

## DHEW Requests Blocked Funds For Research

A total of \$4,693,400 in blocked foreign funds has been requested by DHEW in the budget for Fiscal Year 1961. Of this amount, \$3,707,000 would be allocated to NIH for support of research in eight foreign countries.

Such funds are received from the sale to foreign countries of surplus U.S. agricultural commodities. Retained in the form of local currencies, the funds are used in those countries by the U.S., pursuant to negotiations between the U.S. and the country concerned, under the provisions of the Agricultural Trade Development and Assistance Act of 1954 (PL 480).

### Fund Use Authorized

An amendment to this Act authorizes the use of such funds for the collection and dissemination of scientific and technological information, the conduct and support of scientific activities overseas, and projects "such as coordinated research against diseases common to all mankind or unique to individual regions of the globe. . ."

According to Secretary Flemming, the proposed amounts were not available to DHEW in 1960, and the suggested programs are new ones.

In the event authorization is  
(See *BLOCKED FUNDS*, Page 7)



Representatives from six foreign countries participating in the recent International Symposium on Asian Influenza at NIH are, from left to right: Drs. A. M. M. Payne, WHO, Geneva; J. Mulder, University of Leyden, Holland; Fred P. Nagler, Laboratory of Hygiene, Ottawa; Hideo Fukumi, Japanese Influenza Center, Tokyo; C. H. Stuart-Harris, Sheffield University, England; C. H. Andrews, National Institute for Medical Research, London; and Prof. V. D. Soloviev, Moscow Institute for Poliomyelitis Prophylactics, Russia.

## Surgeon General Outlines Flu Preparedness Plans

Preparedness plans of the PHS for a future influenza pandemic were outlined by PHS Surgeon General Burney at the closing session of the International Symposium on Asian Influenza, held here February 17 through 19.

Dr. Burney pointed out that the objective of the closing session was to crystallize recent experience and make the information available for the next generation.

The PHS plans fall into four broad categories:

- Recognition of the pandemic.
- Preparation of vaccine.
- Use of vaccine, including problems of vaccine distribution and dissemination of information.
- Research.

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## Soviet Scientists Invited to Heart, Cancer Sessions

A delegation of Russian scientists, nine to 13 in number, have been invited by PHS Surgeon General Burney to visit this country in May for joint scientific meetings in the fields of cancer and heart disease.

The Surgeon General's invitation of February 5 to Dr. Sergri Kurashov, Minister of Health of the Soviet Union, was sent under provisions of the November 1959 agreement which extends for two years the program of cultural exchanges between the U.S. and the U.S.S.R.

### NIH Sessions Proposed

Under the terms of this agreement, exchanges in the health field are to be negotiated directly between the PHS and the U.S.S.R. Ministry of Health.

Sessions of both the cancer and heart conferences will be held at NIH if the Surgeon General's invitation is accepted.

He has suggested that cancer meetings be held at NCI and at the Sloan-Kettering Institute in New York during the first two weeks in May, and that week-long conferences on problems in the field of heart disease be held at NIH during the week of May 9, with subsequent meetings during the following week at other centers.

### Virus Role Emphasized

Dr. Burney has also suggested that special emphasis be given to a review of experimental chemotherapy and to the role of viruses in cancer. Scientists here are anxious to review with the Russians the experimental development and therapy of hypertension and arteriosclerosis.

Under the same agreement, four Soviet biochemists are now on a month's survey of research developments in metabolic diseases in the U.S., including a three-day visit to NIH. Dr. G. Gilbert Ashwell, Laboratory of Biochemistry and Metabolism, NIAMD, is ac-  
(See *SOVIET*, Page 7)

## HEALTH CAMPAIGN HEADED BY DR. FLEMMING, STARTS MARCH 1

Dr. Arthur S. Flemming, DHEW Secretary, has been named Chairman of the 1960 Federal Service Health Campaign for the second successive year. Honorary Chairman is Vice President Nixon.

The campaign, which begins March 1, will raise funds for six voluntary health organizations. Combined with this drive is the Federal Service Joint Crusade, which includes three international service and charitable agencies.

The campaign is the second and last to be conducted in the Federal Government this fiscal year. The

six participating agencies formerly conducted separate fund raising efforts. They are the National Society for Crippled Children and Adults, United Cerebral Palsy Associations, American Cancer Society, American Heart Association, Muscular Dystrophy Associations of America, and National Multiple Sclerosis Society.

The three international agencies forming the Federal Service Joint Crusade are CARE, Crusade for Freedom, and the American-Korean Foundation.

Heading the drive at NIH are

Chairman Floyd S. Daft, Director, NIAMD, and Co-Chairman Justin M. Andrews, Director, NIAID. Keymen have been named in each Institute and Division to solicit contributions.

As in previous years, there is no dollar goal and no agency quota to be met; however, it is the aim of the campaign to secure a generous voluntary contribution from each Federal employee in the National Capital Area. Dr. Daft has expressed the hope that NIH will achieve 100% participation by the close of the campaign on April 15.

# the Record

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## NEWS from PERSONNEL

### Position Reclassification

Effective February 21, certain positions throughout NIH were changed to the Wage Board category. The determination for this change has been the subject of a long and exhaustive study and is proper for those positions which are concerned directly with the care of laboratory animals. In this change only the method of determining pay is affected. All other Civil Service privileges and benefits such as leave accrual, insurance, retirement, etc., will remain the same. Each employee affected will receive a copy of the official personnel action which will indicate the effect of this change.

### Automation Test

A revised Request for Personnel Action Form (SF-52) is being tried out in NCI, NHI, NIDR, and CC. The new version of the SF-52 is intended to provide the simplest and most workable form to be used in a planned system for automation.

It is planned to use the IBM 650 computer and automatic typewriters with paper tape in the preparation of these forms.

### Beneficiary Forms

It has been brought to the attention of the Employee Relations Section that some employees are in doubt as to the designation of beneficiaries of Federal Group Life Insurance, unpaid compensation, and retirement benefits. It is not necessary for any employee or former employee to designate a beneficiary unless he wishes to name some person or persons not included below, or to name them in a different order.

1. The widow or widower.
2. If neither of the above, the

## James H. Rice Accepts Post at Public Health

James H. Rice, information specialist in the National Institute of Allergy and Infectious Diseases, has accepted the post of Information Officer, Office of the Chief, Division of Personnel of the Public Health Service. Mr. Rice assumes his new duties on March 1.

