

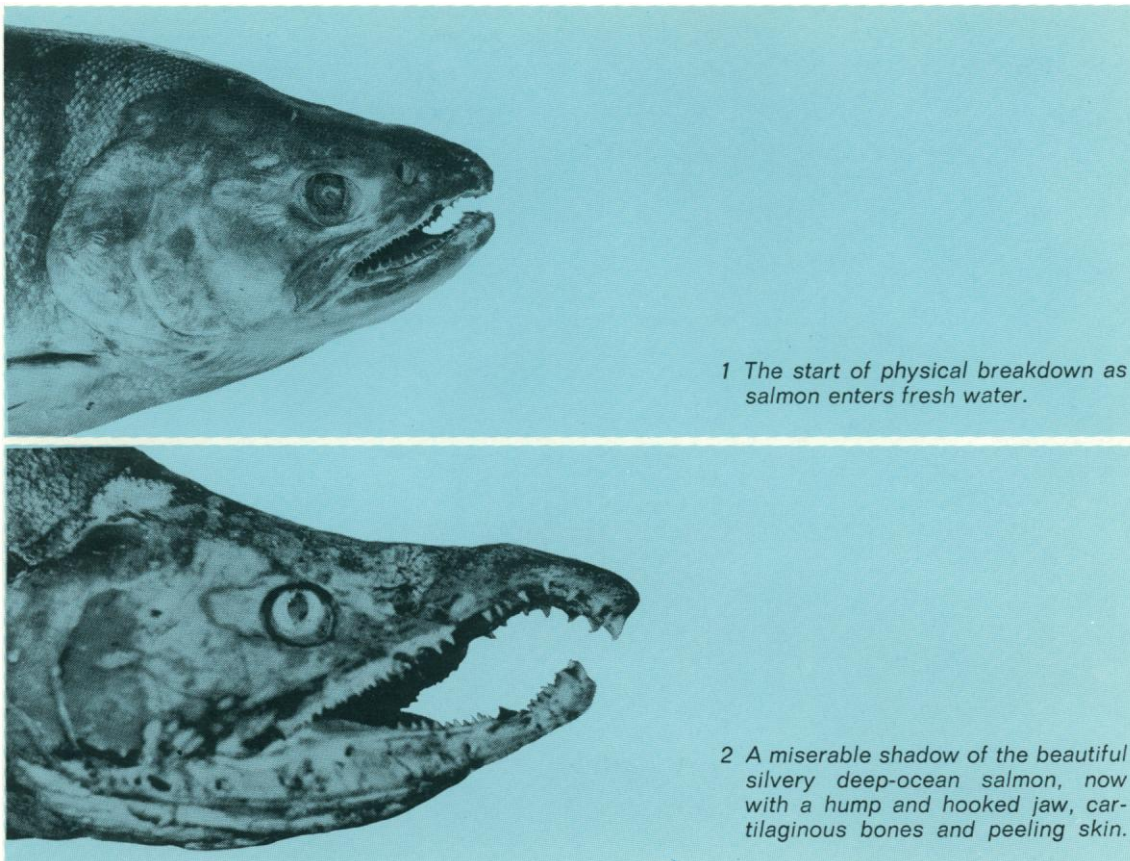
SCIENCE

25 December 1970

Vol. 170, No. 3965



Index Issue



1 The start of physical breakdown as salmon enters fresh water.

2 A miserable shadow of the beautiful silvery deep-ocean salmon, now with a hump and hooked jaw, cartilaginous bones and peeling skin.

Kind permission of Oceans Magazine



The Ultratome at Sea

LKB have taken part in another "first", this time at sea, aboard the "Alpha Helix".

The "Alpha Helix" investigations concerned the rapid aging of salmon, illustrated in the photos above, which occurs when the salmon enter fresh waters on their spawning run.

During the autumn of 1968 the first electron-micrograph made aboard a ship, was produced on this physiological-research vessel belonging to the University of California, San Diego's Scripps Institution of Oceanography. A standard LKB Ultratome cut the sections.

