microsomal enzyme function. For example, barbiturates are potent inducers of detoxifying microsomal enzymes; conversely, microsomal enzyme functions are inhibited by cannabinol constituents of marihuana and by 3,4-methylenedioxyamphetamine (structurally related to piperonyl butoxide, a pesticide synergist and potent microsomal enzyme inhibitor).

While population surveys are helpful in establishing shifts in usage patterns of various drugs of abuse, they are unlikely to be useful in monitoring or detecting chronic hazards. Epidemiological approaches were discussed both generally and in specific relation to mutagenic effects. Detecting such hazards typically requires very large population samples, which practical considerations limit. However, valuable epidemiologic data on drugs of abuse, as well as on a variety of other environmental influences, could well accrue from a uniform nationwide registration for congenital anomalies. For example, if LSD was a powerful teratogen, this might manifest by a significant clustering of birth defects in younger mothers in metropolitan districts. No such fluctuations have been observed. However, present systems of data collection are only marginally capable of detecting gross effects.

The scientific literature on carcinogenicity, teratogenicity, and mutagenicity of drugs of abuse is almost nonexistent, with the notable exception of that on cytogenetic effects of LSD. Carcinogenicity was discussed with particular reference to problems of biotransformation of precarcinogens and carcinogens, the need for enhancing the sensitivity of standard animal tests, and their high degree of human relevance. Feeding or other appropriate administration of high test doses to rodents, from early infancy onward, may help to reduce the insensitivity of current carcinogenicity tests which must use numbers of rodents incomparably smaller than the large human populations at presumptive risk. The recent Bionetics study on pesticides (sponsored by the National Cancer Institute) demonstrates that such techniques do not produce false positives. With regard to teratogenicity testing, while standard protocols are available, these could be made less empirical if modified in light of data on metabolic transformation and on the duration of sensitivity of any particular developing organ to any drug.

Inframammalian models for mutagenicity testing—bacteria, *Neurospora*, *Drosophila*, and in vitro cytogenetics—were considered to yield useful information. Mammalian methods, however, provide information with a higher degree of presumptive human relevance. Such systems, which are both sensitive and practical, include in vivo cytogenetics, the host-mediated assay, in which bacteria or *Neurospora* are tested in a mammalian milieu, and the dominant lethal assay. A combination of mammalian and ancillary submammalian tests are likely to detect all chemicals producing point mutations or chromosome anomalies.

Early cytogenetic studies on LSD were reviewed and found difficult to interpret because of poor experimental design, inadequate controls, drug contaminants, and unresolved sampling problems. These studies reflect difficulties, sometimes inevitable, in the use of humans, notably the likelihood of previous or concurrent exposure to other drugs. It was considered that these problems would be avoided by well-planned serial in vivo animal studies. Recently, more adequate human studies have suggested that pure LSD administered under controlled conditions may not produce cytogenetic effects. Needless to say, such findings have no bearing on the psychiatric hazards of these drugs.

The confusion in regard to LSD underscores the critical need for programmatic development of information on genetic and other hazards of drugs of abuse, quite apart from other drugs and chemical pollutants, with currently available methods that are sensitive, relevant, and practical. Standard uniform reference samples of crude and synthetic drugs of abuse should be made more easily available to toxicologists. The possibility of integrating various methods—for example, the use of single animal groups for concurrent tests such as carcinogenicity tests, in vivo cytogenetics, the host-mediated assay, the dominant lethal assay, and psychopharmacological studies—should also be explored.

The proceedings of the conference will be published by the National Institute of Mental Health in monograph form.

SAMUEL S. EPSTEIN
Children's Cancer Research Foundation, Inc. and *Harvard Medical School, Boston, Massachusetts 02115*
JOSHUA LEDERBERG
Stanford University Medical Center, Stanford, California 94305

Personnel Placement

POSITIONS WANTED

Austrian Engineer, 9 years of English-language industrial experience, available for technical, scientific, and commercial translations from/into German. Professional, prompt. Rudi Payer, Williamstown, Ontario, Canada. 4/24; 5/1, 8, 15, 22

Biochemist: Ph.D., 1965. Research experience in soil-plant nutrition, pesticides, steroids and drugs metabolism. Publications. Seeking teaching, research. Oversea appointment considered. Available September 1970. Box 162, SCIENCE. X

