

NIH-PHS Staff Participate in AMS Meeting

Thirty-four representatives of the Public Health Service, including staff members of NIH, were active participants in the 68th Annual Meeting of the Association of Military Surgeons of the United States at the Mayflower Hotel in Washington, November 6-8.

The 3-day meeting included lectures and panel discussions, with special section meetings for nurses and pharmacists.

It was attended by more than 1,800 physicians, dentists, veterinarians, nurses, and medical specialists from the United States and 34 foreign countries.

Fifty-nine technical and 15 scientific exhibits were displayed at the meeting.

Chairmen Awarded Medal

Chairman of the scientific program was Dr. Thomas J. Kennedy, Jr., Assistant to the Director of Laboratories and Clinics, NIH. Dr. James K. Shafer, Health Advisor, Office of Emergency Planning, PHS, was General Chairman of the meeting.

The Founder's Medal, awarded annually for outstanding contributions to military medicine and for meritorious service to the Association, was awarded to Dr. Kennedy and Dr. Shafer. The medal was first awarded in 1941 to commemorate the 50th anniversary of the founding of the Association.

Gen. Cooney New President

The new president of the Association is Maj. Gen. James P. Cooney, USMC (Ret.). He succeeds Surgeon General Leroy E. Burney, USPHS, (Ret.).

The Sustaining Membership Lecture, established in 1958 by the sustaining members of the Association, was delivered by Dr. Vannevar Bush of the Massachusetts Institute of Technology. He spoke on "The Trend Toward Socialism."

Women members and wives of members of the Association visited

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Scientists Visit Russia To Appraise Research In Medical Ecology

A delegation of medical scientists from the United States departed last Tuesday for the Soviet Union where they will study research activities being carried on in medical ecology in a number of scientific centers, according to an announcement by PHS Surgeon General Luther L. Terry.

Purpose of the scientific mission is to learn of health studies and services underway in different population groups within the Soviet Union. The group will study particularly cardiovascular and non-infectious disease problems.

Studies Termed Important

The American scientists' studies, the Surgeon General's announcement said, will be of prime importance in the relatively new and growing field of medical ecology, which involves study of the interrelationship of the environment and health services to the health and disease problems of people as individuals and as members of groups and communities.

The group was scheduled to ar-

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NIAMD Cracks RNA Genetic Code; Work Seen of Major Importance

Scientists of the National Institute of Arthritis and Metabolic Diseases have succeeded in partially cracking the so-called genetic code which lies at the heart of the systematic reproduction of all living matter.

Their work, of major importance, illuminates the way informa-

tion is coded into the nucleic acids and used to direct the incorporation of specific amino acids into proteins.

The genetic code, involving the two hereditary materials DNA and RNA, (deoxyribonucleic acid and ribonucleic acid), provides the means for storing and transmitting genetic information; to understand it fully is one of the most important basic problems in biology.

Problem Explained

DNA and RNA occur in all living cells and are now believed to direct the manufacture of proteins, life's most complex and important molecules. The core of the problem is the way information is coded and carried from generation to generation in the structure of the DNA molecule, transmitted by "messenger" RNA and then used to direct the making of specific protein molecules from some twenty different amino acids.

In essence, what the NIAMD scientists, Drs. Marshall W. Nirenberg and J. Heinrich Matthaei, of the Laboratory of Biochemistry and Metabolism, have done is to prepare a protein-synthesizing system from bacteria which can be "directed" with samples of synthetic RNA. They have observed that particular RNA samples of known structure direct the system to produce protein material incorporating only one of all the available amino acids.

Relates Code to Acid

With one type of RNA only phenylalanine is incorporated; with another, only proline is incorporated. Since the structure or "code" of the RNA samples is known, it becomes possible to relate this structural code to the specific amino acid utilized.

The code contained in RNA can be thought of as a four letter

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At the recent annual meeting of the Association of Military Surgeons these three Surgeons General of the Public Health Service, past and present, were caught by the camera in a jovial mood. Left to right: Dr. Leonard A. Scheele who served in that capacity from April 1948 to August 1956; Dr. Luther L. Terry, the present Surgeon General; and his predecessor, Dr. Leroy E. Burney who served from August 1956 to January 1961, succeeding Dr. Scheele.—AMS Photos by Jerry Hecht.

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'PERSONNEL' TO PERSON

SINCE some NIH employees are being called to active military duty, the Employee Relations and Services Section offers the following timely information on the subject.

The DHEW policy is to place employees with career, career-conditional, or indefinite appointments, in furlough status (temporary, non-pay), unless they prefer to be separated.

Employees with temporary appointments are separated. Although temporary employees do not have restoration rights, Department policy is to re-employ when feasible.

Two Choices Available

In general, persons inducted into the military service may elect to receive a lump sum payment upon furlough or separation for all accumulated and accrued annual leave up to the limit prescribed by law, or they may elect to have the entire leave account remain to their credit until their return.

Sick leave is carried on the record until the employee returns. Military leave (leave of absence from duty without loss of pay or charge to annual leave) is available for those going on extended duty and for those who go on brief periods of training.

Furlough Benefits Explained

If furloughed, the employee retains rights under the Civil Service Retirement Act, and his retirement fund contribution of 6½ percent is continued by the Government during his period of military service.

Refund of retirement funds can be obtained only if the employee is separated rather than furloughed. The refund makes his separation from the civilian service absolute for retirement purposes, thereby depriving him and his survivors of retirement cover-

MEDICAL ECOLOGY

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rive in Moscow on November 15 and visit several medical institutes and the health services of a number of centers in the Soviet Union for a period of about four weeks.

Members of the mission are:

Dr. William J. Zukel, Office of the Director, National Heart Institute, Chairman of the Mission.

Dr. Urie Bronfenbrenner, Professor of Psychology, Department of Child Development and Family Relationships, Cornell University.

Dr. Paul H. Densen, Deputy Commissioner of Health, New York City.

Dr. Robert Dyar, Chief, Division of Preventive Medical Services, State Department of Public Health, Berkeley, Calif.

Dr. Philip Lee, Department of Internal Medicine, Palo Alto Medical Clinic, and Clinical Instructor in Medicine, Stanford University School of Medicine.

Dr. John D. Turner, Staff Assistant, Office of the Director, National Heart Institute.

The mission is one of five developed under terms of an agreement between the United States of America and the Union of Soviet Socialist Republics for cooperative exchanges in scientific, technical, educational, and cultural fields in 1960-61.

age, unless and until he returns to duty following his military service.

