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1970

## Washington University School of Medicine bulletin, 1970-1971

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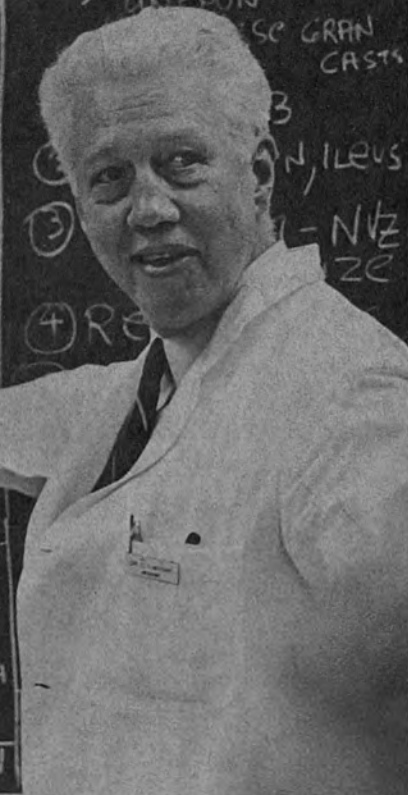
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School of Medicine

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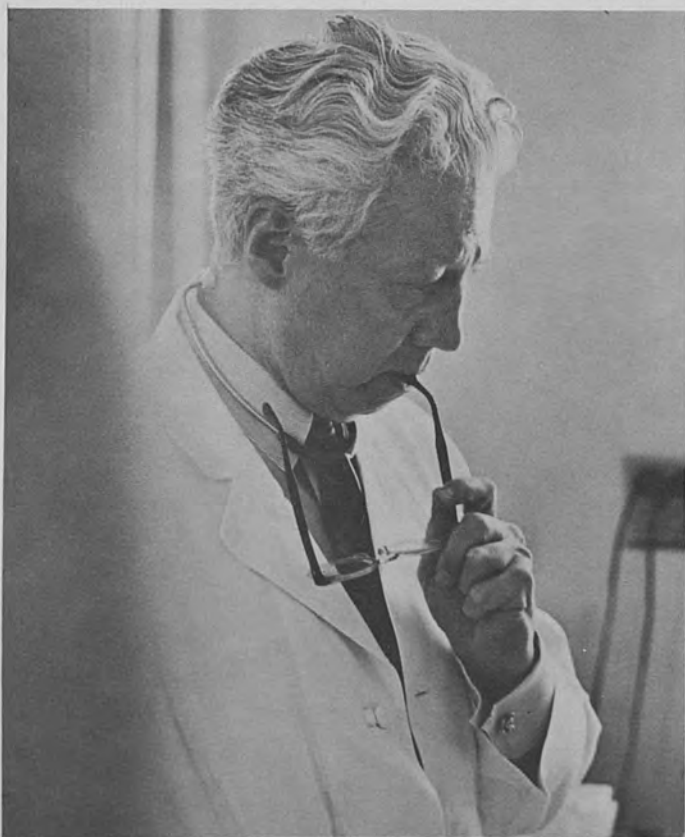
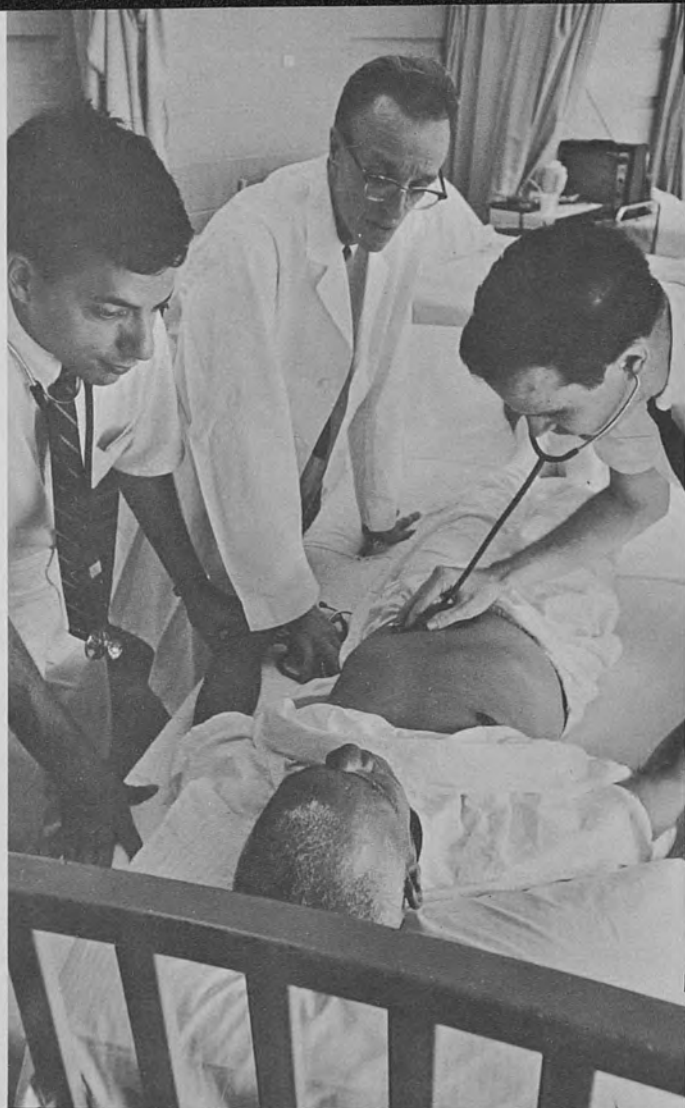
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What is spoken of as a "clinical picture" is not just a photograph of a man sick in bed; it is an impressionistic painting of the patient surrounded by his home, his work, his relations, his friends, his joys, sorrows, hopes, and fears.

*Francis Weld Peabody*

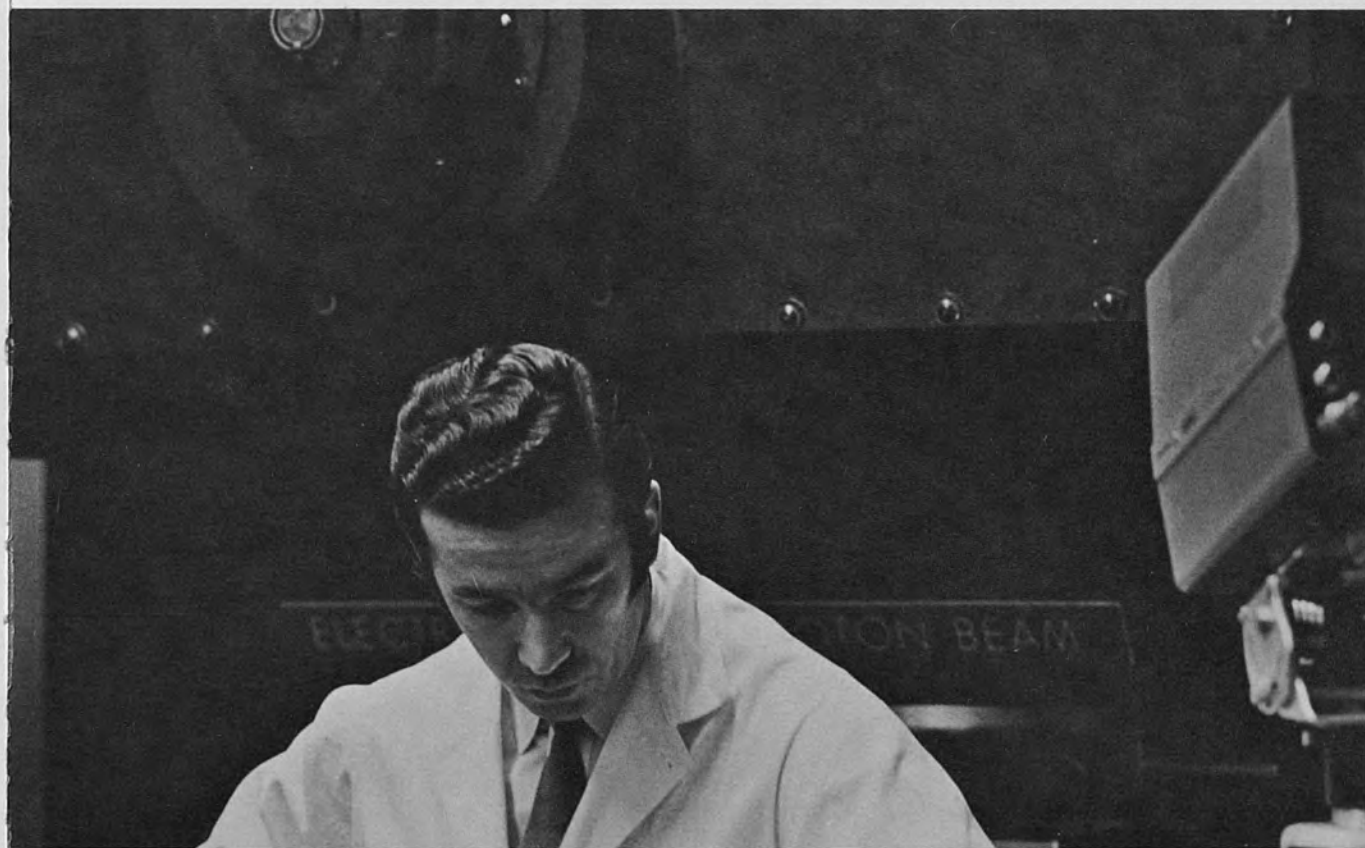






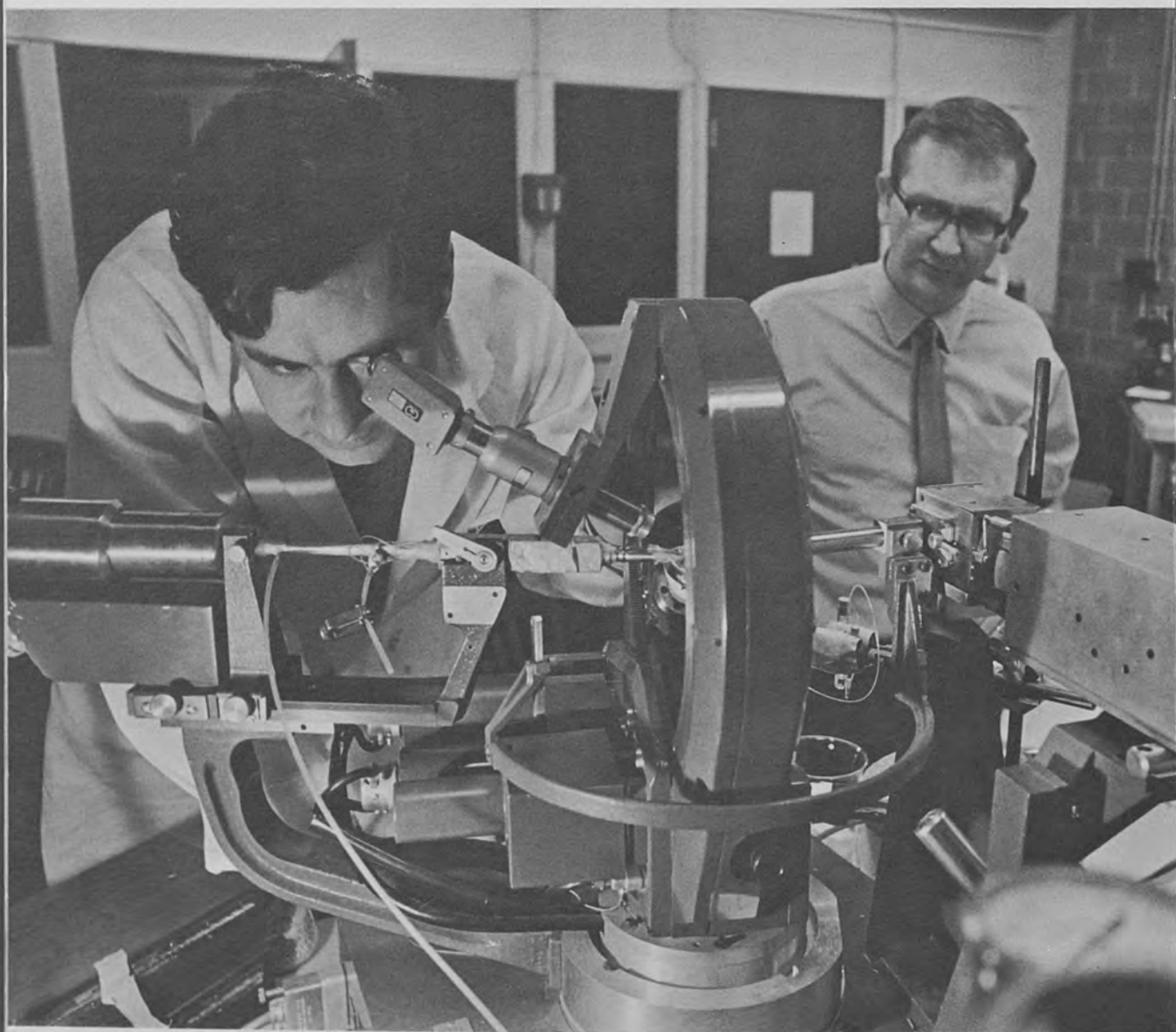
The whole point of a university, on its educational side, is to bring the young under the intellectual influence of a band of imaginative scholars.

*Alfred North Whitehead*



But solving problems of disease is not the same thing as creating health and happiness. This task demands a kind of wisdom and vision which transcends specialized knowledge of remedies and treatments and which apprehends in all their complexities and subtleties the relation between living things and their total environment. Health and happiness are the expression of the manner in which the individual responds and adapts to the challenges that he meets in everyday life.

*Rene Dubos*





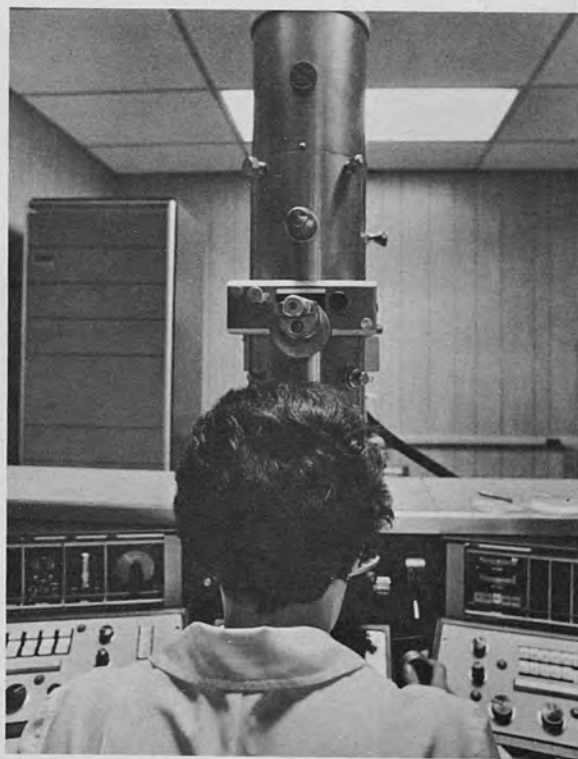
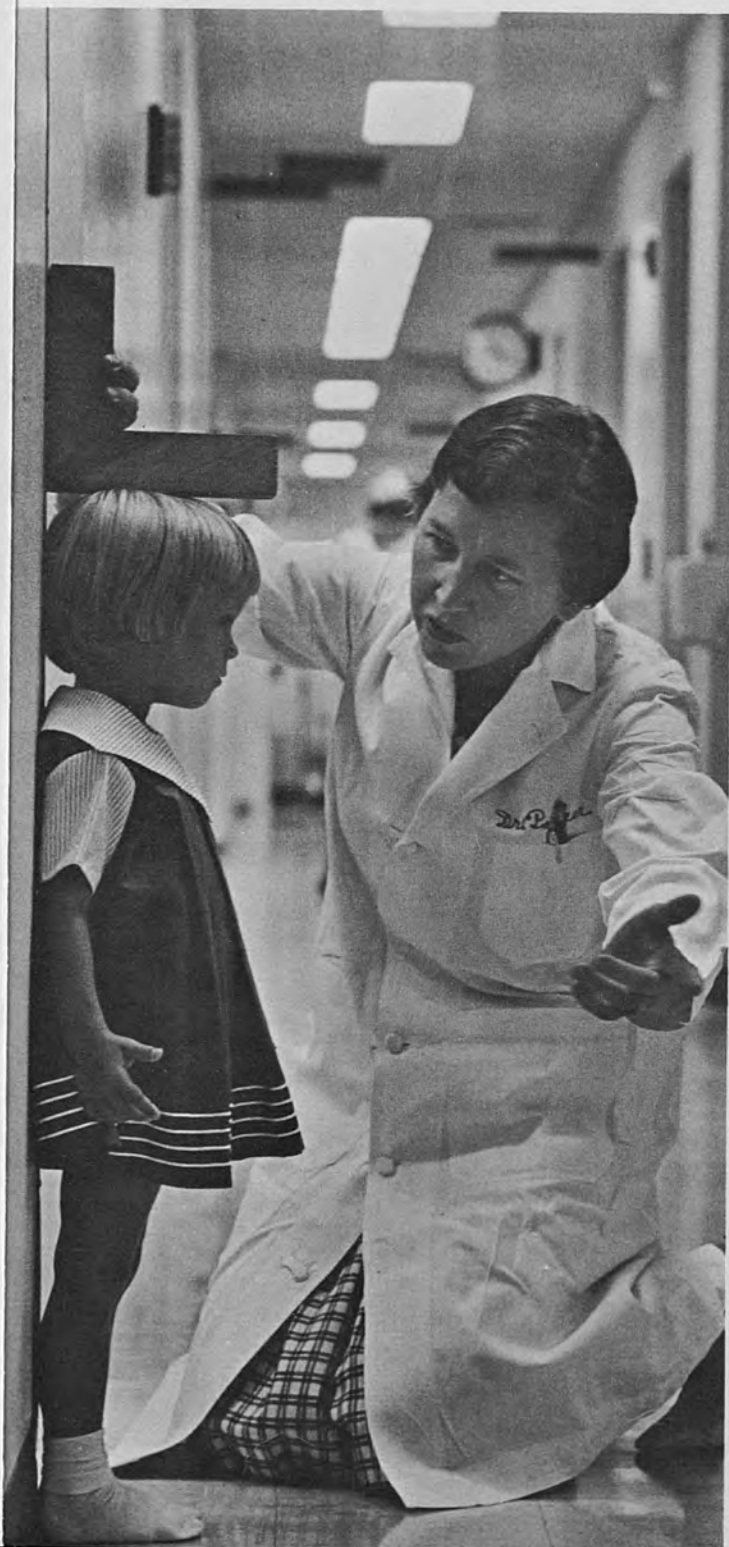


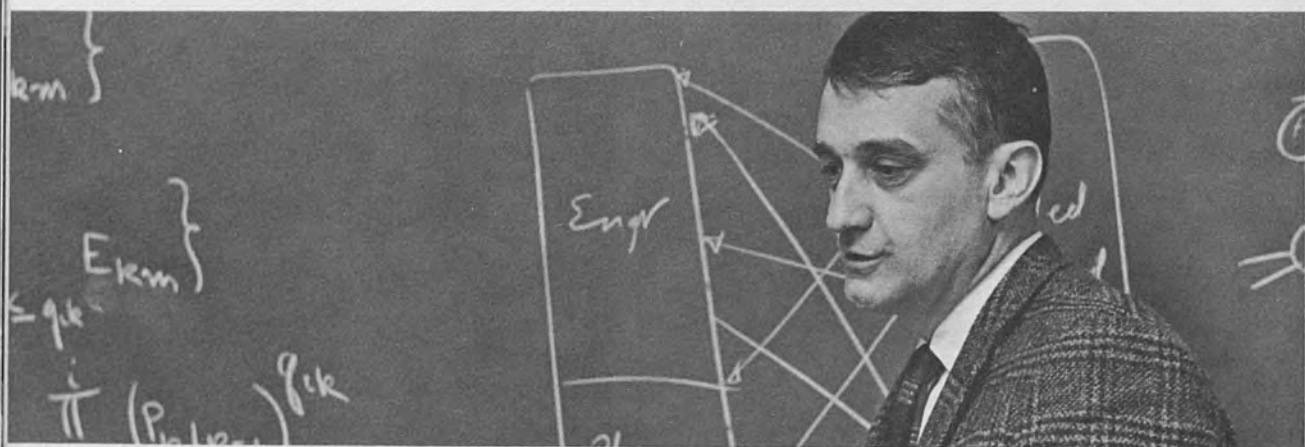
Come, let us work and in this little time  
do some new thing that no one on this  
earth has ever thought to do. Split from  
the world's eternal truth some atom of the  
everlasting! Then let us die, and leave for  
coming generations one bit of knowledge  
by which we'll be remembered until some  
later one shall show the truth we found  
was but a grain gleaned from some vast  
store we'd hardly touched and we shall be  
forgot and he remembered—but we, out  
where the absolute is near, shall smile  
seeing how little a beach of sand resembles  
the granite cliff from which it weathered.

*Sam L. Clark, Sr.*



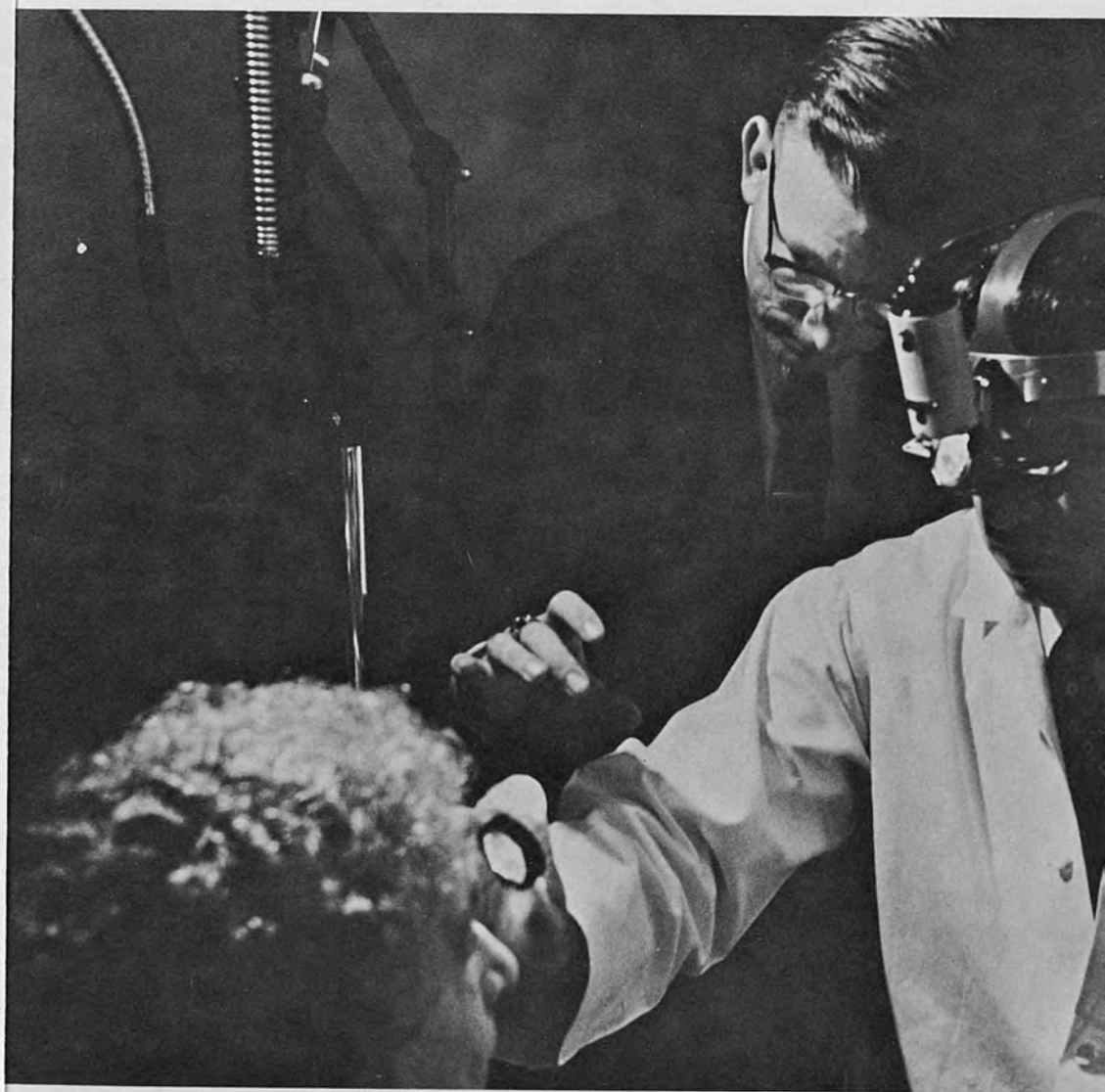






Both the man of science and the man of art live always at the edge of mystery, surrounded by it; both always, as the measure of their creation, have had to do with the harmonization of what is new with what is familiar, with the balance between novelty and synthesis, with the struggle to make partial order in total chaos.

*J. Robert Oppenheimer*

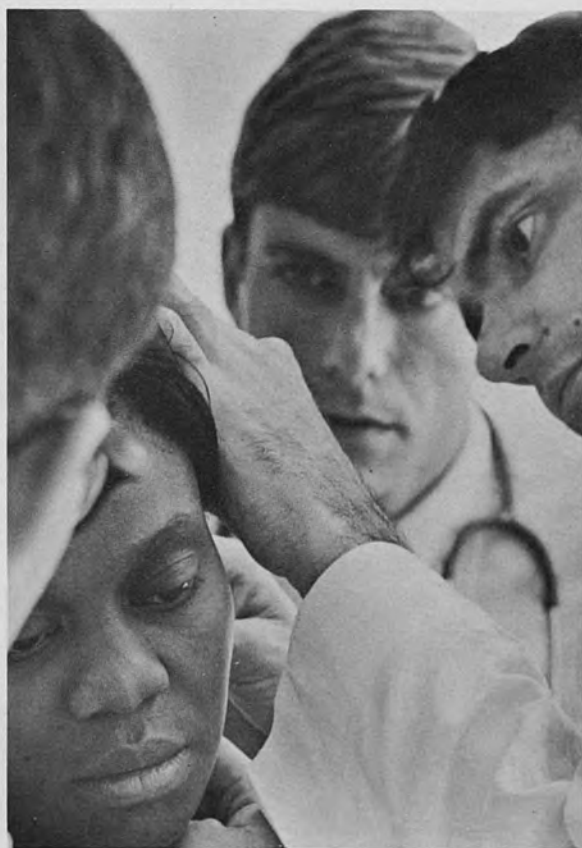


It is a rare blending of learning and humanity, incisiveness of intellect and sensitiveness of the spirit, which occasionally come together in an individual who chooses the calling of Medicine; and then we have the great physician.

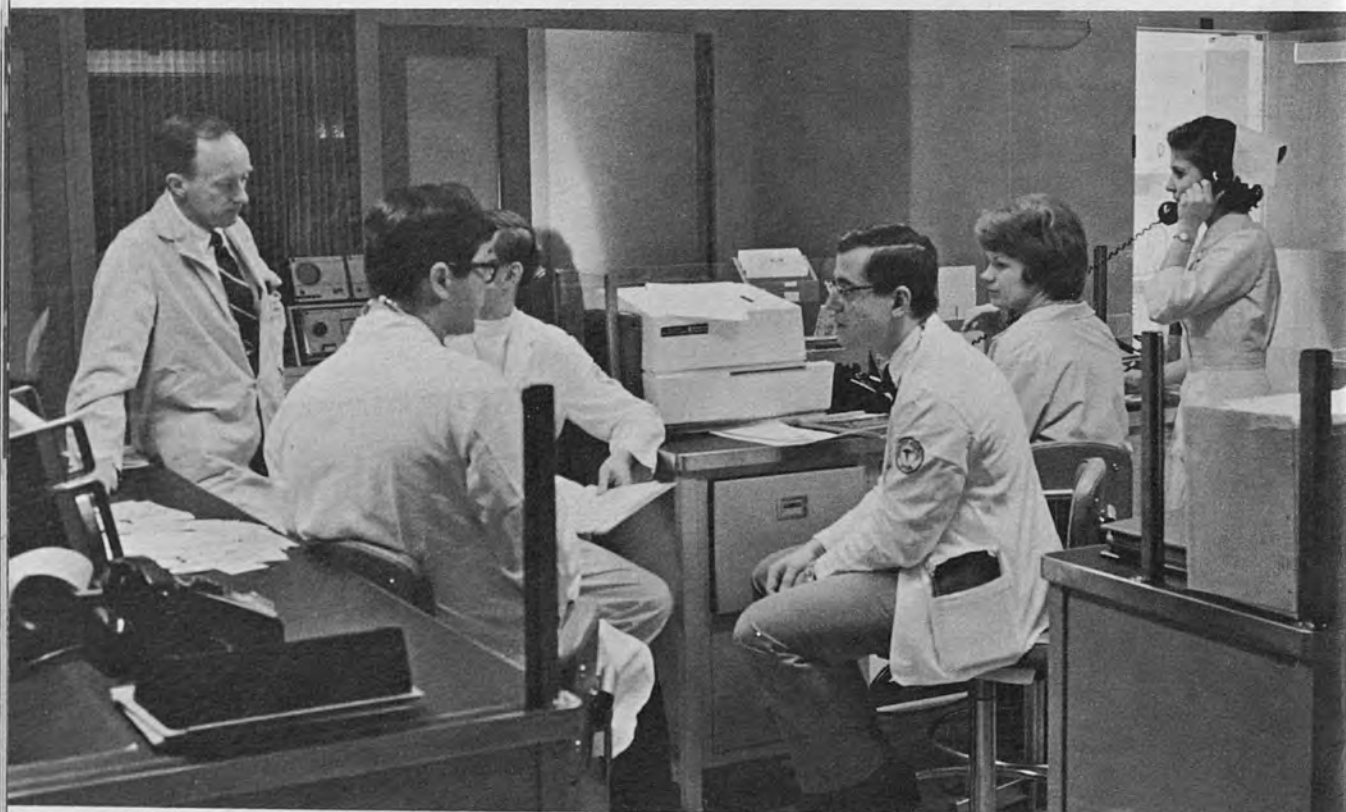
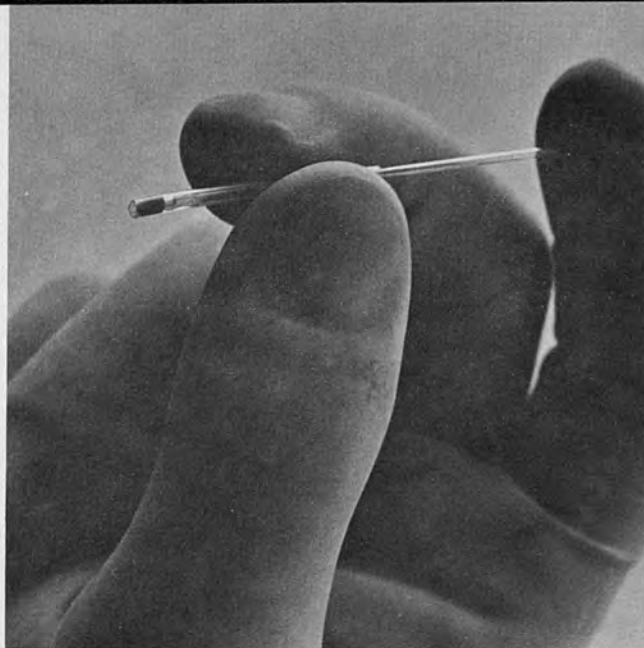
*Hans Zinsser*











**Bulletin of**  
**Washington University**  
**St. Louis, Missouri**

**School of Medicine**

**June, 1970**



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# Calendar

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**September**

- 2 **Wednesday.** Orientation and registration for all new students.
- 2, 3 **Wednesday, Thursday.** Examination for advanced standing and removal of conditions.
- 4 **Friday.** Registration for upper-class students.
- 7 **Monday.** Labor Day, holiday.
- 8 **Tuesday.** Classes begin.
- 

**November**

- 26 **Thursday.** Thanksgiving Day holiday.
- 30 **Monday.** Winter quarter begins.
- 

**December**

- 19 **Saturday.** Christmas recess begins at 1:00 p.m.
- 

1971

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**January**

- 4 **Monday.** Christmas recess ends at 8:00 a.m.
- 18 **Monday.** Registration for second half-year.
- 25 **Monday.** Second semester begins.
- 

**March**

- 8 **Monday.** Spring quarter begins.
- 24 **Wednesday.** Senior Research Program.
- 

**April**

- 9, 10 **Friday, Saturday.** Easter holiday.
- 

**May**

- 29 **Saturday.** Academic year ends.
- 31 **Monday.** Memorial Day holiday. Senior Awards night.
- 

**June**

- 1 **Tuesday.** Commencement.
- 14 **Monday.** Summer session of clinical year begins.
- 

**September**

- 4 **Saturday.** Summer session of clinical year ends.



1971-72  
1971

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September

- 1 **Wednesday.** Orientation and registration for all new students.  
1, 2 **Wednesday, Thursday.** Examination for advanced standing and removal of conditions.  
3 **Friday.** Registration for upper-class students.  
6 **Monday.** Labor Day, holiday.  
7 **Tuesday.** Classes begin.
- 

November

- 25 **Thursday.** Thanksgiving Day, holiday.  
29 **Monday.** Winter quarter begins.
- 

December

- 18 **Saturday.** Christmas recess begins at 1:00 p.m.
- 

1972

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January

- 3 **Monday.** Christmas recess ends at 8:00 a.m.  
17 **Monday.** Registration for the second half-year.  
24 **Monday.** Second semester begins.
- 

March

- 6 **Monday.** Spring quarter begins.  
29 **Wednesday.** Senior Research Program.  
31 **Friday.** Easter holiday.
- 

April

- 1 **Saturday.** Easter holiday.
- 

May

- 27 **Saturday.** Academic year ends.  
29 **Monday.** Memorial Day, holiday.  
30 **Tuesday.** Commencement.
- 

June

- 12 **Monday.** Summer session of clinical year begins.
- 

September

- 4 **Saturday.** Summer session of clinical year ends.

# Administration

## WASHINGTON UNIVERSITY

### The Board of Trustees

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*Chancellor*

Carl A. Dauten, Ph.D.

*Executive Vice Chancellor*

Lattie F. Coor, Ph.D.

*Vice Chancellor*

Robert W. Johnston, Ph.D.

*Vice Chancellor for Research*

William H. Danforth, A.B., M.D.

*Vice Chancellor for Medical Affairs*

Benjamin Roth, A.B., LL.B.

*Assistant Vice Chancellor for Medical Affairs*

### Officers of the School of Medicine

M. Kenton King, B.A., M.D.

*Dean*

John C. Herweg, B.S., M.D.

*Associate Dean for Students*

Richard W. Hudgens, A.B., M.D.

*Assistant Dean for Curriculum*

Hugh Morrison, B.S.

*Assistant Dean for Financial Affairs*

John D. Vavra, B.A., M.D.

*Assistant Dean for Internships*

Samuel B. Guze, M.D.

*Assistant to the Dean*

John L. Schultz, B.S., B.S.Ed., M.S., Ed.S.C.

*Registrar and Secretary to the*

*Executive Faculty*

William Bahlmann Parker, A.B.

*Registrar and Secretary to Executive Faculty*

*Emeritus and Consultant to the Dean*

John L. Midkiff, Jr., B.S.B.A.

*Business Manager*

James C. Peden, Jr., A.B., M.D.

*Physician in Charge of Student Health  
Service at Medical Center*

David H. Brown, B.S., Ph.D.

*Co-ordinator of Preclinical Science Planning*

Estelle Brodman, Ph.D.

*Librarian*

Helen Kaiser

*Administrative Assistant to the Dean*

Bernice H. Storrer

*Administrative Assistant to the Dean*

Louise Jacoby, A.B.

*Administrative Secretary to the Dean*

Dorothy Rinderer

*Administrative Secretary to the Vice Chancellor*

Jane McCammon, A.B., M.A.

*Administrative Assistant for Development  
to the Vice Chancellor*

Georgana P. Buehler, A.B.

*Assistant Registrar*

Daniel Gashler, B.S.

*Director of Alumni Affairs and of News Bureau*

Audrey Wingfield, B.A.

*Executive Secretary,  
Medical Alumni Association*

## THE MEDICAL CENTER

Six institutions comprise the Medical Center, known as the Washington University Medical School and Associated Hospitals. They are: Barnard Free Skin and Cancer Hospital, Barnes Hospital, Central Institute for the Deaf, Jewish Hospital of St. Louis, St. Louis Children's Hospital, and Washington University. Members of the Board are elected yearly by the separate institutions.

### The Board of Directors

Edward B. Greensfelder  
*Chairman*

Norfleet H. Rand  
*Vice Chairman*

Edwin G. Shifrin  
*Secretary*

Raymond E. Rowland  
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Spencer T. Olin

Joseph F. Ruwitch

Charles A. Thomas

Neal S. Wood

# Aims of the School

## PHILOSOPHY AND OBJECTIVES

The efforts of the School of Medicine are directed toward providing able students with a stimulating and challenging milieu in which they may pursue the study of medicine—in which they may acquire a thorough background in scientific medicine, as well as a deep understanding of the meaning of comprehensive medical care. In a field that is developing as rapidly as is medicine, education begun in medical school must serve as the foundation for a life-long course of learning. As Sir William Osler pointed out some decades ago, a faculty, no matter how talented, can “only instil principles, put the student in the right path, give him methods, teach him how to study, and early to discern between essentials and non-essentials.” The faculty’s mission is to preserve the joy of learning and to foster a spirit of discrimination and creativity. For today’s student is preparing to cope with a changing world; to contribute, in a constructive, considered way, to resolving problems of medicine and of health care. It is hoped that each student may achieve this grounding during his years in the School of Medicine.

## CURRICULUM

The curriculum is the product of prolonged and continuing study, by both faculty and students, of the present and probable future course of medical science and medical practice, and of the ways in which medical education can be kept abreast of this course. The curriculum is planned to provide students, who enter medical school with diverse backgrounds and interests and who will undertake a wide variety of careers, with the basic knowledge and skills essential for their further professional development. Modern medical education can no longer hope to be comprehensive; it must be selective. Yet students must develop facility in the understanding and use of several



related technical languages: those of anatomy, chemistry, physiology, and clinical medicine. They must share responsibility for the care of the patient. They must also learn how these areas of endeavor are interrelated, how the organization and needs of society influence the methods of providing medical care, how new knowledge is acquired and old knowledge re-evaluated.

The curriculum includes a core experience for each student through which he may learn these fundamentals. This core experience is based upon a sequence of courses that will introduce the student to the broad panorama of medicine. The principles, the methods of investigation, the problems, and the opportunities in each of the major disciplines of medical science and medical practice are presented in such a way as to help the student select the career best suited to his abilities and goals.

