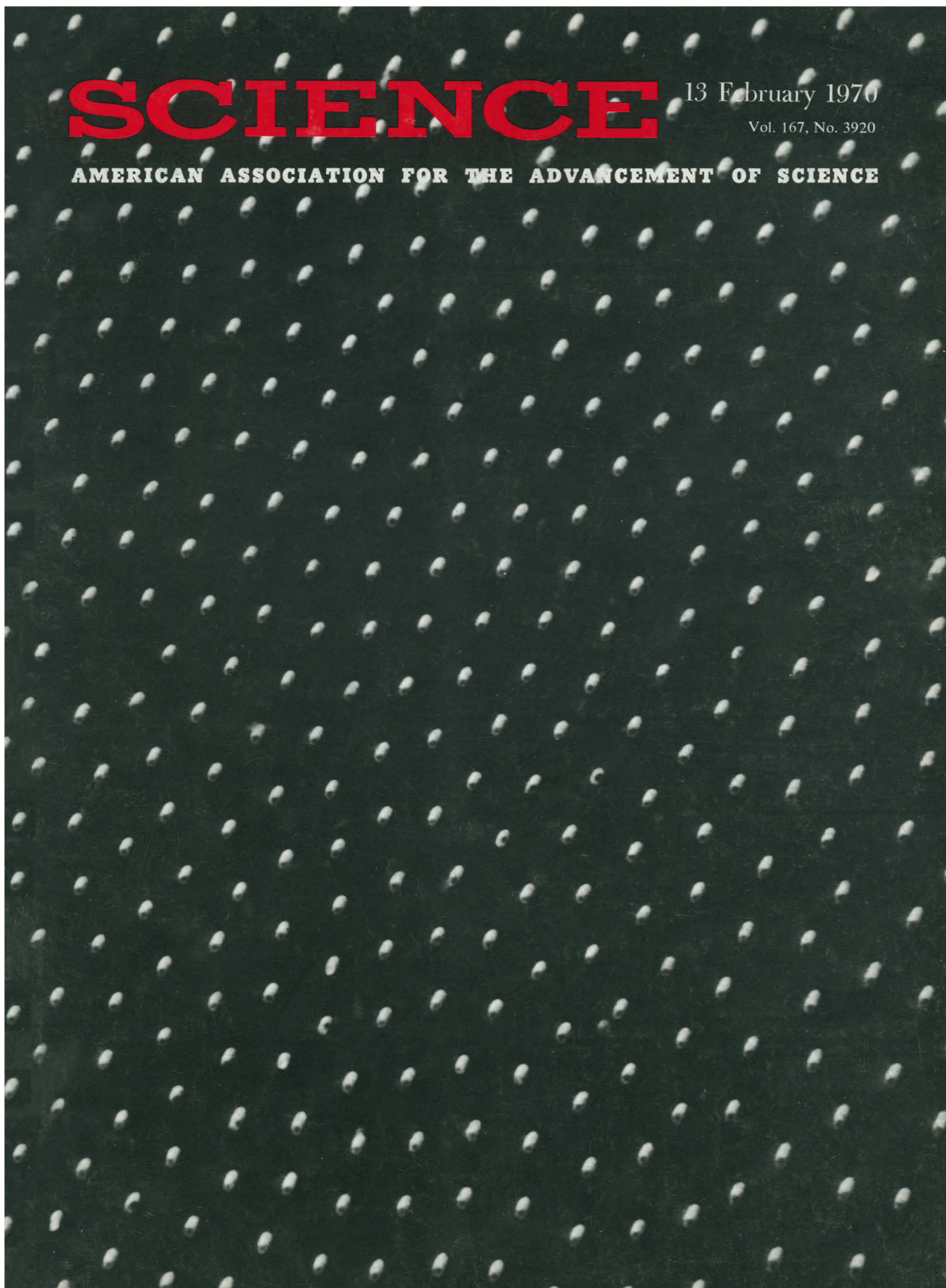


# SCIENCE

13 February 1976

Vol. 167, No. 3920

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE





## **Water, Water Everywhere...**

**... nor any drop to drink?"**

It has not reached that stage, yet. But there is growing concern over the pollution of drinking water in the closely populated areas of the world, and, far more serious, the pollution of the oceans and the sea-food which forms the diet of many millions of people.

One of the most serious effects of ocean pollution is the ruin and destruction of plankton — the food on which most of the creatures of the sea depend.

As part of the search for greater knowledge of the life processes of plankton, a renowned marine biologist has successfully measured their metabolic activity. This investigation called for an instrument with incredible sensitivity — the LKB FLOW MICROCALORIMETER. In fact, the LKB Flow Microcalorimeter sensitivity was such that successful measurements were made not only of concentrated solutions of plankton, but even of such diffuse solutions as normal sea-water. A special feature of both the LKB Flow and Batch Microcalorimeters is the ease with which they can be set up and operated. Even the newcomer to calorimetry will find them easy to use, after only a very brief training session.

