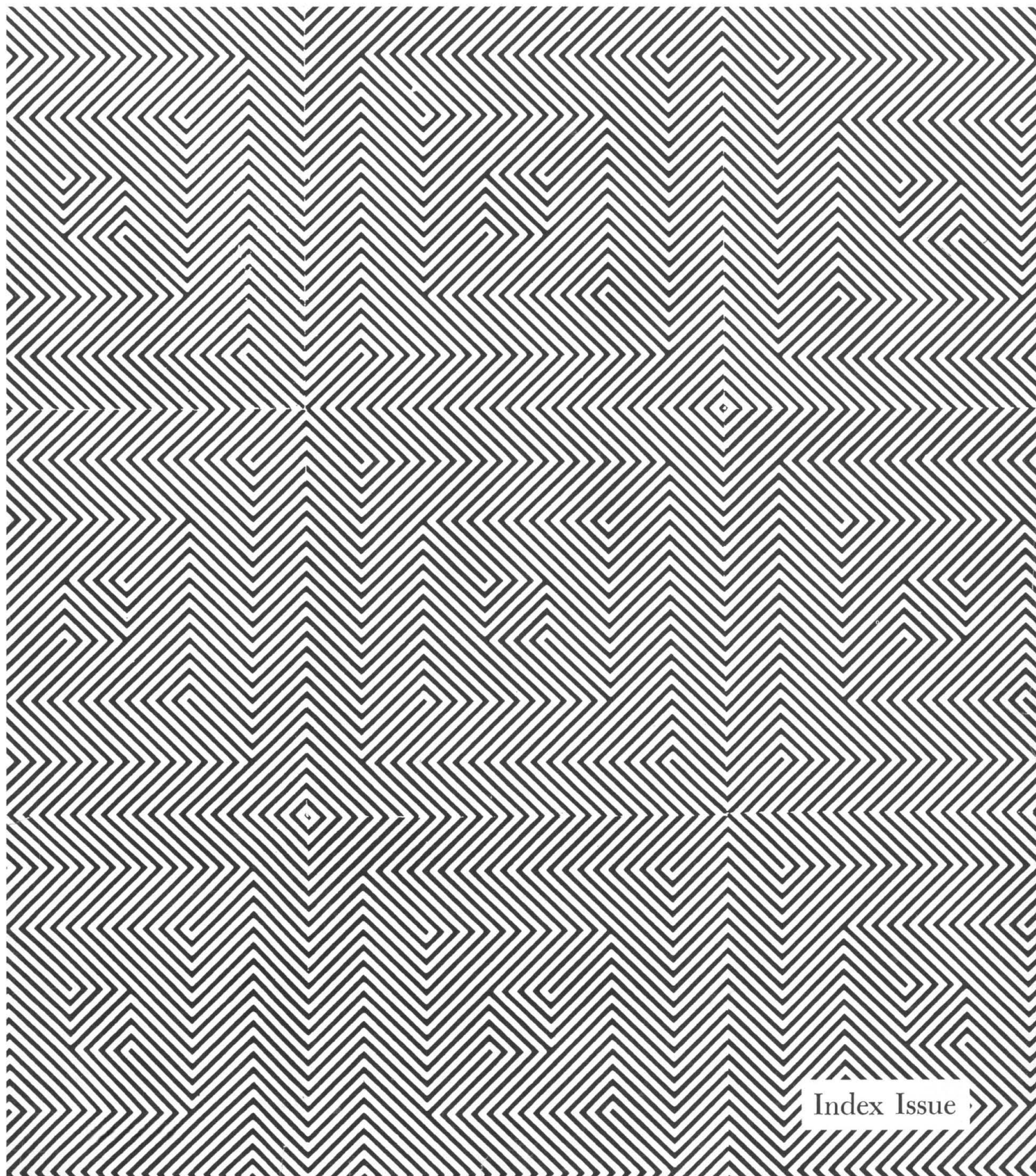


SCIENCE

27 December 1968

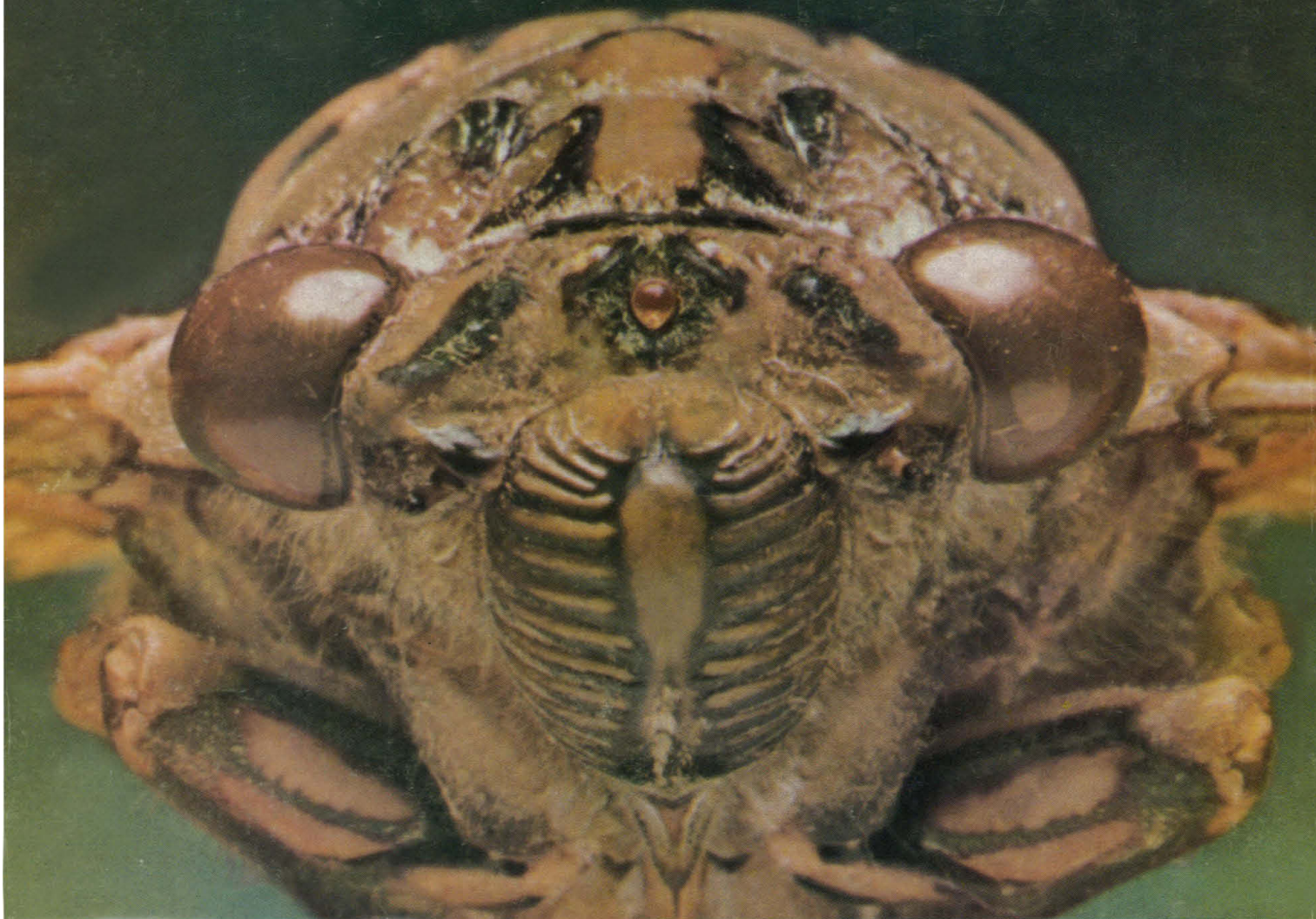
Vol. 162, No. 3861

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

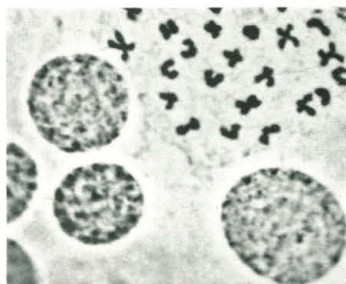


Index Issue

Take almost any kind of subject and the Polaroid MP-3 camera will take almost any kind of picture of it in seconds.



Polacolor picture of a giant Cicada.



Photomicrograph of chromosomes: original magnification 1,000X.

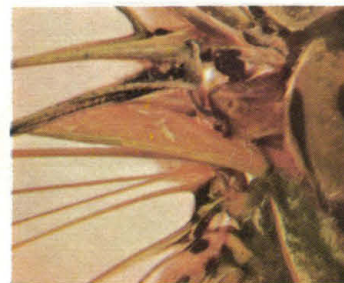
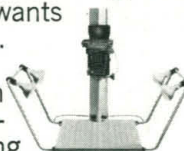
Whatever the subject: gross specimen, production sample, wall chart, biological specimen, original artwork, metallurgical sample, stress analysis record, immunoelectrophoresis or anything else you can think of...

Whatever the picture: black-and-white or color photograph, infrared, positive print with a negative, continuous tone or line transparency...

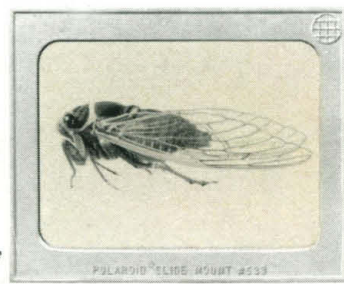
Whatever the problem: photomicrograph, macrophotograph, X-ray copy, photo copy, small object photography, screened or line print...

You're ready for it with the Polaroid MP-3 Land camera, our eye level, reflex stand camera with built-in illumination. This camera is adaptable for 14 different Polaroid Land films and most conventional films. Just get the subject to the MP-3, and the MP-3 will get the picture in seconds. Assuming, of course, that the subject wants to have his picture taken.

For more information or a demonstration write Polaroid Corporation, Industrial Marketing Dept. 134C, Cambridge, Mass. 02139.



Macro photograph of wing attachment.



Continuous tone projection transparency.

The Polaroid MP-3 Multipurpose View Land Camera.

"Polaroid" and "Polacolor"®

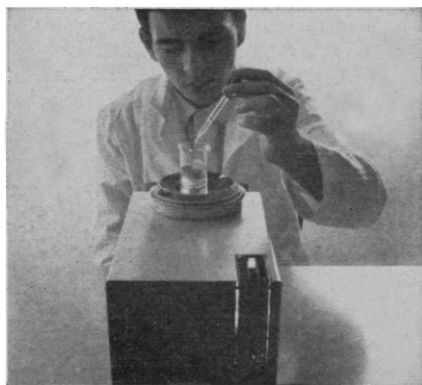
WEIGHT WATCHERS:

These Mettler balances can help reduce your weighing problems