Since the early 1950's he has contributed to the information programs of the National Institutes of Health. Prior to his three and one-half years in the Information Office of NIAID, he was on the information staff of the National Heart Institute.

Mr. Rice, a native Washingtonian, lives in Rockville with his wife, three sons and one daughter.

child or children in equal shares, with the share of any deceased child distributed among the descendants of that child.

3. If none of the above, the parents in equal shares or the entire amount to the surviving parent.
4. If none of the above, the executor or administrator of the estate of the deceased.
5. If none of the above, the next of kin under the laws of the state in which the deceased was domiciled.

Designation of a beneficiary for retirement purposes remains in effect until it is cancelled by the designation of another beneficiary, or by a request to cancel the prior designation. However, designation for the beneficiary for Federal Group Life Insurance and unpaid compensation is cancelled when an employee leaves the agency with which he filed these forms.

Further information and appropriate forms may be secured from the Employee Relations and Services Section, Building 1, Room 21.

## Broadened Research Grants Asked by DHEW Secretary

A proposal by DHEW Secretary Flemming to provide broader grants to medical, dental, and public health schools to strengthen their programs for research and research training has been presented

to Congress in the form of a bill.

Submitted to the House of Representatives on February 10, H.R. 10341 is a bill "To amend the Public Health Service Act to authorize grants-in-aid to universities, hospitals, laboratories, and other public or nonprofit institutions to strengthen their programs of research and research training in sciences related to health."

### Army Exhibit in CC

An exhibit entitled "The History of the Medical Department of the U.S. Army in World War II" will be on display in the CC lobby from March 8 to 14.

## R. P. Miller Retires; With NIH 29 Years

Russell P. Miller, biologists with the Laboratory of Control Activities, DBS, retired February 29 after 31 years of Federal Service.

Mr. Miller was engaged in the preparation of physical standards for such biological products as diphtheria and tetanus toxins and antitoxins for use by manufacturers for standardization of commercial products.

He started his association with NIH in October 1931 at the old 25th and E Streets location, and came to the Bethesda reservation in April 1940. Prior to 1931, Mr. Miller was employed at St. Elizabeths Hospital.

After retirement, Mr. Miller

According to Secretary Flemming, the establishment of such a program of institutional research grants would carry into effect recommendations made by the Bayne-Jones Committee. The committee pointed out that Federal funds for research should be provided under conditions which give the institutions a substantial degree of freedom in deciding how to use the funds.

Under the proposal, funds for the general grants would be obtained by setting aside a uniform percentage, not to exceed 15 percent, of the NIH research grant appropriations. Applications for the grants would be reviewed by the National Advisory Health Council.

He hopes to continue his work as a biologist with the Woodward Research Corporation in Herndon, Va.

Mr. Miller was honored at a reception at Top Cottage on February 26.



One day in 1938, staff members of the Division of Biologics Control posed on the steps of one of the former National Institute of Health buildings, located at 25th and E Sts., N. W. Shortly afterward the Division moved to the NIH reservation. Of this original group, a number will be recognized as present NIH staff members. From left, bottom row: Dr. Karl Habel, Chief, Laboratory of Biology of Viruses, NIAID; Dr. Margaret Pittman, Chief, Laboratory of Bacterial Products, DBS; Dr. William G. Workman, Chief, Laboratory of Control Activities, DBS; Dr. W. T. Harrison, former Chief of the Laboratory of Biologics Control, now retired; Dr. Sara E. Branham, former Chief of Section on Bacterial Toxins, DBS, now retired; Dr. V. J. Dorset, now of OPC-PHS; Dr. Bernice Eddy, Laboratory of Viral Products, DBS. Second row: Glen Hefner; L. J. Bender, retired; Sadie A. Carlin, deceased; Dr. Sarah E. Stewart, Laboratory of Biology, NCI; Marguerite Lyons, retired; Gilbert E. Beard; Robert Forkish. Top row: "Hut" Hudson, retired; Russell P. Miller, retired last month from the Laboratory of Control Activities, DBS; Edward Garlock; Aneas P. Collins, Rocky Mountain Laboratory, NIAID; Ben T. Sockrider, deceased; Thomas F. Probey, retired.

# Science Section

This four-page section, devoted chiefly to summaries of research findings that have been reported by scientists of the National Institutes of Health, is prepared with the cooperation of the Information Offices of the Institutes and Divisions of the National Institutes of Health.

## Age Pigment Accumulation Shows Constant Rate

Insoluble solids called age pigments, long known to be present in certain tissues of aged individuals, appear from National Heart Institute studies to accumulate in the cells of the human heart muscle at a constant rate throughout life, beginning in the second decade and ultimately displacing as much as ten percent of their volume. The process of myocardial age pigment accumulation thus appears to meet criteria set forth for a "basic biological aging process."

A primary objective of research in the biology of aging as conducted in the NHI Gerontology Branch is the identification of time dependent changes in structure and function which contribute to the probability of death characteristic of aged individuals. Four criteria of biologic aging have been tentatively adopted by Dr. Bernard L. Strehler and his colleagues in the Gerontology Branch for the identification of phenomena of biologic aging. These criteria are: 1) universality, 2) time dependence, 3) intrinsicity, and 4) deleteriousness.

Evidence from NHI studies of age pigment in human heart suggests the process of its accumulation there may meet all four criteria.

Measurement of age pigment in microscopic sections of heart muscle obtained at autopsy from 156

human hearts showed homogenous distribution of the brown pigment granules in all individuals above age 10, regardless of age, sex, or cardiac pathology. No age pigment could be found in the hearts of individuals below age 10. These findings suggested conformity of the cumulative process to the first of the four criteria for biologic aging—*universality* ("the change should occur universally in all old individuals of the species and should be absent in the very young").

From the second decade, the average pigment concentration in the group studied increased at a constant linear rate and 1/3 percent of heart volume per decade. The measured fraction of heart muscle occupied by the pigment deposits, and the total heart pigment also showed constant linear rates of increase with age (2/3 percent per decade, and 100 milligrams per heart per year, respectively). This suggested the process conforms to the second criterion—*time dependence* ("The change should proceed gradually in an individual and in a population").

Pigment concentration was independent of sex, race, and various cardiac pathologies, including heart failure, suggesting conformity to the third criterion of biologic aging—*intrinsicity* ("the change should be a consequence of the action of time on the innate proper-



Separation of fluorescent components of age pigments on a chromatographic column—photographed by its own fluorescence.

ties of the biologic system, not of preventable disease or accident").

