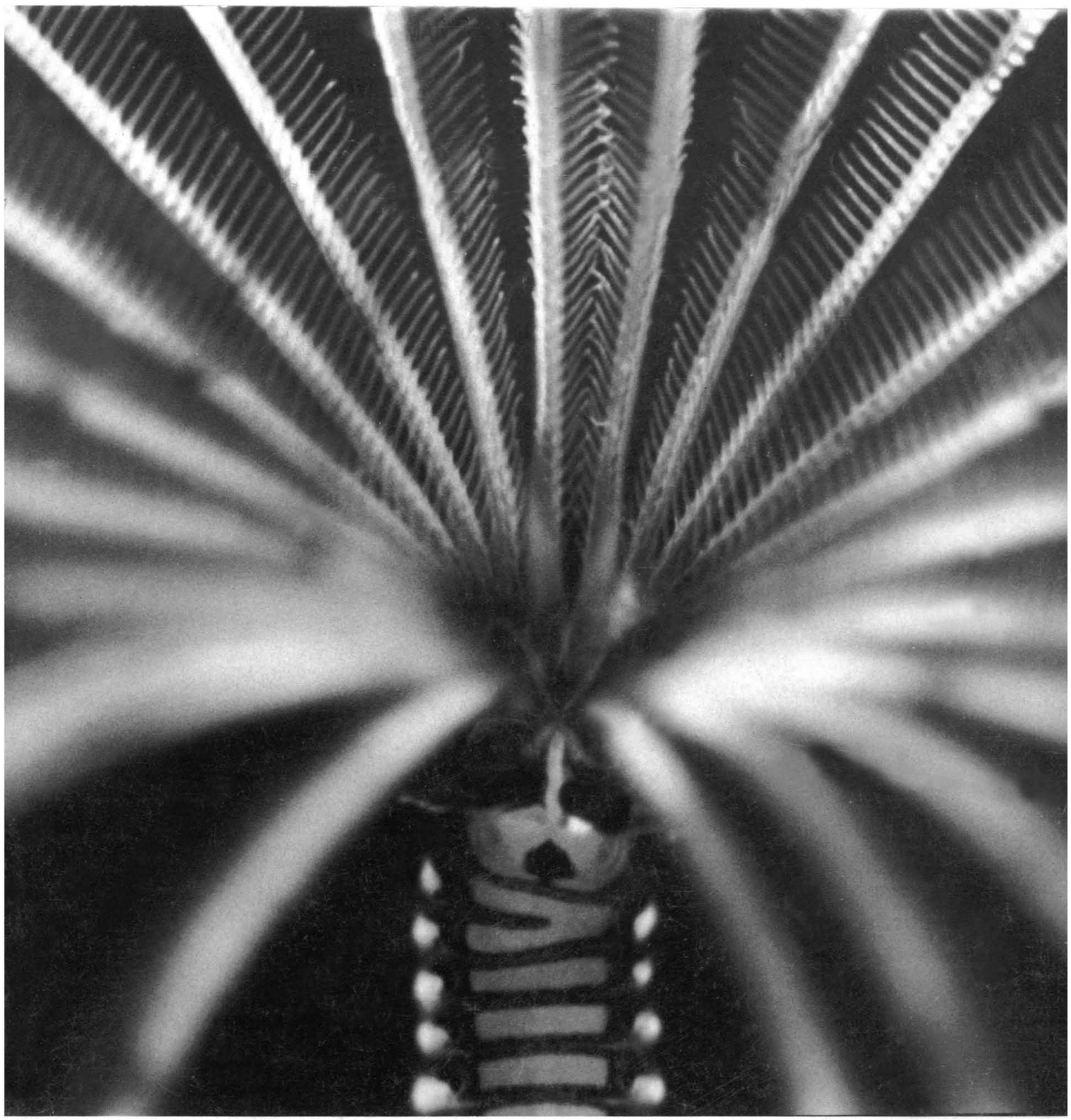
SCIENCE

26 March 1971

Vol. 171, No. 3977

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE



Index Issue

If the Beckman Sequencer is so automatic, why is Dr. Avery here past midnight?

He has *Sequencer Syndrome*—characterized by extreme excitement over what amino acid in his peptide chain will be identified in the next 90 minutes, and the next, and the next.

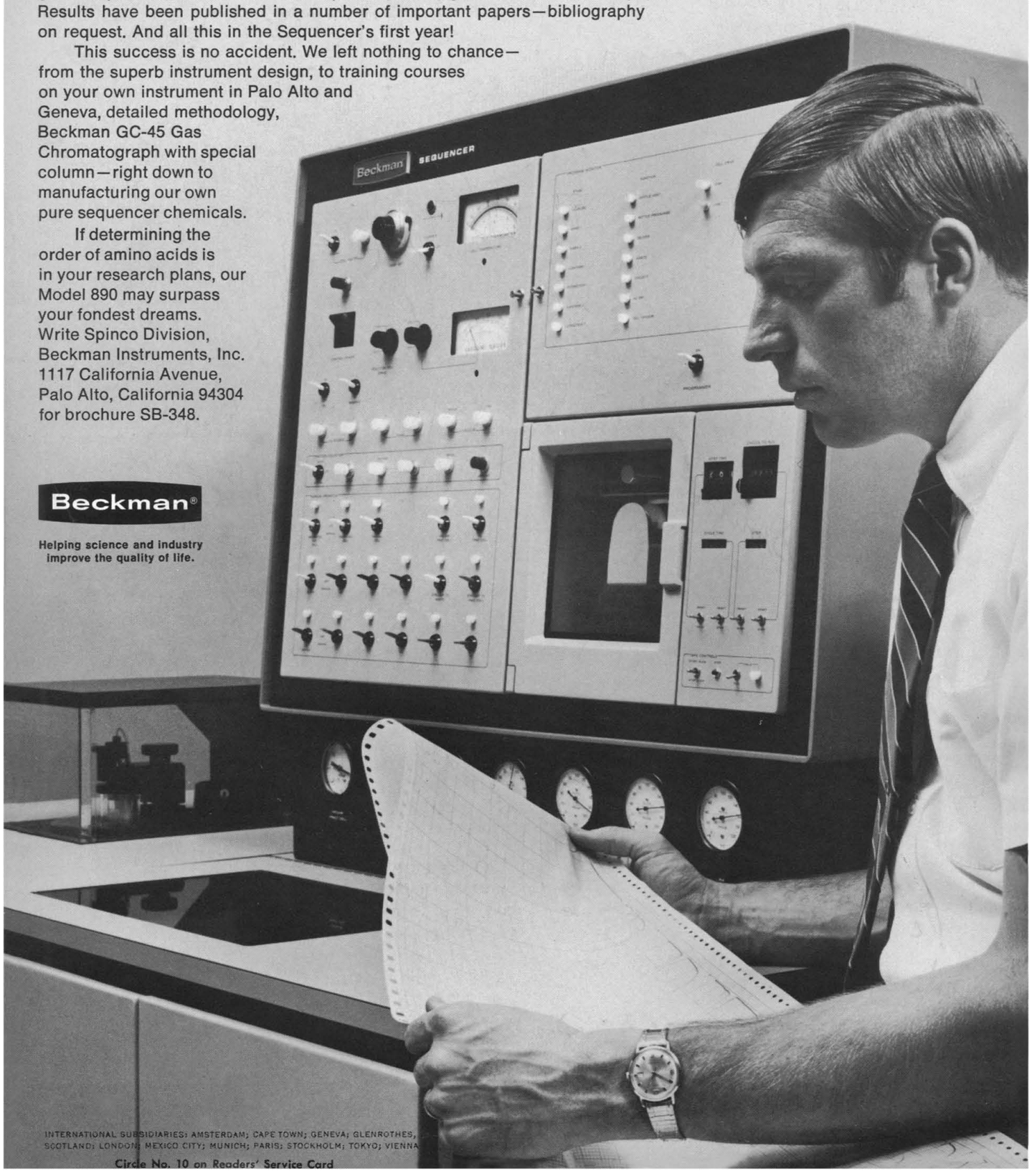
As our dozens of customers can attest, Model 890 Sequencers turn out results from the day we install them. They have been used to sequence a variety of globular proteins, at least one fibrous protein, and fragments as small as a dipeptide. Results have been published in a number of important papers—bibliography on request. And all this in the Sequencer's first year!