Excellent results were achieved, even when the ship was under way, in the open sea. There could hardly be a more convincing demonstration of the versatility of the LKB Ultratome.

Some of the answers found by the research team could have a direct application to man, and ultimately help to reduce the physical and mental deterioration associated with human aging.

Sales and service in USA: New York, Boston, Washington, Chicago, St. Louis, Atlanta, Houston, Los Angeles; in Europe: Stockholm, The Hague, Copenhagen, Rome, Vienna, London; and throughout the world.



IN THE SERVICE OF SCIENCE

LKB INSTRUMENTS INC. 12221 PARKLAWN DRIVE, ROCKVILLE MD. 20852
11744 WILSHIRE BLVD. LOS ANGELES CALIF. 90025
6600 WEST IRVING PARK ROAD, CHICAGO, ILL. 60634

8800-A20(1)

*Suggested Reading on the
Environment*



Estuaries

The development of coastal areas has been very rapid in recent years, but knowledge of estuarine environments has not kept pace with the necessity to resolve problems arising from their intensive use. This is the first comprehensive collection of scientific papers covering the comparatively new field of estuarine research.

This volume contains 71 articles on physical and biological factors, geomorphology, sediments and sedimentation, microbiota, ecology, evolution, fisheries, human influences and pollution.

Edited by George H. Lauff. 1967. 2nd printing, 1968. 776 pages. Illustrated. Bibliography. Indexes.

Agriculture and the Quality of Our Environment

This symposium is basically concerned with the problem of how environmental quality affects agriculture, and how agriculture affects the quality of the environment. It identifies the part which science must play in solving environmental pollution problems.

Edited by N. C. Brady. 1967. 476 pages. Bibliography. Author and subject indexes.

Air Conservation

This is a report of deliberations of the Air Conservation Commission of the AAAS over a 2-year period. It pulls together into a single reference a wealth of information presented by authorities in the fields of conservation, pollution control, pollutants and their effects, law, economics, meteorology, public health, public opinion and government.

The *Bulletin* of the American Meteorological Society calls this work "the most thoughtful, realistic and penetrating analysis of air pollution as a factor in the societies of today and tomorrow now available. It is a *must* for the serious student and professional, and can be highly recommended to the interested citizen."

Report of the AAAS Air Conservation Commission; James P. Dixon, Chairman. 1965. 2nd printing, 1968. 348 pages. Illustrated. Bibliography. Index.

Oceanography

A collection of 30 papers presented at the first International Oceanographic Congress by world-renowned authorities. An interdisciplinary reference that deals with some of mankind's most profound questions . . . the origin and history of living things, for example, and the history of our galaxy as recorded in marine sediments.

Edited by Mary Sears. 1961. 5th printing, 1969. 665 pages. 146 illustrations. Bibliography. Subject index. Author index.

Mail to AAAS, Dept. HN, 1515 Massachusetts Ave., NW, Washington, D.C. 20005

Please send the following:

Quantity

_____ *Estuaries* (Retail price, \$27; AAAS member price when payment enclosed, \$24)

_____ *Agriculture and the Quality of Our Environment* (Retail price, \$13.50; AAAS member price when payment enclosed, \$11.50).