*Sales and service in USA: New York, Boston, Chicago, St. Louis, Atlanta and Houston; in Europe, and throughout the world.*



**IN THE SERVICE OF SCIENCE**

LKB Instruments Inc. 12221 Parklawn Drive. Rockville MD. 20852  
12330 Santa Monica Bd. Los Angeles Calif. 90025



# We want to be useful ...and even interesting

**Kodak**



The Bettmann Archive, Inc.

## Hurry up and get well

Sir Luke Fildes' famous painting notwithstanding, a newer, cold-hearted tide of informed opinion about doctoring has begun to run. To the neglect of bedside demeanor, recognition is accorded such capabilities as resolving 30 distinct proteins in a couple of  $\mu$ l of serum.

Such an ability serves the public weal through science or

the clinic, preventive or therapeutic. As for science, beating a drum most of the past decade for protein resolution by acrylamide-gel electrophoresis has also well served the EASTMAN Organic Chemicals business. The clinic has not yet been served so well. A procedure that takes 6 technician-hours to run costs too much. High cost, low volume. Low volume limits buildup of statistics by which to interpret a protein spectrum clinically. If computers are to help practice medicine as well as issue bills, then the doctor needs to consult the computer in terms the computer can understand.

1-Anilino-8-naphthalenesulfonic Acid Magnesium Salt  
EASTMAN 10990

This new EASTMAN Organic Chemical, of all things, may help. It replaces the 2-3-hour, protein-denaturing staining and destaining step with a 2-5-minute delineation of the major zones by fluorescence. Only on the outer surface does our little lantern molecule covalently bond itself; the volume of the zone remains untouched. "Live" protein so pure and so easily isolated has obvious investigative value. Clinically, the speedup hastens the day when an acrylamide-gel protein pattern becomes as routine as weighing the patient.

*Working procedure was published only last month among the circle interested in—of all things—Neurospora. Copy available from W. T. Fisher, Eastman Kodak Company, Rochester, N. Y. 14650.*

## Mangrove

Here's an instance where real-estate law and botany interlace in a mass as easy to penetrate as a mangrove shore.

Though shore property deeds run to the low-water line in northeastern Maine, it's the mean high-water line in South Florida. Where the Florida shore is not yet man-made, some of it is mangrove-made. With aerial roots and with vigorous germination while the fruit still hangs on the tree, mangrove has built this niche.

What with the very small elevation gradient, the human land-developers argue about where they own. We have been helping the state authorities grapple for a fair resolution.

KODAK EKTACHROME Infrared AERO Film extends color vision into the near-infrared. There it finds in plant tissues spread out beneath the aerial camera as subtle a play of

colors—arbitrary though they be—as ever distinguished a Red Delicious apple from a Macintosh for a shopper who can't name a single plant pigment.

Gerald Norman of the Florida Department of Agriculture hopes a sharp split has occurred in mangrove speciation at the high-water line. Perhaps salinity makes the difference, perhaps time and distance out of water. He further hopes to show a reliable difference in infrared color. After all, in orange trees even differences in variety within a single species stand out this way from aloft. Perhaps "false color" can locate the high-water line honestly.

*Mr. Norman's address is P.O. Box 1269, Gainesville, Fla. 32601, in case you'd like to keep in touch with his progress.*

## Room to work

A small minority of students take physics.

A small minority of physics students thrill to the unit on optics.

Little or none of the unit on optics deals seriously with lens aberrations.

Therefore, when a moderately well-informed person hears of lens aberrations, he thinks of defects in manufacture. Unwittingly imbued with Greek notions of perfection, he reasons that perfect spherical surfaces on perfectly homogeneous media should form perfect images.

There really is no reason why they should, and they don't. The bigger the aperture and angular field, the more they fail.

Though image perfection may remain forever unattainable even with perfect spheres and media, ever nearer approaches are made. One strategy employs numerous successive spherical surfaces separating numerous media of different refractive index. Each is calculated to undo some of the others'

image errors.

In another strategy, sphericity is abandoned. Aspheric lenses now serve usefully in many applications. They, too, all miss perfection in geometrical image formation.

A third way of bending the rays is now receiving consideration: make the index vary on a gradient. Planetary atmospheres bend light that way. How to produce such media in a factory is one question. How to fight aberrations with them is another question, a mathematical question. Mathematical weapons for the fight have been fabricated by the mathematician Erich W. Marchand of the Kodak Research Laboratories. His paper "Ray Tracing in Gradient-Index Media" in the January issue of the *Journal of the Optical Society of America* broadcasts them for use. In acclaiming his achievement, let us point out that the uncrowded fields of scholarly endeavor offer satisfactions comparable in their way with those of an uncrowded physical environment.

