


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, 1968-3, add 60¢ per binder.

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



## HEXOBARBITAL SODIUM

For use in the method of Reinhard and Scudi (*Proc. Exptl. Biol. & Med.* 100-381, 1959) for detecting depressant activity.

**NOW AVAILABLE**

Boxes of 10 x 1 Gm. Ampuls  
at \$25 per lot.

Special Chemicals Department

*Winthrop*  
LABORATORIES

90 Park Ave., New York, N.Y. 10016

## Immediate Openings:

# Space Sciences Department McDonnell Douglas Astronautics Company

**Physicist or Meteorologist** — specializing in radiative transfer through planetary atmospheres.

**Laboratory Assistants** — to carry out experimental research in planetary sciences.

**Senior Research Scientists** — in Geophysics, Astrophysics, Planetary Sciences, Space Physics, and Atmospheric Physics.

**Electronics Engineers** — with experience in circuit design for scientific experiments in satellite, rocket, and planetary probes.

**Specialists** — in UV, X-Ray, IR, Charged Particles, Passive Microwave, and EM field sensors.

If you are interested in a research group involved with programs such as satellite and space probe experiments, remote sensing, planetary science, lunar soil analysis, meteorology and space radiation, give us a call, collect.

Contact: A. D. Goedeke, Chief Scientist, Space Sciences Department, Area Code 213-399-9311, ext. 2626. Or send your resume in confidence to B. A. Stocks, McDonnell Douglas Astronautics Co., 3000 Ocean Park Boulevard, Santa Monica, California 90406.

**MCDONNELL DOUGLAS** 

An equal opportunity employer



## "ZONE ELECTROPHORESIS" by Ivor Smith

new, revised second edition: \$10

... the best book bargain for scientists

*Chromatographic and Electrophoretic Techniques* by Ivor Smith, lecturer in chemistry and biochemistry at the Courtauld Institute, Middlesex Hospital, London, contains two unique reference volumes. The just released and newly revised second edition of Volume II—*Zone Electrophoresis* details low and high voltage paper, cellulose acetate, immuno-diffusion, thin layer, starch gel, disc, preparative acrylamide and other electrophoretic techniques. Chapter texts are contributed by well-known and established authorities such as W. J. Ritschard and J. Kohn as well as Dr. Smith.

Volume I—*Chromatography* is also available from Shandon. This text of the two-book set, currently in its fourth printing since revision, covers all phases of chromatographic procedures.

Send your order for Volume II—*Zone Electrophoresis* (\$10.00) or Volume I—*Chromatography* (\$11.75) to Shandon Scientific Company, Inc., 515 Broad Street, Sewickley, Pa. 15143 (Pittsburgh District).



## Opportunities in Industrial Research

● **DRUG METABOLISM:** Opening for a recent Ph.D. with or without post-doctoral experience, in young, expanding group investigating the absorption, distribution, biotransformation and excretion of a wide variety of substances of potential therapeutic use. Both IN VIVO and IN VITRO techniques are employed and an opportunity for basic investigations in the field is available. Training should be chemical, biochemical or pharmacological with interest in drug metabolism.

● A similar position is open for a scientist with M.S. degree.

● **BIOCHEMISTRY:** Recent Ph.D. with major in Biochemistry for a position requiring broad interest in intermediary metabolism and special interest in oxidative phosphorylation.

● **ENDOCRINOLOGY:** Recent B.S., biology major, with an interest in primate research to join an established reproductive physiology group in the Endocrinology Section. Primary responsibilities will be in the primate phase of the program.

The Sterling-Winthrop Research Institute is the research division of Sterling Drug, Inc., one of the world's largest producers of medicinal agents. Sterling Drug manufactures professional, consumer and industrial products identified by more than a thousand brand names. The Institute employs over 600 people and is engaged in a very active pharmaceutical research program. It is near Albany, on a plateau overlooking the Hudson River Valley.

*Salaries open. Excellent employee benefits include educational assistance at local colleges. Travel and moving expenses paid.*

Send complete resume to C. E. Alford, Director of Personnel

### STERLING-WINTHROP RESEARCH INSTITUTE

Rensselaer

New York

*An Equal Opportunity Employer*

## Personnel Placement

**POSITIONS WANTED.** 25¢ per word, minimum charge \$4. Use of Box Number counts as 10 additional words. Payment in advance is required.