This success is no accident. We left nothing to chance—from the superb instrument design, to training courses on your own instrument in Palo Alto and Geneva, detailed methodology, Beckman GC-45 Gas Chromatograph with special column—right down to manufacturing our own pure sequencer chemicals.

If determining the order of amino acids is in your research plans, our Model 890 may surpass your fondest dreams. Write Spinco Division, Beckman Instruments, Inc. 1117 California Avenue, Palo Alto, California 94304 for brochure SB-348.

Beckman®

Helping science and industry improve the quality of life.



INTERNATIONAL SUBSIDIARIES: AMSTERDAM; CAPE TOWN; GENEVA; GLENROTHES, SCOTLAND; LONDON; MEXICO CITY; MUNICH; PARIS; STOCKHOLM; TOKYO; VIENNA

Circle No. 10 on Readers' Service Card

ISCO column monitor and integrator

THE PEAK PERFORMERS

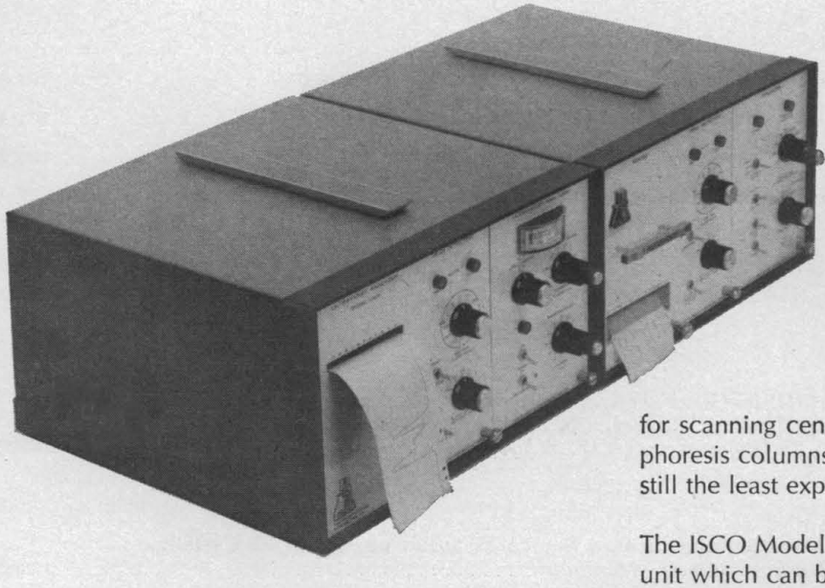
offer you:

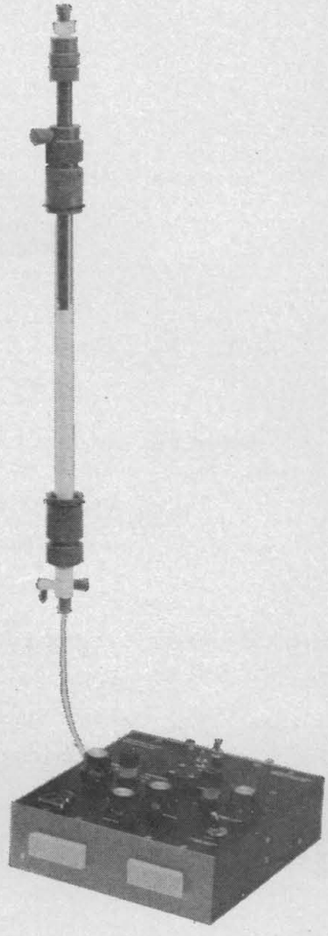
AUTOMATIC INTEGRATION
with printout for each individual peak.

AUTOMATIC FRACTIONATION OF PEAKS
each peak is deposited into a different test tube.

LINEAR ABSORBANCE RECORDING
from .02 to 2.0 full scale, plus %T.

MONITORING OF TWO WAVELENGTHS AT ONCE
Or two columns at once, all on a single pen recorder.





The new ISCO UA-4 UV column densitometer features high sensitivity absorbance recording, built in calibration standards, and flow cells which seldom require solvent degassing. Micro volume flow cells are also available for small columns, as are cuvettes for reading stationary samples. Choose from 5 single or dual beam optical units operating at 254 nm, 280 nm, or other UV to IR wavelengths. The UA-4 is available with either a built in recorder or a meter for use with an external recorder. Accessory instrumentation adapts the UA-4 for scanning centrifuged density gradients and electrophoresis columns. And even with all these features, it is still the least expensive modern flow densitometer.

The ISCO Model 950 electronic integrator is a separate unit which can be used with ISCO UV monitors as well as most other liquid and gas chromatography detectors or other instruments having an analog output. It has automatic baseline compensation, 1 second to 2 hour peak duration capability, and is available with an automatic fraction cutter to physically isolate peaks after integration.

ISCO has the most comprehensive line of flow densitometers, gradient and metering pumps, and fraction collectors for column chromatography. If you don't have our current catalog, write or call us now.

ISCO

INSTRUMENTATION SPECIALTIES COMPANY

4700 SUPERIOR LINCOLN, NEBRASKA 68504 PHONE (402) 434-0231 TELEX 48-6453

See us in booths H 31-32 and I 31-32 at the FASEB in Chicago.

