only $150 buys a $142,000 TIAA 20-Year Decreasing Term policy or a $97,000 5-Year Renewable Term policy, for a man aged 30 or a woman aged 35. The same outlay used to purchase a Whole Life policy would give their family only $13,000 of family protection.

If you're like most of your colleagues in education and research, your first priority is to give your family the most financial security for the least amount of money—and that's what TIAA Term is all about! Whatever *your* age, the difference in the level of protection available for just $150 is dramatic, as the table illustrates.

Immediate Protection Available For $150 First Year Net Cost *

For a Man Aged	For a Woman Aged	20-Year Decreasing Term Plan	5-Year Renewable Term Plan	Whole Life Plan
25	30	$206,000	$112,000	$16,000
30	35	142,000	97,000	13,000
35	40	88,000	74,000	10,000
40	45	52,000	48,000	8,000
45	50	31,000	31,000	7,000

*Annual premium less cash dividend payable at the end of first policy year, based on 1979 dividend scales. While not guaranteed, dividends have been paid every year since TIAA's founding in 1918.

Why such big differences? With Term you pay only for protection, while a Whole Life policy combines protection with a savings (cash value) element. Remember, the protection part of life insurance is relatively inexpensive; it's when savings are included as well that a high outlay per $1,000 of coverage is required.

If you'd like to know more, ask us to send two highly informative articles reprinted from *The New York Times* and *Business Week* that discuss the choice between Term and Whole Life. We'll gladly mail them, along with detailed personal information about TIAA policies for you.

Mail coupon or call collect
Just complete and mail the coupon at right, or call the TIAA Life Insurance Advisory Center (collect) 212-490-9000. If you wish, an Insurance Counselor will review your insurance needs with you and help you select the plan and amount that's right for you. No obligation, of course.

Eligibility to apply for a life insurance policy from Teachers Insurance and Annuity Association is limited to employees of colleges, universities, private schools and certain other nonprofit educational or research institutions. The employee's spouse is also eligible, provided more than half of the combined earned income of husband and wife is from a qualifying institution.

TIAA

Established as a nonprofit service organization by the Carnegie Foundation for the Advancement of Teaching

Life Insurance Advisory Center SP8006K7
Teachers Insurance and Annuity Association
730 Third Avenue, New York, NY 10017

Please send me the reprinted articles contrasting Term and Whole Life, and personal illustrations of these TIAA policies:

☐ Decreasing Term ☐ 5-Year Renewable Term ☐ Whole Life

Please print

Name _____

Job Title _____ Birthdate _____

Home Address _____

City _____ State _____ Zip _____

Phone #s (optional) Home ( ) _____ Office ( ) _____

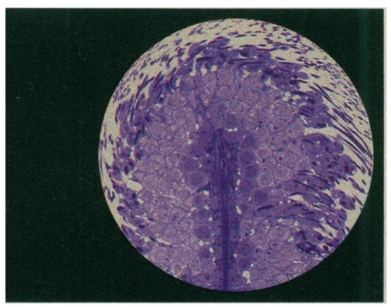
_____

Your nonprofit employer (college, univ., private school, research institution, etc.)

If your spouse is also eligible under the rules given at left, please provide:

Spouse's name _____ Birthdate _____

NIKON VISIONS



NIKON HIGH PERFORMANCE CF OPTICS. POSSIBLY THE FINEST EVER AVAILABLE.

Rat testis photographed with Nikon CF 40x oil plan apochromat. CF 5x photo eyepiece.

INSTRUMENTATION
Nikon Optiphot microscope with CF objectives.

SIGNIFICANCE
Nikon's revolutionary CF optics virtually eliminate chromatic aberration. Within this series, several high performance objectives significantly extend observation powers.

SPECIFICS
While all Nikon CF objectives provide a dramatic improvement in resolution, color rendition and contrast over the old compensation system, the following lenses are exceptional. The unique CF 2x plan apochromat has excellent image flatness for low power photography. The CF 40x plan apochromat, N.A. 0.95, dry, produces exceptionally bright, high contrast images. Nikon's CF 100x NCG plan apochromat is designed to work without a cover glass. Its sharpness must be seen to be believed.

These remarkable optics are matched to a microscope body and illumination system equal to their performance—the Nikon Optiphot. This totally new design is extremely stable. A standard 50 watt halogen Koehler illumination system covers all magnifications without need for adjustment and the full range of Nikon accessories is available to match any assignment.