13 February 1970

Vol. 167, No. 3920

# SCIENCE

<b>LETTERS</b>	Scientific Writing: <i>R. Good; T. S. Y. Koo; M. Rosenblum; F. P. Woodford; E. E. Rosenblum</i> ; Greatest of These Is Charity: <i>G. E. Janssen</i> . . . . .	932
<b>EDITORIAL</b>	The Need for Basic Research: <i>V. F. Weisskopf</i> . . . . .	935
<b>ARTICLES</b>	Clear Air Turbulence: A Mystery May Be Unfolding: <i>J. A. Dutton and H. A. Panofsky</i> . . . . .	937
	Molecular Approach to Breadmaking: <i>Y. Pomeranz, K. F. Finney, R. C. Hosenev</i> . .	944
	Ontogeny of Bird Song: <i>F. Nottebohm</i> . . . . .	950
	Research Management: <i>W. V. Smith</i> . . . . .	957
<b>NEWS AND COMMENT</b>	Japan: A Crowded Nation Wants To Boost Its Birth Rate . . . . .	960
	Harvard Genetics Researcher Quits Science For Politics . . . . .	963
	Government Labs: Britain Weighs Plan To Make Them Earn Their Way . . . . .	964
	Defense: Laird Decentralization Alters Civilian, Military Roles . . . . .	965
<b>BOOK REVIEWS</b>	<i>Deserts of the World and Arid Lands in Perspective</i> , reviewed by <i>M. Evenari</i> ; other reviews by <i>H. P. Caulfield, Jr., R. H. Koch, E. N. Lorenz, B. D. Lichter, E. A. Moody</i> . . . . .	968
<b>REPORTS</b>	Radon-222 in the North Atlantic Trade Winds: Its Relationship to Dust Transport from Africa: <i>J. M. Prospero and T. N. Carlson</i> . . . . .	974
	Active Submarine Volcanism in the Austral Islands: <i>R. H. Johnson</i> . . . . .	977
	Refractory Oxide-Metal Composites: Scanning Electron Microscopy and X-ray Diffraction of Uranium Dioxide-Tungsten: <i>R. J. Gerdes, A. T. Chapman, G. W. Clark</i> . . . . .	979
	Water in the Earth's Mantle: Melting Curves of Basalt-Water and Basalt-Water-Carbon Dioxide: <i>R. E. T. Hill and A. L. Boettcher</i> . . . . .	980
	Magnetic Particles Extracted from Manganese Nodules: Suggested Origin from Stony and Iron Meteorites: <i>R. B. Finkelmann</i> . . . . .	982
	The Ocean: A Natural Source of Carbon Monoxide: <i>J. W. Swinnerton, V. J. Linnenbom, R. A. Lamontagne</i> . . . . .	984
	Airborne Lead and Carbon Monoxide at 45th Street, New York City: <i>J. L. Bové and S. Siebenberg</i> . . . . .	986

<b>BOARD OF DIRECTORS</b>	<b>H. BENTLEY GLASS</b> Retiring President, Chairman	<b>ATHELSTAN SPILHAUS</b> President	<b>MINA REES</b> President-Elect	<b>RICHARD H. BOLT</b> LEWIS M. BRANSCOMB	<b>BARRY COMMONER</b> GERALD HOLTON
<b>VICE PRESIDENTS AND SECTION SECRETARIES</b>	<b>MATHEMATICS (A)</b> Mark Kac F. A. Ficken	<b>PHYSICS (B)</b> Nathaniel H. Frank Albert M. Stone	<b>CHEMISTRY (C)</b> Charles G. Overberger Leo Schubert	<b>ASTRONOMY (D)</b> John W. Fifer Frank Bradshaw Wood	
	<b>ANTHROPOLOGY (H)</b> Jesse D. Jennings Anthony Leeds	<b>PSYCHOLOGY (I)</b> Wendell R. Garner William D. Garvey	<b>SOCIAL AND ECONOMIC SCIENCES (K)</b> Sheldon and Eleanor Glueck Harvey Sapolsky	<b>HISTORY AND PHILOSOPHY OF SCIENCE (L)</b> Loren C. Eiseley Raymond J. Seeger	
	<b>PHARMACEUTICAL SCIENCES (Np)</b> Joseph P. Buckley Joseph A. Oddis	<b>AGRICULTURE (O)</b> T. C. Byerly Michael A. Farrell	<b>INDUSTRIAL SCIENCE (P)</b> Gordon K. Teal Burton V. Dean	<b>EDUCATION (Q)</b> R. Will Burnett J. Myron Adlin	
<b>DIVISIONS</b>	<b>ALASKA DIVISION</b> Victor Fischer President Irma Duncan Executive Secretary	<b>PACIFIC DIVISION</b> William C. Snyder President Robert C. Miller Secretary	<b>SOUTHWESTERN AND ROCKY MOUNTAIN DIVISION</b> Newell A. Younggren President Marlowe G. Anderson Executive Secretary		