Employees' Group Life Insurance terminates upon entering on active military duty.

Health Benefits' enrollment continues for employees entering on active military duty for 30 days or less. If the period of military service is for more than 30 days, enrollment will be suspended on the date of entrance on active duty. Enrollment is reinstated without change when the employee returns to his civilian position. If he returns to his position under conditions which do not entitle him

DRS Initiates Program to Strengthen Engineering in Support of Research

The Division of Research Services recently reported a series of developments designed to strengthen engineering support for biomedical research.

One is a special course being given this semester at the Georgetown University Medical School for DRS architects and engineers.

The course is a four-month accelerated orientation program arranged to familiarize DRS staff engineers and architects with the scientist's terminology, tools, techniques, and problems. The medical school staff is administering the course and providing instruction in a seminar-type atmosphere three nights a week from 5 to 7.

The curriculum covers basic medical and clinical disciplines including microbiology, biochemistry, physical chemistry, biophysics, physiology, immunology, pathology, clinical pathology, pharmacology, genetics, organic chemistry, and biology.

The program was planned and

organized by A. E. Williamson, Chief, Research Facilities Planning Branch, in cooperation with the university and with NIH scientists and other interested in multi-discipline training in the biomedical field.

Lists Services Offered

The recent creation of a new Engineering Development Section within the Division's Instrument Engineering and Development Branch is expected to provide specialized engineering knowledge and experience for application to medical research problems.

The new section is prepared to offer biomedical engineering services in biochemical analysis, automation and computer applications, and physiological monitoring and clinical applications.

The program is supported by staff members and by two biomedical engineers. Both are engineers with graduate degrees in one of the life sciences.

Backgrounds Described

Gerald Vurek, a staff member who recently returned to NIH after a two-year study assignment at Stanford University, has completed all course work required for the Ph.D. degree in physiology.

Peter Carmeci, coauthor of a technical manual on equipment measuring initial projectile velocity, is a graduate biologist and electronic engineer. He has a patent application pending on his invention of a time code generator for analog or digital tape, paper, and photographic recording.

Mr. Carmeci comes to NIH from the United States Army Signal Research and Development Laboratories, Fort Monmouth, N.J., where he had charge of a countermeasures program and helped found a biomedical study group of engineers and psychologists.

Dr. Stetten Lectures At Yale University

Dr. Dewitt Stetten, Jr., Associate Director in Charge of Research for the National Institute of Arthritis and Metabolic Diseases, was the guest speaker at the John Punnett Peters Memorial Lecture series at Yale University on October 31.

The fifth in the annual series of these lectures, Dr. Stetten's talk was entitled "Congenital Enzymatic Defects in Human Disease."

This lecture series was established in honor of the late Dr. Peters of Yale University, who was distinguished for his important contributions to quantitative clinical chemistry and knowledge of a variety of metabolic diseases.

Marine Band to Present Concert November 30

The U.S. Marine Band, conducted by Capt. Dale Harpham, will be heard in the CC auditorium Thursday, November 30, at 7:30 p.m.

Although the band concert is planned especially for Clinical Center patients, NIH employees, their families and friends are cordially invited to attend.

The concert is arranged by Arnold Sperling, CC Patient Activities Section Chief, in cooperation with James G. Dunton, Director of the Special Activities Division, Office of the Secretary of Defense.

to exercise his reemployment rights, he must again register for Health Benefits.

Additional information may be obtained from the Employee Relations and Services Section, Ext. 4851.

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PHS Corps Exams

Regular Corps examinations for the appointment of physicians, dentists, nurses, sanitary engineers, veterinarians, and sanitarians to the Commissioned Corps of the Public Health Service will be held throughout the country on February 13, 14 and 15, 1962.

Applications and additional information concerning the examinations may be obtained by contacting the Commissioned Officer Section, Ext. 4212. Applications must be submitted by January 5, 1962.

Improved DRG Coding Aids Grant Processing

The code used by the Division of Research Grants for numbering research grant and construction grant applications has been revised into a more comprehensive system.

It speeds the work of DRG assignment officers and simplifies existing data processing systems.

The new code includes designations for sub-programs, many of which were not in existence a year ago.

Symbols for Institutes and Divisions have been changed. For instance, the DRG symbol for the National Institute of Allergy and Infectious Diseases is now AI. It used to be E.

System Explained

Under the new system, all grant numbers will have a numerical suffix, indicating the actual grant period. This replaces the suffix "C" which followed the serial number and indicated "continuation."

The use of the letter "R" to represent "revisions" has been discontinued and the letter "A" representing "amended" has been substituted.

Use of the new code does not require changes in Institute or Division grant records. Incoming applications are being given the new identification codes as they are received.

The new code went into effect for research project grant, research program-project grant, and construction grant applications of types 1,2,3,7,8 and 9, received since November 1. Type 5's will be modified beginning January 1, 1962.

Dr. Schaefer Elected to Royal Medical Society

Dr. Arnold E. Schaefer, Executive Director, Interdepartmental Committee on Nutrition for National Defense, which operates through the National Institute of Arthritis and Metabolic Diseases, has been elected to membership as an Affiliate of The Royal Society of Medicine of London.

The membership of this Society, which is dedicated to medical research on an international scale, includes outstanding authorities in the principal fields of medicine.

Internationally recognized for his work on nutrition in the developing countries, Dr. Schaefer became associated with NIH in 1955. Since 1956 he has been Executive Director of the Committee's program. In this capacity he has been active in directing nutrition surveys in 19 foreign countries, and a survey currently under way in Burma.

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NIH the afternoon of November 8 for a guided tour of the Clinical Center. Arrangements for the tour were made by a committee of wives of PHS officers, headed by Mrs. Stuart Sessoms.

Seven NIH scientists presented papers during the 3-day sessions. A brief summary of each follows:

Dr. Donald S. Fredrickson, Clinical Director of Intramural Research, National Heart Institute, read a paper, "From Genes to Molecular Disease—Emerging Concepts," which emphasized the recent surge of interest in genetic determination of molecular disease. As a result, he said, new concepts are emerging which are enriching the practice of medicine and also imposing upon clinicians a need to become familiar with basic principles of genetics and biochemistry.

Traces Susceptibility

Dr. Baruch S. Blumberg, Chief of the Section on Geographic Medicine and Genetics, Epidemiology and Biometry Branch, National Institute of Arthritis and Metabolic Diseases, reported on "Genes and Geography." He said that many variations or differences in diseases susceptibility among people can be traced to their genetic makeup.