Extend *your* vision. Write:
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Instrument Division
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Garden City, N.Y. 11530
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Nikon
Extending Man's Vision

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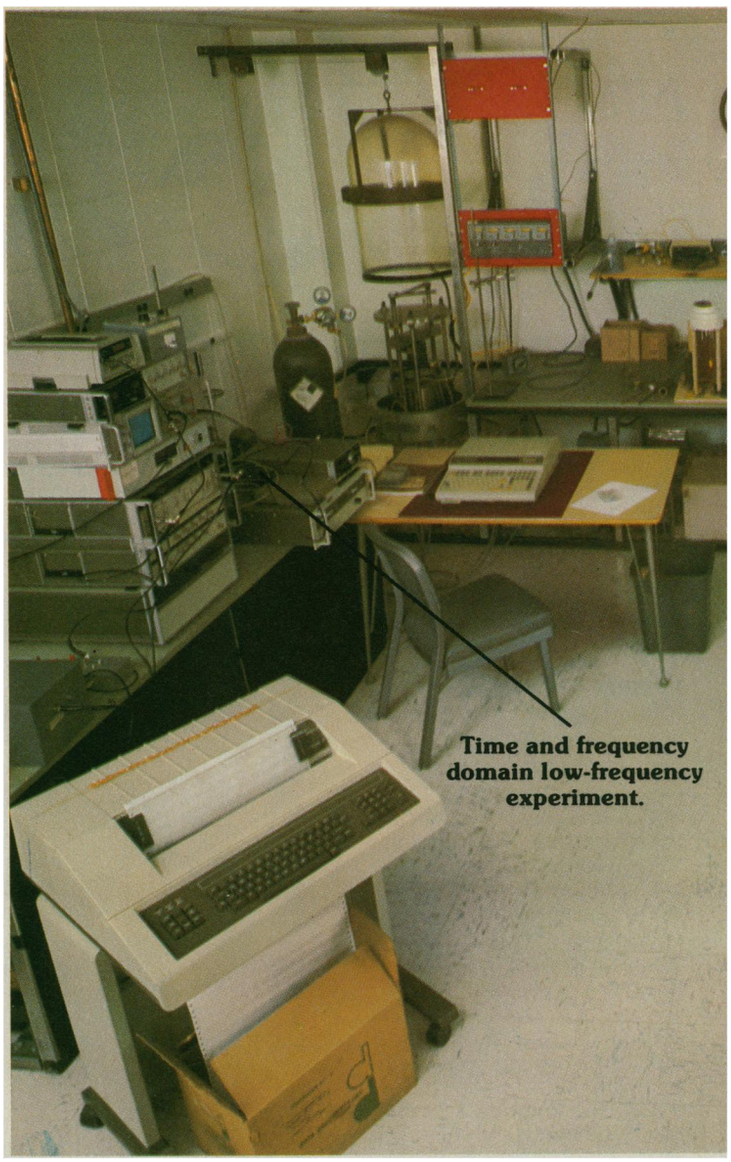
An HP-IB system helped generate— in three months. . .



Time and frequency domain low-frequency experiment.

For Colorado State University's Department of Electrical Engineering, contracts and grants are a hectic game. The competition is stiff, funds must be utilized to the maximum, and contracts unfailingly completed on time.

Professor Joel DuBow, head of the Department's Energy and Materials Group, recommended the use of an HP-IB system for experimental programs involving fossil fuels, because "we have enough problems understanding the measurements without having to worry about interfacing. By using HP-IB compatible instruments and computers, we were able to get right to the data analysis, without first having to do research on research."

Processing the unseen.

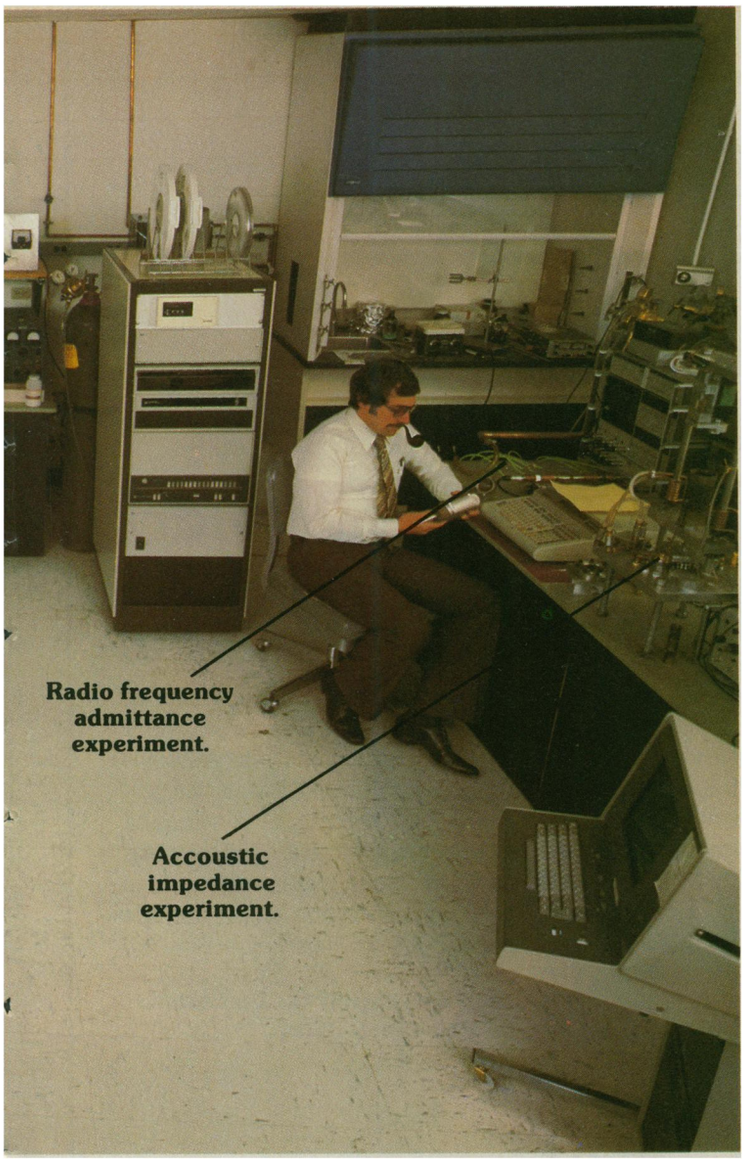
The in situ oil shale processing, now considered the most promising oil extraction technique, utilizes underground processing. Since the material cannot be seen, it is critical that the process be monitored and diagnosed accurately. CSU's HP-IB system has permitted Professor DuBow and his colleagues to devise — and test — conceptual schemes for accomplishing this. For example, when oil shale is heated, it goes through three structural changes: from an "as is" state to a transition zone, to a retorting zone, and, finally, to a combustion zone. By using the HP-IB system to monitor temperature coefficients of the shale properties, Prof. DuBow has been able to delineate the location of these zone boundaries. Process engineers can then use this data to detect the position and velocity of these reaction zones, and to determine the shape of each zone. In turn, this tells them whether or not the desired process is being followed. If not, corrective action can be immediately taken.

