ceptions, will not yield to treatment with diets or drugs. In some of these cases gene therapy appears to be the only hope.

If foreign cells were not rejected, one could modify the genetic makeup of a tissue by transplanting cells or organs from a normal person into a person with a hereditary disease. Such transplantation of erythropoietic cells or whole organs has been successfully performed in inbred mice. In humans, however, transplants are rejected in almost all cases (except identical twins). But one could take cells from the sick person, genetically transform them (by reversion, isolated DNA, virus transduction, cell fusion, and so forth) into cells expressing the normal genetic information, grow a larger number of them in tissue culture, and then return them to the donor. One would hope that their surface antigens would not have changed by this manipulation. (For polygenic diseases replacement of one defective gene by a normal one may be sufficient.) Or one could use certain artificial transducing viruses to treat the patient directly. Recent discoveries have made it probable that transfer of specific genetic information in humans will be feasible within one or two decades. This gene therapy would be initially useful only for mobile multiplying cells (such as those in bone marrow). But when more is known about the differentiation of cells, the replacement of other cell types, which can still multiply in the adult, may become feasible (for example, liver).

The possibilities and potential hazards of gene therapy were the subjects of the conference. Several speakers presented evidence indicating that human cells can express some genetic information contained in the DNA or RNA of animal or bacterial viruses and that the transferred information can be inherited from cell to cell. It is even feasible to link desirable genetic information to a nonpathogenic virus DNA and convey it by a virus into the cell. Furthermore, genetically normal human DNA can be taken up by human cells either directly or packaged into a virus coat, or whole chromosomes can be transferred via cell fusion. It is still not clear which conditions are necessary to allow the replication of the transferred DNA. Instead of transferring normal genetic information, one could possibly subject tissue cultures of deficient cells to mutations and isolate revertants that have regained the normal biochemical property. In principle, it would even be possible to manipulate eggs or sperms genetically, or to produce chimeras by mixing blastocysts, but these possibilities have been disapproved because they would create many new problems and possibly increase, or at least perpetuate, undesirable mutations in the population.

A detailed summary of the meeting will be printed by NIH and can be obtained from the Fogarty International Center, National Institutes of Health, Bethesda, Maryland 20014.

ERNST FREESE
Laboratory of Molecular Biology, National Institutes of Health, Bethesda, Maryland 20014

POSITIONS OPEN

ANIMAL PATHOLOGIST

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Applications, with curriculum vitae and names of three references, should be sent to:

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ASSISTANT PROFESSORSHIPS, undergraduate teaching with research interests in the following disciplines: **Biology** (limnology, photobiology, membrane physiology, or genetics); **Chemistry** (natural products, experimental thermodynamics, biophysical organic, or radiochemistry); **Physics** (experimental approaches to solid state, molecular, earth related physics, biophysics, or laser application). Apply: **J. Wright, University of Michigan–Dearborn, Dearborn, Michigan 48128.** An Equal Opportunity Employer.

BEHAVIORAL ECOLOGIST. Three-year assistant professorship, salary to $10,500 for Ph.D. qualified to teach physiological-behavioral and ecologically oriented coursework. Knowledge of both vertebrates and invertebrates preferred. Research preference open.

ONE-YEAR SUBSTITUTE. Ph.D. to tea especially in biochemistry and animal physiology courses. Salary to $10,500. For either position send application with vita to: **Chairman, Biology Department, Vassar College, Poughkeepsie, N.Y. 12601.**

COMPARATIVE PHYSIOLOGIST

Three-year appointment for a recent Ph.D. as Assistant Professor of Zoology in the University of Michigan, beginning Fall 1972. Duties include teaching and research. Instructional assignments will include course in Comparative Physiology and Introductory Biology. Send résumé and names and addresses of referees to: **Professor William R. Dawson, Chairman of Search Committee, Department of Zoology, The University of Michigan, Ann Arbor, Michigan 48104.** (The University of Michigan is an equal opportunity employer.)

