National Institute of Health

FEDERAL SECURITY AGENCY

Public Health Service

IN THE past few years the public has shown a profound interest in matters of health and an awareness of the benefits to be derived from research in the medical sciences. Proof of this interest and an appreciation of the work done toward the advancement of medicine by the Public Health Service has been demonstrated by the growing number of visitors to our research center in Bethesda. This leaflet has been prepared to give these visitors a directory of buildings and a brief picture of activities at the National Institute of Health.

Oscar R. Ewing

Federal Security Administrator.

FEDERAL SECURITY AGENCY

Public Health Service

National Institute of Health

Bethesda, Md.

1948

THE NATIONAL INSTITUTE OF HEALTH

The National Institute of Health, the principal research arm of the Public Health Service, had its beginning in a small room at the Marine Hospital on Staten Island. A laboratory with apparatus modeled after that used by Koch was set up in the hospital in 1887, when bacteriology was a new science. Here Dr. Joseph J. Kinyoun demonstrated the organism of cholera which had been brought to the port of New York by passengers arriving on steamships from abroad. Shortly thereafter, Dr. Kinyoun was sent to study under Koch in Berlin and at the Pasteur Institute, Paris. Upon his return to the United States, he continued to serve as chief of the laboratory for 12 years.

After only 4 years, better facilities were provided for the new unit at Marine Hospital Service headquarters on Capitol Hill in Washington, where the top floor of the building was given over to the officially recognized Hygienic Laboratory.

These quarters too were soon outgrown, and in 1901 Congress provided land and funds to erect "a laboratory for the investigation of infectious and contagious diseases, and matters pertaining to the public health." The new location, overlooking the Potomac River not far from the Lincoln Memorial, remained the home of the Hygienic Laboratory for nearly 40 years.

In the 1894 report of the Hygienic Laboratory is this note. "It is proposed to detail from time to time officers of the Service to assist in laboratory work and for their instruction in bacteriological diagnosis of contagious diseases and scientific investigation of their causes and means of prevention." Thus the work of the Laboratory first developed as a part of the legal duties of the Service. Investigations of epidemic diseases such as cholera, plague, and yellow fever were carried out under the leadership of the Laboratory staff, and many perplexing problems were solved. Before long, questions encountered in all fields of the Public Health Service were being referred to the Laboratory as its only organized group with training in scientific investigation. Studies were extended to include not only laboratory research in the strictest sense, but also related subjects and field investigations of all diseases that affect the health of the nation.

Among early studies may be mentioned the pioneer work on anaphylaxis, on which much of our knowledge of the so-called sensitization diseases is based (Rosenau and Anderson, 1906); control of serums, vaccines, and viruses (begun in 1902); the epidemiology of typhoid fever in the District of Columbia (Rosenau, Kastle, Lumsden, and Anderson, 1907–11); the discovery that pellagra is a deficiency disease (Goldberger, 1914); tularemia (McCoy, 1911, and Francis, 1919); typhus fever (Goldberger—1909, Maxcy—1926, and Dyer, Rumreich, and Badger—1931); isolation of the causative virus of epidemic encephalitis (Armstrong, 1933); brucellosis (Evans, 1925), and lymphocytic choriomeningitis, a new disease of man (Armstrong, 1935).

In 1899, Dr. Milton J. Rosenau was appointed chief and under his direction (1899–1909) valuable contributions were made to our knowledge of bacteriology and immunology. Succeeding Dr. Rosenau, Dr. John F. Anderson directed the work of the Laboratory for 6 years. In 1915, Dr. George M. McCoy became the fourth director, entering upon a long and distinguished career in this position.

In 1930, the name of the Hygienic Laboratory was changed to the National Institute of Health.

Over the course of years, it became evident that demands upon the Service were such that provision would have to be made for ever-expanding research facilities. The one-room laboratory gave way to the several rooms in the Marine Hospital headquarters and later to the separate building on specially designated land. In this last location, the establishment grew from one to four large buildings, but finally these too became inadequate.

In 1935, the Secretary of the Treasury accepted for the Public Health Service, a beautiful tract of some 90 acres of land northwest of Washington and beyond Bethesda in the adjoining Maryland countryside. This estate, donated by Mr. and Mrs. Luke I. Wilson, was to become the permanent home of the National Institute of Health. Emergency funds allocated by the President were used to construct six red brick buildings of Georgian design housing administration headquarters, offices, and the laboratories. One building was especially planned for the National Cancer Institute created by an act of Congress in 1937. These made up the original establishment on the present site of the National Institute of Health.

Dr. L. R. Thompson became the Director of the Institute in 1937 and under his guidance the first of the new buildings were ready for occupancy in the latter part of 1938.

In 1942, Dr. R. E. Dyer, closely associated with the research work of the Institute for many years, was selected to succeed Dr. Thompson as Director of the National Institute of Health.

The work of the Institute, during the sixty-odd years of its existence, has been extended into nearly all fields of medical research by an ever-increasing complement of scientists whose efforts have carried them to every part of the globe. National Institute of Health laboratories and field stations are now counted among the finest and largest in the world, staffed with about 150 commissioned officers, 750 professional and scientific personnel, 75 trainees and fellows, and some 475 others who provide essential administrative, scientific, and maintenance services in support of the research. And in the immediate future a still greater expansion of facilities will come with the construction of a Clinical Center providing 500 clinical research beds and associated laboratories. These facilities will offer superlative research opportunities for well-trained medical and scientific personnel.

CANCER

The work of the National Cancer Institute falls into three categories: Research, control, and research grants.

The laboratories are provided with exceptional equipment for pursuing the elusive "whys" posed by the cancer problem. Sections on Biology, Endocrinology, Chemotherapy, Biophysics, Pathology, and Biochemistry as applied to cancer have contributed a wealth of information to the fund of knowledge on cancer processes, their control, and cure.