_____ *Air Conservation* (Retail price, \$8; AAAS member price when payment enclosed, \$7)

_____ *Oceanography* (Retail price, \$14.75; AAAS member price when payment enclosed, \$12.50)

Name _____

Address _____

Zip _____

25 December 1970

Vol. 170, No. 3965

SCIENCE

LETTERS	Private Sector: A Proven Record: <i>R. Bennett</i> ; Equal Work—Unequal Pay: <i>T. T. Kennedy</i> ; <i>H. H. Rothman</i> ; <i>K. Graubard</i> ; Boston Science Museum: No Political Hotbed: <i>D. H. Sheingold</i> ; <i>E. E. Spinney</i> ; <i>W. W. Point</i> ; How to Approach Dwindling Funds: <i>W. P. Jacobs</i>	1358
EDITORIAL	Science on a Tight Budget: <i>B. H. Flowers</i>	1361
ARTICLES	Galaxies and the Universe: <i>J. H. Oort</i>	1363
	Computer-Based Chemical Information Services: <i>E. M. Arnett</i>	1370
	Education beyond the Horizon: <i>L. P. Grayson</i>	1376
NEWS AND COMMENT	Federal Science: Differences of Opinion in the Highest Councils	1383
	Aerospace: Unemployed Scientists, Engineers Have No Place to Go	1384
	APA Information Plan Funded	1385
	Timber Management: Improvement Implies New Land-Use Policies	1387
BOOK REVIEWS	<i>Alfred Kroeber</i> , reviewed by <i>H. E. Driver</i> ; other reviews by <i>D. A. Roe</i> , <i>D. E. Young</i> , <i>C. A. Streuli</i> , <i>L. Brand</i> , <i>C. Waymouth</i> , <i>J. J. Schwab</i> ; Books Received	1391
REPORTS	Water Drop Freezing: Ejection of Microdroplets: <i>R. J. Cheng</i>	1395
	Rate of Decomposition of GB in Seawater: <i>J. Epstein</i>	1396

BOARD OF DIRECTORS

H. BENTLEY GLASS
Retiring President, Chairman

ATHELSTAN SPILHAUS
President

MINA REES
President-Elect

DAVID BLACKWELL
RICHARD H. BOLT

LEWIS M. BRANSCOMB
BARRY COMMONER

VICE PRESIDENTS AND SECTION SECRETARIES

MATHEMATICS (A)
R. P. Boas
F. A. Ficken

PHYSICS (B)
R. G. Sachs
Albert M. Stone

CHEMISTRY (C)
Herman S. Bloch
Leo Schubert

ASTRONOMY (D)
Helmut A. Abt
Arlo U. Landolt

ANTHROPOLOGY (H)
Margaret Mead
Anthony Leeds

PSYCHOLOGY (I)
Frank W. Finger
William D. Garvey

SOCIAL AND ECONOMIC SCIENCES (K)
Robert M. Solow
Harvey Sapolsky

HISTORY AND PHILOSOPHY OF SCIENCE (L)
George Wald
Raymond J. Seeger

PHARMACEUTICAL SCIENCES (Np)
Don E. Francke
Joseph A. Oddis

AGRICULTURE (O)
Matthias Stelly
Michael A. Farrell

INDUSTRIAL SCIENCE (P)
Sherwood L. Fawcett
Burton V. Dean

EDUCATION (Q)
Frederic B. Dutton
Phillip R. Fordyce

DIVISIONS

ALASKA DIVISION

T. Neil Davis
President
Irma Duncan
Executive Secretary

PACIFIC DIVISION

George E. Lindsay
President
Robert C. Miller
Secretary

SOUTHWESTERN AND ROCKY MOUNTAIN DIVISION

Loren D. Potter
President
Marlowe G. Anderson
Executive Secretary

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. Copyright © 1970 the American Association for the Advancement of Science. Annual subscription \$12; foreign postage: Americas \$3; overseas \$5; single copies, \$1 (back issues, \$2) except *Guide Scientific Instruments* which is \$4. 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