The curriculum also embraces a broad elective program, new courses in genetics and radiology, a revised and expanded course in pathophysiology, increased co-ordination between the courses in pathophysiology and those in pathology and pharmacology, increased co-ordination between the courses in neuroanatomy and neurophysiology, and a generally more satisfactory sequence of all the pre-clinical courses.

The elective program helps the student to decide where his major interests lie. It also enables him to benefit from the wide range of specialized knowledge and skills found in the faculty. As there is not enough time for each student to be introduced to each of today's areas of specialization, the elective program permits him to select, according to his own desires, the areas he wishes to explore or to study in depth.

#### **STUDENT RESEARCH FELLOWSHIPS**

No matter what medical career an individual chooses, it will be essential for him to evaluate and use fresh knowledge as he moves through his professional life. The Student Research Fellowships, awarded each year to selected students who undertake research projects under the direction of faculty members, are an important part of the educational program. These fellowships offer students an opportunity to attempt original work, thus adding another dimension to their experience as investigators. This research allows students to discover at first hand the problems of obtaining and assessing new information. Selected faculty members serve as advisers to students interested in special research opportunities.

Fellowships are available to students after admission to the School. They are granted for a minimum of two months. The research must be undertaken during the student's free time or a vacation period. Each year a Senior

Research Assembly is held at which the results of student research are presented before the faculty and student body. A number of such studies conducted by students are significant enough to be reported in scientific journals.

#### **OTHER HEALTH PROFESSIONS**

Programs in Health Care Administration, Occupational Therapy, Physical Therapy, and Radiologic Technology are conducted as joint enterprises by the School of Medicine and its affiliated institutions. Information about these programs may be found under Allied Health Professions.



## Teaching Facilities

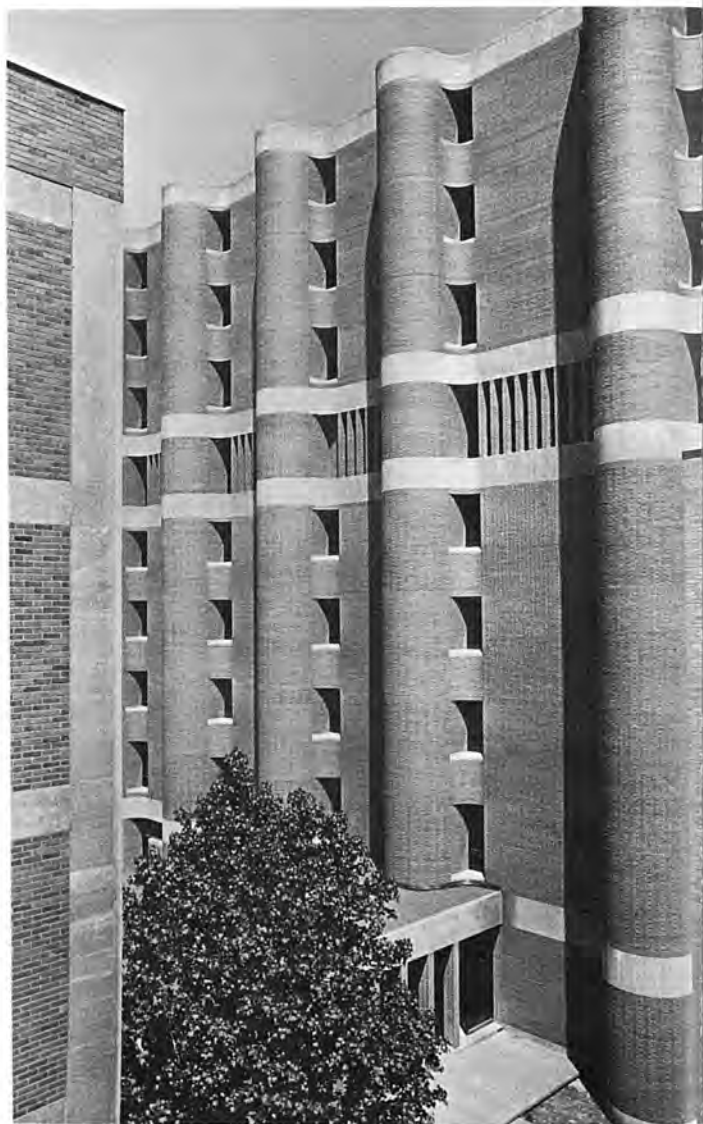
### WASHINGTON UNIVERSITY AND THE SCHOOL OF MEDICINE

The Washington University School of Medicine is located along the eastern edge of Forest Park in St. Louis' West End. Diagonally across Forest Park, along its western edge, is the general campus of the University. As the scope of scientific and humane scholarship has expanded, the resources of the University have greatly enriched the educational opportunities available to individuals interested in medical and paramedical fields. A regularly scheduled shuttle bus, operated for the benefit of students and faculty, brings the two campuses within ten minutes of each other.

The McDonnell Medical Science Building, dedicated in the fall of 1970, is the principal focus of activity for entering medical students. Rising nine floors above ground, it includes administrative offices and two lecture halls on the first floor. Multi-disciplinary teaching laboratories for first- and second-year students, and offices and research laboratories for the six existing basic science departments, as well as for the anticipated Department of Genetics, are located on upper floors. Modern, centralized animal quarters are housed in the basement.

The more venerable structures—the West, North, and South buildings, in which has been centered the work of several Nobel Laureates—have been extensively renovated. Along with the Cancer Research Building, they will continue to provide space for laboratories, administrative offices, the library, and some departmental facilities.

Traditionally, the School of Medicine has been strong in the application of science to biology and medicine. An outstanding group of computer scientists and engineers and their students are engaged in studying the use of computers in tackling biomedical problems.



The Biomedical Computer Laboratory and the Computer Systems Laboratory are located in adjoining buildings at 700 and 724 South Euclid, which also house the Division of Biostatistics of the Department of Preventive Medicine and Public Health.

The School of Medicine Library is one of the largest medical libraries in the Midwest. It is located in the North Building.

The Library contains a collection of over 100,000 volumes and subscribes to more than 1,900 serials. Special holdings include a rare book collection, the School's historical archives, memorabilia, and manuscript copies of the scientific papers of several outstanding men of medicine, including Drs. William Beaumont, Joseph Erlanger, E. V. Cowdry, Evarts Graham, Leo Loeb, Philip Shaffer, and Robert J. Terry.

The Library maintains computer services for storage and retrieval of information, and provides photocopying and interlibrary loan services. It produces computer-based lists of its journals and indexes to its book holdings by title and by subject; a *Catalog of Books*, which is cumulated and published annually; and a record of publications by faculty members. It co-operates with the University library system, and especially with the dental library in the Medical Center. Finally, the Library provides services to hospitals represented in the Bi-State Regional Medical Program, and is deeply involved in the Mid-continental Regional Medical Library.

Library hours are 8:30 a.m. to 12 midnight on weekdays; 8:30 a.m. to 6:00 p.m. on Saturdays; and 1:00 p.m. to 10:00 p.m. on Sundays. In the summer and on holidays special hours are maintained.

#### THE MEDICAL CENTER, ITS HOSPITALS AND INSTITUTES

While the School of Medicine, from its beginnings, has maintained an association with local teaching hospitals, it was not until 1962 that the affiliated institutions were incorporated to form a central organization known as Washington University Medical School and Associated Hospitals (WUMSAH). Thus, the

present Medical Center is a federation of several institutions owned by the University and five institutions owned independently. Students receive clinical instruction and gain experience in all divisions of the Medical Center.

*The Barnes Group.* Barnes Hospital is the largest hospital in the Medical Center. It is independently owned but, through a special agreement, operates all the hospitals and clinics owned by the University. These contiguous facilities provide the chief source of clinical experience for medical students. The original hospital contained 150 beds; the Group now has a capacity of approximately 1,200 beds—teaching facilities for all clinical departments except Pediatrics. All activities of the Barnes Group and the School of Medicine are closely integrated, and the hospital staffs are composed exclusively of members of the Faculty of Medicine. The 18-story Queeny Tower has six nursing floors and two self-care floors, plus several floors of doctors' offices. A large central diagnostic laboratory provides modern diagnostic patient services. A 12-story in-patient wing, known as East Pavilion, is under construction and scheduled for completion in 1972. Facilities owned by Washington University and operated by Barnes Hospital are as follows:

*The McMillan Hospital* is a specialty hospital for the treatment of patients with disorders in the fields of ophthalmology and otolaryngology.

*Renard Hospital* provides 102 beds for patients with psychiatric disorders, and affords laboratories and offices for the Department of Psychiatry.

*The St. Louis Maternity Hospital* houses offices, research, and patient-care facilities for the Department of Obstetrics and Gynecology. A new Perinatal Center and laboratories for research in the physiology of reproduction are planned for this building.



*The David P. Wohl, Jr., Memorial Hospital*, opened in 1953, contains facilities for 84 medical and surgical patients. Offices and laboratories for the Departments of Medicine and Surgery are also situated in Wohl Hospital.

*The David P. Wohl, Jr., Memorial-Washington University Clinics* handles well over 140,000 outpatient visits a year. Five floors of the building are devoted to the Clinics and five floors to research, including the Division of Health Care Research.

Other facilities owned by Washington University are:

*William Greenleaf Eliot Division of Child Psychiatry*. The Division conducts an advanced teaching program in child psychiatry and is the focus for research and treatment in child psychiatry.

*Edward Mallinckrodt Institute of Radiology*. This unit, one of the largest and best equipped in the world, houses the diagnostic, therapeutic, and research activities of the Department of Radiology.

It is connected on most of its floors with the adjoining Barnes and Barnard hospitals, and through them with other hospitals of the Group, thus providing easy access for all inpatients.

*The Irene Walter Johnson Institute of Rehabilitation*. The Institute is a center for training personnel in rehabilitation procedures, for treatment of disabled persons in the St. Louis metropolitan area, and for research related to chronic diseases.

*Oscar Johnson Institute for Medical Research*. Occupying the top five floors of the McMillan Hospital, it provides office space and research facilities for the Departments of Neurology, Ophthalmology, and Otolaryngology.

Other institutions formally associated with the Medical Center are:

*Barnard Free Skin and Cancer Hospital*. Although Barnard Hospital is independently owned, it is operated by Barnes Hospital. It is a 44-bed hospital for the care and treatment of patients who suffer from skin diseases and cancer or who are undergoing special tests in the Clinical Research Center.

*St. Louis Children's Hospital*. From its earliest days, the Children's Hospital, governed by its own directors, has been an integral part of the medical center and a leader in the development of academic pediatrics. All professional staff are members of the Faculty of Medicine, and the physician-in-chief is also professor and head of the Department of

Pediatrics at Washington University. Considerable clinical service and research are conducted at Children's. Of particular interest is the recently created Ranken-Jordan Center for Metabolic Diseases.

*The Jewish Hospital of St. Louis.* Located just north of the Children's Hospital, Jewish Hospital is a strong, independently owned hospital containing beds for 530 patients. Its departments represent each of the major specialties except pediatrics. The Aaron Waldheim Outpatient Clinics provide all facets of health care to the community, while the Yalem Research Building contains important research facilities for the Hospital and School of Medicine.

*Central Institute for the Deaf.* This nationally known institution provides facilities for research into hearing problems, maintains a school for deaf and speech-handicapped children, provides outpatient clinics for children and adults, and engages in a program of professional education for scholars in the fields of audiology and otolaryngology.

#### OTHER INSTITUTIONS

In addition to the previously named facilities which make up the Washington University Medical Center proper, the following hospitals are affiliated with the School of Medicine, and various members of the staffs hold University appointments.

The four City hospitals:

- Max C. Starkloff Hospital, with 550 beds.
- Homer G. Phillips Hospital, with 450 beds.
- Robert Koch Hospital, with 676 beds.
- St. Louis Chronic Hospital, with 975 beds.
- Malcolm Bliss Mental Health Center, with 250 beds.
- Cochran Veterans Administration Hospital, with 504 beds.

Ellis Fischel State Cancer Hospital, Columbia, Missouri, with 104 beds.

Jefferson Barracks Veterans Administration Hospital, with 795 beds.

St. Louis County Hospital, with 325 beds.

St. Louis Shriner's Hospital for Crippled Children, with 100 beds.

St. Louis State Hospital, with 1,640 beds.

St. Luke's Hospital, with 380 beds.



# The Study of Medicine

## ENTRANCE REQUIREMENTS

Because Washington University is a private institution, its School of Medicine is not bound by arbitrary restrictions in its admissions policy; indeed, the School seeks the most able applicants. It is committed, however, to recruiting, enrolling, and educating a greater number of students from racial-minority and educationally deprived groups, and to increasing the number of black physicians in the United States. Applications from Negroes are reviewed and evaluated individually by a black member of the Faculty, a black medical student who serves as an administrative aid in the Registrar's Office, and four of the twelve faculty members on the Committee on Admissions and Financial Aid. Final acceptance is determined by the Committee as a whole. A large scholarship program helps make it possible for the School to lend support to students whose personal resources might otherwise prevent them from obtaining a medical education. At any given time the student body includes representatives from most of the fifty states and from the territories and foreign countries as well.

The course of study leading to the M.D. degree aims to provide students with a knowledge of the fundamentals of both the basic medical sciences and of clinical medicine. This background must serve as the foundation for further and continuing medical education. The School has a strong scientific tradition and emphasizes the scientific basis of medicine. The full implementation of this scientific emphasis includes application of the scientific method to teaching the clinical as well as the basic sciences. Thoughtful and serious consideration is also given to the emotional, social, and cultural characteristics of patients, to the necessity for adapting medical care to meet community health problems, and to the changing social and economic conditions of our society.

Entrance requirements to the School of Medicine are:

1. Evidence of superior intellectual ability and achievement.
2. Completion of at least 90 semester hours of college courses in an approved college or university.
3. Completion of the Medical College Admission Test of the Association of American Medical Colleges.
4. Evidence of character, attitude, and interests suitable for a career in medicine.





Mathematics, physics, and chemistry provide the tools for modern biology, for medicine, and for the biological basis of patient care. Thus a firm grounding in these subjects is essential for study of the medical sciences. Mathematics should be mastered through differential and integral calculus. The background in chemistry should include general and organic chemistry. Physical chemistry (with calculus as a prerequisite) is strongly recommended. Understanding the scientific foundation of modern biology has become increasingly important because new knowledge is bringing with it ever-increasing power to control disease and relieve human suffering. Applicants are encouraged to pursue their interests in other areas of science. (It should be noted that many state licensing boards require a year of college level physics or biology or both.) In selected instances, prerequisites are subject to waiver by the Committee.

A sound general education to prepare the student for the social, psychologic, and economic aspects of medical practice is strongly recommended. Understanding these aspects of medical practice is necessary because, as medical care has become more effective, cost and distribution of medical services, as well as the emotional impact of care on the patient, have become of increasing concern. Of concern, too, is the growing number of people who live a long time, with the attendant problems brought on by age itself, especially by age combined with disease; and the mounting proportion of patients, regardless of age, who have chronic rather than acute illnesses.

Specific courses, other than the few in the natural sciences, are not presented as prerequisite because a great variety of courses may prepare the student for the many roles he may play in his medical career.

A major goal of college should be development of the intellectual talents of the individual.



This often involves the pursuit of some area of knowledge in depth, whether in humanities, social sciences, or natural sciences. At the same time, a diversity of background is encouraged in order to provide a necessary foundation for cultural development. Skill in communication, both verbal and written, is an important requisite in medicine and is appraised in the personal interview, in the Medical College Admission Test, and in a review of the college record.

#### ADMISSION TO ADVANCED STANDING

Applicants who have satisfactorily completed one or two years of study toward the M.D. degree at an approved medical school may be accepted for admission to the second- or third-year class, when vacancies exist, provided that

1. they comply with the requirements for admission to the first-year class;
2. they have satisfactorily completed courses equivalent in general content and duration to those in this School in the years for which credit is asked;
3. they pass any examinations required by the Committee on Admissions and Financial Aid, in subjects already covered.

An applicant for admission to an upper class must have studied as a matriculated medical student in an approved medical school for a period equivalent to that already spent by the class to which admission is sought.

## GRADES

The educational program is designed to meet the needs of all medical students in an individual and a personalized way. To help students who may be having difficulty or who may wish to reinforce their studies, both group and individual tutorials are offered. The School's experience is that tutorials enable students to handle course work with improved proficiency. Students who are found to have difficulties in handling the normal academic course load at the usual rate will be asked to go on a slower track which would require five or more years in order to complete all courses.

In order to assist the student in evaluating his progress, he is graded in each course by the Faculty. In the clinical and elective years, grades are accompanied by detailed descriptive comments characterizing each student's performance. This type of evaluative data is of considerable assistance to the student when he applies for his internship, since it permits the Assistant Dean for Internships to write each hospital to which the student has applied a meaningful, comprehensive summary of the student's attributes, abilities, and performance.

Grades are: H=Honors  
HP=High Pass  
P=Pass  
F=Fail

"Honors" is given for a truly outstanding performance; "High Pass" for very good work; and "Pass" for the remaining passing grades. At the end of every academic year, each student receives a grade sheet listing his achievement in each course completed. The student's official transcript, in addition to listing courses and grades achieved, gives the grade distribution on each course with the exception of elective courses.

## PROMOTIONS

There is a faculty Committee on Promotions for each of the four classes. Each Committee reviews the records of all students in the respective class and acts in accordance with the following rules,

1. A student having failures in two major subjects shall be required to withdraw from the class.

2. A student having one failure in a major course at the end of any year shall be required to remove this failure as directed by the department concerned. When and if the failure is removed, the appropriate Committee on Promotions will re-evaluate the student's entire record. A student who does not succeed in removing a failing grade shall be required to withdraw from the class.

3. A student shall not be promoted to the third year until he has received satisfactory credit for all required subjects of the first and second years.

4. A student may be allowed, under exceptional circumstances, to repeat certain courses as a special student or to repeat the work of the entire year as a member of a lower class.

## DEGREE PROGRAMS

The School of Medicine offers three programs leading to the M.D. degree: a regular 4-year program, a special 5-year program, and a combined M.D./Ph.D. program.

Individuals interested in a degree in biomedical engineering or neurobiology are referred to these programs on pages 118 and 120 respectively.

Students interested in a straight Ph.D. degree in the medical sciences may obtain information by writing directly to the appropriate basic science department, 660 South Euclid, St. Louis, Missouri 63110; applications and enrollments are handled by the Graduate School of Arts and Sciences.

### Doctor of Medicine, Four-year Program

By conferring the M.D. degree, the School certifies that the student is competent to undertake a career as a Doctor of Medicine. It certifies further that, in addition to medical knowledge and skills, the graduate possesses qualities of personality—compassion, emotional stability, and a responsible attitude—essential to an effective professional life.

A course of medical education for the M.D. degree ordinarily consists of a minimum of four years of study. Students recommended for the degree of Doctor of Medicine must be of good moral character; they must have completed an entire academic course of instruction as matriculated medical students;

they must have passed all required subjects, or the equivalent, and have received satisfactory grades in the work of the full academic course; and they must have discharged all current indebtedness to the University. Individuals applying for licensure must be twenty-one years of age and have completed four entire academic years in the study of medicine.

At the end of the final academic year, students who have fulfilled these requirements will be eligible for the M.D. degree.

#### **Doctor of Medicine, Five-Year Program**

In addition to the regular four-year program leading to the M.D. degree, this program permits the student to spend one additional year in an investigative or research concentration. The program must be arranged subject to approval of the Committee on Medical Education.

#### **Combined M.D.—Ph.D. Program**

The Medical Scientist Training Program is designed for selected students who are interested in a research career and whose undergraduate education has placed major emphasis on science. It permits the student to obtain

both the M.D. and the Ph.D. degree. Usually six years of study are required to earn both degrees. The major purpose of the program is to prepare medical scientists, skilled in the study of modern biology, for clinical and pre-clinical faculties of medicine. Individuals interested in entering the Medical Scientist Training Program are asked to write the Office of the Registrar, Washington University School of Medicine, 660 South Euclid, St. Louis, Missouri 63110, specifically requesting application forms for the Medical Scientist Training Program. Only a limited number of trainees can be selected for the program. Trainees will be offered full tuition and a stipend for the duration of their training, plus an allowance of \$500 for each dependent. The stipends are: first year, \$2,400; second year, \$2,600; third year, \$2,600; fourth year, \$2,800; fifth year, \$5,000; sixth year, \$6,000.

#### *Eligibility*

Applicants must meet requirements for admission to both the School of Medicine and the Graduate School of Arts and Sciences. In addition to the minimum requirements established for acceptance into both schools,



students planning to concentrate in disciplines related to the chemical or physical sciences should have completed mathematics through calculus, physics and physical chemistry (with calculus as a prerequisite), and advanced organic chemistry. A course in differential equations is also recommended. For students whose major interests are in the biologic areas of medical science, the requirements for chemistry are less rigorous, but a strong background in mathematics and physics is essential. Although most individuals will enter the program as first-year students, applications will be accepted from students in residence.

#### *The Program*

The program consists of three segments: (1) two years of the usual medical curriculum, (2) three or more years of work in preparing a thesis to satisfy requirements for the Ph.D. degree, and (3) a final year which is the usual clinical year of the medical curriculum. Since the fourth year of medical school is completely elective, the medical scientist will have taken the equivalent of that year while preparing his thesis, and thereby he will have completed the total requirements for the M.D. degree.

While the Medical Scientist Training Program includes all those medical courses required for the M.D. degree, it incorporates a high degree of flexibility for individual students through a wide range of electives and the large number of thesis programs available at Washington University.

Each student will be assigned a counselor (a member of the Medical Scientist Student Advisory Committee) who will meet with him frequently during the first two years to help him decide in which elective courses and laboratories he will participate.

Usually the following courses will be taken in the first two years.

#### *Year 1*

First Semester: Anatomy, Biochemistry, Topics in Clinical Medicine.

Second Semester: Physiology, Microbiology, Neural Sciences, Genetics, Biostatistics.

#### *Year 2*

Third Semester: Pathology, Pathophysiology, Physical Diagnosis, History of Medicine.

Fourth Semester: Pathophysiology, Radiology, Neurology, Surgery, Pediatrics, Ophthalmology, Otolaryngology, Pharmacology, Preventive Medicine, Psychiatry, Obstetrics and Gynecology, Laboratory Diagnosis, Clinical Diagnosis.

Students begin their training on July 1 of the year they enter the School of Medicine. A student who passes a qualifying examination in any of the regularly offered preclinical courses will be allowed to substitute either advanced course work or laboratory research in the time made available. In this way many students will have an opportunity to begin supervised research immediately after entry. Research can be continued in free periods during the first two years.

The courses differ from the usual medical courses with respect to the laboratory training periods and the availability of additional electives. As students enrolled in the program will have begun laboratory work during the summer and will receive additional intensive laboratory training, they may elect, with approval of the Medical Scientist Student Advisory Committee, to omit the laboratory component of a course or to take selected parts of a laboratory component. The time not utilized in the normal laboratory components will be spent in research laboratories and in elective tutorial courses which are offered to supplement in depth the normal course material. These courses include advanced biochemistry, microbial genetics, immunology, neurobiology, biophysics, cell biology and cytology, advanced pharmacology, and pathobiology. In addition, the formal graduate courses are available to the more advanced students.

The performance of each student will be reviewed annually, and he will be expected to maintain a high scholastic standing.

The similarity in course content between the Medical Scientist Training Program and the first two years of the program for the M.D. degree makes it possible for a student to return without loss of time to the regular curriculum after the first two years if this seems advisable.

#### *Years 3, 4, 5*

The student will spend the third, fourth, and fifth years, and possibly a sixth year, in satis-



fulfilling the requirements of the Graduate School of Arts and Sciences for the Ph.D. degree. Before beginning the third year, the student will select a faculty adviser under whom he will do his thesis research and the department or departments in which he will work toward the Ph.D. degree. As prerequisites vary for the different departments, the student should make appropriate inquiries and arrangements well in advance.

Thesis programs are available in the departments of Anatomy, Biological Chemistry, Microbiology, Pathology, Pharmacology, and Physiology and Biophysics. In addition, thesis work may be undertaken in Molecular Biology, Neurobiology, or Biochemical Engineering. The latter three disciplines are administered by interdepartmental committees, and the faculty includes representatives from the departments of Biology, Chemistry, Chemical Engineering, Electrical Engineering, Mechanical Engineering, Neurology, Ophthalmology, Otolaryngology, Physics, and Psychiatry.

The formal requirements for the Ph.D. degree include (1) completion of course work; (2) successful performance in a qualifying examination, usually at the end of the third year; (3) successful performance in one foreign language examination; (4) execution of original research suitable for a dissertation; and (5) defense of the thesis.

A program of special monthly seminars will be arranged for students during the research years. Conducted by medical scientists of the clinical departments of the Washington University School of Medicine, these seminars are aimed at stimulating student interest in clinical medicine and at increasing awareness of major research problems in clinical medicine.

#### *Final Year in Clinical Medicine*

The sixth year is the clinical year of the normal medical curriculum. The intensive clinical training provided in this year is the last formal requirement for an M.D. degree. The Ph.D. and M.D. degrees will be granted simultaneously at the end of the final clinical year.

### **INTERNSHIPS**

Although not required by all states for licensure, an internship in an approved hospital

is considered essential preparation for the practice of medicine, and most graduates seek additional experience by serving as residents, and perhaps later as fellows, for periods up to five years.

In order to aid students in obtaining desirable intern appointments, an active counseling program is maintained by the Assistant Dean for Internships. Thus, in their junior year, students are provided with general background information about the kinds of internships available. Since many more internships exist than there are candidates in any given year, students are able to exert a considerable measure of selection.

In the office of the Assistant Dean for Internships an open file is maintained of brochures and other descriptive data regarding internships throughout the country. Included are evaluations of their own internships obtained from our recent graduates. The School participates in the National Intern and Resident Matching Program, which offers distinct advantages to applicants.

The School maintains an active interest in its graduates and is pleased to assist them in subsequent years as they seek more advanced training or staff appointments in the communities in which they settle.



## Historical Perspective

Washington University School of Medicine was formed in 1899 by the union of the first two medical schools established west of the Mississippi River, the Missouri Medical College and the St. Louis Medical College, popularly known as McDowell's College and Pope's College because of the close identification of the two schools with their respective deans, McDowell of the Missouri Medical College and Pope of the St. Louis Medical College.

These pioneer colleges set high standards for medical education during the heyday of the medical diploma mills, when there were four times as many medical schools operating in the city of St. Louis as there now are in the entire state of Missouri. From their beginnings each school sought university affiliation. The St. Louis Medical College was established as the Medical Department of St. Louis University, became independent in 1855, and affiliated with Washington University in 1891, although it retained its name until the union with the Missouri Medical College in 1899. The Missouri Medical College, first established as the Medical Department of Kemper College, was later the medical department of the University of Missouri; it finally became independent in 1857. In 1899, the Missouri Medical College affiliated with the St. Louis Medical College, and thus formed the Medical Department of Washington University.

Both colleges were particularly fortunate in attracting men of energy, integrity, and skill. Members of their faculties were well known at home and abroad. Charles A. Pope at thirty-six became the youngest president in the first hundred years of the American Medical Association, and his successor as professor of surgery at the St. Louis Medical College, E. H. Gregory, was elected president in 1886. John T. Hodgen, a graduate of the Missouri Medical College and later dean and professor of surgical anatomy at the St. Louis Medical College, was president of the American Med-

ical Association in 1880. Hodgen originated the splint for hip fractures. The Hodgen splint is still used today.

Both colleges continued to raise their requirements, so that at the time they became associated in 1899, each required its students to complete satisfactorily a four-year graded course for the M.D. degree.

In 1909, Abraham Flexner began a survey of 155 medical schools in the United States and Canada for the Carnegie Foundation for the Advancement of Teaching. A similar survey by the American Medical Association and Flexner's survey, the famous Bulletin Number Four on the state of medical education in the United States and Canada, created a national sensation. Some schools collapsed, others pooled their resources, while still others reorganized.

The Medical School of Washington University did not escape criticism. In the report Flexner made to Dr. Pritchett, president of the Carnegie Foundation for the Advancement of Teaching and former professor of astronomy at Washington University, he said that one of two courses must be adopted: "the department must be either abolished or reorganized."

Dr. Pritchett mailed the report to Robert S. Brookings, a St. Louis merchant who was president of the Board of Directors of Washington University. Mr. Brookings was shocked and immediately went to New York to see Flexner, demanding proof that the conditions were as bad as described. Abraham Flexner returned to St. Louis with Mr. Brookings, and the two men went through the School. In less than two hours Mr. Brookings was convinced that drastic action was necessary if the School were to be of highest caliber.

The meeting in 1909 of Robert S. Brookings and Abraham Flexner was of unsurpassed significance in the history of the Washington University School of Medicine, for it led to the complete reorganization of the School and the establishment of the present Medical Center. Abraham Flexner inspired the dream of a model medical school. Robert S. Brookings accepted the challenge, and with the energy and vision which characterized all his enterprises, made the dream a reality.

No time was lost in making changes. The Bulletin of the School of Medicine for July, 1910, makes the following general statement: "The Corporation of the University, becoming convinced that in no other direction could greater service be rendered than through a great, modern medical school, determined to reorganize the School and to place it in the front rank of American medical institutions. It has called to the heads of a number of the leading departments the ablest men it could secure, who shall give their time to teaching and research, providing each with a staff of permanent assistants, who likewise give their time to instruction and research, and has associated with this staff groups of the strongest men in the medical profession in St. Louis."

When Robert A. Barnes died in 1892, he left a will which directed that the trustees of his estate should use \$800,000 for the erection and equipment of a hospital "for sick and injured persons, without distinction of creed, under the auspices of the Methodist Episcopal Church, South." Investigation by the trustees into the cost of building a modern hospital convinced them that the sum was not large enough to build an efficient, fireproof building, and they therefore invested the trust. By 1912, the value had increased to two million dollars, a sum which permitted the building of a hospital and left an endowment greater than the original fund. The trustees were studying hospital construction at the time Mr. Brookings was studying medical schools.

It was apparent to everyone concerned that the two projects, the building of a medical school and the construction of a modern hospital, were so interrelated that the purpose of each would be more successfully fulfilled by an affiliation. A medical school would provide a highly trained staff and would assure the most modern methods and superior laboratory facilities for the hospital. A teaching hospital would give the patient superior care and provide for students the essential clinical experience consistent with modern medical teaching methods.

During the spring of 1912, construction was begun on the medical school and hospital buildings which form the nucleus of the present

center. The laboratories were moved from their old quarters in downtown St. Louis into the new buildings on Euclid and Kingshighway during the summer of 1914, and late in the fall of the same year the activities of the Washington University Hospital were transferred to the Barnes Hospital. Concomitantly, the St. Louis Children's Hospital, then located on Jefferson Avenue, became affiliated with the School of Medicine and moved to its new quarters in the Medical Center.

On April 28, 29, and 30, 1915, exercises were held to celebrate the completion of this group of buildings designed to promote the practice, the teaching, and the progress of medicine. The dedication ceremonies marked what Dr. William H. Welch of the Johns Hopkins University called "one of the most significant events in the history of medical education in America." Robert S. Brookings, the one man most responsible for the reorganization, voiced the hope that "our efforts will contribute, in some measure, to raising the standard of medical education in the West, and that we will add, through research activities, our fair quota to the sum of the world's knowledge of medicine."

These prophetic words of Mr. Brookings have been realized. Local, national, and international recognition has come to the School and to members of the faculty. Members of the faculty have received numerous awards; eight Nobel Laureates have worked in the laboratories of the School's medical science departments.

In the ensuing years, the Medical Center has continued to grow and to provide excellent facilities. With the increase in the physical plant there has also occurred a great increase in the size of the faculty; the expansion has been made without compromise in the standards which marked the early development of the medical center. As a result, significant achievements in both research and clinical areas have been consistently recorded, and the School of Medicine has continued to attract students and faculty of the highest calibre.



## Student Life

### HOUSING

The Housing Office in Wohl Center on the hilltop campus maintains listings of housing appropriate for married and single students.

The Spencer T. Olin Residence Hall has accommodations for approximately 300 single men and women. It was made possible by generous gifts from Spencer T. Olin and alumni and friends of the School of Medicine. Located at 4550 Scott Avenue in the Medical Center, Olin Hall is planned for the convenience of the student in the medical or paramedical sciences. Every effort is made to provide an atmosphere that not only aids him in meeting his study obligations, but also recognizes his privileges as a graduate student.

The rates for the rooms are as follows:

*School year: September to June (9 months)*

\$525 per student in 2-room suite  
(2 students per suite)

475 per student in single room

400 per student in double room

*Summer: For Three Months*

\$175 per student in 2-room suite

160 per student in single room

125 per student in double room

*Summer: Weekly Rates*

\$14.75 per student in 2-room suite

13.50 per student in single room

10.50 per student in double room

*Daily Rates for Visitors*

\$6.00 per person in 2-room suite

5.00 per person in single room

4.00 per person if prospective student

Each occupant is required to pay a \$25 security fee in addition to the room rental fee. This fee will be held by the University until termination of residence to cover losses resulting from possible damage to the room or to the furniture. Any portion not so used will be refunded.



Parking is available on a lot behind Olin Hall and in other lots operated by the medical center. A monthly or annual permit must be purchased.

### STUDENT HEALTH SERVICE

Entering students are given a complete medical examination and are provided with medical care as long as they are enrolled at the School of Medicine. Physicians are available at the Student Health Clinic, and a physician is on call for emergency care at Barnes Hospital or in the student's room when necessary. Essential costs of hospitalization are covered through a liberal group insurance policy. The student or his family is responsible for meeting the costs of hospital care in excess of those paid by this policy. The responsibility of the Student Health Service for hospitalization costs will end thirty days after a hospitalized individual ceases to be an officially enrolled student.

### RECREATIONAL AND CULTURAL OPPORTUNITIES

The City of St. Louis offers many cultural and recreational facilities, among which are Forest Park with its lagoons, sporting areas, and the Zoo; the City Art Museum; the Museum of the Missouri Historical Society; and the McDonnell Planetarium. The St. Louis Symphony Orchestra presents a series of concerts during the season, and the Municipal Opera stages musicals in an outdoor theater during the summer. One of the country's most notable horticultural gardens, the Missouri Botanical Garden, is located in St. Louis.

Professional sports are an important part of the St. Louis scene. The football and baseball Cardinals play in the handsome Busch Stadium downtown, and the St. Louis Blues hockey team plays at the Arena, not far from the School.

Within the University community excellent concerts, theater, lectures, and other cultural activities are open to students in the School of Medicine. Facilities for indoor and outdoor sports, including tennis courts and the Wilson Pool, are available on the hilltop campus. Olin Residence Hall houses an excellent full-sized gymnasium for student use.

### STUDENT ACTIVITIES

*Senior Research Assembly.* In the spring of each year, the Senior Research Assembly is held for the purpose of enabling senior students to report on original research completed at any time during their four years in the School.

*Graham Colloquium.* A gift from Mr. and Mrs. Evarts Graham, Jr., in 1963 enabled the School to establish a series of informal discussions led by outstanding scholars from fields other than medicine and the biological sciences. Mr. and Mrs. Graham's purpose was concordant with that of the School: to encourage opportunities for students to expand their views on social, philosophical, artistic, and political topics. The Graham Colloquia feature guests selected by the students, and are planned to foster an informal, lively exchange of views.

*Pruitt-Igoe Medical Action Program.* Medical students and faculty members working closely with members of the community have established a small outpatient clinic at Pruitt-Igoe, an inner-city, high-rise, public housing project. The facilities are open to patients every evening, Monday through Friday. Medical teams on duty consist of medical students under the supervision of a physician. Their responsibilities include primary care, triage, referral to appropriate health units in the City, and follow-up care.



## THE ALUMNI ASSOCIATION

The Alumni Association of the Washington University School of Medicine plays a significant part in the life of the School. It was organized to promote a spirit of class fellowship among its members, to further the aims and purposes of the School, and to stimulate interest in the advancement of medical and collateral sciences.

Membership is made up of all graduates of the School of Medicine and all members of the faculty. Each year the Association gives a welcoming party for the incoming freshman class and, prior to Commencement on Alumni Day, sponsors the annual alumni banquet at which graduating seniors are guests. The Alumni Day reunion features a scientific program presented by graduates and faculty members and a buffet luncheon at which the alumni and senior students are guests of the School of Medicine and its faculty.

The Alumni Office prepares and distributes a schedule of departmental teaching conferences held each week in the Medical Center and open to physician attendance.

## LECTURESHIPS AND VISITING PROFESSORSHIPS

Several established lectures enable the School to bring to the Medical Center each year distinguished guests who contribute significantly to the richness of student life.

*Harry Alexander Visiting Professorship.* Established by former house officers and friends of Dr. Harry Alexander to provide an annual visiting professor in the Department of Medicine.

*Alpha Omega Alpha Lectureship.* Given each year by a faculty member of the students' selection.

*George H. Bishop Lectureship.* Supported by funds made available by friends interested in the advancement of neurology.

*The James Barrett Brown Visiting Professorship in Plastic and Reconstructive Surgery.* Created by patients, friends, colleagues, and former students to honor Dr. Brown.

*Evarts A. Graham Memorial Lectureship.* Established with a reserve fund left by Dr. Graham for his successors.

*Evarts A. Graham Visiting Professorship of Surgery.* Established by the Harry Freund Memorial Foundation to support an annual lecture in honor of Dr. Graham's contributions to surgery.

*Samuel B. Grant Visiting Professorship.* Created to provide annually a visiting professor in the Department of Medicine.

*Alexis F. Hartmann, Sr., Lectureship.* Established by friends interested in pediatrics to provide an annual lecture in Dr. Hartmann's honor.

*Leo Loeb Lectureship.* Provided by the Mu Chapter of the Phi Beta Pi Fraternity.

*Major G. Seelig Lectureship.* Established in the field of surgery by friends of Dr. and Mrs. Seelig.

*Philip A. Shaffer Lectureship.* Founded by friends of Dr. Shaffer in recognition of his accomplishments in biochemistry.

*Robert J. Terry Lectureship.* Established by alumni "for the purpose of fostering greater appreciation of the study of human anatomy."



# Admission and Fees

## APPLICATION PROCEDURE

A copy of the Bulletin may be obtained by writing to the Registrar, Washington University School of Medicine, 660 South Euclid Avenue, St. Louis, Missouri 63110. Application forms may be obtained by writing to the American Medical College Application Service (AMCAS), Association of American Medical Colleges, 1 Dupont Circle, N.W., Washington, D.C., 20036.

The Committee on Admissions of the Washington University School of Medicine promptly evaluates the initial application and informs each applicant whether or not he may complete his application by having letters of recommendation submitted. The Registrar provides these applicants with the necessary credentials application materials. At this stage, a non-refundable service fee of \$15.00 is charged by Washington University. The applicant is notified as soon as a decision has been made on his application.

## FEES AND OTHER EXPENSES

The University reserves the right to change the fees herein stated at any time without notice. However, if a change is made, it will not become effective until the next academic year. All fees and charges are payable in advance at the Office of the Registrar, School of Medicine. Checks should be made payable to Washington University.