SCIENCE is published weekly on Friday and 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. Copyright © 1970 by the American Association for the Advancement of Science. Annual subscription \$12; foreign postage: Americas \$3; overseas \$5; single copies, 50¢ (back issues, \$1) except Guide to Scientific Instruments and the 30 January issue, which are \$3 each. School year subscription: 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

Potassium Ion Specific Electrode with High Selectivity for Potassium over Sodium: <i>M. S. Frant and J. W. Ross, Jr.</i>	987
Placental Transfer of a Substituted Pteridine from Fetus to Mother: <i>J. L. McNay and P. G. Dayton</i>	988
Environmental and Genetical Contributions to Class Difference: A Model Experiment: <i>J. M. Thoday and J. B. Gibson</i>	990
Bladder Cancer Induction by Aromatic Amines: Role of <i>N</i> -Hydroxy Metabolites: <i>J. L. Radomski and E. Brill</i>	992
Beta Glucuronidase Activity in Skin Components of Children with Cystic Fibrosis: <i>G. E. Gibbs and G. D. Griffin</i>	993
Horseshoe Crab Lactate Dehydrogenase: Tissue Distribution and Molecular Weight: <i>E. J. Massaro</i>	994
Production of Mouse Urinary Bladder Carcinomas by Sodium Cyclamate: <i>G. T. Bryan</i> and <i>E. Erturk</i>	996
Proinsulin: Metabolic Effects in the Human Forearm: <i>S. E. Fineberg</i> and <i>T. J. Merimee</i>	998
Somatic Association in <i>Avena sativa</i> L.: <i>J. P. Dubuc</i> and <i>R. C. McGinnis</i>	999
Cerebral Hemorrhage in Relation to Birth Asphyxia: <i>W. F. Windle</i>	1000
Neutrophils: Their Role in the Formation of a Tick Feeding Lesion: <i>R. J. Tatchell</i> and <i>D. E. Moorhouse</i>	1002
Alanine: Key Role in Gluconeogenesis: <i>P. Felig et al.</i>	1003
Alcohol, Amines, and Alkaloids: A Possible Biochemical Basis for Alcohol Addiction: <i>V. E. Davis</i> and <i>M. J. Walsh</i>	1005
Cretinism in Rats: Enduring Behavioral Deficit Induced by Tricyanoaminopropene: <i>J. W. Davenport</i>	1007
Directional Hearing: Effect of Unilateral Change of the Sound Duration: <i>N. Y. Alexeenko</i>	1009
Unilateral Inhibition of Sound-Induced Convulsions in Mice: <i>R. L. Collins</i>	1010
Technical Comments: Earthquakes and Nuclear Detonations: <i>D. L. Anderson et al.</i> ; <i>J. H. Allen</i> and <i>L. F. Bailey</i> ; <i>A. Ryall</i> and <i>G. Boucher</i> ; <i>C. Emiliani</i> , <i>C. G. A. Harrison</i> , <i>M. Swanson</i> ; Bentonite Landslides: <i>D. B. Prior</i> and <i>C. Ho</i> ; <i>D. M. Anderson</i> , <i>J. Brown</i> , <i>R. C. Reynolds</i> ; $\alpha_1$ -Antitrypsin Deficiency: <i>J. Lieberman</i> ; <i>F. Kueppers</i> ; Monosodium Glutamate: Specific Brain Lesion Questioned: <i>C. U. Lowe</i> ; <i>M. R. Zavon</i> ; <i>J. W. Olney</i> and <i>L. G. Sharpe</i>	1011

<b>MEETINGS</b>	Enzyme Regulation in Mammalian Tissues: <i>G. Weber</i> ; Courses	1018
-----------------	---	------