**POSITIONS OPEN.** Rates listed below—no charge for Box Number. Rates net. No agency commission allowed for ads under 4 inches. No cash discount. Minimum ad: 1 inch. Ads over 1 inch will be billed to the nearest half inch. Frequency rate will apply only to repeat of same ad. No copy changes. Payment in advance is required except where satisfactory credit has been established.

Single insertion	\$70.00 per inch
4 times in 1 year	65.00 per inch

**COPY** for ads must reach **SCIENCE** 4 weeks before issue date (Friday of every week).

Send copy for Personnel Placement advertising to:

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

Replies to blind ads should be addressed as follows:

Box (give number)  
**SCIENCE**  
1515 Massachusetts Ave., NW  
Washington, D.C. 20005

### POSITIONS WANTED

**Anatomy, D.Sc.;** neuropathology postdoctorate; desires research appointment. Woodward Personnel Bureau, 185 North Wabash, Chicago 60601. X

**Biochemist, Ph.D.,** age 25, seeks research or research with teaching position. Experience in RNA, protein and glycolipid biosynthesis. Box 372, **SCIENCE**. X

**Pharmacologist-Physiologist, Ph.D.,** 15 years' responsible experience, seeks relocation to academic position, Midwest, South, quick availability. Box 369, **SCIENCE**. X

**Physiologist-Pharmacologist, Ph.D.** 1962, seeks position in biology department with graduate program. Northeast preferred. Box 373, **SCIENCE**.

**Translations** of scientific literature from German and French into impeccable English. P.O. Box 489, Forest Hills, N.Y. 11375.

**Zoologist, Ph.D.** Canada 1960. Considerable university teaching experience, many publications. General biology, invertebrate zoology, entomology. Immediate teaching/research position. Box 371, **SCIENCE**. X

### POSITIONS OPEN

(a) **BIOCHEMIST** direct dept hosp lab, supv; to \$25,000; 300-bed hosp inc to 500; MidW. (b) **ASSOC RESEARCH DIRECTOR** full charge operation; mgt ability; supv; \$15,000; biomed research co; MidW. (c) **CHIEF CHEMIST** study pesticides-human health; \$10,000 up; med univ; S. (d) **PHARMACOLOGIST/PHYSIOLOGIST** admin ability; dean specialty col; \$15,000 up; MidW. (e) **DVM**; control test animal colony; asst pathology exams; \$12,000; drug mfr; E. (f) **ASST PROF BIOLOGY** teach genetics; 9 mo \$10,000; Lib A col; SE. (g) **MICROBIOLOGY LAB DIR.** develop new infectious disease lab service; large clinic, modern expg group; open; SW. **WOODWARD PERS BUREAU**, 185 N. Wabash, Chicago 60601. X

#### BIOCHEMIST Ph.D.

To work on the isolation and assay of complement components in a research program on tissue transplantation in Department of Surgery. Opportunity for independent research development and for an appointment in the Department of Biological Chemistry. Send curriculum vitae and references to **Dr. Thomas M. Devlin, Department of Biological Chemistry, Hahnemann Medical College, 235 N. 15th Street, Philadelphia, Pennsylvania 19102.**

## POSITIONS OPEN

Opening for **Head Librarian for Biological Science Library**. Degree in library science necessary with scientific background. Work with scientific staff to initiate and organize information alerting and retrieval services. Salary commensurate with experience. Mrs. Mabel Jacobsen, Placement Secretary, Worcester Foundation for Experimental Biology, Shrewsbury, Mass. 01545.

## BIostatistician

We are seeking a statistician at the masters level or above (or equivalent in experience).  
• Duties consist primarily of consulting & assisting in ongoing research. Some teaching will probably be required. There will be opportunities for independent or collaborative research.

Salary & rank depend on qualifications.

Please write or call  
Dr. Marvin Glasser, 212 TR 6-5500

**New York Medical College**  
FLOWER & FIFTH AVE. HOSPITALS  
5th Ave. & 106 St., N.Y., N.Y.

M.D./Ph.D.

## INVESTIGATIVE CYTOGENETICIST

B.S./M.S.