Circle No. 6 on Readers' Service Card

26 March 1971
Vol. 171, No. 3977

SCIENCE

SCIENCE is published weekly, except the last week in December, but with an extra issue on the fourth Tuesday in September, by the American Association for the Advancement of Science, 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Now combined with **The Scientific Monthly®**. Second-class postage paid at Washington, D.C. Annual subscription $12; foreign postage: Americas $3; overseas $5; single copies, $1 (back issues, $2) except **Guide to Scientific Instruments** which is $4. School year subscription: 9 months, $9; 10 months, $10. Rates effective 1 May 1971; Annual subscription $20; foreign postage: Americas $3; overseas $5; air freight to Europe, North Africa, Near East $16. Provide 4 weeks notice for change of address, giving new and old address and zip codes. Send a recent address label. SCIENCE is indexed in the **Reader's Guide to Periodical Literature**.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

COVER

Bi-lobed branchial crown of *Sabella melanostigma*, a polychaete, serves as both a respiratory and feeding organ. During regeneration this structure is completely reformed in every detail including the position of the pinnules and the pigment spots. [Timothy P. Fitzharris, State University of New York at Albany]

NEW **LABELED COMPOUNDS** *from Mallinckrodt*

Mallinckrodt now maintains a broad line of C14 and tritiated compounds immediately available from the shelf. Included are amino acids and related compounds, nucleosides, nucleotides, purines and pyrimidines, lipids and labeled drugs.

This new line of stock items comes from the same source that has the outstanding reputation for custom synthesizing labeled compounds to critical radiochemical and chemical specifications.

All these stock items bear the care and

...that carry the purity mark of custom synthesizers

knowledge of Mallinckrodt's highly trained radiochemists to assure purity at lowest possible cost. Every order is delivered with two or more radiochromatagram scans or other analytical data, and Mallinckrodt's proof of purity guarantee.

Send the coupon and check the wide range of C14 and tritiated shelf items in the new addendum to our Labeled Compounds Catalog. Then order these shelf items from the source that is known for highest purity standards. Send coupon now.

MALLINCKRODT CHEMICAL WORKS
Science Products Div.
P. O. Box 5439
St. Louis, Mo. 63160

☐ Send catalog addendum of new C14 labeled and tritiated compounds.

☐ Send regular catalog of labeled compounds.

Name_____ Title_____

Institution/Company_____

Street_____

City_____ State_____ Zip_____

Circle No. 18 on Readers' Service Card

Mallinckrodt®

MALLINCKRODT CHEMICAL WORKS
SCIENCE PRODUCTS DIVISION
P.O. Box 5439 • St. Louis, Mo. 63160

The indispensable dispensers... Brinkmann liquid handling systems.

We call them 'the indispensables' because once you use them, you'll wonder how you ever managed without them.

For unbelievable ease in micropipetting with virtually 100% sample recovery, try the slim new Eppendorf® push-button Micropipets. They are now available in 13 sizes, from 5 to 1,000 µl, and precision is as fantastic as ever; less than 1% standard deviation at 10 µl. Also note the convenient new rack with two storage compartments for disposable tips.

For the versatility of on-flask *and* off-flask dispensing of liquid volumes from .05 to 15 ml, consider the Brinkmann Dispenser. Unlike most conventional dispensers, this is a precision instrument, with reproducibility of ±.06% at 5 ml.

The Metrohm Multi-Dosimat is an automatic motor-driven buret. Digital readout eliminates meniscus reading error. Snap-in buret assemblies are instantly interchangeable for non-stop titrating. Available in micro (0.2 to 10 ml) and macro (5 to 50 ml) versions, with automatic stirrer and many other accessories.

For administering microliter volumes of liquid at constant rates, nothing matches our Microdoser with 2-speed, battery-powered motor. It utilizes specially designed 50, 100, 250 and 500 lambda microsyringes and is ideally suited to a variety of medical, biological and pharmacological applications, including sample streaking of TLC plates.

Our continuous flow multichannel peristaltic pump lets you circulate, mix, dilute or remove liquids at continuously adjustable flow rates of 0.3 to 7200 ml per hour. Non-pulsating and self-priming, the pump has no valves or seals and can handle up to 18 channels simultaneously.

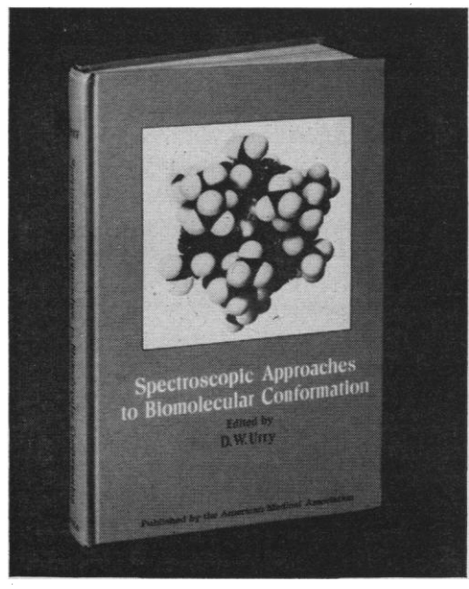
We've got other 'indispensable' dispensers as well. For complete literature on them all, write: Brinkmann Instruments, Cantiague Road, Westbury, N. Y. 11590. In Canada, write: Brinkmann Instruments (Canada) Ltd., 50 Galaxy Boulevard, Rexdale (Toronto), Ontario.

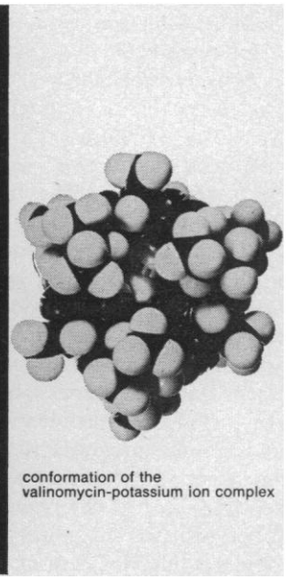
BRINKMANN

An Outstanding Basic Research Volume

SPECTROSCOPIC APPROACHES TO BIOMOLECULAR CONFORMATION

Edited by Dan W. Urry, Ph.D.





conformation of the valinomycin-potassium ion complex

This 300-page book by eminent researchers presents several spectroscopic approaches to the determination of specific atomic and molecular interactions. Arising from such particularized information is the opportunity for specificity in regulation of a biological process. A complete three-dimensional description of a biomolecule at its site of action provides the best opportunity to tailor-make a drug for that site and limit its effect at other sites.