Biologist, desires temporary position (1970–71). Ph.D., 13 years' total teaching. General biology, invertebrate zoology, elementary physiology, evolution. Box 163, SCIENCE. X

Botanist/Mycologist. Ph.D. (1969). Age 41. NSF postdoctoral. Interested aquatic, soil ecology. Seeks teaching and/or research position September 1970. Box 164, SCIENCE. X

German Pharmacist, Dr., rer. nat., seeks research position (drug action or metabolism, pharmaceutical synthetic or analytical chemistry). Two years of postdoctoral industrial experience (analytical field). Box 165, SCIENCE. X

Husband/Wife Team: 1968 Ph.D. Statistics: extensive computer experience, biomedical data acquisition systems, discriminant analysis. 1965 Ph.D. experimental psychology: effects teratological agents on behavior, operant conditioning. Publications, grants. Seeks appointment medical school or other. September 1970. Box 166, SCIENCE. X

Immunologist, Ph.D. Five years' teaching/research (clinical/experimental) experience, including 2 years' postdoctoral training in fluorescent microscopy. Publications. Desires appointment, university-government. Box 167, SCIENCE. X

Inorganic: Analytical/Radiochemist, Ph.D. 1968. Desires learning position in marine sciences. Would like postdoctoral or laboratory position. South Atlantic or Gulf coasts preferred. Box 168, SCIENCE. X

Marine Invertebrate Zoologist/Science Policy. Completion of doctorate, August 1970. Seeks challenging, interdisciplinary position in human biology/human ecology academic setting. Teaching experience, publications, Public Health Service Fellow. Box 169, SCIENCE. X

Molecular Biology: M.S. Microbiology; 4 years' experience including tissue culture, RNA, DNA, nucleoproteins, enzyme extractions, isotopes, bacteriophage, tumors. Research or teaching. Box 170, SCIENCE. X

Physicist, Ph.D., extensive experience in nuclear, electronic and general instrumentation. Position wanted in biomedical/bioengineering research or research and development. Box 171, SCIENCE. X

Plant Ecologist, Ph.D. expected 1970. Five years' full-time college teaching: ecology, biogeography, botany, taxonomy, biology, plant anatomy, science teaching methods. Desires teaching/research in small college/university. Available Fall 1970. Box 172, SCIENCE. X

Retired Ph.D., human anatomist, comparative anatomist, neuroanatomist, biologist. Numerous publications. Active teaching-research. Desires medical school or small college association in South, Southwest, or West. Attractive financial arrangement available, Box 173, SCIENCE. 5/1

Physiologist, Ph.D. 1963. Training with strong chemical orientation. Histochemical, tissue culture, electron microscope and immunoelectrophoretic techniques and T.B. Antigen fractionation and characterization. Seeks research position in and around Baltimore-Washington area. Box 174, SCIENCE. X

POSITIONS OPEN

COLLEGE TEACHERS WANTED
M.S. or Ph.D. NATIONWIDE
SEPT. POSITIONS

BIOLOGY	**MATHEMATICS**
CHEMISTRY	**PHYSICS**
ENGINEERING	**PSYCHOLOGY**
GEOLOGY	**OTHER DISCIPLINES**

WRITE NOW FOR APPLICATION
CITY & SUBURBAN TEACHERS AGENCY
500 FIFTH AVENUE N.Y., N.Y. 10036
OR PHONE 212—546-8370

LABORATORY RESEARCH ASSOCIATE

Permanent position in University Research Institute. Bachelors or Masters Degree with major training in virology or microbiology and experience in cell culture and virology. Excellent salary commensurate with training and experience. Send résumé to **Institute for Molecular Virology, St. Louis, Missouri 63110.**

PHARMACOLOGIST (M.D. or M.D., Ph.D.)

A physician with advanced training in pharmacology or endocrinology is needed to participate in interdisciplinary team efforts investigating potential pharmacological agents in diseases of bone and skin. His primary responsibility would be in studying the effects of these compounds in man, but he is also expected to participate in the planning and interpretation of animal and *in vitro* studies.

This career position offers opportunity for both professional and intra-company growth, and the salary is open. No prior industrial experience is required.