A hierarchy of machines.

Another reason why Prof. DuBow chose HP-IB is because of the flexibility provided. "We use three HP 9825s, in conjunction with an HP 1000," Prof. DuBow says. "That way, we end up with a hierarchy of machines. The 9825s have the capacity to analyze most of our data, while the HP 1000, with floppy disc drive, is faster for graphics and hard copy output. The HP 1000 also gives us the ability to store data permanently, and to compare new data against data that was generated six months ago. On the other hand, if the 1000 is busy, the 9825s can provide us with a lot of our essential data. And, since software is compatible, if one 9825 is unavailable the other two can keep the lab running."

Flexibility for data quantity and quality.

In short, this HP-IB system made it possible for CSU engineers to assemble a system configuration quickly, so they could begin looking at data months faster than might have been possible had conventional components been used. It also permits them to analyze oil shale samples faster and obtain more data from the tests. In fact, in one three-month period, CSU has generated more oil shale test data than had ever before existed in published form.



more oil shale test data than had ever before been published.

"Not a new adventure every time."
Professor DuBow's HP-IB system now represents an investment in excess of $250,000, and includes the computers, a low frequency network analyzer, a differential thermal analyzer, printer, four-pen plotter, five disc drives, tape drive, measurement process controller, terminals, and ten other HP instruments. "With HP," Prof. DuBow reports, "I can modify, upgrade or expand the system as our needs change; I have a system where I can hook up specialized and expensive analytical instruments (such as an HP GCMS) rapidly and not have a new adventure every time. Aid from HP people was crucial at certain times. In fact, if it hadn't been for them, the whole program might have failed. One of their applications engineers was especially helpful not only in the interfacing, but his intimate knowledge of the instrument system helped us design our experiment to get the data we wanted accurately."

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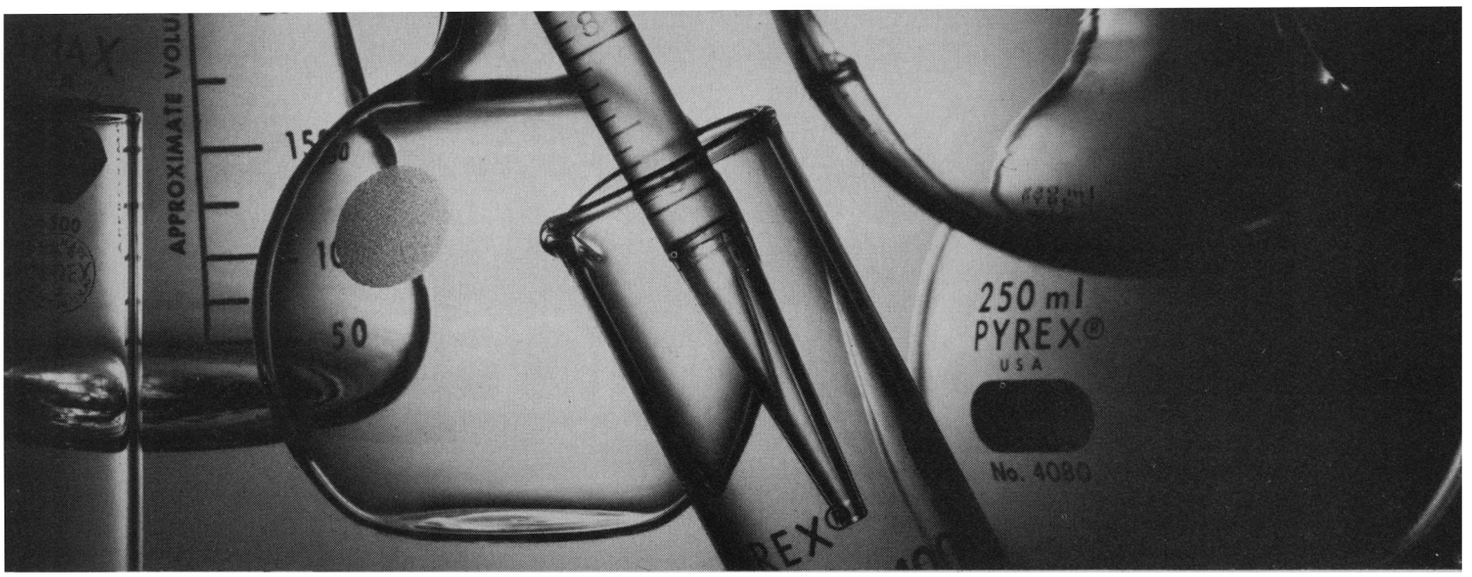