Dr. Bert N. La Du, Arthritis and Rheumatism Branch, NIAMD, reviewed inborn errors of metabolism in his paper, "From Genes to Molecular Disease—Outstanding Examples of Inborn Errors in Metabolism of Aromatic Amino Acids." Several metabolic diseases, such as albinism, phenylketonuria, alcaptonuria, and tyrosinosis, result from defective metab-



Dr. Vannevar Bush, famed U.S. physicist and one of the developers of the atom bomb, listens intently at a session of the annual meeting of the Association of Military Surgeons, at which he delivered the Sustaining Membership Lecture.



Dr. Thomas J. Kennedy, Jr., Assistant to the Director of Laboratories and Clinics, NIH, receives the Founder's Medal citation from former PHS Surgeon General Leroy E. Burney, outgoing President of the Association of Military Surgeons.

olism at particular steps in the oxidation of the aromatic amino acids, phenylalanine and tyrosine, he said. Dr. La Du also discussed the study of human hereditary diseases.

Dr. Alexis Shelokov, Chief of the Laboratory of Tropical Virology, National Institute of Allergy and Infectious Diseases, and Dr. Henry K. Beye, Director of the Middle America Research Unit, reported on "Middle America Research Unit—An Interservice Laboratory Devoted to Medical Research in the American Tropics."

Reviews MARU Activities

Dr. Shelokov discussed and reviewed the activities of MARU. He pointed out its specific contributions to the understanding of the etiology, epidemiology, and ecology of viral and mycotic diseases occurring in the American tropics.

Dr. Arnold E. Schaefer, Executive Director, Interdepartmental Committee on Nutrition for National Defense, NIH, reported on ICNND cooperative nutrition projects with 20 countries. He said that the determination of the nutrition status of population groups is accomplished by a combined survey involving medical, biochemical, and dietary assessment, and a measurement of agriculture productivity and food processing, distribution, habits, and customs.

Dr. Richard A. Tjalma, Chief, Epizootology Section, Epidemiology Branch, National Cancer Institute, reported on the epidemiology of leptospirosis. He reported that the organism has been successfully isolated from both man and/or contact animals in several instances.

Dr. Robert J. Huebner, Chief, Laboratory of Infectious Diseases, NIAID, reported on problems and implications of animal cancer viruses. Perhaps the main problem in the study of cancer-causing

Clinical Malaria Strain Proven Drug-Resistant In Recent Lab Tests

For the first time a strain of one of the clinical malarias has been proven resistant to the two drugs considered most effective against the disease. Resistance of *Plasmodium falciparum* malaria to chloroquine and amodiaquine has been demonstrated in laboratory studies reported by Dr. Martin D. Young to the Tenth Annual meeting of the American Society of Tropical Medicine and Hygiene.

Dr. Young, Assistant Chief of the Laboratory of Parasite Chemotherapy, National Institute of Allergy and Infectious Diseases, undertook to find out if persons taking regular suppressive doses of these drugs would develop malaria after being bitten by infected mosquitoes. His studies were begun following the initial discovery that an American who had contracted malaria in Colombia, South America, failed to respond normally to treatment with chloroquine.

Doses Given Weekly

Weekly doses of chloroquine or amodiaquine in 300 or 400 milligram doses, which usually suppress all types of malaria, were given to individuals who were then bitten by malaria-infected mosquitoes. Malaria developed in these cases at the same time as in controls who took no drugs. Subsequent weekly doses of the drugs after the appearance of the infections failed to suppress the disease.

The finding that suppressive regimens of chloroquine and amodiaquine were no protection against a resistant strain of malaria is particularly important since these drugs are widely used in many parts of the world for both suppression and cure of malaria.

Dr. Young points out that fortunately this is the only strain of malaria proven to be resistant to these drugs, but cautions that the appearance of one resistant strain points up the necessity for alertness to the possibility of additional resistant malarials in the future.

viruses in animals, Dr. Huebner said, are common extraneous viruses that interfere in the cancer virus study systems by producing confusing "background noises."

Before the animal tumor viruses can be studied intelligently and in accordance with principles of microbiology, the "background noise" must be eliminated from the viral study systems, he said.

Dr. Huebner called this "the first order of business in cancer virus research." He said it is not unlikely that the cancer-causing viruses in animals may be similar to those causing cancer in man.

Role of Bacteria In Mineralization Studied by NIDR

The process of mineralization is of particular interest to dental and medical scientists, but the underlying factors that regulate normal and pathological calcification in body tissues are still not clearly understood.

Recent experiments by National Institute of Dental Research investigators, using a technique of intraperitoneal transplants, have opened the way for studying the mechanism of calcification under highly controlled conditions.

In earlier studies of the calcification phenomenon, Drs. Anthony A. Rizzo, David B. Scott, and Stephen E. Mergenbogen, of NIDR, and Dr. George R. Martin, American Dental Association Research Associate at the Dental Institute, implanted specimens of normally noncalcifying tissues into the peritoneal cavity of young rats. They found that these tissues, removed after several months, had undergone mineralization. This was confirmed by X-ray diffraction analysis.

Further Studies Made

These findings served as a basis for further *in vivo* studies of mineralization using tissue preparations implanted in dialysis bags, and in combination with certain agents thought to influence calcification.

When various collagenous tissues were implanted in rats in sealed dialysis bags, it was found that some specimens became calcified, while other samples of the same material did not. Further investigation revealed that the implants which mineralized had been contaminated with bacteria during preparation, whereas those that failed to mineralize had remained sterile.

As a result of the latter findings, NIDR scientists turned their attention to studies of individual microorganisms to determine the extent of bacterial implication in the calcification process, and whether such bacteria would calcify when implanted alone.

In a current study, a number of bacterial species were used including coccoid and filamentous forms isolated from human dental calculus. One-day-old cultures were washed, suspended in saline, and transferred to sterile dialysis bags.

The sealed bags were then implanted through an abdominal incision into the peritoneal cavities of young rats. Similar implantations were also made of other nonviable organisms. Following sacrifice of the animals at various intervals over a 90-day period, the



Using a technique of intraperitoneal transplants in rats, these scientists found that certain tissues that normally do not calcify will undergo mineralization in the presence of bacteria. Left to right: Drs. George R. Martin, Anthony A. Rizzo, and Stephen E. Mergenbogen.—Photo by Jerry Hecht.

contents of the dialysis bags were examined by standard bacteriological technique, X-ray diffraction and electron microscopy.