The insoluble deposits were found to occupy as much as 10 percent of the intracellular volume of the heart muscle, or 30 percent of its total intracellular solids. The replacement of such a large proportion of the functional mass of a muscle with a non-contractile agent suggests possible impairment of cardiac function or reserve, hence possible conformity to the fourth of Dr. Strehler's criteria of biologic aging—*deleteriousness* ("the change should reduce the survival capacity of the organism in its natural environment").

In obtaining these measurements, it was necessary to determine the different tissue constituents of the hearts studied, and the proportion of each heart comprised of each constituent. Of possible interest as a by-product of this was the finding that the proportion of total heart tissue devoted to contractile muscle fibers did not decrease with increasing age.

Although absolute proof of conformity of any biologic phenomenon to all four criteria of aging is obviously impossible, the close time-dependence of age pigment accumulation and its gross displacement of functioning units found in the population studied by Strehler strongly suggest the possibility of such conformity. The findings appear to constitute a significant advance in gerontology, the science which seeks knowledge of the phenomena of aging in terms of consistent natural forces, or biologic laws.

Dr. Strehler and Drs. Donald Mark, Albert Mildvan, Daniel D. Hendley, and Malcolm Gee have

## Etiologic Role of Streptococci in Caries Reported

Studies demonstrating the etiologic role of certain oral streptococci in experimental caries were reported by Drs. R. J. Fitzgerald, Laboratory of Microbiology, and P. H. Keyes, Laboratory of Histology and Pathology, National Institute of Dental Research, to the Chicago Dental Society.

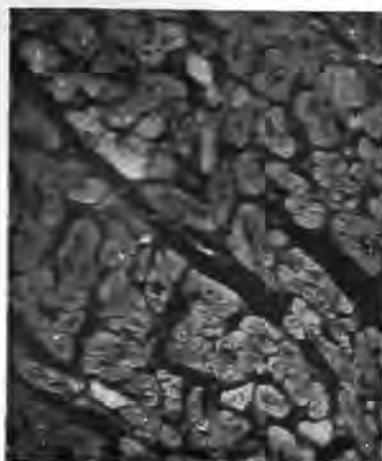
In a series of earlier studies, Dr. Keyes showed that the so-called resistance of certain laboratory animals was due, in part, to the absence of necessary microflora. He demonstrated, for example, that caries-active female rats could transmit the disease to their offspring, and that such transmission could be terminated with antibiotics. The progeny subsequent to the antibiotic treatment would remain caries free until reinfected through contact with caries-active animals.

With this mechanism established, a collaborative study was designed with Dr. Fitzgerald to identify specific bacterial agents involved in the caries process. Utilizing refined culture techniques, five different strains of streptococcus isolated from carious lesions in hamsters were shown to induce caries when introduced singly and in combination into the mouths of caries-resistant animals. Since prior to some of the experiments the infectious organisms were made streptomycin-resistant, it was possible to isolate and precisely identify each strain during and at the end of the test period.

As yet, the individual strains have not been classifiable serologically; however, they appear to occupy a position intermediate between the enteric and lactic groups of the genus. In similar experiments where caries-resistant hamsters were experimentally infected with other streptococci, lactobacilli, and diphtheroids, no caries developed.

The results of these important studies have already had a widespread effect in the field of experimental caries, and they have opened the way with new methods for the identification of specific microbial agents and determination of host specificity in human caries.

published their findings in the *Journal of Gerontology*. They are now attempting to isolate the age pigment to gain a better understanding of its nature. The effects of radiation exposure are also being studied to test the suggestion that radiation may accelerate aging.



Photomicrographs of human hearts (young and old) taken by their own fluorescence. The left section is typical of younger hearts. Note that it contains few fluorescent granules and that they are only weakly fluorescent by comparison with the old section on the right.

# Influenza Conference Papers Cover Wide Area of Studies

The following are authors' summaries of some of the papers presented at the International Symposium on Asian Influenza, held at the National Institutes of Health February 17-19. The conference was co-sponsored by the National Institute of Allergy and Infectious Diseases and the University of Southern California School of Medicine, under the chairmanship of Dr. Clayton G. Loosli, USC.

## MECHANISM OF SPREAD

By Dr. William S. Jordan, Jr.,  
University of Virginia

Asian influenza was truly the Phineas Fogg of diseases, spreading around the world in less than twice 80 days with a rapidity to delight the most sanguine of Jules Verne virologists. The global dissemination has been attributed to the capacity of Asian virus to infect a highly susceptible population. Beyond belaboring the obvious, what more needs to be said about how Asian influenza spread?

Students of past epidemics and pandemics have noted that clinical influenza spread rapidly even before the advent of fast transportation, and that dates of maximal incidence did not provide good evidence of routes of spread. Such discrepancies spoiled the case-to-case transfer explanation, and prompted several suggestions as to how a new antigenic strain of virus could appear within a short space of time in widely separated countries: 1) widespread pre-seeding of virus in masked form, with its almost simultaneous provocation to infectivity; 2) simultaneous mutations in multiple foci; 3) mutation on a single occasion followed by rapid spread.

The abundance of data collected as Asian virus extended throughout the world in 1957 established direct lines of transmission from one focus to another, and makes it unnecessary to invoke multiple mutations to explain pandemic occurrence.

Do the data also disprove the suggestion regarding pre-seeding of virus and provocation to infectivity? Not necessarily. On the contrary, the behavior of Asian influenza lends support to this concept. How else can we explain the fact that, after the introduction and multiple seeding of virus in the U.S. during the summer, outbreaks were consistently limited to circumstances when large numbers of people were crowded together? How else can we explain the almost simultaneous outbreaks that fall in Arizona, Cleveland, Oregon, Florida, and New York? These are some of the questions which merit discussion.

There are many others. What part did exposure within the school play in the dissemination of virus? In the U.S., in Alaska, in Great Britain, in Japan, and elsewhere,

epidemic influenza first appeared among school children and then spread to preschool children and adults. The first community spread in the U.S. was associated with a July opening of schools in Louisiana. In Liverpool, independent schools started their terms three weeks later. The high attack rate consistently noted in the 5-19 year olds has been attributed by some to the high rate of exposure in schools rather than to greater susceptibility. Conversely, it has been suggested that the low attack rate among older people may have been due to lack of contact with school children rather than to greater resistance attributable to specific antibodies.