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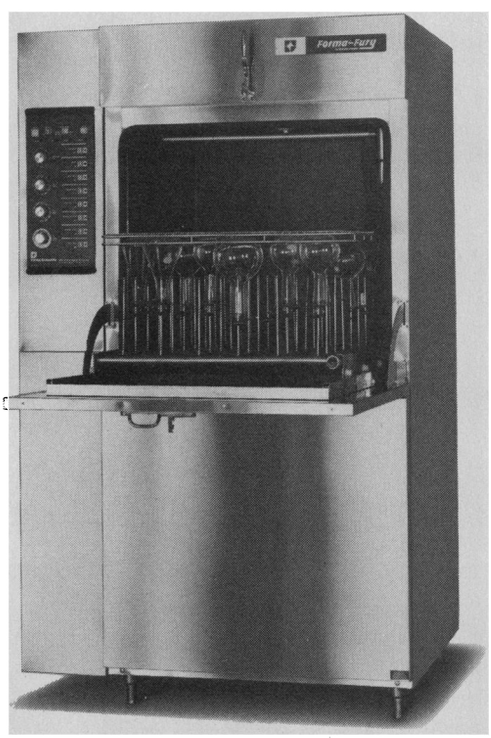

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Applying genetic engineering of osmoregulation to the practical area of plants and microorganisms, the contributors to this volume focus on enhancing the productivity of stress environments, and eventually increasing the world's supply of food, chemicals, and biomass. *Basic Life Sciences, Volume 14*. 396 pp., 1980, $39.50

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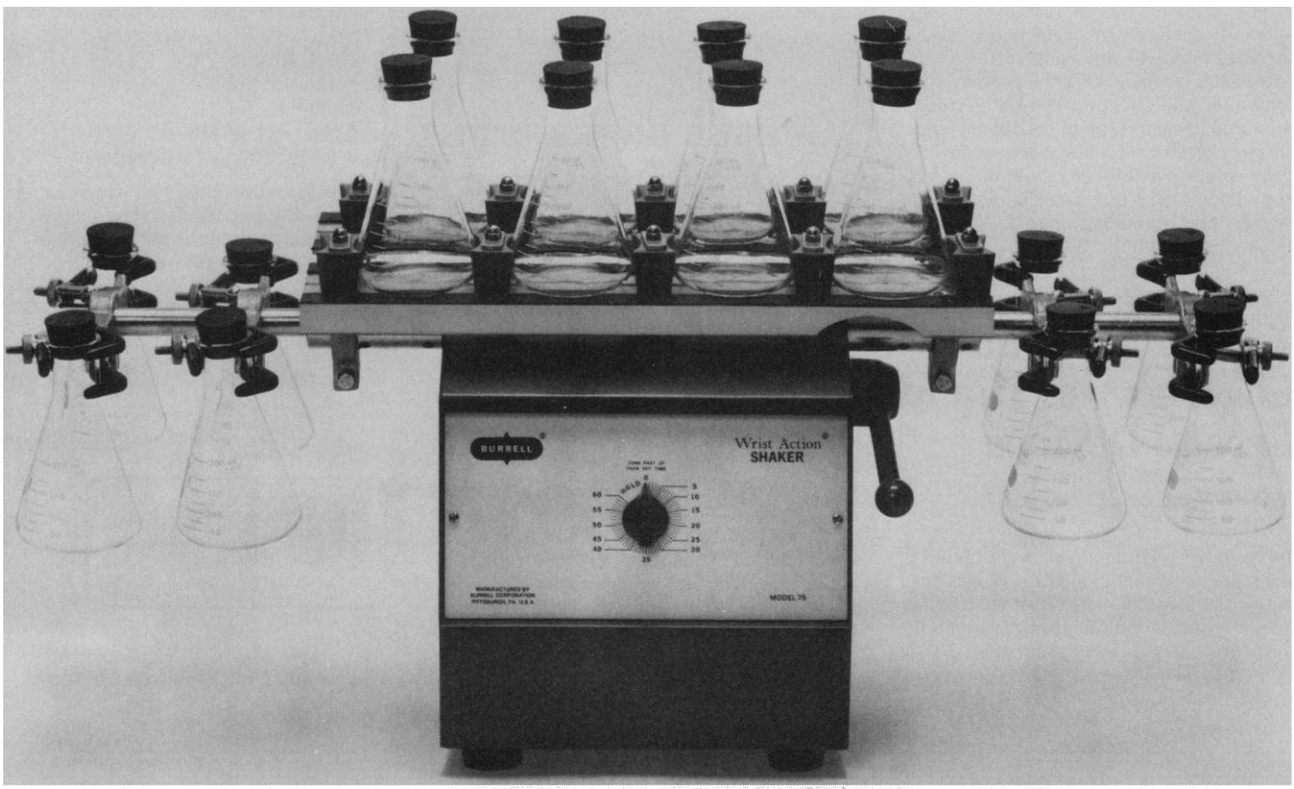