For the academic year 1970-71, tuition and fees total \$2,200. This figure includes student health coverage.

### Withdrawals and Refunds

A student who withdraws within the first two weeks of classes is charged 20% of the semester tuition fee; a student who withdraws during the third week is held for 40% of the charges;

during the fourth week for 60%; during the fifth week for 80%. There is no refund of any portion of the tuition fee after the fifth week. No special fees are refundable after the second week of the term.

### Estimate of Expenses

An estimate of the average expenses of a single student in the School of Medicine is given below. In addition to these expenses, every student is required to have a standard microscope, which may be rented or purchased from the Bookstore of the School of Medicine. The microscope rental fee is currently \$80 per academic year.

	1970-71
Tuition and fees . . . . .	\$2,200
Books and instruments (average) . . . . .	250
Room and board (average) and incidentals . . . . .	<u>2,000</u>
	\$4,450

## Financial Assistance, Prizes, Awards

Comprehensive in scope, the financial aid program of the School of Medicine encompasses scholarships, loans, fellowships, and several prizes and awards. Every assistance is afforded to students to obtain necessary funds and to avoid excessive indebtedness.

As all students accepted for admission have proven scholastic ability, scholarships are granted primarily on a basis of financial need. Immediately upon notification of acceptance for admission, the applicant may file with the Registrar's Office an application for financial aid in the form of scholarship and loan support. All information is evaluated by the Committee on Admissions and Financial Aid and is held in strict confidence. Scholarships and loans can be awarded only if it is apparent that the applicant has budgeted his expenditures to a practical minimum, and only if he has made a reasonable effort to secure the necessary financial support as gifts or loans from family sources.

All awards are made for a given academic year; however, students may renew financial assistance in succeeding years of medical school if they remain in good academic and personal standing, and if there is continued financial need. Awards made to a student may vary from year to year, depending upon the student's needs and upon the availability of funds to the Committee. Students are responsible for filing applications for renewal of awards in the spring of each year. Medical students married to schoolmates should submit a single application, together with financial statements from each student's parents. First- and second-year students are urged not to accept employment during the academic year. A number of third- and fourth-year students find employment in hospitals within the Medical Center. The Personnel Office provides assistance to students' wives seeking employment.

The Committee holds that students receiving assistance have an obligation to notify the

Committee if their financial situation changes, for example, through employment or receipt of a scholarship not anticipated at the time the application was submitted. Many students who consider themselves independent of their parents successfully arrange clearly specific loans from parents.

### SCHOLARSHIP FUNDS

*Grace Strong Coburn Scholarship Fund.* Created in 1962 through the bequest of Mrs. Grace Strong Coburn for scholarships in the School of Medicine.

*The T. Griswold Comstock Scholarships.* Established under the will of Marilla E. Comstock for students who would otherwise be unable to obtain a medical education.

*The George F. Gill Scholarship Fund.* Instituted in memory of a former clinical professor of pediatrics.

*Health Professions Scholarship Grant.* Established by federal legislation to enable students from low income families to undertake the course of study required to become physicians.

*Jackson Johnson Scholarship Fund.* Provided through a bequest in 1930 from Jackson Johnson; income devoted to seven Regional Honor Scholarships named for the donor and to other scholarships for needy students.

*George D. Kettelkamp Scholarship Fund.* Established in 1969 by Mrs. Kettlekamp in memory of her husband, an alumnus of the School of Medicine.

*The Eliza McMillan Scholarship Fund* provides assistance to young women in any of several schools of the University to secure an education.

*Medical Alumni Scholarship Fund.* Awarded on the basis of academic achievement and financial need.

*Roy B. and Viola Miller Memorial Fund.* Created in 1963 through the bequest of Roy B. Miller to provide scholarships for medical students and for postgraduate students engaged in study and research in the medical sciences.

*Pfizer Laboratories Division Medical Scholarship.* Awarded annually to a medical student

of high scholastic standing; funds provided by Pfizer Laboratories.

*Robert Allen Roblee Scholarship Fund.* Established in 1948 through the gift of Mrs. Joseph H. Roblee for students in the School of Medicine.

*Thomas W. and Elizabeth J. Rucker Scholarship Fund.* Created in 1956 under the will of Eugenia I. Rucker, in memory of her mother and father.

*Joseph H. Scharf Scholarship Fund.* Provided in 1949 through the bequest of Dr. Joseph H. Scharf.

*Dr. John B. Shapleigh Scholarship Fund.* Established in 1926 with the bequest of Dr. John B. Shapleigh and supplemented by contributions from Mrs. Shapleigh and Miss Margaret Shapleigh.

*Alexander Balridge Shaw Scholarship Fund.* Created in 1958 through the bequest of Roy A. Shaw in memory of his father, Dr. Alexander Balridge Shaw.

*Beulah B. Strickling Scholarship Fund.* Established in 1960 with a bequest from Mrs. Beulah B. Strickling.

*Edwin H. and Virginia M. Terrill Scholarship Fund.* Established in 1964 with the bequest of Dr. Edwin H. Terrill, an alumnus. It was Dr. Terrill's hope that scholarship recipients would repay into the Fund the amount of the award.

## SCHOLARSHIP AND LOAN FUNDS

*Isabel Valle Brookings Scholarship and Loan Fund.* Established in 1957 by Isabel Valle Brookings (Mrs. Robert S.) for scholarships and loans in the School of Medicine.

*The Danforth Foundation Loan and Scholarship Fund.* Provides financial assistance for medical students.

*The Danforth Medical Fund.* Created through gifts from the Danforth Foundation and the late William H. Danforth to furnish loans, scholarships, or outright grants to talented and promising young men and women engaged in study or research in basic medical or clinical sciences.

*The Wilkinson Scholarship Fund.* Created in 1968 by the bequest of Anna J. Wilkinson in honor of her husband, Dr. George E. Wilkinson. Medical and postdoctoral students are eligible for Wilkinson scholarships or loans.

## LOAN FUNDS

*The American Medical Association Loan Program* makes available bank loans without collateral to eligible medical students, interns, or residents who are citizens of the United States. Applications for such loans are made through the Education and Research Foundation of the American Medical Association.

*Health Professions Student Loan Fund.* Established by federal legislation for medical students with a demonstrated financial need. Loans are available for long terms at favorable rates.

*Ursula Hecker Loan Fund.* Established in 1967 by a bequest from Ursula Lee Hecker for the use and benefit of worthy, deserving, and needy medical students.

*W. K. Kellogg Foundation Loan Fund.* Provides financial assistance to medical students in need of such aid.

*G. H. Reinhardt Memorial Scholarship Loan Fund.* Established in 1947 through the bequest of G. H. Reinhardt. Loans of \$100 each are available to four medical students during their second year.

*The Aline Rixman Loan Fund.* Created in 1940 by William Rixman in memory of his wife, the fund is used to alleviate unexpected financial emergencies of medical students.

*Caroline O. Schlesinger Loan Fund.* Established in 1969 to provide financial support for medical students.

#### FELLOWSHIP AND OTHER FUNDS

*Alexander and Gertrude Berg Fellowship Fund.* Created in 1952 through the bequest of Gertrude Berg to provide a fellowship in the Department of Microbiology.

*William H. Danforth Loan Fund for Interns and Residents in Surgery.* Provides financial assistance in the form of loans for postdoctoral students in surgery.

*J. Albert Key Fellowship Fund.* Provides a stipend for a fellow in orthopedic surgery.

*George W. Merck Memorial Loan Fund.* Established in 1959 through the Merck Company Foundation to encourage deserving interns and residents to seek the best possible postdoctoral training.

*Student Research Fellowships* are awarded each year to students who undertake special research projects under the direction of a faculty member. They carry a stipend. Application should be made to the Committee on Fellowships and Awards, which supervises the program. These fellowships are described more completely on page 9.

#### AIDS IN ALLIED HEALTH PROFESSIONS

*Frank R. Bradley Scholarship Loan Fund.* Established in 1958 by the Alumni Association of the Graduate Program in Health Care Administration as a loan fund in honor of Dr. Frank R. Bradley.

*W. K. Kellogg Foundation Loan Fund for Graduate Students in Hospital Administration.* Established in 1958 and supplemented in 1964.

*Mary A. Lennon Memorial Scholarship Loan Fund in Health Care Administration.* Established in 1958 by Mrs. Maureen Lennon Callaghan and Lieutenant Colonel Donald E. Callaghan to provide loans for students in the Graduate Program in Health Care Administration.

*Washington University Health Care Administration Scholarship and Emergency Fund.* Started in 1968 to provide help on the basis of need without interest or expectation of repayment.

*Foster G. McGaw Scholarship Fund.* Awarded to two students entering the graduate program in Health Care Administration. Selection is based on financial need and potential for contribution to the profession.

*Bertha Reinhardt Green Memorial Fund.* Created in 1954 by a bequest from Bertha Reinhardt Green as a loan fund for students enrolled in the program in Occupational Therapy.

*Rehabilitation Services Administration Traineeships in Occupational Therapy* provide tuition funds and a monthly stipend for a limited number of students in Occupational Therapy.

*W. K. Kellogg Foundation Loan Fund for Students in Physical Therapy.* Created in 1943 for students in the Program in Physical Therapy.

*Rehabilitation Services Administration Traineeships in Physical Therapy.* Provides tuition funds and a monthly stipend for a limited number of students in Physical Therapy.

#### AWARDS AND PRIZES

*Alpha Omega Alpha Book Prize.* Awarded at the end of the fourth year to a member of that class who has performed outstandingly for the entire medical course.

*The Alexander Berg Prize.* Awarded to a student of high general standing who presents the best results in research in bacteriology.



*The Jacques J. Bronfenbrenner Prize.* Provided by Dr. Bronfenbrenner's students in memory of his inspiration as a teacher and scientist, and awarded to the member of the graduating class who, in the judgment of the Chairman of the Department of Medicine, has done the most outstanding work in infectious diseases or related fields.

*Dr. Richard Brookings and Dr. Robert Carter Medical School Prizes.* Provided for medical students through a bequest of Robert S. Brookings.

*The Kehar S. Chouké Prize.* Awarded at the end of the first year to a medical student who has demonstrated superior scholarship in anatomy.

*The Carl F. and Gerty T. Cori Prize in Biochemistry.* Awarded at the end of the first year to the member of the class who has demonstrated superior scholarship in biochemistry.

*Edmund V. Cowdry Prize in Histology.* Established in 1969 to honor Dr. Cowdry; awarded to a freshman medical student who has performed meritoriously in microscopic anatomy.

*Antoinette Frances Dames Prize in Physiology and Biophysics.* Awarded annually to a member of the first-year class who has demonstrated superior scholarship in these fields.

*George F. Gill Prizes.* One prize awarded at the end of the first year to a member of the class who has demonstrated superior scholarship in anatomy; one prize awarded to a member of the graduating class who has demonstrated superior scholarship in pediatrics.

*Dr. Joseph J. Gitt and Charlotte E. Gitt Prize.* Awarded to a senior student for the best original work in the field of clinical and therapeutic medicine.

*Lange Medical Publications Book Awards.* Given to members of all four classes for high scholastic standing and achievement in research.

*The Howard A. McCordock Book Prize.* Awarded at the end of the second year to a member of that class for general excellence in pathology.

*Medical Alumni Scholarship Prize.* Given annually to a student who has shown excellence in his work during the preceding year.

*Medical Fund Society Prizes.* One prize awarded

annually to a student of the senior class who has excelled in the study of internal medicine; one prize awarded annually to a student of the senior class who has excelled in the study of surgery. No individual is eligible for both prizes.

*The Missouri State Medical Association Award.* A scroll and a U. S. Savings Bond presented annually to an honor graduate of the senior class.

*The C. V. Mosby Company Book Awards.* Made to five members of the graduating class for high general scholastic standing and research achievement.

*The Roche Award.* A scroll and a gold wrist-watch presented at the end of the second year to the student who best exemplifies the ideals of the modern American physician.

*St. Louis Pediatric Society Senior Prize.* Presented to the student showing the greatest promise in clinical pediatrics.

*Sandoz Award.* Given annually to a graduating student who has made a meritorious contribution to psychiatric research.

*The Sidney I. Schwab Book Prizes.* Awarded at the end of the fourth year for general excellence in neurology and psychiatry.

*The Samuel D. Soule Award in Obstetrics and Gynecology.* Presented to a member of the junior or senior class for meritorious achievement in either basic or clinical investigation in obstetrics and gynecology.

*The Upjohn Achievement Award.* Given to the senior student who has done the most meritorious work during his medical school career in the field of metabolism.

*The Dr. Samson F. Wennerman Prize.* Donated by his wife, Zelda E. Wennerman, and awarded annually to that senior student who has demonstrated promise in surgery.

*Hugh M. Wilson Award for Meritorious Work in Radiology.* Given annually to a graduating medical student in recognition of outstanding work in radiology-related subjects, either clinical or basic science.

*The James Henry Yalem Prize in Dermatology.* Established by Charles Yalem in memory of his son and awarded annually to a member of the senior class for outstanding work in dermatology.



*McDonnell Medical Science Building.  
Dedication: October 16 and 17, 1970.*



# **CLASS SCHEDULE** **FIRST YEAR**

## **COURSE OF INSTRUCTION**

The first and second academic years are each 36 weeks long; the clinical-clerkship year is 48 weeks long. The elective year includes 36 weeks of elective time and 12 weeks of free time. The first two years are divided into semesters, while the third and fourth years are divided into quarters.

### **First Semester—September 8, 1970, through January 23, 1971**

Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
9 to 10	Anatomy	Anatomy	Biochemistry	Biochemistry	Anatomy	Biochemistry	
10 to 11			Biochemistry	Biochemistry			
11 to 12			Laboratory*	Laboratory*			
12 to 1							
1 to 2	Anatomy	Anatomy	Biochemistry Laboratory*	Biochemistry Laboratory*			
2 to 3					Anatomy		
3 to 4					Topics in Clinical Medicine		
4 to 5							

\*Laboratory will run for 9 weeks only.

### **Second Semester—January 25, 1970, through May 29, 1971**

Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday		
9 to 10	Physiology	Microbiology	Neural Sciences	Microbiology	Neural Sciences	Microbiology		
10 to 11				Genetics	Physiology			
11 to 12								
12 to 1								
1 to 2	Physiology		Microbiology		Physiology			
2 to 3				Biostatistics				
3 to 4								
4 to 5								

**CLASS SCHEDULE  
SECOND YEAR**

**Third Semester—September 8, 1970, through January 23, 1971**

Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
8 to 9	Pathophysiology	Pathophysiology	History of Medicine	Pathophysiology		
9 to 10	Pathology	Physical Diagnosis	Pathology	Pathology	Pathology	Pathology
10 to 11						
11 to 12						
12 to 1						
1 to 2						
2 to 3	Pathophysiology		Pathophysiology		Pathophysiology	
3 to 4						
4 to 5						

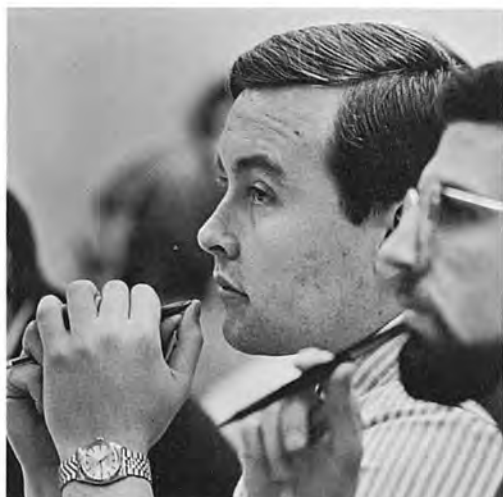
**Fourth Semester—(First 9 weeks)—January 25, 1971, through March 27, 1971**

Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
8 to 9		Pathophysiology	Preventive Medicine	Pathophysiology	Neurology	
9 to 10		Laboratory Diagnosis	Pharmacology	Pharmacology	Psychiatry	Clinical Diagnosis
10 to 11	Radiology					
11 to 12					Eye/ENT	
12 to 1						
1 to 2	Surgery		Pharmacology		Laboratory Diagnosis	
2 to 3						
3 to 4	Pathophysiology					
4 to 5						



**Fourth Semester—(Second 9 weeks)—March 29, 1971, through May 29, 1971**

Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
8 to 9		Pathophysiology	Preventive Medicine	Pathophysiology	Neurology	
9 to 10		Pediatrics	Pharmacology	Pharmacology	Psychiatry	Clinical Diagnosis
10 to 11	Radiology					
11 to 12		Ob/Gyn			Eye/ENT	
12 to 1						
1 to 2	Surgery		Pharmacology		Pediatrics	
2 to 3						
3 to 4	Pathophysiology				Ob/Gyn	
4 to 5						



# **CLASS SCHEDULE** **THIRD YEAR**

## **Medicine Service, 12 weeks**

Group A  
Summer Quarter, June 15 through  
September 5, 1970.

Group B  
Fall Quarter, September 8 through  
November 28, 1970.

Group C  
Winter Quarter, November 30 through  
December 19, 1970, and January 4  
through March 6, 1971.

Group D  
Spring Quarter, March 8 through  
May 29, 1971.

C.P.C.	Medicine Clinic
Thursday 12 to 1:00	Saturday 12 to 1:00

*Note:* The CPC and Medicine Clinic are required for students on the Medicine Service and are optional for third-year students on other services.



## **Surgery Service, 12 weeks**

Group D  
Summer Quarter, June 15 through  
September 5, 1970.

Group A  
Fall Quarter, September 8 through  
November 28, 1970.

Group B  
Winter Quarter, November 30 through  
December 19, 1970, and January 4  
through March 6, 1971.

Group C  
Spring Quarter, March 8 through  
May 29, 1971.







**Pediatrics Service, 6 weeks**

**Obstetrics and Gynecology Service, 6 weeks**

**Group C**

Summer Quarter, June 15 through September 5, 1970.

**Group D**

Fall Quarter, September 8 through November 28, 1970.

**Group A**

Winter Quarter, November 30 through December 19, 1970, and January 4 through March 6, 1971.

**Group B**

Spring Quarter, March 8 through May 29, 1971.

Section I, Pediatrics.

Section II, Obstetrics and Gynecology.

Sections change at end of six-week period.

**Psychiatry Service, 6 weeks**

**Neurology Service, 3 weeks**

**ENT Service, 2 weeks**

**Eye Service, 1 week**

**Group B**

Summer Quarter, June 15 through September 5, 1970.

**Group C**

Fall Quarter, September 8 through November 28, 1970.

**Group D**

Winter Quarter, November 30 through December 19, 1970, and January 4 through March 6, 1971.

**Group A**

Spring Quarter, March 8 through May 29, 1971.

Section I, Psychiatry.

Section II, Neurology, ENT, and Eye.

Sections change at end of six-week period.



## CLASS SCHEDULE FOURTH YEAR

**Elective Year.** This is a 48-week year, divided into eight six-week sessions. Each student is required to attend for only 36 weeks.

### "A" Electives

These seminar courses meet 2 to 4 hours a week for 12 or 18 weeks, and most are given in the late afternoon on Tuesdays and Thursdays in order to facilitate scheduling and planning. Each student must complete at least two of these courses to graduate. Most students take these seminars concurrently with "B" electives, but selected students may take them during semester two, three, or four.

### "B" Electives

These electives include advanced clinical clerkships in any of the clinical departments, research in any department, and other special full-time courses as outlined in the senior elective book. Most students take "B" electives after completing the clinical year, but these electives can precede the clinical year, or be interspersed among the quarters of the clinical year. An individual student may even decide to take his elective year after completing semesters one and two. Each student must take at least 36 weeks of these full-time elective courses.



**TABLE OF REQUIRED HOURS  
1970-71**

As reported to the Liaison Committee on Medical Education, representing the Council on Medical Education of the American Medical Association and the Executive Council of the Association of American Medical Colleges, credit hours for courses are expressed in terms of clock hours—the scheduled hours per year of actual lecture and laboratory contact between faculty and students. These clock hours are not to be interpreted as either semester or quarter hours.

<b>Year 1</b>	<b>Clock Hours</b>
Anatomy.....	432
Physiology.....	234
Biochemistry.....	216
Microbiology.....	180
Biostatistics.....	54
Genetics.....	36
Topics in Clinical Medicine.....	36
	<u>1,188</u>

<b>Year 2</b>	
Pathology.....	342
Pathophysiology	
Infectious Diseases.....	54
Cardiovascular and Renal Diseases, Fluid and Electrolyte Balance, Respiratory Disorders.....	54
Metabolic Disorders, Gastroenterology, Nutrition, Hematology, Developmental Biology.....	72
Nervous System Disorders.....	54
Pharmacology.....	180
Physical Diagnosis.....	72
Laboratory Diagnosis.....	54
Clinical Diagnosis.....	54
Surgery.....	36
Pediatrics.....	36
Obstetrics and Gynecology.....	36
Radiology.....	36
Psychiatry.....	36
Neurology.....	18
Ophthalmology and Otolaryngology..	18
Preventive Medicine.....	18
History of Medicine.....	18
	<u>1,188</u>

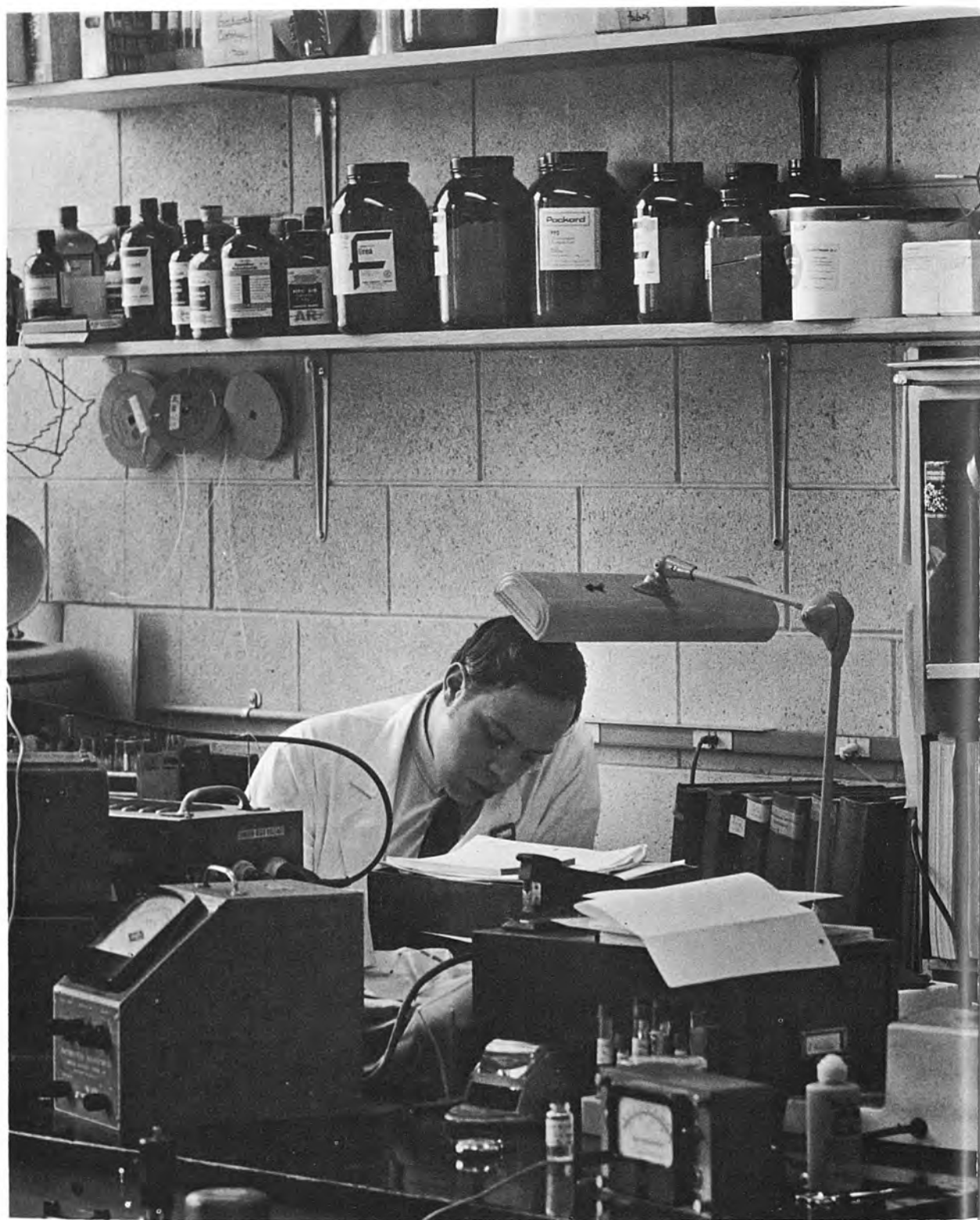
**Year 3: Clinical Year**

Medicine.....	462
Surgery.....	462
Obstetrics and Gynecology.....	231
Pediatrics.....	231
Psychiatry.....	231
Neurology.....	115½
Otolaryngology.....	77
Ophthalmology.....	38½
	<u>1,848</u>

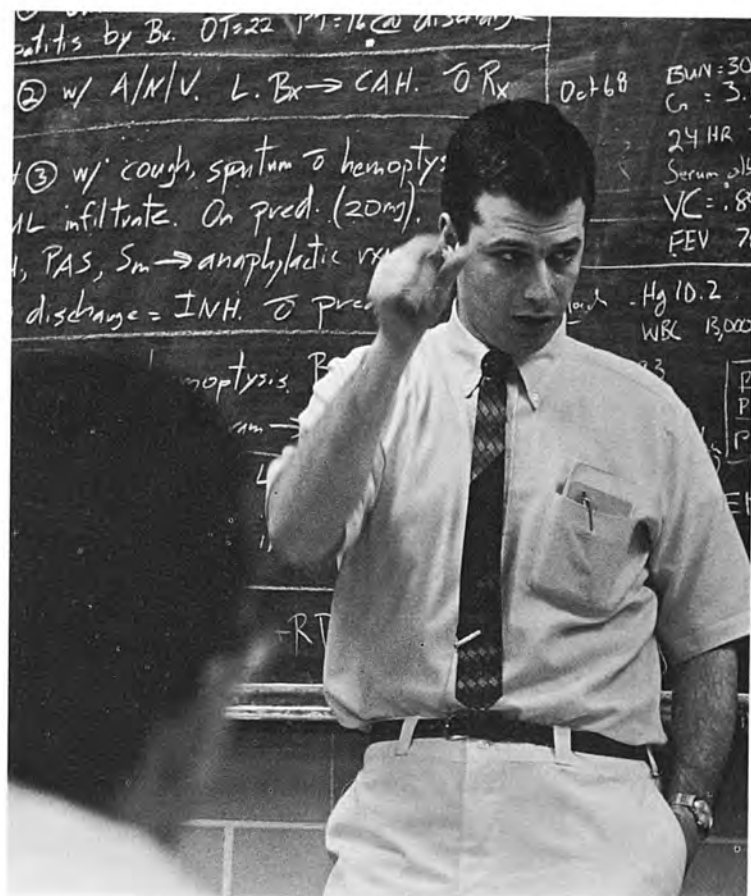
**Year 4: Elective** 1,188

Each student must take at least two "A" electives (seminars which meet two or more hours each week for 12 or 18 weeks) and at least 36 weeks of "B" electives (usually either a clinical clerkship or research).

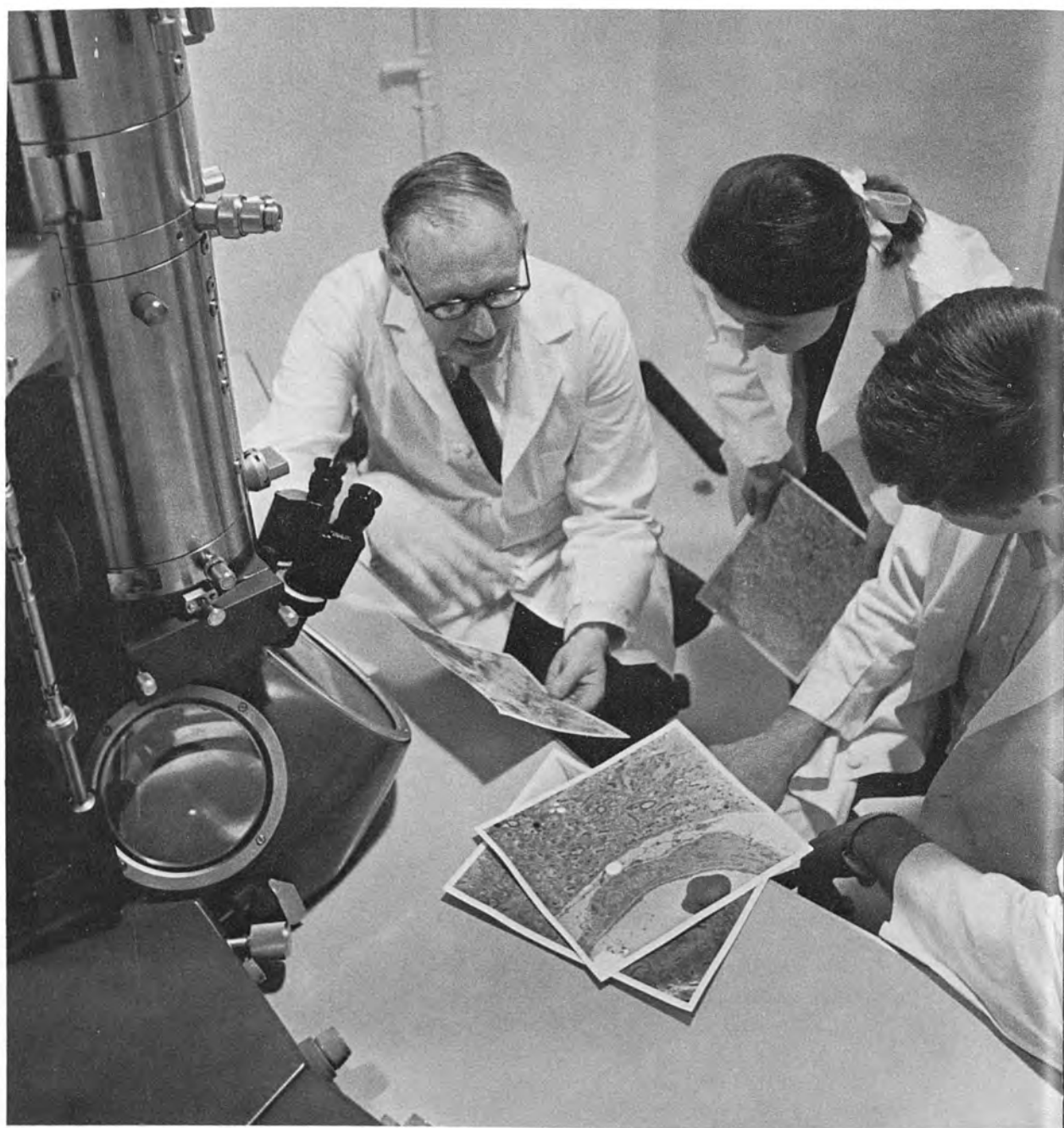
Total for four years 5,412



## Departments of the School of Medicine







## Department of Anatomy

The anatomical sciences are presented in three required courses: gross anatomy and microscopic anatomy, which are offered in the first semester; and neuroanatomy, which is taught conjointly with neurophysiology in the second semester. In addition, the Department offers a series of elective courses for senior students. Gross anatomy is taught essentially as a laboratory course, but with some lectures dealing with anatomical principles. Human growth and development are given together with the lectures in microscopic anatomy. The course in microscopic anatomy consists largely of cell and tissue biology, with laboratory sessions paralleling the lectures in these areas. Neuroanatomy is taught mainly from an experimental point of view, with particular emphasis upon the development and structure of the neural tissues. Throughout all three courses attention is paid to the results of recent investigations and to major developments in each field. The Department is well equipped for special work in several areas, including gross anatomy, electron microscopy, tissue culture, neuroanatomy, cell biology, and developmental biology.

### *Professor and Head of the Department*

**W. Maxwell Cowan**, B.Sc. (hon.), Witwatersrand University, 1952; Ph.D., Oxford University, 1956; M.B.B.Ch., 1958.

### *Professors*

**Estelle Brodman** (Medical History in Anatomy), A.B., Cornell University, 1935; B.S., Columbia University, 1936; M.S., 1943; Ph.D., 1953.

**Richard P. Bunge**, B.A., University of Wisconsin, 1954; M.S., 1956; M.D., 1960.

**Adolph I. Cohen**, B.S., City College of New York, 1948; M.A., Columbia University, 1950; Ph.D., 1954. (See Department of Ophthalmology)

**Allen C. Enders**, A.B., Swarthmore College, 1950; A.M., Harvard University, 1952; Ph.D., 1955.

**Joe W. Grisham**, A.B., Vanderbilt University, 1953; M.D., 1957. (Markle Scholar) (See Department of Pathology)

**Roy Reed Peterson**, A.B., University of Kansas, 1948; Ph.D., 1952.

**Leonard J. Tolmach** (Radiation Biology), B.S., University of Michigan, 1943; Ph.D., University of Chicago, 1951. (See Department of Radiology)

**Richard Torack**, B.S., Seton Hall University, 1948; M.D., Georgetown University, 1952 (See Department of Pathology)

### *Professors Emeriti*

**Walter P. Covell**, B.S., Oregon State College, 1922; M.S., 1923; Ph.D., University of Minnesota, 1926; M.D., University of Chicago, 1933. (See Department of Otolaryngology)

**Edmund V. Cowdry**, A.B., University of Toronto, 1909; Ph.D., University of Chicago, 1912.

**Mildred Trotter**, A.B., Mount Holyoke College, 1920; Sc.M., Washington University, 1921; Ph.D., 1924; Sc.D. (hon.), Western College, 1956; Sc.D. (hon.), Mount Holyoke College, 1960. (See Department of Radiology) (Also Lecturer)

### *Associate Professors*

**Cecil Marvin Charles**, A.B., University of Kentucky, 1926; M.S., 1927; Ph.D., Washington University, 1929; M.D., 1933. (See Department of Medicine)

**Milton N. Goldstein**, B.S., Western Reserve University, 1946; M.S., 1947; Ph.D., 1952. (See Department of Pathology)

**Joseph R. Williamson**, A.B., Phillips University, 1954; M.D., Washington University, 1958. (See Department of Pathology)

### *Associate Professor Emeritus*

**Valentina Suntzeff**, M.D., Women's Medical Institute (Petrograd, Russia), 1917. (Cancer Research) (Also Lecturer)

### *Assistant Professors*

**E. Richard Bischoff**, A.B., Knox College, 1960; Ph.D., Washington University, 1966.

**Harold Burton**, B.A., University of Michigan, 1964; Ph.D., University of Wisconsin, 1968. (See Department of Physiology and Biophysics)

**Robert H. Laatsch**, B.A., Park College, 1955; M.D., Washington University, 1959.

Lorraine Lake, B.S., Washington University, 1950; M.A., 1954; Ph.D., 1962. (See Program in Physical Therapy, Department of Preventive Medicine, and Institute of Rehabilitation)

William F. Marovitz, B.A., University of California, 1962; Ph.D., 1966. (See Department of Otolaryngology)

David N. Menton, B.S., Mankato State College, 1959; Ph.D., Brown University, 1966. (See Department of Pathology)

H. David Porter, B.S., University of Illinois, 1958; M.S., 1959; Ph.D., University of Wisconsin, 1964.

#### *Research Assistant Professor*

Mary B. Bunge, B.S., Simmons College, 1953; M.S., University of Wisconsin, 1955; Ph.D., 1960.

#### *Instructor*

Joseph L. Price, B.A., University of the South, 1963; Ph.D., Oxford University, 1969.

#### *Consultant*

Juan M. Taveras, B.S., Normal School of Santiago, Dominican Republic, 1937; M.D., University of Santo Domingo, 1943; M.D., University of Pennsylvania, 1949. (See Department of Radiology)

#### *Research Assistants*

Oliver H. Duggins, B.S., Northwestern University, 1934; M.S., 1936; Ph.D., Washington University, 1953.

Paul R. Myers, A.A.S., M.T. (A.S.C.P.), Rochester Technological Institute, 1957.

Sandra J. Schlafke, B.A., Rice University, 1959; M.A., 1962.

### **FIRST YEAR**

**501. Gross Anatomy.** The course is based on dissection of the human body. An extensive collection of dissected specimens is housed in the dissecting rooms so that students may easily compare their dissections with museum specimens. X-ray equipment and films are used to complement the current dissections; cine-radiographs are presented regularly. Fresh organs are provided for demonstration and dis-

section at appropriate times. Special attention is given to surface anatomy. Students examine each other and are encouraged to learn as much as possible from the living subjects. Occasional attendance at autopsies is recommended. Frequent discussions are held with small groups of students. 189 hours.

**504. Neural Science.** This course, which is taught conjointly by the Departments of Anatomy and Physiology and Biophysics, provides a broad introduction to modern neurobiology. The neuroanatomical aspects of the course deal primarily with the tissues of the central nervous system from an experimental point of view. The course occupies two and one-half days a week for the first eight weeks of the second semester.

**506. Microscopic Anatomy.** The structure of cells, tissues, and organs is studied with regard to the functional significance of the morphological features. The laboratories consist of the study of prepared slides, of preparations of fresh tissues, and of electron micrographs. Each student is required to have his own microscope. 153 hours.

### **ELECTIVE COURSES**

*Morphological Basis of Cell Biology.* A seminar course with a revolving subject. The subject for 1970-71 will be Secretion. (Staff)

*Recent Studies of Mammalian Development.* This seminar course deals with a number of topics in early mammalian development, including capacitation of spermatozoa; sperm transport; penetration of the ovum; interspecies crosses; cleavage; tubal transport of the ovum; metabolism of the egg and blastocyst; in vitro culture of embryos; the intrauterine environment; attachment of the blastocyst;

*Note*—The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences and may be found under that number in the Bulletin of that School.

mechanisms of penetration of the endometrium; maintenance of the conceptus; differentiation of the embryonic cell mass; host-fetus immunological relationships. The emphasis will be largely morphological, but will include a good deal of the relevant physiological and biochemical material. (Dr. Enders)

*Anatomy of Surgical Approaches.* A dissection review of the anatomy of specific regions of the body by way of surgical routes.

(Drs. Peterson, Laatsch)

*Anatomy of the Fetus and Child.* Dissection of the stillborn fetus. Emphasis on normal and abnormal anatomy of thoracic and abdominal regions and principles and patterns of growth.

(Drs. Peterson, Trotter)

*Experimental Neuroanatomy.* This course is designed as an extension of the neuroanatomy portion of the neural sciences course and deals with selected topics of current interest in neuroanatomy.

(Drs. Cowan, Cohen)

*Advanced Dissection:* Different regions of the body will be dissected in detail. A period of six weeks should be allowed for each region: Head and neck, thorax, abdomen, superior limb, inferior limb.

(Dr. Peterson)

*Research.* Properly qualified individuals are encouraged to carry on research in the anatomical sciences with the guidance of the departmental staff.