Auroral-Particle Precipitation and Trapping Caused by Electrostatic Double Layers in the Ionosphere: <i>R. D. Albert and P. J. Lindstrom</i>	1398
Is Ozone Trapped in the Solid Carbon Dioxide Polar Cap of Mars?: <i>H. P. Broida et al.</i>	1402
Jurassic Sandstone from the Tropical Atlantic: <i>P. J. Fox, B. C. Heezen, G. L. Johnson</i>	1402
Specificity of Antigen Recognition by Human Lymphocytes in vitro: <i>D. C. Zoschke and F. H. Bach</i>	1404
Cytotoxicity: Specificity after in vitro Sensitization: <i>S. Solliday and F. H. Bach</i>	1406
Postembryonic Development of Adult Motor Patterns in Crickets: A Neural Analysis: <i>D. R. Bentley and R. R. Hoy</i>	1409
Fluorocitrate Inhibition of Aconitase: Relative Configuration of Inhibitory Isomer by X-ray Crystallography: <i>H. L. Carrell et al.</i>	1412
Threonine Deaminase: A Novel Activity Stain on Polyacrylamide Gels: <i>R. S. Feldberg and P. Datta</i>	1414
A Thermophilic, Acidophilic Mycoplasma Isolated from a Coal Refuse Pile: <i>G. Darland et al.</i>	1416
Tongue Cooling: A New Reward for Thirsty Rodents: <i>J. Mendelson and D. Chillag</i> ..	1418
Adenyl Cyclase of Cultured Mammalian Cells: Activation by Catecholamines: <i>M. H. Makman</i>	1421
Visual Adaptation in Monkey Cones: Recordings of Late Receptor Potentials: <i>R. M. Boynton and D. N. Whitten</i>	1423
Superior Colliculus: Single Unit Responses to Stimulation of Visual Cortex in the Cat: <i>J. T. McIlwain and H. L. Fields</i>	1426
Visual Discrimination of Movement: Midbrain or Forebrain? <i>C. R. Hamilton and J. S. Lund</i>	1428
<i>Technical Comments: Energy and Epilepsy: R. C. Collins, F. Plum, J. Posner; A. P. Sanders et al.; Asteroid Landing: J. H. Guth; H. Alvéén and G. Arrhenius; Ionic Character of Bonds in Crystals: L. Pauling; J. C. Phillips</i>	1430

GERALD HOLTON
PHYLLIS V. PARKINS

LEONARD M. RIESER
KENNETH V. THIMANN

WILLIAM T. GOLDEN
Treasurer

WILLIAM BEVAN
Executive Officer

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

ZOOLOGICAL SCIENCES (F)
David Bishop
Richard J. Goss

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

ENGINEERING (M)
Newman A. Hall
Raynor L. Duncombe

MEDICAL SCIENCES (N)
Leon O. Jacobson
F. Douglas Lawrason

DENTISTRY (Nd)
Robert C. Likins
Richard S. Manly

INFORMATION AND
COMMUNICATION (T)
R. M. Hayes
Scott Adams

STATISTICS (U)
Douglas Chapman
Ezra Glaser

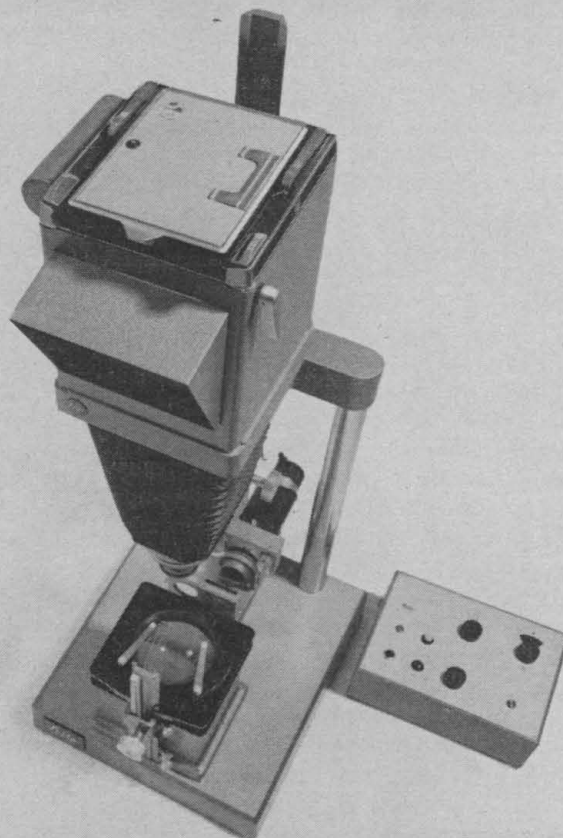
ATMOSPHERIC AND HYDROSPHERIC
SCIENCES (W)
Robert M. White
Louis J. Battan

COVER

Water droplets are ejected through pores on the outer ice shell of a freezing supercooled water drop. Some of the droplets are frozen by contact with the splinters from the frozen drop. See page 1395. [Roger J. Cheng, State University of New York, Albany]

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.