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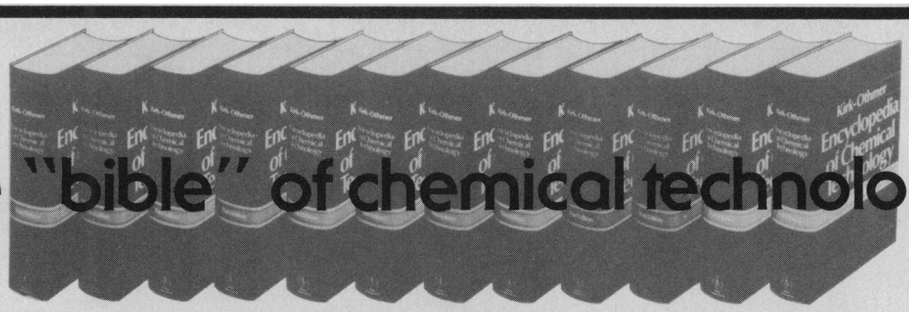

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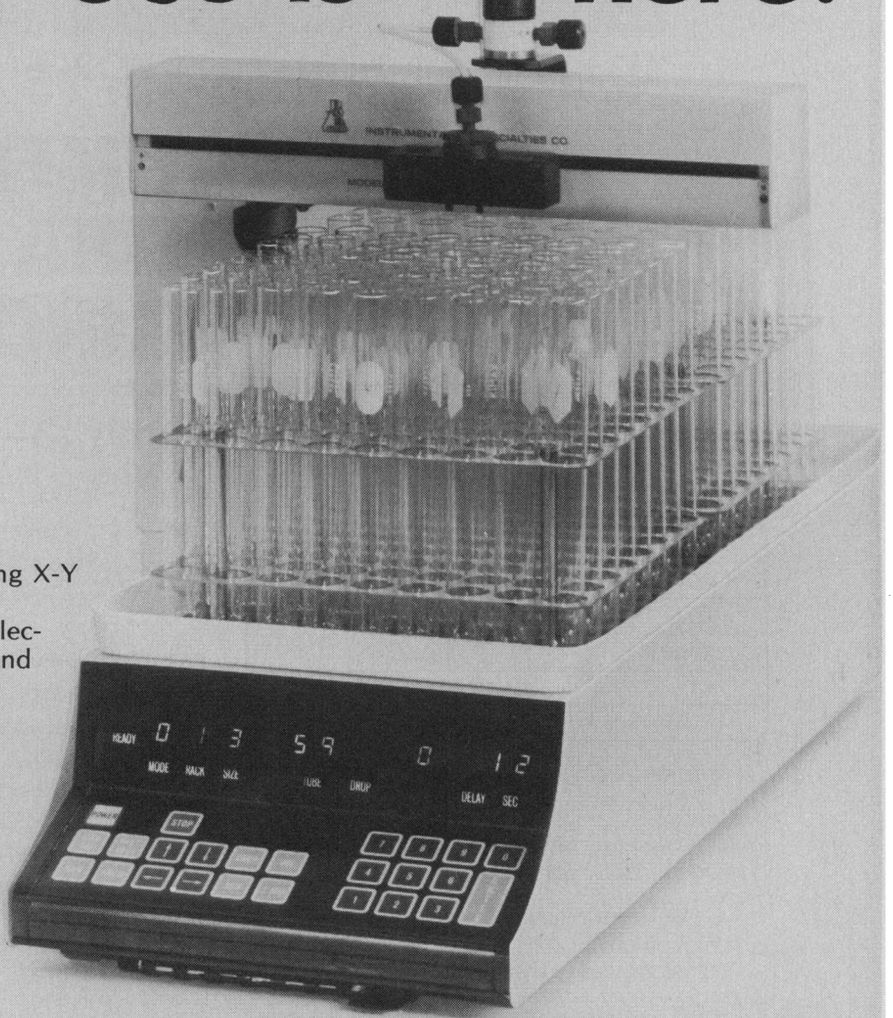

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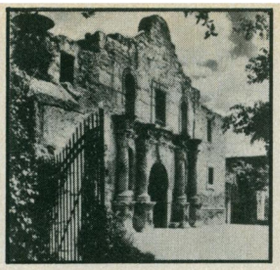

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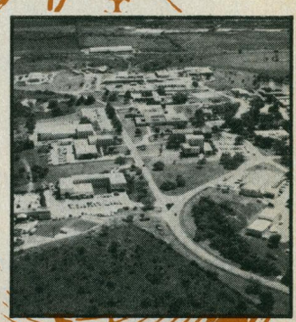