PHYLLIS V. PARKINS  
LEONARD M. RIESER

KENNETH V. THIMANN

WILLIAM T. GOLDEN  
Treasurer

DAEL WOLFLE  
Executive Officer

GEOLOGY AND GEOGRAPHY (E)  
Richard H. Mahard  
William E. Benson

ZOOLOGICAL SCIENCES (F)  
David Bishop  
David E. Davis

BOTANICAL SCIENCES (G)  
William A. Jensen  
Arthur W. Cooper

ENGINEERING (M)  
Paul Rosenberg  
Newman A. Hall

MEDICAL SCIENCES (N)  
Allan D. Bass  
F. Douglas Lawason

DENTISTRY (Nd)  
Robert S. Harris  
Richard S. Manly

INFORMATION AND  
COMMUNICATION (T)  
Dale B. Baker  
Ileen E. Stewart

STATISTICS (U)  
Ezra Glaser  
Rosedith Sitgreaves

ATMOSPHERIC AND HYDROSPHERIC  
SCIENCES (W)  
Robert M. White  
Louis J. Battan

## COVER

Composite of uranium oxide and tungsten. The bright tungsten fibers are exposed because a thin layer of the oxide matrix was selectively etched away. The sample was not coated with a conductive layer and the emissive mode was used at a viewing angle of 0 degree. The composite was unidirectionally solidified in a modified floating zone process ( $\times$  about 2300). See page 979. [R. J. Gerdes and A. T. Chapman, Georgia Institute of Technology; G. W. Clark, Oak Ridge National Laboratory]

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.



# Whatever range you're weighing in, Sartorius top-loaders are best to weigh it on.



#### COLUMN PRINTER-CALCULATOR

Adapts Sartorius top-loaders to automatic print out. Eliminates manual calculations and recording of results.

Meet the top-loaders that carry a lot of weight, particularly with people who have important weighing work to do—the Sartorius Series 2250 Balances.

These dependable, extremely accurate instruments have net capacities ranging from 160 g to 5000 g, with accuracies from 1 mg to 0.1 g. All 2250's have all-digital readout and huge optical scales with large numerals for easy reading, even under adverse lighting. They have no discernible swing or deviation from the indicated weight, and all models in this series provide mechanical taring. Some models even feature automatic leveling systems, electrical output for external control or print out of results, and special tolerance weighing facilities. In short, there is a Sartorius 2250 top-loader to meet virtually every non-

analytical laboratory weighing situation, including direct weighing of unknowns and animals; rapid weighing-in of powders, liquids, granulated materials or fabricated parts; tolerance weighings; even below-balance weighings.

Choosing which model best suits your particular weighing requirements is probably the most serious problem you'll ever encounter with a Sartorius top-loader. The solution to that one is in our comprehensive new 52-page balance catalog. For your free copy, just write: Sartorius Division, Brinkmann Instruments, Cantiague Road, Westbury, N.Y. 11590.

**sartorius balances**

## 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

1970

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

1971

THOMAS EISNER	NEAL MILLER
AMITAI ETZIONI	BRUCE MURRAY
EMIL HAURY	JOHN R. PIERCE
DANIEL KOSHLAND, JR.	

### 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, PHILIP M. BOFFEY, JOEL R. KRAMER, ANDREW HAMILTON, NANCY GRUCHOW, SCHERRAINE MACK

*Research Topics:* ROBERT W. HOLCOMB

*Book Reviews:* SYLVIA EBERHART

*Editorial Assistants:* JOANNE BELK, ISABELLA BOULDIN, ELEANORE BUTZ, GRAYCE FINGER, NANCY HAMILTON, CORRINE HARRIS, OLIVER HEATWOLE, ANNE HOLDSWORTH, MARSHALL KATHAN, PAULA LECKY, KATHERINE LIVINGSTON, MARGARET LLOYD, VIRGINIA NUSSLE, PATRICIA ROWE, LEAH RYAN, LOIS SCHMITT, BARBARA SHEFFER, RICHARD SOMMER, YA LI SWIGART, ALICE THEILE, MARLENE TUCKER, MARIE WEBNER

\* *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. 10036: Robert S. Bugbee, 11 W. 42 St. (212-PE-6-1858); SCOTCH PLAINS, N.J. 07076: C. Richard Callis, 12 Unami Lane (201-889-4873); MEDFIELD, MASS. 02052: Richard M. Ezequille, 4 Rolling Lane (617-444-1439); CHICAGO, ILL. 60611: Herbert L. Burklund, Room 2107, 919 N. Michigan Ave. (312-DE-7-4973); BEVERLY HILLS, CALIF. 90211: Winn Nance, 111 N. La Cienega Blvd. (213-657-2772)

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 7, *Science*, 4 July 1969. ADVERTISING CORRESPONDENCE: Rm. 1740, 11 W. 42 St., New York, N.Y. 10036. Phone: 212-PE-6-1858.

