

Alpha Radiation In Space Travel May Harm Brain

Clues to a radiation hazard that could affect man's brain in traveling through outer space may be provided in a new study conducted by the National Institute of Neurological Diseases and Blindness in collaboration with two other research organizations.

Investigators for the project were from the Institute's Surgical Neurology Branch; the Donner Laboratory, University of California; and the Armed Forces Institute of Pathology, Washington, D. C.

Recognized as Hazard

Alpha radiation is known to exist in outer space and presents a potential hazard in manned space flight. An important technical point in devising protective methods is precise knowledge as to how alpha radiation damages the brain.

Previous studies by other investigators have resulted in differing opinions concerning the primary site of radiation brain damage. One widely held opinion has been that the primary damage is to the blood vessels of the brain.

This study, which used sensitive new methods to show the early effects of alpha radiation on the brains of rats, indicates that damage primarily occurs in the cells of brain tissue itself and that blood vessel injury is secondary.

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New Medical Library 'Roof' Has Uniqueness and 'Zing'



This recent picture, looking northwest, shows a portion of the hyperbolic paraboloid shell under construction atop the new National Library of Medicine Building here.—Photo by Bob Pumphrey.

By John M. Blamphin

The pagoda-like roof of the new National Library of Medicine—that unusual building nearing completion on the southeast corner of the NIH reservation—has increasingly become the subject of a question often asked of modern art: "What is it?"

The Record, as curious as any, assigned this reporter to find out. The assignment led to interviews with engineers in the Research Facilities Planning Branch of DRS, in which they explained "the roof" in language a layman might understand.

It's Not a Roof

As a result, this reporter is able to report that what everyone thought was a roof is not a roof at all. It is a four-quadrant hyperbolic paraboloid shell made of reinforced concrete. And it takes the place of what otherwise would have been a dome on the \$7.5 million building.

Moreover, it enjoys the distinc-

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PHS to Detail Officers To Peace Corps Duty

Surgeon General Terry has announced that the Public Health Service will detail Commissioned Officers to serve as staff members for the medical program of the Peace Corps.

Officers so detailed will serve as PHS officers on active duty, according to the announcement.

Medical officers interested in overseas assignments with the Peace Corps may obtain additional information by writing to the Chief, Division of Commissioned Officer Personnel, PHS, HEW South Bldg., Rm. 4086.

NIH Team Visits India to Discuss Joint Research

A team of four NIH negotiators departed for New Delhi, India, August 4 to discuss proposed collaborative studies with representatives of the Indian Government.

The proposed research projects would be supported by NIH under the Special Foreign Currency Program administered by the Office of International Research.

Leader of the negotiating team is Dr. Arnold E. Schaefer, Executive Director of the Interdepartmental Committee on Nutrition for National Defense, NIAMD. He is accompanied by Dr. Charles P. Hutter of NHI, who will represent OIR in the discussions; Dr. Margaret Sloan, Special Assistant to the Director, NCI; and Howard E. Kettl, Acting Assistant Executive Officer, OD.

Meet Government Official

In New Delhi, the NIH delegation was scheduled to meet with the Indian Government's representative, Prof. M. S. Thacker, Director General of the Council of Scientific and Industrial Research. Their discussions are intended to carry forward negotiations begun during a preliminary negotiating session held in New Delhi late last year.

(See NIH TEAM, Page 2)

Postdoctoral Stipends Increased by \$500

The Executive Committee for Extramural Affairs, Division of Research Grants, has announced a \$500 increase in stipends for postdoctoral fellowships awarded on or after July 1, 1961. This decision follows a recent National Science Foundation recommendation.

The new stipend scale will be as follows: first level—\$5,000; second level—\$5,500; third level—\$6,000.

The higher stipends are to be provided for all postdoctoral awards made from the fiscal year 1962 program funds. Awards made from funds appropriated for earlier fiscal years will not be affected and allowances for dependents, travel, and supply grants remain unchanged.

Disabling Accidents Decrease 46 Percent, Survey Reveals

NIH employees are becoming more safety conscious, according to the latest accident report issued by Plant Safety Branch, OAM.

The report, covering January through July of this year, revealed a 46 percent reduction in the rate of disabling injuries over last year.

Potentially serious injuries, and no-lost-time injuries in all Institutes, Divisions, Office of the Director, and the Clinical Center are also on the decrease, the report indicated.

Commenting on the report, Dr.

G. Burroughs Mider, Director of Laboratories and Clinics said, "We're beginning to make some progress in this business of accident prevention. A 46 percent reduction in the frequency of disabling injuries can result for the most part from only one factor—a greater effort by all in attempting to prevent accidents."

In the first seven months of 1961 there were 4.2 disabling injuries per million man-hours worked, compared with 7.8 disabling injuries per million man-hours worked in 1960.

Seven of the Institutes and Divisions—NIMH, NIAMD, NINDB, NIAID, DBS, NIDR, and DGMS—have a record of no disabling injuries during the first seven months of this year. Of these, only two—DGMS and NIDR—reported no disabling injuries in 1960.

Dr. Mider gave special recognition to Plant Engineering Branch, DRS, for integrating safety into design of new structures. He also congratulated NIDR for "operating 636 days without a disabling injury."

the NIH Record

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Brazilian Heart Society Presents Scroll to NHI

The National Heart Institute has received a testimonial of recognition from the Brazilian Society of Cardiology for its part in the support of the Sixth Inter-American Congress of Cardiology, held last August in Rio de Janeiro under auspices of the Brazilian and Inter-American Societies of Cardiology.

Dr. Paul Schlesinger, Adjunct Secretary of the Brazilian society, presented the testimonial, a parch-



Dr. Watt displays parchment scroll presented to the Heart Institute by the Brazilian Society of Cardiology.—Photo by Jerry Hecht.

ment scroll, to the Heart Institute Director, Dr. James Watt, on July 18.

NHI supported the Congress in part through a grant awarded to the International Society of Cardiology Foundation.

The grant was recommended by the National Advisory Heart Council, which emphasized that the Congress would offer an unusual opportunity for the interchange of ideas and research experience among cardiovascular physicians and researchers in the Western Hemisphere, and that its support would provide important tangible evidence of North American good will.

In a letter accompanying the scroll, Aarão Benchimol, President of the Brazilian society, said the grant "represented an important contribution to the strengthening of

NIH TEAM

(Continued from Page 1)

Under consideration are a number of collaborative projects proposed by NIH to be undertaken at research institutions in India by Indian investigators. Special program funds presently earmarked for the Indian studies amount, in the aggregate, to some \$1.8 million.