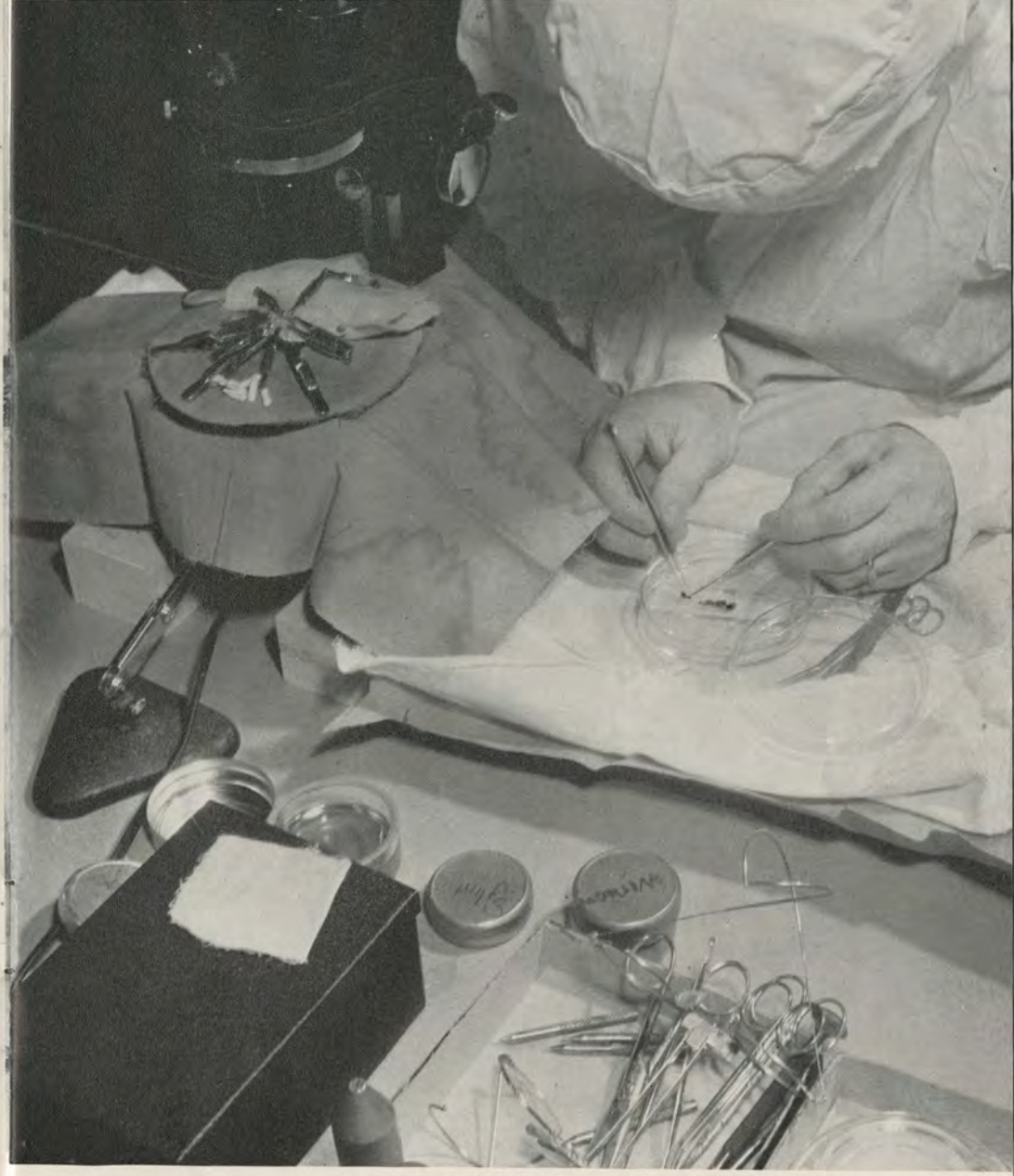
In addition to the research activities within the facilities of the National Cancer Institute, staff members are assigned to branch laboratories in Baltimore, Md.; Princeton, N. J.; and Washington, D. C. The University of California Medical School in San Francisco has provided space for the Laboratory of Oncology—a cooperative venture of the National Cancer Institute with the University—which is engaged in testing compounds reputed to be of therapeutic value in the treatment of cancer and in the physiologic study of cancer patients.

The Journal of the National Cancer Institute, published every 2 months, is the means by which results of National Institute of Health research are made available to other research organizations, scientists, and physicians.

To the Cancer Control Branch of the Institute is delegated the task of maintaining a program to reduce the number of cancer deaths by helping practicing physicians and their patients make the most effective use of current knowledge on cancer. Grants are made for training doctors in the diagnosis and treatment of cancer. Financial assistance is rendered medical and dental schools for improving the training of undergraduate and graduate students in the cancer problem. To supplement educational phases of control, money is granted to the States and Territories through their official health agencies to amplify their own cancer control programs.

Loans of Government-owned radium are made to hospitals for the treatment of cancer patients. This single phase of cancer control has been of inestimable value to thousands who otherwise, through lack of funds or inadequacy of supply, would never have received the benefits from this form of therapy.

Literature and graphic illustrations of the most recent findings on cancer for education of the public are issued under the sponsorship of the Cancer Control Branch and also in cooperation with other agencies and foundations whose work is dedicated to the elimination of this disease.



Transfer of tumor tissue to transparent chamber for microscopic examination of its growth in living mice.