If you have weight problems, chances are they can be solved with one of these three Mettler balances. Two are top-loaders, one an analytical. Collectively, they solve virtually any weighing problem in the laboratory. Individually, they perform their special jobs with unique speed, ease and precision.

Weight Watching Has Never Been Easier

The Mettler P1200, a well established and versatile top-loading balance, now has digital readout. This feature permits even relatively unskilled operators to obtain accurate results without misinterpretation or reading errors.



The P1200 will tackle weighings to 1200 grams (plus 100-gram tare), and give you a precision of ± 5 mg. That's better than one part in 250,000. But despite its capabilities for handling the bigger weighing jobs, the P1200 will also complete a weighing in just three seconds. It will also checkweigh to plus or minus values as fast as you can place an object on the scale, and without referring to scale readout. Powdery, granular or liquid substances can be filled rapidly by the use of a filling guide which shows the approximate weight on the pan throughout the entire weighing operation. This eliminates time-consuming interruptions for reading the balance.

Remove Grams — Positively

The P160, another top-loader, weighs unknowns to 160 grams with a precision of ± 1 mg. In addition to having all the features of the P1200, it is ideally suited for weight loss studies. It has a reverse scale which gives a



positive reading as weight decreases in drying, evaporation and residue determination studies. This feature eliminates time-consuming calculations and the possibility of arithmetical errors. It also simplifies gravimetric titrations (for more information on the advantages of gravimetric titrimetry, write for Bulletin M-1014A).