The funds used to support this international research program are U.S.-owned foreign currencies resulting from the overseas sale of surplus U.S. agricultural commodities under Public Law 480.

The overall appropriation for NIH's foreign currency program in 1961 totals \$3.7 million. This program represents a direct extension of NIH intramural research programs and reflects the research interests of the several Institutes and Divisions of NIH.

Total Support Provided

The special foreign currency funds, as appropriated, are intended to cover the total support of a project over a three- to five-year period, if necessary. In operation, the program, therefore, provides funds for completion of the project.

During the past year a number of similar negotiating trips have been made to countries in Europe, the Middle East, and Asia. Among these were missions to Poland, Yugoslavia, Israel, Egypt, Pakistan, and Indonesia.

Future missions, now in the planning stage, will visit Poland and Brazil. Members of these delegations have not yet been announced.

the traditional ties of friendship and good will among the cardiologists of the American Continent."

Dr. Eleanor M. K. Darby, Head of the Conference and Publications Section, Grants and Training Branch, represented NHI at the Congress.

NIAID Scientists Attend Conference In Hawaii

Four NIAID scientists will be among representatives of more than 50 nations participating in the Tenth Pacific Science Congress to be held at Honolulu, Hawaii, August 21-September 6.

Dr. G. Robert Coatney, Chief of the Laboratory of Parasite Chemotherapy; Dr. Leon Rosen, of the Laboratory of Infectious Diseases; and Dr. John E. Tobie, of the Laboratory of Immunology, will present papers to the Congress.

Dr. Dorland J. Davis, Associate Director in charge of Research, will consult with officials of the Hawaii State Department of Health and the University of Hawaii, in addition to attending the Congress.

Sessions at which papers will be presented or symposia conducted will be supplemented by plenary sessions, Oahu field trips, public lectures, evening panel discussions, and visits to marine research ships.

The program will be divided into nine sections reflecting broad scientific interests, including geophysical sciences, biological sciences, public health and medical sciences, agricultural sciences, forestry, conservation, anthropology and social sciences, geography, and scientific information.

SPACE TRAVEL

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Alpha particles from a 60-inch cyclotron at the University of California were used to irradiate the brains of the experimental rats—specifically, the rear portion of the cerebrum and cerebellum. Disturbances in the permeability of the blood vessels in the brain were observed 48 hours after irradiation.

However, the investigators detected disturbances in the cells of brain tissue considerably earlier. These disturbances consisted of sugar (glycogen) granules within the cells, which were detected within 12 hours after the animals were exposed.

A new technique involving the "labeling" of protein molecules with a fluorescing material (fluorescein) made it possible to detect microscopically the penetration of proteins through the walls of the blood vessels into surrounding tissues. Fluorescein-labeled albumin was detectable in the tissues of irradiated brains for some 36 days after exposure.

Using histochemical techniques, investigators found that the glycogen granules were predominantly in the glial cells—highly specialized nervous tissue cells. Thus the investigators suggest that radiation injury may disrupt the protein bonds of glycogen, resulting in its liberation through the blood vessels and subsequent up-

Dr. L. L. Ashburn Retires; Served 31 Years in PHS

Dr. Llewellyn L. Ashburn, Chief of the Laboratory of Pathology and Histochemistry of the National Institute of Arthritis and Metabolic Diseases, retired July 1 after 31 years of active service with the PHS Commissioned Officers Corps.

Dr. Ashburn became a member of the Public Health Service in 1930, shortly after receiving his M.D. degree from the Medical College of Virginia.

He served his internship at the Public Health Service Hospital

in Norfolk, Va., and was active in clinical medicine at other PHS hospitals prior to his appointment to NIH in 1935.

Since then, with the exception of a four-year assignment with the PHS Hospital in Baltimore (1949 to 1953), he has been engaged in experimental pathology in NIAMD laboratories.

Primary Interests Cited

His primary research interests have been the fields of nutrition, toxicology, and parasitic infections. He has been particularly interested in the role of vitamin, choline, and methionine deficiencies on human and animal tissue, with emphasis on nutritional cirrhosis of the rat.

Dr. Ashburn's knowledge, judgment, and broad experience in experimental and human pathology have been a source of help and inspiration to many investigators at NIH and elsewhere. His guidance was particularly helpful to investigators concerned with lesions occurring in monkeys used in connection with the polio vaccine safety test.

In spite of his favorite expression, "The right to complain is something I guard jealously," Dr. Ashburn was quick to give credit and commendation. His competence, frankness, and friendliness earned him the esteem and respect of his colleagues and associates.

Dr. Ashburn said he plans to continue, on a limited basis, his work as a consultant in pathology to several research organizations.

take by the glial cells.

Results of the study were presented at the recent Symposium on Effects of Ionizing Radiation on the Nervous System, sponsored by the International Atomic Energy Agency in Vienna, and at the 37th Annual Meeting of the American Association of Neuropathologists in Atlantic City.

Lyman Is Named Dental Institute Asst. Director

Appointment of Dr. F. Earle Lyman, Chief of the Extramural Programs Branch, National Institute of Dental Research, to the newly created position of Assistant Director of the Institute was announced this week by Dr. Francis A. Arnold, Jr., NIDR Director.

Dr. Robert C. Likins of the Institute's Laboratory of Biochemistry has been named to succeed Dr. Lyman as Chief of the Extramural Programs Branch.

"Creation of the position of Assistant Director reflects the steadily increasing staff work as a result of our expansion in both the intramural and extramural programs," Dr. Arnold said. "As a key staff member, Dr. Lyman will assist in

Dr. Arnold Completes Three-Week Tour of Soviet Institutions

Dr. Francis A. Arnold, Jr., Director of the National Institute of Dental Research, returned recently from Russia, where as a member of an 8-man dental mission he spent three weeks touring dental and research institutions.

The group returned an earlier visit to the United States by a Russian dental mission. The exchange was sponsored and arranged by the American Dental Association with the Ministry of Health, U.S.S.R.

"At the present time," Dr. Arnold said, "dental research is not as advanced in the U.S.S.R. as it is in this country. Dentistry as a profession in Russia is much younger than it is in the United States."

"However, it should be recognized," he said, "that under Russia's 7-year plan the decision has been made to increase the scope of dental services as an integral part of health services."

Members Named

The group, headed by Dr. Charles H. Patton, President of the ADA included Dr. John W. Knutson, Assistant Surgeon General and Chief Dental Officer of the PHS; Dr. Harold Hillenbrand, Executive Secretary, ADA; Dr. John R. Abel, President-elect, ADA; Dr. Thomas J. Hill, Professor Emeritus, Western Reserve University; Dr. Arthur F. Schopper of Kansas City, Mo.; and Dr. Gerald D. Timmons, Dean of the School of Dentistry, Temple University, Philadelphia.