The 4"x5" lab camera that has a mind of its own.



It gives you perfect exposures. Automatically.

From cat jaw to concrete, from spleen to diatoms, whatever you photograph in your lab —the new model Leitz ARISTOPHOT bellows camera with automatic exposure control takes the guesswork out of it.

This exposure system is fully transistorized, with a photomultiplier detector, and practically unlimited exposure range. You get exact exposure control independent of bellows extension, eyepieces and methods of illumination. Exposure control is individually adjustable to the characteristics of each

specimen. And can also be set manually.

The ARISTOPHOT is extremely versatile. It can be used both with a microscope and a macroscopic setup. The film speed range is 6 ASA to 10,700 ASA. The built-in vibration damper on the shutter gives you perfect picture sharpness at all magnifications and shutter speeds.

Write for complete details and specifications to:

Leitz

E. Leitz, Inc., Rockleigh, N.J. 07647

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

WILLIAM BEVAN

Business Manager

HANS NUSSBAUM

Managing Editor: ROBERT V. ORMES

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

Assistant to the Editor: NANCY TEIMOURIAN

News and Comment: JOHN WALSH, PHILIP M. BOFFEY, LUTHER J. CARTER, ROBERT J. BAZELL, CONSTANCE HOLDEN, SCHERRAINE MACK

Research Topics: ALLEN L. HAMMOND

Book Reviews: SYLVIA EBERHART, KATHERINE LIVINGSTON, ANN BARKDOLL

Cover Editor: GRAYCE FINGER

Editorial Assistants: JOANNE BELK, ISABELLA BOULDIN, ELEANORE BUTZ, CORRINE HARRIS, OLIVER HEATWOLE, ANNE HOLDSWORTH, ELEANOR JOHNSON, MARSHALL KATHAN, MARGARET LLOYD, DANIEL RABOVSKY, PATRICIA ROWE, LEAH RYAN, LOIS SCHMITT, BARBARA SHEFFER, RICHARD SOMMER, YA LI SWIGART, ALICE THEILE, MARIE WEBNER

Membership Recruitment: LEONARD WRAY

Subscription: BETT SEEMUND

Addressing: THOMAS BAZAN

Advertising Staff

Director

EARL J. SCHERAGO

Production Manager

BONNIE SEMEL

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 xv, *Science*, 25 September 1970. ADVERTISING CORRESPONDENCE: Room 1740, 11 W. 42 St., New York, N.Y. 10036. Phone: 212-PE-6-1858.

Science on a Tight Budget

The British Science Research Council is now facing tight budgets. We have had to defer reaching a decision on several scientifically desirable major projects because, without an assurance of reasonable growth in our budgets, we cannot be sure of carrying every such large project through even when we know we can start it. We have not yet had to turn down any single outstandingly brilliant idea, however, and I hope we never shall. For sifting the bulk of the ideas that are put to us, the Council has been developing a policy of "selectivity and concentration."

In essence, the policy means preferential support for first-rate people doing first-rate science at the right places. In making our choices, we rely on the advice of independent scientists and engineers from universities, industry, and government. Each of the subject committees on which they sit has tried to pick out genuinely promising—as distinct from fashionable—fields for special encouragement. The inevitable corollary is marginally less support for fields not so selected.

We have also been publicly recognizing what no one privately denies: not all the 50 or so British universities can be equally good at everything. We have to concentrate our support: for example, only three major centers of control engineering, or two in enzyme chemistry and technology. This concentration may lead to only a dozen of our 50 universities becoming recognized as generally strong in science and engineering. The less favored may not even have an equal opportunity to achieve excellence, except in the very long term. That is something I do not feel comfortable about, but the alternative is to spread our limited resources too thinly to be effective anywhere.