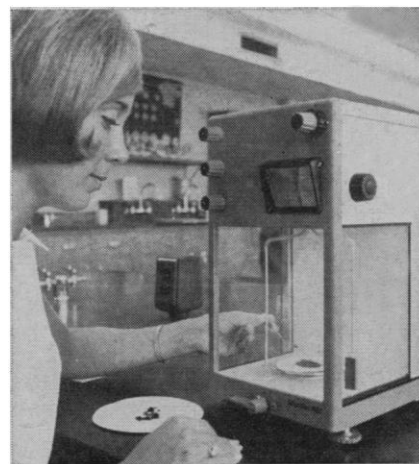
A Well-Balanced Balance

Slight changes in the balance level of the P1200 and the P160 (as in all Mettler top-loaders) are automatically compensated for by a zero point restoration feature. We call it Mettler Levelmatic. If your balance is out of plumb beyond its compensation range, you won't be able to make a weight reading because the readout is automatically obscured. Because Levelmatic automatically compensates for most shifts in zero position, it is rarely necessary to re-zero the balance before weighing.

Have Your Cake and Eat It

If you need an analytical balance to watch your weight, consider the Mettler H20 . . . it's really two balances in one. It gives you the 160.1-gram capacity of a macro-analytical balance, and the ± 0.01 mg precision of a semi-micro instrument. The H20 readout, like the P1200 and P160, is digital. It also has a high-speed filling guide, and an optional accessory will let you weigh objects below the balance; for example, to make specific gravity measurements by weighing objects submerged in liquids.

Because of the unrestricted optical taring feature of the H20, you can tare off the weight of your container in seconds, and begin weighing-in with readout at zero. You can't make a weighing mistake. If you're adding several components, you can dial back to zero for each one.



Some Food For Thought

In case you have a weighing requirement that can't be solved by one of these three balances, Mettler has 35 more models ranging from top-loaders that weigh to 13 kilos all the way through analyticals to ultra micro instruments with precision of ± 0.1 μ g. We'll bet a gram-cracker that one of these will fill the bill. To arrange for a free demonstration or trial, or for further particulars, write to Mettler Instrument Corporation, 20 Nassau Street, Princeton, New Jersey 08540.

METTLER®

27 December 1968

Vol. 162, No. 3861

SCIENCE

LETTERS	More on Amazonian Fauna: <i>C. W. Quaintance; M. Tsalickis; A. M. Fletcher;</i> Homology as Applied to Proteins: <i>W. P. Winter; K. A. Walsh, H. Neurath;</i> Regulation of Indirect Costs: <i>R. N. Faiman</i>	1432
EDITORIAL	Lee DuBridge	1435
ARTICLES	Temperatures of the Earth's Upper Atmosphere: <i>J. C. G. Walker and N. W. Spencer</i> ..	1437
	Psychochemical Research Studies in Man: <i>A. J. Mandell and C. E. Spooner</i>	1442
	Genotype, Environment, and Population Numbers: <i>F. J. Ayala</i>	1453
NEWS AND COMMENT	Nerve Gas: Dugway Accident Linked to Utah Sheep Kill	1460
	Peace Research: SIPRI, in Sweden, Is Making a Role for Itself	1465
BOOK REVIEWS	<i>Prelude to Riot</i> , reviewed by <i>E. Liebow</i> ; other reviews by <i>M. Lieberman,</i> <i>J. P. Boineau, J. B. Thompson, Jr., M. L. Moss, F. Ordway, C. W. Condit</i>	1467
REPORTS	Investigation of Horizon Beta: <i>C. C. Windisch et al.</i>	1473
	Spores, Pollen, and Microplankton from the Horizon Beta Outcrop: <i>D. Habib</i>	1480
	Pulsating Radio Sources near the Crab Nebula: <i>D. H. Staelin and</i> <i>E. C. Reifenstein III</i>	1481
	Surface Structure of Polymers: Glancing-Angle Electron Diffraction Study of Polyethylene: <i>H. Schonhorn and J. Drobek</i>	1483
	Inhibition of Cell Growth in vitro by Adenosine 3',5'-Monophosphate. <i>W. L. Ryan and M. L. Heidrick</i>	1484
	Virus-Like Particles in the Spiral Ganglion of the Guinea Pig Cochlea: <i>J. L. Craft and D. A. Hilding</i>	1485

BOARD OF DIRECTORS

DON K. PRICE
Retiring President, Chairman

WALTER ORR ROBERTS
President

H. BENTLEY GLASS
President-Elect

BARRY COMMONER
HUDSON HOAGLAND

GERALD HOLTON
MINA S. REES

VICE PRESIDENTS AND SECTION SECRETARIES

MATHEMATICS (A)
A. H. Taub
Wallace Givens

PHYSICS (B)
Stanley S. Ballard
Albert M. Stone

CHEMISTRY (C)
Ralph Shriner
Milton Orchin

ASTRONOMY (D)
Thornton L. Page
Frank Bradshaw Wood

ANTHROPOLOGY (H)
Gabriel W. Lasker
Anthony Leeds

PSYCHOLOGY (I)
Delos D. Wickens

SOCIAL AND ECONOMIC SCIENCES (K)
Guy E. Swanson
Eugene B. Skolnikoff

HISTORY AND PHILOSOPHY OF SCIENCE (J)
Robert Bruce Lindsay
Raymond J. Seeger

PHARMACEUTICAL SCIENCES (Np)
Andre Archambault
Joseph A. Oddis

AGRICULTURE (O)
Daniel G. Aldrich, Jr.