The itinerary, planned by the Russians, included research, educational, and public health institutions in Moscow, Leningrad, Kiev, Tbilisi (Tiflis), and Sochi.

Dr. Arnold also attended two large dental meetings while abroad. He read papers on dental research in the United States at the 8th Annual Congress of the European Organization for Research on Fluorine (ORCA) in London, and before the 49th Annual Session of the Federation Dentaire Internationale in Helsinki, Finland.

to the Dental Institute at the time of its establishment in 1948.

Dr. Likins has conducted research on basic problems related to mineralization of teeth and bones. He is considered an authority on fluoride metabolism and has worked on many aspects of this problem, including urinary excretion, metabolic fate of various fluoride compounds, and the effect of fluoride on skeletal growth and calcification. He is presently working on problems related to the crystal chemistry of bone mineral.

Dr. Likins was born in Springfield, Mo., and received the degree of D.D.S. from Kansas City Uni-

85 Are Selected From 500 Applicants For Clinical and Lab Training Here

Eighty-five young physicians reported here during the past month to begin their training as Clinical Fellows, Clinical Associates, and Research Associates. They were selected from over 500 applicants.

Most of their training will be in the Clinical Center, the 500-bed research hospital where combined laboratory and clinical study is conducted with selected patients referred by physicians throughout the country.

Clinical Fellows (equivalent to resident physicians in other hospitals) are appointed to those NIH Institutes and professional departments where the clinical research programs are sufficiently varied to meet the requirements of one of the American specialty boards.

Training Areas Listed

The 25 new Fellows have been assigned to the following areas of medical specialty training: clinical pathology, pathologic anatomy, radiology, dermatology, internal medicine, psychiatry, neurology, oral pathology, periodontology, and ophthalmology.

The 44 physicians appointed as Clinical Associates also have clinical responsibilities equivalent to those of residents. Each is the junior member of a research team and divides his time between laboratory research and working with patients on the wards.

The 16 appointed as Research Associates will receive two years

training in laboratory research and will have no clinical duties.

In announcing the list of appointees, Dr. James A. Shannon, NIH Director, said, "These appointments for advanced training in research medicine and allied disciplines are based upon intellectual attainment, demonstrated research interest and ability, and professional preparation."

Have Research Backgrounds

He explained that candidates for these appointments tend to be young physicians who have been trained at universities where there are extensive research programs in the biomedical sciences.

Most appointments are for two years as reserve officers of the U.S. Public Health Service. After this time most of the young physicians expect to have their commissions inactivated so they may return to their universities to continue careers in academic medicine and research.

A few stay on at the National Institutes of Health as regular staff member, but these appointments are relatively rare due to the limited number of such positions.

"About 1,200 young physicians were sufficiently interested to make inquiry," Dr. Shannon said, "and about 500 actually did apply. Of these about one in six was accepted. These appointments were made 18 months ago. Those for July 1963 and later are now being received."



Dr. Lyman

Dr. Likins

the formulation, interpretation and coordination of policies and operations of the Dental Institute."

Dr. Lyman has guided the Extramural Programs Branch since July 1956. He joined NIH in 1955 as Executive Secretary of the Morphology and Genetics Study Section, and the Parasitology and Tropical Medicine Study Section.

A native of Saginaw, Mich., Dr. Lyman received his Ph.D. degree in 1940 from the University of Michigan. From 1940 to 1941, he was Assistant Professor of Zoology, Grand Rapids Junior College, followed by two years as Aquatic Biologist with the Tennessee Valley Authority.

Commissioned in the PHS in 1943, he served for nine years as Assistant Chief of the Entomology Branch, Communicable Disease Center. From 1952 to 1955 he was Associate Professor of Zoology at Southern Illinois University.

Prior to his affiliation with NIDR, Dr. Lyman made significant contributions as a research worker in the fields of limnology and entomology. He has published more than 35 articles.

Dr. Likins was one of the original members of the Dental Institute. He came to NIH in 1946 as an investigator with the then Dental Research Section, Division of Physiology, Experimental Biology and Medicine Institute. Dental personnel of that unit were reassigned

Soviet Childbirth Film Available from NINDB

The NINDB Information Office recently obtained a Russian-language motion picture, entitled *Without Pain*, which tells the story of one woman's experiences in the Soviet childbirth program.

The film portrays the expectant mother attending lectures on the physiology of pregnancy and the mechanics of labor and delivery, learning to relax and distract herself during labor, and finally giving birth without benefit of pain-killing drugs or anesthetics.

A print of the film with an English translation can be borrowed from the NINDB Information Office.

He was a Carnegie Fellow in dental research at the University of Rochester School of Medicine and Dentistry before coming to Washington. He received a commission in the PHS in 1946.

He has been a member of the Dental Study Section, NIH, since 1958, and is President of the Washington, D.C., Section of the International Association for Dental Research.

Dr. Laqueur Appointed Head of NIAMD Lab

Dr. Gert Laqueur was appointed Chief of NIAMD's newly designated Laboratory of Experimental Pathology, formerly the Laboratory of Pathology and Histochemistry, following the retirement of Dr. Llewellyn L. Ashburn last month.

At the same time Dr. Frederick Stohlman, Jr., was appointed Chief of the Section on Hematology, succeeding Dr. George Brecher who will devote full time to the Hematology Service in the Clinical Center.

The redesignation of the Laboratory of Experimental Pathology reflects the Laboratory's broadened scope of research function within its five sections—Anatomical Pathology, Histochemistry, Hematology, Biophysical Histology, and Rheumatic Diseases.

Dr. Laqueur joined the NIAMD staff in July 1950. From May 1954 to May 1957 he worked as Chief of Pathology of the Atomic Bomb Casualty Commission in Hiroshima, Japan, where he conducted follow-up studies of the survivors of the atomic bomb explosion.

NEW ROOF

(Continued from Page 1)

tion of being one of the largest hyperbolic paraboloid shells ever constructed, and the only one of its kind in this section of the country.

This four-quadrant shell consists of four hyperbolic paraboloids that share a common center—the high point of the shell.

These hyperbolic paraboloids may be visualized as solid parallelograms, having depth (thickness) as well as length and breadth.

The surface of each quadrant has both an upward and a downward curvature. These opposing curves are between each pair of diagonally opposite corners, creating the effect of a surface that is evenly and symmetrically warped in both directions.

Covers Central Room

The entire shell covers a large central room 63 feet square, where card catalogue files for the library's more than one million books will be located.

It measures 98 feet on each of its four sides and is only three inches thick at its thinnest part.