## The Need for Basic Research

Basic science is attacked today from two major fronts. One attack stems from a mounting opinion, widely held and shared by some members of Congress and government, that the search for deeper insight into natural phenomena is an expensive luxury which should be supported only if it promises immediate payoff in terms of practical applications for industry, for medicine, or for national defense. The other attack comes from a significant part of the younger generation; they distrust science as being the source of industrial innovations leading to further deterioration of our environment, to further destructive applications in weaponry, and to further developments in our society toward Orwell's world of 1984. At best, they say, pure science is a waste of resources which would be better devoted to some immediate, socially useful purposes.

Caught between these two wedges, basic science is threatened, and its activities may be reduced further. Lack of material support and public disinterest and distrust not only endanger basic science now, they also jeopardize its future by increasing demoralization among working scientists and sharply reducing the influx of young people into science. The character of our higher education in science is to be blamed, too, because it too strongly emphasizes narrow specialization instead of broader training for more general scientific approaches. In consequence of these trends, the number of scientists adept at pure research is already small, and basic science is in process of shrinking toward insignificance in this country. This ominous trend must be combated.

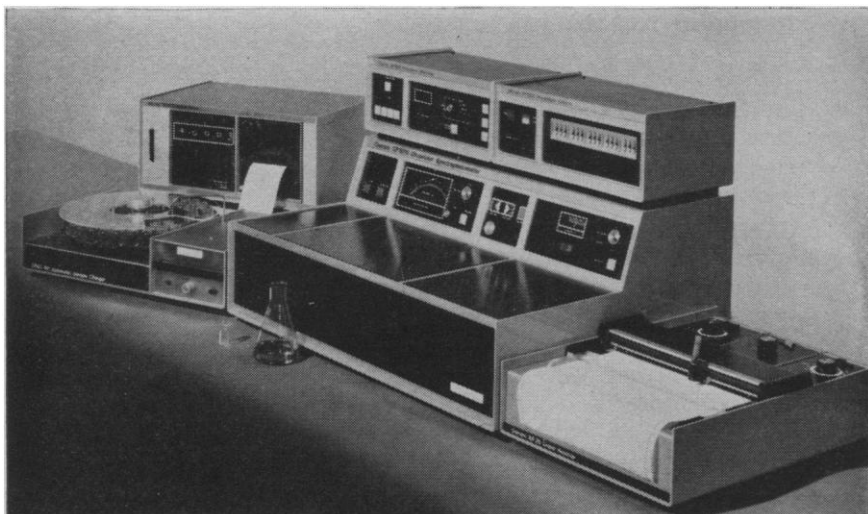
We live in critical times. The growing speed of technological change, and the growing expansion of technology over the globe, have created vast social and technical problems which must be attacked if we are to avoid major catastrophes. This attack must take the form of painstaking investigation of the effects of industrialization and thorough study of the interrelation of many factors which determine our environment. To proceed effectively will involve more basic science, not less. To quote Polanyi\*:

The scientific method was devised precisely for the purpose of elucidating the nature of things under more carefully controlled conditions and by more rigorous criteria than are present in situations created by practical problems. These conditions and criteria can be discovered only by taking a purely scientific interest in the matter, which again can exist only in minds educated in the appreciation of scientific value.

The careful analysis of the problems and the necessary measures for solving them will require more, not less, of the spirit engendered in pure research. We will need more, not fewer, people trained in pure research, in the unbiased search of causes and effects. The scientists who are involved in fundamental research have always proved to be the best reservoir of manpower for tasks requiring objectivity, innovative ideas, and imaginative approaches. We must not let the source of this reservoir dry up. We cannot afford to do what we did during World War II—to stop basic research for the duration, which for us was only 4 years. The present environmental trouble could well extend over many decades, during which time we must continue to train new generations of devoted young scientists. We need a continuous vigorous pursuit of basic research in this time of crisis, for its intrinsic values as well as for its role as a source of brainpower for the tasks which we will face in the future.—VICTOR F. WEISSKOPF, *Department of Physics, Massachusetts Institute of Technology*

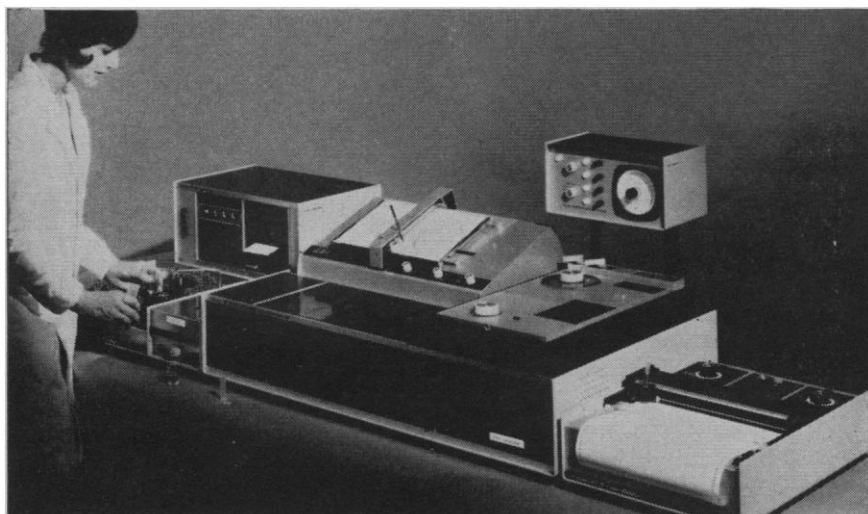
\* M. Polanyi, *Personal Knowledge* (Chicago Univ. Press, Chicago, 1958), p. 182.