INDUSTRIAL SCIENCE (P)
Donald W. Collier
Burton V. Dean

EDUCATION (Q)
Willard J. Jacobson
J. Myron Atkin

DIVISIONS

ALASKA DIVISION

Richard Hill
President

Irma Duncan
Executive Secretary

PACIFIC DIVISION

Garrett Hardin
President

Robert C. Miller
Secretary

SOUTHWESTERN AND ROCKY MOUNTAIN DIVISION

Terah L. Smiley
President

Marlowe G. Anderson
Executive Secretary

SCIENCE is published weekly on Friday and on the fourth Tuesday in November 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. Copyright © 1968 by the American Association for the Advancement of Science. Annual subscriptions: \$12; foreign postage: Americas \$3; overseas \$5; single copies, 50¢ (back issues, \$1) except *Guide to Scientific Instruments*, which is \$2. School year subscriptions: 9 months, \$9; 10 months, \$10. 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

Photoregulation of an Enzymic Process by Means of a Light-Sensitive Ligand: <i>H. Kaufman, S. M. Vratsanos, B. F. Erlanger</i>	1487
Reactions of Aromatic and Sulfur Amino Acids in Ribonuclease with Hydrogen Atoms in Water Solution: <i>R. Shapira and G. Stein</i>	1489
Staphylococcal Nuclease: Size and Specificity of the Active Site: <i>P. Cuatrecasas, M. Wilchek, C. B. Anfinsen</i>	1491
Warfarin Treatment of Mice Bearing Autochthonous Tumors: Effect on Spontaneous Metastases: <i>J. J. Ryan, A. S. Ketcham, H. Wexler</i>	1493
Immunologic Enhancement of Tumor Xenografts by Pepsin-Degraded Immunoglobulin: <i>S. Broder and F. Whitehouse, Jr.</i>	1494
Sterol Precursors of Cholesterol in Adult Human Brain: <i>G. Galli, E. G. Paoletti, J. F. Weiss</i>	1495
Biologic Precipitation of Fluorite: <i>H. A. Lowenstam and D. McConnell</i>	1496
Amino Acid Composition of Organic Matrix in Calcareous Oolites: <i>R. M. Mitterer</i> ..	1498
Receptors Sensitive to Carbon Dioxide in Lungs of Chicken: <i>D. F. Peterson and M. R. Fedde</i>	1499
Separation of Cellular from Extracellular Controls of Drinking in Rats by Frontal Brain Damage: <i>E. M. Blass</i>	1501
Sleep after Exercise: <i>J. A. Hobson</i>	1503
Is Orientation-Specific Color Adaptation in Human Vision Due to Edge Detectors, Afterimages, or "Dipoles"?: <i>C. S. Harris and A. R. Gibson</i>	1506
<i>Technical Comments:</i> Potassium Feldspar in Weekeroo Station, Kodaikanal, and Colomera Iron Meteorites: <i>T. E. Bunch and E. Olsen</i> ; Chromosomal Effect and LSD: Samples of Four: <i>W. H. Kruskal and S. Haberman</i> ; <i>F. W. Whitmore</i> ; <i>R. S. Sparkes et al.</i> ; Factors Determining Spatial and Size-Frequency Distributions of <i>Gemma gemma</i> : <i>R. H. Green and K. D. Hobson</i> ; <i>J. B. C. Jackson</i>	1507
MEETINGS Peptides: <i>B. Weinstein and S. Lande</i> ; Calendar of Events	1511

LEONARD M. RIESER H. BURR STEINBACH	KENNETH V. THIMANN JOHN A. WHEELER	PAUL E. KLOPSTEG Treasurer	DAEL WOLFLE Executive Officer
GEOLOGY AND GEOGRAPHY (E) Claude C. Albritton, Jr. Richard H. Mahard	ZOOLOGICAL SCIENCES (F) Vincent Dethier David E. Davis	BOTANICAL SCIENCES (G) Warren H. Wagner, Jr. Arthur W. Cooper	
ENGINEERING (M) Paul Rosenberg Newman A. Hall	MEDICAL SCIENCES (N) Shields Warren	DENTISTRY (Nd) Barnet M. Levy Richard S. Manly	
INFORMATION AND COMMUNICATION (T) J. C. R. Licklider Ileen E. Stewart	STATISTICS (U) Chester I. Bliss Rosedith Sitgreaves		

COVER

"Square of Three," by Reginald Neal, Rutgers—The State University, New Brunswick, New Jersey. A simplified version of this painting served as the test stimulus in research on a new color illusion. See page 1506.

The American Association for the Advancement of Science was founded in 1848 and incorporated in 1874. Its objects are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress.



Smile

Now you can get precisely exposed photomicrographs . . . automatically. You may wait for hours for a photomicrograph opportunity. Why risk spoiling it by a wrong meter reading? Or why take a chance on missing the picture completely while you're busy with camera controls?

The Leitz ORTHOMAT Microscope Camera leaves your hands and your mind free for more important things. All you do for a perfect photomicrograph is select your field and push a button. Attachable to most microscopes, this automatic 35mm camera trips the shutter, calculates exposure and advances the film. Even automatically compensates for changes during exposures! Exposures range from 1/100 second with electronic flash to over 1/2 hour with fluorescent.

The shutter of the Leitz ORTHOMAT is specially dampened against vibration. You can switch from black and white to color film, or vice versa, even in the middle of a roll. Use any system of microscope illumination you want. And, of course, the ORTHOMAT is built with the famous Leitz precision.

Let the Leitz ORTHOMAT Microscope Camera automate your clinical and research photomicrography. Write for an ORTHOMAT catalog.

Leitz® E. LEITZ, INC., 468 Park Avenue South, New York, N. Y. 10016

69168

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

Science serves its readers as a forum for the presentation and discussion of important issues related to the advancement of science, including the presentation of minority or conflicting points of view, rather than by publishing only material on which a consensus has been reached. Accordingly, all articles published in *Science*—including editorials, news and comment, and book reviews—are signed and reflect the individual views of the authors and not official points of view adopted by the AAAS or the institutions with which the authors are affiliated.

Editorial Board

1968

ROBERT L. BOWMAN
JOSEPH W. CHAMBERLAIN
JOHN T. EDSELL
ALEXANDER HOLLAENDER
GORDON J. F. MACDONALD
NEAL E. MILLER
DE WITT STETTIN, JR.