## MICROBIOLOGIST LIPID RESEARCH

## ASSISTANT

## MOBILE RADIOISOTOPE LAB INSTRUCTOR

Staff positions available with research and educational organization. Competitive salaries and benefit program. Send résumé to:

Personnel Office  
**OAK RIDGE**  
**ASSOCIATED UNIVERSITIES**  
P.O. Box 117  
Oak Ridge, Tennessee 37830  
*An Equal Opportunity Employer*

## ATOMIC ENERGY OF CANADA LIMITED requires two research scientists

for the  
**BIOLOGY AND HEALTH PHYSICS DIVISION**  
of its  
**CHALK RIVER NUCLEAR LABORATORIES**

## a BIOLOGIST

to study the effects of ionizing radiations in mammalian systems. Should have training in one of the biological disciplines such as physiology, genetics, cytology, or biochemistry; plus proven ability to plan and carry out independent research. Duties include studying the effects of radiation on laboratory animals or mammalian systems. A suitable study might deal with either the genetic of the physiological effects, or with the induction of cancer.

and either a

## RADIATION BIOLOGIST

with a background in physics for work on either the deposition and distribution of energy from ionizing radiation in biological systems, or the effects of ionizing radiation on mammalian cells.

or a

## PHYSICIST

with a strong background in nuclear, radiation or health physics for research into new methods and techniques in dosimetry and radiation protection. A capability to apply modern electronic circuit techniques would be an asset.

Modern laboratories, fringe benefits and pleasant living conditions. Quote all particulars in first letter to:

**FILE 8 B**  
**Atomic Energy of Canada Limited**  
Chalk River, Ontario

11 OCTOBER 1968

## POSITIONS OPEN

## PATENT LIAISON

Seeking Ph.D. in chemistry or chemical engineering with 3 or more years' experience in the patent area. Knowledge of licensing and legal contracts as well as patent agents certificate useful but not essential. We are looking for applicant strong in science and highly interested in patent work capable of assuming full responsibility for our patent program within two years. Will consider B.S. or M.S. with strong patent experience. Excellent working conditions, company-paid benefits include profit sharing, relocation expenses. Write to:

Manager of Administration  
**PHILIP MORRIS RESEARCH CENTER**  
P.O. Box 3-D  
Richmond, Va. 23206

*An Equal Opportunity Employer*

## PHYSICAL CHEMIST

Recent graduate, experimentally oriented. Will work on critical low fluid flow and surface chemistry problems. Major portion of time on actual experiments. Mechanical and chemical background desirable. Leading manufacturer of automated analytical instruments offering excellent opportunity with excellent company paid benefits. Send résumé to Personnel Manager.

## TECHNICON CORPORATION

Saw Mill River Road  
Ardsley, N.Y. 10502

## Ph.D. Immunohematology

Research interests in the field of immunohematology. This position is a new addition to our Immunological Development Group and involves research into the development of new diagnostic reagents.

ORTHO is located in an attractive suburban area of New Jersey near Princeton. If interested send resume including salary requirements to Mr. Richard Groben.

## ORTHO DIAGNOSTICS

(A Johnson & Johnson Company)

**RTE. 202, RARITAN, NEW JERSEY 08869**

*An Equal Opportunity Employer*

# Senior Scientist

## Can You

Provide technical leadership in the R&D of biological products for the Animal Health Division of a nationally known corporation?

## We Need:

A Scientist who probably has:  
A Ph.D. in Microbiology or Virology, 3 to 5 years of relevant experience

(Virology)  
(Tissue culture)  
(Microbiology)

## We Offer:

Excellent Compensation and Benefits. An opportunity for Professional and Personal Growth in a stimulating and challenging environment.

If qualified, send your resume in complete confidence to:

**Box 331, SCIENCE**

*An Equal Opportunity Employer*

## OCEANOGRAPHY

1961. Fourth Printing: September 1966. Invited lectures presented at the International Oceanographic Congress held in New York in 1959.

Edited by Mary Sears. 666 pp., 146 illus., indexes.

\$14.75. AAAS members' cash orders: \$12.50.

## Chapters:

### I. History of the Oceans

Authors: Gustaf Arrhenius, J. B. Bernal, Sir Edward C. Bullard, Maurice Ewing, Edwin L. Hamilton, G. E. Hutchinson, Mark Landisman, A. I. Oparin.

### II. Populations of the Sea

Trygve Braarud, H. O. Bull, G. S. Carter, Preston E. Cloud, Jr., Hermann Friedrich, R. S. Glover.