## Department of Biological Chemistry

The Department offers a first-year course in biological chemistry for students of medicine and for students in the Graduate School of Arts and Sciences. All students are afforded the opportunity to pursue research work under the direction of the staff. Facilities are provided for research on the preparation and properties of enzymes and the mechanism of their action, and on the metabolism of carbohydrates and proteins. Some summer research fellowships are offered to students of medicine.

### *Professor and Head of Department*

**P. Roy Vagelos**, A.B., University of Pennsylvania, 1950; M.D., Columbia University, 1954.

### *Distinguished Service Professor Emeritus*

**Carl F. Cori**, M.D., University of Prague, 1920; Sc.D. (hon.), Yale University, 1946; Sc.D. (hon.), Western Reserve University, 1946; Sc.D. (hon.), Boston University, 1948; Sc.D. (hon.), Cambridge University, 1949; Sc.D. (hon.), Washington University, 1966.

### *Professors*

**David H. Brown**, B.S., California Institute of Technology, 1942; Ph.D., 1948.

**Carl Frieden**, B.A., Carleton College, 1951; Ph.D., University of Wisconsin, 1955.

**Luis Glaser**, B.A., University of Toronto, 1953; Ph.D., Washington University, 1956.

### *Associate Professors*

**George R. Drysdale**, B.S., Birmingham-Southern College, 1948; M.S., University of Wisconsin, 1950; Ph.D., 1952.

**Hiromichi T. Narahara**, B.A., Columbia University, 1943; M.D., 1947.

**Robert E. Thach**, A.B., Princeton University, 1961; Ph.D., Harvard University, 1964.

### *Research Associate Professor*

**Barbara Illingworth Brown** (Established Investigator of the American Heart Association), B.A., Smith College, 1946; Ph.D., Yale University, 1950.

### *Assistant Professors*

**Alfred W. Alberts**, B.S., Brooklyn College, 1953.

**Leonard J. Banaszak**, B.S., University of Wisconsin, 1956; M.S., Loyola University, 1961; Ph.D., 1961.

**Ralph Bradshaw**, B.A., Colby College, 1962; Ph.D., Duke University, 1966.

**William F. Holmes**, A.B., Princeton University 1953; Ph.D., University of Pennsylvania, 1960. (See Biomedical Computer Laboratory)

**Craig Merton Jackson**, B.S., Washington State University, 1963; Ph.D., University of Washington, 1967.

**Philip W. Majerus**, M.D., Washington University, 1961. (See Department of Medicine)

**Garland R. Marshall**, B.S., California Institute of Technology, 1962; Ph.D., Rockefeller University, 1966. (See Department of Physiology and Biophysics)

**F. Scott Mathews**, B.S., University of California, 1955; Ph.D., University of Minnesota, 1959. (See Department of Physiology and Biophysics)

**David F. Silbert**, A.B., Harvard University, 1958; M.D., 1962.

### *Research Assistant Professor*

**Paul W. Preister**, B.S.Chem.E., Washington University, 1923; M.S., 1925; Ph.D., 1927; LL.B., St. Louis University, 1954.

### *Instructor*

**John J. Jeffrey, Jr.**, B.S., College of the Holy Cross, 1958; Ph.D., Georgetown University, 1965. (See Department of Medicine)

### *Research Instructors*

**William H. Holland**, A.B., Washington University, 1950. (See Department of Psychiatry)

**Walter Louis Nulty**, B.A., Southern Illinois University, 1956.

**Stuart W. Weidman**, B.A., St. Olaf College, 1965; Ph.D., University of Iowa, 1969.

### *Lecturer*

**Walter Gibson Wiest**, A.B., Brigham Young University, 1948; Ph.D., University of Wisconsin,

1952. (See Department of Obstetrics and Gynecology)

*Research Assistant*

Carmelita Lowry, B.S., University of Illinois, 1944.

## FIRST YEAR

**503. Biological Chemistry.** Lectures, conferences, and laboratory work covering those portions of the subject which are of special importance to the student of medicine. First semester, 216 hours. Graduate student credit, 10 units; lectures only, 4 units.

## ELECTIVE COURSES

**505. Proteins and Enzymes.** Discussion of the chemistry of amino acids, peptides, and proteins, with emphasis on those aspects contributing to their three-dimensional structure. Development of enzyme kinetic theory, including current concepts of regulatory enzymes. Specific enzymes and classes of enzymes are discussed with respect to the correlation of their kinetic and molecular properties and the over-all chemical mechanism of the catalytic reaction. Four class hours a week. Credit 4 units.

**506. Selected Topics in Intermediary Metabolism.** The regulation of metabolic pathways, protein-protein interactions, the biosynthesis and interconversions of various carbohydrates and lipids.

**508. Membrane Chemistry, Structure and Function.** Chemistry and physical chemistry of membrane components. Membrane structure as related to cell permeability, active transport, and synthesis of the bacterial cell wall. Three class hours a week. Credit 3 units.

**512. Digital Computers for Laboratory Use.** Methods of using small digital computers with laboratory instruments. Basic programming, data collection and conversion, data process-

ing, digital control, output techniques. Calculus is desirable. Three class hours and one laboratory period a week. Credit 4 units.

(Dr. Holmes)

**515. Research opportunities** are offered in the following general areas of biochemistry:

Biochemical studies in lipid metabolism.

(Dr. Vagelos)

Protein structure and function.

(Dr. Bradshaw)

Biochemical investigation of metabolic disorders of carbohydrate metabolism.

(Dr. B. Brown)

Studies of pathways of carbohydrate metabolism in mammalian tissues.

(Dr. D. Brown)

Mechanism of enzyme reactions.

(Dr. Drysdale)

Relationship of protein structure and enzyme activity. Kinetic theory and applications to enzyme reactions. (Dr. Frieden)

Biosynthesis of cell wall structures and mechanism of sugar transformations in microorganisms. (Dr. Glaser)

Biochemical studies of protein-lipid interactions. (Dr. Jackson)

Regulation of carbohydrate metabolism in muscle. (Dr. Narahara)

Investigation of fatty acid metabolism and membrane biochemistry through techniques of biochemical genetics.

(Dr. Silbert)

Biochemical transformations of steroid hormones. (Dr. Wiest)

X-ray analysis of enzyme structure.

(Dr. Banaszak)

Mechanism of biosynthesis of lipids in mammalian systems. (Dr. Majerus)

Conformation and chemistry of polypeptide hormones. (Dr. Marshall)

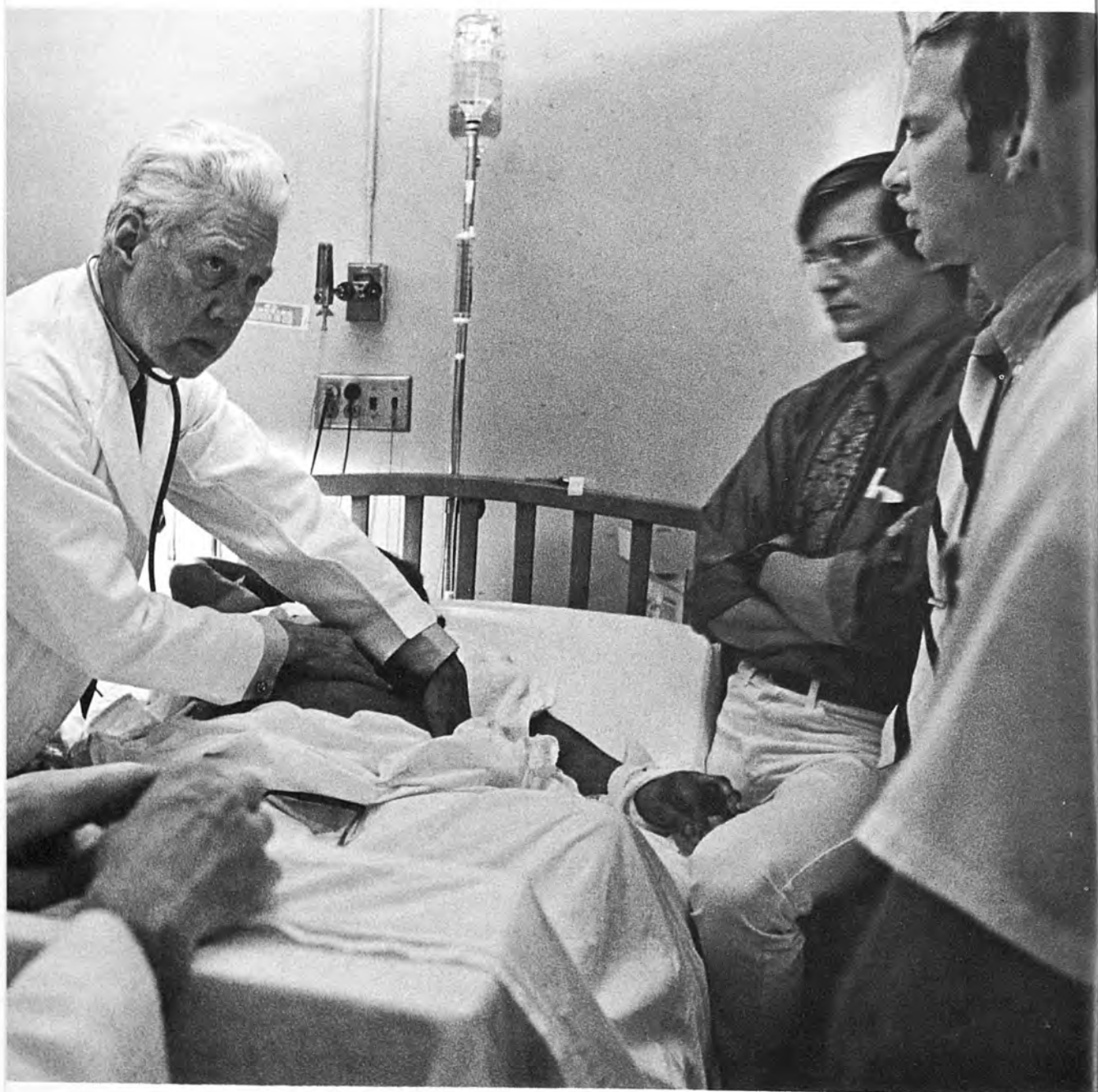
Crystal structure and conformation of proteins.  
(Dr. Mathews)

Mechanism of protein synthesis.  
(Dr. Thach)

**523-524.** *Biochemistry Seminar.* An advanced course organized as a series of seminars designed to encourage interdepartmental contact between students and staff of all departments. Topics to be considered in depth will be selected from (1) carbohydrates, (2) amino acid and nitrogen metabolism, (3) proteins, (4) lipids, (5) co-enzymes, (6) regulation of cellular processes, (7) energy relationships and kinetics, and (8) cellular permeability and transport mechanisms. As appropriate, additional topics in biology will be introduced. Ordinarily required of all graduate students in the Department. Hours and credit to be arranged.

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*Note*—The number preceding the course indicates that the course carries credit in the Graduate School of Arts and Sciences and may be found under that number in the Bulletin of that School.



# The John Milliken Department of Medicine

## **(Includes Internal Medicine and Dermatology)**

For the purposes of both teaching and research, the Department of Medicine is divided into specialty divisions under the following directors:

Arthritis and Connective Tissue Diseases

*Dr. Osterland*

Cardiovascular Disease

*Dr. J. Smith, Dr. B. Parker*

Dermatology

*Dr. A. Eisen*

Endocrinology and Metabolism

*Dr. Daughaday, Dr. Kipnis*

Gastroenterology

*Dr. Alpers, Dr. Aach*

Hematology

*Dr. E. B. Brown, Jr.*

Hypertension

*Dr. H. M. Perry*

Immunology

*Dr. C. Parker*

Infectious Diseases

*Dr. Harford*

Malignant Disease

*Dr. Reinhard*

Medical Genetics

*Dr. Sly*

Nutrition

*Dr. Shank*

Peripheral Vascular Disease

*Dr. Wessler*

Psychosomatic Medicine

*Dr. Guze*

Pulmonary Diseases

*Dr. Pierce*

Renal Disease

*Dr. N. Bricker*

Instruction in Medicine commences with the first semester of the second year and continues throughout the third and fourth years of the curriculum. Teaching in the second year has two main objectives: first, the correlation of the basic sciences with the clinical aspects of disease, and second, training in the technical methods of physical examination and laboratory diagnosis. By the beginning of the third year the student is prepared for supervised clinical study of individual patients.

A junior clerkship of twelve weeks, divided into two six-week periods, is served on the nursing divisions of the Barnes Hospital Private Medical Service, the St. Louis City (Max C. Starkloff) Hospital, at Jewish Hospital of St. Louis, or at Cochran Veterans Administration Hospital. Senior students may elect to take a six-week clerkship on the Barnes Hospital Ward Medical Service or at Jewish Hospital; formal instruction in medical therapeutics is given during this period and responsibility is graded to be greater than during the junior clerkship. A twelve-week outpatient clerkship is also offered as an elective during the senior year.

## *Busch Professor and*

### *Head of the Department*

**Carl V. Moore**, A.B., Washington University, 1928; M.D., 1932; LL.D. (hon.), Elmhurst College, 1955.

## *John E. and Adaline Simon Professor*

**Stanford Wessler**, B.A., Harvard University, 1938; M.D., New York University, 1942. (Jewish Hospital)

## *Professors*

**Louis V. Avioli**, B.A., Princeton University, 1953; M.D., Yale University, 1957. (Jewish Hospital)

**Neal S. Bricker**, A.B., University of Colorado, 1945; M.D., 1949.

**Hugh Chaplin, Jr.**, A.B., Princeton University, 1943; M.D., Columbia University, 1947. (See De-



partment of Preventive Medicine and Public Health and Institute of Rehabilitation)

**William H. Danforth**, A.B., Princeton University, 1947; M.D., Harvard University, 1951.

**William H. Daughaday**, A.B., Harvard University, 1940; M.D., 1943.

**Herbert R. Domke**, S.B., University of Chicago, 1939; M.D., 1942; M.P.H., Harvard University, 1948; D.P.H., 1959. (See Department of Preventive Medicine and Public Health) (Hospital Commissioner of St. Louis and Acting Director of Health and Hospitals)

**Carl G. Harford**, A.B., Amherst College, 1928; M.D., Washington University, 1933.

**M. Kenton King**, B.A., University of Oklahoma, 1947; M.D., Vanderbilt University, 1951. (See Department of Preventive Medicine and Public Health)

**David M. Kipnis**, A.B., Johns Hopkins University, 1945; M.A., 1949; M.D., University of Maryland, 1951.

**John Esben Kirk**, M.D., University of Copenhagen, 1929. (See Division of Gerontology)

**Gerald T. Perkoff**, M.D., Washington University, 1948. (See Department of Preventive Medicine and Public Health and Division of Health Care Research)

**Edward H. Reinhard**, A.B., Washington University, 1935; M.D., 1939. (See Department of Radiology)

**Robert Ely Shank**, A.B., Westminster College, 1935; M.D., Washington University, 1939. (See Department of Preventive Medicine and Public Health)

**John Russell Smith**, A.B., University of Wisconsin, 1931; A.M., 1932; M.D., Washington University, 1934.

*Professor (Clinical)*

**Edward Massie**, A.B., Washington University, 1931; M.D., 1935.

*Professor Emeritus (Clinical)*

**Clinton Welsh Lane** (Dermatology), A.B., St. Mary's College (Kansas), 1916; M.D., St. Louis University, 1921.

*Associate Professors*

**Elmer B. Brown, Jr.**, A.B., Oberlin College, 1946;

M.D., Washington University, 1950.

**Arthur Z. Eisen** (Dermatology), B.A., University of Buffalo, 1951; Sc.M., Brown University, 1953; M.D., University of Pennsylvania, 1957.

**Anthony P. Fletcher**, B.M., University of London, 1943; B.S., 1943; M.D., 1949.

**Samuel B. Guze**, M.D., Washington University, 1945. (See Department of Psychiatry)

**Leonard Jarett** (Laboratory Medicine), B.A., Rice University, 1958; M.D., Washington University, 1962. (Markle Scholar) (See Department of Pathology)

**Saulo Klahr**, M.D., Universidad Nacional de Colombia, 1959. (Established Investigator of the American Heart Association)

**Stuart A. Kornfeld**, A.B., Dartmouth College, 1958; M.D., Washington University, 1962. (Faculty Associate, American Cancer Society)

**J. Russell Little, Jr.**, A.B., Cornell University, 1952; M.D., University of Rochester, 1956. (See Department of Microbiology) (Jewish Hospital)

**Herbert Lubowitz**, A.B., Clark University, 1954; M.D., Washington University, 1958.

**Philip W. Majerus**, M.D., Washington University, 1961. (American College of Physicians Scholar; Faculty Associate, American Cancer Society) (See Department of Biological Chemistry)

**George R. Morrison**, B.N.S., Holy Cross College, 1946; A.B., University of Rochester, 1948; M.D., 1954. (See Department of Preventive Medicine and Public Health)

**G. Charles Oliver**, A.B., Harvard University, 1953; M.D., 1957.

**C. Kirk Osterland**, M.D., University of Manitoba, 1956. (See Department of Preventive Medicine and Public Health)

**Brent M. Parker**, M.D., Washington University, 1952.

**Charles Ward Parker**, M.D., Washington University, 1953.

**Horace Mitchell Perry**, M.D., Washington University, 1946. (Cochran Veterans Administration Hospital)

**John A. Pierce**, M.D., University of Arkansas, 1948. (Also Cochran Veterans Administration Hospital)

**William S. Sly, M.D.**, St. Louis University, 1957. (Faculty Associate, American Cancer Society) (See Department of Pediatrics)

**John D. Vavra, B.A.**, University of Colorado, 1950; M.D., Washington University, 1954. (See Department of Preventive Medicine and Public Health)

*Associate Professors (Clinical)*

**Bernard T. Garfinkel, M.D.**, Washington University, 1948. (See Division of Health Care Research)

**Paul O. Hagemann, A.B.**, Washington University 1930; M.D., 1934.

**Michael M. Karl, B.S.**, University of Wisconsin, 1936; M.D., University of Louisville, 1938.

**Virgil Loeb, Jr., M.D.**, Washington University, 1944. (See Department of Pathology)

**Cyril M. MacBryde, A.B.**, Washington University, 1926; M.D., Harvard University, 1930.

**Joseph W. Noah, A.B.**, University of Missouri, 1938; B.S. in Medicine, 1939; M.D., Washington University, 1941.

**Robert Paine, M.D.**, Harvard University, 1944. (St. Luke's Hospital)

**Thomas Joseph Walsh, B.S.**, University of Richmond, 1946; M.D., Washington University, 1949.

*Associate Professors Emeriti (Clinical)*

**Alfred Goldman, A.B.**, Washington University, 1916; M.D., 1920; M.S., 1922.

**Joseph W. Larimore, A.B.**, DePauw University, 1908; M.D., Washington University, 1913.

**Drew W. Luten, A.B.**, University of Kentucky, 1901; M.D., Johns Hopkins University, 1911.

**William H. Olmsted, B.S.**, Coe College, 1909; M.D., Johns Hopkins University, 1913.

*Research Associate Professors*

**Norma A. Fletcher, M.S.**, The Technical University, Copenhagen, 1949; Ph.D., University of Copenhagen, 1965.

**Virginia Minnich, B.S.**, Ohio State University, 1937; M.S., Iowa State College, 1938.

*Assistant Professors*

**Richard D. Aach, A.B.**, Washington University 1955, M.D., 1959.

**David Hershel Alpers, B.A.**, Harvard College, 1956; M.D., 1960.

**Stanley Julius Birge, Jr., B.A.**, Amherst College, 1959; M.D., Washington University, 1963. (Jewish Hospital)

**Richard B. Byrd, M.D.**, St. Louis University, 1954; M.S. Med, University of Minnesota, 1960.

**Malcolm T. Foster, Jr., B.S.**, Wake Forest College, 1959; M.D., 1963. (Starkloff Hospital)

**Dhanjoo N. Ghista (Biomedical Engineering)**, B.Eng., V.J.T. Institute, Bombay University, 1960; Ph.D., Stanford University, 1964. (See Department of Surgery and School of Engineering)

**Duane C. Hellam, B.A.**, Arizona State College, 1955; M.D., Washington University, 1959. (See Department of Physiology and Biophysics)

**John O. Holloszy, M.D.**, Washington University, 1957. (See Department of Preventive Medicine and Public Health)

**Rex L. Jamison, A.B.**, University of Iowa, 1955; B.A., Oxford University, 1957; M.D., Harvard University, 1960. (Markle Scholar) (Jewish Hospital) (See Department of Physiology and Biophysics)

**Harold Seymore Kaplan (Laboratory Medicine)**, A.B., Oberlin College, 1958; M.D., Albert Einstein College of Medicine, 1962. (See Department of Pathology)

**Manuel E. Kaplan, B.S.**, University of Arizona, 1950; M.D., Harvard University, 1954. (Jewish Hospital)

**Robert E. Kleiger, B.A.**, Yale University, 1956, M.D., Harvard Medical School, 1960. (Jewish Hospital)

**George Kobayashi (Mycology-Dermatology)**, B.S., University of California, 1952; Ph.D., Tulane University, 1963. (See Department of Microbiology)

**J. Joseph Marr, B.S.**, Xavier University, 1959; M.D., Johns Hopkins University, 1964; M.S., St. Louis University, 1968. (Starkloff Hospital)

**Gerald Medoff, A.B.**, Columbia College, 1958; M.D., Washington University, 1962.

**Glenn T. Peake, B.A.**, University of Kansas, 1959; M.D., 1963. (See Department of Pediatrics)

**David L. Rimoin, B.S.**, McGill University, 1957; M.D., C.M., 1961; M.S., 1961; Ph.D., Johns Hopkins University, 1967. (See Department of Pediatrics)

**Alan M. Robson**, M.B.B.S., University of Durham Medical School (England), 1959; M.D., 1964. (See Department of Pediatrics)

**Shabbir Haider Safdar**, F.Sc., Government College Jhang, 1954; M.D., Nishtar Medical College, Multan, Pakistan, 1961. (Cochran V.A. Hospital)

**Gustav Schonfeld**, B.S., Washington University, 1956; M.D., 1960. (Cochran V. A. Hospital)

**Robert M. Senior**, A.B., Oberlin College, 1957; M.D., George Washington University, 1961. (Jewish Hospital)

**Laurence A. Sherman**, B.A., B.S., University of Chicago, 1956; M.D., Albany Medical College, 1964. (Jewish Hospital)

**Eduardo Slatopolsky**, M.D., University of Buenos Aires, 1959.

**Jay Wesley Smith** (Immunology), A.B., Columbia University 1958; M.D., Washington University, 1962.

**Isaias Spilberg**, B.S., University of San Marcos, Lima, Peru, 1956; M.D., 1963. (See Department of Preventive Medicine and Public Health) (Starkloff Hospital)

**R. Dean Wochner**, A.B., Arizona State College, 1956; M.D., Washington University, 1960. (Starkloff Hospital)

**Gerald A. Wolff**, A.B., Harvard College, 1955; M.D., Washington University, 1961.

*Assistant Professors (Clinical)*

**Morris Alex**, B.S., University of Missouri, 1942; M.D., Washington University, 1943.

**France Alexander**, A.B., Indiana University, 1950; M.D., 1953. (Homer G. Phillips Hospital)

**Grace E. Bergner**, A.B., Washington University, 1939; M.D., 1943.

**John W. Berry**, B.S., University of Toledo, 1943; M.D., St. Louis University, 1946.

**Morton A. Binder**, B.S., Yale University, 1948; M.D., Columbia University, 1951.

**Benjamin A. Borowsky**, M.D., Washington University, 1958.

**Francis Joseph Catanzaro**, M.D., Washington University, 1948.

**Adolph H. Conrad, Jr.** (Dermatology), A.B., Washington University, 1934; M.D., 1938.

**Charles W. Duden**, M.D., Washington University, 1926.

**Joseph C. Edwards**, A.B., University of Oklahoma, 1930; M.D., Harvard University, 1934.

**I. J. Flance**, A.B., Washington University, 1931; M.D., 1935.

**Bernard Friedman**, A.B., University of Wisconsin, 1931; M.D., 1934.

**Ralph V. Gieselmann**, M.D., Washington University, 1947.

**Melvin Leonard Goldman**, A.B., Washington University, 1939; M.D., 1943.

**Neville Grant**, A.B., Yale University, 1950; M.D., Columbia University, 1954.

**William Kearney Hall** (Dermatology), B.S., Yale University, 1939; M.D., Harvard University, 1942.

**Lawrence K. Halpern** (Dermatology), M.D., University of Colorado, 1937.

**David T. Hammond**, A.B., Indiana University, 1957; M.D., Washington University, 1960.

**Stanley Forrest Hampton**, A.B., Washington and Lee University, 1930; M.D., Washington University, 1934.

**James H. Hutchinson, Jr.**, B.S., Arkansas A. and M. College, 1942; M.D., University of Arkansas, 1945.

**Sidney Jick**, M.D., Washington University, 1949.

**Robert S. Karsh**, A.B., Washington University, 1951; M.D., 1952.

**Robert W. Kelley**, A.B., Southwestern College, 1932; M.D., Washington University, 1936.

**Charles Kilo**, M.D., Washington University, 1953; M.D., 1959.

**Robert C. Kingsland**, A.B., Washington University, 1933; M.D., 1937.

**Norman P. Knowlton, Jr.**, B.S., Harvard University, 1942; M.D., 1945.

**Marvin E. Levin**, A.B., Washington University, 1947; M.D., 1951.

**Douglas R. Lilly**, A.B., Princeton University, 1952; M.D., Washington University, 1956. (See Department of Radiology)

**Morris D. Marcus** (Dermatology), M.D., Washington University, 1934.

**Robert S. Mendelsohn**, B.A., Washington and Lee University, 1950; M.D., Washington University, 1954. (See Division of Health Care Research)

**Morris Moore** (Mycology-Dermatology), S.B., Boston University, 1928; A.M., Harvard University, 1929; Ph.D., Washington University, 1933.

**J. Roger Nelson**, A.B., Washington University, 1949; M.D., 1953. (See Department of Otolaryngology)

**James F. Nickel**, A.B., University of Oklahoma, 1944; M.D., Washington University, 1948.

**James C. Peden, Jr.**, A.B., Haverford College, 1951; M.D., Washington University, 1955. (See Department of Preventive Medicine and Public Health) (Also Student Health Service)

**William David Perry**, A.B., Northwest Missouri State College, 1943; B.S. in Medicine, University

of Missouri, 1945; M.D., Washington University, 1947.

**Kenneth C. Price**, M.D., University of Washington, 1951.

**Harold K. Roberts**, B.A., Ohio State University, 1935; M.D., 1939.

**Marvin Rosecan**, B.S., Washington University, 1949; M.D., 1949.

**Ernest T. Rouse**, B.S., Alabama Polytechnic Institute, 1939; M.D., Washington University 1943.

**Llewellyn Sale, Jr.**, A.B., Yale University, 1936; M.D., Washington University, 1940.

**Harold Scheff**, M.D., University of Toronto, 1931.

**Burton A. Shatz**, A.B., Washington University, 1940; M.D., 1943.

**James C. Sisk** (Dermatology), A.B., Washington University, 1943; M.D., 1946.

**Franz U. Steinberg**, M.D., University of Berne, 1938. (See Department of Preventive Medicine and Public Health) (Jewish Hospital)

**Barrett L. Taussig**, A.B., Harvard University, 1928; M.D., Washington University, 1932.

**Alvin S. Wenneker**, A.B., Washington University, 1949; M.D., 1953.

**Ray David Williams**, A.B., Hampden-Sydney College, 1930; M.S., Emory University, 1931; M.D., Washington University, 1937.

**Keith S. Wilson**, A.B., Williams College, 1930; M.D., Washington University, 1934.

**Herbert B. Zimmerman**, M.D., Washington University, 1951.

#### *Assistant Professors Emeriti (Clinical)*

**Charles H. Eyermann**, M.D., St. Louis University, 1911.

**Samuel B. Grant**, B.S., Washington University, 1918; M.D., 1920.

**Arthur E. Strauss**, B.S., Harvard University, 1912; M.D., 1917.

**Lawrence D. Thompson**, B.S., Rutgers University, 1917; M.D., Cornell University, 1922.

#### *Research Assistant Professors*

**Michiyasu Awai**, B.S., Osaka College of Technology, 1948; M.D., Okayama University, 1953; Ph.D., 1959.

**John James Jeffrey, Jr.** (Dermatology), B. S., College of the Holy Cross, 1958; Ph.D., Georgetown University, 1965. (See Department of Biological Chemistry)

**Irene E. Karl**, B.S., University of Wisconsin, 1937; M.D., 1938; Ph.D., 1940. (See Department of Pathology)

**Rosalind H. Kornfeld**, B.S., George Washington University, 1957; Ph.D., Washington University, 1961.

**Mabel L. Purkerson**, A.B., Erskine College, 1951; M.D., Medical College of South Carolina, 1956. (See Department of Pediatrics)

**Doris Rolf**, A.B., Harris Teachers College, 1936.

**Richard J. Warren**, A.B., University of Oklahoma, 1958; Ph.D., St. Louis University, 1967. (See Department of Pediatrics)

**Ee Thye Yin**, Inter.B.Sc., University of London, 1954. (Jewish Hospital)

#### *Research Assistant Professor Emeritus*

**Anna Reuben Dubach**, A.B., Bryn Mawr College, 1919; M.S., University of Colorado, 1935; Ph.D., 1938.

#### *Instructors*

**Om P. Bahl**, M.B.B.S., Punjab University, 1957; M.R.C.P., University of Edinburgh, 1960.

**Greta Camel**, A.B., University of Wisconsin, 1946; M.D., 1949. (Cochran V.A. Hospital)

**Lewis R. Chase**, A.B., Princeton University, 1960; M.D., Harvard University, 1964.

**Lester S. Garfinkel**, A.B., Washington University, 1955; M.D., 1959. (Ellis Fischel State Cancer Hospital)

**John T. Garland**, B.A., Cornell University, 1961; M.D., Johns Hopkins University, 1965. (Trainee NIAMD, Metabolism)

**Bevra H. Hahn**, B.Sc., Ohio State University, 1960; M.D., Johns Hopkins University, 1964. (See Department of Preventive Medicine)

**Hall E. Harrison**, A.B., Amherst College, 1961; M.D., Washington University, 1965. (Starkloff Hospital)

**Robert L. Kaufman**, A.B., Washington University, 1959; M.D., 1963. (See Department of Pediatrics)

**Joseph Lee Kinzie, Jr.**, B.A., Bridgewater College, 1959; M.D., University of Virginia, 1963. (Trainee NIAMD, Gastroenterology)

**Joseph E. Lowenstein**, B.A., University of Texas, 1959; M.D., Washington University, 1963. (Trainee NIAMD, Metabolism)

**Anthony S. Pagliara**, B.S., Union College, 1960; M.D., Albany Medical College 1965. (Trainee NIAMD, Metabolism)

**Reginald P. Pugh**, B.A., University of Michigan, 1953; M.D., 1955. (Ellis Fischel State Cancer Hospital)

**Michael Geoffrey Rosenfeld**, B.A., Johns Hopkins University, 1962; M.D., University of Rochester, 1966.



David Shander, B.A., Brooklyn College, 1957; M.D., University of Rochester, 1961. (Jewish Hospital)

Dennis DeVere Taggart, B.S., Utah State University, 1959; M.D., George Washington University, 1963. (Special USPHS Fellow—Renal)

James Witcher Turner, Jr., A.B., Duke University, 1960; M.D., 1964.

#### *Instructors (Clinical)*

Charles C. Abel, A.B., Westminster College, 1952; M.D., Washington University, 1956.

Oliver Abel III, Westminster College, 1951; M.D., Washington University, 1955.

Harry Agress, B.S., Washington University, 1932; M.D., 1932.

Louis F. Aitken, B.S., University of Illinois, 1923; M.D., Washington University, 1927.

James W. Bagby (Dermatology), A.B., University of Missouri, 1930; B.S. Med., 1931; M.D., Washington University, 1933.

Jack Barrow, M.D., Washington University, 1946.

Walter M. Baumgarten, Jr., A.B., Washington University, 1935; M.D., 1939.

Aaron Birenbaum, M.D., Washington University, 1948.

Benje Boonshaft, A.B., Washington University, 1957; M.D., 1961.

Edward W. Cannady, A.B., Washington University, 1927; M.D., 1931.

John M. Cary, A.B., Central College, 1954; M.D., St. Louis University, 1958.

Benjamin H. Charles, M.B., Ch.B., University of Edinburgh, 1934.

Cecil Marvin Charles, A.B., University of Kentucky, 1926; A.M., 1927; Ph.D., Washington University, 1929; M.D. 1933. (See Department of Anatomy)

Margaret Chieffi, M.D., University of New Zealand, 1937.

Philip Comens, B.S. in Medicine, University of Missouri, 1949; M.D., Washington University, 1951.

Ralph Copp, Jr., A.B., Washington University, 1948; M.D., 1952.

Duane E. Cozart, Ph.B., University of Chicago, 1947; A.B., Washington University, 1949; M.D., Medical College of Virginia, 1959.

Arnold Dankner, M.D., Washington University, 1947.

John D. Davidson, A.B., Washington University, 1948; M.D., 1952.

Bernard DeHovitz, M.D., Louisiana State Uni-

versity, 1948. (On leave of absence)

Norman Walter Drey, A.B., Princeton University, 1932; M.D., Washington University, 1936.

Calvin C. Ellis (Dermatology), A.B., Washington University, 1937; M.D., 1941.

Julius Elson, M.D., Washington University, 1928.

Mauri Feldaker (Dermatology), A.B., Washington University, 1949; M.D., 1950.

Donald H. Finger, A.B., Washington University, 1949; M.D., 1950.

Alfred Fleishman, B.S., Washington University, 1935; M.D., 1935.

Bruce Todd Forsyth, M.D., Washington University, 1947.

Arthur H. Gale, B.S., Washington University, 1955; M.D., University of Missouri, 1959.

Kenneth Gentsch, A.B., Princeton University, 1954; M.D., Washington University, 1958.

Arnold M. Goldman, A.B., Harvard University, 1955; M.D., Washington University, 1959.

John M. Grant, A.B., Princeton University, 1950; M.D., Washington University, 1954.

Axel R. Gronau, M.D., University of Naples, 1935.

Mark J. Halloran, M.D., Marquette University, 1959.

Lee W. Hawkins, A.B., Haverford College, 1948; M.D., Washington University, 1952.

James Neil Heins, A.B., University of Louisville, 1957; M.D., 1961.

John L. Horner, A.B., Washington University, 1932; M.D., 1936.

Richard F. Huck, B.S., Notre Dame University, 1947; M.D., Washington University, 1948.

Bernard Hulbert, B.A., University of Wisconsin, 1938; M.D., 1941.

Warren Z. Jacobsohn, M.D., St. Louis University, 1959. (On leave of absence)

Harold J. Joseph, B.A., University of Texas, 1947; M.D., 1950.

William G. Juergens, M.D., Washington University, 1961.

David N. Kerr, A.B., University of Colorado, 1936; M.D., Washington University, 1941.

Melvin B. Kirshtein, B.S., Indiana University, 1930; M.D., 1933.

Robert E. Koch, A.B., Washington University, 1936; M.D., 1940.

Phillip E. Korenblat, M.D., University of Arkansas, 1960.

Daniel K. Lane (Dermatology), B.A., Princeton University, 1955; M.D., Washington University, 1959.



**Joseph Levitt, M.D.**, Washington University, 1949.

**Morton Allan Levy, B.A.**, University of California in Los Angeles, 1957; **M.D.**, Washington University, 1961.

**David M. Lieberman, M.D.**, Vanderbilt University, 1949.

**Warren M. Lonergan, A.B.**, Westminster College, 1936; **M.D.**, Vanderbilt University, 1940.

**Carl A. Lyss, A.B.**, Washington University, 1952; **B.S.**, 1952; **M.D.**, 1956.

**William E. Magee, M.D.**, Duke University, 1950.

**Richard W. Maxwell, A.B.**, Greenville College, 1932; **M.D.**, University of Chicago, 1937.

**Oliver A. McKee (Dermatology), L.R.C.P.**, Royal College of Physicians and Surgeons (Dublin), 1949; **S.M.**, 1949.

**Edward J. Miller, B.A.**, St. John's University, 1958; **M.D.**, St. Louis University, 1962. (See Department of Preventive Medicine and Public Health)

**Austin F. Montgomery, M.D.**, University of Pittsburgh, 1954.

**Arlen E. Morrison, A.B.**, Washington University, 1954; **M.D.**, 1958.

**Frede Mortensen, B.A.**, Wagner College, 1949; **M.D.**, New York Medical College, 1953.

**Leonard N. Newmark, A.B.**, Washington University, 1956; **M.A.**, 1959; **M.D.**, 1963.

**Gordon Newton, M.D.**, University of Arkansas, 1958.

**Charles C. Norland, B.S.**, Washington State University, 1955; **M.D.**, Washington University, 1959.

**Lamar H. Ochs, A.B.**, Washington University, 1941; **M.D.**, 1944.

**M. Norman Orgel, B.S.**, College of City of New York, 1929; **M.A.**, Harvard University, 1930; **M.D.**, Washington University, 1934.

**Robert F. Owen, B.A.**, Princeton University, 1948; **M.D.**, Yale University, 1952.

**Robert C. Packman, A.B.**, Washington University, 1953; **B.S. in Med.**, University of Missouri, 1954; **M.D.**, Washington University, 1956.

**William J. Phillips, B.A.**, Oklahoma State University, 1959; **M.D.**, Washington University, 1963.

**Vincent J. Proskey, B.S.**, University of Detroit, 1954; **M.D.**, Marquette University, 1964.

**Samuel E. Schechter, M.D.**, Washington University, 1941.

**John Wickham Seddon, Ph.B.**, Yale University, 1931; **M.D.**, Washington University, 1935.

**John Blasdel Shapleigh II, M.D.**, Washington University, 1946.

**John Spalding Skinner, M.D.**, Washington Uni-

versity, 1940.