Contributors

M. LASKOWSKI, JR. The Use of Electronic Absorption Spectra In the Study of Environment of Chromophores in Proteins.

G. WEBER Fluorescence Methods in the Study of Protein Conformation

D.W. URRY Optical Rotation and Biomolecular Conformation

W. RHODES Linear Response Theory of the Optical Properties of Biopolymers

S. HANLON Infrared Studies On Biopolymers and Related Models

P.G. DEBRUNNER Mössbauer Spectroscopy of Biomolecules

D.W. URRY and M. OHNISHI Nuclear Magnetic Resonance and the Conformation of Cyclic Polypeptide Antibiotics

Published By The American Medical Association

Order From:
American Medical Association S/3/71
535 N. Dearborn Street
Chicago, Illinois 60610

I enclose $_____ for _____ copy(s) of
SPECTROSCOPIC APPROACHES TO BIOMOLECULAR CONFORMATION
(OP-204, 300 pages, hardbound)

- ☐ $15 U.S., U.S. Poss., Canada, Mexico
- ☐ $ 7.50 each 11 or more copies in these same countries
- ☐ $17 in all other countries
- ☐ $ 7.50 per copy to Medical Students, Hospital Residents, Hospital Interns in these same countries (Special subsidized price)

Name _____

Address _____

City _____ State _____ Zip _____

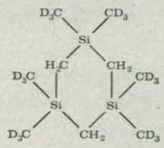
Payment must accompany all orders

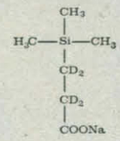
EM ANALYTICAL REPORT

Two New Proton NMR Standards for High Temperatures and Aqueous Solutions • Carrier-Bound Enzymes • Non-Bleeding pH Indicators

Two New Proton NMR Standards for High Temperatures and Aqueous Solutions

The temperature range above 100 °C is important for studies of rotation barriers in molecules with hindered rotation, of transition enthalpies of structural isomers and of NMR emission phenomena after chemically induced dynamic nuclear polarization. Tetramethylsilane (TMS) is used in this temperature range with difficulty because of its low boiling point. Cyclosilane with its boiling point of 208 °C would be ideal had it not two NMR signals, from methyl protons near 0 and from methylene protons at −0.327 ppm. So, we removed the CH_3 signals by replacing them with trideuteromethyl groups. The result is **cyclosilane-d_{18}**. Its solubility in solvents used for high temperature NMR measurements is sufficient to obtain a stable locking signal up to the boiling point of the solvent used. It has one sharp resonance signal with a half width of 0.5 Hz at −0.327 ppm and allows recording of undisturbed spectra downfield of TMS.





To obtain a good NMR standard for aqueous solutions, we started with 3-trimethylsilylpropionic acid and replaced the two methylene groups with deuteromethylene groups. This removed disturbing proton signals. The new standard is water soluble and has a strong resonance signal, like TMS, at 0.00 ppm.

Carrier Bound, Highly Active, Insoluble Enzymes

Our research laboratories have developed a new method to bind enzymes covalently to natural and synthetic carriers. Advantages are: They can be recovered and they do not contaminate sample. They can be used batchwise or in a continuous chromatography-like process. They are stable and highly active. Most are proteases for the controlled degradation of proteins, but other usages can be projected.

Activity of Bovine Trypsin Bound to CM-cellulose

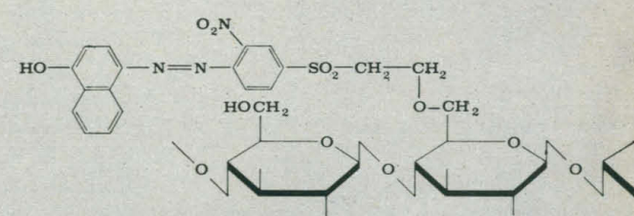
	Insoluble derivative	Free enzyme
BAEE (pH 9.5; 30 °C)	10 U/mg	60 U/mg
BAPA (pH 8.0; 25 °C)	0.1 U/mg	2.0 U/mg
Protein content	35%	100%
Specific activity of bound protein		
BAEE	35 U/mg protein	60 U/mg
BAPA	0.3 U/mg protein	2.0 U/mg

Other available enzymes are insoluble bromelin, α-chymotrypsin, ficin, papain, pronase, proteinase k, ribonuclease, subtilisin, trypsin (porcine), and trypsin inhibitor.

Non-Bleeding pH Indicators

The big disadvantage of pH papers has been the **bleeding** of the dye components especially in alkaline and non-buffered solutions. Bleeding of dye components from mixed indicators gives color gradients, making color comparison unreliable.

EM offers indicator sticks with the dye bound covalently to the carrier. Color change is indicated but it cannot be washed out.



As shown in the above formula, the indicator dyes are attached to cellulose molecules via a sulfonylethyl ether group. From the dyed cellulose, paper is made which is attached to a plastic strip support. These pH ranges are available 0-14, 0-6, 5-10, 7.5-14, 0-2.5, 2.5-4.5, 4.0-7.0, 6.5-10.0, 11.0-13.0.

EM Laboratories, Inc.

affiliate of **E. Merck, Darmstadt, Germany**

500 Executive Boulevard, Elmsford, New York 10523
Phone 914/592-4660

EM Laboratories Inc.
500 Executive Boulevard
Elmsford, New York 10523

Please send me information about:

NMR Standards ☐
Samples of non-bleeding pH indicator sticks ☐
Carrier-bound enzymes ☐

Name.....

Company.....

Address.....

City.....State.....Zip.....

EM solves the problems of tomorrow

The new and only $499 digital pH meter.

Meet the CORNING™ Digital 109 general-purpose pH Meter. Just $499, complete with electrodes.

That's about $100 less than you'd have to pay for the closest comparable meter. Yet the Digital 109 cuts no corners on performance.

You get 0.01 pH resolution, from 0 to 14 pH. You get 1.0 mv resolution, and from −1900 to +1900 mv.

Readout is sharp and bright in Nixie* tube numbers. No parallax problems, as with analog meters. And no burned out number segments, as with segmented-number digital meters.

Inside the handsome, rugged case that adjusts to any viewing angle, we have built the latest in electronic reliability with field-effect transistors.

Also new: our Digital 110 expanded scale meter that lets you simply push a button to expand the readout to 0.001 pH over the entire 0—14 pH range. Or push the same button and get .1 mv resolution from −1900 to +1900 mv, so you can do any existing selective-ion determinations more easily. And the Digital 110 is just $795, with electrodes.

Our 109 and 110 join the CORNING Digital 112 research instrument and the Digital 101 Electrometer to offer you the widest choice in digital pH instrumentation.

For in-your-lab demonstrations or for literature, send the coupon, please.