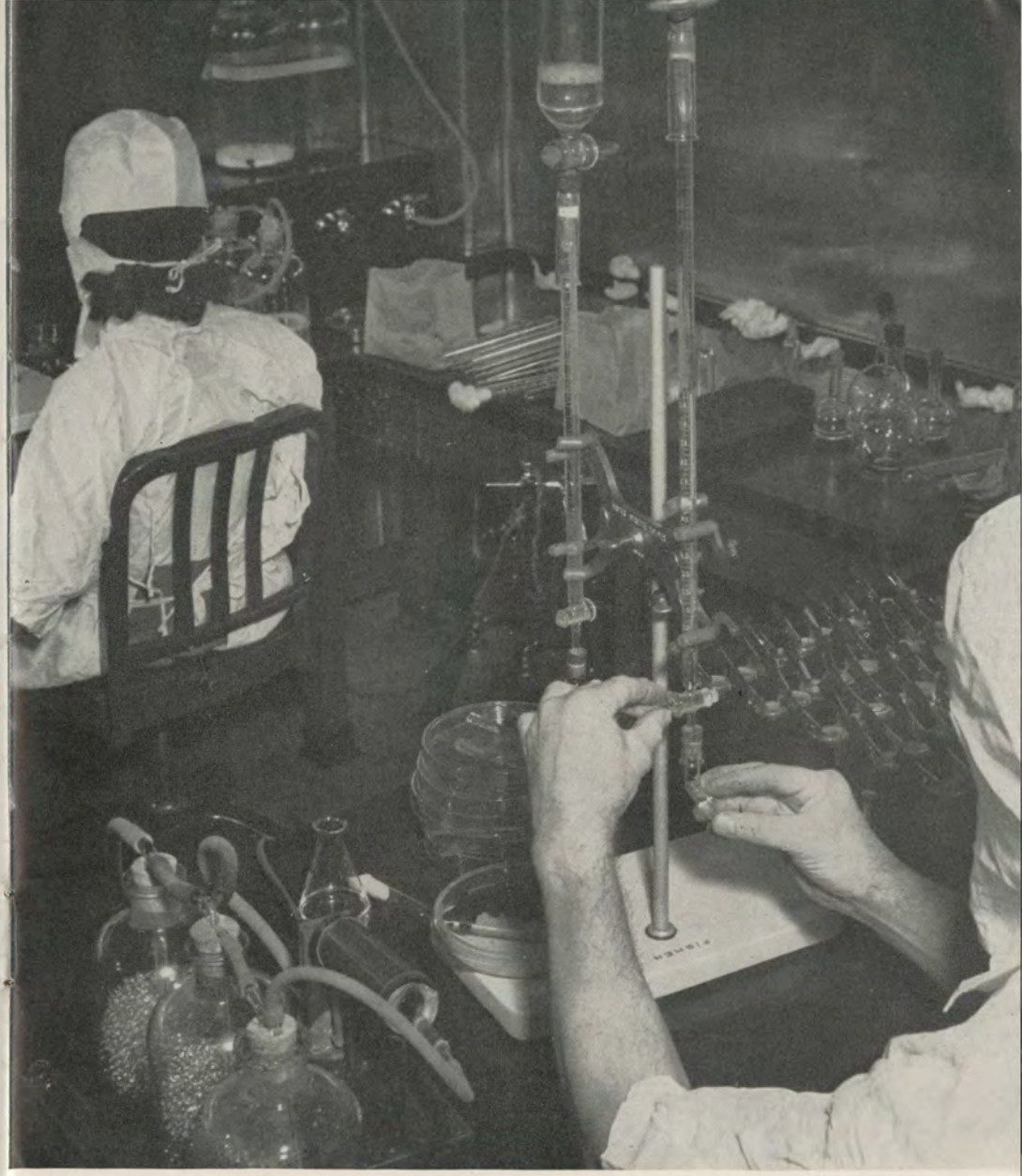
CANCER

The act of Congress creating the National Cancer Institute in 1937 also authorized the formation of the National Advisory Cancer Council. Six of its members are selected from leading medical and scientific authorities in the study of cancer in the United States; the Surgeon General of the Public Health Service is chairman. Appointive members serve a 3-year term. The Council acts in an advisory capacity on the work of the National Cancer Institute, reviews and makes recommendations on all applications for grants-in-aid, and stimulates and helps to coordinate cancer research.

The research grants program, under the guidance of the National Advisory Cancer Council, supports cancer research on an even larger scale than that done within the laboratories of the Institute itself. Grants-in-aid for special projects are given to other research groups throughout the country, and individual fellowships are granted to research personnel interested in further training as part of the cancer fellowship program. Funds are also made available to assist in the construction of facilities for clinical and laboratory research.

ILLUSTRATIVE STUDIES

Tissue culture studies on normal and malignant tissue.
Further work on the Rous sarcoma virus.
Propagation of inbred mouse strains in relation to the genetic factors in the causation of cancer.
The significance of hormones for the diagnosis and treatment of cancer.
Chemotherapy of tumors.
Carcinogenesis induced by radiation.
Histogenesis and cytogenesis of cancer.
Experimental production of tumors.
Transparent chamber technique to visualize tissue reaction and growth.
Vitamins and proteins in relation to cancer.



Changing fluid on cultures of cancer cells grown in flasks. Three times weekly these cultures must be fed by draining the old culture fluid off and adding fresh culture media; cultures waiting to be changed are arranged in rows in front of and to the right of the operator.

PHYSIOLOGY AND BIOCHEMISTRY

The Division of Physiology, made up of sections on Cardiovascular Diseases and Gerontology, Chemotherapy, Dental Research, Nutrition, and Pharmacology, together with the Chemistry and Pathology Laboratories, combined in December 1947 to form the Experimental Biology and Medicine Institute. Their principal objectives are to improve methods in the diagnosis, treatment, and prevention of disease through the study of fundamental physiological and biochemical processes. With this unlimited range for investigation, the related activities of these seven sections and laboratories are directed toward the explanation of some of the more pressing problems of universal interest to the medical world.

Work is proceeding in the chemotherapy of tuberculosis, surgical and burn shock, new narcotics, dental caries and related oral diseases, investigations in human pathology, the chemistry of carbohydrates, the study of insecticides and rodenticides, and dietary deficiency diseases. The scale of studies on new chemotherapeutic agents is being extended constantly. Particular emphasis is placed on the clinical aspects of cardiovascular and degenerative diseases, and facilities for these studies are being expanded in the Baltimore City Hospitals. Fundamental studies on hormones and vitamin deficiencies are in progress. Attention is being given to the changes wrought by age in kidney function, mental performance, and work capacity. Efforts to retard and modify the degenerative changes that develop with aging mark the initial steps of the National Institute of Health scientists into a field virtually untouched by medical investigators. Further insight gained from results of the long-range program now under way will show the way to a longer and healthier life.

ILLUSTRATIVE STUDIES

Coronary artery disease.
Sugar researches.
Morphine substitutes.
Toxicologic pathology.
Enzyme studies.
Chemotherapy of tuberculosis.
Effect of fluorine on dental decay.
Vitamins and blood dyscrasias.

Weighing rats to evaluate the effects of various diets.

INFECTIOUS DISEASES

The Division of Infectious Diseases centers its research interests chiefly in the epidemiology, diagnosis, cause, prevention, and treatment of communicable diseases. The successes of early workers in their efforts toward the control of epidemics and plagues in this country are counted among the more spectacular accomplishments of the Public Health Service. Now, constant vigilance is practiced to guard against the recurrence of old diseases or the spread of those newly identified. The program develops as new problems arise. For example: Responding to a call from the New York City Health Department in 1946, where a mysterious illness had been attacking residents of one of the city's housing developments, the Division identified a new disease, rickettsialpox, determined the causative agent, found the animal reservoir—the common house mouse, and identified the transmitting agent, a mite-parasite of the mouse. Assistance is rendered whenever the State or local health unit asks for help.