**Ross B. Sommer, A.B.**, Miami University, 1949; **M.D.**, Cornell University, 1949.

**J. Allen Thiel, B.S.**, Rockhurst College, 1956; **M.D.**, St. Louis University, 1960.

**Stanley M. Wald, M.D.**, Washington University, 1946.

**James W. Walsh, A.B.**, Washington University, 1950; **M.D.**, 1954.

**Hugh R. Waters, B.S.**, Northwestern University, 1942; **M.D.**, Washington University, 1945.

**Herbert C. Wiegand, A.B.**, Washington University, 1940; **M.D.**, 1943.

**Charles A. Winterling, B.A.**, Oberlin College, 1954; **M.D.**, University of Rochester, 1958.

**Edward M. Wolfe (Dermatology), B.A.**, Hobart College, 1956; **M.D.**, Washington University, 1960.

**James A. Wood, A.B.**, Westminster College, 1947; **M.D.**, Washington University, 1949.

#### *Instructors Emeriti (Clinical)*

**Anthony B. Day, B.S.**, Harvard University, 1913; **M.D.**, Washington University, 1919.

**Martin F. Engman, Jr. (Dermatology), M.D.**, Washington University, 1928.

**Bertrand Y. Glassberg, B.S.**, Washington University, 1923; **M.D.**, 1925.

**Lee B. Harrison, A.B.**, University of Utah, 1925; **M.D.**, Washington University, 1927.

**J. Ted Jean, A.B.**, Indiana University, 1924; **M.D.**, Washington University, 1928.

**David Miller Skilling, Jr., B.S.**, Washington and Jefferson College, 1923; **M.D.**, Washington University, 1928.

**Harry W. Wiese, B.S.**, Washington University, 1920; **M.D.**, 1922.

#### *Research Instructors*

**Ammini K. Jacob, B.Sc.**, St. Philomena's College, (Mysore, India), 1959; **M.Sc.**, Siddharth College (Bombay), 1961; **Ph.D.**, Grant Medical College (Bombay), 1968.

**Teofil Kheim (Gerontology), M.D.**, University of Budapest, 1934. (See Division of Gerontology)

**Stanley Charles Mazaleski, B.S.**, University of Scranton, 1964; **M.A.**, University of Texas, 1965; **M.S.**, University of Oklahoma, 1966; **Ph.D.**, 1968. (Cochran V.A. Hospital)

**Sister Ann Marie Skinner, A.B.**, Harris Teachers College, 1931; **M.A.**, St. Louis University, 1936.

**Aniece A. Yunice, B.A.**, American University of Beirut, 1948; **M.S.**, Wayne State University, 1958. (Cochran V.A. Hospital) (On leave of absence)

### *Assistants (Clinical)*

John E. Mullins, M.D., Washington University, 1958.

John S. Schoentag (Dermatology), A.B., University of Missouri, 1956; M.D., Washington University, 1960.

### *Research Assistants*

Sharon E. Carmody, B.A., Webster College, 1960. (Cochran V.A. Hospital)

Margaret Williams Erlanger, B.A., University of Iowa, 1932; M.S., 1938. (Cochran V.A. Hospital)

Mary Chapman Johnson, A.B., Washington University, 1938.

Sook Won Lee, B.S., Seoul National University (Korea), 1957; M.S., George Peabody College, 1962. (Jewish Hospital)

Ida Kozak Mariz, A.B., Washington University, 1940.

Betty F. Perry, A.B., Washington University, 1945. (Cochran V.A. Hospital)

Elaine V. Rieders, B.A., Hunter College, 1948.

John Woodring Studt, A.B., Yale University, 1957.

Doris Thompson, B.S., Mississippi State University, 1942.

Verna Venson, B.S., Bennett College, 1964. (Starkloff Hospital)

Teaching by the Department of Medicine in the second year is designed to (a) prepare the student for the transition from the preclinical sciences to the study of the sick patient at the bedside; (b) help him analyze the manifestations of disease in terms of the altered mechanisms responsible for these changes; and (c) introduce him to those special techniques of examination which will be used constantly with the beginning of junior clerkships. This instruction will at times be undertaken jointly with members of other clinical departments, and will be co-ordinated when practicable with subject matter presented by the Department of Pathology.

### FIRST YEAR

*Human Genetics.* This course, which is taught by the Division of Medical Genetics and the Departments of Pediatrics and of Medicine, is divided into three parts: cytogenetics, biochemical genetics, and population genetics. Each section consists of ten to twelve formal lectures in one of these three areas, followed

by a clinical correlation session presenting a series of patients who illustrate the genetic principles covered in the lectures. A serious attempt is made to correlate the studies in biochemistry, microbiology, and biostatistics as well as in this course, with problems relevant to clinical medicine.

*Topics in Clinical Medicine.* This interdepartmental course is designed to stimulate student interest in clinical medicine through carefully selected and presented discussions of both the clinical and basic science features of a number of illnesses. The course director involves faculty from the several clinical departments in structuring the direction, content, and presentation of the subject. (Dr. Kipnis and Staff)

### SECOND YEAR

(a) *Pathophysiology.* Selected topics in clinical medicine are discussed in detail to illustrate the application of biochemical, physiological, and anatomical information in the understanding of pathological states. Infectious, cardiovascular and renal, neurological, gastrointestinal, hematological, metabolic, nutritional, and developmental diseases are reviewed by an interdepartmental faculty. Emphasis is placed on the use of fundamental information in approaching clinical problems as a way of thinking in preparation for a lifetime of medicine, during which much new information will constantly be acquired.

(Drs. Daughaday, Bricker, Middelkamp, Landau, Alpers)

(b) *Clinical Diagnosis.* Lectures, demonstrations, and practical exercises in the technique of clinical diagnosis.

(Drs. Garfinkel, Smith, and Staff)

(c) *Laboratory Methods of Diagnosis.* Lectures and laboratory course in microscopic, bacteriological, serological, and chemical methods of diagnosis. (Dr. E. B. Brown and Staff)

### THIRD YEAR

*General Medicine.* Supervised study of patients on the semi-private medical service of Barnes Hospital and Jewish Hospital, and on the wards of Starkloff Hospital and Cochran Veterans Administration Hospital. Students are

assigned in rotation as clinical clerks to the patients admitted to these services. Teaching exercises include ward rounds, clinics, and afternoon work in the wards and laboratories. Students serve for six weeks on each of the two services.

(Drs. Reinhard, M. Perry, Wochner, Wessler, and Staff)

(a) *Medical Clinics.* Cases which have been studied by students working in the wards of Barnes Hospital are presented before the third- and fourth-year classes to illustrate medical problems of particular interest.

(Dr. C. Moore and Staff)

(b) *Clinical Pathological Conference.* Abstracts of the clinical records of patients upon whom post-mortem examinations have been performed are presented in advance to members of the third- and fourth-year classes and to members of the medical staff. At each conference the diagnosis is discussed in detail by the clinical staff before the anatomical findings are presented by the pathologists.

(Dr. Reinhard and Medical Staff,  
Dr. Kissane and Pathology Staff)

#### FOURTH-YEAR ELECTIVES

*Clinical Clerkship, Medical Wards of Barnes Hospital.* Six weeks, entire day. Patients are assigned for complete study and are followed throughout their stay in the hospital. Cases are presented by the students before house officers and the attending physician at ward rounds three times a week. Special therapeutic conferences are held two times a week with the Medical Resident. Students also attend weekly staff rounds, specialty conferences, Saturday Noon Clinic, and clinicopathologic conferences.

(Drs. C. Moore, Daughaday, and Staff)

*General Medicine and Subspecialty Clinics.* Six weeks, all day. Designed to give the students an opportunity to work up and follow in the general medicine clinic patients for whom they have primary responsibility under supervision of the part-time and full-time staff. Subspecialty clinic participation is included in the clerkship and is integrated with specialty rounds held in conjunction with the clinic. Subspecialty clinics include dermatology,

arthritis, renal, GI, metabolism and hematology. May be elected once for six weeks or twice for twelve weeks, which would provide better opportunity for follow-up of patients.

(Dr. Vavra and Staff)

#### Cardiovascular Disease

(a) Electrocardiography, elementary vectorcardiography. Lectures and practical demonstrations designed to provide a solid base of electrocardiographic knowledge.

(Drs. Parker, Hellam, Oliver, Wolff)

(b) Clinical Cardiology, St. Luke's Hospital, six weeks, all day. Students are assigned to intensive care service, the heart station, and the Radiology Department.

(Dr. Paine)

(c) Clinical Cardiopulmonary Physiology, Jewish Hospital, six weeks, all day. Experience in heart station, coronary care unit, pulmonary station, and catheter laboratory.

(Dr. Zimmerman)

(d) Research (minimum of twelve weeks, all day).

1. Myocardial contraction, experimental pharmacology, cellular physiology.

(Dr. J. Smith)

2. Muscle contraction and electrophysiology.

(Dr. Hellam)

3. Pulmonary vasomotion and the physiology of pulmonary embolism.

(Dr. B. Parker)

4. Biochemistry and measurement of cardiac glycosides; computer application to cardiology.

(Dr. Oliver)

5. Experimental thrombosis.

(Dr. Wessler)

6. Pathogenic mechanisms of hypertension.

(Dr. Perry)

#### Dermatology

(a) Clinical Clerkship. Students participate in both inpatient and outpatient care. Stress is placed on the dermatologic variations normally encountered, identification of common skin diseases, dermatologic clues to systemic disease, etc. Instruction is given in cutaneous histopathology and clinical mycology.

(Dr. Eisen and Staff)

(b) Research (minimum of twelve weeks, all day).

1. Connective tissue, macromolecular or-

ganization, degradation, and related problems. (Dr. Eisen)

2. Studies of *Histoplasma capsulatum* and other mycotic agents. (Dr. Kobayashi)

#### *Jewish Hospital Student Internship*

(a) Private Medical Service, six weeks, all day. Assignments and responsibilities comparable to those of interns. Students attend the medical teaching conferences at the Jewish Hospital, as well as Grand Rounds, C.P.C., and Noon Clinics at Barnes Hospital.

(Dr. Wessler and Staff)

(b) Intensive Care Unit, after completion of above. Varied experience in the care and management of acute and critical medical catastrophes.

(Dr. Wessler and Staff)

*Student Internships.* Unit I Service at Starkloff Hospital and St. Luke's Hospital. Students are assigned responsibilities similar to those of an intern and participate in all teaching conferences.

(Drs. Wochner, Paine)

*Saturday Noon Clinic.* Medical problems of particular interest.

(Dr. C. Moore and Staff)

*Clinical Pathological Conferences.* Thursdays, 12-1 p.m., September to June.

(Dr. Reinhard and Medical Staff,

Dr. Kissane and Pathology Staff)

*Arthritis and Rheumatic Diseases.* (See Department of Preventive Medicine and Public Health.)

#### *Gastroenterology*

(a) Clinical gastroenterology. Six weeks, all day. Students participate in the study of patients on whom consultations have been requested, receive instruction in specialized diagnostic techniques, and participate in the conferences and clinics run by the Division.

(Drs. Alpers, Aach)

(b) Research (minimum of twelve weeks, all day).

1. Disaccharidase deficiency and related problems. (Dr. Alpers)

2. Hepatic synthesis of "early labeled" bilirubin, excretory function in the isolated rat liver. (Dr. Aach)

#### *Genetics*

(a) Medical Genetics. Twelve weeks, all day. Combined clinical and research course.

(Drs. Sly, Rimoin, Warren)

(b) Experience in clinical or laboratory investigative approach to the study of genetic problems. (Drs. Sly, Rimoin, Warren)

#### *Hematology*

(a) Clinical hematology. Six weeks, all day. Students receive intensive instruction in morphology, specialized diagnostic techniques, management of patients with hematologic disorders. Two separate clerkships are offered.

(Drs. Kornfeld, Reinhard)

(b) Clinical blood coagulation. Six weeks, all day. Students learn to perform the test of blood coagulation and then participate in the evaluation of patients with bleeding disorders.

(Dr. Sherman)

(c) Hemostasis, thrombosis, blood coagulation, and fibrinolysis. Series of twelve weekly seminars.

(Dr. Fletcher)

(d) Research (minimum twelve weeks, all day).

1. Normal and deranged iron metabolism.

(Dr. E. Brown)

2. Clinical and biochemical studies of patients with suspected defects in erythrocyte energy metabolism. (Dr. Vavra)

3. Lipid metabolism in platelets.

(Dr. Majerus)

4. Biochemical studies of the process of transformation in malignancy.

(Dr. Majerus)

5. Biochemical studies of erythrocytes and glycoproteins of hematologic interest.

(Dr. Kornfeld)

6. Sugar nucleotide metabolism and its control in white blood cells and platelets.

(Dr. Kornfeld)

#### *Immunology*

(a) Clinical immunology. Series of 24 lectures and seminars on immunologic mechanisms in disease.

(Dr. C. Parker)

(b) Research. Minimum 12 weeks, all day.

1. Research in clinical or basic immunology (cellular immunity, immunologic deficiency diseases, antigen processing by macrophages). (Dr. C. Parker)

2. Antibody structure, antibody biosynthesis, and antibody binding reactions.

(Dr. Little)

3. Plasma protein metabolism, particularly as related to the immune system.

(Dr. Wochner)



### *Infectious Disease*

(a) Clinical infectious disease and bacteriology. Jewish Hospital, six weeks, all day.

(Drs. Little, Sonnenwirth)

(b) Clinical infectious diseases. Barnes Hospital, six weeks, all day. (Dr. Harford)

### *Metabolism and Endocrinology*

(a) Seminar: Endocrine physiology and the biochemical aspects of hormone action. Twelve weeks. Offered once a year.

(Drs. Daughaday, Kipnis, Avioli)

(b) Clinical clerkship, endocrine patients at Barnes, Jewish, and Children's Hospitals. Six weeks, all day. (Dr. Daughaday and Staff)

(c) Research. Minimum of twelve weeks, all day.

1. Pituitary physiology; growth hormone, prolactin. (Dr. Daughaday)

2. Experimental diabetes, insulin action, intermediary metabolism of fats and carbohydrate. (Dr. Kipnis)

3. Calcium and parathyroid metabolism, vitamin D. (Dr. Avioli)

*Pulmonary Disease and Function.* Six weeks, all day, but may be extended to longer period if student wishes to participate in research. Instruction in the evaluation of pulmonary function and in the management of pulmonary disease. (Dr. Pierce)

### *Renal Disease*

(a) Clinical nephrology. Six weeks, all day. Study of patients with renal disease and electrolyte disorders.

(Drs. Bricker, Klahr, Slatopolsky, Lubowitz)

(b) Mixed clinical and research elective in renal disorders and transport. Eighteen weeks, all day. Research activities can be selected in general renal physiopathology, micropuncture techniques, or transport. Limit three students.

(Dr. Bricker and Staff)

(c) Renal and electrolyte disorders. Jewish Hospital, six weeks, all day. (Dr. Jamison)

(d) Micropuncture studies of transport systems in the renal medulla. Twelve weeks, all day. (Dr. Jamison)

*Ethical Problems in Medicine.* Twelve weekly seminars. (Dr. J. Vavra)

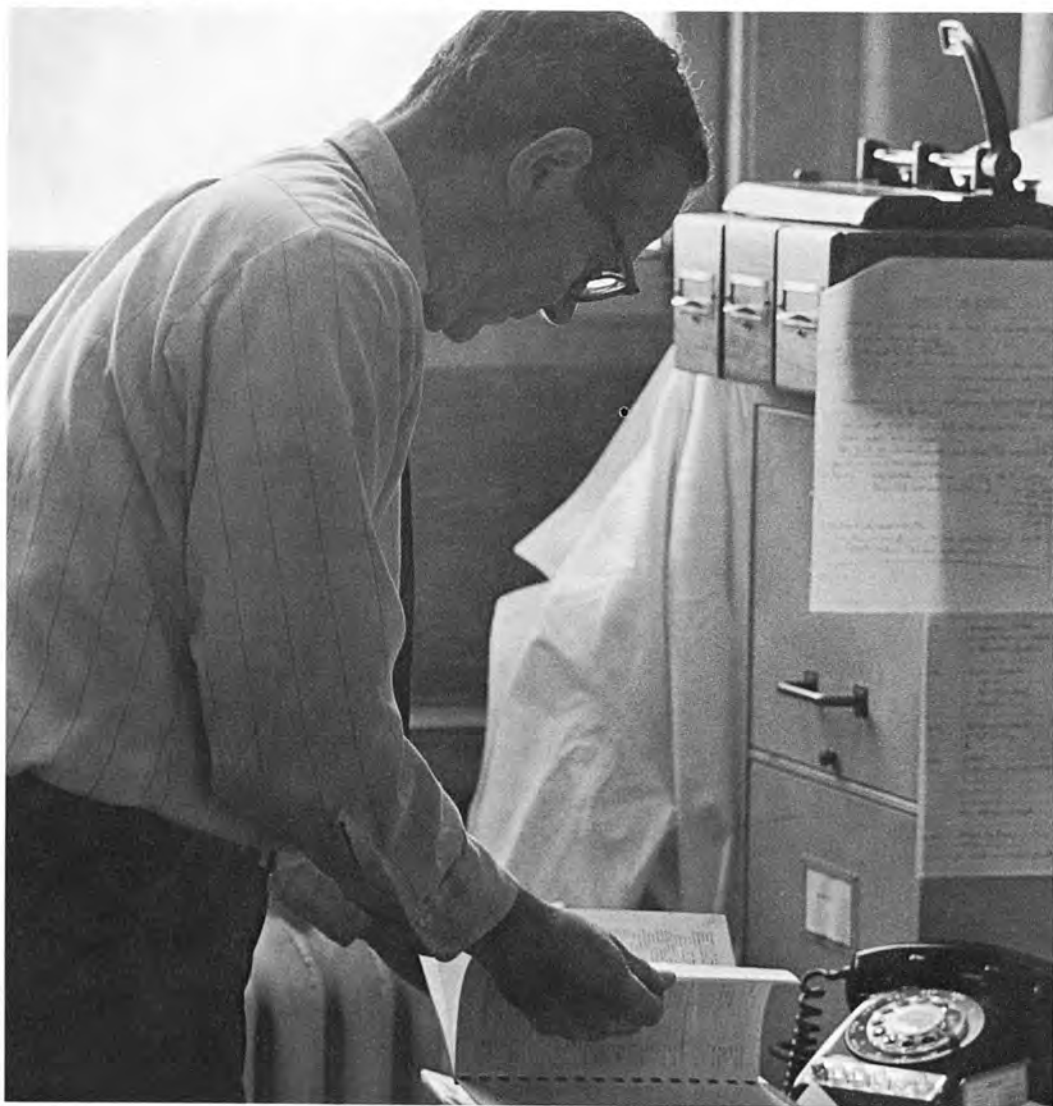




## Department of Microbiology

The Department teaches a one-semester introductory course in microbiology for first year medical students and for graduate students. This course is concerned particularly with principles of microbial physiology and genetics, and of immunology, and through a limited survey of pathogenic bacteria, viruses, and

fungi attempts to prepare medical students for more advanced study of infectious diseases later in the curriculum. The Department also offers a number of advanced elective courses and opportunities for elective research activities. A limited number of summer research fellowships is available.



*Professor and Head of Department*

Herman N. Eisen, A.B., New York University, 1939; M.D., 1943.

*Associate Professors*

David Apirion, M.S., Hebrew University of Jerusalem, 1960; Ph.D., University of Glasgow, 1963.

David E. Kennell, A.B., University of California, 1955; Ph.D., 1959.

J. Russell Little, Jr., A.B., Cornell University, 1952; M.D., University of Rochester, 1956. (See Department of Medicine) (Jewish Hospital)

Milton Schlesinger, B.S., Yale University, 1951; M.S., University of Rochester, 1953; Ph.D., University of Michigan, 1959.

David Schlessinger, B.A., University of Chicago, 1955; B.S., 1957; Ph.D., Harvard University, 1961.

Alexander C. Sonnenwirth, A.B., University of Nebraska, 1950; M.S., Purdue University, 1953; Ph.D., Washington University, 1960. (See Department of Pathology)

*Associate Professor Emeritus*

Hironu Tsuchiya (Parasitology), A.B., University of Missouri, 1913; Sc.D., Johns Hopkins University, 1930.

*Assistant Professors*

Joseph Eigner, A.B., Dartmouth College, 1955; A.M., Harvard University, 1958; Ph.D., 1960.

Julian B. Fleischman, B.S., Yale University, 1955; Ph.D., Harvard University, 1960. (See Department of Preventive Medicine and Public Health)

Sondra Schlesinger, B.S., University of Michigan, 1956; Ph.D., 1960.

Ernest S. Simms.

*Instructor*

George Kobayashi, B.S., University of California, 1952; Ph.D., Tulane University, 1963. (See Department of Medicine)

*Research Assistant*

John Courtney, A.B., University of Illinois, 1953.

**FIRST YEAR**

(531). *Microbiology*. Lectures and laboratory.

This course presents the basic principles relating to the metabolism, growth, and reproduction of bacteria and viruses and to the immune responses of the host to pathogenic microbes and their metabolic products. The organization of the course is as follows: pure culture methodology, biochemical mechanisms of nutrition and intermediary metabolism, physiology of growth, fundamental genetics (with special emphasis on microbial aspects), immunology. In terms of the above concepts, specific groups of pathogenic organisms and viruses are then considered. The interaction between host and parasite is studied by analyzing the biochemical basis for the pathogenicity of the microbe and for the immune reaction of man. The factors which make micro-organisms vulnerable or resistant to chemotherapeutic agents are also examined.

**FOURTH YEAR**

**Seminar Electives**

At present the primary enrollees in these courses are students working for a Ph.D. degree in one of the basic sciences. However, these courses are recommended for interested medical students, especially those who may be considering a career in medical research. Emphasis is placed on the organization and function of living systems at the molecular level. The courses combine formal lectures with student-directed seminars. In the latter, each student has an opportunity to integrate various disciplines of modern molecular biology into the area of biology or medicine that is of particular interest to him. Representative courses are as follows:

*Microbial Physiology* (Fall, 1970). The regulation of microbial growth and metabolism. Some of the topics to be covered are biosyn-

thesis of proteins and nucleic acids in bacteria and in virus-infected bacteria, control of enzymatic activity, spore formation and germination, and permeability properties of microorganisms.

(Drs. M. Schlesinger, S. Schlesinger)

*Molecular Biology of Bacterial Viruses* (Spring, 1971). Molecular structure of bacterial viruses. Metabolism of the infected cell, with emphasis on the genetics of host and viral controlled functions. Types of relationships of a virus to the infected cell, e.g., lysogeny, immunity, virulence. Emphasis is on the bacterial viruses, especially  $\lambda$ ,  $\Phi$ x174, and T-even bacteriophages. However, where appropriate, comparisons are made with animal viruses.

(Drs. Eigner and Kennell)

#### Full-Time Electives

The purpose of these electives is to acquaint the student with the kinds of analyses that are used in present-day biomedical research, especially at the molecular level. Although the subject matter is mostly restricted to microbial systems or to the immune response, the experience should provide useful training for later research in any area of modern biological or clinical research.

(Staff)

Topics to be offered include:

Genetic and biochemical analyses of normal and mutated ribosomes from *E. coli* strains. Ribosomes as a model for the genetic control and biosynthesis of a cellular organelle.

(Dr. Apirion)

Role of nucleases, especially DNases, in bacterial metabolism and their mechanism of action. Host-induced modification and restrictions of bacteriophage.

(Dr. Eigner)

Biologic activity and structure of myeloma proteins and antibodies.

(Dr. Eisen)

Structure and biosynthesis of immunoglobulin polypeptide chains using methods and techniques of protein chemistry and isotope labeling.

(Dr. Fleischman)

The regulation of nucleic acid and protein metabolism in virus-infected bacteria. The response of bacteria to starvation.

(Dr. Kennell)

The control of cellular differentiation of the medically important systemic fungi, in particular, *Histoplasma capsulatum*.

(Dr. Kobayashi)

Immunochemical techniques. Biosynthesis of antibodies and their binding reactions.

(Dr. Little)

Comparative studies of alkaline phosphatase from different microorganisms: Protein chemistry, metal binding sites in bacterial envelopes, molecular hybrids of enzymes from different organisms.

(Dr. M. Schlesinger)

The effect of amino acid analogues on the structure and function of proteins. The role of transfer RNA in the regulation of enzyme synthesis.

(Dr. S. Schlesinger)

The metabolism of protein, ribosomes, and polyribosomes in growing and nongrowing bacteria. Mechanisms of action of antibiotics.

(Dr. D. Schlessinger)

Performance and interpretation of diagnostic and serologic bacterial tests, as well as consultations with patients who have infectious diseases. Integration of the clinical and laboratory findings.

(Drs. Sonnenwirth and Little)

## Department of Neurology



Neurology concerns itself with the diseases of brain, spinal cord, and peripheral nerves. An introduction to the anatomy and physiology of the nervous system is presented in the first-year course in neural sciences provided by the Departments of Anatomy and Physiology and Biophysics. In the second year the Department is the major contributor to an interdepartmental course in pathophysiology of nervous system disorders. Here the inter-relationships are demonstrated between knowledge derived from basic investigative and from clinical sources. In addition there are lectures and exercises with patients in neurological physical diagnosis, and a sequence of lecture-demonstrations in clinical neurological medicine. Third-year activities are based in a full-time inpatient and outpatient clerkship. In the fourth year there are opportunities for clinical externship and for investigation of nervous system functioning in every aspect.

### *Professor and Head of Department*

**William M. Landau, M.D.**, Washington University, 1947.

### *Professors*

**Philip R. Dodge, M.D.**, University of Rochester, 1948. (See Department of Pediatrics)

**Sven G. Eliasson, Ph.D.**, University of Lund, 1952; M.D., 1954.

**James Lee O'Leary, B.S.**, University of Chicago, 1925; Ph.D., 1928; M.D., 1931. (See Department of Surgery)

### *Professor Emeritus and Lecturer*

**George Holman Bishop** (Neurophysiology), A.B., University of Michigan, 1912; Ph.D., University of Wisconsin, 1920.

### *Associate Professor*

**George Klinkerfuss, A.B.**, Washington University, 1952; M.D., 1956.

*Associate Professor Emeritus*

**Ethel Ronzoni Bishop** (Biochemistry), B.S., Mills College, 1913; A.M., Columbia University, 1914; Ph.D., University of Wisconsin, 1922.

*Associate Professors (Clinical)*

**Leonard Berg**, A.B., Washington University, 1945; M.D., 1949.

**Andrew J. Gay**, B.S., University of Alabama, 1950; M.A., 1954; M.D., Medical College of Alabama, 1955. (See Department of Ophthalmology)

**Irwin Levy**, A.B., Cornell University, 1927; M.D., St. Louis University, 1931; D.M.S., Columbia University, 1935.

*Associate Professor Emeritus (Clinical)*

**Andrew B. Jones**, M.D., Vanderbilt University, 1916.

*Assistant Professors*

**John E. Brooks**, M.B., Ch.B., Victoria University of Manchester, 1958; M.R.C.P., London, 1965.

**Robert L. Chesanow**, B.S., Union College, 1955; M.D., Albany Medical College, 1960. (Starkloff Hospital)

**Lawrence A. Cohen**, B.S., Western Reserve University, 1948; M.D., 1954; M.A., Northwestern University, 1951.

**Darryl C. DeVivo**, B.A., Amherst College, 1959; M.D., University of Virginia, 1964. (See Department of Pediatrics)

**James A. Ferrendelli**, A.B., University of Colorado, 1958; M.D., 1962. (See Department of Pharmacology)

**Marvin A. Fishman**, B.S., University of Illinois, 1959; M.D., 1961. (See Department of Pediatrics)

**William B. Hardin**, B.A., Rice University, 1953; M.D., University of Texas, 1957.

**Alan L. Pearlman** (Gordon R. Coates Scholar in Neurology), A.B., State University of Iowa, 1958; M.D., Washington University, 1961. (See Department of Physiology and Biophysics)

**Arthur L. Prensky**, A.B., Cornell University, 1951; M.D., New York University, 1955. (See Department of Pediatrics)

*Assistant Professors (Clinical)*

**Herbert E. Rosenbaum**, B.S., University of Oregon, 1947; M.D., 1949.

**Stuart Weiss**, A.B., Washington University, 1950; M.D., 1954.

*Assistant Professor Emeritus (Clinical)*

**Archie D. Carr**, B.S., Washington University, 1918; M.D., 1921.

*Research Assistant Professor*

**Margaret H. Clare** (Neurophysiology), B.S.Ed., Southeast Missouri State Teachers College, 1941; M.A., Washington University, 1951.

*Instructors*

**Hugo Mejia**, B.A., St. Tomas de Aquino, 1955; M.D., National University of Colombia, 1963. (Starkloff Hospital)

**Warren A. Weinberg**, B.A., Vanderbilt University, 1956; M.D., 1959. (See Department of Pediatrics)

*Instructors (Clinical)*

**Joseph M. Dooley, Jr.**, M.D., St. Louis University, 1958.

**Thomas R. Moon**, A.B., De Pauw University, 1955; M.D., Washington University, 1959.

**Robert J. Mueller**, M.D., Washington University, 1936; M.S., University of Michigan, 1942.

**Earl R. Schultz**, A.B., Southeast Missouri State College, 1952; B.S. in Medicine, University of Missouri, 1953; M.D., Washington University, 1955. (See Department of Psychiatry)

*Research Assistants*

**Joe Inukai**

**Lloyd N. Simpson**

**Jeanne M. Smith**

**SECOND YEAR**

*Neurological Examination in Clinical Diagnosis* (part of course in physical diagnosis). Lectures, demonstrations, and practice examinations of neurological patients.

(Drs. Eliasson, Chesanow, and Staff)



*Pathophysiology of Nervous System Disorders* (part of course in pathology). A collaborative sequence with other clinical and basic science departments concerned with diseases of the nervous system. Lectures and seminar-symposia. (Drs. Eliasson, Hardin, and Staff)

*Clinical Neurology*. Eighteen lectures and clinical demonstrations concerning major problems in neurological medicine.

(Drs. Hardin, Brooks, and Staff)

### THIRD YEAR

*Neurology*. A full-time, three-week clerkship is provided on the ward and private services at Barnes Hospital. Patients are assigned to students, who follow them with the resident staff and discuss them regularly in conferences with the senior staff. Students also work in the Neurology Clinic under staff supervision.

(Drs. Eliasson, Landau, and Staff)

### FOURTH YEAR

#### Electives

*Neurological Research*. A twelve-week elective is available in several areas: electron microscopy of the nervous system, clinical experimental neurophysiology, neurochemistry, and other areas. Facilities are available for qualified students in any year to undertake original research in the laboratories of the department or in the clinics and wards.

(Dr. Landau and Staff)

*Clinical Neurology*. A six-week elective neurology clerkship is offered at Starkloff Hospital. There the student works as a full-fledged member of the clinical team and assumes responsibility for patients. Formal teaching conferences are provided in addition to regular teaching rounds.

(Drs. Chesanow, Mejia, Dooley, and Staff)

*Staff Conferences*. Students are invited to attend the conjoint neurological conference (neuropathology, neuroradiology, medical neurology, pediatric neurology, and neurological surgery) held on Wednesday afternoon at 2:00 p.m. in Clopton Amphitheatre. (On the second Wednesday of the month it is held at Starkloff Hospital.) Neuropathology brain cutting conferences are held in the Pathology Amphitheatre on Monday at 1:00 p.m. and in the Starkloff Hospital autopsy conference room on Thursday at 12:30 p.m.



## Department of Obstetrics and Gynecology

For convenience of administration, care of patients, and teaching and research, the Department of Obstetrics and Gynecology includes the following specialty divisions:

Gynecological Endocrinology

*Dr. Woolf*

Gynecological Oncology

*Dr. Camel*

Research (Myometrial Physiology)

*Dr. Csapo*

Research (Biochemistry)

*Dr. Wiest*

Ob.-Gyn. Service at Max C. Starkloff Hospital

*Dr. Esslinger*

Ob.-Gyn. Service at Homer G. Phillips Hospital

*Dr. Monat*

Students are given practical instruction in obstetrics and gynecology at St. Louis Maternity Hospital, Barnes Hospital, the Washington University Clinics, and also at Starkloff and Homer Phillips Hospitals. Approximately 6,000 confinements annually are available for teaching obstetrics on the ward services of St. Louis Maternity, Starkloff, Homer Phillips, Jewish and St. Luke's Hospitals. Instruction in the care of ambulatory obstetrical and gynecological patients is carried out in the University Clinics, where about 1,000 new patients are seen and about 15,000 follow-up visits are made annually. Instruction in gynecology is given in the University Clinics and on the wards of the St. Louis Maternity, Barnes, and Barnard hospitals. There are approximately 2,500 admissions annually to the gynecological service, of which about one-fifth have malignant disease.

### *Professor and Head of the Department*

**Willard Myron Allen**, B.S., Hobart College, 1926; M.S., University of Rochester, 1929; M.D., 1932; Sc.D. (hon.), 1957; Sc.D. (hon.), Hobart College, 1940.

### *Head of the Department, Designate*

**James C. Warren**, A.B., University of Wichita, 1950; M.D., University of Kansas, 1954; Ph.D., University of Nebraska, 1961. (Markle Scholar)

### *Professors*

**Arpad I. Csapo**, M.D., University of Szeged (Hungary), 1941.

**Walter G. Wiest** (Biochemistry), A.B., Brigham Young University, 1948; Ph.D., University of Wisconsin, 1952. (See Department of Biological Chemistry)

**Ralph B. Woolf**, B.S., Massachusetts Institute of Technology, 1935; M.D., University of Rochester, 1939.

### *Professors (Clinical)*

**A. Norman Arneson**, B.S., Texas Christian University, 1924; M.D., Washington University, 1928. (See Department of Radiology)

**William H. Masters**, B.S., Hamilton College, 1938; M.D., University of Rochester, 1943.

**Samuel D. Soule**, M.D., Washington University, 1928.

### *Professors Emeriti (Clinical)*

**John E. Hobbs**, A.B., Southwest Missouri State Teachers College, 1923; M.D., Washington University, 1927.

**Melvin A. Roblee**, B.S., Washington University, 1923; M.D., 1925.

**Grandison D. Royston**, M.D., Washington University, 1907.

### *Associate Professor Emeritus (Clinical)*

**F. P. McNalley**, B.S., Washington University, 1915; M.D., 1917.

### *Assistant Professors*

**H. Marvin Camel**, M.D., Creighton University, 1950.

**Ernest R. Friedrich**, M.D., University of Heidelberg, 1954.

### *Assistant Professors (Clinical)*

**William Berman**, A.B., Washington University, 1931; M.D., 1935.

**Arthur R. Bortnick**, M.D., Washington University, 1935.

**Robert Burstein**, M.D., Washington University, 1948.

**Arthur T. Esslinger**, M.D., Washington University, 1940.

**Charles R. Gulick**, A.B., Central College, 1940; M.D., St. Louis University, 1943.

**Herman Hutto**, A.B., University of Alabama, 1932; M.D., Washington University, 1935.

**Frank B. Long, Jr.**, M.D., Washington University, 1947.

**John B. Martin**, B.A., Amherst College, 1951; M.D., Washington University, 1955.

**Laurence E. Maze**, M.D., Washington University, 1948.

**Seymour Monat**, A.B., University of Pennsylvania, 1935; M.D., Long Island College, 1939.

**Norman K. Muschany**, A.B., Westminster College, 1947; M.D., Temple University, 1951.

**James Pennoyer**, B.S., Hobart College, 1933; M.D., University of Rochester, 1939.

**David Rothman**, B.S., Washington University, 1935; M.D., 1935.

**Willard C. Scrivner**, B.S., Washington University, 1926; M.D., 1930.

**William L. Smiley**, A.B., Ohio State University, 1933; M.D., 1937.

**Helman C. Wasserman**, A.B., Johns Hopkins University, 1928; M.D., Washington University, 1932.

**Carol F. Williams**, B.A., University of Tennessee, 1952; M.D., 1955.

**Seth E. Wissner**, A.B., Washington University, 1942; M.D., 1945.

**George J. L. Wulff, Jr.**, A.B., Washington University, 1929; M.D., 1933.

#### *Assistant Professor Emeritus (Clinical)*

**Kevin C. Morrin**, M.B., B.Ch., National University of Ireland, 1921.

#### *Instructors*

**Hanna Klaus**, A.B., University of Louisville, 1948; M.D., 1950.

**Samad Momtazee**, M.D., Shiraz Medical School (Iran), 1961. (See Division of Health Care Research)

#### *Instructors (Clinical)*

**Hubert L. Allen**, A.B., University of Kansas, 1932; M.D., Tulane University, 1936.

**Joe E. Belew**, A.B., Central College, 1953; M.D., St. Louis University, 1957.

**Bryce H. Bondurant**, A.B., Northeast Missouri State Teachers College, 1936; D.O., Kirksville College of Osteopathy and Surgery, 1940; M.D., Washington University, 1943.

**Robert S. Cohen**, B.S., Union College, 1958; M.D., State University of New York, 1962.

**Robert Duemler**, A.B., Washington University, 1952; M.D., 1956.

**S. Michael Freiman**, A.B., Montana State University, 1951; M.D., Washington University, 1955.

**Andrew Galakatos**, B.S., St. Louis College of Pharmacy, 1960; M.D., University of Missouri, 1965. (On leave of absence)

**Ira Clyde Gall**, B.S., University of Cincinnati, 1948; M.D., 1951.

**Robert S. Goell**, A.B., Middlebury College, 1949; A.M., University of Pennsylvania, 1950; M.D., Washington University, 1960.

**Godofredo M. Herzog**, B.S., Louisiana State University, 1953; M.D., Washington University, 1957.

**S. Robert Kovac**, A.B., Washington University, 1960; M.D., University of Missouri, 1964.

**Justin F. Kraner**, M.D., University of Michigan, 1949.

**Ruben Marmet**, B.S., University of Cincinnati, 1958; M.D., 1962. (See Division of Health Care Research)

**Paul F. Max**, B.S., Washington University, 1932; M.D., 1932.

**Michael McNalley**, A.B., Washington University, 1947; M.D., 1951.

**Theodore Merrims**, A.B., Washington University, 1949; M.D., 1954.

**Jerry N. Middleton**, B.A., Westminster College, 1959; M.D., Washington University, 1963.

**Frank A. Morrison**, B.S., University of Nebraska, 1935; M.D., 1936.

**Nathaniel H. Murdock**, B.S., Harvard University, 1958; M.D., Meharry Medical College, 1963.

**Ivan T. Myers**, B.A., University of Missouri, 1958; M.D., University of Missouri Medical School, 1963.

**Gerald Newport**, A.B., Washington University, 1948; M.D., 1953.

**Joseph D. O'Keefe**, A.B., University of Colorado, 1946; M.D., Washington University, 1950.

**Harry E. Raybuck, Jr.**, A.B., Westminster College, 1949; M.S., St. Louis University, 1951; Ph.D., 1953; M.D., Medical College of Georgia, 1959.