Although the hyperbolic paraboloid form has been known to architects for many years, it has seldom been used because of the complicated mathematics necessary to incorporate it into actual design and construction.

According to the RFPB engineers, the hyperbolic paraboloid shell is amazingly strong and is considered cheaper to build than the conventional dome.

For strength it relies on shape rather than mass, and it permits economical use of construction materials.

Lines Contribute 'Zing'

Its angular and sweeping lines also add a bit of "zing" to the otherwise solid and static rectangular bulk of the building.

The shell is formed on a straight-member frame of reinforced concrete ribs which rest on four steel columns each 35 feet high. The 185 cubic yards of concrete in these ribs required approximately 15 hours to pour.

After the ribs had attained a required and tested strength of 3,000 pounds per square-inch, steel reinforcing was laid in a criss-cross pattern between them to form the curved slopes of the four quadrants.

Gunit concrete was then sprayed onto the steel reinforcing. Gunit, sprayed under pressure from a hose, is more fluid than regular concrete. It dries quickly and has great adhesive strength.

When the concrete had set, the main weight of the shell rested on the wooden forms used when the concrete was poured. To transfer the weight from these forms to the four steel columns, it was necessary



A workman on top of the hyperbolic paraboloid shell that crowns the National Library of Medicine Building sprays Gunit concrete onto the steel reinforcing between ribs of the shell.—Photo by Sam Silverman.

to stress the shell. This was done by means of the shell's supporting columns.

For this purpose, each column was constructed in two sections. The bottom section was firmly imbedded in the building foundation and extended to the mezzanine floor. It was separated from the top section by a steel plate covered with graphite, to permit the slight degree of horizontal movement essential to the stressing operation.

Hydraulic Jacks Used

Hydraulic jacks, mounted horizontally on the mezzanine floor at the base of each upper column, applied force to the columns in an outward direction. The resultant force on the shell was, therefore, in an inward direction, toward the center. This stressed the shell and transferred its weight from the wooden framework to the four steel columns.

The upper and lower sections of each column were then welded together permanently, and the wooden supports were removed.

Heavy Pressure Applied

Thousands of pounds of pressure per square inch had to be applied at the base of each of the upper sections to move them the fraction of an inch required to stress the shell.

This was the first time that supporting columns had been used as cantilevers to stress a hyperbolic paraboloid shell, according to the engineers.

Last steps in the construction of the shell will be the smoothing and painting of its under surface, application of insulation to the top surface, and addition of a final covering of white marble chips. The open space between the eaves of the shell and the mezzanine roof will

Schedule Is Announced For Council Meetings

The schedule of winter meetings of the National Advisory Councils has been announced by the Division of Research Grants.

All meetings will be held in Stone House (Bldg. 16), except one session of the Advisory Health Council, to be held at DHEW, as indicated. All meetings begin at 9:30 a.m., except the Cancer Council, scheduled for 9 a.m.

The schedule follows:

Health Research Facilities and Dental Councils, Mon.-Wed., Nov. 6-8; Heart Council, Sat.-Mon., Nov. 18-20; Cancer Council, 9 a.m., Mon.-Wed., Nov. 20-22; Health Council, Mon., Nov. 20, HEW Building, and Tues.-Wed., Nov. 21-22, Stone House; Allergy and Infectious Diseases, and Neurological Diseases and Blindness Councils, Mon.-Wed., Nov. 27-29; Mental Health Council, Thurs.-Sat., Nov. 30-Dec. 2; and Arthritis and Metabolic Diseases Council, Fri.-Sun., Dec. 1-3.

Advises BSS

The Federal Hospital Council, which serves in an advisory capacity to the Bureau of State Services, is scheduled to meet Wed., Nov. 29, at 9:30 a.m. in the HEW Building.

The National Advisory Councils, composed of distinguished leaders in science and public affairs, serve in an advisory capacity to the seven Institutes and DGMS, reviewing and making recommendations to the Surgeon General of the Public Health Service on grant applications submitted to NIH.

In addition, they have the responsibility of considering policy and over-all objectives of the respective Institutes at their thrice-yearly meetings.

Members are appointed by the Surgeon General for 4-year terms.

then be enclosed with glass.

Another unusual feature of the building is that most of it—three floors—are under ground. Only the main and mezzanine floors are above ground.

Public Building Service of General Services Administration is responsible for contract administration, and Research Facilities Planning Branch of DRS, serving in a liaison capacity, is supervising the construction of the new building.

The contractor is Arthur Venneri Co. of Westfield, N.J., and the structural engineers are Severud-Elstad-Krueger, Associates, of New York. The architects are R. B. O'Connor and W. H. Kilham, Jr., also of New York.

Although the new building will be part of the NIH physical plant and will be maintained by NIH, the library is administered as a separate bureau of the Public Health Service.

Aging Research Center Publications Off Press

Two annual publications of the Center for Aging Research, Division of General Medical Sciences, are now off the press and available for distribution.

They are Research Highlights in Aging, 1960, and Activities of the National Institutes of Health in the Field of Gerontology, January 1961.

Research Highlights in Aging presents a review of a selected number of scientific papers on research in aging carried out or supported by NIH. The articles reviewed range from fundamental studies in the biology of aging to studies concerned with the physical, psychological, and social problems of aging people.

Other Content Given

The brochure also includes reviews of new literature in the field, meetings of considerable importance, programs of the five major multidisciplinary centers for aging research, and training programs.

Activities of the National Institutes of Health in the Field of Gerontology lists all grants for aging research active on January 31, 1961. The grants are arranged in two categories—those primarily related to aging and those secondarily related to aging.

In each category the grants are classified as follows: General Major Multidisciplinary Research Projects, Structural Aspects of Aging, Physiological and Biochemical Aspects of Aging, Psychological Aspects of Aging, Social Aspects of Aging, Identifiable Disease Processes, and Training.

Single copies of these publications are available upon request to the Information Officer, Center for Aging Research, National Institutes of Health, Bethesda 14, Md. Multiple copies may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

3 Appointments Made To Training Committees

Three new appointments to NIH Training Committees were announced recently by the Division of General Medical Sciences.

Dr. D. Bernard Amos, principal cancer research scientist at the Roswell Park Memorial Institute, Buffalo, N.Y., was named to the Genetics Training Committee; Dr. Sarah A. Luse, Associate Professor of Anatomy and Pathology, Washington University School of Medicine, St. Louis, Mo., to the Pathology Training Committee; and Dr. William L. Straus, Jr., Professor of Anatomy and Physical Anthropology, Johns Hopkins University School of Medicine, to the Anatomical Sciences Training Committee.