Cincinnati is an urban area offering excellent cultural activities, restaurants and shopping. The laboratories are in a picturesque rural setting about 20 miles northwest of downtown Cincinnati.

For further information, contact **W. Blair Geho, M.D., Ph.D., The Procter & Gamble Company, Miami Valley Laboratories, P.O. Box 39175, Cincinnati, Ohio 45239.**

An Equal Opportunity Employer

RESEARCH TOXICOLOGIST

IF YOU HAVE:

- A Ph.D. in experimental Pathology, Zoology, or a D.V.M.
- Experience with drug safety evaluation, or pathologic techniques used in studying the effects of new drugs on animals.
- The ability to conduct studies that will be used for filing investigational new drug exemptions, and new drug applications with the Federal Drug Administration.
- Substantial knowledge of clinical chemistry, hemotology, urinalysis and animal pathology.

WE HAVE:

The Senior Research position you have been looking for, complete with the challenges, personal and professional satisfaction, and compensation you have been seeking.

If you qualify, please submit your curriculum vitae in strict confidence to:

R. R. Wengel, Employee Relations

ARMOUR PHARMACEUTICAL COMPANY

P.O. Box 511
Kankakee, Illinois 60901

An Equal Opportunity Employer

POSITIONS OPEN

MOLECULAR BIOLOGIST
UNIVERSITY OF MICHIGAN

Immediate opening for Molecular Biologist in Department of Dermatology. Position involves the elucidation of the biochemical control mechanism of the cell cycle in epithelial tissue, histology at the light microscope level, tissue extraction, and simple protein purification procedures. Requires a M.S., Ph.D., or M.D. Salary commensurate with experience and qualifications. Excellent laboratory facilities and fringe benefits. Send complete résumé to: **Frank R. Palmer, Jr., Research Personnel Office, University of Michigan, P.O. Box 622, Ann Arbor, Michigan 48105.**

UNIVERSITY OF ALBERTA
DEPARTMENT OF BOTANY

Applications are invited for the following:

PHYCOLOGIST with interests in ecology of fresh-water algae.

BRYOLOGIST-LICHENOLOGIST with interests in taxonomy, ecology and phytogeography of northern taxa.

Both positions require a Ph.D and carry the rank of Assistant Professor with a minimum salary of $10,500. Résumé and three letters of reference to **Dr. Wilson N. Stewart, Chairman, Department of Botany, University of Alberta, Edmonton 7, Alberta, Canada.** *Deadline 15 May 1970.*

PHYSIOLOGIST OR EMBRYOLOGIST required for 1-year appointment. Undergraduate teaching in General Biology, Physiology, and/or Embryology. Rank and salary open. For information write **Biology Department, Southampton College, Southampton, N.Y. 11968.**

Applications are invited for a new position of **Radiobiologist** in the Department of Radiation Therapy at the American Oncologic Hospital. The radiobiologist will participate in the training of residents in radiation therapy. Research facilities available in an adjacent cancer research institution. Academic affiliation with a local medical school. Address inquiries to **H. Gunter Seydel, M.D., M.S., Chief, Department of Radiation Therapy, American Oncologic Hospital, Central and Shelmire Avenues, Philadelphia, Pa. 19111.**

NEW ZEALAND
DEPARTMENT OF AGRICULTURE

Vacancy 1479

SCIENTIST (REPRODUCTIVE PHYSIOLOGY), WHATAWHATA

Applications are invited to fill the above vacancy.

Salary:
Up to $NZ6709 according to qualifications and experience.

Duties:
Conduct research in collaboration with scientists of other disciplines on problems of fertility in sheep and cattle, including investigation of such aspects as ovulation and fertilization rates, embryonic losses, ovarian-pituitary interactions and responses etc. A wide range of pure breeds and crosses of sheep and cattle are available for study, including some lines specially selected for fertility.

Qualifications:
An honours degree in Science preferably with a Ph.D. Housing available at an assessed rental.

Applications:
Applications close on 5 June 1970.

THE NEW ZEALAND EMBASSY
19 Observatory Circle, NW
Washington, D.C. 20008

Application forms and standard conditions of appointment are available on request.