### III. The Deep Sea

M. N. Bramlette, W. S. Broecker, Anton F. Bruun, Maurice Ewing, R. D. Gerard, B. C. Heezen, W. V. R. Malkus, Edgard E. Picciotto, Torben Wolff, L. A. Zenkevitch.

### IV. Boundaries of the Sea

F. G. Barber, Erik Eriksson, P. H. Kuenen, Gunnar Thorson, J. P. Tully, Pierre Welander.

### V. Cycles of Organic and Inorganic Substances in the Ocean

L. H. N. Cooper, Edward D. Goldberg, Johannes Krey, G. E. Lucas, Lars Gunnar Sillén, John H. Steele.

## American Association for the Advancement of Science

1515 Massachusetts Avenue, N.W.  
Washington, D.C. 20005

## POSITIONS OPEN

### SCIENCE LIBRARIAN

Abbott Laboratories is internationally recognized as a major multi-product manufacturer in the expanding health care field.

We seek a degreed MLS with training in chemistry or biomedical sciences. These credentials will provide our candidate with the opportunity to participate in the development of a science library information system—including supervision of reference services and preparation of literature surveys and biographies in the biomedical area.

Pleasant suburban location within 40 miles of Chicago. In addition to fine starting salary and a professional atmosphere in which to advance your career, we offer an outstanding benefit package including profit sharing. Reply in full confidence to:

**E. W. Weidenfeller**  
Professional Employment  
ABBOTT LABORATORIES  
North Chicago, Illinois 60064

*An Equal Opportunity Employer*

### A Faculty Position in ECOLOGICAL CHEMISTRY

is announced by the Department of Chemistry  
State University College of Forestry  
at Syracuse University, Syracuse, N.Y. 13210

Applications are invited from Ph.D. chemists interested in the structure of natural products and their role in ecology. Applicants should be competent to use modern methods of separation and identification including mass spectrometry. The responsibilities of the position include independent and collaborative research on the isolation and structure proof of natural products of ecological significance, and graduate and undergraduate teaching in organic chemistry. Although the title of Assistant Professor is proposed, more advanced applicants will be considered. Write to Dr. C. Schuerch, Chairman.

### STATEMENT REQUIRED BY THE ACT OF OCTOBER 23, 1962: SECTION 4369, TITLE 39, UNITED STATES CODE SHOWING THE OWNERSHIP, MANAGEMENT AND CIRCULATION OF

SCIENCE published weekly on Friday and on the fourth Tuesday in November at 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Date of filing: 19 September 1968. This is also the address of the publisher, editor, and managing editor, who are, respectively, Dael Wolfe, Philip H. Abelson, and Robert V. Ormes.

The owner is American Association for the Advancement of Science, 1515 Massachusetts Avenue, NW, Washington, D.C. 20005. Stockholders: None.

Known bondholders, mortgagees, and other security holders owning or holding one percent or more of total amount of bonds, mortgages or other securities: None.

The purpose, function, and nonprofit status of this organization and the exempt status for Federal income tax purposes have not changed during preceding 12 months.

## POSITIONS OPEN

Applications are invited for two teaching-research posts (in epidemiology and in biostatistics) each at the rank of assistant professor in newly established French-language medical school in Canada. Send complete curriculum vitae at the earliest to: Chairman, Department of Epidemiology, University of Sherbrooke, Sherbrooke, Quebec.

### BIOLOGISTS

An animal physiologist and a population biologist-ecologist (Ph.D.'s) to teach in a core curriculum of expanding, young, and democratic modern biology department of new university. Opportunity for creativity in teaching and research. Rank and salary open. September 1969.

**BOX 376, SCIENCE**

### ELECTRON MICROSCOPIST

Experienced expert for research unit in Medical School situated in northeastern United States possessing excellent facilities. Dynamic outlook needed, combined with readiness to work on a team comprising biochemists, experimental pathologists, histochemists, and toxicologists. Reply with complete résumé and salary requirements to

**BOX 375, SCIENCE.**

### CHIEF MEDICAL TECHNOLOGIST

ASCP or Eligible. An unusual, challenging, and rewarding position (private laboratories) for an experienced person with managerial ability and proficiency in chemistry and microbiology.

**H. C. Bryant, M.D.**  
425 E. Washington Street  
Ann Arbor, Michigan 48108

## APPRENTICESHIP

**Apprenticeship Graduate Tool or Instrument Maker**, 8 to 10 years' professional experience minimum, over 35 years old, to run newly equipped one-man precision instrument shop, to design, fabricate, and modify research equipment in university science department. Equitable retirement plan, location in clean, quiet midwestern town. For details and interview contact Dr. David Filmer, Department of Biological Sciences, Purdue University, Lafayette, Indiana 47907.