Variety of Unusual Animals Aid in NIH Laboratory Research

Alligator, Clams, Frogs, Necturi Among Those Used in Red Cell, Heart, and Kidney Studies

By Carole Spearin

Summer Information Trainee

Ever wonder how to dissect a mosquito? Or take a blood sample from an alligator's tail?

These are but two problems now confronting NIH researchers as they work with a host of unusual animals in the never-ending war against disease.

Investigators first used large numbers of unusual animals during World War II when the customary mice and guinea pigs were not available in sufficient quantity. Also, certain animals such as clams and toads have relatively simple organs that react in particular ways like human organs.

Clams Donate Hearts

Venus clams, for example, have been donating their hearts to NIH research for two years. Obtained locally and from the Woods Hole Oceanographic Institute on Cape Cod, the clams measure about 3½ inches across. They are slightly larger than the ordinary cherry stone clam and are used commercially in chowder.

Dr. Richard Irwin of the Neuropharmacology Laboratory, National Institute of Neurological Diseases and Blindness, reports no particular problems connected with keeping the clams—wet or dry.

"We don't even need a sea water solution," he said, "We just let them close up and keep enough fluid in their shells. Then we put them in our refrigerator."

The clams' hearts are being used in research to measure the amount of acetylcholine—a chemical thought to be released at certain nerve endings—that is present in the nervous and muscular systems.

100 Frogs Used Monthly

Like the Venus clam, the North American leopard frog (*Rana pipiens*) is giving its heart to the latest research conducted by Dr. Stephen Hajdu of the National Heart Institute's Laboratory of Kidney and Electrolyte Metabolism.

Every month Dr. Hajdu receives 100 frogs from a Wisconsin supplier. Before research can begin, however, these frogs must be given chloromycetin to cure an infectious, ordinarily fatal bleeding disease known as red leg.

Dr. Hajdu is using the frogs' hearts to study cardioglobulins, a group of protein substances found in blood plasma, which are essential for maintaining the normal contractility of heart muscle and may prove to be the main regulator of heart function.

The frog is particularly useful in this work because it has one of the

lowest natural cardioglobulin concentrations, permitting varying amounts of the substance to be more easily measured.

Probably the most unusual animal now used in NIH blood research is Calvin, a 3-year-old, 8-pound Louisiana alligator.

Kept in an aquarium with a constant flow of fresh water, Calvin eats goldfish, mice, and horsemeat.

Dr. Martin Cline of the National Cancer Institute's Metabolism Service is using Calvin to measure the life span of red blood cells at various metabolic rates. Alligators are useful in this work, since they not only vary their metabolic rate according to changes in surrounding temperature but are large enough to withstand repeated blood samplings.

Dr. Cline reports no outstanding



This Necturus, an 8-inch amphibian obtained from Wisconsin, is being used in kidney research by Dr. Herbert Lubowitz, Laboratory of Kidney and Electrolyte Metabolism, NHI.—Photo by Lee Bragg.



Dr. Martin Cline, Metabolism Service, NCI, somewhat warily lifts Calvin's mate (now at Washington Zoo) from aquarium prior to blood sampling.—Photo by John Romine.

problems in keeping alligators. "Well, one once bit a keeper at the Washington zoo, but that was before it was brought here."

One difficulty, however, is capturing Calvin and tying his jaws long enough to sample the blood from either his heart or tail after injection of radioactive isotopes.

Calvin will soon return to the Washington Zoo, and Dr. Cline reports that it's just as well. "Calvin has never been the same since he was separated from his mate which went back to the zoo. He's depressed. He used to come to the surface and eat, but now he just sits there."

Mud Puppies Eat Little

NIH doctors are using other unusual animals in kidney and bladder research. Dr. Herbert Lubowitz of the Laboratory of Kidney and Electrolyte Metabolism, NHI, is maintaining a colony of 50 *Necturi maculosi*, otherwise known as mud puppies.

These are salamander-like amphibians about eight inches long, tail included. Kept in saline solution at five degrees C., the *Necturi* have an extremely slowed metabolic rate and require little food during their stay at NIH, even when tempted with delicacies like flies, bugs, and shrimp.

"In fact, as far as we can tell," says Dr. Lubowitz, "they don't eat anything. They may even be a bit cannibalistic. Every once in a while we find one with a bite out of his tail."



NIAID scientists maintain a large colony of this snail, *Australorbis glabratus*, one of the hosts for the blood fluke causing schistosomiasis.—Photo by Vernon Taylor.

Necturi are valuable in kidney research for several reasons. Their kidneys are relatively simple, with large, conveniently arranged tubules and a capsule (kidney covering) thin enough to allow easy insertion of micropipettes for injecting or withdrawing fluid and chemicals.

During the past year NIH kidney research has also used toads from a pet farm in Florida. The toads are kept in cages in straw-like matter.

Since this toad's bladder functions like a certain portion of the human kidney, Drs. Joseph Handler and Jack Orloff, Leukemia, NHI, are using it to study the action of hormones causing urine concentration.

Doctors are also using several

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Mosquito Proven Malaria Carrier In Monkeys

A mosquito that transmits malaria to monkeys in nature has been identified and reported for the first time by Dr. R. H. Wharton of the Institute for Medical Research, Kuala Lumpur, Federation of Malaya, and Dr. Don E. Eyles of the Laboratory of Parasite Chemotherapy, National Institute of Allergy and Infectious Diseases.

Their report, appearing in the July 28 issue of *Science*, marks the first demonstration of a natural vector of any monkey malaria. Whether this species, *Anopheles hackeri*, also transfers simian malaria to man remains to be proven.

Under Investigation

The problem of transmission of this malaria in nature is under intensive investigation as a follow-up to the discovery last year by Dr. Eyles and his colleagues (also reported in *Science*, June 17, 1960) that monkey malaria is transmissible to man. (The mosquito involved in that work was *A. freeborni*, a species distinct from the one in Malayan studies.) This fact has disproved the long-held concept of malaria investigators that types of malaria infecting lower animals cannot be inoculated successfully into man by the bite of an infected mosquito.

Until comparatively recently, the *A. hackeri* mosquito was regarded as a rather rare species breeding in split bamboos in inland forest. It is now known, however, to be quite common on the Selangor Coast of Malaya.

Mosquito Trap Set

Mosquitoes were caught in an open net trap, baited with monkeys, on a platform 20 feet above ground level. Over a period of 34 nights, 20 *A. hackeri*, including 17 which contained blood, were captured. Four without blood were taken in a similar trap on the ground. Tests with blood from freshly fed mosquitoes confirmed that *A. hackeri* was feeding upon monkeys.