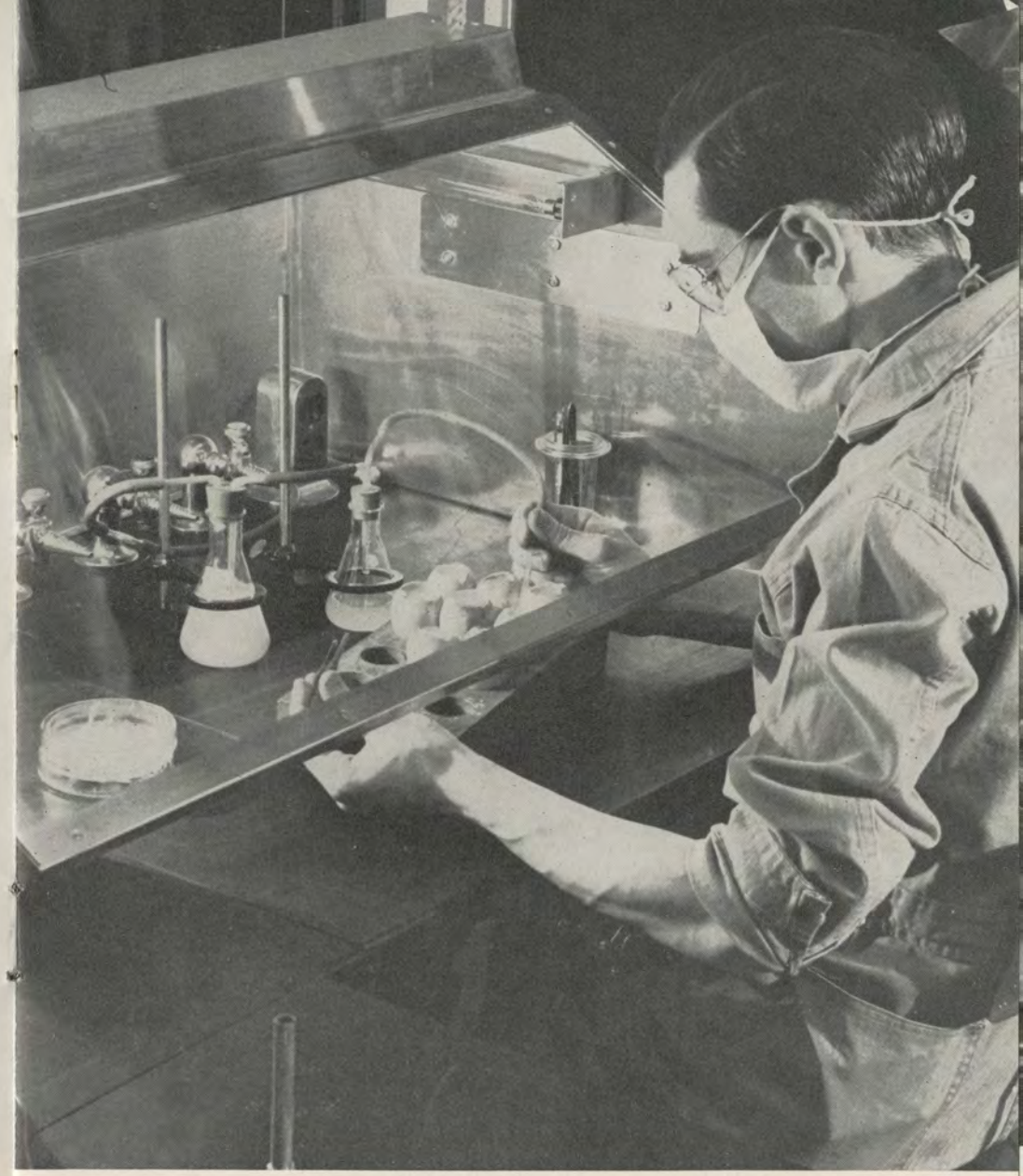
The Division comprises sections devoted to the study of rickettsial, bacterial, virus, and fungous diseases. An epidemiology unit collects data on the immunity-giving properties of vaccines and the efficacy of therapeutic serums. Epidemiologic studies are maintained in cooperation with other units of the Division engaged in field studies.

A large field station is maintained at Hamilton, Mont.—the Rocky Mountain Laboratory—engaged primarily in the manufacture of vaccines against Rocky Mountain spotted fever, yellow fever, and typhus; the study of arthropod-borne diseases; and securing data on medical entomology.

A Dysentery Control Project has recently been established at the Louisiana State University School of Medicine staffed by National Institute of Health personnel, and extension studies of this project will soon be under way at Albuquerque, N. Mex.

ILLUSTRATIVE STUDIES

Q fever.
Poliomyelitis.
Acute diarrheal disease.
Common cold.
Influenza.
Mycotic disease.
Rheumatic heart disease.
Psittacosis.
Brucellosis.
Tuberculosis.



Harvesting psittacosis virus from eggs beneath the shield of a sterile cubicle in the Memorial Laboratory.

TROPICAL DISEASES

Air travel and global warfare highlighted the need for coordinating and expanding research in the field of tropical medicine. Consequently, the several units engaged in malaria research and those studying diseases caused by protozoan and worm parasites were consolidated in April 1947 to form the Division of Tropical Diseases. Now well established on a more comprehensive basis, the Division is composed of eight sections: Diagnosis and Prevention of Malaria; Chemotherapy of Malaria; Helminthic Diseases; Protozoan Diseases Other Than Malaria; Medical Entomology; Therapeutic and Preventive Measures; Immunology; and Physiology. These are augmented by field stations in Memphis, Tenn.; Lexington, Ky.; Columbia, S. C.; Milledgeville, Ga.; Seagoville, Tex.; and Guatemala, Central America.

Malaria investigations are concerned with the development of methods for active immunization, serologic procedures for diagnosis during absence of the parasites from the blood, behavior of foreign strains of malaria in domestic anophelines, biology of the malaria parasite and vector in relation to drug action, clinical evaluation of promising drugs, and the maintenance of a repository for reception, classification, and distribution of potential antimalarial drugs.

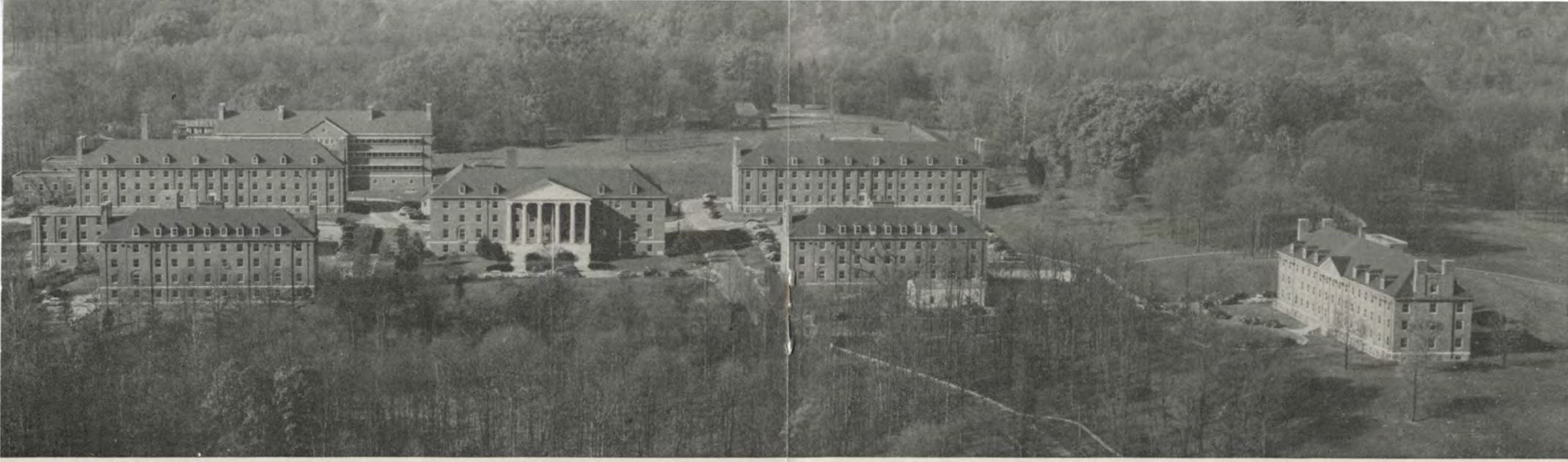
The work of other sections includes the search for possible intermediate snail hosts of blood flukes, improvement of diagnostic procedures for parasitic diseases, particularly the development of immunologic tests, and the effect of nutritional levels on hookworm disease—still a public health problem in many parts of the South. The biology and ecology of insect vectors of disease and morphology of anopheline vectors of malaria are under investigation. Radioactive isotopes are used in studies on the mode of action of parasiticides. Experiments are set up to evaluate the effect of sewage treatment processes on parasite cysts and ova.