1969

EMIL HAURY
WILLARD F. LIBBY
EVERETT I. MENDELSON
JOHN R. PIERCE
KENNETH S. PITZER
ALEXANDER RICH
CLARENCE M. ZENER

1970

GUSTAF O. ARRHENIUS
FRED R. EGAN
HARRY F. HARLOW
MILTON HARRIS
RICHARD C. LEWONTIN
ALFRED O. C. NIER
FRANK W. PUTNAM

Editorial Staff

Editor

PHILIP H. ABELSON

Publisher

DAEL WOLFLE

Business Manager

HANS NUSSBAUM

Managing Editor: ROBERT V. ORMES

Assistant Editors: ELLEN E. MURPHY, JOHN E. RINGLE

Assistant to the Editor: NANCY TEIMOURIAN

News Editor: JOHN WALSH

Foreign Editor: DANIEL S. GREENBERG*

News and Comment: LUTHER J. CARTER, BRYCE NELSON, PHILIP M. BOFFEY, PETER THOMPSON, MARTI MUELLER, ANNE H. LARUS

Book Reviews: SYLVIA EBERHART

Editorial Assistants: SUSAN AXELRAD, JOANNE BELK, ISABELLA BOULDIN, ELEANORE BUTZ, HELEN CARTER, GRACE FINGER, NANCY HAMILTON, OLIVER HEATWOLE, ANNE HOLDSWORTH, PAULA LECKY, KATHERINE LIVINGSTON, LEAH RYAN, LOIS SCHMITT, BARBARA SHEFFER, RICHARD SOMMER, YA LI SWIGART, ALICE THEILE

* European Office: 22 Mulberry Walk, London, S.W. 3, England (Telephone: 352-9749)

Advertising Staff

Director

EARL J. SCHERAGO

Production Manager

KAY GOLDSTEIN

Advertising Sales Manager: RICHARD L. CHARLES

Sales: New York, N.Y., 11 W. 42 St. (212-PE-6-1858), ROBERT S. BUGBEE; Scotch Plains, N.J., 12 Unami Lane (201-889-4873), C. RICHARD CALLIS; Medfield, Mass. 02052, 4 Rolling Lane (617-359-2370), RICHARD M. EZEQUELE; Chicago, Ill. 60611, 919 N. Michigan Ave., Room 426 (312-DE-7-4973), HERBERT L. BURKLUND; Los Angeles 45, Calif., 8255 Beverly Blvd. (213-653-9817), WINN NANCE.

EDITORIAL CORRESPONDENCE: 1515 Massachusetts Ave., NW, Washington, D.C. 20005. Phone: 202-387-7171. Cable: Advancesci, Washington. Copies of "Instructions for Contributors" can be obtained from the editorial office. See also page 1709, *Science*, 29 December 1967. ADVERTISING CORRESPONDENCE: Rm. 1740, 11 W. 42 St., New York, N.Y. 10036. Phone: 212-PE-6-1858.

Lee DuBridge

The choice of DuBridge as Science Adviser to the President has been widely acclaimed, and rightly so. To the office he will bring a combination of distinction, excellent judgment, poise, and ability to communicate. These qualities will gain for him the ear of the President, the respect of Congress, and strong support from scientists and engineers.

DuBridge began his professional career as a highly regarded physicist. Next came his wartime leadership of the great Radiation Laboratory in Cambridge. Since 1946 he has served as president of the California Institute of Technology.

These are tense days on campus, but soundings at Pasadena indicate warm admiration for the way in which DuBridge has conducted affairs there. He has been flexible and therefore responsive to the changing times. He has handled touchy situations well. For example, the intense concern that Linus Pauling's views must have aroused in a conservative board of trustees did not lead to an explosion.

Good judgment is an essential ingredient of poise. The interplay of those two characteristics can be seen repeatedly in the record of DuBridge's public appearances. A recent example was the press conference, held in New York, at which his appointment was announced. The press gave DuBridge a number of opportunities to stumble, but he was surefooted.

An important asset is DuBridge's ability to communicate effectively. His lectures, though related by common threads, have been remarkably free from platitudes and worn-out ideas; they contain fresh concepts and arguments. A guest editorial in *Science* (13 December) is a fair example of his style and creativity.

The post of Science Adviser does not automatically carry with it much authority or influence. During the Eisenhower administration the science advisers, Killian and Kistiakowsky, were able to be quite effective. They enjoyed the confidence of the President, and they dealt with problems on which their advice was needed and followed. Jerome Wiesner was very close to President Kennedy, and he wielded much power. DuBridge inherits an office whose stature inevitably diminished under Donald Hornig. Despite his many good qualities, Hornig could not overcome Johnson's distaste for the intellectual.

It seems likely that DuBridge will enjoy the confidence of his President. They have had friendly contacts over two decades. Establishing a good working relationship with Congress will require flexibility and skill. During the last 5 years Congress has assumed leadership in matters of science policy and has established its own sources of scientific advice. Many of its members have become versed in pressing problems, such as pollution. In these matters, various congressmen may well feel that they have as good a basis for judgment as DuBridge has.

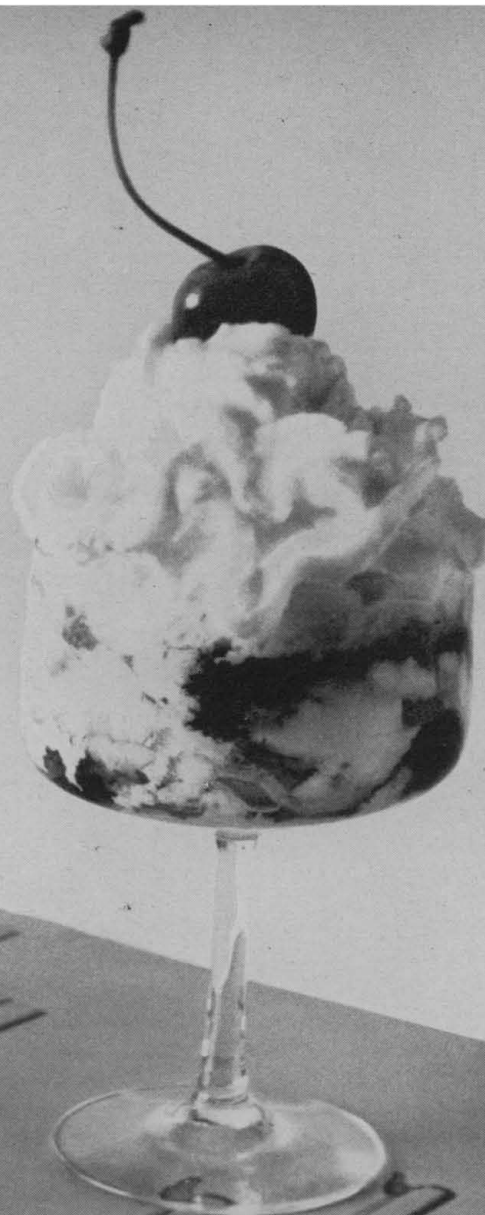
In the area of federal support of academic science, DuBridge must be flexible. As president of one of the top institutions of learning, he has urged emphasis on the support of excellence. The mood of Congress is clearly with those who urge more attention to geographical distribution of funds.