# 3 ways to go into analysis.



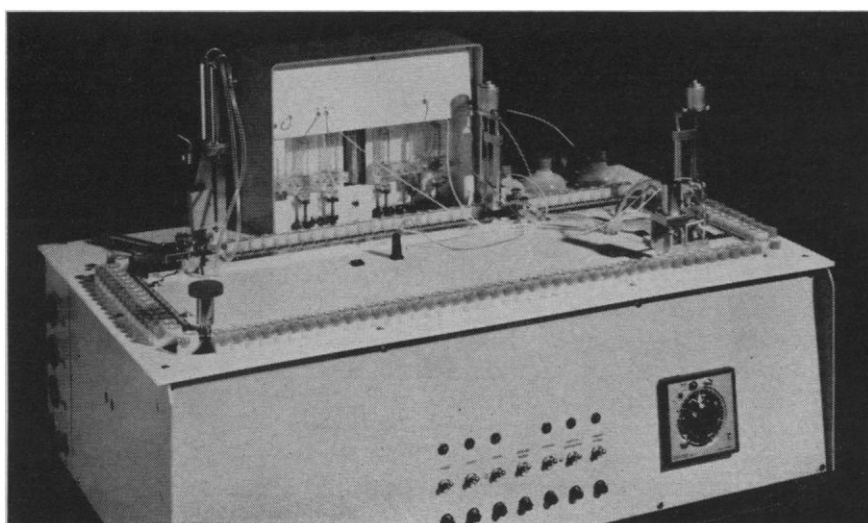
## 1. Unicam SP1800 Spectrophotometer

- Unique flat-bed recorder
- Pre-selected wavelength range scanning
- Exceptional kinetic capability
- Second sample position
- Digital readout and printout facilities
- Concentration calibration capability
- Wavelength and absorbance scale expansion
- Automatic wavelength selection



## 2. Unicam SP8000 Spectrophotometer

- Low cost double beam grating instrument from \$5,000
- Four absorbance scales and concentration presentation
- Multichannel kinetic capability
- Second sample position (for turbid solutions)
- Automatic wavelength selection
- Digital printout
- Automatic sample changer



## 3. AC 60 Automatic Chemistry Systems.

- Up to 120 analyses per hour
- Multiple automatic Enzyme capability
- Absolute minimum contamination with unique auto-flush system
- Wide range of methodology
- Very low running and reagent costs
- Priced from \$5,500

**PHILIPS  
ELECTRONIC  
INSTRUMENTS**

750 S. FULTON AVE., MT. VERNON, N.Y. 10550  
A DIVISION OF PEPI, INC.



## Here's an Instrument that can make the Gradient.

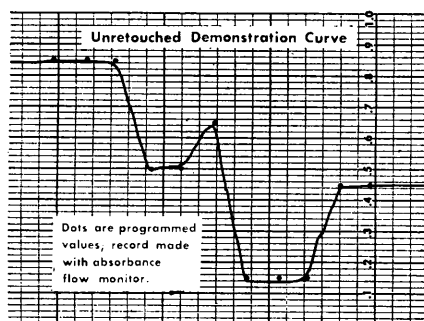


### FOR CHROMATOGRAPHIC ELUTION OR FILLING ZONAL ROTORS

With a capacity of 3200 ml/hr, the Model 380 DIALAGRAD Programmed Gradient Pump is especially suited for filling zonal rotors as well as forming liquid chromatographic elution gradients and similar applications. Almost any two component gradient can be formed by simply setting a series of dials. There are no cams to cut or multiple solutions to mix at estimated concentrations. The shape of the curve is determined by setting eleven 0 to 100% dials which represent the initial, final, and nine evenly spaced intermediate ratios. This gives 10 program intervals, each of which are automatically subdivided by five linear interpolations to produce a smooth gradient.

Calibrated flow rates from 1 to 3200 ml/hr and program durations from 5 minutes to 16 days are set with positive stop switches. The DIALAGRAD will produce linear or curved gradients with equal accuracy and the program will be perfectly reproducible run after run. The instrument takes but a few minutes to program and requires no attention during a program run.