There is a good sense in which our chosen centers may be self-perpetuating; namely, they ought to continue to attract bright young scientists and produce good ideas. But there is a bad sense, too; namely, we may be too scared to close them down even when the claims of others become stronger. We shall need courage. Moreover the most important discovery in British science in the next 30 years may well be made in a field no committee would select and at a university few people have heard of. That is why we insist that we shall always support outstanding scientists, whatever they do and wherever they work, and shall always provide funds for trying out good new ideas.

We are also insisting ever more strongly that the universities themselves provide reasonable backing for the research we support. A university may, therefore, be unable to start a new line of research, even with our support, unless it stops something else. I am unrepentant about that. "In recent years, it has become just a bit too easy to get a Ph.D. of sorts, and an academic job of sorts, and a grant for research of sorts—to produce yet more Ph.D.'s of the same sort."*

So I am not despondent. And, though as an outsider I hesitate to comment, I hope the greater difficulties in the United States will do no lasting harm. They may even do good, by allowing the rest of us to catch up a little with you, so that you become the leaders of a world community of scientists instead of an Olympian elite that we cannot hope to compete with. And in a few fields, together with our colleagues in Europe, we shall continue to challenge your leadership.

—BRIAN H. FLOWERS, *Chairman, Science Research Council, London*

* J. M. Ziman, "Some pathologies of the scientific life," *Advan. Sci.* 27, 13 (1970).

AAAS Symposium Volumes

#92. Research for the World Food Crisis

1970. 330 pages. Editor: Daniel G. Aldrich, Jr., Chancellor, University of California, Irvine. Fifteen distinguished scientists demonstrate that the present revolution in agriculture is equal in importance to the Industrial Revolution. New methods and techniques have been developed which will make it possible to supply enough food to keep pace with the world's rapidly increasing population.

Price: \$12.50. AAAS Member's Cash Price: \$10.00.

#89. Biology of the Mouth

1968. 320 pages. Editor: Philip Person. A collection of comprehensive, multidisciplinary articles dealing with problems of the biology of the mouth and oral disease and also the borderlands where fundamental approaches and investigations in physics and chemistry relate to, and can be brought to bear on, such problems.

Price: \$10.00. AAAS Member's Cash Price: \$8.75.

#88. Folk Song Style and Culture

1968. 384 pages. Alan Lomax. The book affirms that song characteristics trace the main paths of many cultures; it also shows that specific qualities of song performance are directly related to identifiable attributes of ancient, modern, and primitive cultures.

Price: \$16.75. AAAS Member's Cash Price: \$14.50.

#87. Formulation of Research Policies

1967. 218 pages. Editors: Lawrence W. Bass and Bruce S. Old. Goals, accomplishments—and weaknesses—of past and present science policies of nations, government agencies, individual industries, and international organizations are given expert and candid appraisal in this work—the record of an exciting conference.

Price: \$7.75. AAAS Member's Cash Price: \$6.75.

#86. Ground Level Climatology

1967; 2nd printing, 1970. 408 pages. Editor: Robert H. Shaw. Relation of climate to the distribution and abundance of plants and animals; the effects of weather modification on physical processes within the microclimate; and the effects of moisture, temperature, and energy balance on physiological functions.

Price: \$12.50. AAAS Member's Cash Price: \$10.50.

#85. Agriculture and the Quality of Our Environment

1967; 2nd printing, 1970. 480 pages. Editor: N. C. Brady. Damage resulting from air pollutants; extent and consequences to agriculture of salt buildup in soils and water; dangers from radionuclide contamination of soil, water, and air. Extent of pesticide buildup in soil and water and of means to minimize potential hazards from pesticide use; siltation of reservoirs and streams and their nutrient enrichment; disposal of animal wastes.

Price: \$13.50. AAAS Member's Cash Price: \$11.50.

#84. **Molecular Mechanisms of Temperature Adaptation**
1967. 398 pages. Editor: C. Ladd Prosser. A collection of papers on the general physiology of temperature adaptation in cold-blooded animals, plants, and microorganisms.