DuBridge faces a most interesting challenge. The good wishes of the scientific community go with him as he prepares to take on his new responsibilities.—PHILIP H. ABELSON

N-riching

Catalog N, eight months old but still growing strong. Now enriched by an addendum containing more than 30 new C^{14} and H^3 labeled compounds, important price reductions, and a summary of labeled chemicals under development. If you haven't received a copy of the addendum or need a copy of Catalog N write or call for literature "N/A" today. Here is a partial list of the many new radioactive chemicals offered in this addendum.

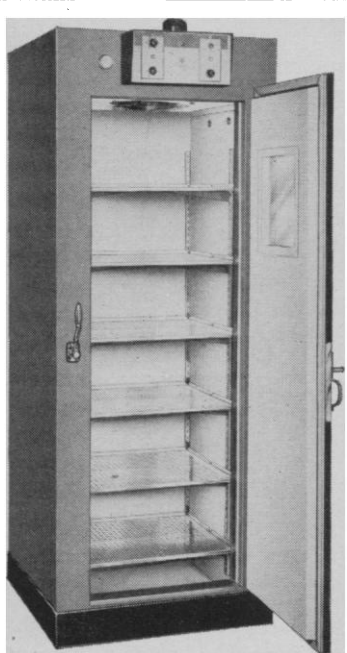
Acetyl- H^3 Coenzyme A
Adenosine- H^3 (G) 3',5'-Cyclic Phosphate
Adenosine-8- C^{14} 5'-Diphosphate
L-Arabinose-1- C^{14}
L-Asparagine- H^3 (G)
Cytidine- C^{14} (U) 5'-Diphosphate
Cytidine- H^3 (G) 5'-Monophosphate
Deoxyguanosine- H^3 (G)
N-Formyl-L-methionine-methyl- C^{14}
Guanosine- C^{14} (U) 5'-Diphosphate
Inosine- H^3 (G) 5'-Monophosphate
L-Proline- H^3 (G)
Thymidine-methyl- C^{14}
L-Tryptophan- H^3 (G)
Uridine- H^3 (G) 5'-Diphosphate
Uridine-5- H^3 (N) 5'-Triphosphate



**New England
Nuclear**

575 Albany Street
Boston, Mass. 02118
Tel. (617) 426-7311
Telex: 094-6582

**PUT WASTED
LAB SPACE
TO WORK!**
LAB-LINE Reach-in
"ENVIRONETTE"
Controlled
Environmental Rooms



Only 2 ft. deep!

Don't waste valuable bench space! New vertical "Environettes" occupy minimum floor space with the economy of a modern skyscraper. Exclusive De-Gradientator system minimizes chamber gradients with gentle, positive air circulation and solid state temperature controller.

Choose from 4 Sizes, 8 Models

- 2 ft., 3 ft., 4 ft., and 6 ft. wide chambers.
- 6 adjustable shelves.
- 24 to 72 sq. ft. shelf space.
- 0° to +60°C, or ambient to +60°C.
- Only 24" deep—yet more shelf space.
- Corrosion-resistant metal construction
- Built-in temperature safeties.
- Humidification, Dehumidification and CO₂ options.

Write for full details and prices.

Gentlemen: Please rush me Bulletin 271 I-12

Name _____
Title _____
Company _____
Address _____
City _____ State _____

LAB-LINE
INSTRUMENTS, Inc.
MANUFACTURERS and DESIGNERS
MELROSE PARK, ILL.

tin, has only a fraction of the activity of the pure hormone. This fact suggests that the intact NH₂-terminal end of secretin is necessary for biological purposes. Later, the problems associated with the preparation of an octapeptide residue in cholecystokininpancreozymin were pointed out, especially in regard to residues containing *O*-tyrosyl sulfonate. Use of the fat cell to explore structure-activity relations was considered by D. Rudman (Emory University School of Medicine). The reduction in free fatty acid concentration may indicate the degree of activity of both hormones and proteins, and such information can be used to correlate different peptide sequences. It was postulated that the unit tyrosyl-A₁-A₂-glutamyl-A₃-A₄-arginyl is important to the activity of a peptide hormone; further synthetic efforts are needed to verify this assumption. J. T. Potts (National Institutes of Health) presented a way of improving the Edman degradation scheme, in which gas-liquid chromatography was utilized for the analysis of the phenylthiohydantoin derivatives. The modified technique, in combination with new enzymatic procedures for the total hydrolysis of proteins, was applied to the elucidation of the hormone thyrocalcitonin. To complete the story, J. Pless (Sandoz) considered various problems associated with a total synthesis of thyrocalcitonin by a fragmentation-condensation route, which made use of some novel protecting groups.