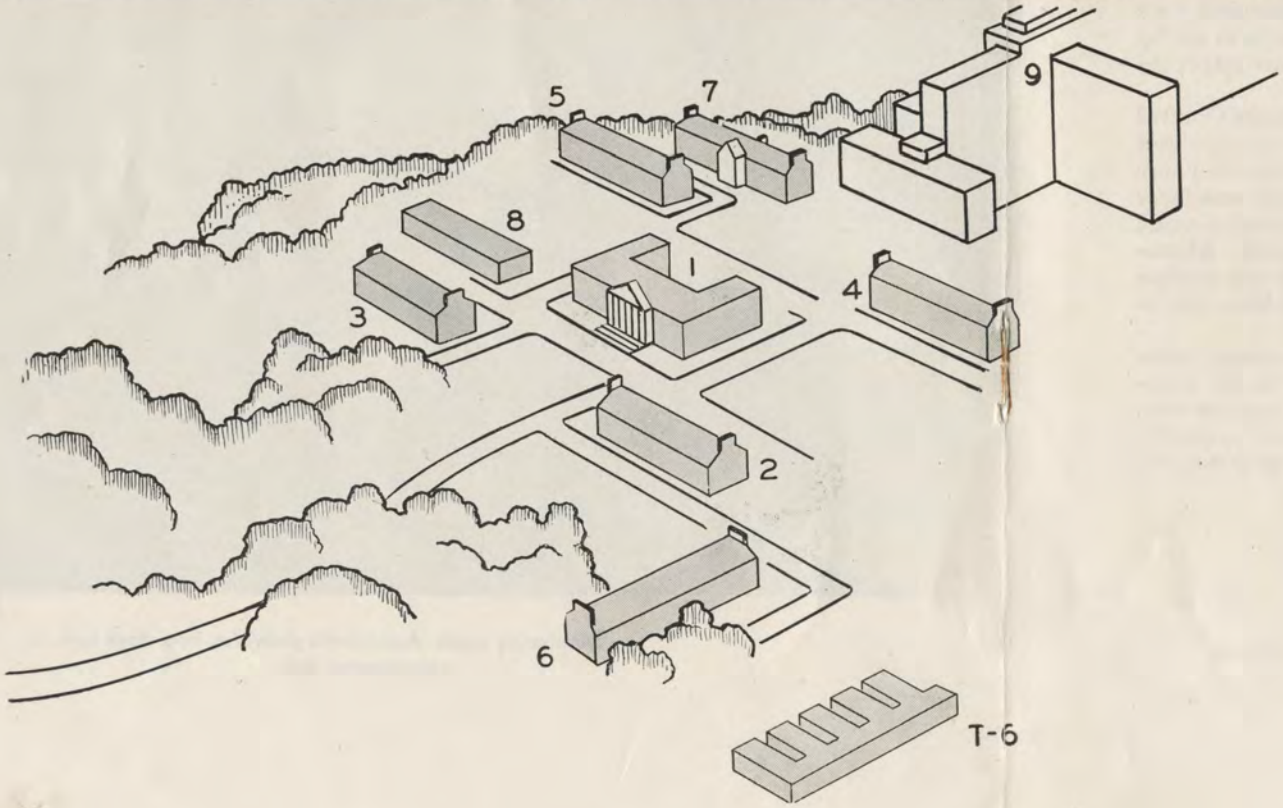
Efforts of all groups are aimed at supplementing our present knowledge regarding the diagnosis, pathogenicity, treatment, and control of the common as well as the less familar diseases of the tropics.

ILLUSTRATIVE STUDIES

Amebiasis.	*Life cycle of blood flukes in man.*
Filariasis.	*Development of molluscacides.*
Trypanosomiasis.	*Methods of water sterilization.*
Trichinosis.	*Laboratory rearing of insect vectors.*
Toxoplasmosis.	*Physiology of the Trypanosomidae.*
Leishmaniasis.	*Antimalarial drugs in volunteer patients.*

Transferring snails, *Australorbis glabratus*, from stock tank to experimental dish.

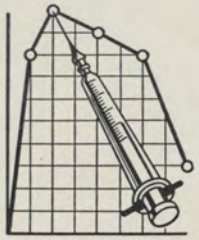




DIRECTORY OF BUILDINGS

1. Administration.
2. Laboratory of Physical Biology.
3. Division of Tropical Diseases: Malaria.
   Experimental Biology and Medicine Institute: Nutrition, Cardiovascular diseases.
4. Experimental Biology and Medicine Institute: Physiology, Pathology, Chemistry.
5. Division of Tropical Diseases.
   Division of Infectious Diseases.
   Biologics Control Laboratory.
6. National Cancer Institute: Biology, Biochemistry, Biophysics, Endocrinology.
7. Memorial Laboratory: Virus and infectious diseases.
8. National Cancer Institute: Chemotherapy, Pathology, Genetics unit.
9. Clinical Center.

T–6. National Cancer Institute: Administration, Control Branch, Research Grants.
Division of Research Grants and Fellowships.



BIOLOGICS CONTROL

The Biologics Control Laboratory is designated to perform the functions of control of biologic products as required by the act of Congress of 1902. Research on related problems essential for properly carrying out provisions of that law and to improve the quality of vaccines, antitoxins, and therapeutic serums is a part of these duties. Regulations for the control of such products are formulated in this laboratory and "dating periods" are fixed—the time limit beyond which the product cannot be expected to yield specific results, and the conditions of storage during this period. Minimum requirements for licensed products are issued and periodically revised.