Price: \$12.50. AAAS Member's Cash Price: \$10.50.

#83. Estuaries

1967; 2nd printing, 1968. 776 pages. Editor: George H. Lauff. The first comprehensive collection of scientific papers covering the comparatively new field of estuarine research. "Estuaries is recommended; it is likely to be the reference compendium on the subject for many years to come." (*Geotimes*, May-June 1968)

Price: \$27.00. AAAS Member's Cash Price: \$24.00.

#81. Environmental Variables in Oral Disease

1966. 328 pages. Editors: S. J. Kreshover and F. J. McClure. Contents: Geographical and clinical considerations; the oral environment—nutrition and dental caries; experimental considerations in oral soft lesions; prenatally occurring influences.

Price: \$8.75. AAAS Member's Cash Price: \$7.75.

#80. Air Conservation

1965; 3rd printing, 1970. 348 pages. "The result of a 2-year study by the AAAS Air Conservation Commission, all aspects—sociological, technical, political and biological—of air pollution are considered concisely." (*Chemical Processing for Operating Management*, May 1966)

Price: \$8.00. AAAS Member's Cash Price: \$7.00.

#79. Science in Japan

1965. 496 pages. Editor: Arthur H. Livermore. A broad and detailed review of recent scientific and technological developments in Japan.

Price: \$13.00. AAAS Member's Cash Price: \$11.00.

#78. Man, Culture, and Animals

1965; 3rd printing, 1970. 304 pages. Editors: Anthony Leeds and Andrew P. Vayda. "This volume contains articles pertaining to the relationship between man and animals in different parts of the world, covering the influence of domesticated and non-domesticated animals on a variety of cultures." (*Biological Abstracts*, 1 February 1966)

Price: \$8.00. AAAS Member's Cash Price: \$7.00.

#67. Oceanography

1961; 5th printing, 1969. 665 pages, 146 illustrations. Editor: Mary Sears. A collection of 30 papers presented at the first International Oceanographic Congress by world-renowned authorities. An interdisciplinary reference that deals with some of mankind's most profound questions . . . the origin and history of living things, for example, and the history of our galaxy as recorded in marine sediments.

Price: \$14.75. AAAS Member's Cash Price: \$12.50.

British Agents: Bailey Bros. & Swinfen, Ltd., Warner House, Folkestone, Kent, England

Clip out this Form. Fill in and Mail Today

Circle Volumes
You Wish To Order . . .

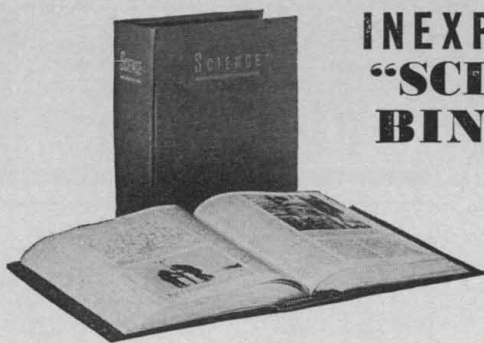
92		
89	88	87
86	85	84
83	81	80
79	78	67

American Association for the Advancement of Science
1515 Massachusetts Avenue, NW
Washington, D.C. 20005

Please send the symposium volumes circled on this form, to:

Name
Address
City State Zip Code

Note: Special prices are allowed only to AAAS members for orders submitted directly to AAAS with payment. Individual membership at \$12.00 per year includes a subscription to SCIENCE.