**Jonathan R. Reed**, B.A., Fisk University, 1956; M.D., Meharry Medical College, 1965.

**Marvin Rennard**, A.B., Washington University, 1947; M.D., 1952; B.S., University of Missouri, 1950; M.S., 1950.

**Alexander M. Roter**, A.B., University of Illinois, 1948; M.D., 1951.

**James Sawyer**, A.B., Ohio State University, 1949; M.D., 1951.

**Melvin M. Schwartz**, A.B., University of Nebraska, 1945; M.D., 1947.

**Arthur A. Smith**, M.D., St. Louis University, 1958.

**Robert J. Sokol**, B.A., University of Rochester, 1962; M.D., 1966. (On leave of absence)

**Frances H. Stewart**, M.D., Washington University, 1927.

**Herman Taute**, M.D., Philipps University (Marburg/Lahn, West Germany), 1954.

**Eugene D. Taylor**, B.S., Virginia State College, 1948; M.D., Howard University, 1954.

**M. Bryant Thompson**, M.D., University of California, 1961.

**Bernice A. Torin**, A.B., Washington University, 1937; M.D., 1941.

**Arthur M. Townsend III**, B.S., University of Michigan, 1955; M.D., Howard University, 1962.

**Alva C. Trueblood, Jr.**, A.B., Washington University, 1940; M.D., 1943.

**J. Leslie Walker**, M.D., University of Tennessee, 1960.

**Wilfred B. Weisbrod**, M.D., University of Toronto, 1947.

**Sol Weisman**, A.B., Washington University, 1928; M.D., 1932.

**Parker H. Word**, B.S., Virginia State College, 1941; M.D., Howard Medical School, 1944.

**Mitchell Yanow**, M.D., Washington University, 1941.

#### *Instructor Emeritus (Clinical)*

**Grover B. Liese**, A.B., Real-Gymnasium (Cassel, Germany), 1910; M.D., University of Heidelberg 1918.

#### *Research Instructors*

**B. Ramanath Rao**, B.S., University of Madras (India), 1957; M.S., University of Baroda (India), 1962; Ph.D., University of Utrecht (Netherlands), 1967.

**Jacques Sauvage**, M.D., University of Liege (Belgium), 1957.

#### *Research Assistant*

**Samuel J. Hayward.**

Instruction in Obstetrics and Gynecology commences with the second semester of the second year and continues through the third and fourth years.





## SECOND YEAR

A series of lectures is given to familiarize the student with the physiological and biochemical aspects of the reproductive processes as they relate to Obstetrics and Gynecology. Clinical application is emphasized.

## THIRD YEAR

The student devotes six weeks to intensive clinical experience in the hospital and in the outpatient department. He attends prenatal clinics and assists at the delivery of selected patients; is assigned selected gynecological patients and acquires familiarity with the surgical techniques employed; and attends scheduled teaching sessions in which the clinical aspects of obstetrics and gynecology are discussed.

Students at some time during the third year are encouraged to attend the Planned Parenthood Clinic for practical instruction in the various methods of family planning.

## FOURTH YEAR

Instruction in the fourth year is entirely elective. The electives are sufficiently varied to permit the individual student to get either limited or extensive additional experience in obstetrics and gynecology.

### Electives

*Seminar: Advanced Obstetrics.* Students interested in obstetrics are given the opportunity to study the literature pertaining to many of the complications of pregnancy. The various topics assigned are discussed with members of the faculty. The seminar is of especial value to students taking clerkships in obstetrics.

*Seminar: Advanced Gynecology.* Students interested in gynecology are given the opportunity to study the literature pertaining to the diseases and disorders peculiar to women, including endocrine disorders and infertility.

The assigned topics are discussed in a systematic manner with selected members of the faculty. This seminar is of especial value to students taking clerkships in gynecology.

*Research.* Students interested in research in the broad area of reproduction may actively participate in research current in the Department. Students may also be assigned specific research problems. A personal interview is required before admission to this elective.

Research in myometrial physiology

(Dr. Csapo)

Research in steroids in reproductive physiology

(Dr. Wiest)

Research in ultrastructure of generative tract

(Dr. Friedrich)

The following clinical externships are available:

1. Ob.-Gyn. Clinic, W. U. Clinics

(Dr. Woolf)

2. Obstetrics, Barnes-Maternity

(Dr. Woolf)

3. Gynecology, Barnes-Maternity

(Dr. Friedrich)

4. Gynecologic Oncology, Barnes-Maternity

(Dr. Camel)

5. Gynecologic Pathology, Barnes-Maternity

6. Obstetrics and Gynecology, Jewish

Hospital (Dr. Rothman)

7. Obstetrics and Gynecology, St. Luke's

Hospital (Dr. Williams)

8. Obstetrics and Gynecology, Homer G.

Phillips Hospital (Dr. Monat)

9. Ob.-Gyn. Clinic, Jefferson-Cass Health

Center (Dr. Smiley)

These clerkships provide opportunity for the student to obtain clinical proficiency in the various aspects of clinical obstetrics and gynecology. A combination of one or more of these clerkships with the seminars provides excellent foundation for residency training in obstetrics and gynecology.

## Department of Ophthalmology

The instruction in the Department of Ophthalmology begins in the second year with methods of examination of the eye. Emphasis is placed on the use of the ophthalmoscope. During the second year a series of nine didactic lectures is given as an introduction to various aspects of ocular disease. During the third year students are assigned to an ophthalmology clerkship for one week. In the fourth year, a six-week ophthalmology elective is offered to senior students. This elective affords opportunity for work with patients under supervision.

### *Professor and Head of the Department*

**Bernard Becker**, A.B., Princeton University, 1941; M.D., Harvard University, 1944.

### *Professor*

**James E. Miller**, B.S., Tulane University, 1946; M.D., The Medical College of Alabama, 1949. (See Department of Pediatrics)

### *Research Professors*

**Adolph I. Cohen**, B.S., City College of New York, 1948; M.A., Columbia University, 1950; Ph.D., 1954. (See Department of Anatomy)

**Jay M. Enoch**, B.S., Columbia University, 1950; Ph.D., Ohio State University, 1956. (Also College of Arts and Sciences)

### *Associate Professors*

**Marguerite A. Constant** (Biochemistry), B.S., George Washington University, 1947; Ph.D., University of Wisconsin, 1951.

**Allan E. Kolker**, A.B., Washington University, 1954; M.D., 1957.

**Robert A. Moses**, A.B., Johns Hopkins University, 1938; M.D., University of Maryland School of Medicine, 1942.

**Morton Smith**, B.S., University of Maryland, 1956; M.D., 1960. (See Department of Pathology)

### *Associate Professors (Clinical)*

**Andrew J. Gay**, B.S., University of Alabama, 1950;



M.A., 1954; M.D., Medical College of Alabama, 1955. (See Department of Neurology)

Edward Okun, M.D., University of Vermont, 1956.

Theodore Eugene Sanders, B.S., University of Nebraska, 1931; M.D., 1933.

*Associate Professors Emeriti (Clinical)*

Bennett Young Alvis, B.S., St. Louis University, 1916; M.D., 1918.

Howard Rommel Hildreth, M.D., Washington University, 1928.

Frederick Oscar Schwartz, M.D., Washington University, 1910.

*Assistant Professors*

Ronald Burde, B.S., Massachusetts Institute of Technology, 1960; M.D., Jefferson Medical College, 1964.

Steven M. Podos, A.B., Princeton University, 1958; M.D., Harvard University, 1963.

*Assistant Professors (Clinical)*

Edmund B. Alvis, M.D., Washington University, 1934.

Stanley Becker, A.B., Washington University, 1948; M.A., 1950; Ph.D., 1951; M.D., Chicago Medical School, 1955.

Daniel Bisno, B.A., University of Wisconsin, 1927; M.D., Johns Hopkins University, 1931.

Isaac Boniuk, B.S., Dalhousie University, 1958; M.D., 1962.

Robert C. Drews, A.B., Washington University, 1952; M.D., 1955.

Jack Hartstein, B.S., University of Missouri, 1953; M.D., University of Cincinnati, 1955.

Glen P. Johnston, A.B., Washington University, 1953; M.D., 1956.

Jack Kayes, B.A., Yale University, 1953; M.D., Washington University, 1957.

William H. Meinberg, B.S., Washington University, 1928; M.D., 1932.

Benjamin Milder, M.D., Washington University, 1939.

Harry David Rosenbaum, M.D., Washington University, 1934.

Bernd Silver, B.S., University of Louisville, 1952; M.D., 1956.

*Research Assistant Professor*

Nigel Daw, B.A., Trinity College, 1956; M.A., 1961; Ph.D., Johns Hopkins University, 1967. (See Department of Physiology and Biophysics)

*Instructors*

Edward F. Berg, A.B., Washington University, 1960; M.D., 1964. (On leave of absence)

John F. Bigger, Jr., A.B., Duke University, 1960; M.D., Washington University, 1964.

Stephen Waltman, B.S., Massachusetts Institute of Technology, 1961; M.D., Yale University Medical School, 1964. (On leave of absence)

*Instructors (Clinical)*

James Howard Bryan, A.B., Washington University, 1932; M.D., 1936.

Samuel A. Canaan, Jr., A.B., State University of Iowa, 1942; M.D., Meharry Medical College, 1954.

Ruth Schreiber Freedman, A.B., Washington University, 1938; M.D., 1942.

David Merrill Freeman, A.B., University of Missouri, 1940; B.S. in Medicine, 1941; M.D., Washington University, 1943.

William Steven Joffe, A.B., Washington University, 1959; M.D., 1963.

Matthew Newman, A.B., Vanderbilt University, 1956; M.D., Columbia University, 1959.

Lawrence T. Post, Jr., M.D., Washington University, 1948.

Maxwell Rachlin, M.D., University of Ontario, 1942.

Mickey L. Salmon, M.D., Louisiana State University, 1959.

Philip T. Shahan, A.B., Harvard University, 1938; M.D., Washington University, 1942.

Arthur W. Stickle, Jr., M.D., University of Oklahoma, 1943.

Howard P. Venable, B.S., Wayne State University, 1935; M.D., 1940.

Charles E. Windsor, A.B., Carleton College, 1956; M.D., University of Rochester, 1960.

*Research Instructors*

Walter J. Grodzki, D.D.S., St. Louis University, 1944.

**Elaine Miller**, A.B., Judson College, 1944; M.D., Medical College of Alabama, 1949. (See Department of Pediatrics)

**Gerard M. Shickman**, A.B., Washington University, 1955; M.A., 1956; Ph.D., Harvard University, 1960.

#### *Assistants*

**Lisa M. Cibis**, M.D., University of Heidelberg, 1939; Certified Orthoptist, Washington University, 1956.

**William A. Moor**, A.B., Washington University, 1934.

#### *Research Assistants*

**Dorothy G. Cooper**, R.N., Washington University, 1953; B.S.N., 1964; M.S.N., 1966.

**Nels J. Holmberg**, B.S., Oklahoma State University, 1963; M.S., 1966.

### **SECOND YEAR**

*Ophthalmology.* Lectures and demonstrations are given in the basic principles of ophthalmology. (Drs. Moses, Drews, Kolker, Smith, and Resident Staff)

### **THIRD YEAR**

*Ophthalmology.* All students rotate through the eye clinic for a one-week clinical clerkship.

### **FOURTH YEAR**

#### **Electives**

**439. Seminar.** A course in the basic principles of vision is conducted under the supervision of the Departments of Psychology and Ophthalmology. (Dr. Enoch)

**B 208. Clinical Clerkship in Ophthalmology.** One student rotates through the Department of Ophthalmology for a period of six weeks. The first three weeks is an introduction-orientation period. He is given instruction in the basic principles of an ophthalmologic examina-

tion, including slit lamp biomicroscopy, motility evaluation, neuro-ophthalmologic evaluation, perimetry, ophthalmoscopy, tonometry, etc. During this time he assists in the work-up of eye patients and attends all rounds and conferences. During the final three weeks he works up patients in the clinic and on the wards and is responsible for presenting cases to the house staff and faculty. He also assists in the operating room. This elective is primarily geared to the student who expects to enter ophthalmology in the future. (Dr. M. Smith)

#### **Research Electives**

Retinal physiology. (Dr. Enoch)

Experimental and clinical research in glaucoma. (Dr. Becker)

Experimental and diagnostic ophthalmic pathology. (Dr. M. Smith)

Experimental research in ocular physiology. (Dr. R. Moses)

*Note*—The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences and may be found under that number in the Bulletin of that School.

## Department of Otolaryngology

Otolaryngology is presented to students during their sophomore, junior, and senior years. Clinico-pathologic correlation lecture series is presented to the sophomores. In the junior year each student spends two weeks on one of the services at McMillan, Cochran V.A., Max C. Starkloff, or Homer G. Phillips Hospitals. During this period there is teaching at the bedside, in the operating room, and at the clinic. This is supplemented by daily afternoon lectures, grand rounds on Thursdays, and an introduction to audiology as well as to basic ENT research.

The ENT rotation is highlighted by a field trip to an outlying community where a full-time member of the Department evaluates and treats a large number of adults and children with common ENT problems. Those senior students who show a special interest may take a rotating elective in ENT. The elective can be suited to the interests of the student. Some possibilities include research or clinical work. Ample research facilities and ongoing projects are available. Clinical exposure could include oncologic diseases related to the head and neck, otologic diseases, otoneurology, audiology, or middle ear surgery.

### *Lindburg Professor and Head of Department*

**Joseph H. Ogura**, A.B., University of California, 1937; M.D., 1941.

### *Professor*

**Sol Richard Silverman** (Audiology), A.B., Cornell University, 1933; M.S., Washington University, 1938; Ph.D., 1942.

### *Research Professors*

**Donald H. Eldredge**, S.B., Harvard University, 1943; M.D., 1946.

**Ira J. Hirsh** (Audiology), A.B., New York State College for Teachers (Albany), 1942; M.A., Northwestern University, 1943; M.A., Harvard University, 1947; Ph.D., 1948.

### *Professors Emeriti*

**Walter Page Covell**, B.S., Oregon State College, 1921; M.S., 1923; Ph.D., University of Minnesota, 1926; M.D., University of Chicago, 1933. (See Department of Anatomy)

**Theodore E. Walsh**, B.A., Cambridge University (England), 1921; M.R.C.S., L.R.C.P., London, 1925. (Also Lecturer)

### *Research Professor Emeritus and Lecturer*

**Hallowell Davis** (Research), A.B., Harvard Uni-





versity, 1918; M.D., 1922. (See Department of Physiology and Biophysics)

*Associate Professors*

**Malcolm H. Stroud**, M.B., Ch.B., University of Birmingham, 1945; L.R.C.P., M.R.C.S., 1946; F.R.C.S., 1949.

**Ruediger Thalmann**, M.D., University of Vienna, 1954.

*Associate Professor (Clinical)*

**Ben H. Senturia**, A.B., Washington University, 1931; M.D., 1935.

*Associate Professor Emeritus (Clinical)*

**French K. Hansel**, M.D., St. Louis University, 1918.

*Assistant Professors*

**Hugh Biller**, M.D., Marquette University, 1960.  
**William A. Carver** (Audiology), B.A., University of Southern California, 1951; M.A., 1955; Ph.D., 1960.

**David Crowley** (Physiological Acoustics), B.A., Middlebury College, 1961; M.A., University of Vermont, 1963; Ph.D., Princeton University, 1965.

**William H. Diehl, Jr.**, B.A., Washington and Jefferson College, 1958; M.D., Jefferson Medical College, 1962.

**Joseph E. Harvey**, B.A., University of California, 1954; M.A., 1964; Ph.D., 1968. (See Department of Anatomy)

**William F. Marovitz**, B.A., University of California, 1962; Ph.D., 1966. (See Department of Anatomy)

**Mark May**, B.S., Dickinson College 1957; M.D., Hahnemann Medical College, 1961.

**Lindsay Pratt**, B.S., Muhlenberg College, 1949; M.D., Jefferson Medical College, 1953; M.S., Temple University, 1960.

*Assistant Professors (Clinical)*

**William T. K. Bryan**, A.B., Washington University, 1929; M.D., 1933.

**Harold M. Cutler**, A.B., University of Maine, 1930; M.D., Tufts College, 1937.

**Morris Davidson**, B.S., Indiana University, 1936; M.D., 1938.

**L. Wallace Dean, Jr.**, B.S., Yale University, 1930; M.D., Washington University, 1933.

**Guerdan Hardy**, M.D., Washington University, 1929.

**Daniel D. Klaff**, B.S., University of Virginia, 1933; M.D., 1936.

**Edward H. Lyman**, B.S., Washington University, 1937; M.D., 1937.

**Herbert M. Smit**, M.D., St. Louis University, 1933.

**Robert E. Votaw**, B.S., State University of Iowa, 1927; M.D., 1929.

**Joseph Warren West**, M.D., Duke University, 1944.

*Assistant Professors Emeriti (Clinical)*

**Alfred J. Cone**, B.S., State University of Iowa, 1921; M.D., 1923; M.S., 1927.

**Harry N. Glick**, A.B., Cornell University, 1916; M.D., St. Louis University, 1922.

*Research Instructor*

**Marian Pfingsten Bryan**, A.B., Washington University, 1931.

*Instructors (Clinical)*

**Benard Adler**, B.S., Washington University, 1937; M.D., 1937.

**Charles C. Jacobs**, A.B., Washington University, 1942; M.D., 1945.

**A. Chesterfield Stutsman**, B.S., Roanoke College, 1927; M.D., University of Virginia, 1931.

**Wayne A. Viers**, B.S., Phillips University, 1952; M.D., University of Oklahoma, 1956.

*Research Assistants*

**Charles Carr.**

**Thomas H. Comegys**, B.A., Central Methodist College, 1966.

**Loretta E. Glismann**, B.S., Fordham University, 1960.

**George Holtzsch**, B.A., Southern Illinois University, 1962; M.A., 1966.

*Assistants*

**Jacquelyn J. Scorza** (Audiology), B.A., Parson's College, 1944; M.A., University of Iowa, 1957.

**Frederick Waldman** (Audiology), B.S., Upsala College, 1963; M.S., Seton Hall University, 1966.

## SECOND YEAR

*Otolaryngology and Physical Diagnosis.* Clinical pathologic correlative lectures in otolaryngology are given to the entire class.

(Dr. Ogura)

## THIRD YEAR

*Otolaryngology Clerkship.* Practical instruction in diagnosis and treatment. Two weeks.

(Drs. Pratt, Biller, May, Diehl)

## FOURTH-YEAR ELECTIVES

*Structure and Innervation of Labyrinth.*

(Dr. Marovitz)

*Clinical Clerkship.* A three-week rotation in areas of otology, laryngology, and head-neck surgery.

(Drs. Ogura and Clinical Staff)

*Basic Science Review.* Fundamental principles of anatomy and physiology of head and neck; lectures and dissection.

(Dr. Marovitz and Staff)

### *Research*

Cytology, neurology, and histochemistry of membranous labyrinth. (Dr. Marovitz)

Physiology of larynx. (Drs. Ogura, Harvey)

Nasopulmonary physiology. (Dr. Ogura)

Metabolism of the inner ear. Physiological and biochemical aspects. (Dr. Thalmann)

Otoneurology labs. (Dr. Stroud)

Development of otic capsule and ossicles.

(Dr. Marovitz)

Audiology

(Dr. Carver)

## Department of Pathology

Pathology for medical students is given during the second, third, and fourth years. In the second year the course covers general and special pathology, and in the third and fourth years the students attend the clinical pathological conferences conducted in collaboration with the clinical departments.

### *Edward Mallinckrodt Professor and Head of the Department*

**Paul E. Lacy**, B.A., Ohio State University, 1945; M.D., 1948; M.S., 1948; Ph.D., University of Minnesota, 1955.

### *Professors*

**Lauren V. Ackerman** (Pathology and Surgical Pathology), A.B., Hamilton College, 1927; M.D., University of Rochester, 1932.

**Allen C. Enders**, A.B., Swarthmore College, 1950; A.M., Harvard University, 1952; Ph.D., 1955. (See Department of Anatomy)

**Joe W. Grisham** (Markle Scholar), A.B., Vanderbilt University, 1953; M.D., 1957. (See Department of Anatomy)

**Thomas R. Hamilton**, A.B., University of Missouri, 1932; M.D., University of Kansas, 1935; M.S., 1941. (Cochran V.A. Hospital)

**John Kissane**, A.B., University of Rochester, 1948; M.D., Washington University, 1952. (See Department of Pediatrics)

**Ruth Silberberg**, M.D., University of Breslau, 1931.

**Richard Torack**, B.S., Seton Hall University, 1948; M.D., Georgetown University, 1952. (See Department of Anatomy)

### *Associate Professors*

**Robert C. Ahlvin**, B.S., Iowa State College, 1950; M.D., Washington University, 1954. (Jewish Hospital)

**Walter C. Bauer**, B.S., Ohio State University, 1946; M.D., Washington University, 1954.

**Virgil R. Bleisch**, M.D., Washington University, 1948.

**Milton N. Goldstein**, B.S., Western Reserve University, 1946; M.S., 1947; Ph.D., 1954. (See Department of Anatomy)

**Marie Greider**, B.S., Ohio State University, 1949; M.S., 1955; Ph.D., 1960.

**Phyllis M. Hartroft**, B.S., University of Michigan, 1949; M.A., University of Toronto, 1951; Ph.D., 1954.

**Leonard Jarett** (Laboratory Medicine) B.A., Rice University, 1958; M.D., Washington University, 1962. (Markle Scholar) (See Department of Medicine)

**Gerald Kessler**, B.S., City College of New York, 1950; M.S., University of Maryland, 1952; Ph.D., 1954. (Jewish Hospital)

**Erwin R. Rabin**, A.B., Washington University, 1952; M.D., Washington University, 1956. (Jewish Hospital)

**Morton E. Smith**, B.S., University of Maryland, 1956; M.D., University of Maryland, 1960. (See Department of Ophthalmology)

**Alex C. Sonnenwirth**, A.B., University of Nebraska, 1950; M.S., Purdue University, 1953; Ph.D., Washington University School of Medicine, 1960. (See Department of Microbiology) (Jewish Hospital)

**Joseph R. Williamson**, A.B., Phillips University, 1954; M.D., Washington University, 1958. (See Department of Anatomy)

### *Assistant Professors*

**Waguih M. Abdel-Bari**, B.A., School of Science, Cairo, 1948; M.D., Ein Shams University, Cairo, 1953, Ph.D., Washington University School of Medicine, 1965.

**Luis Alvarez**, M.D., University of Santo Domingo, 1958. (Starkloff Hospital)

**Francisco Barrios-Granguillhome**, M.D., National University of Mexico, 1938.

**John D. Bauer**, B.Sc., University of Innsbruck, 1938; L.R.C.P. and S., University of Glasgow, 1944; M.D., Marquette University, 1947.

**Gustave L. Davis**, B.A., Union College, 1959; M.D., State University of New York, College of Medicine, 1963. (Jewish Hospital)

**Luis Q. Del Rosario**, M.D., University of Santo Tomas, 1954. (Starkloff Hospital)



**Harold S. Kaplan** (Laboratory Medicine), A.B., Oberlin College, 1958; M.D., Albert Einstein College of Medicine, 1962. (See Department of Medicine)

**Mery Kostianovsky**, M.D., Universidad Nacional del Litoral (Rosario, Argentina), 1958. (Cochran V.A. Hospital)

**Frederick T. Kraus**, B.A., College of William and Mary, 1951; M.D., Washington University, 1955.

**Charles Kuhn**, A.B., Harvard University, 1955; M.D., Washington University, 1959.

**Michael Kyriakos**, B.S., City College of New York, 1958; M.D., Albert Einstein College of Medicine, 1962.

**Virgil Loeb, Jr.**, M.D., Washington University, 1944. (See Department of Medicine)

**David N. Menton**, B.S., Mankato State College, 1959; Ph.D., Brown University, 1966. (See Department of Anatomy)

**John S. Meyer**, B.A., Yale University, 1952; M.D., Washington University, 1956. (Jewish Hospital)

**Blanca M. Perez**, B.A., Universidad del Valle (Colombia), 1953; M.D., 1961. (Jewish Hospital)

**William R. Platt**, B.S., University of Maryland, 1936; M.D., 1940.

**William Schlaepfer**, B.A., Princeton University, 1954; M.D., Yale Medical School, 1958.

**Herbert Silver**, B.A., Adelphi College, 1953; M.D., University of Buffalo, 1957. (Jewish Hospital)

**Carl H. Smith**, B.A., Swarthmore College, 1955; M.D., Yale University, 1959. (See Department of Pediatrics)

Sue Cassell Stevens, A.B., Goucher College, 1930; M.A., 1931; Ph.D., Columbia University, 1940. (Jewish Hospital)

Lawrence Steinberg, A.B., Washington University, 1956; M.D., 1960. (Jewish Hospital)

Steven L. Teitelbaum, B.A., Columbia University, 1960; M.D., Washington University, 1964. (Jewish Hospital)

Thomas W. Tillack, A.B., University of Rochester, 1959; M.D., Yale University, 1963. (Effective January 1, 1971)

#### *Instructors*

Robert R. Dahlgren, B.S., Oklahoma State University, 1962; D.V.M., 1963; M.S., 1966.

Marcos G. Cruz, A.B., Manila Central University, 1952; M.D., 1957. (Cochran V.A. Hospital)

John Gerdes, B.S., University of Illinois, 1955; D.V.M., 1957; M.D., 1961. (Cochran V.A. Hospital)

Rodolfo A. Lattore, M.D., University of the East-Ramon Magsayay Memorial Medical Center, 1961.

Robert W. Long, B.A., University of Nebraska, 1950; M.D., Marquette University, 1961.

Napoleon Maminta, M.D., University of the Philippines, College of Medicine, 1956.

Khrosrow Mechanic, M.D., Tehran Medical School, 1958. (July 1 to December 31, 1970)

Manuel F. Menendez, B.S., University of Havana, 1949; M.D., 1956.

Carlos Perez-Mesa, M.D., University of Havana, 1950.

Ursula Sclafford, B.S., Howard University, 1942; M.D., 1945.

Laurence A. Sherman, B.A., University of Chicago, 1956; M.D., Albany Medical College, 1964. (See Department of Medicine) (Jewish Hospital)

Minor B. Vargas, B.A., Colegio Seminario, 1957; M.D., Universidad Nacional Autonoma de Mexico, 1962.

William G. Wood, B.S., Oklahoma State University, 1962; M.D., Washington University, 1966.

Louis S. K. Yuan, M.D., Aurora University (China), 1938.

#### *Research Assistants*

Kathryn Brooks, B.A., Washington University, 1967.

Edward H. Finke, B.S., Washington University, 1962.

Maria C. LaValle, A.B., Hunter College, 1963.

Willy Jean Malaisse, M.D., Free University of Brussels, 1960. (July 1 to September 30, 1970)

Francine Malaisse-Lagae, M.D., Brussels University, 1960. (July 1 to September 30, 1970)

Kenneth E. Moore, B.S., Nebraska State College, 1960. (Jewish Hospital)

#### SECOND YEAR

**501. Pathology.** General and special pathology are covered by lectures, gross and microscopic demonstrations, and laboratory work. In general pathology, degenerations, inflammations, infectious diseases, and tumors are considered. The diseases of each organ system are studied during the time devoted to special pathology. Small groups are given instruction in post-mortem technique and in gross pathology. 288 hours. (Staff)

#### THIRD AND FOURTH YEARS

*Clinical Pathological Conference.* The clinical history and treatment of patients who have died are discussed before the class by the physicians and surgeons of the departments concerned. These conferences afford the students an opportunity to interpret the clinical observations in the light of the postmortem findings. One hour a week during the third year. (Staff)

*Tumor Conference.* One hour each week for twelve weeks during the surgery and obstetrics and gynecology clerkship. Problem cases are presented for illustration and discussion of all aspects of neoplastic disease. 12 hours. (Staff)

#### Elective Courses

**502. Major Research.** The laboratory offers facilities for research in pathology. Specialists and students with adequate training who desire to extend their knowledge of pathology will be admitted. (Staff)

**595. Journal Club.** The current journals concerned with morphological and experimental pathology and oncology are reviewed by the members of the staff. Properly prepared students may attend or participate.

**596. Seminar in Gross Pathology.** The autopsies for the affiliated hospitals are performed by the junior members of the staff. The entire Department meets, and the cases are evaluated by the senior staff at this conference. Two hours once a week throughout the year. (Staff)



**597. Seminar in Microscopic Pathology.** The microscopic sections from each autopsy are presented by the prosector at a conference.  
(Staff)

**598. Endocrine Pathology.** A study of disease processes involving the endocrine system, including endocrine functions of the kidney and gastrointestinal system in addition to the classical endocrine glands. Correlation of macromolecular structure and function of both natural disease and experimentally induced conditions is emphasized. Two units.  
(Dr. P. Hartroft and Staff)

#### **Seminar Electives**

**Ultrastructural Pathobiology.** This seminar is based on a detailed consideration of the general ultrastructural features of cells, including a comprehensive review of these features in terms of normal biological function and of deranged functions associated with pathobiological conditions.

(Dr. Grisham and Staff)

**Correlative Pathology.** In depth presentation of selected topics on disease constellations to include recent advances in morphology and clinicopathologic correlation. The topics include cardiomyopathies, glomerulopathies, chronic pulmonary indurative diseases, etc.

(Dr. Kissane)

**Correlative Pediatric Pathology** (may be taken only as a continuation of correlative pathology). In-depth presentation of selected topics on disease constellations peculiar to the pediatric age group, including recent advances in morphology and clinico-pathologic correlation. Topics include the newborn lung, fibrocystic disease, etc.

(Dr. Kissane)

#### **Research Electives**

The research activities of the senior staff encompass basic investigations of nearly all of the major disease entities of man. Students interested in a research elective may either consult the chairman of the Department or the particular senior staff member who is working in his area of interest.

*Note*—The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences and may be found under that number in the Bulletin of that School.

# The Edward Mallinckrodt Department of Pediatrics

The primary aim of the Department of Pediatrics in the undergraduate teaching program is to stimulate interest in developmental biology, especially human growth and development, and to provide the student with a foundation sufficiently comprehensive so that he will have an appreciation of pediatric problems regardless of his future choice of a career in medicine.

The major clinical and research facilities are in the St. Louis Children's Hospital and the St. Louis Maternity Hospital. The former has a bed capacity of 165, and accepts children under sixteen years of age with all types of medical problems. Hospital admittances average 6,000 annually. The Pediatric Outpatient Division averages about 40,000 yearly visits. In the Medical Center the yearly number of newborn infants averages more than 4,000.

## *Professor and Head of the Department*

**Philip R. Dodge, M.D.**, University of Rochester, 1948. (See Department of Neurology)

## *Professors*

**David Goldring, A.B.**, Washington University, 1936; M.D., 1940.

**John Kissane, A.B.**, University of Rochester, 1948; M.D., Washington University, 1952. (See Department of Pathology)

**William H. McAlister, B.S.**, Wayne State University, 1950; M.D., 1954. (See Department of Radiology)

**J. Neal Middlekamp, B.S.**, University of Missouri, 1946; M.D., Washington University, 1948.

**James E. Miller, B.S.**, Tulane University, 1946; M.D., Medical College of Alabama, 1949. (See Department of Ophthalmology)

## *Professor Emeritus (Clinical)*

**Borden Smith Veeder, M.D.**, University of Pennsylvania, 1907; Sc.D., Colgate University, 1929.

## *Associate Professors*

**Alexis F. Hartmann, Jr., B.S.**, Washington University, 1951; M.D., 1951.

**John C. Herweg, B.S.**, Drury College, 1943; M.D., Washington University, 1945.

**Arthur L. Prensky, A.B.**, Cornell University, 1951; M.D., New York University, 1955. (See Department of Neurology)

**Alan M. Robson, M.B.B.S.**, University of Durham (England), 1959; M.D., 1964. (See Department of Medicine)

**William S. Sly, M.D.**, St. Louis University, 1957. (See Department of Medicine)

**Donald Lionell Thurston, B.S.**, Vanderbilt University, 1934; M.D., 1937.

**Jean Holowach Thurston, B.A.**, University of Alberta, 1937; M.D., 1941.

**Teresa J. Vietti, B.S.**, Rice University, 1949; M.D., Baylor University, 1953.

## *Assistant Professors*

**Darryl C. DeVivo, B.A.**, Amherst College, 1959; M.D., University of Virginia, 1964. (See Department of Neurology)

**David N. Dietzler, A.B.**, Washington University, 1957; Ph.D., 1963. (See Department of Pharmacology)

**Ralph D. Feigin, A.B.**, Columbia College, 1958; M.D., Boston University, 1962.

**Marvin A. Fishman, B.S.**, University of Illinois, 1959; M.D., 1961. (See Department of Neurology)

**Antonio Hernandez, Jr., M.D.**, Manila Central University, 1954.

**Dorothy Jeannette Jones, A.B.**, Oberlin College, 1930; M.D., Washington University, 1934.

**James P. Keating, A.B.**, Harvard University, 1959; M.D., 1963.

**Glenn T. Peake, B.A.**, University of Kansas, 1959; M.D., 1963. (See Department of Medicine)

**Mabel L. Purkerson, A.B.**, Erskine College, 1951; M.D., Medical College of South Carolina, 1956. (See Department of Medicine)

**David L. Rimoin, B.S.**, McGill University, 1957; M.D., C.M., M.S., 1961; Ph.D., Johns Hopkins University, 1967. (See Department of Medicine)

**Kenneth S. Shepard, A.B., B.S.**, Duke University, 1943; M.D., 1946.

**Carl H. Smith, B.A.**, Swarthmore College, 1955;



M.D., Yale University, 1959. (See Department of Pathology)

**Warren A. Weinberg**, B.A., Vanderbilt University, 1956; M.D., 1959. (See Department of Neurology)

**Virginia V. Weldon**, A.B., Smith College; 1957; M.D., University of Buffalo, 1962.

**Harold Zarkowsky**, A.B., Washington University, 1957; M.D., 1961.

#### *Assistant Professors (Clinical)*

**Max Deutch**, M.D., Washington University, 1926.

**Stanley Leonard Harrison**, B.S., Washington University, 1928; M.D., 1930. (On leave of absence)

**Frederick August Jacobs**, B.S., Washington University, 1927; M.D., 1928.

**Joseph C. Jaudon**, A.B., Washington University, 1926; M.D., 1933.

**Lawrence I. Kahn**, A.B., University of Alabama, 1941; M.D., Louisiana State University, 1945. (See Division of Health Care Research)

**Sol Londe**, B.S., Washington University, 1925; M.D., 1927.

**Paul H. Painter**, M.D., St. Louis University, 1947. (See Department of Psychiatry)

**Alfred S. Schwartz**, A.B., Amherst College, 1932; M.D., Johns Hopkins University, 1936.

#### *Assistant Professor Emeritus*

**Ruth E. Martin** (Dentistry), D.D.S., Washington University, 1923.

#### *Assistant Professor Emeritus (Clinical)*

**Park J. White**, A.B., Harvard University, 1913; M.D., Columbia University, 1917.

#### *Research Assistant Professors*

**Mary L. Parker**, B.S., Florida State University, 1946; M.S., 1949; M.D., Washington University, 1953. (On leave of absence)

**Richard J. Warren**, A.B., Oklahoma City University, 1958; Ph.D., St. Louis University, 1967. (See Department of Medicine)

#### *Instructors*

**Natalie Aronson**, A.B., Hunter College, 1942;

- M.D., New York University College of Medicine, 1947.
- Stanley D. Johnson**, B.S., University of Wisconsin, 1959; M.S., 1963; M.D., 1963.
- John Gilster** (Dentistry), D.D.S., Washington University, 1944.
- Robert L. Kaufman**, B.A., Washington University, 1959; M.D., 1963.
- Vita J. Land**, B.S., McGill University, 1961; M.D., 1965.
- Helen Palkes** (Psychology), B.S., Washington University, 1966; M.A., 1968.
- Patricia A. Parsons** (Dentistry), B.S., San Diego State College, 1953; D.D.S., Washington University, 1957.
- Joel Y. Rutman**, B.A., Brandeis University, 1959; M.D., Harvard University, 1963.
- Leo R. Sullivan**, B.S., Boston College, 1959; M.D., Tufts University, 1963.
- Charles N. Swisher**, B.A., Harvard University, 1961; M.D., McGill University, 1965.
- Instructors (Clinical)*
- Helen M. Aff**, B.S., Washington University, 1934; M.D., 1934.
- Christos Antoniou**, M.D., University of Athens, 1958.
- Edward T. Barker**, A.B., Princeton University, 1953; M.D., Washington University, 1957.
- Joseph A. Bauer**, M.D., Washington University, 1926.
- Benjamin B. Berman**, M.D., Washington University, 1939.
- Gordon R. Bloomberg**, A.B., University of Illinois, 1955; B.S., 1955; M.D., 1959.
- Clifford Read Boles**, A.B., Washington University, 1940; M.D., 1943.
- Martin Calodney**, B.S., College of the City of New York, 1930; M.D., New York University, 1936.
- Ira J. Friedman**, B.S., University of Arkansas, 1955; M.D., 1960.
- Robert H. Friedman**, M.D., Washington University, 1948.
- Elliot F. Gellman**, B.A., State University of Iowa, 1957; M.D., University of Missouri, 1961.
- Alan L. Goldman**, A.B., Harvard University, 1959; M.D., Washington University, 1963.
- Samuel Gollub**, B.S., Washington University, 1941; M.D., 1941.
- Gene Grabau**, B.S., St. Louis College of Pharmacy, 1937; M.D., Washington University, 1942.
- Marshall B. Greenman**, B.S., University of Illinois, 1946; M.D., 1948.
- Roman E. Hammes**, B.A., University of Iowa, 1950; M.D., 1954.
- Norman Hankin**, A.B., University of Wisconsin, 1940; M.D., 1943.
- James L. Harwell**, A.B., Washington University, 1957; M.D., University of Missouri, 1961.
- Maurice J. Keller**, A.B., Yale University, 1936; M.D., Columbia University, 1940.
- Sheldon Kessler**, M.D., St. Louis University, 1951.
- Henry L. Knock**, A.B., Johns Hopkins University, 1949; M.D., 1952.
- Kenneth Albert Koerner**, A.B., Washington University, 1935; M.D., 1941.
- Norton S. Kronemer**, A.B., Washington University, 1958; M.D., University of Missouri, 1962.
- Marian Kuttner**, M.D., Johann Wolfgang Goethe University (Frankfurt am Main), 1931.
- Maurice J. Lonsway, Jr.**, A.B., Washington University, 1946; M.D., 1950. (See Division of Health Care Research)
- Stanley B. Lyss**, A.B., Harvard University, 1958; M.D., Washington University, 1962. (See Division of Health Care Research)
- Richard Margolis**, B.S., College of William and Mary, 1947; M.D., Western Reserve University, 1951.
- John C. Martz**, A.B., University of Missouri, 1938; M.D., Washington University, 1942.
- David McClure**, M.D., University of Tennessee, 1940.
- Helen Nash**, A.B., Spelman College, 1942; M.D., Meharry Medical College, 1945.
- Homer E. Nash, Jr.**, M.D., Meharry Medical College, 1951.
- W. Neal Newton** (Dentistry), D.D.S., Washington University, 1951. (On leave of absence)
- Frederick D. Peterson**, A.B., Knox College, 1953; M.D., Washington University, 1957. (See Division of Health Care Research)
- Eugenia M. Pierce**, M.D., St. Louis University, 1958.
- Steven I. Plax**, A.B., University of Missouri, 1957; M.D., 1961.
- Edith C. Robinson**, A.B., Randolph-Macon College, 1927; M.S., University of South Carolina, 1928; M.D., Johns Hopkins University, 1932. (See Department of Psychiatry)
- Frederick Sargent**, A.B., Yale University, 1939; M.D., Cornell University, 1943.
- George Sato**, M.D., Washington University, 1947.
- Robert C. Schaan**, A.B., Washington University, 1949; M.D., 1953.