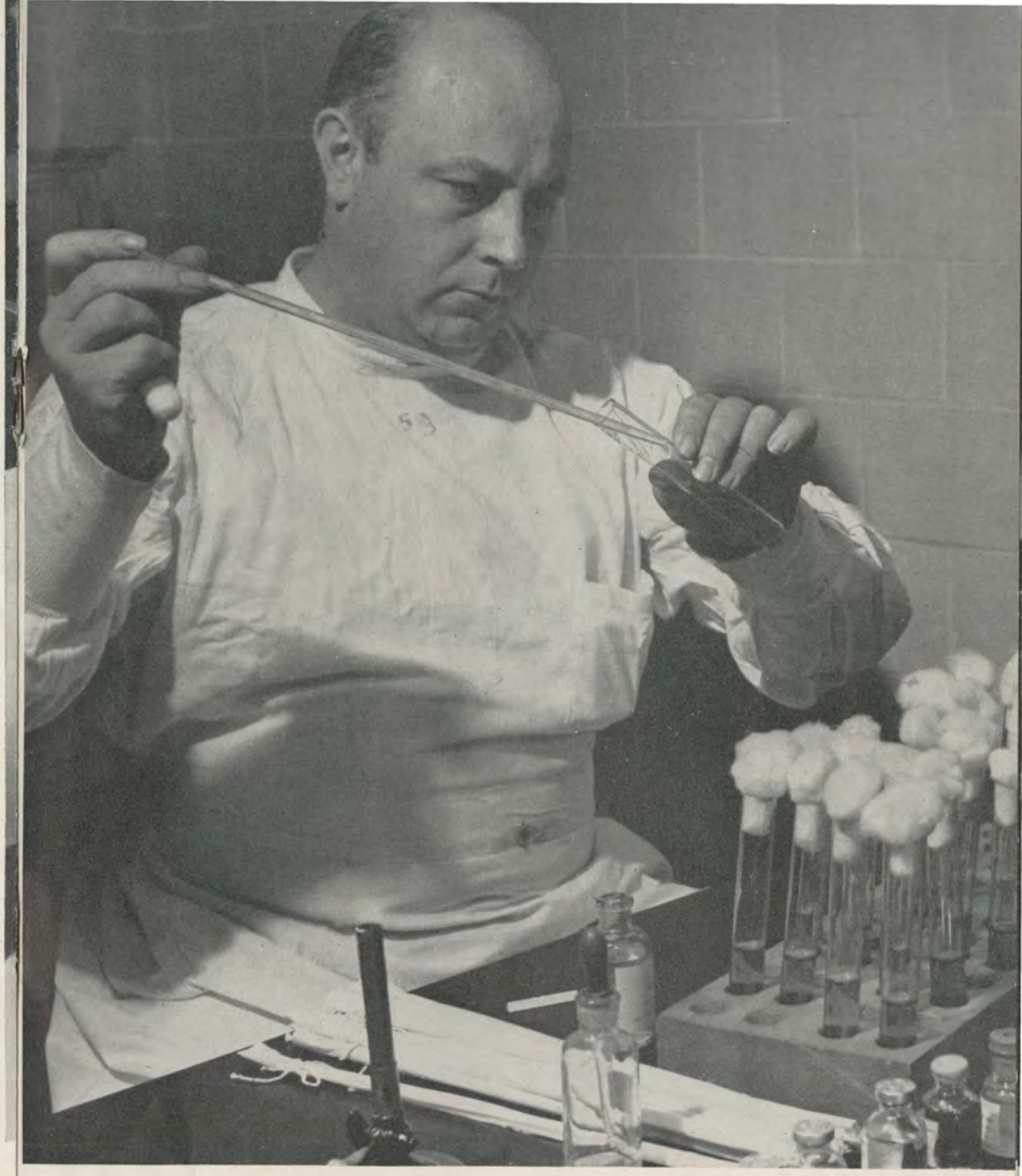
All firms manufacturing biologic products entering interstate commerce in the United States, regardless of whether they are manufactured here or in a foreign country, must qualify for a license under standards set by the National Institute of Health. These licensed laboratories are inspected at least annually by staff members of the Institute.

But for the vigilance and guardianship exercised by the Biologics Control staff, Americans would not have the confidence in accepting vaccines and serums from their physicians or the corner drug store which they are accustomed to take for granted. Adherence to the same high standards of safety, purity, and potency is equally well enforced for American-made biologics destined for the export trade throughout the world. Manufacturers producing these unstable materials give wholehearted cooperation to this authority which insures the greatest benefits with the least risk to both the consuming public and their own integrity.

The staff also works with international societies in promoting standardization of biologics throughout the world. One member is on the committee of experts on biological standards of the World Health Organization. This committee establishes international standards for biological products, a service once performed by a similar group under the health section of the League of Nations.

ILLUSTRATIVE STUDIES

Blood grouping and Rh typing serums.
Stability of serum components.
Homologous serum jaundice research.
Rabies vaccine.
Problems related to pyrogens.
Influenza virus vaccine.
Hemophilus pertussis.
S. dysenteriae toxoid.
Use of ultraviolet light in sterilizing biologic preparations.



Testing typhoid fever vaccine, from a licensed manufacturer, for sterility.

PHYSICAL BIOLOGY

The techniques of the physical sciences can materially advance medical research when used to obtain an understanding of the properties and activities of tissues, cells, and biologically important molecules. On this premise, the Laboratory of Physical Biology now concentrates on basic research in the fields of biological chemistry and physics, including high and low energy radiation biology, molecular biophysical studies, and cellular metabolism. Many of these basic studies were introduced during the recent war and emphasis has continued along these lines. Consequently, the Industrial Hygiene Research Laboratory, as it was called previous to 1947, was renamed the Laboratory of Physical Biology, and investigations related strictly to industrial hazards are now under the supervision of the Division of Industrial Hygiene in the Bureau of State Services.