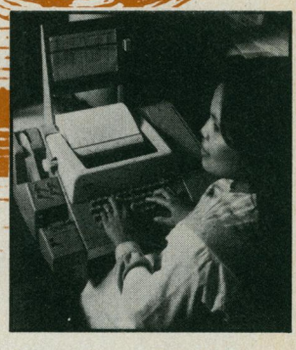

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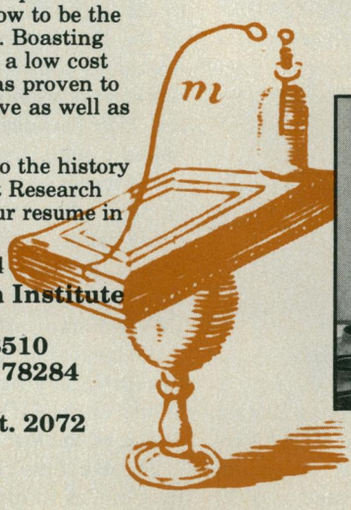

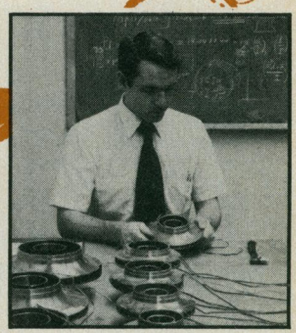

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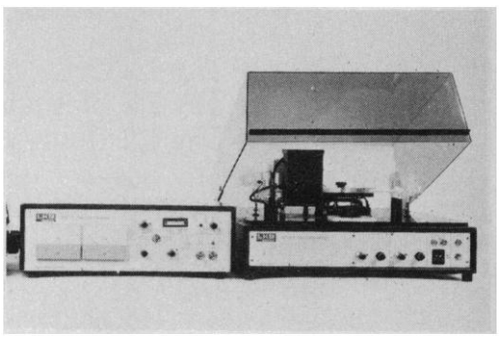

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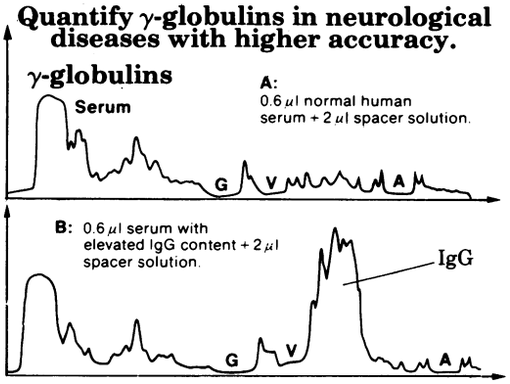
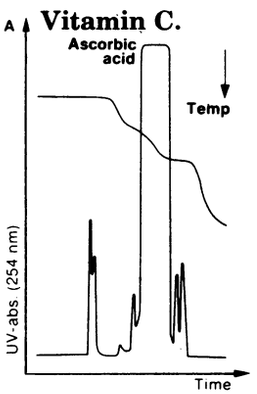


Analysis of γ-globulins related to neurological disease as in e.g. Multiple Sclerosis. The speed of assay and provision of quantitative information makes isotachophoresis superior.

Reference
Delmotte, P., Science Tools 24 (1977) 33–41.

Analyze the sample without pretreatment.



Analysis of vitamin C in 1.6 μl of a commercially-available orange juice; the juice was analysed directly from the container, *without any pretreatment*. Analysis time: 12 minutes! Other acids of interest in the juice can be analysed simultaneously.

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Baldesten, A., Hjalmarsson, S-G and Neumann, G., Fres. Z. Anal. Chem. 290 (1978) 148–149.

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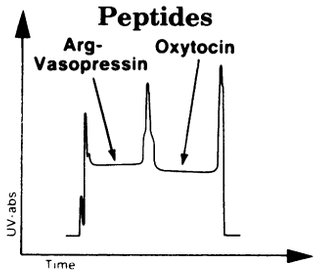

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LKB Isotachophoresis News IN 2 (1977)

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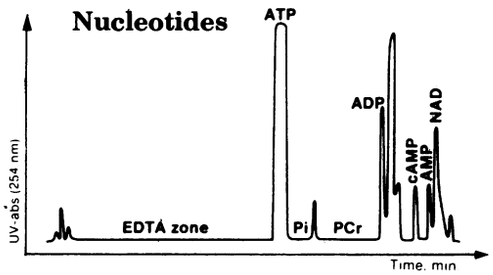

10 μl methanol extract of frog sartorius muscle. All the nucleotides are analysed and estimated in *one single run*. Analysis time: 20 minutes.

Reference
Gower, D.C. and Woledge, R.C., Science Tools 24 (1977) 17–21.