Results showed that all of the viable implants had undergone calcification in a period of 14 to 26 days, whereas specimens containing killed cultures calcified in an appreciably shorter time. In both instances, the presence of hydroxyapatite was confirmed by X-ray diffraction. Control dialysis bags containing 4% saline or distilled water showed no calcification.

It is of significance that electron microscopy revealed striking similarities between the mineral deposits recovered from the intraperitoneal transplants and those obtained from developing human oral calculus.

Although these findings do not implicate any specific organism, they do support the contention that bacteria play a role in the mineralization of dental deposits. Continuing studies, utilizing similar techniques to test the calcifying potential of saliva, may add further to understanding of the mechanism of ectopic oral calcification.

Causative Agent of Toxoplasmosis Seen Related to Sporozoa Parasite Group

Toxoplasma gondii, the causative agent of the sometimes fatal disease, toxoplasmosis, has been unclassified since it was first discovered in 1908. On the basis of new findings by National Institutes of Health investigators, it can now be related to a large group of parasites called the Sporozoa.

The findings, by Mary Ann Gavin, formerly of the National Institute of Neurological Diseases and Blindness; Dr. Theodor Wanko of the same Institute, and Dr. Leon Jacobs of the National Institute of Allergy and Infectious Diseases, were reported to the Tenth Annual Meeting of the American Society of Tropical Medicine and Hygiene by Dr. Wanko.

He said that *Toxoplasma gondii* has been known since 1908 when Nicelle and Manceaux found it in a small African rodent and Splendore found it in a rabbit.

Considered A Curiosity

Despite very careful observation by excellent microscopists, the light microscope has not been adequate to discern features of its structure that could aid in deciding its classification. It has remained a parasitological curiosity usually included in text books in a category called "Protozoa of Uncertain Position."

In 1957 Goldman and his co-workers at the Public Health Service's Communicable Disease Center in Atlanta, Ga., stained *Toxoplasma* with silver stains and noticed a strange phenomenon, the reproduction of an organism by the formation of two filial organisms within it.

Because silver stains can give false appearances, or artifacts, under some conditions, this report did not receive acceptance. However,

it stimulated further work on attempts to discern the reproductive mechanisms of *Toxoplasma*.

The Ophthalmology Branch, NINDB, and the Laboratory of Parasitic Diseases, NIAID, pursued this work by using the electron microscope.

The results of the studies have been very revealing, according to Dr. Wanko. Not only has the process of endodyogeny, or internal budding, been seen and confirmed in detail, but evidence for another division process, schizogony, has been obtained.

Form Within Parent

Schizogony is a process in which a number of individuals are formed within a parent organism. Actually, Dr. Wanko said, endodyogeny can be looked upon as a special form of schizogony in which only two filial organisms are produced instead of many.

With the light microscope it was not possible to establish clearly the mode of reproduction of *Toxoplasma*, but the use of the electron microscope has aided in providing a new appraisal of its relationships.

On the basis of the new findings this parasite can be related to a large group called the Sporozoa, in which are located the agents causing malaria and certain intestinal infections of human beings and many animal diseases. While *Toxoplasma* is not closely related to these, Dr. Wanko said it seems to fit in the same large group.

He expected that a number of other findings in the electron micrographs will be important when they are evaluated later in relation to other organisms and to the mechanisms by which *Toxoplasma* invades and grows in the host cells.

Study Relates Monkey Age to Recovery Rate after Hemidecortication

National Institute of Neurological Diseases and Blindness studies of young monkeys subjected to hemidecortication (removal of the cortex of one brain hemisphere) show that the rate and degree of recovery from resulting neurological deficits is directly related to the age of the animal.

A marked degree of early recovery has been observed in infant monkeys subjected to hemidecortication, while older monkeys retained persistent and severe deficits.

In studies conducted by Dr. Max Ramirez de Arellano of the NINDB Laboratory of Perinatal Physiology, Puerto Rico—reported

at the Seventh International Neurological Congress in Rome, Italy—the neurological status of two groups of monkeys subjected to hemidecortication was determined. One group was made up of animals from six to 22 days old. In the other group were animals over 19 months of age.

Early and complete recovery from paralysis occurred in the young. The operation produced remarkably little or no facial asymmetry in the younger group, while asymmetry was marked and persistent in all older animals.

In the younger animals, voluntary grasp reflex normalized in between 40 minutes and nine days after surgery. Return of volun-

tary grasp did not occur in the older group.

The younger animals began to vocalize soon after surgery, while the older ones were practically "aphasic." The young animals also had earlier recovery of muscle tone than the older animals.

In electroencephalographic recordings of the monkeys, no electrical activity was noted on the side of operation, yet activity remained normal in the records made from the intact brain hemisphere.

Veterans make up some 54 percent of the Federal work force in the United States.

Nat'l Advisory Councils' Appointees Are Listed

Additional appointments of new members to the National Advisory Councils, effective October 1, have been announced as follows:

National Advisory Arthritis and Metabolic Diseases Council: Dr. Conrad A. Elvehjem, President of the University of Wisconsin; Dr. Franz J. Ingelfinger, Professor of Medicine, Boston University; and Dr. Arnold Lazarow, Head of the Department of Anatomy, University of Minnesota.

Members Listed

National Advisory Cancer Council: Dr. R. Lee Clark, Jr., Director and Surgeon-in-Chief, M.D. Anderson Hospital and Tumor Institute, University of Texas; Dr. Abner McGehee Harvey, Professor of Medicine, Johns Hopkins University School of Medicine; and Dr. George B. Cooper of the Department of History, Trinity College, Hartford, Conn.

National Advisory Dental Research Council: Dr. Jacob J. Longacre, Director of the Cleft Palate Clinic, Children's Hospital, Cincinnati, Ohio; Dr. Emory W. Morris, General Director and President of the W. K. Kellogg Foundation, Battle Creek, Mich.; Dr. R. Blackwell Smith, President of the Medical College of Virginia; and W. Howard Chase, President of Howard Chase Associates, Inc., New York City.

Others Named

National Advisory Mental Health Council: Dr. Jack R. Ewalt, Professor of Psychiatry, Harvard Medical School; and Dr. George C. Ham, Chairman of the Department of Psychiatry, School of Medicine, University of North Carolina.