Digital 110 Expanded Scale

Digital 112 Research

Corning Glass Works, Scientific Instruments, Dept. SC-3, Medfield, Mass. 02052

☐ Please contact me to demonstrate the Digital model number_____

☐ Please send me specifications on the Digital model number_____

Name

Title

Organization

Address

City

State Zip

Telephone and ext.

CORNING
SCIENTIFIC INSTRUMENTS

*Burroughs Co. trademark

26 March 1971, Volume 171, Number 3977 **SCIENCE**

The R & D Processing of Domestic Programs

An encouraging development on the domestic front is the increasing, albeit still limited, recognition that ideas for new domestic programs must undergo a full "research *and* development" processing before they are mass-produced. Such an R & D processing is a fairly standard practice in the engineering of weapons and spacecrafts. However, until recently, the jump from a vague notion of a new domestic social program to a multibillion dollar system or to congressional legislation requiring nationwide implementation has been all too common. In the past, frequently, the assumptions on which the success of a project would depend were not spelled out, nor was the idea subjected to trial runs in real-life situations. Probably the most notorious jump was the last-minute writing into the 1964 antipoverty legislation of a phrase requiring "maximum feasible participation of the poor" in more than a thousand communities, without anyone's having a clear conception what such participation entails, how it is to be effected, and what the consequences are likely to be.* Less known, but much costlier, was the commitment to spend $1.05 billion a year on Title I of the Equal Opportunity Educational Act, which provided compensatory education for disadvantaged children, before a major study of the effects of the plan was carried out. When the study was available 3 years later, it showed that there were no measurable beneficial effects.†

In contrast, two new ideas, in the same areas of combating poverty and improving education, are being carefully processed; these are the negative income tax and the school voucher plan. First, they were worked out theoretically; negative income tax was studied primarily in mathematical and statistical terms, while the school voucher plan was carefully spelled out in chiefly qualitative terms. Next, small-scale experiments are being conducted, which have already led to numerous specifications and revisions of the systems, and then these revised versions are next tried in still larger systems. Once the results of these trials have been evaluated, a much sounder foundation on which to base national policy will be available.

One case in point is the school voucher plan, designed in detail by Christopher S. Jencks at the Center for the Study of Public Policy in Cambridge, Massachusetts. The plan provides parents with vouchers to "buy" whatever kind of education they wish for their children from various educational sources. Now, small-scale feasibility studies are being conducted in Seattle, Washington, Gary, Indiana, and Alum Rock, California. If successful, the experiment will be conducted in three or more school districts.

The negative income tax plan was first studied in great detail by economists, chiefly at the University of Wisconsin, and by a Presidential Commission; subsequently, it was tested with 400 families in New Jersey. Next it was planned that a whole state (Vermont) take part in this experiment.

Cynics may say that the motivation for going slow—conducting first studies and *experimenting* next—is not due to a quest for sounder policy but is a result of lack of funds for large-scale programs and the desire to seem innovative and active without taking substantial action. They further point out that, at least in the case of the New Jersey experiment, legislation was promoted before the data were available. Indeed, we may have turned to the correct procedure for inappropriate reasons, and the acceptance of the R & D processing on the domestic front surely is less than complete. Still the two experiments do constitute a step in the right direction, and the success of policies carefully checked out and de-bugged may taste so good that it may yet become a widely followed practice.—AMITAI ETZIONI, *Chairman, Department of Sociology, Columbia University,* and *Director, Center for Policy Research.*

* Daniel P. Moynihan, *Maximum Feasibility Misunderstanding* (Free Press, New York, 1969), pp. 87–88. † James S. Coleman *et al., Equality of Educational Opportunity* (U.S. Government Printing Office, Washington, D.C., 1966).

Great News in Microscopes!

BAUSCH & LOMB INTRODUCES NEW LINES WITH FEATURES FOR THE 70'S, BUT PRICED AT THE LEVEL OF THE 60'S!

Now you can have the microscopes you really prefer but thought you couldn't afford . . . Bausch & Lomb instruments meeting requirements of modern learning methods and general laboratory use, priced to permit quantity purchases out of curtailed science budgets. We've been completely successful in cancelling out inflation effects while designing innovated microscopes with features modern laboratory techniques and curriculums demand.

Here's a "for instance":—

For only $22 more than the 1962 price of a Bausch & Lomb Dynoptic® Laboratory Microscope you can have today's Academic Model B57-02W which has all the features available on the 1962 Dynoptic . . . *PLUS:*

- Flat field optical system
- Wide field eyepieces
- Low position coaxial coarse and fine adjustments
- Harmonic drive with continuous fine adjustment
- Choice of built-in-base illuminators
- Interpupillary distance adjustment with constant tube length
- Choice of plain, glide or ball-bearing mechanical stage with low position coaxial controls
- Choice of reversible binocular or monocular head. Monocular takes a teacher's observation eyepiece.
- Focusable rack and pinion substage with removable 1.30 N.A. Abbe condenser with iris diaphragm in 360° full ring mount

We'll tell you more if you will just give us the opportunity. Write for our new catalog 31-2366.

More Great News! There's a new Academic 256 line with the famous DynaZoom® stand, at prices that help meet today's tight budgets. Just write for our new catalog 31-2283.

BAUSCH & LOMB

SCIENTIFIC INSTRUMENT DIVISION

77439 Bausch Street, Rochester, N.Y. 14602

Circle No. 9 on Readers' Service Card

This page contains everything you need to do life sciences GC extraordinarily well.

Our Model 2100 is the best "U" column gas chromatograph ever made. It was designed specifically for life science and bio-medical applications. By people who know what they—and you—are doing.