Bernard Schwartzman, A.B., Washington University, 1931; M.D., 1935.

Richard H. Spitz, B.A., Washington University, 1946; M.D., 1952.

Donald B. Strominger, B.A., Yale University, 1949; M.D., Washington University, 1953.

Mary A. T. Tillman, M.D., Howard University, 1960.

Argyrios A. Tsifutis, M.D., Salonika University Medical School, 1954.

James K. Turner, A.B., Washington University, 1949; M.D., 1953.

Barbara Nancy Voegel, B.S., University of Illinois, 1950; M.D., Washington University, 1957.

George T. Wilkins, Jr., B.S., University of Illinois, 1956; M.D., 1957.

Kathleen Winters, B.S., Winthrop College, 1946; M.D., Medical College of South Carolina, 1955.

Frank S. Wissmath, A.B., Washington University, 1939; M.D., 1943.

Gerald Wool, A.B., Princeton University, 1958; M.D., Washington University, 1962. (See Division of Health Care Research)

H. Benjamin Zwirn, M.D., University of Basel (Switzerland), 1954.

#### *Instructors Emeriti (Clinical)*

Maurice J. Lonsway, B.S., Valparaiso University, 1910; M.D., St. Louis University, 1914.

Edwin H. Rohlfing, M.D., Washington University, 1919.

#### *Research Instructor*

Elaine Miller, B.A., Judson College, 1944; M.D., Medical College of Alabama, 1949. (See Department of Ophthalmology)

#### *Assistants (Clinical)*

Robert D. Cox, B.S., University of Notre Dame, 1945; M.D., Johns Hopkins University, 1949.

Gerald J. Duling, B.S., Xavier University, 1955; M.D., St. Louis University, 1959.

Diosdada T. Guillen, A.A., University of Santo Tomas, 1950; M.D., 1955.

Seymour M. Schlansky, M.D., Chicago Medical School, 1950.

#### *Research Assistants*

Charles Crawford, Jr., B.S., Washington University, 1956.

Elizabeth Jones, B.S., Fontbonne College, 1959.

Charles A. Reed, A.B., Washington University, 1961.

Sheila Warren

## SECOND YEAR

The student is introduced to pediatrics and to the full-time staff through a series of lectures designed to acquaint him with the concepts of human growth and development, genetics, and the effects of age and maturity on reactions to injury and disease. A second series of talks highlights the important disorders commonly encountered in infants and children. The unique aspects of the physical examination of the infant and child are presented during the course in physical diagnosis. Members of the Department also participate in the sophomore course in pathophysiology.

## THIRD YEAR

A clerkship of six weeks is scheduled, during which period the student participates in the following:

1. Care of inpatients, sharing responsibility with intern or resident.
2. Daily ward rounds and bedside conferences with house staff and attending physician.
3. Daily noon and afternoon conferences on various facets of pediatrics.
4. Weekly grand rounds.

## FOURTH-YEAR ELECTIVES

This year is devoted to elective time which may be spent according to the individual preferences of the student. He may serve as an intern substitute or in the research laboratory or combine clinical and laboratory work.



The following electives are offered:

#### *Pediatric Cardiology*

*Clinical Inpatient Service:* Diagnosis and management of patients with acquired and congenital heart disease, including critically ill and postoperative patients in the Intensive Care Unit. Activities include daily ward rounds, pre-catheterization critiques three times a week, and a weekly conference on catheterization laboratory findings.

*Outpatient Service:* New patients for consultation, as well as follow-up of old patients.  
(Dr. Goldring)

*Laboratory Diagnostic Procedures:* The student is involved as an observer and then as a participant in conducting catheterization and angiocardigraphic studies. The theory and interpretation of physiologic data are reviewed in daily sessions. The student may participate in the other activities of the Pediatrics Cardiology Division as time permits.  
(Dr. Hartmann, Jr.)

*Research Elective:* This study is concerned with the effect of digoxin (tritium labeled) on the cardiovascular hemodynamics of the fetal lamb. The exteriorized fetal lamb preparation is used. There will be opportunity to learn about cardiac output, blood flow and the use of isotopes (tritium labeled digoxin) in experimental procedures.

(Drs. Goldring, Hernandez)

*Electrocardiography, Vectorcardiography, Phonocardiography:* An intensive course, with emphasis on the electrophysiology and theory as well as interpretation of electrocardiograms, phonocardiograms and vectorcardiograms of inpatients and outpatients. The student may participate in the other activities of the Pediatric Cardiology Division as time permits. (Dr. Hernandez)

#### *Pediatric Neurology*

*Clinical Elective:* The student participates as

a full member of the neurology ward team and is directly responsible for a proportion of the patients on the service under the direction of the senior resident. He is expected to take night call every third night, during which time he is responsible for the medical care of the entire ward, as well as for emergency admissions. (Dr. Dodge)

*Research Elective:* The student has an opportunity to learn some of the chromatographic and spectrophotometric techniques frequently used in a lipid chemistry laboratory while working on a project of his own choosing or one that is currently in progress in the laboratory. Prior discussion is necessary.  
(Dr. Prenskey)

#### *Pediatric Infectious Diseases*

*Clinical Elective:* The student is assigned selected patients on the Isolation Division for initial evaluation and continuing care. He attends daily ward rounds and scheduled conferences. Time is spent each day reading cultures in the diagnostic bacteriology laboratory. Instruction is given in diagnostic serology. A short library or laboratory project is completed during the six weeks.

(Dr. Middelkamp)

*Research Elective:* Laboratory research programs are available in the areas of (1) tissue culture; (2) viral infections during pregnancy; (3) electron microscopy of viral infections; (4) metabolic aspects of infectious diseases in man and a variety of animal models. Amino acids in blood and urine are studied in terms of their differential diagnostic and prognostic possibilities during active infection, and mechanisms for these changes are sought.

(Drs. Middelkamp, Herweg, Feigin)

*Pediatric Hematology and Oncology.* Large numbers of children with diverse hematological and oncological problems are seen. During

the six-week rotation the student is expected to acquire sufficient knowledge to interpret the blood smears, bone marrows, and special laboratory studies. There will be no night call.

(Drs. Vietti, Zarkowsky, Land)

*Pediatric Clinical Allergy.* Complete review of allergic theory. Application of approach to patient evaluation and therapeutics. Responsibility for inpatients and outpatients, patient care, and on-going evaluation of methods of diagnosis and therapy. Multidiscipline approach to care of allergic patients. Student is expected to complete a short library or laboratory project in on-going research in allergy.

(Dr. Thurston)

*Pediatric Renal Disease.* The students work up and present both inpatients and outpatients who have renal disease. Discussions emphasize the relationship between the clinical problem and the pathophysiology underlying the disease, and clinical and pathologic changes are related. Surgical aspects of pediatric nephrology are discussed, and there are formal sessions in which renal physiology and clinical topics are reviewed by the students. Other pediatric teaching functions may be attended.

(Drs. Robson, Manley)

*Pediatric Ambulatory Service.* A six-week course with participation in all aspects of ambulatory care of children under the direction of St. Louis Children's Hospital staff physicians. Includes diagnosis and treatment of acute and chronic illness in general pediatric service, in private physicians' offices, and in the emergency room. Experiences in subspecialties and in community clinics are also offered.

(Dr. Jones)

*Combined Pediatric and Adult Metabolism.* This elective is designed to include broad clinical experience in both pediatric and adult endocrine problems. The student has an opportunity to work up all of the pediatric endocrine patients and to see most of the adult

patients. He attends rounds in pediatric metabolism, pediatric-endocrine and diabetic clinics, and the adult metabolic research seminar and rounds. There is an opportunity to attend pediatric and medical grand rounds and metabolic rounds at Jewish Hospital. A large number of patients with all types of endocrine disorders are seen and studied in depth.

(Drs. Weldon, Peake, Daughaday)

#### *Genetics*

*Medical Genetics.* Twelve weeks, all day. Combined clinical and research course.

*Clinical Genetics.* Six weeks, all day. Experience in clinical/laboratory approach to study of genetic problems. Students see all consultations referred to the Division of Medical Genetics. They work in Medical Genetics Clinic on Tuesday mornings, attend daily genetics rounds, and participate in scheduled seminars. (Drs. Sly, Rimoin, Warren)

## The Edward Mallinckrodt Department of Pharmacology



The number of useful drugs is steadily increasing. It is the purpose of the pharmacology course, through discussions of existing drugs, to develop general principles which will be applicable as well to drugs of the future. Pharmacology draws heavily on biochemistry, physiology, and microbiology for an understanding of drug action. It looks toward pathology, medicine, and surgery for its uses. For this reason the course is constructed as a part of the continuum of medicine rather than a separate discipline. Since many drugs are harmful in excessive amounts, toxicology is included in the course as a logical part of pharmacology.

The laboratory portion of the course is closely co-ordinated with the lecture material and is designed (1) to demonstrate and emphasize pertinent pharmacological principles and (2) to employ agents, equipment, and skills relevant to current medical practice.

### *Professor and Head of the Department*

**Oliver Howe Lowry**, B.S., Northwestern University, 1932; Ph.D., University of Chicago, 1937; M.D., 1937.

### *Professors*

**Francis Edmund Hunter, Jr.**, B.S., Mount Union College, 1938; Ph.D., University of Rochester, 1941.

**Stephen C. Kinsky**, A.B., University of Chicago, 1951; Ph.D., Johns Hopkins University, 1957.

### *Professor Emeritus*

**Helen Tredway Graham**, B.A., Bryn Mawr College, 1911; M.A., 1912; Ph.D., University of Chicago, 1915.

### *Associate Professors*

**Helen B. Burch**, B.S., Texas University, 1926; M.S., Iowa State University, 1928; Ph.D., 1935.

**Robert M. Burton**, B.S., University of Maryland, 1950; M.S., Georgetown University, 1952; Ph.D., Johns Hopkins University, 1955.

David M. Geller, B.A., Amherst College, 1952; Ph.D., Harvard University, 1957.

Franz M. Matschinsky, M.B., University of Freiburg, 1955; M.D., University of Munich, 1959.

David B. McDougal, Jr., A.B., Princeton University, 1945; M.D., University of Chicago, 1947.

#### *Assistant Professors*

James A. Ferrendelli, A.B., University of Colorado, 1958; M.D., 1962. (See Department of Neurology)

Philip Needleman (Established Investigator of the American Heart Association), B.S., Philadelphia College of Pharmacy and Science, 1960; M.S., 1962; Ph.D., University of Maryland Medical School, 1964.

#### *Research Instructor*

Ellen E. Smith, B.S., University of Pittsburgh, 1939; M.S., 1942; Ph.D., 1948.

#### *Lecturer*

Saul Boyarsky, B.S., University of Vermont, 1943; M.D., 1946. (See Department of Surgery)

#### *Postdoctoral Fellows*

Clinton C. Corder, B.S., University of Kansas, 1964; Ph.D., Marquette University, 1968.

Norman P. Curthoys, B.S., Clarkson College, 1966; Ph.D., University of California, 1970.

Eugene M. Johnson, Jr., B.S., University of Maryland, 1966; Ph.D., 1970.

Tateshi Kataoka, B.S., Ph.D., University of Tokyo.

Takahiko Kato, M.D., University of Tokyo, 1961; Ph.D., 1962.

Rudiger Landgraf, M.D., University of Munich, 1966.

Michael McDaniel, M.S., University of North Dakota; Ph.D., St. Louis University, 1970.

Robert N. Miller, A.B., University of Missouri, 1953; M.D., 1957.

Lester Partlow, B.S., Johns Hopkins University, 1964; Ph.D., 1969.

Stephen Perry, B.A., Augustana College, 1960; Ph.D., University of Kansas, 1968.

#### *Research Assistants*

Delores Blehm, B.S., Colorado State University, 1965.

Joseph Brown, B.A., University of Missouri, 1957.

Frances Campbell, B.S., University of Santa Clara, 1967.

Joyce Carter, Washington University.

Jeanette Ellermann, A.A., William Woods, 1947.

Lucy Fan, B.S., National Taiwan University, 1967; M.S., St. Louis University, 1969.

Dana Sue Greenwood, B.S., University of Texas, 1966.

Anne B. Harkey, B.A., Grinnell College, 1969.

Constance Kinsky, B.A., College of Notre Dame of Maryland, 1959.

Audrey Painter, B.S., Florida Southern, 1955.

Arthur Solomon, A.B., Washington University, 1963.

## SECOND YEAR

**501, 502.** (a) Lectures, conferences, panel discussions. (b) Laboratory course.

(Dr. Lowry and Staff)

#### *Elective Course*

**521.** *The Interaction of Drugs with Tissue Components.*

*Kinetics of Pharmacologic Reactions.* Mathematical consideration of the binding of drug(s) to bioreceptor(s) and the relationship to enzyme-substrate kinetics.

*Receptor Identification and Isolation.* The consideration of experimental approaches to this problem include structure activity relationships, affinity characteristics, types of receptors (nature of pharmacological events in more than one receptor), substrates (agonists), inhibitors (antagonists), evidence for the elucidation of the nature and function of receptors (active centers, binding sites). Minimum ten students.

(Dr. Needleman and Staff)

**572.** *Biochemistry of the Central Nervous System.* (Given in co-operation with the Department of Psychiatry. See course offerings in Psychiatry.)

(Drs. McDougal, B. Moore, and Staff)

**590. Research.** The facilities of the laboratory are available to those who wish to carry on an original investigation on problems of their own or on those the Department is prepared to suggest.

#### **Research Electives**

Problems in the biochemical development of rat tissues. (Dr. Burch)

Photophosphorylation and electron transfer in biological systems. (Dr. Geller)

Studies on oxidative phosphorylation and mitochondrial structure, as well as purification and properties of the drug metabolizing enzyme. (Dr. Hunter)

Immune lysis; membrane structure. (Dr. Kinsky)

Metabolism of isolated pancreatic islets. (Dr. Matschinsky)

Comparative neurochemistry, energy metabolism in nerve, biochemical effects of thiamine deficiency. (Dr. McDougal)

The pharmacological and biochemical mechanisms leading to the development of tolerance to nitroglycerine. Pharmacology of angiotensin. (Dr. Needleman)

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## Department of Physiology and Biophysics

The Department offers instruction to medical and graduate students in physiology and biophysics. A course in the second semester of the first year of the medical curriculum is designed to provide students with a foundation for their further study of clinical and applied physiology. In addition, advanced courses open to medical and graduate students provide for more detailed study of specific areas of physiology and biophysics. The following research interests are represented in the Department at the present time: macromolecular structure as studied by X-ray crystallography and other physical methods, the mechanism of action of polypeptide hormones, transport across cell membranes, neurophysiology, contractile activation of muscle, cardiac muscle, peripheral circulation, respiration, and the application of computer techniques to biological problems. The interests in neurophysiology concern principally membrane phenomena in nerve fibers, the function of receptors and sensory systems. Electron microscopy of nerve and muscle is used to relate structure and function in these tissues.

*Edward Mallinckrodt, Jr., Professor and  
Head of the Department*

**Carlton C. Hunt**, B.A., Columbia University, 1939;  
M.D., Cornell University, 1942.

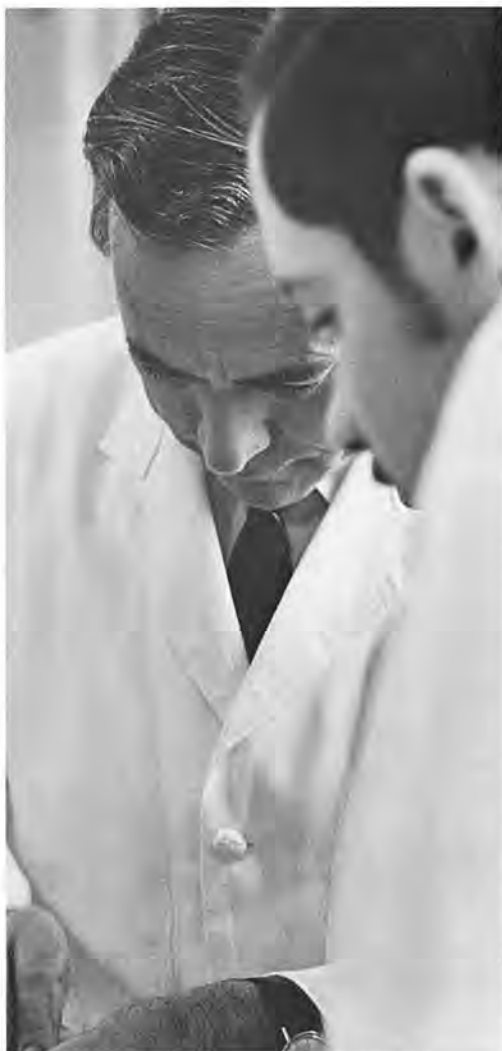
### *Professors*

**Jerome Cox, Jr.** (Biomedical Engineering), S.B.,  
Massachusetts Institute of Technology, 1947; S.M.,  
1949; Sc.D., 1954. (See Biomedical Computer  
Laboratory)

**Albert Roos** (Physiology), M.D., University of  
Groningen, 1940. (See Department of Surgery)

**Thomas T. Sandel** (Psychology), B.A., University  
of Texas, 1947; M.A., 1950; Ph.D., 1954. (Also  
College of Arts and Sciences)

**William W. Sleator** (Physiology and Biophysics),  
A.B., University of Michigan, 1938; M.S., 1939;  
Ph.D., 1946.



**Michel M. Ter-Pogossian** (Radiation Physics),  
B.A., University of Paris, 1942; M.S., Washington  
University, 1948; Ph.D., 1950. (See Department of  
Radiology)

### *Professors Emeriti*

**Hallowell Davis**, A.B. Harvard University, 1918;  
M.D., 1922; Sc.D. (hon.), Colby College, 1954.  
(See Department of Otolaryngology) (Also Lec-  
turer)

**Arthur S. Gilson, Jr.**, B.S., Dartmouth College, 1919; A.M., Harvard University, 1922; Ph.D., 1924.

**Harvey Lester White**, B.S., Washington University, 1918; M.D., 1920.

#### *Associate Professors*

**Mordecai Blaustein** (Physiology and Biophysics), B.A., Cornell University, 1957; M.D., Washington University, 1962.

**Stanley Lang** (Physiology and Biophysics), Ph.B., University of Chicago, 1946; S.B., 1948; S.M., 1949; Ph.D., 1952.

**Charles E. Molnar** (Physiology and Biophysics), B.S.E.E., Rutgers University, 1956; M.S.E.E., 1957; Sc.D., Massachusetts Institute of Technology, 1966. (See Biomedical Computer Laboratory)

**Russell R. Pfeiffer** (Engineering Biophysics), B.S., Purdue University, 1959; S.M., Massachusetts Institute of Technology, 1960; Ph.D., 1963. (See School of Engineering)

#### *Assistant Professors*

**Leonard J. Banaszak** (Biophysics), B.S., University of Wisconsin, 1956; M.S., Loyola University, 1961; Ph.D., 1961. (See Department of Biological Chemistry)

**W. Sherman Beacham** (Physiology), B.S., University of Utah, 1959; M.D., 1964.

**Harold Burton**, B.A., University of Michigan, 1964; Ph.D., University of Wisconsin, 1968. (See Department of Anatomy)

**Nigel Daw** (Physiology and Biophysics), B.A., Trinity College, Cambridge, 1956; M.A., 1961; Ph.D., Johns Hopkins University, 1967. (See Department of Ophthalmology)

**Duane C. Hellam**, B.A., Arizona State College, 1955; M.D., Washington University, 1959. (See Department of Internal Medicine)

**Rex L. Jamison**, A.B., University of Iowa, 1955; B.A., Oxford University, 1957 (Rhodes Scholar); M.D., Harvard University, 1960. (Jewish Hospital) (See Department of Medicine)

**Garland R. Marshall** (Physiology and Biophysics) (Established Investigator of the American Heart Association), B.S., California Institute of Tech-

nology, 1962; Ph.D., Rockefeller University, 1966. (See Department of Biological Chemistry)

**F. Scott Mathews** (Biophysics), B.S., University of California, 1955; Ph.D., University of Minnesota, 1959. (See Department of Biological Chemistry)

**Alan Pearlman** (Physiology and Biophysics), A.B., State University of Iowa, 1958; M.D., Washington University, 1961. (See Department of Neurology)

**Carl Marx Rovainen** (Physiology and Biophysics), B.S., California Institute of Technology, 1962; Ph.D., Harvard University, 1967.

#### **FIRST YEAR**

**502. Introduction to Physiology.** The course of study utilizes lectures, demonstrations, and laboratory experiments. The aim is to provide a basis for understanding general physiological mechanisms and the functional organization of physiological systems that are of immediate or potential importance in medicine. (Staff)

**504. Neural Sciences.** A conjoint course on the structure and function of the nervous system given by the Departments of Anatomy and Physiology and Biophysics.

#### **Electives**

**507. Macromolecules.** Topics to be covered include the structure of proteins and nucleic acids and discussion of theory and instrumentation related to determination of their physical and hydrodynamic properties, with special emphasis on X-ray scattering.

(Drs. Banaszak, Mathews)

**509. Polypeptide Hormones.** Structural basis for physiological action of biologically active polypeptides.

(Dr. Marshall)

**511. Properties of Cell Membranes.** A consideration of active and passive membrane transport.

(Dr. Blaustein)

**513. Nerve, Muscle and Synapse.** Mechanisms of conduction and synaptic transmission, excitation, and contraction of muscle.

(Drs. Blaustein, Rovainen)

**515. *Sensory Systems.*** A detailed study of somatic, auditory, and visual physiology.

(Drs. Daw, Molnar, Pearlman, Pfeiffer)

**517. *Advanced Renal Physiology.*** Mechanisms of glomerular and tubular function.

(Dr. Jamison)

**519. *Fundamentals of Circulation.*** Mechanisms of cardiac muscle excitation and contraction. Analysis of peripheral circulation. Neural regulation of circulation. (Dr. Lang)

**521. *Fundamentals of Respiration.*** Consideration of gas transport, alveolar ventilation, and neural control of respiration.

(Drs. Roos, Beacham)

**590. *Research.*** The Department offers a variety of research opportunities, particularly in the following areas: macromolecular structure as studied by X-ray crystallography; synthesis and biological activities of polypeptides; membrane transport; neurophysiology including nerve membrane, muscle, synaptic transmission, sensory systems (especially auditory and visual), electron microscopy of neural tissues, and biochemical regulation in neurons; circulation (especially peripheral) and heart muscle; respiration; renal physiology; and the application of computer sciences to physiological problems. (Staff)

#### **Seminar Electives**

***Molecular Biophysics.*** Macromolecular structure and function and the use of physical methods in their study.

(Drs. Banaszak and Mathews)

***Biochemistry and Physiology of Peptide Hormones.*** Chemical structure of peptide hormones as related to physiological action.

(Dr. Marshall)

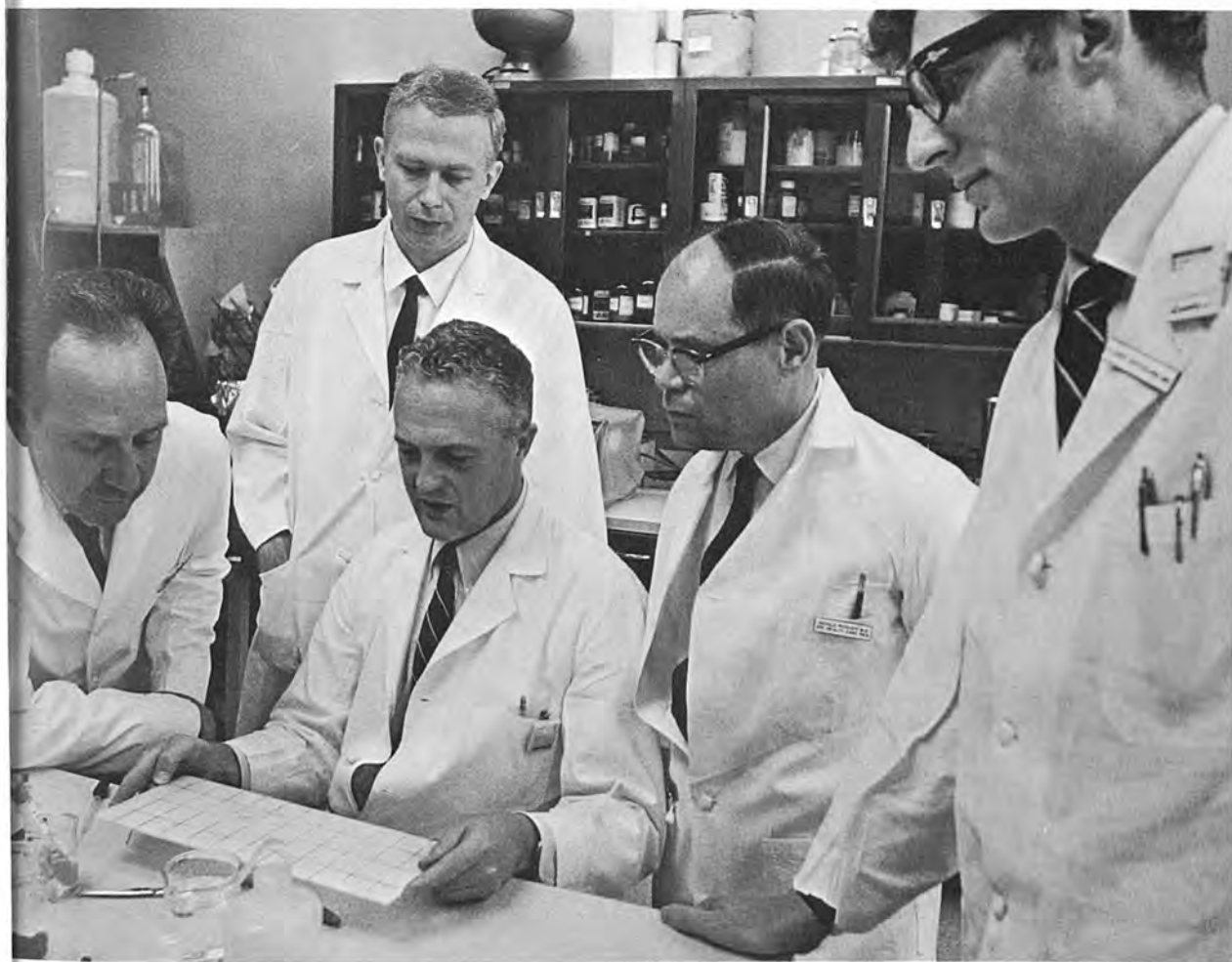
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## Department of Preventive Medicine and Public Health

The Department of Preventive Medicine and Public Health offers instruction during the first and second years of the curriculum and provides other learning experience in elective courses in the fourth year. In clinical clerkships of other departments, students also have experience in rehabilitation in the Irene Walter Johnson Institute of Rehabilitation. During the first year a course in statistical methods in medicine is given, which is introductory to the use of statistical procedures in courses of

other departments and prepares the student for critical evaluation of reports published in the medical literature. A second-year course is concerned with the epidemiology of disease and the derivation of effective procedures for the prevention and control of disease and disability. Emphasis is given to the opportunities for health promotion and disease prevention in the practice of medicine. Problems of community health and health care delivery are discussed.



*Danforth Professor and Head of the Department*

**Robert Ely Shank**, A.B., Westminster College, 1935; M.D., Washington University, 1939. (See Department of Medicine)

*Kountz Professor*

**Hugh Chaplin, Jr.**, A.B., Princeton University, 1943; M.D., Columbia University, 1947. (See Department of Medicine and Institute of Rehabilitation)

*Professors*

**Herbert R. Domke** (Public Health), S.B., University of Chicago, 1939; M.D., 1942; M.P.H., Harvard University, 1948; D.P.H., 1959. (See Department of Medicine)

**C. Howe Eller** (Public Health), A.B., Stanford University, 1927; M.D., University of Colorado, 1930; Ph.D., Johns Hopkins University, 1934.

**M. Kenton King**, B.A., University of Oklahoma, 1947; M.D., Vanderbilt University, 1951. (See Department of Medicine)

**Gerald T. Perkoff**, M.D., Washington University, 1948. (See Department of Medicine) (Division of Health Care Research)

*Professor and Director of the Division of Biostatistics*

**Reimut Wette** (Biostatistics), M.S., University of Heidelberg, 1952; D.Sc., 1955.

*Associate Professors*

**John Holloszy**, M.D., Washington University, 1957. (PHS Career Development Award) (See Department of Medicine) (Institute of Rehabilitation)

**George R. Morrison** (Markle Scholar), B.N.S., Holy Cross College, 1946; A.B., University of Rochester, 1948; M.D., 1954. (See Department of Medicine)

**C. Kirk Osterland** (Arthritis Foundation Special Investigator), M.D., University of Manitoba, 1956. (See Department of Medicine)

*Assistant Professors*

**Sung C. Choi** (Biostatistics), B.S., University of Washington, 1957; M.A., 1960; Ph.D., University of California, 1966.

**Julian B. Fleischman** (American Heart Association Established Investigator), B.S., Yale University, 1955; Ph.D., Harvard University, 1960. (See Department of Microbiology)

**Kaare Julian Lindqvist** (Immunology), D.V.M., Veterinary College, Norway, 1953; M.S., Michigan State University, 1957; Ph.D., Indiana University Medical Center, 1967. (On leave of absence)

**John D. Vavra**, B.A., University of Colorado, 1950; M.D., Washington University, 1954. (See Department of Medicine)

**M. Frances Watson** (Social and Environmental Studies), B.S., Northeast Missouri State Teachers College, 1932; M.S.W., Washington University, 1949.

**M. Anita Whitney**, B.S., McGill University (Montreal), 1952; M.S., Cornell University, 1954; Ph.D., Michigan State University, 1962. (Also Division of Health Care Research)

*Assistant Professor (Clinical)*

**Franz U. Steinberg**, M.D., University of Berne, 1938. (See Department of Medicine) (Jewish Hospital)

**James C. Peden, Jr.**, A.B., Haverford College, 1951; M.D., Washington University, 1955. (See Department of Medicine)

*Instructors*

**Evelyn E. Bonander** (Social Work), B.A., Gustavus Adolphus College, 1959; M.S.W., Washington University, 1966.

**Ruth E. Brennan** (Nutrition), B.S., University of Tennessee, 1943; M.S., Simmons College (in affiliation with Harvard School of Public Health), 1945; Sc.D., University of Pittsburgh, 1966.

**Lynn Gillula** (Physical Therapy), B.S., Washington University, 1968.

**Heather Higbee** (Physical Therapy), B.S., Northwestern University, 1968.

**Barbara B. Hixon** (Biostatistics), B.S., University of Illinois, 1941.

**Mary Lynn Meyer** (Occupational Therapy), B.S., Washington University, 1967.

**Edward J. Miller** (Clinical Immunology), B.A., St. John's University, 1958; M.D., St. Louis University, 1962. (See Department of Medicine)

**Martha A. Minter** (Rehabilitation Medicine), B.S., Carnegie-Mellon University, 1958; M.D., University of Pittsburgh, 1964. (Jewish Hospital)

**Virginia L. Moyers** (Physical Therapy), B.S., Washington University, 1966.

**Barbara J. H. Norton** (Physical Therapy), B.S., Washington University, 1966.

**Bevra Hannahs Hahn** (Clinical Immunology), B.Sc., Ohio State University, 1960; M.D., Johns Hopkins University, 1964. (See Department of Medicine)

**Patricia Pickett** (Nursing and Rehabilitation), B.S.N., Western Reserve University, 1959.

**Anne Brown Short** (Physical Therapy and Rehabilitation), B.S., Washington University, 1951.



**Isaias Spilberg**, B.S., University of San Marcos, (Lima, Peru) 1956; M.D., 1963. (See Department of Medicine) (Starkloff Hospital)

**Elizabeth A. Stoddard**, B.S., Montana State University, 1954; M.D., Washington University, 1957. (Rehabilitation) (Jewish Hospital)

**Ellen T. Tyson** (Occupational Therapy), B.A., Syracuse University, 1949; M.A., 1950.

#### *Research Instructors*

**Howard A. Bomze** (Rehabilitation Biomedical Engineering), B.S.E.E., Drexel Institute of Technology, 1966; M.S.Bm.E., 1968.

**Chuan Huan Cheng**, B.S., China National Central University, 1944; M.S., Cornell University, 1950; Ph.D., Michigan State University, 1955.

**Estelle Kochavi** (Biostatistics), A.B., Washington University, 1960; M.S., University of Wisconsin, 1963.

#### *Lecturers*

**Harry L. Acker** (Physical Medicine and Rehabilitation), B.S., Clemson College, 1940; M.D., Medical College of South Carolina, 1950.

**William Stoneman III**, B.S., St. Louis University, 1948; M.D., 1952. (Also Director, Bi-State Regional Medical Program for Heart, Cancer, and Stroke)

**Richard A. Sutter** (Industrial Medicine and Rehabilitation), A.B., Washington University, 1931; M.D., 1935.

#### *Research Assistant*

**Mary B. Koch**, A.B., Miami University, 1936.

## FIRST YEAR

**Biomedical Statistics.** This course is an introduction to the principles and methods of biostatistics. It emphasizes the concepts of statistical methodology as being essential to proper application and interpretation of statistical methods. Elementary statistical techniques illustrating the use of statistical principles in experimentation and clinical research are discussed. Second semester.

(Dr. Wette and Staff, Division of Biostatistics)

## SECOND YEAR

**Epidemiology and Prevention of Disease.** This is a lecture course which describes the patterns of occurrence and the distribution of selected diseases in populations. It is concerned with

the variety of characteristics of host, agent, and environment which determine the occurrence of specific disorders. Procedures which may be utilized to prevent or interrupt the course of disease and disability are described and evaluated.

(Dr. Shank and Staff)

**Summer Traineeships in Physical Disability and Rehabilitation.** (See Institute of Rehabilitation.)

(Drs. Chaplin, Holloszy)



## FOURTH-YEAR ELECTIVES

**Health Care Delivery in a Deprived Community.** Students are supervised in investigating or evaluating an aspect of health care delivery in a low income community. Topics for study are selected by students and faculty. Representative of the type of study considered appropriate are: Studies of methods for funding neighborhood health projects; community directors and community action programs; use of non-medical personnel for health care delivery; patient attitudes toward health care; interrelationships between an inner city clinic and various health services; hospital record systems; role of students in a service-oriented clinic; scope of medical care in neighborhood health projects;

relation between health, social, legal and other community services. Each student is responsible for assembling pertinent data, analyzing the information, preparing a written report and presenting his findings in a seminar.

(Dr. Perkoff and Staff)

*Studies in Clinical Practice.* Students spend 6 to 12 weeks working in the private office of a physician who also works in the Medical Care Group of Washington University's group practice program. Either internal medicine or pediatrics may be elected. During the study period students work in physicians' offices, make hospital rounds, attend Medical Society and hospital staff meetings, and will make night and emergency calls with their physician. During the period a clinical diary is kept and community resources are evaluated as they relate to the patient's care. (Dr. Gerald T. Perkoff)

*Clinical Elective: Physical Disability and Rehabilitation.* (See Institute of Rehabilitation.)  
(Drs. Chaplin, Holloszy)

*Statistical Methods in Experimental and Clinical Medicine.* This course involves lectures, seminars, and laboratory experience to enhance the competence of students in the selection and application of biostatistical procedures for purposes of experimental and clinical investigation.

(Dr. Wette and Staff, Division of Biostatistics)

*Clinical Immunology.* This course, through lectures and seminars, provides opportunity for broadening the knowledge and experience of students in fields of clinical immunology. The material covered includes immunization, immune deficiency states, immunological diseases, cellular hypersensitivity, complement in human disease, and cancer immunology.

(Drs. Osterland, Chaplin, J. Smith,  
C. W. Parker)

#### Seminar Electives

*Clinical Nutrition.* This series of seminars is concerned with nutrient requirements, metabolic roles of nutrients, modification of nutrient requirements by disease, deficiency disorders, obesity, hypervitaminoses, and the role of diet in the occurrence or treatment of various diseases.

(Drs. Shank, Morrison, Holloszy, Brennan)

*Topics in Health Care Delivery.* A series of seminars concerned with community medicine, social aspects of medical care systems, and alternative procedures for improvement of health care delivery. Under supervision of an instructor, readings will be assigned and the discussions led by students.

(Dr. Perkoff and Staff)

*Biochemistry of Exercise.* Includes laboratory and clinical investigation of the changes in muscle and other tissues, with the objective of determining the role of exercise in the prevention and rehabilitation of disease.

(Dr. Holloszy)

*Biostatistics.* Research experience is offered in the application of statistical, mathematical, and computer methodology for experimental and clinical research problems.

(Drs. Wette and Choi)

*Clinical and Experimental Nutrition.* The student participates in laboratory studies of the influence of various nutrients on enzyme activity in liver and other tissues and in clinical evaluation of nutritional status of selected patients. Opportunities are available to selected students to study and observe major problems of deficiency disease in other countries.

(Drs. Shank, Morrison, Holloszy,  
Brennan, Cheng)

*Immunohematology.* Included are opportunities to gain experience in the application of serologic and immunochemical techniques in basic investigations of erythrocyte auto-antibodies and iso-antibodies encountered in hemolytic diseases of the newborn, leukemias, lymphomas, malignancies and connective tissue disorders.

(Dr. Chaplin)

*Research Problems in Health Care.* With advice from a faculty adviser, the student will engage in a research project relating to health care. The topic selected may be in fields of pediatrics, medicine, ambulatory care, group practice, or another area of mutual interest to the student and his preceptor.

(Dr. Perkoff and Staff)

## Department of Psychiatry

Instruction in psychiatry is given in all four years of the medical course. Emphasis is on teaching psychiatry as a medical discipline, including the biological, social, and psychological mechanisms and manifestations of psychiatric illness, as well as psychological reactions to other illnesses. Recognition of current limitations of knowledge combined with an appreciation of what is known leads to a spirit of constructive skepticism. This attitude permits the student to study psychiatry in depth and broadly without preconceived theories.

### *Wallace Renard Professor and Head of Department*

**Eli Robins, A.B.**, Rice University, 1940; M.D., Harvard University, 1943.

### *Wallace Renard Professor Emeritus*

**Edwin Francis Gildea, A.B.**, Colorado College, 1920; M.D., Harvard University, 1924.

### *Professors*

**Samuel B. Guze, M.D.**, Washington University, 1945. (See Department of Medicine)

**Blake W. Moore (Biochemistry), B.S.**, University of Akron, 1948; Ph.D., Northwestern University, 1952.

**George E. Murphy, B.S.**, Oregon State College, 1949; M.D., Washington University, 1952.

**Lee N. Robins (Sociology), A.B.**, Radcliffe College, 1942; M.A., 1943; Ph.D., 1951.

**Saul Rosenzweig (Medical Psychology), A.B.**, Harvard University, 1929; M.A., 1930; Ph.D., 1932. (Also College of Arts and Sciences)

**John A. Stern (Psychology), A.B.**, Hunter College, 1949; M.S., University of Illinois, 1951; Ph.D., 1953. (Also College of Arts and Sciences)

**Mark A. Stewart, B.A., M.A.**, Cambridge University, 1953; M.R.C.S., L.R.C.P., Cambridge and St. Thomas' Hospital, 1956. (See Department of Pediatrics)

**George Winokur, A.B.**, Johns Hopkins University, 1944; M.D., University of Maryland, 1947.

### *Blanche Ittleson Professor of Child Psychiatry*

**E. James Anthony, B.S.**, University of London,

1938; M.R.C.S., L.R.C.P., 1941; M.B., B.S., 1942; D.P.M., 1947; M.D., 1949.