National Advisory Health Council: Dr. Lloyd Viel Berkner, President of the Graduate Research Center, Dallas, Tex.; Dr. Michael E. DeBaakey of the College of Medicine, Baylor University; Dr. Edward W. Dempsey, Dean of the School of Medicine, Washington University, St. Louis, Mo.; and Dr. Herbert M. Bosch, Professor of Public Health Engineering, University of Minnesota.

Vacancies Filled

In addition, five appointments effective September 1, were made to fill vacancies on the Research Facilities Council.

They are Dr. Clark D. Ahlberg, Vice President of Research and Administration, Syracuse University; Dr. Robert J. Glaser, Vice President for Medical Affairs, University of Colorado; Dr. Maxwell E. Lapham, Dean of Medicine, Tulane University; Dr. Raymond J. Nagle, Dean of the College of

Inferior Mother-Child Relationships Found Among Dissatisfied Mothers

A mother's employment has little relation to her childrearing characteristics, but her childrearing practices are significantly affected by fulfillment or frustration, and inferior mother-child relationships are found more generally among dissatisfied nonworking mothers.

These findings, among those resulting from a recent National Institute of Mental Health study, were reported by Dr. Marion Radke Yarrow of the Institute's Laboratory of Socio-Environmental Studies, to the Society for Research in Child Development at Pennsylvania State University.

The NIMH study involved 50 working mothers from the middle and upper-middle classes in which employment is not a traditional role. The subjects were matched in family characteristics, with a male wage earner present and from one to four children in each family.

Few Differences Seen

Few differences in childrearing practices appeared between mothers who worked and those who stayed at home. However, when mothers' motivations to work were considered, those who preferred to work but out of a sense of duty did not, appeared to have the greatest problems in dealing with their children.

Child control was a continuing issue for 67 percent of these mothers, compared with 32 percent of the mothers who preferred not to work, 18 percent of the dissatisfied working mothers, and 42 percent of the satisfied working mothers.

The study also revealed that mothers' confidence in a frank mother role was generally inferior when they preferred to work but did not.

More than half of the mothers worked as a means of supplementing family income to achieve cultural, status, educational, and health goals inaccessible without additional income. Forty-eight percent of this group stressed a need for self-fulfillment, such as using their training, contributing to society, or being with people. Nonworking mothers refrained from work primarily because of a love of mothering (48%); a duty to mothering (36%); and a small group (15%) felt that it was an

Dentistry, New York University; and Ben Taub, Executive Director, J. N. Taub & Sons, Houston, Tex.

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

easier and freer life.

Analyses were also made of childrearing differences associated with employment status among mothers with high school and college training. Within the high school group, maternal employment was associated with firmer child control, assignment of greater responsibility to children, and delegation of a stricter disciplinary role to the father. This difference between the working and nonworking mothers did not appear within the college group.

On the other hand, the college working parents revealed a tendency to compensate for time away from their children by more planned, shared activities with them than was found in the college nonworking group and the high school working and nonworking groups.

The NIMH findings suggest that mothers' employment brings about varying childrearing and familial adaptations, depending on mothers' motivations, attitudes, and cultural backgrounds.

Three Named to NCI's Grants, Training Staff

The National Cancer Institute recently announced the appointments of three new members to its Grants and Training staff.

They are Dr. Willis Robert Boss, Chief of the Training Branch; Dr. Norah Ducernet Tapley, Special Assistant to the Associate Director, NCI, for Grants and Training; and Dr. Silvio Stephen Schiaffino, Research Grants Branch.

Prior to his appointment Dr. Boss was Assistant Dean of the College of Liberal Arts and Professor of Zoology at Syracuse University.

He was on leave from these posts while serving with the Biology and Medicine Branch of the Atomic Energy Commission from 1953 to 1955, and as the Science Attache at the American Embassy in Tokyo from 1959 to 1961.

Dr. Boss, whose chief research interests are experimental endocrinology and radiation biology, received a Ph.D. degree in zoology from the State University of Iowa.

Dr. Tapley is on leave from her position as Director of Radiation Therapy at Presbyterian Hospital, Columbia-Presbyterian Medical Center, New York.

In her new post Dr. Tapley will facilitate the expanding grant program of training and research in the areas of radiation therapy, radiation biology, and radiation

Donald R. Goldthorpe Appointed as Chief Of Public Information

Clifford F. Johnson, Chief of the Office of Research Information, has announced the appointment of Donald R. Goldthorpe, Information Officer of the National Institute of Allergy and Infectious



Mr. Goldthorpe

Diseases, as Chief of Public Information, ORI. The appointment is effective November 27.

In his new post Mr. Goldthorpe succeeds Judson Hardy who recently returned to the Public Health Service as Public Affairs Officer of the Division of Radiological Health.

Mr. Goldthorpe will serve as staff assistant to Mr. Johnson with primary responsibility for NIH activities designed to bring about better public and professional understanding of the total medical and allied research, training, and related programs of NIH.

To Coordinate Programs

In addition, he will coordinate the public information programs of the various NIH components.

Before coming to NIH in 1952, Mr. Goldthorpe was on the public relations staff of the American Red Cross and has had extensive experience in public relations and newspaper work.

From 1942 to 1946 he served with the Aerial Photographic Intelligence Section of the U.S. Army, and before World War II was Assistant to the Director of the New England Radio News Service in Boston.

A native of Minnesota, Mr. Goldthorpe graduated from the University of Minnesota in 1939. He attended the American University Graduate School from 1948 until 1950.

physics. She received her M.D. degree from Columbia University.

Before coming to NIH, Dr. Schiaffino was Chief of the Chemistry Laboratories of the Hazleton Laboratories, Falls Church, Va., and was previously Assistant Chief of the Microbiology Branch, Division of Nutrition, Food and Drug Administration. He will be responsible for research grant applications from the following NIH Study Sections: Allergy and Immunology, Biochemistry, Bacteriology and Mycology, Nutrition, Toxicology, Tropical Medicine and Parasitology, and Virology and Rickettsiology.

Dr. Schiaffino received a Ph.D. degree in biochemistry from Georgetown University.

Governors Hear PHS Views on Mental Illness

Public Health Service views on the major recommendations of the Final Report of the Joint Commission on Mental Illness and Health were disclosed at the National Governors' Conference, November 9-10, in Chicago.