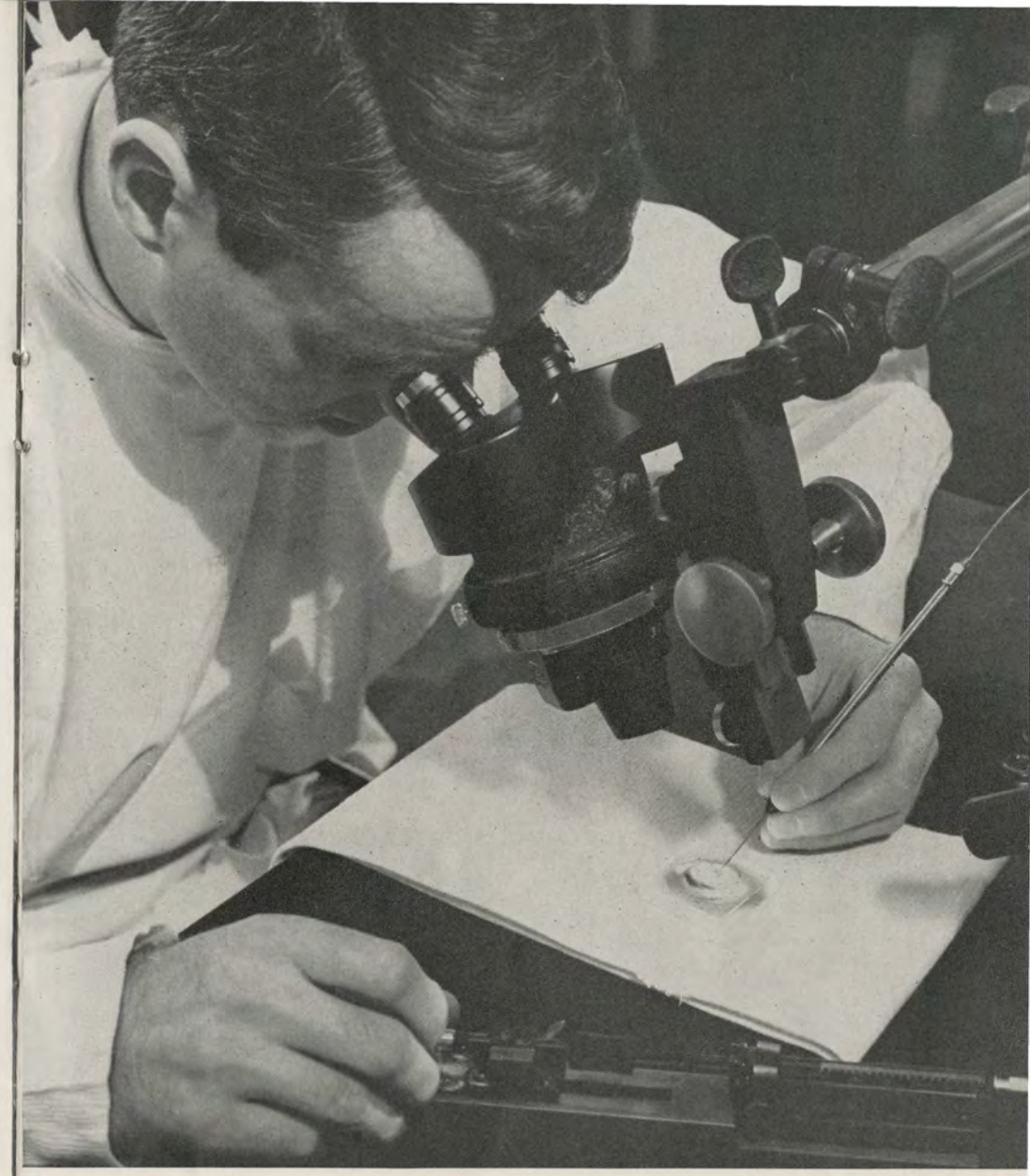
Special use is being made of the electron microscope because it permits visualization of particles of molecular dimension. With this aid the size and shape and physicochemical properties of viruses and large proteins are being determined.

New approaches in the use of nuclear energy and radiation procedures are now available to study biophysics and physiology of cellular and subcellular matter. Research in physical biochemistry includes studies on the nature and functions of membranes, colloidal structures, and phases of surface chemistry and aerosols.

Other phases of the physical biology program include research concerning the effect of high altitudes on respiration, growth, and muscle hemoglobin, and concerning the fundamental action of physical and chemical agents on the metabolism of living cells.

ILLUSTRATIVE STUDIES

Metabolism of microorganisms.
Cytochemistry of nucleic acids.
Chemistry of muscle proteins.
Enzyme purification.
Allergic contact dermatitis.
Problems of radiation hazards.
Effect of high-energy radiation on biologic processes.
Studies of membranes and colloidal structures.
Influence of atmospheric changes on lung ventilation.
Electron microscopic studies of large molecules.



Observing the physical action of oil and water solutions injected into tissues and cells by the use of a semimicro-injection technique.

RESEARCH GRANTS

The extensive research grants program of the Public Health Service is administered by the Division of Research Grants and Fellowships of the National Institute of Health. Three councils—the National Advisory Health Council, the National Advisory Cancer Council, and the National Advisory Mental Health Council—authorized by Congress, recommend to the Surgeon General the granting of funds to assist "universities, hospitals laboratories, and other public or private institutions, and individuals" in advancing medical and scientific knowledge.

On receipt of inquiries, the Division supplies either institutions or an individual scientist with application blanks and instructions to submit an outline of the proposed research project for which a grant is desired. Study sections, composed of consultants who have achieved national recognition in their fields, evaluate the scientific ability of applicants and suitability of their proposed research projects. On the basis of study section findings, the appropriate National Advisory Council recommends final action on each grant application.

To the Division of Research Grants and Fellowships are detailed the administrative functions such as processing papers, paying grants and keeping pertinent records, and the analysis of reports in connection with various funds allotted.

ORGANIZED STUDY SECTIONS ON RESEARCH GRANTS

Antibiotics.
Bacteriology.
Biochemistry and Nutrition.
Cardiovascular Diseases.
Dentistry.
Cancer.
Gerontology.
Hematology.
Malaria.
Mental Health.
Metabolism and Endocrinology.
Pathology.
Pharmacology.
Physiology.
Public Health Methods.
Radiobiology.
Sanitation.
Surgery.
Syphilis.
Tropical Diseases.
Virus and Rickettsial Diseases.
Tuberculosis.

Study section chairmen meeting in special session with NIH officials for discussion of policy and plans for research grants.

FELLOWSHIPS

The Surgeon General of the Public Health Service was first empowered to provide fellowships by the act establishing the National Cancer Institute in 1937. Public Law 410, approved July 1, 1944, extends this authority to other branches of the service. The Surgeon General may establish and maintain research fellowships with such stipends and allowances, including traveling and subsistence expenses, as he deems necessary to procure the assistance of the most brilliant and promising research fellows from the United States and abroad.

The program is administered by the Division of Research Grants and Fellowships. Stipends are awarded to accredited applicants for studies to be pursued in institutions outside the Government as well as for research fellowships established within the service. Awards are made for 1-year periods and are renewable.