## Family Exposure

What part did exposure within the family play in the dissemination of virus? In some outbreaks, attack rates increased with increase of family size; in others, differences in family size had no effect. Although the data are not detailed enough for analysis, it is suggested that the observed attack rates could have been as much a function of the age of the children in the family as of the number of individuals.

What evidence is there for intra-familial spread? After studying an earlier epidemic, that due to A1 virus in 1951, Hope Simpson noted the paradox of an "epidemic of a disease with a very high attack rate and against which there appears to be little immunity in the population which the school child does not bring home from his school and which does not appear to be transmitted inside the home." He made this observation because first cases in families and subsequent cases showed no special age preference, and because, in an analysis of intervals from the first case, susceptibles fell rapidly and steadily away from the zero day. What did we learn about first cases and intervals during the Asian influenza epidemic?

## Susceptibility

Answers to this and to the preceding questions were sought by examinations of data derived from study of a population of families in Cleveland. Asian influenza did, in truth, spread widely in a susceptible population. The most susceptible group proved to be the



U.S. leaders in the field of influenza research attending the recent international conference at NIH include, from left to right: Drs. Maxwell Finland, Boston City Hospital; Thomas Francis, Jr., University of Michigan School of Public Health; Fred M. Davenport, Director, Commission on Influenza, University of Michigan; Colin M. MacLeod, University of Pennsylvania Hospital; and Clayton G. Loosli, Conference Program Committee Chairman and Dean of the University of Southern California School of Medicine.

5-19 years olds, and the high attack rate in these children resulted from the complex interaction of a number of variables: non-specific susceptibility, lack of protective antibodies, and contact in schools. The school appeared to be a much more important site of virus dissemination than did the home.

The long intervals between the first and second cases in families, and the longer interval between first introduction of virus and epidemics in nations suggest that the possible seeding of "masked" virus prior to the appearance of clinical disease should be investigated the next time we have an opportunity to anticipate an epidemic.

## EFFECTS OF ULTRAVIOLET

By Dr. Ross L. McLean,  
Emory University

The advent of Asian-strain influenza created new opportunities to study the mechanism of transmission of epidemic influenza. Prior work on this subject includes studies of ultraviolet radiation of barracks, recreation halls, and other places of congregation. These studies were interpreted as showing a "partial effect on certain types of respiratory diseases" but not sufficient to justify a recommendation for general use.

This study was based upon the concept of "aerial isolation" as described by William Firth Wells, which states that the principal mode of transmission of air-borne disease may be blocked by adequate disinfection of air that has been contaminated by the aerosolized respiratory secretions of infected persons. Ultraviolet radiation of the upper air of rooms has been shown to be effective in disinfecting truly air-borne par-

ticles, but relatively ineffective against surface contamination at lower levels. Thus, if disinfection of upper air of rooms diminishes the incidence of influenza, this effect must be related to the relative importance of air-borne mechanisms in the transmission of influenza.

An entire hospital building unit, housing approximately 150 patients, was totally radiated, and facilities for the total care of these patients, with no need to venture outside the radiated area, were provided. Samples of serum were obtained from all hospital personnel and all patients at the end of July 1957, again in mid-November 1957, and finally, in mid-March 1958. Virtually none of the patients or personnel were vaccinated.

During the first phase (July 28, 1957, to November 15, 1957) approximately 186 susceptible (by serology) patients resided within the radiated area. Only 2 (1 percent) were infected by the transradiation route. By contrast, 11 (4 percent) of 248 susceptible non-radiated patients and 56 (12 percent) of 465 susceptible personnel showed serologic evidence of infection.

During the second phase of the study (November 16, 1957, to March 15, 1958), of 277 susceptible patients within the radiated area, only 2 (0.7 percent) cases of transradiation infection occurred. By contrast, 41 (20 percent) of 201 susceptible nonradiated patients and 35 (9 percent) of 370 susceptible personnel showed serologic evidence of infection.

The striking differences in the incidence of infection, as determined by serologic means, between the radiated patients, and the hos-

(Continued on Page 5, Column 1)

(Continued from Page 4)

pital personnel, in particular, suggests strongly that an important mechanism of transmission of epidemic influenza was significantly blocked. It is possible that an airborne mechanism has been blocked by the aerial isolation accomplished by ultraviolet disinfection of the upper air of an entire hospital building unit.

#### HORSES AND SWINE

By Dr. Martin M. Kaplan,  
Wistar Institute

In 1957-58 the WHO arranged a survey of horse and swine sera in a number of countries in order to gain information on the possible role and importance of animals in the epidemiology of influenza. The veterinary services of the countries concerned were requested to obtain blood specimens from these animals, if possible both before and after the human pandemic of Asian influenza. Hemagglutination-inhibition and complement fixation tests were performed on these sera in WHO Influenza Centers and other collaborating laboratories using uniform techniques and reagents.

The results of this survey indicated that the A-2 strain can cause natural inapparent infection in horses and swine. Equine influenza caused by the A-Equi strain was shown to be present in many countries from which it had not been previously reported, and infection in pigs with A-swine strain, long known in the U.S.A., was recorded in at least two European countries.

These findings indicate the necessity for much further study on the position of animals in influenza epidemiology. Such studies, coordinated by WHO, are now under way. These include the question of serological relationships of animal influenza strains with human influenza strains studied by means of the complement fixation technique developed by Henle and his co-workers.

#### THE FUTURE

By Dr. C. H. Andrewes,  
Medical Research Council,  
National Institute for  
Medical Research

Swift diagnosis is needed in order to spot a novel variant of influenza virus which might sweep around the world as in 1918 and 1957. The organization of laboratories in the U.S.A., Britain and some other countries is reasonably good. The Asian (A2) epidemic started in China where the WHO program did not operate, and, as far as the rest of the world was concerned, there was two months' delay in identifying the virus as new.

It is important to ensure that

## Nuclear Magnetic Technique Furtheres Molecule Studies

Physical biologists at the National Institute of Arthritis and Metabolic Diseases have used an advanced electronic technique known as nuclear magnetic resonance to study the atomic structure of porphyrins, complex molecules found in hemoglobin, chlorophyll and other important biological materials. The study has demonstrated that the new technique is useful for analyzing the structure of large molecules and has revealed the presence of "ring currents" in the porphyrin molecules. It also demonstrates the kind of research carried on in the new and growing science of physical biology.

The porphyrins are pigments which occur throughout the plant and animal world. They form the base of chlorophyll in plants and hemoglobin in man and readily combine with metals such as iron and magnesium. The porphyrins are of fundamental importance to many oxidation-reduction reactions in the body and are also known to affect radiation sensitivity.