Spokesman for the Service was Dr. Robert H. Felix, an Assistant Surgeon General, PHS, and Director of the National Institute of Mental Health. Boisfeuillet Jones, Special Assistant for Health and Medical Affairs of the Department of Health, Education, and Welfare, delivered the opening address.

Dr. Felix complimented the Joint Commission on its "bold and brilliant" recommendations and cited the need for attacking mental illness at all levels.

Suggests Considerations

Regarding the Commission's recommendation that Federal financial assistance be made available to the States to improve the quality of inpatient treatment for the mentally ill, Dr. Felix told the Governors that if a decision is made to draft new legislation providing for such Federal assistance, consideration should be given to:

1. Providing for appropriate amounts of money to implement the program;
2. Concurrently evaluating the impact of these funds upon the States and upon the care of the mentally ill;
3. Appraising the new program at the end of the first five years; and
4. Letting experience during the first five years set the pace for future Federal appropriations.

He pledged the Public Health Service's continued interest in, and emphasis on: long-term research, basic research, adequate support for career researchers, the training of many types of personnel for work in the mental health field, and the extramural aspects of State mental health programs.

He emphasized his agency's interest in three mental health problems in which the Commission showed little concern. These areas included the needs of mentally retarded persons, the prevention of mental disorders, and the need for area-wide planning for health facilities and services.

Referring to other Joint Commission recommendations, Dr. Felix suggested that some proposals need further study.

These included a recommendation concerning a suggested daily expenditure to meet the costs of caring for hospitalized psychiatric

Dr. Kuvin Reports Research Findings On Simian-Man Malaria Transmission

Dr. Sanford F. Kuvin of the National Institute of Allergy and Infectious Diseases' Laboratory of Clinical Investigations reported research findings on the problem of transmission of simian malaria to man, at the Tenth Annual Meeting of the American Society of Tropical Medicine and Hygiene, held early this month in Washington.

A series of laboratory accidents last year triggered the discovery by Dr. Don E. Eyles and Dr. G. Robert Coatney of the Laboratory of Parasite Chemotherapy, NIAID, that at least one strain of malaria normally found only in monkeys is transmissible to man.

Mishaps Described

The mishaps involved four laboratory workers who were accidentally bitten by mosquitoes infected with *Plasmodium cynomolgi bastianellii*, a new strain of malaria isolated from Malayan monkeys, and recently imported into this country for study.

The victims subsequently exhibited symptoms similar to those following infection with *Plasmodium vivax*, the most common of the four species of malaria which infect human beings. Studies related to the clinical and parasitological aspects of infection with this simian malaria in man have been carried out at the United States Federal Penitentiary in Atlanta, Ga., by Dr. Henry Beye of the NIAID and his associates.

Dr. Kuvin presented additional clinical and physiological findings in inmate volunteers infected with *Plasmodium cynomolgi bastianellii*, and compared these with results in volunteers infected with *P. vivax*.

Seven physically and mentally fit volunteers with no history of malaria were chosen for this study. Five of the men were bitten by *Anopheles* mosquitoes infected with *P. cynomolgi bastianellii*, and the remaining two men by mosquitoes

infected with *P. vivax*. Such expenditures cannot be determined in an "across-the-board" fashion, Dr. Felix said, since they depend on the patient's medical needs.

While pointing out that "evidence is accumulating which indicates that the smaller hospital . . . is more desirable," he called for more "operations research" on a Joint Commission proposal recommending the maximum size of mental hospitals be set at 1,000 beds.

Dr. Felix also revealed his professional reservations concerning the timeliness of the Commission's recommendation that long-term patients be segregated from acute patients into hospitals caring only for chronic patients.

infected with *P. vivax*.

The group of patients infected with this strain of monkey malaria had malaria parasites in their blood nine to 15 days after infection, followed by episodes of fever 30 to 40 hours apart and lasting eight to 12 days. Spontaneous remissions followed their clinical illnesses.

The fever pattern was similar to that found in the vivax-infected group, but it did not rise as high nor last as long as the fever in the patients infected with *P. vivax*.

Headache, abdominal pain, and enlargement of the liver and spleen were prominent findings in the bastianellii infections, while loss of appetite, shaking chills, and weight loss were pronounced in the vivax-infected volunteers. The numbers of parasites found in the blood of the volunteers infected with *P. cynomolgi bastianellii* was quite low in comparison to the vivax-infected group.

Anemia Is Present

Significant laboratory findings in both groups of patients were anemia, a fall in the white blood cell count and platelet count, a rise in the sedimentation rate and alterations in the serum proteins.

In general, the illness produced in man by this strain of monkey malaria appears less severe than that produced by vivax malaria, although its severity is out of proportion to the numbers of parasites found in the blood.

Whether this and other simian malaras will be significant in terms of world-wide malaria eradication can only be determined by further investigations now in progress.

Coauthors of the paper presented by Dr. Kuvin were Drs. Beye, P. G. Cantocos, and G. Robert Coatney of NIAID; and Dr. Frederick Stohlman, Jr., of the National Institute of Arthritis and Metabolic Diseases.

"With emerging new patterns of treatment, new techniques, and new modalities of care," he said, "I strongly suspect that the recommendation to convert certain of the mental hospitals into chronic hospitals will be obsolete before this report is well along the way to total implementation."

The National Governors' Conference, attended by most of the Governors and Mental Health Commissioners of the various States, was held in accordance with a resolution adopted by the Governors' Conference in Hawaii last June and was sponsored by the Council of State Governments.

The Conference is designed to evaluate progress made since the

Dr. Deignan to Serve In WHO Headquarters As Advisor to OIR

The Office of International Research has announced the appointment of Dr. Stella L. Deignan, Director of the Science Information Exchange, as Scientist Administrator, OIR.

Dr. Deignan sailed from New York November 9 for Geneva, Switzerland, to serve in the offices of the World Health Organization in an advisory capacity to Dr. Martin M. Cummings, Chief of OIR. She will keep that office informed of the world-wide medical research programs with particular reference to Europe.

Dr. Deignan will serve as a professional staff member for the development and execution of a variety of special studies concerning the direction and relationships of international medical research programs.

In addition, she will contribute to establishment of cooperative information exchange arrangements between NIH and the WHO, which are expected to serve as guidelines to NIH on phases and problems of international research. She will also serve as a primary source point of information and advice to OIR and senior NIH staff members on WHO research activities.

Founds Information Service

Dr. Deignan was the founder, in 1947, of the information service which she headed before coming to NIH. At that time it was known as the Office of Exchange of Information, operating under the Public Health Service.