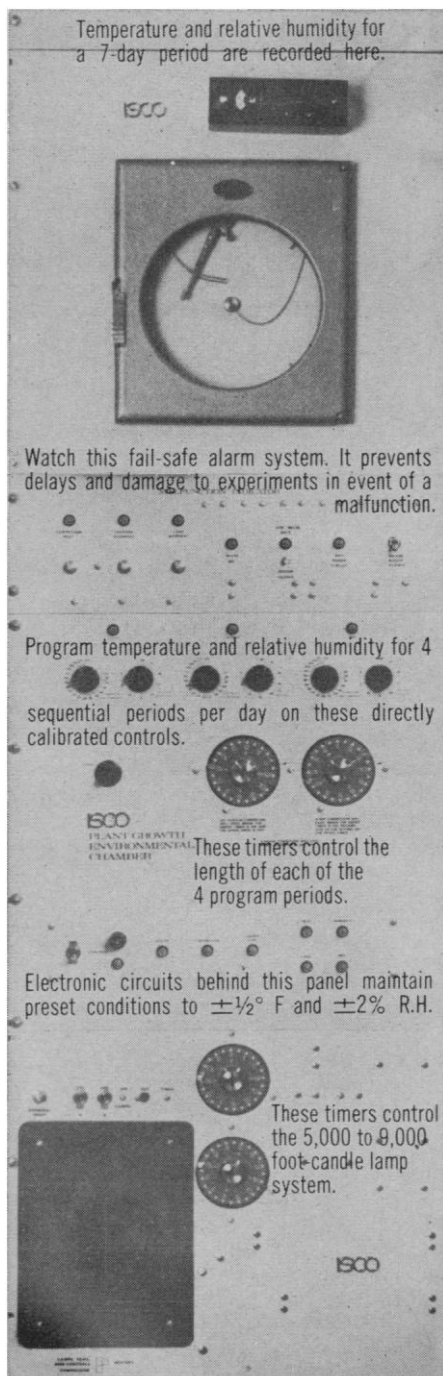
G. W. Anderson (American Cyanamid) reviewed methods for the detection of racemization. The mixed anhydride procedure was greatly improved by using *N*-methylmorpholine rather than triethylamine as the base in the reaction. Similarly, the coupling of peptides by a mixture of *N*-hydroxysuccinimide and dicyclohexylcarbodiimide have several advantages and, under certain conditions, are free of racemization. Various oxazolones, implicated as the intermediates involved in racemization, were prepared by C. Glazer (Brooklyn Polytechnic Institute). A study of the reaction kinetics revealed that the rate of racemization is faster than the rate of ring opening and is dependent on hydrogen bonding effects. This information is very useful in the designing of new coupling agents. Racemization in cysteine peptides was explored by J. Kovacs (St. John's University), who used sulfur labeling techniques. Benzyl mercaptan served as a convenient test

system in this study. N. Izumiya, in a second paper, used an ion-exchange column to separate the L-L and L-D diastereoisomeric forms of leucylalanine and leucylvaline. An extension to various tripeptides furnished a sensitive scheme for the determination of racemization. For example, *N*-benzyloxycarbonylglycyl-L-alanine was coupled with L-leucine benzyl ester in the presence of some agent, then the resulting product was hydrogenolyzed to furnish glycyl-L-alanyl-L-leucine, plus any glycyl-D-alanyl-L-leucine. An ion-exchange analyzer provided an accurate quantitative measure of the two compounds. The application of gas-liquid chromatography to the separation of asymmetric isomers was explained by J. Westley (Hoffman-LaRoche). *N*-Trifluoroacetylprolyl chloride reacts smoothly with racemic amino acid methyl esters to furnish volatile derivatives, which have different retention periods. Another compound, (–)-menthyl chloroformate, has given good results in the separation of depsi-peptide hydrolyzates. Nuclear magnetic resonance shifts were utilized for both the detection and determination of racemization in a wide variety of peptides by B. Weinstein (University of Washington). Generally, any dipeptide or tripeptide containing the elements L(or D)-alanyl-L-aromatic amino acid or the reverse will produce two different sets of methyl doublet signals. The application of optically active solvents to the nuclear magnetic resonance resolution of enantiomers was considered to be a useful technique.

The last part of the program dealt with special problems in the analysis and synthesis of peptides. E. Gross (National Institutes of Health) elucidated the main features of nisin as judged by reaction with cyanogen bromide. Cleavage of a methionylsulf bond afforded two major fragments, consisting of cyclic peptides with internal disulfide links. Unusual features of the primary sequence were clarified, and a tentative structure was proposed for this antibiotic. Cystine residues are found in many proteins, but existing preparative procedures for these compounds are difficult and lack wide application. R. G. Hiskey (University of North Carolina) resorted to thiocyanogen in combination with thioethers to construct large disulfide rings. A feature of this work was a possible extension to a new synthesis of insulin.

J. Meienhofer (Children's Cancer Research Foundation) delineated routes to the preparation of actinomycin D.

Here's how to program an ISCO plant growth environmental chamber.



Send for brochure EC37
INSTRUMENTATION SPECIALTIES CO., INC.
 4700 SUPERIOR LINCOLN, NEBRASKA 68504

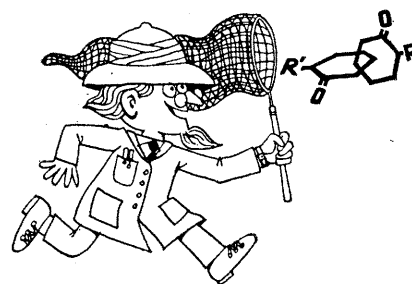
The peptide portion of the molecule is essential for biological activity, but its precise role is unclear and needs elaboration. The capsular polypeptide derived from anthrax bacillus was studied by D. E. Nitecki (University of California Medical School, San Francisco). The material appears to be a pure form of poly- δ -D-glutamic acid. A detailed preparation was given for the individual oligomeric peptides, including the hexamer. The solid-phase procedure was generally used, but difficulties were encountered in achieving complete purity. The stereospecific preparation of dipeptides from alkyliminophenylacetyl amino acids was outlined by K. Harada (University of Miami). Hydrogenation led to partial optical activity, which is dependent on the bulkiness of the residues, the distance between the reaction center and the catalyst, as well as chelation factors. R. Walter (Mt. Sinai Medical School) described some selenium-containing oxytocins and compared their activity to deamino-oxytocin. L-Selenocysteine was also prepared and incorporated into various peptides. Effects of chemical modification on conformation can be estimated by comparison of optical rotatory dispersion spectra.

The antigenic properties of penicillin were discussed by N. Grant (Wyeth). Antigenicity arises from an opening of the β -lactam ring to yield a penicillenic acid, followed by polymerization or diketopiperazine formation. Present evidence favors the oligomeric formulation for the antigenic factor. S. W. Fox (University of Miami) revealed that thermal polymerization of common amino acids will produce a polymer having properties similar to histones. An equivalent reaction with amino acid adenylates formed high-molecular-weight materials which are characterized as modified proteinoids. These procedures offer a model for DNA-independent formation of biologically active high molecular weight compounds in prebiotic times.