## TRAINEESHIPS

**Postdoctoral Traineeships in Journal Editing.** Applications are invited for the second 8-month training program for executive editors of biomedical journals, to begin October 1969. Applicants must have a doctorate (Ph.D. or M.D.) in science and at least 3 years' research experience, including publication in scientific journals. No editorial experience is necessary. All aspects of journal editing and management will be taught through experience with editorial offices of five leading biomedical journals. Trainees will receive a stipend commensurate with their training, experience, and present status. Apply (enclosing a curriculum vitae) by 15 November to Dr. F. Peter Woodford, The Rockefeller University, New York 10021.

The average number of copies each issue during preceding 12 months are (A) Total No. copies printed: 144,543; (B1) Paid circulation through dealers and carriers, street vendors and counter sales: 36; (B2) Mail subscriptions: 138,156; (C) Total paid circulation: 138,192; (D) Free distribution (including samples) by mail, carrier or other means: 4,865; (E) Total distribution: 143,057; (F) Office use, left over, unaccounted, spoiled after printing: 1,486; (G) Total: 144,543.

Single issue nearest to filing date: (A) Total No. copies printed: 145,400; (B1) Paid circulation through dealers and carriers, street vendors and counter sales: 32; (B2) Mail subscriptions: 140,413; (C) Total paid circulation: 140,445; (D) Free distribution (including samples) by mail, carrier or other means: 3,589; (E) Total distribution: 144,034; (F) Office use, left over, unaccounted, spoiled after printing: 1,366; (G) Total: 145,400.

I certify that the statements made by me above are correct and complete.

(signed) HANS NUSSBAUM  
Business Manager

## The Market Place

BOOKS • SERVICES • SUPPLIES • EQUIPMENT

### AUTHORS WANTED BY NEW YORK PUBLISHER

Your book can be published, promoted, distributed by a reliable company on a subsidized basis. Fiction, non-fiction, poetry, scholarly, scientific and even controversial manuscripts welcomed. For Free Booklet write Vantage Press, Dept. SC, 120 W. 31 St., New York 10001.

**SPRAGUE-DAWLEY, INC.**  
Pioneers in the development of the  
STANDARD LABORATORY RAT  
P.O. Box 4220  
Madison, Wisconsin  
CE 3-5318

### Now RADIO- AUTOGRAPHY

made fast and easy with self-contained, table-top exposure chamber.

For information on the Con-Rad/Joffe Fluid Emulsion System, write to:  
Laboratory Products Division  
ISOTOPES, 50 Van Buren Avenue  
Westwood, New Jersey 07675



Publicly held Research and Development Corporation interested in acquisition of small business in any of the following areas:  
**PHARMACOLOGY MICROBIAL PRODUCTS  
BIOLOGIES BIOLOGICAL SPECIALTIES  
ANTIBIOTICS**

Life Sciences, Inc.  
2950 72nd St., North  
St. Petersburg, Fla. 33710

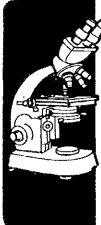
### ULTRA-PURE WATER

Triply Distilled from  $KMnO_4$  in Quartz  
Specifications Upon Request  
\$9.50/gallon

Prompt Delivery  
**CHEMATECS RESEARCH**  
7040 Darby Avenue Reseda, California 91335  
Telephone: (213) 342-8383

### TRACE ELEMENT PROBLEMS?

Contact Activation Analysis Service,  
Dept. A-234, Gulf General Atomic Incorporated, P.O. Box 608, San Diego, California 92112. Or phone collect 714/453-1000, Ext. 421.



### Histology Service, Inc.

Servicing Pharmaceutical Industry.  
Toxicologists and Research Projects.  
Emergency Service for peak load periods.

Serial Sections—Special stains.  
Full Range of Histology Studies and Chemical Analyses.

Division of  
Lawndale Laboratory (215) RA 5-5103  
6190 Rising Sun Avenue  
Philadelphia, Pa. 19111



CHESTERTOWN, MARYLAND 21620

Manufacturers of chemical testing equipment  
and accessories since 1919  
Write Dept. H for free catalog