In 1950 the office became an inter-agency service within the National Academy of Sciences-National Research Council, and was renamed the Medical Sciences Information Exchange.

In 1953 the service transferred to the Smithsonian Institution as the Biosciences Information Exchange, and in September 1960 was again renamed to its present title.

A native of New Orleans, La., Dr. Deignan received her B.S. degree from the Newcomb College of Tulane University in 1923 and her M.S. degree from Tulane University in 1925. She received her Ph.D. degree in anatomy from the Tulane University Medical School in 1927.

1954 Governors' Conference and to discuss the steps to be taken to translate the broad recommendations of the Joint Commission Report affecting State action into specific administrative and legislative proposals, for consideration by the executive and legislative branches of the State Governments.

Good Nutrition Is Seen Beneficial in Treatment Of Schistosomiasis

Results of a 15-month clinical study conducted in Puerto Rico have conclusively demonstrated the marked benefits of good nutrition in combating the disease processes associated with schistosomiasis.

A report on the findings to date was presented by Dr. William B. DeWitt of the Laboratory of Parasitic Diseases, National Institute of Allergy and Infectious Diseases, at the Tenth Annual Meeting of the American Society of Tropical Medicine and Hygiene held in Washington this month.

The study was conducted by Dr. DeWitt with the collaboration of Dr. Jose Oliver-Gonzales of the University of Puerto Rico and Dr. Eduardo Medina of the Rio Piedras Municipal Hospital.

34 Patients Studied

Prior to initiation of the study, 34 young adults infected with *Schistosoma mansoni* who had subsisted on a diet low in protein and deficient in vitamins—mainly rice and beans—were hospitalized and given complete physical and laboratory examinations with special emphasis on evaluation of nutritional state and the disease processes associated with the schistosome infection. Similar examinations were made at 3-month intervals during the course of the study. Frequent stool examinations were made to determine egg production and viability of the parasites.

Following the initial examination the patients were given a high-protein, high-calorie diet containing large amounts of red meat, cheese, milk, butter, and eggs. The effects of the improved diet on their general health and on the parasite infections were evaluated for the next 15 months. In every case the results of both physical and laboratory examinations showed improvement due to the good diet.

A group of patients under detention by the Department of Justice served as controls. Their diet throughout the study consisted mainly of rice and beans.

NIH Staff Conference Open to D.C. Doctors

Several hundred Washington area physicians in addition to NIH staff are expected to attend the Combined Clinical Staff Conference on "The Syndrome of Sarcoidosis, Psoriasis, and Gout," to be held Tuesday, November 28, at 8:30 p.m. in the CC auditorium.

Sponsored by the National Institute of Arthritis and Metabolic Diseases, the conference will be moderated by Dr. Joseph J. Bu-

DON'T 'Do-It-Yourself' Is PBS Warning On Shipment of Hazardous Material

Plant Safety Branch is currently advising NIH laboratories against the practice of self-packaging hazardous materials for shipment.

While NIH itself has been responsible for relatively few mishaps, there have been instances, PSB points out, in which containers of highly carcinogenic virus, cancer specimens, flammable solvents, and acids have broken in transit through the mails, both to and from this institution.

The potentiality for serious accidents is so great that PSB strongly advises laboratories wishing to ship hazardous material to call the Shipping and Receiving Room, Ext. 2211, for information on proper packaging.

The Shipping and Receiving Room will arrange to pack and crate outgoing material in accordance with the regulations of the Domestic Postal Guide.

PSB also stresses that Postal regulations prohibit the shipment through the mails of many hazardous chemicals and biologicals. Methods of transportation, whether by mail, railway express, or air or motor express, can be safely determined only by the staff of the Shipping and Receiving Room which is experienced in the transport of these items.

Further information on shipping procedure may be found in Item 90 of the Yellow Pages of the NIH Telephone Directory.

NCI Scientists Named To Lab Animal Council

The National Cancer Institute has announced the appointment of two of its staff members to the Advisory Council of the Institute of Laboratory Animal Resources.

They are Dr. Joseph Leiter, Chief of the Drug Evaluation Branch of the Cancer Chemotherapy National Service Center, and Dr. Robert Holdenried of the Virology Research Resources Branch.

The Institute, established in 1952 by the National Academy of Sciences-National Research Council, provides informational and educational services in the field of experimental animal resources. Its three major project areas at present are the establishment of standards for the production and shipment of laboratory animals, the collection and dissemination of information, and the development of training courses for animal technicians.

Members of the Institute's Advisory Council represent agencies and institutions across the country interested either in producing or using experimental animals. They meet twice annually to review Institute activity.

Dr. Holdenried has special responsibility at NCI for the development of a laboratory animal program which will assist investigators in the field of cancer virology.

Dr. Gerald Klatskin, Professor of Medicine, Yale University School of Medicine, will be the guest speaker.

Other participants include Dr. Eugene Van Scott, Chief of the Dermatology Branch, National Cancer Institute, and Dr. Daniel V. Kimberg, of the Arthritis and Rheumatism Branch, NIAMD.

NIAID Studies Suggest Virus Recovery May Indicate Reinfection

NIAID-Navy studies of myxovirus infections in adults strongly indicate that these infections represent reinfection, since neutralizing antibody was almost always detected in the acute phase serum.

Drs. H. H. Bloom and R. Jacobsen of the Naval Medical Field Research Laboratory, Camp Lejeune, N.C., and Drs. K. M. Johnson and R. M. Chanock of the National Institute of Allergy and Infectious Diseases, conducted the study at Camp Lejeune, using individuals selected from Marine Corps units. Their findings, describing the recovery of 15 strains of parainfluenza virus from adults, appear in the American Journal of Hygiene.

Isolated Previously

Myxovirus parainfluenza types 1, 2, and 3 were previously isolated in the U.S., Canada, Denmark, England, and France. Epidemiologic studies have associated these viruses with respiratory illnesses of varying severity, including mild respiratory infections, acute croup, bronchiolitis, and pneumonia in young children. At present, little is known about the natural history of the infection of adults by these viruses.

In the Camp Lejeune study the investigators recovered parainfluenza virus from 15 patients—11 with upper respiratory illness, one with parotitis, and three in the non-respiratory control group composed of individuals with non-infectious ailments. Patients in this group had no respiratory complaints within the preceding 10 days.