Persons afflicted with one of the forms of porphyria, a rare disorder of porphyrin metabolism, are sensitive to light and must avoid direct exposure to the sun. In radiation research certain porphyrin compounds have been used to protect animals against lethal doses of radiation.

The NIAMD study was done to learn more about the atomic structure of these important molecules. It utilized nuclear magnetic resonance (NMR) equipment. The study was reported by Dr. Edwin D. Becker and Robert B. Bradley

all the world is covered by a network of collaborating laboratories. At present there are too many blank areas on the map where new strains might get going and not be spotted quickly.

There are pitfalls in applying present diagnostic methods and it is worth seeking for simpler techniques, which can be used confidently and reliably even in less elaborately organized laboratories.

Influenza should no longer be considered apart from other respiratory viruses. New ones are being discovered all the time. The WHO influenza network should have its scope widened to include reference laboratories capable of identifying these "new" viruses. Those from different parts of the world need to be compared, and where necessary named or numbered in an orderly manner. They may be shown to travel around the world as novel strains of influenza virus seem to do.

of NIAMD's Laboratory of Physical Biology in the *Journal of Chemical Physics*.

The NMR technique of the physical biologists makes it possible to determine the presence or absence of certain functional groups (OH, NH, etc.) in a molecule and to determine the relative positions of these groups, thus giving a three dimensional picture of molecular structure. The test substance is placed in a strong magnetic field and bombarded with radio waves which can be varied in frequency. Once in the magnetic field, the molecules of the sample substance absorb radio waves of certain frequencies, the particular frequencies being determined by the atomic structure of the molecule. By noting what frequencies are absorbed, the investigators can determine what atomic particles are present and how they are arranged.

#### NMR Analysis

NMR analysis of several non-metallic porphyrin compounds revealed that their NMR spectra had considerably different values from those that had been expected. The NIAMD scientists found that the differences could be accounted for in large part by the presence of a "ring current" around the porphyrin molecule. The molecule has a ring-like structure and the current is due to flow of electrons around the periphery of the molecule. Such a current would produce a small magnetic field that would interact with the larger field of the NMR equipment, and this would account for the unexpected results.

The finding is of considerable interest to other NMR spectroscopists for it will explain what would otherwise be confusing experimental results. Additionally, the NIAMD study has indicated that some unknown structural factor may also be involved, suggesting that the presently accepted "model" of the porphyrin molecule is inadequate. Further studies to clarify this point will be done on samples of metal-containing porphyrins.

The porphyrin samples used in the study were provided by Dr. Cecil J. Watson, Professor of Medicine at the University of Minnesota Medical School, who is chairman of NIAMD's Board of Scientific Counselors. Dr. Watson has specialized for many years in the study of porphyria and spent several months at the Institute last year as a Visiting Scientist.

## Lipid Movement Rate Studied

Quantitative studies on the rates of movement into arterial walls of proteins, lipids, and lipoproteins are being carried on at the National Heart Institute. These studies are of interest in connection with the filtration theory of atherosclerosis which holds that atherosclerosis is a result of the passage of lipoproteins from serum into arterial walls.

Dr. Leroy Duncan of NHI has devised methods for determining the rates of entrance of proteins and lipids into the walls of arteries. Studies on the entrance of labeled albumin and labeled cholesterol into the aortic wall of the normal dog have been completed. Studies on the rates of entrance of cholesterol and low density lipoprotein into the aortic wall of the dog developing experimental atherosclerosis are in progress.

The studies on albumin and cholesterol in the normal dog have shown that both of these substances enter the inner layer of the aortic wall with a gradient of rates. The rate of entrance is fastest in the ascending thoracic aorta and decreases progressively down the length of the aorta. The rate of entrance in the ascending aorta is five times that in the abdominal aorta.

The gradient of rates is not due to variations in lateral blood pressure since the mean pressure is the same down the entire aorta. The gradient does correlate with the circumferential tension exerted on the wall of the aorta by the blood since this tension, which tends to stretch the aortic wall, is the product of the lateral blood pressure and the aortic radius.

The following theory is advanced to account for these findings:

Circumferential tension facilitates the passage of protein into aortic wall by widening the pores between the endothelial cells lining the aorta. It is through these pores that protein is thought to pass. The theory has implicit in it the assumption that the endothelial layer exerts a part, although a small part, of the force exerted by the aortic wall against the circumferential tension exerted by the blood. This theory is being tested in additional experiments.

The labeled cholesterol fed the dogs became incorporated into their normal serum lipoproteins. The studies thus furnish basic information on the passage of normal lipoproteins into arterial walls. Extension of these studies to experimental atherosclerosis should provide useful information on the passage of abnormal lipoproteins into arterial walls.

The completed studies have been reported in *Circulation Research*.

## Isolation of DNA From SE Polyoma Virus Reported

The first evidence that an isolated nucleic acid will turn a normal cell into a cancerous cell has been obtained by Sloan-Kettering and National Institutes of Health scientists. They have now reported (*Proceedings of the National Academy of Sciences*) their preliminary work on the isolation of infectious deoxyribonucleic acid from SE polyoma-infected tissue culture.

The SE polyoma virus was originally isolated from leukemic mice by Drs. Sarah Stewart, National Cancer Institute, and Bernice Eddy, Division of Biologics Standards, several years ago. To date it has produced more than 20 types of tumors in a number of species of laboratory animals.

Isolation of infectious nucleic acids, either from purified viruses or virus-infected animals or plant tissue has been reported by various workers with positive identification of RNA as the infectious agent, but no well-substantiated findings of DNA. The induction of tumors in mice with preparations of mixed nucleic acids from leukemic mice also has been reported, but the nature of the infectious substance has not been clarified (Hayes and Latarjet).

### Isolation of Nucleic Acid

The most convincing evidence for the successful isolation of an infectious nucleic acid depends on its sensitivity to a specific nuclease. The authors report the isolation from mouse embryo cultures infected with SE polyoma virus of an infectious nucleic acid which is resistant to the action of ribonuclease (RNase) but which is destroyed by deoxyribonuclease (DNase). The intact polyoma virus is resistant to both enzymes.

The virus was grown in mouse embryo cells in tissue culture and recovered from the fluid medium of the tissue culture. Then the protein jacket of the virus was removed and the viral nucleic acid isolated and injected into embryonic cells in tissue culture. When the medium from this tissue culture was injected into hamsters, it caused tumors in 100 percent of the animals within 18 days. When the enzyme DNase was added to the isolated nucleic acid it became non-infective, but was resistant to the action of RNase. Results of direct inoculation of nucleic acid preparations into animals will be reported later.