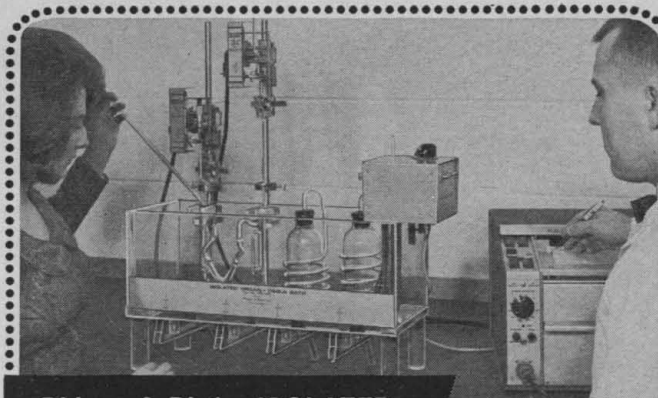
INEXPENSIVE "SCIENCE" BINDERS

Keep your copies of **SCIENCE** always available for quick, easy reference in this attractive, practical binder. Simply snap the magazine in or out in a few seconds—no punching or mutilating. It opens **FLAT**—for easy reference and readability. Sturdily constructed, this maroon buckram binder stamped in gold leaf will make a fine addition to your library.

SCIENCE Binders hold one three-month volume of **SCIENCE**. They have a 3¼-inch back and 13 flat fasteners. \$4.00 each. Four binders, \$15.00.

For orders outside the United States add 50¢ per binder. Imprint: name of owner, add 85¢ per binder; year of issues, for example, 1969-2, add 60¢ per binder.

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



Phipps & Bird • ISOLATED ORGAN/TISSUE BATH

Catalog No. 7053-400

**A compact system designed to aid
the investigator to obtain accurate,
reproducible measurements**

BIO-ASSAY SYSTEM TRANSDUCER—RECORDER

■ High Sensitivity ■ Precise Temperature Control ■ Allows Quick Attachment of Tissue ■ Tissue Can Be Washed Without Exposure or Chamber Can Be Drained ■ Writing Levers Available for Mechanical Operation

PHIPPS & BIRD, INC.



Manufacturers & Distributors of Scientific Equipment
6th & Byrd Sts. — Richmond, Va. 23205

Just published . . .

THE AAAS SCIENCE BOOK LIST (Third edition)

Citations and annotations on 2441 trade books, textbooks, and references in the pure and applied sciences for secondary school students, college undergraduates, teachers, and nonspecialist adult readers.

Supersedes the popular 1964 edition which has been widely used as a library acquisition and collateral reading guide.

Bound in sturdy green cloth, 452 pages, with author, title, and subject indexes and a directory of book publishers. Complete citation of each book includes, author, title, name of publisher, level of difficulty, descriptive annotation and price of book.

List price \$10

AAAS members' cash price, \$9.00

Send orders to
AAAS Publications Department BL
1515 Massachusetts Avenue, NW
Washington, D.C. 20005

Our retirement plan starts working long before you stop.

One of the beauties of the Investment Annuity* is that you don't have to wait until you retire to begin enjoying its benefits.

As an employee of a qualifying non-profit organization, your income tax liability drops the moment you make your first purchase contribution. And that's just the beginning.

The money you've paid in is immediately invested so that the potential for growth is there from the start. And it's enhanced by a full tax shelter, which means you pay no taxes on capital gains, interest or dividends from those investments until you begin receiving monthly payments at retirement.

Another thing you start enjoying right away is peace of mind. The assurance that you'll go into retirement with a guaranteed income . . . an income you can't outlive. An income that can provide for your survivors as well.

And just to frost the cake, your investments remain under your control at all times. You can put them in securities, mutual funds or a savings account. And you can change them whenever you wish. There's no such thing as being

permanently wedded to an insurance company's portfolio, as is required by other plans.

If you're not an employee of a qualifying non-profit institution, you may be able to purchase an Investment Annuity as a self-employed individual or as a member of a professional corporation.

Mail the coupon today and find out how you can start enjoying retirement benefits now. No matter how old you are.

*Reg. Service Mark

First Investment Annuity
Company of America
1845 Walnut Street, Phila., Pa. 19103

Gentlemen:
Please send me full information about the Investment Annuity. I am:

____ Employed by a non-profit organization
____ Self-employed
____ Associated with a professional corp.

Name _____

Address _____

City _____ State _____ Zip _____