GRADUATE STUDY

Predoctoral Assistantships and NSF Traineeships available for **Graduate Training in Cell Biology, Plant Physiology, Ecology, and Freshwater Mycology.** Stipends start at $3000. For details write or call **(614—594-5759) C. E. Miller, Graduate Chairman, Department of Botany, Ohio University, Athens, Ohio 45701.**

GRADUATE STUDY

The Veterans Administration Hospital, Little Rock, in cooperation with the University of Arkansas Medical Center, announces **FELLOWSHIPS IN RADIATION BIOLOGY.** This program, which is fully integrated with the Medical Center, provides experience in the following areas: General Radiobiology, Molecular Biology and Biophysics, Cellular and Molecular Radiobiology, Instrumentation Methods in Radiobiology, Biochemical Methods as related to Radiobiology, Tissue Culture Methods, Radiologic Physics, Radioisotope Applications, Biometrics, Computer Programming and Applications, Research, and Teaching. In addition, advanced electives are available in Biochemistry, Biophysics, Biometry, Mathematics, Computer Applications, and Instrumentation.

The 2-year program may (if the fellow so desires) lead to the M.S. degree in Biophysics at the University of Arkansas Medical Center. This aspect, however, is totally optional. There will be no prejudice toward individuals who do not wish to pursue the Master's or Ph.D. degrees.

Research space is available in both the VA Hospital and in the Barton Research Institute of the University of Arkansas Medical Center. The laboratories are completely equipped for a broad range of experimentation in mammalian, cellular, and molecular radiation biology. A broad range of consultation in such areas as biochemistry, biometry, and biophysics is available at the Medical Center and the VA Hospital. The Southern Research Support Center, which provides support in biometry, data processing and biomedical engineering is housed on the grounds of the VA hospital. In addition to the academic and research activities, fellows will be able (if they so desire) to spend a portion of their time in clinical medicine.

The program is open to physicians and dentists.

The stipend for the first year is $12,300. An allowance for tuition, expendable supplies, and equipment is also provided.

Inquiries should be addressed to:

GLENN V. DALRYMPLE, M.D.
Acting Chief, Radioisotope Service
Veterans Administration Hospital
300 East Roosevelt Road
Little Rock, Arkansas 72206

NEUROCHEMISTRY

Two Postdoctoral Fellowship positions (M.D. or Ph.D.) for candidates with background in biochemistry, cell biology, or organic chemistry. These positions are available on 1 July 1970 and are restricted to U.S. citizens or permanent residents. Send résumé to **Dr. Pierre Morell or Dr. Michael Shelanski, Departments of Neurology and Neuropathology, Albert Einstein College of Medicine, 1300 Morris Park Ave., Bronx, New York 10461.**

Applications are invited for admission to graduate programmes leading to Ph.D. or M.Sc. degrees. **TEACHING ASSISTANTSHIPS AND FELLOWSHIPS** are available to students with B.Sc. degrees and to persons with professional degrees. Research emphasis is on the biochemistry of calcified tissues, with particular emphasis on the protein matrix of these tissues. For further information write to the **Chairman, Committee on Graduate Studies, Faculty of Dentisitry, The University of Alberta, EDMONTON 7, Alberta, Canada.**

The Market Place

BOOKS • SERVICES • SUPPLIES • EQUIPMENT

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.

HISTOLOGY SERVICE, Inc.
6190 Rising Sun Avenue
Phila., Pa. 19111 (215) RA 5-5103

ELECTRON MICROSCOPISTS

OSMIC ACID (OSMIUM TETROXIDE)
TOP QUALITY—LOW PRICES
PHOSPHO MOLYBDIC AND TUNGSTIC ACIDS
CRYSTAL REAGENT GRADES
Call or Write:
STEVENS METALLURGICAL CORP.
342 Madison Ave.
New York, N.Y. 10017
(212) 697-0570

UNIVERSITY of NIJMEGEN (Netherlands)
FACULTY OF SCIENCE

In the Faculty of Science of the University of Nijmegen exists a vacancy for

A CHAIR OF MOLECULAR BIOLOGY

Applicants should have research and teaching experience in order to develop the new department of Molecular Biology.