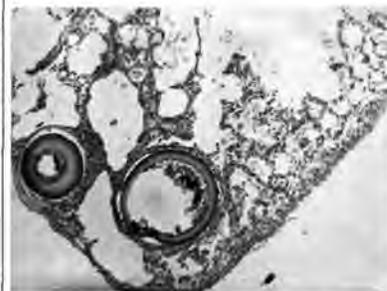
The results of these studies suggest that the nucleic acid of the SE polyoma virus is DNA, and that the latter is infective when

## Emmonsia Crescens Fungus Described at Conference

A species of new and unusual fungus pathogen of rodents has been transferred to a new genus, *Emmonsia*, named for a National Institute of Allergy and Infectious Diseases scientist, Dr. C. W. Emmons. The fungus is designated *Emmonsia crescens*.

When inhaled by its rodent host, a spore of *Emmonsia crescens* is 3 to 4 microns in diameter. The spores grow to a maximum diameter of 480 microns, 1,000,000-fold increase in volume, which is extremely unusual in the micro biological world. The fungus was described by Dr. Emmons, Head of the Medical Mycology Section of the Laboratory of Infectious Diseases, and Dr. W. L. Jellison, Senior Parasitologist, Rocky Mountain Laboratory, during the Second Conference on Medical Mycology of the New York Academy of Sciences.

Having increased 1,000,000-fold in volume the spores are incapable of further growth and do not reproduce as long as they remain in the animal. In spite of their enormous size, which makes them easy



1. *Emmonsia crescens*. Two cells of the fungus in the lung of a naturally infected rodent.

to see with the naked eye, these fungus cells cause little host reaction except physical displacement of pulmonary tissues. After a month, if the cells are removed to a culture tube from the lung, they germinate by sending out dozens of germination tubes. After several months they may die and calcify.

The fungus has been named *E. crescens* to denote the immense increase in the size of the fungus cell. The disease it causes in rodents is called adiaspiromycosis to signify the failure of the fungus to disseminate in the animal. In spite of the size of the fungus and

extracted and purified from a virus suspension. The work was reported by Dr. G. A. Di Mayorea of Sloan-Kettering Institute for Cancer Research; Dr. B. E. Eddy, DBS, NIH; Dr. S. E. Stewart, NCI; and W. S. Hunter, DBS, NIH; and C. Friend and A. Bendich of Sloan-Kettering Institute.

its wide geographic prevalence, pathologists and mammalogists appear either to have overlooked it or perhaps have mistaken it for a worm or other parasite. It has not



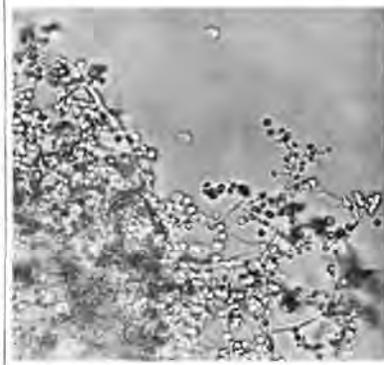
2. *E. crescens*. Colony of the fungus in culture in a 4-inch petri dish. Two weeks old.

yet been found in man.

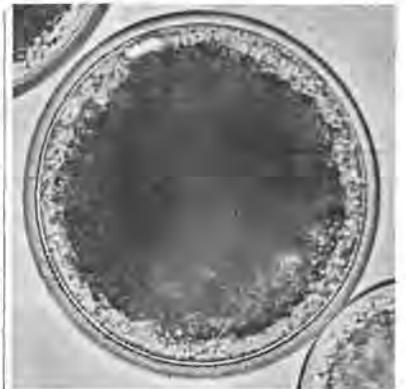
Dr. Jellison, collecting and studying material in Europe during the summer of 1959, found *E. crescens* in Norway, Sweden, Finland, France, Yugoslavia, Africa, and within 50 miles of the Arctic Circle. In Stockholm, examining preserved museum specimens, he found it in a vole trapped 115 years ago. Dr. Jellison has also discovered the fungus in rodents of the United States, Korea and Ecuador.

In 1942, Dr. Emmons found a similar fungus that was frequent in the lungs of rodents in southern Arizona. This was designated *Haplosporangium*. Recently it was transferred to a new genus, *Emmonsia*, by Italian mycologists Ciferri and Montemartini.

Other contributions to the con-



3. Spores of the fungus from a culture.



4. Spores of the fungus which were removed from a culture and incubated 2 weeks on blood agar at 37° C. Spores enlarge in the same way when inhaled by an animal.

ference from NIAID scientists included a paper by Dr. G. W. Lones, LID Mycology Section, reporting the successful cultivation of *Coccidioides immitis* in its spherule or *in vivo* form for as many as 160 consecutive transfers. Dr. H. F. Hasenclever, also of the Mycology Section, reported significant studies of distribution of *Cryptococcus neoformans* in organs of experimentally infected mice.

## NCI Scientists Report Use of Radiographs Of Ileal Bladder

Scientists of the National Cancer Institute's, Surgery Branch have previously reported the successful clinical use of the ileal bladder as a means of urinary diversion in patients whose normal urinary bladder function stops as a result of disease or surgery. Use of the ileal bladder, however, creates an abnormal anatomical arrangement and makes difficult the evaluation of the upper urinary tract.

Dr. James R. Jude and his colleagues have now reported a method in which a series of radiographs is made of the ileal bladder following introduction of a radioopaque dye. Findings in a study of 15 patients show that failure of the ureters to fill with the dye does not necessarily imply that an anatomical obstruction is present. A fortuitous valvelike action may be present, preventing regurgitation of the dye up one or both ureters. The investigators conclude that when the cause of postoperative hydronephrosis needs to be determined, these retrograde urinary ileograms together with the usual excretory urograms provide valuable information as to the status of the ileal bladder urinary diversion.

The paper appears in a recent issue of *Cancer* and is co-authored with Drs. Lee B. Lusted and Robert R. Smith.

## BLOCKED FUNDS

(Continued from Page 1)

obtained for the use of the blocked currencies in the coming fiscal year, the NIH program would support research in the following countries: India, Pakistan, Indonesia, Brazil, Egypt, Israel, Yugoslavia, and Poland.

In accordance with the general objectives of the program, the intent will be to support research which will have wide significance and importance in the control, eradication, or understanding of disease and disease processes.