In a search for the parasite which causes malaria, over 700 mosquitoes were dissected to find one sporozoite infection—the phase of the developmental cycle when the parasite becomes infective for its vertebrate host.

An uninfected Indian rhesus monkey was inoculated intravenously with the sporozoites. Six days later small ring forms were seen sparsely in the blood. The infection built up so rapidly that the monkey died three days later. The parasites which caused the malar-

Presence of Serum Protein Antibody Gives Clue to Transfusion Reaction

During the past few years the field of genetic blood characterization has developed in new directions due to the finding that people can be classified into sharply distinct groups according to differences in their serum proteins. Many of these serum protein variations are genetically determined and can be detected by starch gel electrophoresis and other techniques.

These developments prompted scientists of the National Institute of Arthritis and Metabolic Diseases to investigate the possibility that sera of people who had received multiple blood transfusions might contain antibodies which would react with particular serum proteins, present in some individuals but not in others. Such a reaction had been shown in rabbits and monkeys by previous investigators.

Precipitin Found

The NIAMD scientists first found a precipitin (an antibody which acts on its antigen to produce a precipitate) in the serum of a patient who had recently received approximately 50 transfusions with such reactions as fever, headache and muscle pain for no known reasons.

There was no evidence of red cell incompatibility with donor bloods; rather the patient's serum gave a well defined precipitin reaction (i. e., acted as an antibody) with an alpha-two macroglobulin, a protein present in the serum of some normal individuals but not

in the serum of others. The investigators subsequently found an anti-protein antibody as the first subject.

Family and twin studies of the precipitin reaction showed that the presence or absence of the alpha-two globulin which causes precipitation with the transfused patient's antibody is inherited according to simple Mendelian rules. The gene which determines the presence of the protein in normal serum which reacts with antibody has been designated AgA.

Antigen Frequency Varies

Approximately half of the American sera tested by the NIAMD scientists contained the protein giving the precipitin reaction. In a sample of sera from a Central Pacific Micronesian population 50 out of 51 individuals gave a positive precipitin reaction, indicating that the frequency of the antigen varies in different geographic groups.

Besides being of genetic and anthropological interest, this finding of a specific precipitin in serum suggests that human serum protein isoimmunization may occur.

The studies by Drs. A. C. Allison (NIAMD visiting scientist, now at the National Institute for Medical Research, London) and B. S. Blumberg of NIAMD's Epidemiology and Biometry Branch, reported in *The Lancet*, also indicate that serum protein antigen-antibody reactions may be involved in some post transfusion reactions in multitransfused patients.

ia were identified as *Plasmodium knowlesi*, a common form of simian malaria.

The infection has been transferred to another monkey, and infected blood from this animal has been shipped to the United States for further study.

Called Important Link

The demonstration that *A. hackeri* is a natural vector of one of the many species of simian malaria is an important link in the chain that may eventually explain what mosquito carriers are involved in the transfer of the disease in monkeys. This is by no means a total explanation, since these malarias occur in many areas where *A. hackeri* does not commonly occur.

Dr. Eyles, at his Malayan field station, is studying other aspects of the problem, with continuing collaboration of the Institute for Medical Research at Kuala Lumpur.

The University of Malaya is one of the overseas installations which is receiving support under the new

program sponsored by the International Health Research Act.

Through a grant by the National Institute of Allergy and Infectious Diseases to the University of California (Berkeley), the University of Malaya will serve as a tropical disease base for mutual research and training between the two universities over an initial 5-year period.

Investigations of simian malaria will continue until its role in worldwide malaria in man is better understood, since the United States is vitally concerned in international efforts to eradicate the disease.

Approximately one-half of the world's population lives in areas exposed to malaria. An estimated 250 million suffer from the disease each year, and of these 2,500,000 die. In the last four years alone, this country has contributed over \$100,000,000 in direct support of this international effort, plus large amounts of supplemental funds. The report of Drs. Wharton and Eyles adds new data to an area poorly documented at present.

New NINDB Publication Reports Latest Findings On Parkinson's Disease

More than 25,000, possibly as many as 43,000, new cases of Parkinson's disease are now occurring each year in the U.S., according to a pamphlet just issued by the National Institute of Neurological Diseases and Blindness.

The total number of victims is at least 300,000, the publication states. Furthermore, since the incidence of the disease increases sharply when people pass the age of 50 and since the number of older people in this country is steadily increasing, both new cases and total number of Parkinson's disease patients is likely to increase unless a preventive can be found.

Once known as "shaking palsy," Parkinson's disease is accompanied by muscle rigidity and uncontrollable shaking or trembling of one or more parts of the body.

Cause Unknown

The cause of the disease, which rarely kills but often severely cripples its victims, is not known. Scientists have noted, however, that some forms of the disease definitely increase after epidemics of encephalitis or influenza, both of which are caused by viruses.

The pamphlet notes that "no one perfect medicine has yet been discovered for the disorder" and that surgery is effective treatment only in highly selected cases. However, the vigor and scope of research being conducted or supported by the Public Health Service and by other scientific organizations promises constant improvement in treatment methods.

Written primarily to inform and reassure the victims of Parkinson's disease and their families, the pamphlet describes three typical cases.

Skilled Care Needed

Emphasis is given to the role of the family physician and assistance by skilled physical, occupational, and recreational therapists. Under their care the symptoms of the disease often can be reduced and the patient helped to retain a more normal existence.

Parkinson's Disease — Hope Through Research is listed as Public Health Service Publication No. 811 and Health Information Series No. 100.

Single copies may be obtained without charge from the NINDB Information Office or the Public Health Service. Orders under 100 are 15 cents a copy from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. There is a 25 percent discount on orders of 100 or more going to one address.

ANIMALS

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types of unusual animals in research on infectious and parasitic diseases. Dr. G. Robert Coatney of the Laboratory of Parasite Chemotherapy, National Institute of Allergy and Infectious Diseases, is using *Aedes aegypti* mosquitoes in studies of malaria transfer in lower animals, especially mice and chickens.

Kept in screened cages, the mosquitoes are maintained on a diet of sugar water, but the females must have at least one blood meal from rabbits, mice, or chicks if they are to lay viable eggs. Temperature and humidity in mosquito labs must be kept constant and equipment scrupulously clean. And the eggs are hatched in distilled water.

Mosquitoes Get Sick

In fact, Dr. Coatney reports "problems—nothing but problems" in raising his mosquitoes. "In nature they grow without any trouble but when we try to raise them, things are different. Did you know that mosquitoes get sick just like people?"