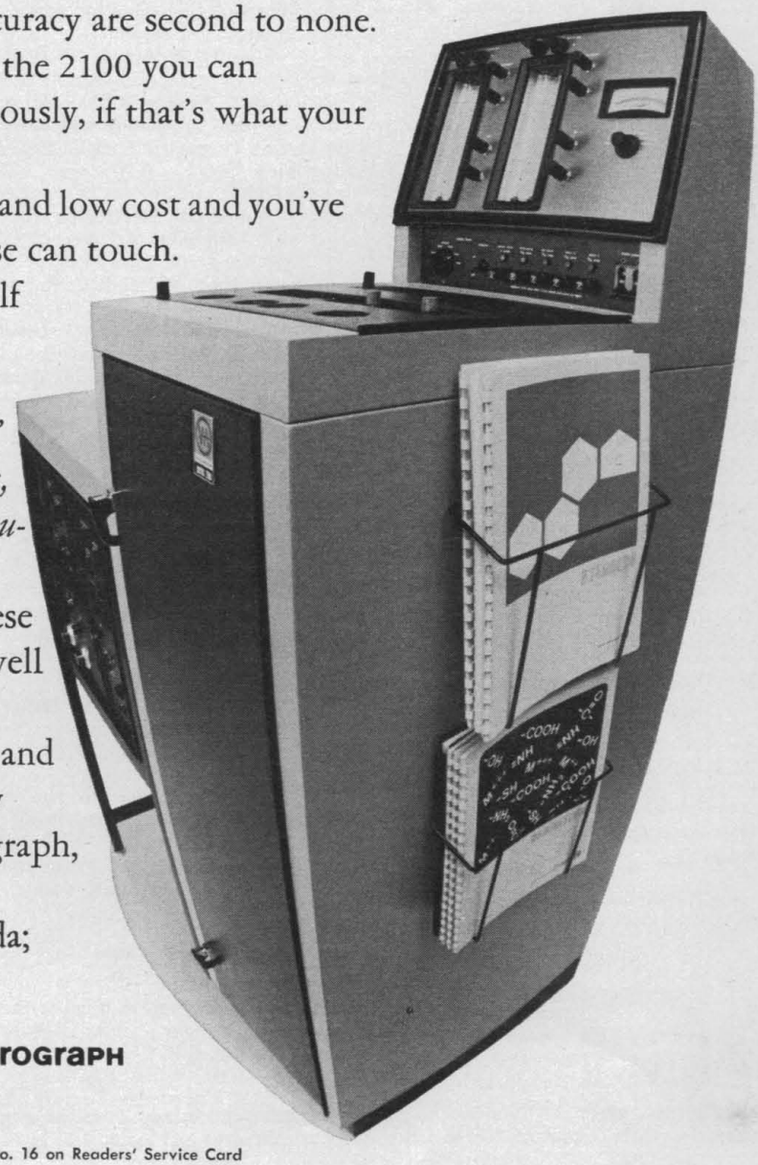
The 2100 is an all-glass system with on-column injection so that you can analyze even the most labile compounds with complete confidence. You get virtually no dead volume and precision and accuracy are second to none.

Then there's versatility. With the 2100 you can operate up to four columns simultaneously, if that's what your workload calls for.

Add fast, personalized service and low cost and you've got a life sciences GC that nobody else can touch.

But our instrument is only half the story. The other half is a series of unique life sciences GC methodology books. Each a procedural "cook book" in itself. Our titles include: *Fatty Acids, Steroids, Lipids, Carbohydrates, Pharmaceuticals & Drugs* and *Alcoholic Beverages.*

You can have any or all of these fine books with our compliments as well as a detailed product bulletin on the Model 2100. Simply write your name and the books you want on your company letterhead and mail it to Varian Aerograph, Walnut Creek, California 94598; Tokyo, Japan; Malton, Ontario, Canada; Crows Nest, N.S.W., Australia; or Zug, Switzerland.



varian aerograph

Circle No. 16 on Readers' Service Card

BOOKS RECEIVED

(Continued from page 1234)

Epicenter. Basil Jackson. Norton, New York, 1971. 234 pp. $6.95.

Festkörperprobleme X. Advances in Solid State Physics. Lectures of the German Physical Society, Freudenstadt, April 1970. Vieweg, Braunschweig, Germany; Pergamon, New York, 1971. viii, 346 pp., illus. $23.

Functions of the Nervous System. Vol. 2, Motor and Psychomotor Functions. Marcel Monnier. Elsevier, New York, 1971. xx, 658 pp., illus. $54.50.

Hot Electron Microwave Generators. John E. Carroll. Elsevier, New York, 1970. xvi, 306 pp., illus. $20.25.

Human Energy. Pierre Teilhard de Chardin. Translated from the French edition (Paris, 1962) by J. M. Cohen. Harcourt Brace Jovanovich, New York, 1971. 192 pp. $5.95. A Helen and Kurt Wolff Book.

Human Infants. Experience and Psychological Development. Burton L. White. Prentice-Hall, Englewood Cliffs, N.J., 1971. xvi, 160 pp., illus. $4.95. Current Research in Developmental Psychology Series.

Humus. Biogénèse, Biochimie, Biologie. A. R. Prévot. Éditions de la Tourelle, St. Mandé, France, 1970. 342 pp.

Image Formation and Cognition. Mardi Jon Horowitz. Appleton-Century-Crofts, New York, 1970. xvi, 352 pp., illus. $12.50.

Industrial Electronics for Technicians and Technician Engineers. N. M. Morris. McGraw-Hill, New York, 1970. xii, 376 pp., illus. $12.50. Technical Education Series.

Industrial Research Laboratories of the United States. Jaques Cattell Press, Ed. Gerald A. Rosselot and Marsh W. White, Editorial Consultants. Jaques Cattell Press, Tempe, Ariz.; Bowker, New York, ed. 13, 1970. x, 660 pp. $39.50.

Industry and Tropical Health, 7. Proceedings of a conference, Boston, October 1969. Published for the Industrial Council for Tropical Health by the Harvard School of Public Health, Boston, 1970. 196 pp., illus. $10.

An Introduction to Electronics. Dennis F. Shaw. Longman, London, ed. 2, 1970 (U.S. distributor, Elsevier, New York). x, 398 pp., illus. $9.

An Introduction to Industrial Mathematics. M. Rothman. Van Nostrand Reinhold, New York, 1970. 370 pp., illus. $18.50.

An Introduction to Insect Physiology. E. Bursell. Academic Press, New York, 1970. xvi, 276 pp., illus. $10.

Introduction to Respiratory Therapy. Workbook and Study Guide. Steve Grenard, Gustav J. Beck, and George W. Rich. Glenn Educational Medical Services, Monsey, N.Y., 1970. xii, 180 pp., illus. Paper, $6.95.

Introduction to Social Research. Sanford Labovitz and Robert Hagedorn. McGraw-Hill, New York, 1971. xii, 116 pp., illus. Paper, $2.95.

The Knowledge Factory. Student Power and Academic Politics in America. Irving Louis Horowitz and William H.

Friedland. Aldine, Chicago, 1971. xii, 354 pp. $9.75. Observations.

Man and the Environment. Wes Jackson. Brown, Dubuque, Iowa, 1971. xxiv, 322 pp. Paper, $3.95.

Manual of Surface Drainage Engineering. Vol. 1. B. Z. Kinori. Elsevier, New York, 1970. xii, 224 pp., illus. $23.25.

Marine Careers. Selected Papers. Bernard L. Gordon, Ed. Department of Earth Sciences, Northeastern University, Boston, 1970. iv, 42 pp. Paper, $1.

Methoden der enzymatischen Analyse. Hans Ulrich Bergmeyer, Ed. Verlag Chemie, Weinheim, Germany, ed. 2, 1970. Vol. 1, xxxvi, 1086 pp., illus. + index; vol. 2, xxxvi + pp. 1087–2220, illus. + index. DM 285.