UNIVERSITY OF CAPE TOWN SHELL CHAIR OF ENVIRONMENTAL STUDIES

Applications are invited for the Shell Chair of Environmental Studies and the directorship of the School of Environmental Studies to be established in the University.

The salary scale is R8100 × 300 to R9900 per annum, and the post is available immediately. Candidates are requested to indicate the date on which they can take up the post.

The main duty of the applicant will be to coordinate training and research in Environmental Studies and, in addition, to carry out his own research.

Memoranda giving information regarding research in progress and support available in other departments, together with the general conditions of service, can be obtained from the Registrar.

Applications (accompanied by a recent photograph and medical certificate) stating age, marital status, qualifications, experience and publications, and giving the names and addresses of two referees (preferably persons with knowledge of the applicant's academic qualifications and experience) whom the University may consult, should reach the **Registrar, University of Cape Town, Private Bag, Rondebosch, C.P.,** not later than 31 March 1972. The University reserves the right to appoint a person other than one of the applicants, or to make no appointment.

FACULTY FOR WILLIAM JAMES COLLEGE. The newest college of the Grand Valley State Colleges seeks faculty who qualify in one or more of the following areas: **Demography, Cultural Anthropology, Ecology, Environmental Design, Environmental Law, Political Science, Sociology, Social Work/Counseling, Human Development, Urban Planning, Regional Planning, Human Ecology, Environmental Technology.** William James is an innovative college which attempts to prepare students for effective roles in contemporary society. Interested persons should contact **John MacTavish, William James College, The Grand Valley State Colleges, Allendale, Michigan 49401.**

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Teaching and research responsibilities in molecular genetics, microbiology, and/or virology on a new campus with developing graduate programs. Rank and salary open. Applicants should submit a curriculum vitae and three letters of reference to **Dr. D. Grogan, University of Missouri—St. Louis, 8001 Natural Bridge Road, St. Louis, Missouri 63121.**

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Ph.D. in statistics or biostatistics with 2 or more years experience in pharmaceutical research or related field. Will be accountable for a biostatistical design and interpretation of clinical trials for new drugs and for interaction with scientists to point out and participate in biostatistical contributions to research projects.

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Applications are invited from qualified persons with postdoctoral experience who intend to pursue research on the formation or function of synapses. Successful candidates will be expected to develop a high quality research and teaching program. Applications should include a curriculum vitae, names of referees, and a statement of research interests, and should be sent prior to 15 April 1972 to **Dr. L. M. Passano, Department of Zoology, The University of Wisconsin, Madison, Wisconsin 53706.**

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Biochemist. Ph.D. with interest in proteins. Excellent research opportunity for postdoc to work with neuropathology, other neurosciences, in New York City. Address résumé to
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Applications are wanted from person having research and teaching experience in neurophysiology. The university welcomes applications from women and from members of minority groups.

Applications, with curriculum vitae, should be addressed to: **Dr. Oscar Hechter, Chairman, Department of Physiology, Northwestern University Medical School, 303 East Chicago Avenue, Chicago, Illinois 60611.**

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NEUROENZYMOLOGIST. Postdoctoral Fellowship (1 to 2 years). To study enzyme systems involved in metabolism of brain glycolipids. Experience in all aspects of enzyme chemistry essential.

Location: New York metropolitan area in a well-equipped university-affiliated hospital research institute.

Salary: $13,000 (plus liberal fringe benefits). Send curriculum vitae and two references to:
BOX 92, SCIENCE

POSTDOCTORAL FELLOWSHIPS IN PHARMACOLOGY

Fellowships available for postdoctoral studies in department of pharmacology. Applicants should be citizens or permanent residents of the United States. Active areas of research include investigations at biochemical, cellular, and organ levels in cardiovascular, renal, endocrine, gastrointestinal, and central nervous systems. Address inquiries to **Dr. Samuel Mallov, Department of Pharmacology, State University of New York, Upstate Medical Center, Syracuse 13210.**