Another animal used in parasitic disease research is the reddish-brown snail *Australorbis glabratus*, one of the hosts for the blood fluke causing schistosomiasis, a disease found in over 100 million people throughout the tropics and subtropics. Begun more than 15 years ago, the NIH snail colony, which now includes numerous species known to transmit schistosomiasis, has grown to many thousands.

The raising of snails presents several problems, such as preventing overcrowding in jars and aquariums, controlling pests, and maintaining constant water quality.

Snails Prefer Cakes

As Dr. Louis Olivier, Laboratory of Parasitic Diseases, NIAID, says, "We're lucky here because tap water is all right provided we get the chlorine out by letting the water sit for a day."

Feeding was rather a problem until the Laboratory developed its own food cakes, a pulped and dried mixture of wheat germ, powdered milk and leaves, to stimulate snail appetites. The snails now prefer the cakes to Romain lettuce.

The snails have been "trained" to lay their eggs on pieces from plastic freezer bags spread on the water surface. These plastic pieces can be manipulated easily without damage to the eggs.

Dr. Olivier, whose previous experiments in conjunction with Dr. Willard Haskins showed that low concentrations of sodium pentachlorophenate drastically diminished the snails' fertility, is now investigating the effects of this and other chemicals on the eggs themselves.

NHI Scientists to Conduct Research At Pakistan-SEATO Cholera Lab

Dr. Robert S. Gordon, Jr., and Dr. O. Ross McIntyre, of the National Heart Institute's Geographic Pathology Section, will leave in September for two years' research and clinical work at the Pakistan-SEATO Cholera Research Laboratory in Dacca, E. Pakistan.

Dr. Gordon will head the Clinical Research Section and will be in charge of organizing a new ward to which the Laboratory's first patients will be admitted. He will investigate the possible role of nutritional deficiency in susceptibility to cholera and will also collect data on whether recovery from clinical cholera produces lasting immunity.

To Conduct Studies

Dr. McIntyre, a newly commissioned Public Health Service officer, will assist in the clinical and research work. He will conduct a number of studies including an investigation of the role of nutritional deficiency and anemia in susceptibility to cholera.

Recent studies have led some investigators to suspect that the result of infection with the cholera-producing organism is a breakdown of the normal mechanism by which the bowel transports ions (electrically charged atoms) into the bloodstream. The study of acute disturbances in the transport process, such as occur in cholera, may help in un-

derstanding the longer-term disturbances in the ion transport which occur in chronic heart failure and kidney disease—a subject of great interest to many investigators in the National Heart Institute.

Devises Test

In 1959 Dr. Gordon was one of the American doctors who accepted the Government of Thailand's invitation to do research during the cholera epidemic there. Last December he reported his findings at the Conference on Cholera, sponsored by SEATO and NIH at Dacca, during which the Laboratory was dedicated. A test which Dr. Gordon devised indicates that cholera patients do not lose appreciable quantities of blood plasma proteins through the intestine. Replacing protein is therefore not a necessary part of treatment for these patients.

Dr. McIntyre completed his undergraduate work at Dartmouth and received his M.D. degree from Harvard Medical School in 1957. He interned at the University of Pennsylvania and completed his residency at Dartmouth Medical School this year.

The Research Laboratory, housed in a three-story wing of the Dacca Institute of Hygiene, was converted by the Pakistani Government and equipped with SEATO funds.



Dr. Robert S. Gordon, Jr. (holding vacuum tube tester) and Dr. Ross McIntyre (center) examine equipment intended for the Pakistan-SEATO Cholera Research Laboratory with Supply Management employees David Smith (left), Head of Shipping and Receiving, and Paul Schenk, Property Utilization. The cartons contain cases of normal saline solution for use by the Laboratory in treatment of cholera patients.

Dr. Alina Szumlewicz, a Visiting Scientist on a 2-year fellowship from the Pan American Union, is engaged in another aspect of schistosomiasis research. She is investigating the effects of irradiation on both the snail and the parasite before and after it enters the snail's body.

These unusual animals involved in heart, blood, kidney, and parasitic disease research actually rep-

resent only a few of many types now being used. Previous research has also involved such creatures as bats and silver fox for rabies studies, mink for infectious hepatitis, and ferrets for influenza.

But it may be said that in NIH medical research the usual run of white mice, guinea pigs, and rats is receiving competition from more exotic varieties in the animal world.

NHI Biochemist Accepts Mass. Hospital Position

Dr. Barbara E. Wright, a biochemist in the Laboratory of Cellular Physiology and Metabolism, NHI, will leave NIH at the end of August to accept a position in the Huntington Laboratories of the



Dr. Wright

Massachusetts General Hospital in Boston.

Dr. Wright joined the staff of the Heart Institute in 1953. Her initial investigations concerned folic acid and one-carbon metabolism. For the past four years she has been studying the biochemistry of morphogenesis in slime molds.

In her new position she will continue her studies of the mechanisms underlying biochemical differentiation.

Works in Denmark

A native of Pasadena, Calif., Dr. Wright received a B.S. degree in 1947 and a Ph.D. degree in 1951 from Stanford University. Before coming to NIH, she worked for three years on post-doctoral fellowships at the Carlsburg Laboratories in Copenhagen, Denmark.

Dr. Wright's husband, Dr. Herman Kalckar, a former NIH Visiting Scientist, will become Professor of Biological Chemistry at the Harvard Medical School at the end of this month, as reported in the July 18 issue of the *Record*.

Cancer Conference Proceedings Published

Proceedings of the Fourth National Cancer Conference, sponsored jointly by the National Cancer Institute and the American Cancer Society and held September 13-15, 1960, at the University of Minnesota, have been published by J. B. Lippincott Co., Philadelphia.

The 774-page volume contains lectures and panel discussions on the causation, development, spread, and treatment of cancer and control of the disease. Contributions from almost 130 scientists summarize recent advances in knowledge of cancer through laboratory research and clinical studies.

NCI scientists who participated in the conference were Dr. Kenneth M. Endicott, Dr. Michael B. Shimkin, Dr. Howard B. Andervont, Dr. W. E. Heston, Dr. Sidney J. Cutler, Fred Ederer, Dr. Sarah E. Stewart, Marjean Irwin, and Dr. Eugene J. Van Scott. Dr. Lewis C. Robbins, Chief of the Cancer Control Program, Bureau of State Services, also contributed to one of the panel sessions.

Dr. Chaudhury Reveals New Method for Assay Of ADH in Body Fluids

In a National Heart Institute Lecture on July 21, Dr. Ranjit R. Chaudhury of New Delhi, India, described to NHI staff members an improved method for the assay of antidiuretic hormone in body fluids.