Micromorphological Features of Soil Geography. Walter L. Kubiëna. Rutgers University Press, New Brunswick, N.J., 1971. xxiv, 256 pp. + plates. $30.

Modern Elementary Geometry. James M. Moser. Prentice-Hall, Englewood Cliffs, N.J., 1971. xiv, 334 pp., illus. $8.95.

Molders of Modern Thought. Ben B. Seligman, Ed. Quadrangle, Chicago, 1970. x, 368 pp. Cloth, $8.95; paper, $2.95. *New York Times* Book.

Moral Education. Five Lectures. James M. Gustafson, Richard S. Peters, Lawrence Kohlberg, Bruno Bettelheim, and Kenneth Keniston. Harvard University Press, Cambridge, Mass., 1970. vi, 136 pp. $4.95.

My University, My God. Daniel Hershey. Vantage Press, New York, 1970. 80 pp. $3.50.

The Mystery of Heredity. John J. Fried. Day, New York, 1971. x, 180 pp., illus. $6.95. The Frontiers of Science Series.

The Nature of Geology. Contemporary Readings. Brainerd Mears, Jr. Van Nostrand Reinhold, New York, 1970. xii, 248 pp., illus. Paper, $3.50.

1971 Homosexual National Classified Directory. Michael K. DuReve, Ed. Tangents, Hollywood, Calif., 1970. 25 pp. Paper, $1.

1971 Yearbook of Astronomy. Patrick Moore, Ed. Norton, New York, 1971. 194 pp., illus. $4.95.

Nonlinear Programming. Proceedings of a symposium, Madison, Wis., May 1970. J. B. Rosen, O. L. Mangasarian, and K. Ritter, Eds. Academic Press, New York, 1970. xii, 490 pp., illus. $10.50. Mathematics Research Center, University of Wisconsin, Publication No. 25.

Nuclear Reactor Theory. George I. Bell and Samuel Glasstone. Van Nostrand Reinhold, New York, 1970. xviii, 620 pp., illus. $24.50.

Nursing and Anthropology. Two Worlds to Blend. Madeleine Leininger. Wiley, New York, 1970. xviii, 182 pp. $7.50.

The Occupations of Migrants in Ghana. Polly Hill. University of Michigan, Ann Arbor, 1970. vi, 76 pp., illus. Paper, $2. Anthropological Papers, No. 42.

On the Management of Computer Programming. George F. Weinwurm, Ed. Auerbach, Princeton, N.J., 1970. xviii, 266 pp., illus. $12.50.

Pathways to Data. Field Methods for Studying Ongoing Social Organizations. Robert W. Habenstein, Ed. Aldine, Chi-

cago, 1970. xii, 276 pp. $7.95. Observations.

pH Meters. A. Wilson. Kogan Page, London; Barnes and Noble, New York, 1970. 120 pp., illus. $6.50. Laboratory Instruments and Techniques Series.

Pituitary, Adrenal and the Brain. D. de Wied and J. A. W. M. Weijnen, Eds. Elsevier, New York, 1970. xvi, 358 pp., illus. $24.

Plane Geometry. An Approach through Isometries. Dick Wick Hall and Steven Szabo. Prentice-Hall, Englewood Cliffs, N.J., 1971. x, 210 pp., illus. $8.95.

Politics of Southern Equality. Law and Social Change in a Mississippi County. Frederick M. Wirt. Aldine, Chicago, 1971. xiv, 336 pp., illus. $10.

A Primer on Social Dynamics. History as Dialectics and Development. Kenneth E. Boulding. Free Press, New York; Collier-Macmillan, London, 1970. x, 154 pp., illus. Cloth, $5.95; paper, $2.45.

Probleme der Neurokybernetik und Neurobionik. S. N. Brajnes and V. B. Svecinskij. Fischer, Jena, Germany, 1970. 186 pp., illus. Paper, 28.50 M.

Progress in Quantum Electronics. Vol. 1, part 4, The Semiclassical Theory of the Gas Laser. S. Stenholm. Pergamon, New York, 1971. iv + pp. 187–272, illus. Paper, $4.

Progress in Separation and Purification. Vol. 3. Edmond S. Perry and Carel J. van Oss, Eds. Wiley-Interscience, New York, 1970. xii, 316 pp., illus. $19.95.

The Protistan Kingdom. Protists and Viruses. Robert K. Jennings and Robert F. Acker. Van Nostrand Reinhold, New York, 1970. viii, 120 pp., illus. Paper, $3.50. Selected Topics in Modern Biology.

Proxemic Behavior. A Cross-Cultural Study. O. Michael Watson. Mouton, The Hague, 1970. 130 pp., illus. 24 G. Approaches to Semiotics, vol. 8.

Quantum Mechanics. John G. Taylor. Elsevier, New York, 1970. 208 pp., illus. $7.75. Unwin Studies in Physics and Applied Mathematics, No. 2.

Radiation Sources for Industry and Research. Radiochemical Centre, Amersham, England, 1970. 64 pp., illus. Paper.

Radioactivity Standards. Radiochemical Centre, Amersham, England, 1970. 32 pp., illus. Paper.

Radiochemicals. Radiochemical Centre, Amersham, England, 1970. 96 pp., illus. Paper.

Radiopharmaceuticals and Clinical Radiation Sources. Radiochemical Centre, Amersham, England, 1970. 104 pp., illus. Paper.

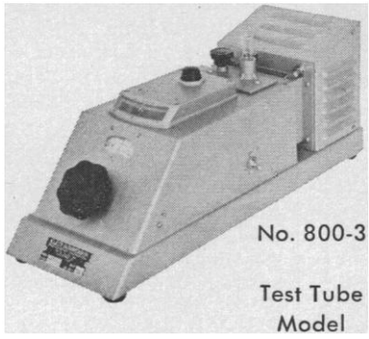
Random and Restricted Walks. Theory and Applications. Michael N. Barber and B. W. Ninham. Gordon and Breach, New York, 1970. xiv, 176 pp. $14.95. Mathematics and Its Applications, vol. 10.

Regional Advisory Committee on Computers in Health. A meeting, Buenos Aires, Argentina, April 1970. Pan American Health Organization, Washington, D.C., 1970. vi, 28 pp., illus. Paper, 75¢.

Renin-Angiotensin Mechanisms. A Review of Research Grants Supported by the National Heart and Lung Institute, 1949 to 1970. May Sherman. National Institutes of Health, Bethesda, Md., 1970. vi, 140 pp. Paper.

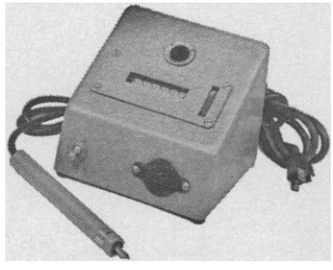
Research in Progress, 1970. Pan Amer-

Klett Summerson Photoelectric Colorimeter



KLETT COLONY MARKER and TALLY

This instrument takes the drudgery and error out of the counting of bacterial colonies.