### Projects Linked to WHO

Projects will be those to which the countries themselves give a high priority but which they cannot adequately support. In some cases the work in several countries will be coordinated against targets of common concern. This will include studies with respect to diseases whose epidemiology is global. Such projects will be linked with those being carried out by the World Health Organization.

Disease areas to be investigated are cholera, schistosomiasis, filariasis, toxoplasmosis, virus diseases, cardiovascular diseases, nutrition, and cancer.

### Follow Normal Procedures

The projects will be handled either as grants or contracts, following the normal NIH procedures. Technical advice from scientists in the countries concerned will be utilized to the maximum possible extent.

When approved, each project will have funds allocated for the duration, up to five years, as a means of insuring stable support. The funds will support only additive research in those projects not normally eligible to dollar appropriations.

## SOVIET

(Continued from Page 1)

companying the group on the entire tour.

A return mission of U.S. scientists headed by Dr. Floyd S. Daft, NIAMD Director, will go to the U.S.S.R. next September.

Dr. Burney has also proposed that an American delegation in the field of maternal and child care go to the Soviet Union in October.

Subject to the approval of the Soviet Ministry, he is suggesting that subsequent delegations visit the U.S.S.R. on the following schedule: infectious diseases and microbiology, March 1961; neurophysiology and pathology, April 1961; metabolism and genetics, October 1961; and medical ecology, September 1961.

In addition, the agreement provides that a joint meeting on poliomyelitis be held in Moscow during 1960.

## NIDR RESEARCH TEAM HONORED



Drs. Paul H. Keyes (left) and Robert J. Fitzgerald (center), both of NIDR, receive the Chicago Dental Society's 19th Annual Research Award. Presenting the award certificates at the Society's midwinter meeting is Dr. Harold H. Hayes, Society President. The Fitzgerald and Keyes findings on streptococci in dental decay are outlined in the Science Section of this issue.

## Maintenance Crews Conquer Snow Removal Problems

By Mary-Helen Emmons

NIH home-owners, afflicted with "snow shovel back" following the storm of February 13, may be thankful they were not faced with the complexities of snow removal at NIH.

Clearing the 6.5 miles of roadway, 30.5 acres of parking lots, and approximately 10 miles of sidewalks on the NIH reservation was an around-the-clock operation for Milford D. Myers, Chief of the Grounds Maintenance Section, PEB-DRS, and his 42-man crew.

Fortunately for Mr. Myers, the February 13 storm hit the Washington area on a Saturday afternoon, when the reservation was relatively clear of the 3,600 cars it normally accommodates.

When weather forecasts indicated heavy precipitation, nine men responded to an alert from Mr. Myers, and by early Saturday evening the fleet of plow-equipped Jeeps, trucks, and tractors had swung into action.

Operations continued with this crew throughout the night and until noon on Sunday, when relief was provided by a fresh 11-man group.

In all, approximately two tons of chemical snow and ice remover, 60 tons of sand, and 280 man-hours were required to clear the roads

for the Monday morning traffic onslaught.

Mr. Myers' top concern when snow hits the area is the clearance of access roads to the loading platforms of the Clinical Center and the animal buildings, for the delivery of food and fuel. Next, access must be provided to all other buildings in the event of fire or other emergencies.

Finally, all other roads are cleared and sanded, or treated with chemicals to prevent freezing. These procedures must be repeated several times in the course of a storm, for to wait until the end of a snowfall would be fatal to a successful operation.

The most difficult aspect of snow removal at NIH is finding space to maneuver the plows in the constricted areas between buildings. Mr. Myers relies on that burro of the automotive world, the Jeep, to help him here. He has three of these at his command, plus three tractor plows and two heavy-duty, plow-equipped sanders.

Another difficult problem for the crews to face is the abandoned car, which is a virtual road block. Upon the unfortunate owner's return, he is almost certain to find it buried by snow thrown up by the plows. Mr. Myers advises, "Stay with your car if you are stuck. Within a very short time one of the crews will find you and pull you out."

## New Aging Handbook Provides Survey

A comprehensive survey of literature in the field of gerontology is provided for the first time by the "Handbook of Aging and the Individual: Psychological and Biological Aspects," edited by Dr. James E. Birren, Section on Aging, NIMH.

Five of the handbook's 24 chapters were contributed by Dr. Birren and Drs. William Bondareff, Alfred D. Weiss, Edward A. Jerome, and Jack Botwinick, all of the NIMH Section on Aging.

The handbook, published in December 1959 by the University of Chicago Press, emphasizes age changes in human beings and the bases for these changes in both biological and social processes.

Lack of assembled information has been a handicap to planning of research in the behavioral aspects of aging. It is expected that the handbook will facilitate systematic research and the development of instruction in the causes of aging.

## Appointment Made in NIMH Research Grants

Dr. Louis A. Wienckowski, NIMH, has been appointed Assistant Chief of the NIMH Research Grants and Fellowships Branch.

Since January 1956, Dr. Wienckowski has assisted Philip Sapir, Branch Chief, in planning and directing the program of the Branch, and has participated in the formulation of overall policies.

Dr. Wienckowski received his Ph.D. from the University of Buffalo.

Before joining NIMH, he was associated with the Human Resources Research Office at George Washington University.

Dr. Elinor S. Brush, research psychologist, will serve as Staff Assistant to Dr. Wienckowski.

## Blum Article Cited

Dr. Harold F. Blum, NCI, is one of four recipients of a new Sigma Xi scientific fraternity award. He was cited for his article, "Quantitative Aspects of Cancer Induction and Growth: As Illustrated in Carcinogenesis by Ultraviolet Light," which appeared in the *American Scientist*.

Dr. Blum, a member of the staff of the Laboratory of Physiology, is presently detailed to the Department of Biology, Princeton University.

The British Medical Association states that a 0.05 percent concentration of alcohol in the blood is the highest that can be accepted as consistent with traffic safety.

# Surgeon General Outlines Flu Preparedness Plans

(Continued from Page 1)

A condensed version of Dr. Burney's discussion of these four points follows:

I shall not belabor the need for improving the reporting systems throughout the world, which serve as tracking stations for following epidemics of whatever cause. The Public Health Service's reporting system comprises our foreign quarantine division, with its officers stationed in various parts of the world and its liaison with private organizations such as transportation companies, plus our State and national health reporting systems. This network is integrally related with that of the World Health Organization. We shall strive to improve these services for the continuous monitoring of various types of infectious diseases.