An Assistant Professor of Pharmacology at the All India Institute of Medical Sciences, New Delhi, Dr. Chaudhury is presently conducting research at the Drug Laboratories of the Government of Canada in Ottawa.

Research on antidiuretic hormone has been hindered by the lack of techniques for accurate measurement of this substance in body fluids. The available methods, usually intricate, laborious, and time consuming, yielded only rough approximations even when skillfully applied.

Results More Accurate

The technique described by Dr. Chaudhury combines some of the desirable features of several earlier techniques. It is not simple either, but rewards the user with more accurate results.

Antidiuretic hormone regulates one of the most important kidney mechanisms for adjusting fluid output to fluid intake; the urine concentrating mechanism. A deficiency of this pituitary hormone, and the resulting failure of the concentrating mechanism, leads to the enormous urinary water losses and insatiable thirst that characterize diabetes insipidus.

Antidiuretic hormone is measured in body fluid samples by bioassay techniques. This involves administering a given volume of the sample to be analyzed to a test animal, then comparing its effects on urinary volume or concentration with the effects of an equal volume of a standard containing a known amount of ADH.

Hormone Action Mimicked

To complicate matters, however, a number of other substances in the blood mimic the action of antidiuretic hormone, among them serotonin, acetylcholine, angiotensin, norepinephrine, and epinephrine. Further, the animal's own production of ADH must be halted completely or he might add his own ADH to that injected.

In the method used by Dr. Chaudhury, the animal's ADH production is halted by feedings of 10% grain alcohol. This is followed by water or 5% alcohol to initiate diuresis.

Urine samples are then taken to establish base line data, the urinary water losses being replaced by equal volumes of 2% alcohol to maintain the block on ADH pro-

EXHIBIT DRAWS CROWDS AT ARMORY



The NIH exhibit is one of the most popular at the first Montgomery County Science and Industry Showcase, held at the Silver Spring Armory July 27-29. Left: Carole Spearin, NIH Summer Information Trainee, takes names of school children requesting NIH publications. Right: A germfree animal tank inhabited by white rats attracts some of the estimated 10,000 who visited the NIH display.—Photos by Sam Silverman.

Dr. T. L. Perrin Joins Creighton Medical Staff

Dr. Theodore L. Perrin, former Chief of the Department of Pathology at NIH, has been appointed Chairman of the Department of Pathology of the Creighton University School of Medicine, Omaha, Neb., according to a recent announcement.

Dr. Perrin, who has conducted research primarily in the field of infectious diseases, will also serve as a consultant in pathology to the Division of Hospitals of the Bureau of Medical Services, PHS.

A PHS commissioned officer for 25 years, Dr. Perrin retired with the rank of Medical Director last June. He joined the NIH staff in 1937 and remained until 1947, with two years out for wartime service with the Coast Guard.

NINDB Information Office Moves to Robin Building

Due to construction in Building 8, the NINDB Information Office is now located in the Robin Building, Silver Spring.

Mail should be addressed to NINDB Information Office, Rm. 4 B 21, Robin Bldg., NIH, Bethesda, Md. The telephone extension is 8426.

duction and to maintain diuresis.

Separate determinations are then made after administering the various doses of standard and after administering the unknown. The ADH content is calculated for the unknown on the basis of the relative urine volumes.

In order to correct for errors that might be introduced by compounds which mimic the effects of ADH, the standard and the unknown are incubated separately in sodium thioglycolate. This compound inactivates ADH, but not its imitators. The incubated com-

Dr. Karl Frank Begins Special Study in Paris

Dr. Karl Frank, Chief of the Spinal Cord Section of the Laboratory of Neurophysiology, NINDB, recently began a year of special study at the National Center of Scientific Research in Paris.

While in France, he will work with Dr. Ladislav Tauc of the Center for the Study of Nervous Physiology. They will explore the role of dendrites and their synaptic connections in the integration of activity in the central nervous system.

In attempting to uncover single cell mechanisms involved in learning, the investigators will attempt to produce changes in a simple nervous system by altering the synaptic inflow to specific cells.

Fight-for-Sight Prize Won by Dr. Bonting

Dr. Sjoerd L. Bonting, Chief of the Section on Cell Biology, Ophthalmology Branch, NINDB, has received \$500 and the first "Fight for Sight" citation for his paper entitled, "The Rhodopsin Cycle in the Developing Vertebrate Retina."

Leo L. Caravaggio and Dr. Peter Gouras of the Ophthalmology Branch were co-authors of the paper which will appear in the fall issue of the new journal, *Experimental Eye Research*.

The "Fight for Sight" award is given annually by the National Council to Combat Blindness for the most significant paper presented at sectional meetings of the Association for Research in Ophthalmology.

pounds are then tested separately. Any ADH-like activity remaining is due to these imitators, and can then be corrected for.

NINDB Study Suggests Coenzyme DPN Governs Metabolism of Oxygen

Factors which may govern the channeling of metabolic activity via either of two parallel chemical pathways in the brain have been defined by National Institute of Neurological Diseases and Blindness scientists.

The availability of a specific coenzyme appears to influence the probable reciprocal relationship between a direct metabolic route, by way of succinyl coenzyme A, and a "shunt" pathway, via gamma-aminobutyric acid.

Previous studies by these investigators have shown that derangement of the latter pathway is intimately associated with the development of epileptic seizures.

In conducting the study, a specific phase of cerebral oxidative metabolism was investigated in subcellular bodies, known as the mitochondria, in the cat brain. Findings were reported by Drs. Guy McKhann, now of Massachusetts General Hospital, and Donald B. Tower, Laboratory of Neurochemistry, NINDB, in the *Journal of Neurochemistry*.

Experiments Cited

Experiments revealed that an increase in the level of the common chemical precursor, alpha-ketoglutarate, enhanced the activity of the direct pathway and depressed the shunt or gamma-aminobutyric acid pathway. However, chemicals which blocked the direct route caused an increase in the activity of the shunt pathway, indicating that high levels of the common precursor, per se, are not a regulatory factor.

When the mitochondria were made permeable to a coenzyme, diphosphopyridine nucleotide (DPN), the investigators found a significant increase in the utilization of the gamma-aminobutyric acid pathway. They suggest that the two pathways may compete for oxidized DPN and that the availability of the coenzyme may be an important factor in regulating metabolism.

Drs. Ingraham, Hilberg Accept PHS Positions

Dr. Samuel C. Ingraham and Dr. Albert W. Hilberg, both formerly of the Diagnostic Research Branch of the National Cancer Institute, have recently accepted positions with the Radiological Health Division of the Public Health Service.

Dr. Ingraham has been named Chief of the Training Branch, and Dr. Hilberg Director of Human Studies, a new position in the Research Branch.