Klett MANUFACTURING CO., INC.,
179 East 87th Street, New York, 28, N.Y.

Circle No. 102 on Readers' Service Card

PRECISION PS SCIENTIFIC — SUBSIDIARY OF GCA CORPORATION

Thelco® Glassware Dryer

High speed! High capacity!

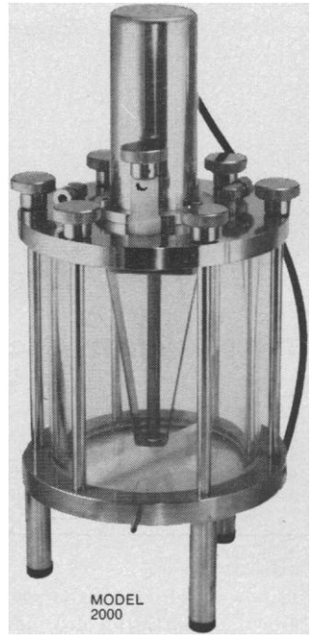
Featuring—
- Filtered air supply.
- Mechanical Convection.
- 5- to 15-minute drying time.
- Timer-controlled drying cycle.
- Capacity up to two 18" x 18" racks:
- Thermal overload protection.
- Continuous flow exhaust to exterior.

Ask your Precision Scientific Dealer for complete performance data, or write us. Precision Scientific Co., 3737 W. Cortland St., Chicago, Ill. 60647.

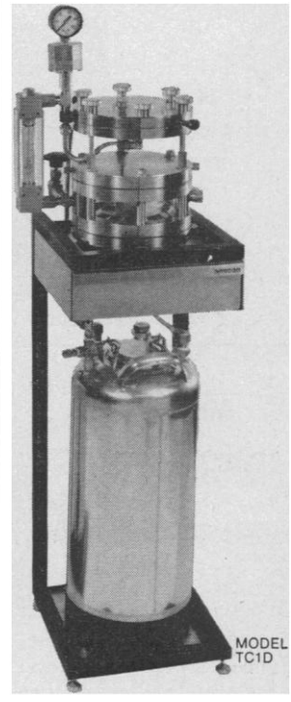
Circle No. 101 on Readers' Service Card

Which of these amicon Ultrafiltration Systems would you choose for

CONCENTRATION?



DILUTE PROTEINS can be routinely processed in very short time with Stirred UF Cells. Get up to several-hundred-fold concentration. Use one of five basic cells for samples from a few ml to liters.



HIGHLY CONCENTRATED FLUIDS (even at 50% solids) are processed rapidly in Thin-channel UF Systems. At least double the rate of agitated cells. Clarify sera, extracts, culture media. Dewater latices. Fractionate mixtures.

These and other versatile Amicon systems employ DIAFLO membranes (Retention range: 500 to 300,000 MW), or microporous filters. Capability from milliliters to thousands of gallons. The Amicon CATALOG AND APPLICATIONS GUIDE or an Application Engineer can help you make the Best Choice.

amicon

21 Hartwell Ave., Lexington, Mass. 02173 • (617) 862-7050

Circle No. 61 on Readers' Service Card

ican Health Organization, Washington, D.C., 1970. xii, 306 pp. Paper.

The Single Reality. Preston Harold and Winifred Babcock. Harold Institute, Winston-Salem, N.C., 1971 (distributed by Dodd, Mead, New York). vi, 386 pp. $7.95.

Society in India. David G. Mandelbaum. University of California Press, Berkeley, 1970. Vol. 1, Continuity and Change, xiv, 324 pp. + a bibliography and an index; vol. 2, Change and Continuity, xii + pp. 325–666 + a bibliography and an index. Paper, $3.25 per volume.

Soviet Image of Contemporary Latin America. A Documentary History, 1960–1968. Robert G. Carlton, Ed. Compiled and translated from the Russian by J. Gregory Oswald. Published for the Conference on Latin American History by the University of Texas Press, Austin, 1971. xvi, 366 pp., illus. $15.

The Space-Age Photographic Atlas. Compiled by Ken Fitzgerald. Crown, New York, 1970. x, 246 pp., illus. $7.95.

The Stability of Flat Plates. P. S. Bulson. Elsevier, New York, 1970. x, 470 pp., illus. $20.50.

Steam at Sea. A History of Steam Navigation. K. T. Rowland. Praeger, New York, 1970. 240 pp., illus. $8.

Student-Structured Learning in Science. A Program for the Elementary School Teacher. Charles C. Matthews, Darrell G. Phillips, and Ronald G. Good. Brown, Dubuque, Iowa, 1970. Unpaged, illus. Spiral bound, $4.95.

Study Guide for Eastman, General Chemistry. Experiment and Theory. Donald W. Gallup. Holt, Rinehart and Winston, New York, 1970. viii, 206 pp., illus. Paper, $4.50.

Survey of Organic Syntheses. Calvin A. Buehler and Donald E. Pearson, Wiley-Interscience, New York, 1970. xii, 1166 pp., illus. $27.50.

Surveying for Young Engineers. S. Wright Perrott. Revised by A. L. Allan. Chapman and Hall, London, ed. 3, 1970 (U.S. distributor, Barnes and Noble, New York). viii, 188 pp., illus. Paper, $4.

250 Problems in Elementary Number Theory. W. Sierpiński. Polish Scientific Publishers, Warsaw; Elsevier, New York, 1970. viii, 126 pp. $9.50. Modern Analytic and Computational Methods in Science and Mathematics, No. 26.

Understanding Evolution. E. Peter Volpe. Brown, Dubuque, Iowa, ed. 2, 1970. xiv, 176 pp., illus. Paper, $2.75. Concepts of Biology Series.

The Uses of Cyclotrons in Chemistry, Metallurgy and Biology. Proceedings of a conference, Oxford, September 1969. C. B. Amphlett, Ed. Davey, Hartford, Conn., 1970. x, 400 pp., illus. $30.

Vistas in Astronomy. Vol. 12, The Henry Norris Russell Memorial Volume. Arthur Beer, Ed. Pergamon, New York, 1970. x, 426 pp., illus. $27.

Water Pollution in the Greater New York Area. Alan A. Johnson, Ed. Gordon and Breach, New York, 1970. xxii, 212 pp., illus. $12.50.

World Catalogue of Theses on the Pacific Islands. Compiled by Diane Dickson and Carol Dossor. University of Hawaii Press, Honolulu, 1970. xii, 126 pp. $4.25. Pacific Monograph Series, No. 1.