The investigators found that the

Dr. Miller Is Appointed Epidemiology Chief In Cancer Institute

Appointment of Dr. Robert W. Miller as Chief of the Epidemiology Branch under the Associate Director for Field Studies, National Cancer Institute, has been announced by Dr. Kenneth M. Endicott, NCI Director. The appointment was effective October 23.



Dr. Miller

Dr. Miller joined the National Cancer Institute staff in September 1961, after spending most of his professional career in the areas of pediatrics and radiation medicine.

He has served as a scientist at the University of Rochester Atomic Energy Project, as Chief of the Pediatrics Department of the Atomic Bomb Casualty Commission in Hiroshima and Nagasaki, Japan, and as a professional associate for the National Academy of Sciences in Washington, D.C.

The author and coauthor of numerous scientific and medical papers, Dr. Miller is a Diplomate of the American Board of Pediatrics and a member of the American Society of Human Genetics.

Tapeworm Infections in Mice Affected by Diet

The effects of several different diets on the development of experimental tapeworm infections in mice were reported by Drs. William B. DeWitt and Louis J. Olivier of the Laboratory of Parasitic Diseases, National Institute of Allergy and Infectious Diseases, at the recent Tenth Annual Meeting of the American Society of Tropical Medicine and Hygiene.

The mice were fed either purified semi-synthetic diets deficient in amino acids and certain vitamins or complete balanced purified diets. When compared with mice maintained on rations made from crude natural products, those that received special diets were poor hosts for the larval stage of the tapeworm (*taenia taeniaeformis*).

Infected animals maintained on deficient diets in these studies also responded very poorly in the production of gamma globulin, the antibody factor of the blood.

Infected adults shed a very small amount of virus compared with that shed by children. They experienced difficulty in reisolating virus from frozen specimens, and serodiagnostic methods proved relatively inefficient for this study.

MEN OF SCIENCE ASSEMBLE TO DISCUSS RESEARCH FINDINGS



Conferring at the International Conference on Measles Immunization are Dr. A. M. M. Payne of the Department of Epidemiology and Public Health, Yale University School of Medicine (left), and Dr. James A. Shannon, Director of NIH.



Dr. Joseph E. Smadel, Chief of the Laboratory of Virology and Rickettsiology, DBS (right), emphasizes a point in discussion with (left to right): Dr. Philip B. Stones of Pfizer, Ltd., Sandwich, England; Dr. Maurice Hilleman of the Merck Institute for Therapeutic Research, and Dr. John R. Paul of the Department of Epidemiology and Public Health, Yale University School of Medicine.



Between Conference sessions, Dr. John F. Enders, Chief of the Research Division of Infectious Diseases, the Children's Hospital, Boston, Mass. (left), talks things over with Dr. Roderick Murray, Chief of the Division of Biological Standards.



Pictured during an intermission at the meeting of the American Society of Tropical Medicine and Hygiene are (left to right): Dr. Janet Travell, White House Physician; Dr. Willard H. Wright, Special Consultant to the National Research Council; and Dr. E. Harold Hinman, Chief of the Technical Resources Division, Agency for International Development.

PARTICIPANTS in two of the several important medical research meetings held here and in the Nation's Capital recently are pictured in these candid photos taken at the International Conference on Measles Immunization at NIH, November 7-9 (top row), and the 10th Annual Meeting of the American Society of Tropical Medicine and Hygiene in Washington, November 1-3.—Photos by Bob Pumphrey and Sam Silverman.



This amiable group consists of (left to right): Dr. Paul C. Beaver of the Tulane University School of Medicine, Dr. John F. Kessel of the UCLA Medical School, Dr. Wright, Dr. Henry E. Meleney of the University of Florida Medical School, and Dr. William W. Frye, Dean of the Louisiana State University Medical School and outgoing President of the American Society of Tropical Medicine and Hygiene.



Conducting a council meeting of the Society are (left to right): Dr. Geoffrey M. Jeffery, Head of the Section on Epidemiology of the Laboratory of Parasite Chemotherapy, NIAID, and Secretary of the Society; Dr. Frye, and Dr. John E. Larsh, Jr., of the University of North Carolina School of Public Health.

GENETIC CODE

(Continued from Page 1)

"language," each letter being represented by one of the four chemical bases that are attached to the long-chain RNA molecule. It is the particular sequence of these bases—adenine, guanine, cytosine, and uracil—that determines the code, and this sequence is believed to reflect the sequence of similar bases which occur in DNA.

Serves as Template

Since messenger RNA serves as a template against which 20 or more kinds of amino acids may be aligned in the making of protein molecules, the problem of the code is to translate the four letter language of RNA into the 20 letter language of protein.

In the first part of their work the NIAMD scientists found that trace amounts of the DNA-de-

stroying enzyme, DNAase, could inhibit amino acid incorporation into protein, suggesting that DNA functions all the way down to amino acid linkage. The work on the action of RNA was made possible in large part by their development of a cell-free protein synthesizing system that remained stable.

Add Reducing Agent

The one they used, derived from the microorganism *Escherichia coli*, has hitherto been extremely unstable, but they found that the addition of the reducing agent, mercaptoethanol, could stabilize it remarkably. The system was provided with a full complement of amino acids and a source of chemical energy (adenosine triphosphate continuously regenerated by secondary reactions), and then various types of RNA were added. The NIAMD investigators found

that the incorporation of individual amino acids into protein was dependent upon the addition of particular RNA templates. These could be either naturally occurring RNA or synthetic preparations of polyribonucleotides of known structure.

Reactions Described

When polyuridylic acid, a synthetic RNA containing only the base uracil was added, one and only one amino acid, phenylalanine was incorporated. Similarly, when another synthetic RNA, polycytidylic acid containing only the base cytosine, was added, the sole amino acid incorporated was proline. Only "single stranded" RNA fibers were found to be active in the system.

Many authorities in the past have held that a minimum of three bases is needed to impart the necessary information for the use

of any one amino acid.

If this theory is correct, and if one were to extend the analogy of the coded language to the present work, the "word" in RNA that contains information for using phenylalanine would become uracil-uracil-uracil, and the word which contains the corresponding information for proline would be cytosine-cytosine-cytosine. With this cell-free system it now seems likely that any type of protein can be made corresponding to a meaningful informational RNA.

Findings Termed Important

These NIAMD findings provide information of considerable importance to biochemical research, and they represent the first experimental evidence which permits direct translation of the RNA code of protein synthesis. They are reported in the Proceedings of the National Academy of Sciences.