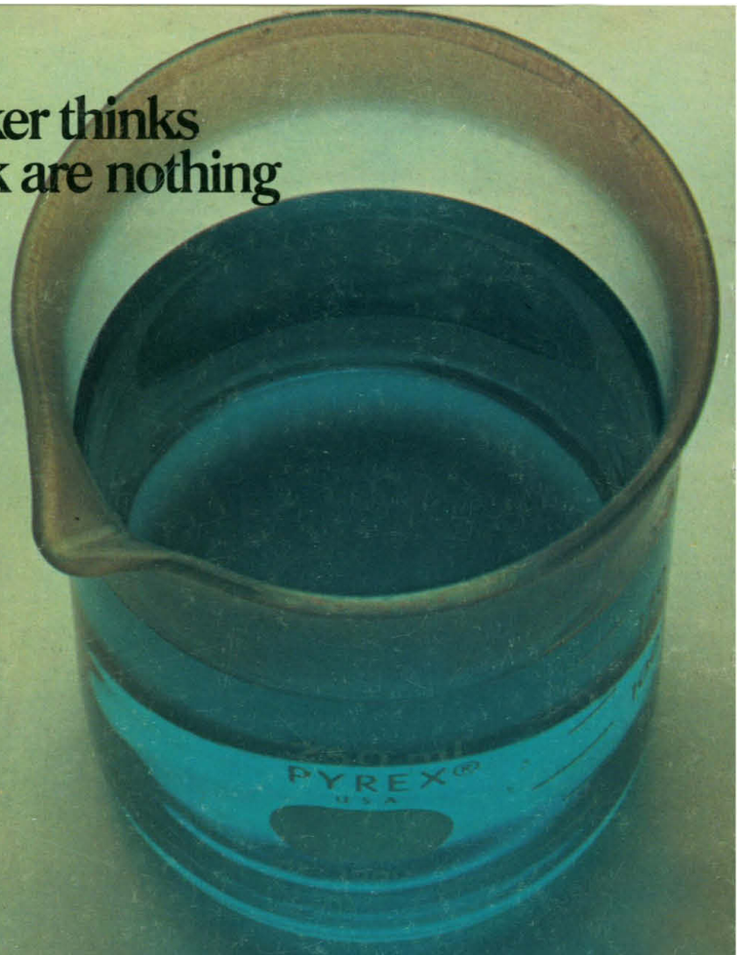
Experience with research on problems concerning regulatory mechanisms in eukaryote development at the molecular level is preferred.

Candidates offering themselves for the above chair should send their letter of application, including a curriculum vitae, a list of publications and a list with the names and addresses of three referees to the

Chairman of the department of Biology
of the Faculty of Science

Driehuizerweg 200 in Nijmegen, Netherlands.

This dripless beaker thinks dribble and run-back are nothing but sports terms



Good-bye to messy pouring. Good-bye, funnels and stirring rods. Here's our new PYREX® brand dripless beaker with Teflon*-clad rim. It's the one and only no-drip beaker. Try some in your lab. You'll discover this is the beaker that allows you to pour contents safely, gives you drop-by-drop pourout, even lets you pull a single drop with most solutions. You'll find this is the beaker to use when you're mixing slurries. Or when you're handling HCl or H_2SO_4 or NaOH. And when you're working with materials so valuable or so hard to obtain that you just don't want to spill a drop.

Another plus: the bonded Teflon strengthens the beaker rim, lengthens beaker life. Send for a free sample and see.
Corning Glass Works,
Laboratory Products Dept. 9304
Corning, N. Y. 14830.

*Teflon is a Du Pont trademark

Portable top toppers work great, look great

Good-bye to charred, marred, chewed benchtops. You can really shield a benchtop with CORNING® Bench Protectors made of PYROCERAM® brand glass-ceramic. They're immune to acids and alkalies and solvents and gases, and to temperatures up to 500°F. We strengthen them chemically so they can withstand bangs and bumps, and they just won't dent or gouge. The glare-free white matte finish is more than handsome—it's also useful: titrations are easier to monitor. Silicone rubber feet make the protectors stable. Their light weight makes them portable. Yours in 10″ x 10″, 18″ x 24″, 23″ x 35″, and 23″ x 47″ sizes.

CORNING
BP 18 x 24

CORNING
LABORATORY PRODUCTS
Makers of PYREX® Labware