GRADUATE STUDY

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Program offers pre- and postdoctoral training leading to M.S. and Ph.D. degrees. Traineeships available to students with B.S. degrees and to persons with professional degrees. Research emphasis is on vertebrate endocrinology and mammalian reproductive physiology and is centered in several laboratories. Stipend, research support, and tuition available for approximately 50 trainees per year. The University of Wisconsin is an Equal Opportunity Employer. Write **Dr. Richard C. Wolf, Program Director, Wisconsin Regional Primate Center, University of Wisconsin, 1223 Capitol Court, Madison, Wisconsin 53706.**

RESEARCH CONTRACTS

BIOMEDICAL FACTORS IN DRUG ABUSE RESEARCH

The United States Army Medical Research and Development Command is currently encouraging submission of unsolicited proposals for drug abuse research. There are three general areas of interest: (i) to develop rapid, accurate, reliable, low-cost screening and confirmation systems for detection of commonly abused drugs in biological fluids, (ii) to investigate the social, epidemiological and environmental factors related to drug abuse, and (iii) to evaluate Army medical treatment and rehabilitation programs.

Inquiries concerning the USAMRDC Drug Abuse Research Program should be addressed to **Commanding General, U.S. Army Medical Research and Development Command, Washington, D.C. 20314 (SGRD-PC).**

U.S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND, ANTIMALARIAL DRUG DEVELOPMENT CONTRACT PROGRAM

The U.S. Army Medical Research and Development Command is responsible for a coordinated research program on the development of new antimalarial drugs, both prophylactic and therapeutic. Research contract support is given to qualified laboratories willing to undertake experimental programs of the following types:

1) **Chemical Synthesis of New Antimalarials.**
Based upon sound biochemical rationale, literature leads which could be exploited, or structure/activity relationship, potential antimalarials are synthesized and screened in appropriate systems. Screening data are used to guide the syntheses.

2) **Acute and subacute toxicity studies on candidate new drugs in experimental animals.**
These studies have the objectives of establishing a safe drug dose level for candidate drugs in the most sensitive species, target organ of drug toxicity and clinical signs that predict these changes.

3) **Absorption, distribution, biotransformation and excretion of candidate new drugs in experimental animals.**
The objectives of these studies are to obtain pharmacokinetic and metabolic data for candidate drugs in experimental animals in order to predict the most efficacious treatment for clinical trials.

4) **Experimental formulation of candidate drugs.**
The objective of these studies is to prepare experimental dosage forms to provide optimal bioavailability of candidate drugs from oral administration.

5) **Development and utilization of in vivo and in vitro biological models for the testing of compounds.**
These studies have the objective of developing more rapid, inexpensive, and reliable biological tests to evaluate suppressant and prophylactic antimalarial activity. Both screening tests and tests for advanced evaluation of candidate antimalarials are needed.

Many of the programs require an interdisciplinary approach. Factors considered in awarding a contract include, but are not necessarily limited to:

a. Soundness and cogency of rationale
b. Qualifications and experience of personnel
c. Allotment of adequate time
d. Adequacy of activities and equipment
e. Budget

Proposals must include specific approaches and an appreciation of the limitations of these approaches.

Acceptance of a contract implies a willingness to participate in a coordinated national program. This necessitates close collaboration with other participating contractors, with the staffs of the U.S. Army Medical Research and Development Command and the Walter Reed Army Institute of Research, and the submission of prompt and comprehensive reports.

In addition to submitting proposals on specific topics, as advertised in the U.S. Department of Commerce *Business Daily*, scientists interested in and qualified for these programs are invited to indicate their specific program interest and to send résumés of training, experience, and facilities showing their qualifications for participation.

In addition to advertising, when requests for proposals are desired by the Command, they will be sent directly to those qualified scientists expressing an interest and having a capability in the program involved.

For information write to: **Commanding General, U.S. Army Medical Research and Development Command, ATTN: SGRD-PC, Washington, D.C. 20314.**

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