Finally, the selective labeling of the COOH-terminal amino acid in proteins in terms of deuterium or tritium was developed into an analytical technique by H. Matsuo (University of California, Berkeley). The reaction scheme involves oxazolone formation with the aid of acetic anhydride, then incorporation of deuterium at the optical center by exposure to deuterium oxide-pyridine and ring opening to the starting peptide. Hydrolysis yields the labeled COOH-terminal amino acid. This method



stop hunting




let our computer do your searching

All Aldrich chemicals . . . those in our 1969-70 catalog (just off the press) as well as those that are too new or too rare to list . . . all of them are coded for computer retrieval.

The computer can locate them by specific structures, by a structural fragment or by a ring notation system. Thus chemicals containing such structural fragments as $-C-S-C-$, $-C-S(O)-NR_2$, etc., are easily found. Certain size rings or combination of rings such as a 5-membered ring containing one N and S or a three ring system containing 7 and two 6-membered rings, etc., these also are quickly uncovered. The computer's versatility can be seen if we consider that it can be programmed to ignore certain fragments or ring systems from its searching.

What would you like? A list of all our pyrroles?, all our β -diketones?, all our quinones? . . . simple. Just ask our technical services department to get the computer working. It won't cost you anything and it may save you a lot of hunting time.

Aldrich Chemical Company, Inc.
 CRAFTSMEN IN CHEMISTRY

STOCKING POINTS: Milwaukee Wisconsin 53210 2371 N. 30th St. Dial (414) 374-4620 TWX 910-262-3052 TELEX 26 843	Cedar Knolls, N.J. 07927 10 Ridgedale Ave. P.O. Box AA Dial (201) 539-9494 TWX 710-986-7480
Gardena, California 90247 Wilshire Chemical Co. 15324 South Broadway Dial (213) 323-9232 TWX 910 346 6722	



can save you time, money, and a lot of grief. With a Hardco Automatic Watering System, lab animals always have a supply of fresh, filtered water. There are no bottles to refill, wash or replace. Personnel are free to do other things.

Heart of the Hardco System is a leak-proof dispenser that can be easily activated by a small animal. A dispenser is installed in each cage and is connected to the water source by a network of special plastic piping.

Hardco designs and installs systems for all species of lab animals... for both planned and existing facilities. Our catalog goes into the details. Write for it today.

Hardco Scientific

The Fieldstone Corporation
Hardco Scientific Division
6811 Grace Avenue
Cincinnati, Ohio 45227

MOLECULAR MECHANISMS OF TEMPERATURE ADAPTATION

Edited by C. LADD PROSSER
Published July 1967

A symposium presented at the Berkeley Meeting of AAAS, December 1965. AAAS Publication No. 84, 398 pages, 41 tables, 127 illustrations, bibliography, index. Regular Price \$12.50. AAAS Members' Cash Orders \$10.50.

Molecular Mechanisms of Temperature Adaptation is a collection of papers on the general physiology of temperature adaptation in cold-blooded animals, plants, and microorganisms. Twenty-four contributors from the Soviet Union, Germany, Canada, Denmark, and the United States report recent research findings on the diverse molecular mechanisms of response, acclimation, and adaptation to heat and cold in bacteria, plant cells and tissues, insects, fishes, amphibians, and reptiles.

AAAS

1515 Massachusetts Ave., NW
Washington, D.C. 20005

should have wide application in the elucidation of peptide sequence.

The edited symposium papers are to be made available in a book (Marcel Dekker, New York), which should appear early in 1969.

BORIS WEINSTEIN

Department of Chemistry,
University of Washington, Seattle 98105

SAUL LANDE

School of Medicine, Yale University,
New Haven, Connecticut 06511

Calendar of Events

Nucleic Acid and Protein Interactions, Spetsai, Greece, 6-19 July. This is the fourth Advanced Study Institute of Molecular Biology. Application forms and information may be obtained from the NATO Advanced Study Institute Secretary, M.R.C. Laboratory of Molecular Biology, Hills Road, Cambridge, England.

Water Pollution Control, Washington, D.C., 3-7 February. This course is designed for engineers, scientists, and researchers who are working in the field of control of water pollution. The scope of the course includes principles of hydrology, treats to water resources, sources of pollution, workshop on abatement technology, system analysis, economic analysis, legislation and legal aspects, and enforcement. (Jack E. Mansfield, Coordinator of Continuing Engineering Education, School of Engineering and Applied Science, George Washington University, Washington, D.C. 20006)

Fundamentals of Dynamic Measurements as Applied to the Ocean Sciences, San Diego, Calif., 11-14 Mar. The course is designed for practicing engineers, scientists, and technicians who use sophisticated electronic instrumentation in ocean research. The course outline includes units on recorders, signal generators, transducers, analog and digital conversion, waveforms, filters, amplifiers, voltage regulators, and the ocean research applications of these units. (Third Ocean Sciences Short Course, Instrument Society of America, Education & Research Services, 530 William Penn Place, Pittsburgh, Pa. 15219)

Epidemiology, Minneapolis, Minn., 15 June-3 July. Is designed primarily for teachers in medical schools, but post-doctoral fellows, graduate students, and residents in departments of preventive medicine and other medical school departments may qualify. In addition to the courses in the fundamentals of epidemiology and of biostatistics; epidemiology of cancer, cardiovascular diseases, and infectious diseases; genetics and epidemiology, new courses in epidemiology of mental disorders and of neurological diseases will be offered. Tuition: \$120. Limited stipends are available. (Dr. Leonard M. Schuman, Director, Graduate Summer Session in Epidemiology, University of Minnesota School of Public Health, 1558 Mayo Building, Minneapolis 55455)

"Quick, Henry, the screwdriver!"

All you need is a screwdriver to adapt Conflex lab furniture to changing R & D requirements.

BLICKMAN
WEHAWKEN, NEW JERSEY

S. Blickman Inc.
6912 Gregory Ave.
Weehawken, N. J.

Send free CONFLEX LAB FURNITURE catalog

Name/Title _____

Institution _____

Address _____

City/State/Zip _____

Whenever a new project comes along — or there's a new wrinkle in an old project — you can set up quickly. Over 800 possible arrangements. Change doors to drawers... Turn 3½" depth drawers into 7¼" depth drawers... Adjust full depth shelves to 1" increments... Mix and match door and drawer sizes to your needs!

Just a twist of the wrist and everything fits.

Write for your free catalog today.