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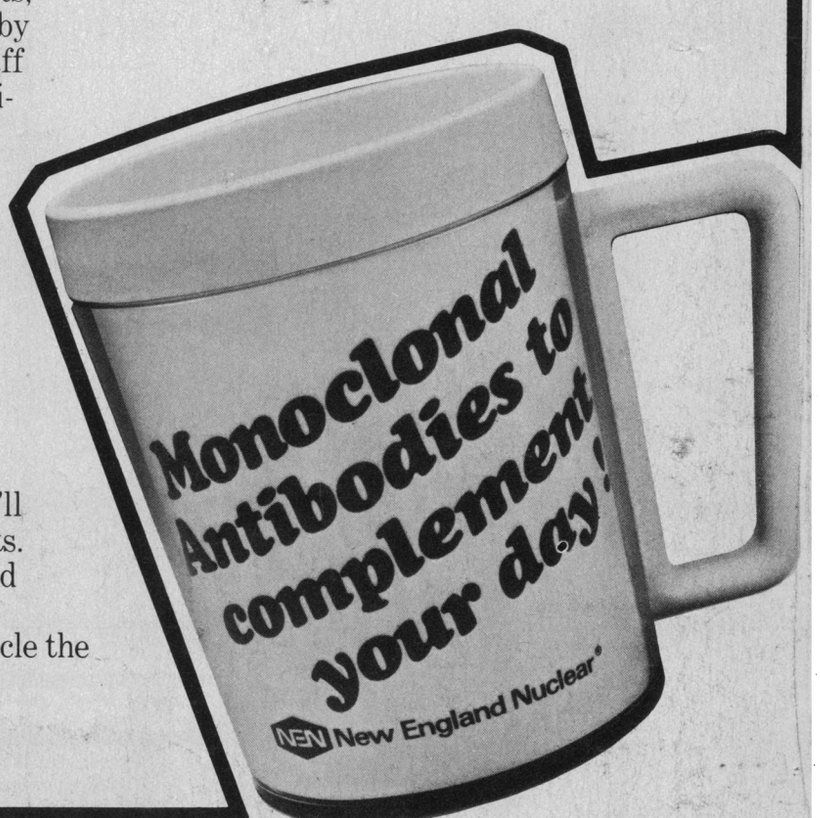

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12 September 1980, Volume 209, Number 4462 **SCIENCE**

Karl Marx Was a City Boy

Although the Soviet invasion of Afghanistan has been widely perceived as a show of strength, it has drawn attention to a major Soviet weakness—a growing dependence on foreign grain. The decision by President Carter to embargo grain imports to the Soviet Union underlined this vulnerability. The harsh reality is that the Soviet Union, once a leading grain exporter, is losing the capacity to feed itself.

Historically, the U.S.S.R. was the breadbasket of Europe. As recently as the late 1930's, net grain exports from the Soviet Union and Eastern Europe averaged 5 million tons a year—exactly the same as those from North America. Since then, the food balance has slowly shifted and the Soviet Union has become a food-deficient country. During the mid-1970's, grain imports by the Soviet Union averaged 9 million tons a year; by the end of the decade, they had climbed to some 20 million tons a year. The Soviets had originally planned to import 34 million tons in 1980—the largest amount in the history of any country.

The Soviet agricultural problem is twofold, with each part compounding the other. They have inherited a relatively poor piece of agricultural real estate, and they have designed an agricultural system that is close to being the worst imaginable. Agriculture in the U.S.S.R. is handicapped by low rainfall and a short growing season. The shortage of well-watered, fertile land is a handicap, but not an insuperable obstacle. It might explain why the Soviet Union is not the leading food exporter, but it is not a sufficient explanation of why it is importing so much grain. Japan, for example, is also poorly endowed with agricultural resources, yet with 3 million hectares of land in grain, it manages to satisfy the needs of its 110 million people for rice, and have some left over for export. The Soviet Union, with 260 million people, has 122 million hectares in grain.

The more serious problem facing the U.S.S.R., and the one it appears least able to cope with, is the inefficiency of its agricultural system. The key link between the efforts of people who work the land and the reward for those efforts is weak. Soviet agricultural collectives and giant state farms do not begin to approach the productivity of the family farm system that dominates Japanese and U.S. agriculture.

A group of young American farmers, who recently returned from living on Soviet collective farms on an exchange program, were amazed to see workers leave their tractors promptly at 5 o'clock, regardless of the circumstances. Planting could be weeks behind schedule or a harvest could be threatened by a coming storm, it made little difference. The mentality was that of factory workers leaving their shifts, not that of farmers. This would never happen in Kansas or Iowa. Farmers in the United States would, if necessary, work around the clock to get their corn or soybeans planted. Everyone—husband, wife, and any children old enough to handle the equipment—would take a turn.

The lack of deep personal ties to the land has also led managers of state and collective farms to exploit the soil in order to meet short-term production quotas and advance their own careers. The widespread loss of topsoil and the associated loss of inherent productivity may help to explain why returns on the heavy investment in agriculture are so disappointing. Thane Gustafson, a Soviet scholar at Harvard, explains that Soviet efforts to expand food production must now reckon with "50 years of neglect that have left a legacy of badly damaged soils."