For more information, please request Brochure DP 37.



INSTRUMENTATION  
SPECIALTIES CO.  
4700 SUPERIOR LINCOLN, NEBRASKA 68504  
PHONE (402) 434-0231 CABLE ISCOLAB LINCOLN

in cancer cells and the degree of differentiation of this organ-specific isozyme whose pattern changes irreversibly in the course of development. The activity of the marker enzyme does not change in regenerating liver or after various hormonal treatments. H. Inoue (University of Wisconsin Medical School, Madison) observed two forms of the enzyme serine dehydratase in liver and hepatomas. The two forms appear to be regulated by different environmental mechanisms. Serine dehydratase in the rat occurs only in the liver. These studies again emphasize that the mammalian cell must have considerably greater flexibility in the regulation of enzyme synthesis than the bacterial cell. This may in part be due to the complex structure of the mammalian cell with spatial separation of the synthesis of different forms or to even more subtle distinctions in the regulation of the synthesis of such closely related isozymes.

In a session on Control Mechanisms in Tumors, V. R. Potter (University of Wisconsin Medical School, Madison) described the induction of an enzyme in Morris hepatoma 9618-A that was thought to be noninducible. Tyrosine transaminase in hepatoma 9618-A is very low in activity on standard diets and is unaffected by a 60 percent protein diet or by hydrocortisone injections, either of which induces high amounts of activity in normal liver. Thus it might have been assumed to be "uninducible" or "deleted." Potter reported that such interpretations were now untenable and that the lack of an enzyme or the failure to induce an enzyme under conditions that result in enzyme induction in differentiated tissues of adults no longer suffices to define the state of the genome in a neoplasm. The experiment in which the enzyme was induced in the hepatoma was the culmination of numerous trials using inductive procedures designed on the assumption that the hepatoma cells resemble fetal cells more closely than they resemble adult liver cells. G. Galli (University of Milan, Milan, Italy) investigated the latest stages of cholesterol biosynthesis in rat liver, in growing and adult central nervous systems, and in experimental and spontaneous brain tumors. The incorporation of a specific precursor (mevalonic acid) in the individual sterols, particularly in brain and brain tumors, was established, and a biosynthetic sequence was described. A new precursor of cholesterol, 4,4-

dimethyl-5 $\alpha$ -cholesta-8,14 dien-3  $\beta$ -ol, was identified, and its formation and role were discussed. G. A. LePage (University of Texas, Houston) discussed two examples in which the tumors had suffered partial deletion of catabolic enzymes or changes in enzyme-substrate specificity. In one case, the alpha-enomer of a fraudulent nucleoside was inert in mouse bone marrow but was phosphorylated to the active nucleotide form in some neoplastic tissues. Neoplastic tissues that phosphorylated the nucleoside, alpha-2'-deoxythioguanosine, were responsive to treatment with this nucleoside. In a second case the analogs of adenosine, arabinosyladenine, and xylosyladenine were carcinostatic in some neoplasms. Evidence was obtained for variation in the relative rates of deamination of ribosyladenine, arabinosyladenine, and xylosyladenine from one species to another and from one tumor to another within a species.

GEORGE WEBER

Pharmacology Department,  
Indiana University School of Medicine,  
Indianapolis 46202

#### Notes

1. The full text of the papers, edited by the chairman of the conference, George Weber, will be published in the spring of 1970 as volume 8 of *Advances in Enzyme Regulation* (Pergamon, New York and Oxford, in press).
2. The conference was sponsored by the Indiana University School of Medicine, Burroughs-Wellcome and Co., Hoffman-LaRoche, Eli Lilly and Co., and the Squibb Institute for Medical Research.

#### Courses

**Summer Institute on Surtsey**, 15 June–1 July. An interdisciplinary course to study the geological, geochemical, geophysical, biological, and ecological implications of the new volcanic island, Surtsey, and selected areas of Iceland. Is intended for university teachers and research workers. Financial support is available for 14 participants. *Deadline for receipt of applications*: 1 March. (Prof. James W. Skehan, S.J., Department of Geology and Geophysics, Boston College, Chestnut Hill, Mass. 02167)

**Field Ion and Field Emission Microscopy**, Gainesville, Fla., 23–27 March. Among the subjects to be covered are geometry of surfaces and computer techniques, electronic structure of surfaces, field electron emission, field ionization and image formation, field evaporation, grain boundaries and interfaces, metallurgical applications, and atomic order. Travel and subsistence allowances and/or tuition waivers have been made available by the National Science Foundation. (Dr. J. J. Hren, Department of Metallurgical and Materials Engineering, University of Florida, Gainesville 32601)