## Readiness Stressed

The influenza diagnostic laboratory facilities in the Continental United States and in U.S. military installations overseas are ultimately tied in with the WHO surveillance system, and about 75 of them receive immediate support from the International Influenza Center for the Americas which is established within the Public Health Service and is located at the Communicable Disease Center in Atlanta. The Center and its associated laboratories must remain in readiness to initiate promptly, and carry through to completion, antigenic studies on newly isolated strains of influenza and serological assessment of immunity of a population.

Over and above this, we must be prepared to put into the field small, mobile teams which will be able to establish the precise etiology of influenza outbreaks wherever and whenever they occur and to return to their base laboratories with strains and materials that can be used for production of diagnostic reagents and vaccines.

Finally, we shall maintain a competent advisory group which will stay abreast of all types of information on influenza and which can advise the Surgeon General when a local epidemic shows possibilities of becoming a pandemic.

Advance planning must provide lists of types of persons who should receive vaccine on a priority basis. These categories of persons will fall into two general classes. One will include those who might be considered medical risks and whose immunization might prevent death, among whom will be the aged, the debilitated, and pregnant women. The second will comprise those persons who

should be kept healthy because of their essentiality to the nation and the community. As an ancillary value, such list would provide the manufacturers with an estimate of the minimal amount of vaccine which would be required in an emergency.

We have time before the next pandemic to work out with the various health groups concerned a better method for voluntary control of influenza vaccine when it is in short supply. I feel confident that in developing plans for informing and educating practicing physicians, cognizance should be taken of the difference in points of view of the physician and the health officer. We can hope, by appropriate educational measures to help each understand the other.

An important corollary to the information that reaches the public through its medical and health authorities is the information that reaches them through lay sources: the press, radio, TV, magazines, meetings of clubs, business, church, and other groups. If our story is clear, convincing, and told in simple, specific and understandable terms, it can and will be quickly disseminated through national channels.

## News Media Important

Like the professional public, the general public must also get information from local sources before it is ready to act. Much can be accomplished when representatives from the local press, radio and TV stations are included as members of the local planning committee. The PHS will give primary attention to ways in which State and national agencies, working cooperatively, can help communities develop strong information programs.

The importance and urgency of influenza studies are, I trust, evident in the priority given this area by the Public Health Service. We have created a National Advisory Committee on Influenza Research. And we have set up a Subcommittee of Investigators to enable the parent group to operate with maximum efficiency and dispatch. We look to the Subcommittee to stimulate and maintain long-term research interest in influenza, to assess research needs, and to help establish the general climate which is indispensable to productive study.

We shall foster research on the mutagenic capacity of influenza viruses, on the nature of the virulence factor, on detailed analyses of the full spectrum of antigens of all known prototype strains of the

viruses, and on the pathogenesis and physiological abnormalities of the disease in man. In brief, we shall look to the subcommittee of investigators to encourage basic studies on the virus and on the abnormalities it produces in man in order that this knowledge may be used during the next pandemic.

In the area of applied or developmental research we should sponsor research on chemotherapy and chemoprophylaxis of influenza and improve the methods for lengthening the protective period afforded by vaccines. In the latter category, research should be pushed on the development of adjuvants—materials which, when added to vaccines, are capable of greatly boosting the antibody levels produced by immunization. Experimental results to date are sufficiently encouraging to warrant extensive exploration of the whole problem.

## More Research Needed

Many other areas might be cited in which research could profitably be initiated or expanded. I will mention only a few: the use of germ-free animals to explore the relationship between single bacterial infection and influenza virus infections; neurological research on the causes of myalgia and post-influenza myasthenia; and studies relating to the cardiopulmonary complications common to influenza. These examples and many others one might name suggest that influenza is still very much an unfinished business.

The kinds of research I have in mind will provide a nucleus of intelligent, trained people who will be available at a moment's notice to provide the Surgeon General of the Public Health Service in 1980 with the kind of essential advice that he will require if faced with a pandemic of influenza.

In preparing the legacy for my successor who will hold office when the next pandemic strikes, I hope to provide him with three different kinds of sound investments. These are (1) a finite set of operating plans based on the experience of 1957; (2) a continually accumulating body of scientific information resulting from sound research on influenza carefully fostered by a dedicated cadre of investigators; and (3) a group of senior scientists and health officers who have maintained cognizance in the field and who can serve as his advisors.

Where the next pandemic will start no one knows. If it starts in our own country we would nevertheless expect to accumulate—and disseminate—the information necessary for effective control measures, even though it would be obtained too late to be of value to us. We would do this because it would help others—a motive that is a tradition of our Nation and the Public Health Service.

# James E. Phillips Dies; PHS Career Began At Hygienic Lab

James E. Phillips, Administrative Officer of the Lab Aids Branch, DRS, died of a heart condition Thursday evening, February 18, at Georgetown University Hospital, following a short illness. He



Mr. Phillips

would have had 40 years of service with NIH in August of this year.

"Jimmy" Phillips started his long PHS career as a messenger boy in the old Hygienic Laboratory on August 11, 1920. Less

than 16 years old at the time, he had already seen government service between June and September 1919, when he worked as a messenger in the Civil Service Commission.

At NIH, he rose rapidly to become Assistant to the Chief of the Business Office, which was the forerunner of the centralized services now shared by the Office of Administrative Management and the Division of Research Services. In 1949 he was appointed to the position he held until his death.

During his years here he hired and trained many of the young men who were to become future NIH executives, including James B. Davis, Chief of the Supply Management Branch, OAM, and Albert H. Siepert, former Executive Officer, now Director of Business Administration, National Aeronautics and Space Agency.

Jimmy was a member of the International Laboratory Glassware Standards Committee and the NIH Uniform Regulations Committee. He also headed the Caging Specifications Committee.

Born September 14, 1904, in Takoma Park, Jimmy attended the Rockville High School from 1916 to 1918 and took business and accounting courses at Benjamin Franklin University, Columbia Technical Institute, and Steward's Business College.

In January of this year he was an honored guest at the Old-Timers Club, a reunion of many scientists, administrators, and technicians who have worked at NIH for over 12 years.

Jimmy and his wife, Hazel Horton Phillips, lived for many years at the same address, 1750 Harvard Street, N.W. Mrs. Phillips is a teacher in the Parkwood School, Kensington.

Other survivors are a sister, Mrs. Lucretia White, and brother, Bruce P. Phillips, a parasitologist in the NIAID Laboratory of Germfree Animal Research.