The combination of a relatively poor agricultural resource endowment and one of the most inefficient agricultural systems yet devised helps explain the failure of Soviet agriculture. It virtually guarantees a gap between food consumption and agricultural output. The factory-style organization of agriculture into state farms and large collectives may sound like a good idea, but it does not work very well. Karl Marx was a city boy, and his origins are evident in the shortcomings of Soviet agriculture.—LESTER R. BROWN, *President, Worldwatch Institute, Washington, D.C. 20036*

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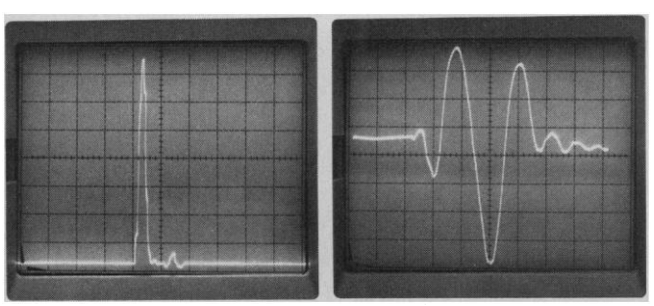

***At left, the 12-ns pulse** and leading edge information were captured with a Biomation Model 6500, sampling at 2-ns intervals. Each scope division represents 20 ns. **Signal at right** was captured by the precision Model 1010. Each division is 20 μs wide.*

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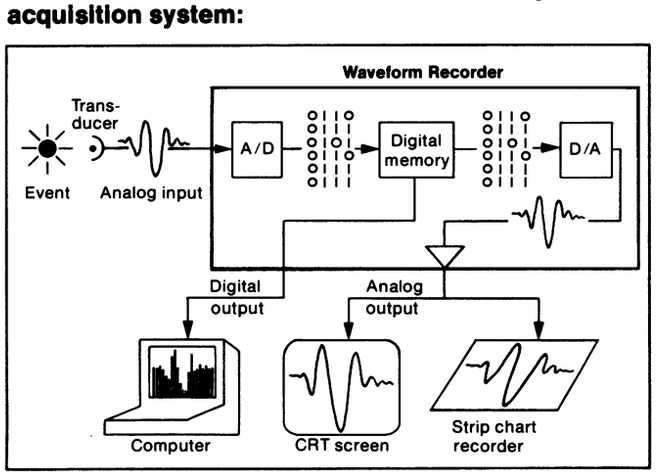

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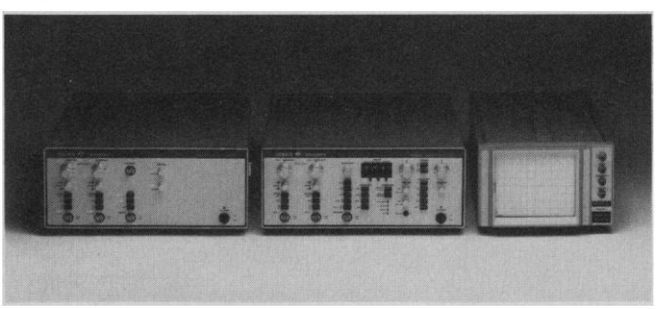
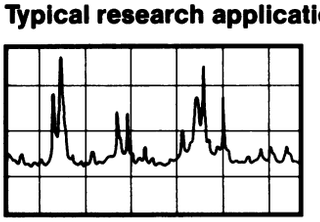
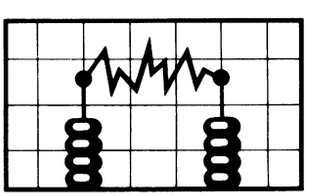


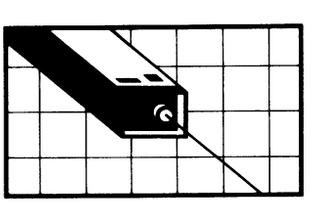
Typical research applications:



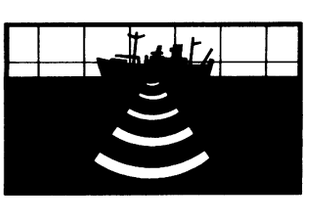
***KINETIC CHEMISTRY**—Mass spectroscopy / Fluorescence / Pulse radiolysis / Flash Photolysis / NMR / Stopped flow / T-jump*



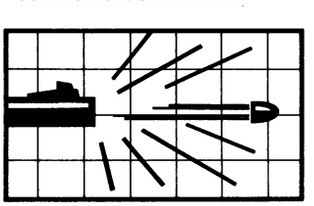
***ELECTRICAL / ELECTRONICS**—HV design & testing / Analog circuit design / Automated test systems / Energy conversion / Telecommunications*



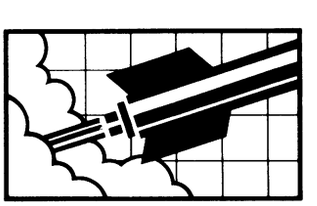
***LASERS**—Pulsed lasers / Laser fusion / Luminescence / Laser-plasma interactions / Laser communications / LIDAR*



***ULTRASONICS**—Sonar / Acoustic emission / Body-scanners / UNDT*



***BALLISTICS**—Weapons research / Explosives testing / Shock tube physics*



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