Three types of fellowships are available—predoctorate, postdoctorate, and special research. Stipends awarded with the first two range from $1,600 to $3,000 with additional allowances for dependents. In addition, a special fellowship may be obtained by one who qualifies for a postdoctorate fellowship and has demonstrated outstanding ability or who has specialized training for a specific problem. The stipend in this case is determined by individual considerations. In certain instances a fellow may accept limited teaching assignments in the university or institution to which he is attached.

Fellows may be assigned for studies or investigations in this country or abroad during the tenure of their fellowships.

The security and prosperity of the United States depend today, as never before, upon the rapid extension of scientific knowledge. The system of research fellowships is a vital one in the process of mobilizing and developing the talent of the nation.

A fellowship applicant receives instructions and advice in a personal interview.

THE CLINICAL CENTER

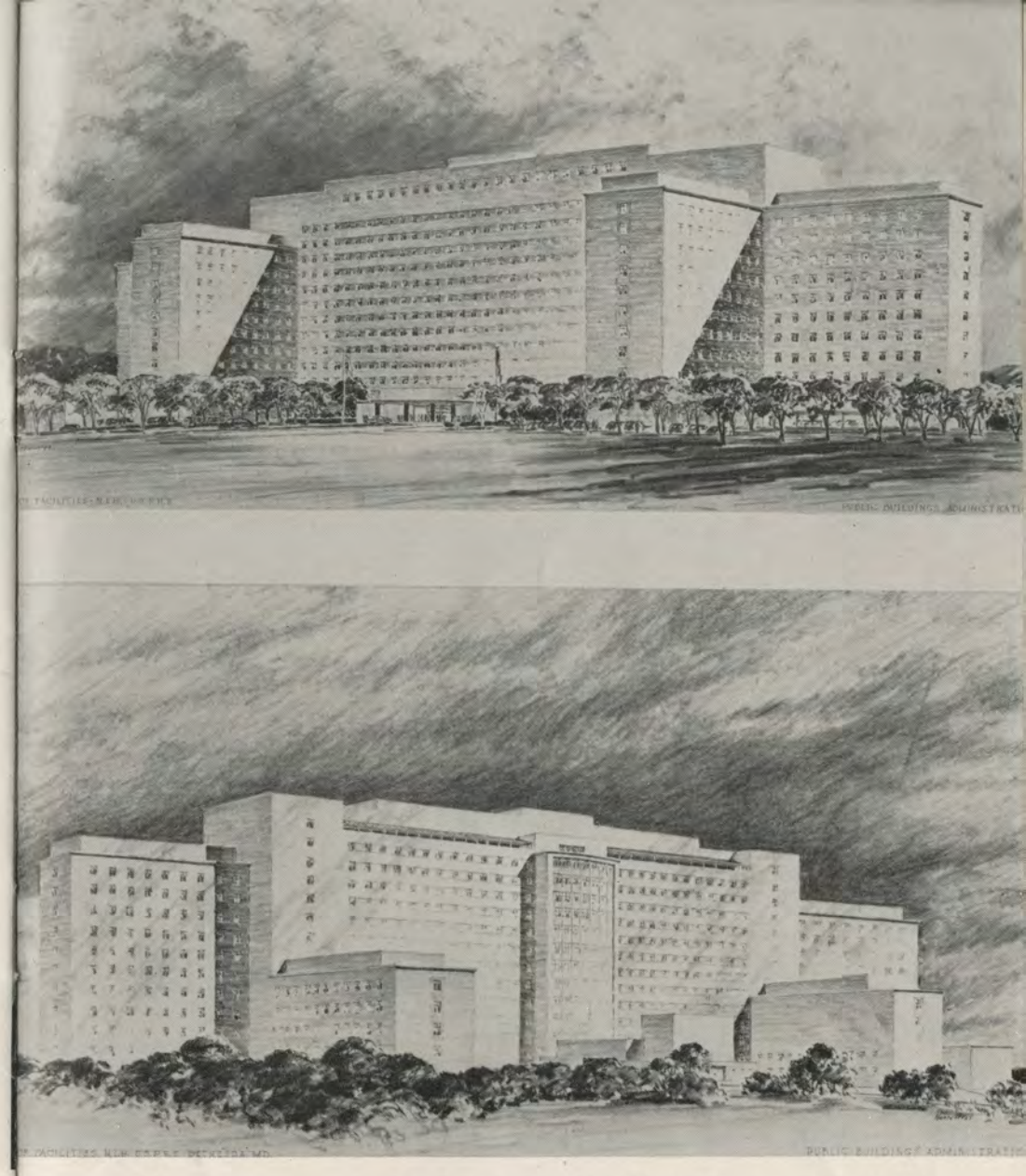
The present facilities of the National Institute of Health will be supplemented by a 500-bed Clinical Center in the near future. Major emphasis will be placed on the investigation and treatment of cancer, heart disease, and mental disease—now the greatest causes of illness, disability, and death in our population.

The decreased prevalence and duration of acute illnesses and the tendency toward an "aging population" stress the need for a coordinated research program in long-term illnesses. Plans for construction of the new Clinical Center incorporate hospital facilities of the most modern design and laboratories with a wide range of flexibility for study in the biological and physical sciences. The hospital will also house the National Institute of Mental Health, and space will be provided to extend the clinical work of the National Cancer Institute. Integration of fundamental and clinical research will afford endless opportunities to advance methods of diagnosis and treatment and to study the causes of and means of preventing degenerative diseases.

The 13-storied hospital-laboratory center will be situated just west of the Administration Building. Patients from all parts of the country will be referred for study and treatment of particular disease groups under investigation. The Clinical Center will offer unique staff opportunities for well-qualified scientific and clinical investigators.

SIGNIFICANT FEATURES OF THE CLINICAL CENTER

- Consolidation in one building of facilities and personnel for the investigation of: *Cancer, heart disease, mental disease, infectious and tropical diseases.*
- Ready collaboration of effort in clinical and non-clinical sciences for a unified attack on various phases of chronic diseases.
- Laboratory facilities with wide range of adaptability for changing needs: *Module construction, demountable partitions and equipment, grouped service line outlets at regular intervals, standardized laboratory benches.*
- Special wing for investigating the application of radiation to the diagnosis and treatment of diseases.
- Modern hospital facilities for the care of long-term patients, including special services for: *Physical therapy, occupational therapy, rehabilitation, diversional and recreational therapy, religious ministry for all faiths.*
- Integration of facilities of the National Institute of Mental Health and consultative psychiatric services which will be readily available to other clinical divisions of the Center.



Artist's conception of the Clinical Center—north and south elevations. Laboratories are to be on the north side of the building. All patients' rooms have southern exposure.

M. J. Weygandt

#4 Path