### *Associate Professors*

**Richard W. Hudgens, M.D.**, Washington University, 1956.

**Lucy J. King, A.B.**, Washington University, 1954; M.D., 1958.

**William R. Sherman (Biochemistry), A.B.**, Columbia University, 1951; Ph.D., University of Illinois, 1955.

**Kathleen Smith, B.S.**, University of Arkansas, 1944; M.D., Washington University, 1949. (Malcolm Bliss Hospital)

**Robert A. Woodruff, Jr., A.B.**, Harvard University, 1956; M.D., 1960.

### *Associate Professors (Clinical)*

**Margaret C-L. Gildea, B.S.**, University of Chicago, 1923; M.D., Yale University, 1936.

**Alex H. Kaplan, B.S.**, College of City of New York, 1932; M.D., St. Louis University, 1936.

**Patricia L. O'Neal, A.B.**, Washington University, 1944; M.D., 1948.

**Ferris N. Pitts, Jr., A.B.**, Washington University, 1952; M.D., 1955. (See Department of Pediatrics)

### *Research Associate Professor*

**David J. Pittman (Sociology), A.B.**, University of North Carolina, 1949; M.A., 1950; Ph.D., University of Chicago, 1956. (Also Jewish Hospital)

### *Assistant Professors*

**Thomas C. Brugger (Child Psychiatry), B.S.**, University of Wisconsin, 1950; M.D., 1953.

**Remi J. Cadoret, M.D.**, Harvard College, 1949; M.D., Yale University, 1953.

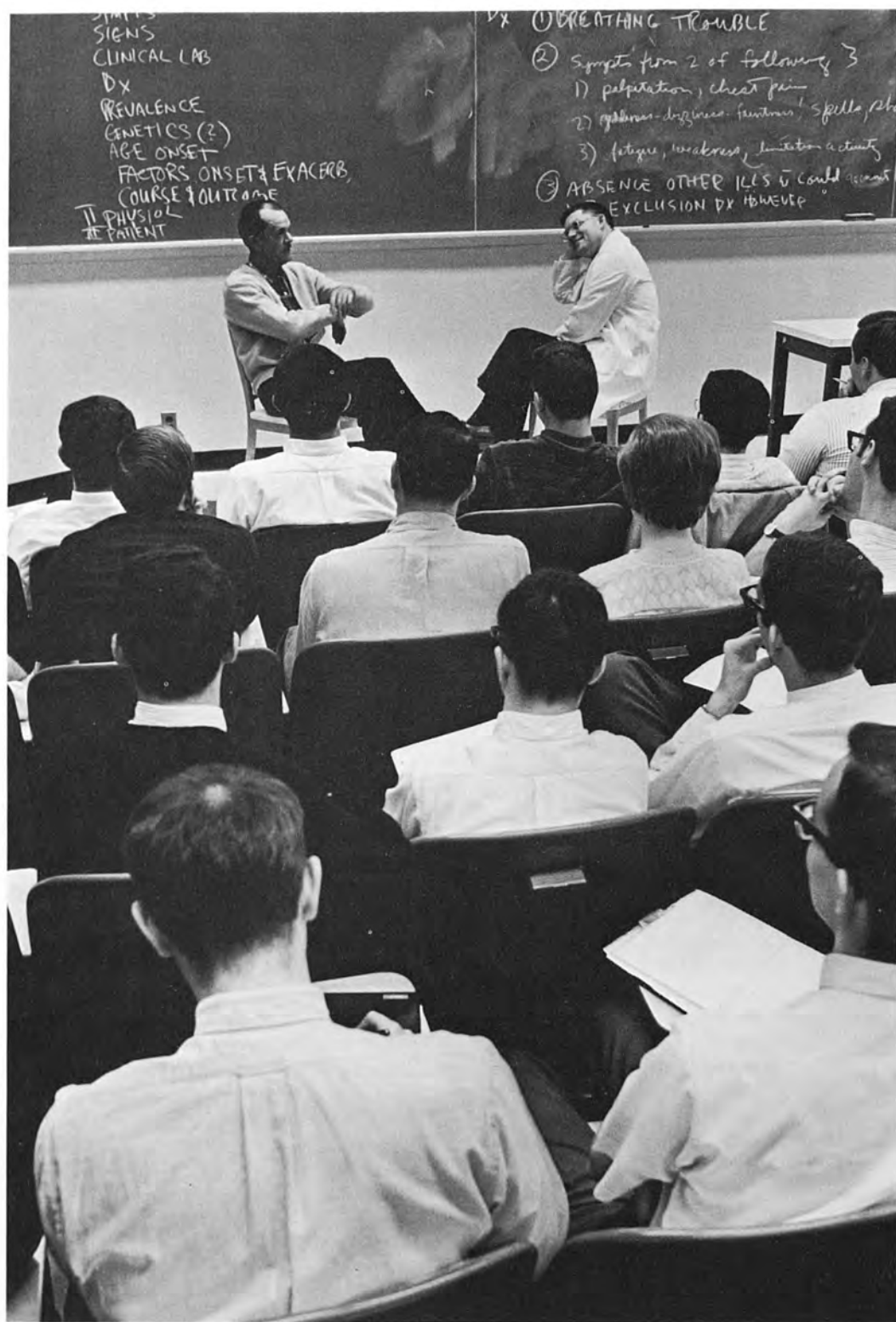
**Loretta Cass (Medical Psychology in Child Psychiatry), B.A.**, Colorado College, 1934; M.A., 1942; Ph.D., Ohio State University, 1950. (Also College of Arts and Sciences)

**Paula J. Clayton, B.S.**, University of Michigan, 1956; M.D., Washington University, 1960.

**Donald S. Goodwin, A.B.**, Baker University, 1953; M.D., Kansas University, 1964.

**Julian C. Hall (Social Work), B.S.**, University of Louisville, 1949; M.S., 1951. (Bliss Hospital)

**Marijan Herjanic, M.D.**, Zagreb University, 1956.





**James N. McClure, Jr., A.B.,** Washington University, 1951; M.D., 1955.

**John W. Olney, B.A.,** State University of Iowa, 1956; M.D., 1963.

**Ekkehard Othmer** (Experimental Psychiatry), Ph.D., University of Hamburg, 1966; M.D., 1967. (Also College of Arts and Sciences)

**Vernon J. Perez** (Neuropsychology), B.S., Tulane University, 1957; M.S., 1960; Ph.D., Washington University, 1964. (Also College of Arts and Sciences)

**Barbara Powell** (Medical Psychology), Ph.D., Washington University, 1964. (Malcolm Bliss) (Also College of Arts and Sciences)

**Lawrence G. Sharpe** (Neuropsychology), B.A., Florida State University, 1959; M.A., San Jose State College, 1964; Ph.D., Purdue University, 1968. (Also College of Arts and Sciences)

**Vincente B. Tuason, M.D.,** University of Santo Tomas, 1955. (Malcolm Bliss)

#### *Assistant Professor Emeritus*

**Lucile Healy** (Social Work) A.B., College of St. Catherine, 1922; M.A., University of Minnesota, 1927; M.S.W., Washington University, 1949.

#### *Assistant Professors (Clinical)*

**John F. Bergmann, A.B.,** Washington University, 1950; M.D., 1954.

**Nathan Blackman, B.S.,** University of Rhode Island, 1929; M.D., University of Paris, 1936.

**Robert D. Brookes, A.B.,** DePauw University, 1934; M.D., Washington University, 1938.

**Anthony K. Busch, M.D.,** St. Louis University, 1937.

**Alan G. Craig, M.D., (MB., Ch.B.),** Aberdeen University, 1951.

**Robert Bailey Deitchman, B.A.,** University of Virginia, 1949; M.D., 1953.

**Hyman H. Fingert, B.A.,** State University of Iowa, 1931; M.D., 1934.

**James N. Haddock, A.B.,** University of Missouri, 1940; M.A., 1942; M.D., Washington University, 1943.

**Leopold Hofstatter, M.D.,** University of Vienna, 1926.

**Boaz Kahana** (Child Psychiatry), B.A., Yeshiva University, 1955; M.S., 1957; Ph.D., University of Chicago, 1966.

**Edward H. Kowert, A.B.,** Washington University, 1940; M.D., 1943.

**Wanda M. Lamb, B.S.,** University of Missouri, 1946; M.D., Washington University, 1948.

**Sydney B. Maughs, A.B.,** Westminster College, 1931; M.D., Washington University, 1935.

**Roy M. Mendelsohn** (Child Psychiatry), B.S., University of Illinois, 1950; M.D., 1952.

**Marie O. Mowrer, A.B.,** Southern Illinois University, 1947; B.S., University of Illinois, 1949; M.D., 1951.

**Paul H. Painter** (Child Psychiatry), M.D., St. Louis University, 1947. (See Department of Pediatrics)

**Luis H. Schwarz, M.D.,** Universidad Nacional Autonoma de Mexico, 1955. (Malcolm Bliss)

**Frank O. Shobe, A.B.,** Washington University, 1938; M.D., 1942.

#### *Research Assistant Professors*

**Manon McGinnis** (Psychiatric Social Work in Child Psychiatry), B.A., Westhampton College, 1927; M.S.W., Pennsylvania School of Social Work, 1929.

#### *Instructors*

**Jane Stuart Barr** (Psychiatric Social Work in Child Psychiatry), B.A., Southwestern College, 1958; M.S.W., Washington University, 1967.

**Michael Barton** (Medical Psychology), B.A., Southern Illinois University, 1965; Ph.D., Washington University, 1969. (Malcolm Bliss)

**Rajendra K. Bhamu, M.B., B.S.,** Grant Medical College. (Malcolm Bliss)

**Savitri Bhamu, M.B., B.S.,** Grant Medical College. (Malcolm Bliss)

**Nelson Ceballos, B.S.,** Colegio Academico, 1954; M.D., Universidad del Valle, 1961. (Malcolm Bliss)

**Theodore J. Cicero** (Neuropsychology) B.S., Villanova University, 1964; M.S., Purdue University, 1966; Ph.D., 1968.

**Anna K. Bradley** (Social Work), B.J., University of Missouri, 1956; M.S.W., Washington University, 1958. (Malcolm Bliss)

**Marguerite Cannon** (Social Work), B.S., St. Louis University, 1936; M.S.W., Washington University, 1948.

**Plaridel C. Deza, M.D.,** University of Santo Tomas, 1956. (Malcolm Bliss)

**James E. Edwards, B.A.,** University of Tennessee, 1959; M.D., 1962. (Malcolm Bliss)

**Kimon Efstathianos, M.D.,** National University of Athens, 1951. (Malcolm Bliss)

**Adele Feldman** (Child Psychiatry), B.A., New York University, 1945; M.S.W., University of Denver, 1957.

**James A. Halikas, B.S.,** Brooklyn College, 1962; M.D., Duke University, 1966.



**Willy Hoffmeister** (Child Psychiatry), M.D., University of Buenos Aires, 1958. (St. Louis State Hospital)

**Margaret Horton**, (Medical Psychology) B.A., University of Missouri, 1964; Ph.D., Washington University, 1970.

**Patricia Brilliant Lacks** (Medical Psychology), A.B., Washington University, 1961; M.A., 1962; Ph.D., 1966. (Malcolm Bliss)

**Jane B. Landsbaum** (Medical Psychology), B.A., Washington University, 1961; Ph.D., 1968. (Malcolm Bliss)

**Jon Tek Lum**, B.A., Brown University, 1959; M.D., Tulane University, 1963. (Malcolm Bliss)

**Sue Marten**, B.A., University of Missouri, 1960; M.D., 1962.

**John R. Mattheus** (Medical Psychology), B.S., University of Missouri, 1959; Ph.D., Washington University, 1969. (Malcolm Bliss)

**Rodrigo Munoz**, M.D., Universidad del Cauca (Colombia), 1963. (Malcolm Bliss)

**Elizabeth C. Penick** (Medical Psychology), B.A., Sophie Newcomb College, 1957; M.S., Tulane University, 1960. (Malcolm Bliss)

**Janet Sue Portell** (Psychiatric Social Work in Child Psychiatry), B.A., Southern Illinois University, 1965; M.S.W., Washington University, 1967.

**H. M. A. Rahman**, M.D., King Edward Medical College, 1958. (Malcolm Bliss)

**Adolfo E. Rizzo** (Child Psychiatry), M.D., Buenos Aires University, 1955.

**Abdallah A. Sabet**, M.D., University of Tehran, 1960.

**Isa A. Samad**, M.B., B.S., Patna University, 1946. (Malcolm Bliss)

**Elizabeth M. Smith** (Social Work), B.A., University of Nebraska, 1960; M.S.W., 1962.

**Michael Stern** (Medical Psychology), B.A., New Mexico State University, 1962; M.A., 1964; Ph.D., Washington University, 1968.

**Eve Love Sutton** (Psychiatric Social Work in Child Psychiatry), B.A., University of Kentucky, 1957; M.S.W., St. Louis University, 1964.

**Houshang Vafi**, M.D., University of Tehran, 1961. (Malcolm Bliss)

**Robert H. Vanderpearl**, A.B., Washington University, 1951; M.D., 1956. (Malcolm Bliss)

**Jorge A. Viamontes**, M.D., Havana University, 1948; Ph.D., Ignacio Agramonte University, 1957. (Malcolm Bliss)

**Marilyn Voerg** (Medical Psychology in Child Psychiatry), B.A., University of Florida, 1950.

#### *Instructor Emeritus and Lecturer*

**Louetta Berger** (Social Work in Child Psychiatry), B.S., University of Wichita, 1941; M.S.W., Washington University, 1946.

#### *Instructors (Clinical)*

**John M. Anderson**, B.S., Colorado State University, 1938; M.D., Meharry Medical College, 1958. (Malcolm Bliss)

**Libby G. Bass** (Medical Psychology), B.A., University of Illinois, 1928; M.A., Northwestern University, 1929.

**William Cone**, B.A., Yale University, 1949; M.D., 1954.

**Edmund V. Cowdry, Jr.**, A.B., Princeton University, 1942; M.D., Washington University, 1945.

**Alejandro M. Datuin**, A.A., University of Santo Tomas, 1951; M.D., 1956. (Malcolm Bliss)

**Mary E. Cox**, A.B., Washington University, 1941; M.D., 1944.

**Wilbur H. Gearhart**, B.S., Butler University, 1949; M.D., Hahnemann Medical College, 1950.

**Doris C. Gilpin** (Child Psychiatry), M.D., University of Chicago, 1948.

**Janet Golden** (Social Work), A.B., Washington University, 1924.

**Douglas R. Gowler** (Child Psychiatry), M.D., Manitoba College, 1957.

**Robert S. Hicks**, A.B., Hendrix College, 1951; M.D., University of Arkansas, 1958.

**Lilli Hofstatter**, M.D., University of Vienna, 1949.

**R. Eugene Holemon**, A.B., Washington University, 1954; M.D., 1958.

**Joseph B. Kendis** (Clinical Medicine), M.D., Washington University, 1933.

**Robert R. Knowles**, M.D. (M.B., B.S.), University of Sydney, 1947.

**Gary Kulak**, M.D., University of Kansas, 1965. (Malcolm Bliss)

#### *Instructors Emeriti (Clinical)*

**Robert M. Bell**, M.D., St. Louis University, 1928.

**Barbara S. Kendall** (Medical Psychology), A.B., Radcliffe College, 1913; Ed.M., Harvard University, 1928.

#### *Research Instructors*

**Robert Goldstein** (Medical Psychology), B.A., City College of New York, 1954; Ph.D., University of Illinois, 1962. (Also College of Arts and Sciences)

**John K. Lescow** (Child Psychiatry), B.A., Concordia Senior College, 1962; B.D., Concordia Seminary, 1966.

**William H. Holland** (Electronics) A.B., Washington University, 1950. (See Department of Biological Chemistry.)

**Cynthia L. Janes** (Child Psychiatry) B.A., University of Oklahoma, 1965; Ph.D., 1969.

**Peter J. Quinn** (Biochemistry) D.D.A., Dokie Agricultural College, 1959; B.Agr.Sc., University of Melbourne, 1963; Ph.D., University of Sydney, 1967.

**Theodore Reich**, B.S., McGill University, 1959; M.D., 1963.

**Marcel T. Saghir**, B.S., American University of Beirut, 1959; M.D., 1963.

**John B. Lewis** (Medical Psychology in Child Psychiatry), B.S., Northwestern University, 1949; M.S.W., Washington University, 1952.

**Joe K. McKinney**, B.A., Westminster College, 1954; M.D., Washington University, 1958.

**John H. McMahan**, A.B., Southeast Missouri State Teachers College, 1939; M.D., St. Louis University, 1943.

**Jay Meyer**, A.B., Washington University, 1956; M.D., St. Louis University, 1960.

**Jackson C. Neavles**, A.B., Washington University, 1938; B.S. in Med. Sci., 1942; M.D., 1942.

**Saul Niedorf** (Child Psychiatry), B.A., University of California, 1952; C.S.W., 1953; M.D., University of Geneva, 1959.

**Abelardo Pena-Ramos**, M.S., Buenos Aires University, 1954. (Malcolm Bliss)

**Reese H. Potter**, A.B., University of Kansas, 1931; B.S., University of Missouri, 1933; M.D., Washington University, 1935.

**Thomas F. Richardson**, B.A., Millikin University, 1959; M.D., Washington University, 1963.

**Harry M. Ricketts**, M.D., Tulane University, 1947.

**Edith C. Robinson** (Child Psychiatry), A.B., Randolph-Macon College, 1927; M.S., University of South Carolina, 1928; M.D., Johns Hopkins University, 1932. (See Department of Pediatrics)

**Earl R. Schultz**, A.B., Southeast Missouri State College, 1952; B.S., University of Missouri, 1953; M.D., Washington University, 1955. (See Department of Neurology)

**Nathan M. Simon**, M.S., Yale University, 1950; M.D., Washington University, 1955.

**Alberto Soto**, M.D., Salamanca University, 1959.

**Harold D. Wolff**, A.B., Washington University, 1952; B.S., University of Missouri, 1953; M.D., State University of Iowa, 1955.

**Edwin D. Wolfgram**, B.A., State University of Iowa, 1954; M.D., 1959.

### *Research Instructors (Clinical)*

**Lois E. Franklin** (Medical Psychology in Child Psychology), B.A., Blackburn College; M.A., MacMurray College, 1952.

### *Consultants*

**Eleanor T. Kenney** (Medical Psychology, Child Psychiatry Clinics), A.B., Bryn Mawr College, 1937.

**Robert E. Lefton** (Medical Psychology) A.B., Washington University, 1953; Ph.D., 1958.

## FIRST YEAR

In the first half of the year lectures are given as part of the course Topics in Conjoint Medicine, concerning results of psychological and psychiatric research relevant to a deeper understanding of clinical psychiatry.

## SECOND YEAR

*Introduction to Clinical Psychiatry.* Emphasis is upon (a) effective interviewing in preparation for medical history taking, (b) evaluation of behavioral and emotional factors in patients with various kinds of illnesses, (c) the diagnosis and natural history of the major psychiatric disorders, (d) critical evaluation of conceptual and methodologic problems in psychiatry and psychology. Lectures, demonstration interviews, discussions.

(Dr. Murphy and Staff)

## THIRD YEAR

*Psychiatry Clerkship.* Students in groups of about ten spend six weeks full time on the in-patient services of Renard and Bliss Hospitals.

(Drs. Woodruff, Tuason, and Staff)

## FOURTH-YEAR ELECTIVE COURSES

*Outpatient Adult and Child Psychiatry.* This course is intended to provide instruction and experience in the evaluation and treatment of both adult and child psychiatry clinic patients, and to increase knowledge about community resources dealing with these patients.

(Drs. Hudgens, Stewart, and Staff)

*Selected Topics in Psychiatric and Neuropsychological Research.* Students may elect to work full time in psychiatric research at any

time during their elective year. Twelve weeks will be the minimum time allowed; no maximum time is specified. Arrangements will be made on an individual basis with the appropriate investigators.

(Drs. E. Robins, Guze, Winokur,  
Murphy, L. Robins, and Staff)

*Child Psychiatry.* This course will meet once a week for formal lectures followed by group discussions. Twelve sessions are scheduled as follows: History of child psychiatry, specific diagnosis and general principles of management, theory of child development A, hyperactive children; theory of child development B, autism, examination of children with psychiatric problems A, school phobia, fears, and depression, examination of children with psychiatric problems B, retardation and reading disability, treatments in child psychiatry, accident proneness (fire setting, stealing).

(Drs. Larocca, Stewart)

*Neurochemistry.* This course is given jointly by the Departments of Psychiatry and Pharmacology. Topics covered include carbohydrates; energy metabolism, including changes found in different functional states; amino acid metabolism and its relation to protein and transmitter synthesis; special proteins and protein metabolism; cerebral lipids, membranes, and normal and disordered lipid metabolism; transmitters and modulators; learning; growth, development, and trophic functions; cerebral blood flow, blood brain barrier.

(Drs. McDougal and B. Moore)

*Staff Conferences.* Students are invited to attend certain of the psychiatric staff conferences held weekly at Malcolm Bliss Mental Health Center.

*Psychoanalysis.* Introduction to psychoanalysis is presented at weekly seminars lasting one trimester. Some didactic material is given, but most of the session is devoted to discussion.

(Drs. Fingert, Kaplan)

## Department of Radiology

For the convenience of administration, teaching, and research, the Department of Radiology is divided into divisions and sections under the following directors:

### **Diagnostic Radiology**

#### **Abdominal Radiology**

*Dr. Ruben Koehler*

#### **Cardiac Radiology**

*Dr. Nikolaus Schad*

#### **Musculoskeletal and Peripheral**

#### **Angiography**

*Dr. Tom Staple*

#### **Neuroradiology**

*Dr. David Davis*

#### **Nuclear Medicine**

*Dr. James Potchen*

#### **Pediatric Radiology**

*Dr. William McAlister*

### **Pulmonary Radiology**

*Dr. S. David Rockoff*

### **Radiation Biology**

*Dr. Leonard Tolmach*

### **Radiation Physics**

*Dr. Michel Ter-Pogossian*

### **Radiation Therapy**

*Dr. William Powers*

The Department of Radiology of Washington University, housed in the Edward Mallinckrodt Institute of Radiology, provides both diagnostic and therapeutic radiological services. It connects by corridor and tunnel with Barnes, St. Louis Children's, St. Louis Maternity, McMillan, Wohl, Barnard, and Renard Hospitals and the Washington University Clinics. In addition, laboratory facilities for research in radiation physics, radiation biology, radiation therapy, and ultrasound are housed in the Institute.

Four floors of the building are devoted to diagnostic roentgenographic facilities. The first

floor houses administrative and business offices, film library, and consultation viewing rooms. A book and journal library and a conference room are located on the eighth floor. The radiation therapy division is located on the ground floor of the Institute and in Barnard Hospital. It has facilities for low and high voltage X-ray therapy, cobalt therapy, and radium and other radioactive isotope therapy, as well as a 24 Mev betatron. Two floors of the Institute provide research laboratories for the staff and experimental diagnostic and therapeutic service for other departments of the School. The radiation physics and the nuclear medicine divisions have the most up-to-date equipment for radiation detection and scanning, as well as a cyclotron used to produce short-lived isotopes for research. A medical ultrasound laboratory for research and clinical application is located on the sixth floor of the Institute. A well staffed radiation biology laboratory is located on the tenth floor.

The undergraduate teaching program is designed to present both diagnostic and therapeutic radiology to students as part of their clinical clerkship experience. Every effort is made to provide an opportunity to correlate roentgen and clinical findings through interdepartmental conferences, consultations, and group discussions.

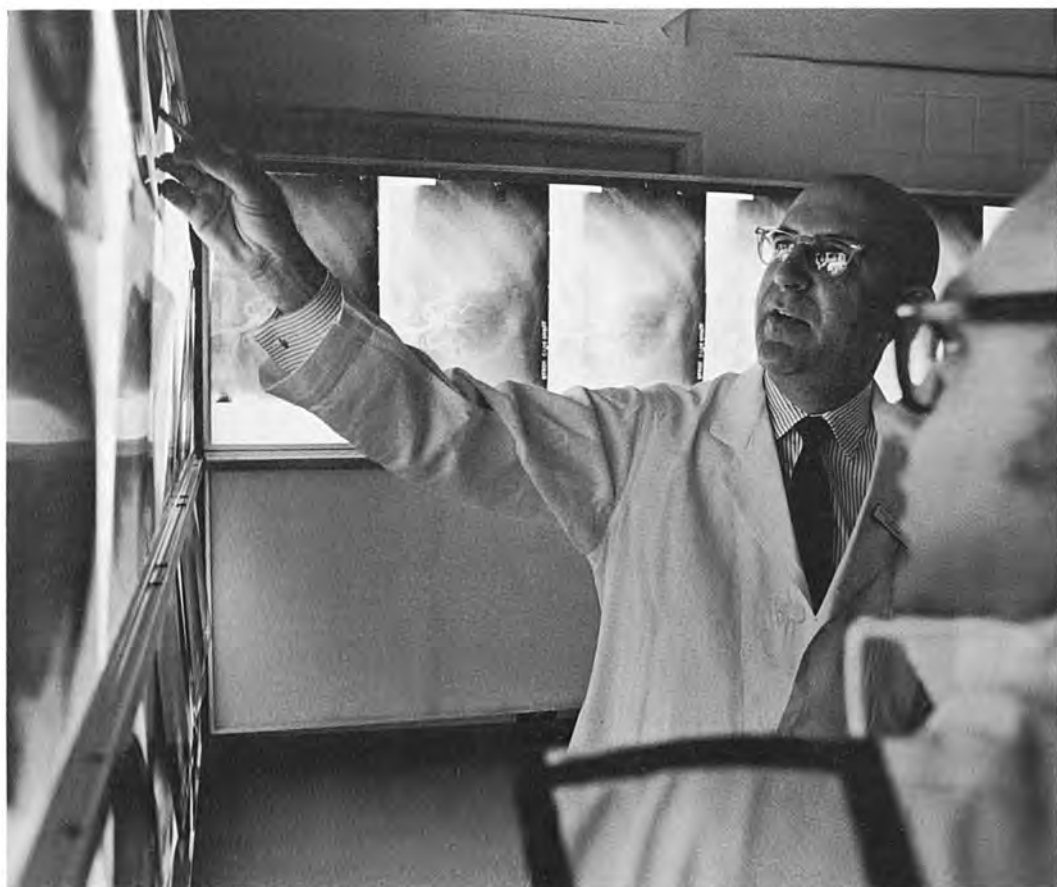
### *Professor and Head of the Department and Director of the Mallinckrodt Institute of Radiology*

**Juan M. Taveras**, B.S., Normal School of Santiago, Dominican Republic, 1937; M.D., University of Santo Domingo, 1943; M.D., University of Pennsylvania, 1949. (See Department of Anatomy)

### *Professors*

**P. Ruben Koehler**, M.D., University of Berne (Switzerland), 1956.

**William H. McAlister**, B.S., Wayne State University, 1950; M.D., 1954. (See Department of Pediatrics)



**E. James Potchen**, B.S., Michigan State University, 1954; M.D., Wayne State University, 1958.

**William E. Powers**, B.S., University of Illinois, 1949; M.D., 1951. (See Department of Surgery)

**Michel M. Ter-Pogossian** (Radiation Physics), B.A., University of Paris, 1942; M.S., Washington University, 1948; Ph.D., 1950. (See Department of Physiology and Biophysics)

**Leonard J. Tolmach** (Radiation Biology), B.S., University of Michigan, 1943; Ph.D., University of Chicago, 1951. (See Department of Anatomy)

*Professor Emeritus*

**Hugh Monroe Wilson**, A.B., Illinois College, 1924; M.D., Washington University, 1927; M.A. (hon.)

Yale University, 1945. (See Department of Anatomy)

*Professor (Clinical)*

**Wendell G. Scott**, A.B., University of Colorado, 1928; M.D., Washington University, 1932; Sc.D. (hon.), University of Colorado, 1954.

*Consultants*

**Arthur L. Hughes** (Physics), B.Sc., Liverpool University, 1906; M.Sc., 1908; D.Sc., 1912; B.A., Cambridge University, 1910.

**Ruheri Perez-Tamayo** (Radiation Therapy), B.S., National School of Medicine, National University of Mexico, 1945; M.D., 1952.



**Edward H. Reinhard** (Hematology and Oncology), A.B., Washington University, 1935; M.D., 1939. (See Department of Medicine)

**Jose Sala** (Radiation Therapy), B.S., Colegio Nacional (Argentina), 1936; M.D., Universidad del Litoral (Argentina), 1944.

**Mildred Trotter** (Anatomy), A.B., Mount Holyoke College, 1920; Sc.M., Washington University, 1921; Ph.D., 1924; Sc.D. (hon.), Western College, 1956; Sc.D. (hon.), Mount Holyoke College, 1960. (See Department of Anatomy)

#### *Associate Professors*

**David O. Davis**, B.S., University of Illinois, 1954; M.D., St. Louis University, 1958.

**Carlos Perez**, B.S., University of Antioquia (Colombia), 1952; M.D., 1960.

**S. David Rockoff**, A.B., Syracuse University, 1951; M.D., Albany Medical College, 1955; M.S., University of Pennsylvania, 1961.

**Nikolaus Schad**, M.D., University of Munich, 1951; Privat Dozent, University of Zurich, 1967.

**Tom W. Staple**, B.S., University of Illinois, 1953; M.D., 1955.

#### *Associate Professors (Clinical)*

**A. Norman Arneson**, B.S., Texas Christian University, 1924; M.D., Washington University, 1928. (See Department of Obstetrics and Gynecology)

**Hyman R. Senturia**, A.B., Washington University, 1929; M.D., 1933.

#### *Assistant Professors*

**Ronald G. Evens**, B.A., Washington University, 1961; M.D., 1964.

**Arnold Feldman** (Radiation Physics), B.S., Pennsylvania State College, 1944; M.S., California Institute of Technology, 1948; Ph.D., University of Colorado, 1960.

**John W. Fenlon**, A.B., Washington University, 1958; M.D., 1962.

**Tom L. Gallagher** (Computer Science), B.A., North Texas State College, 1953; M.S., 1954; D.Sc., Washington University School of Medicine, 1967. (Also School of Engineering and Applied Science)

**Allan H. McCown**, B.S., University of Idaho, 1962; M.D., Washington University, 1964.

**Howell S. McCreary**, B.S., University of Texas School of Pharmacy, 1954; M.D., University of Texas Southwestern Medical School, 1958.

**William B. Mill, Jr.**, M.D., University of Tennessee, 1962.

**Frederick Augustus Valeriote**, B.S., University of Toronto, 1962; M.A., 1964; Ph.D., 1966.

**Barbara Gibgot Weiss**, B.A., Hunter College, 1959; Ph.D., Washington University, 1964.

**Michael J. Welch** (Radiation Chemistry), B.A., Cambridge University (England), 1961; M.A., 1964; Ph.D., University of London, 1965.

#### *Assistant Professors (Clinical)*

**Mark D. Eagleton, Jr.**, A.B., Amherst College, 1947; M.D., Washington University, 1950.

**Sumner Holtz**, M.D., St. Louis University, 1948.

**Douglas R. Lilly**, A.B., Princeton University, 1952; M.D., Washington University, 1956. (See Department of Internal Medicine)

**Wayne A. Simril**, A.B., Culver-Stockton College, 1941; M.D., Washington University, 1944.

**Noah Susman**, A.B., Washington University, 1948; M.D., 1952. (Jewish Hospital)

#### *Assistant Professor Emeritus (Clinical)*

**Oscar C. Zink**, M.D., Washington University, 1921.

#### *Research Assistant Professor*

**Robert M. Hochmuth**, B.S., University of Colorado, 1961; Ohio State University, 1962; Ph.D., Brown University, 1967. (Also School of Engineering and Applied Science)

#### *Instructors*

**John David Armstrong, Jr.**, B.A., University of Kansas, 1962; M.D., 1966.

**Carol A. Archer**, A.B., University of California at Berkeley, 1952; M.D., McGill University, 1956.

**John O. Eichling** (Radiation Physics), B.S., Northeastern Oklahoma State College, 1958; M.S., Oklahoma State University, 1959.

**Frank Wilson Farrell** (NINDS Special Fellow, Neuroradiology), M.D., Bowman Gray School of Medicine, 1962.

**Sheila Elsie Hodgson**, M.D., Woman's Medical College of Pennsylvania, 1964.

**Margit Lassen** (Radiation Physics), M.Sc., University of Gothenburg (Sweden), 1960.

**Henry Jerome Llewellyn**, M.D., University of Texas Southwestern Medical School, 1962.

**Glenn H. Roberson**, B.S., Baylor University, 1962; M.D., University of Texas Southwestern, 1965.

**Marvin Eugene Skelton**, B.S., University of Georgia, 1962; M.D., Medical College of Georgia, 1966.

**Robert Joseph Stanley**, B.S., St. Peter's College, 1959; M.D., St. Louis University, 1963.

**Frederick Sherwin Vines** (NINDS Special Fellow, Neuroradiology), B.S., Bethany College, 1957; M.D., University of Virginia School of Medicine, 1961.

#### *Instructors (Clinical)*

G. W. Spector, B.A., Amherst College, 1954; M.D., Yale University, 1959.

#### *Research Instructor*

Rebecca K. Studer, B.S., State Teachers College (Kirksville), 1964; M.S., Texas Christian University, 1966.

#### *Lecturers*

Armand Diaz (Radiologic Technology), R.N., R.T., Havana University School of Medicine, 1948.

Arkady J. Smolin, Jr. (Radiologic Technology), R.T., United States Public Health Service Hospital (New York), 1963.

#### *Research Assistants*

Maria Chraplyvy, M.S., St. Louis University, 1967.

Julius Hecht, A.B., Washington University, 1950.

Judith Arlene Lifton, B.S., University of Iowa, 1969.

Joanne Markham, B.A., Centre College, 1963.

Judith M. Metzger, B.S., Southeast Missouri State College, 1960; M.A., University of Missouri, 1962.

James H. Patterson, B.A., Lincoln University, 1955.

Sandra Jean Tolen, A.A., Belleville Jr. College, 1958.

#### *Assistant*

Andrzej Demidecki (Physics in Radiation Therapy), M.Sc., Warsaw University (Poland), 1956.

### SECOND YEAR

Eighteen hours of lecture devoted to diagnosis. Eighteen hours of lecture devoted to radiation physics, radiation biology, radiation therapy, and nuclear medicine.

#### *Electives*

*Research Electives.* Opportunity is available to carry out research in the laboratories under the guidance of the staff in the fields of diagnostic radiology, therapeutic radiology, radiation physics, nuclear medicine, radiation biology, and medical ultrasound.

*Nuclear Medicine.* A series of 24 lectures emphasizing the principles of the tracer method as applied to clinical medicine. The material includes means of obtaining and interpreting kinetic data and the application of such data to the pathophysiologic assessment of specific disease states. Emphasis is placed on the current status of radioisotopes in evaluating normal and pathologic clinical physi-

ology as a transition between basic sciences and clinical medicine.

*Cellular Radiation Biology.* This course, which is offered as Molecular Biology 567 in the Graduate School, is concerned with cellular changes brought about by the absorption of ionizing and ultraviolet radiations. Emphasis is on mammalian cells, though other kinds of cells will be discussed as well. Particular attention is devoted to the loss of cell viability and modifications that can be made in this response by various agents.

### FOURTH-YEAR ELECTIVE COURSES

*Clerkships in Radiology.* Clinical rotations and formal teaching sessions offering a broad introduction to the role of radiology in clinical diagnosis and therapy. Six weeks.

The clinical rotation consists of exposure to the various divisions or sections within the Department (abdominal, thoracic, cardiovascular, musculoskeletal, pediatric, radiation therapy, nuclear medicine) one week at a time, but the program can be varied to suit individual requirements. These sessions include an introduction to the principles of film interpretation and the opportunity to observe fluoroscopy and special procedures. Therapy sessions include case presentation and clinical oncology. Each student's clinical rotation is customized and varies with his needs and interest. The formal teaching sessions, however, are more rigidly structured.

*Clerkships in Subspecialties of Radiology.* These clerkships are offered in nuclear medicine, radiation therapy, and the various subspecialties of diagnostic radiology.

(Drs. Koehler, Davis, McAlister, Powers, Potchen, Schad)

## The Mary Culver Department of Surgery

The Department of Surgery includes General Surgery, Plastic and Reconstructive Surgery, Orthopedic Surgery, Neurological Surgery, Genitourinary Surgery, Cardiothoracic Surgery, and Anesthesiology.

The instruction begins with an introduction to surgical principles in the second year. These surgical principles for the most part are derived from fundamental concepts in the pre-clinical sciences which have been occupying the student since the beginning of the freshman year. Although in this course a few patients are used for the demonstration of lesions which illustrate the principles of surgery, it is in the junior year that the first personal contact with patients occurs. Students in the third year are assigned to general surgical clinical clerkships in the hospitals, where they have an opportunity to study the frequent and important surgical diseases.

The junior general surgical clerkship, lasting twelve weeks, is spent on the surgical services of the hospitals in the medical center. Students attend patient rounds with residents and staff daily during the clerkship and attend seminars conducted by the general and specialty surgical staffs. Students are encouraged, but are not required, to attend and assist at operations upon patients assigned to them. The physiology, pathology, chemistry, and bacteriology of pre- and post-operative care are stressed. Experience is acquired in surgical diagnosis and in the use of scientific methods that permit students to assess the effectiveness of what they do.

The fourth-year surgical program permits the senior student to select any of the following types of electives for periods of six to eighteen weeks: (1) preceptorships in which the student is assigned to a staff member for instruction and exposure to the problems of clinical practice, (2) surgical research under supervision (minimum time twelve weeks), (3) electives in anesthesiology, pediatric surgery, thoracic

and cardiac surgery, plastic and reconstructive surgery, orthopedics, neurosurgery, urology, and oncology.

### *Bixby Professor of Surgery and Head of the Department*

**Walter F. Ballinger, M.D.**, University of Pennsylvania, 1948.

### *Harry Edison Professor of Surgery*

**Arthur E. Baue, A.B.**, Westminster College, 1950; M.D., Harvard Medical School, 1954.

### *Professor*

**Harvey R. Butcher, Jr., A.B.**, Central College, 1941; M.D., Harvard University, 1944.

### *Professor (Clinical)*

**Eugene Myron Bricker, M.D.**, Washington University, 1934.

### *Professor Emeritus (Clinical)*

**Glover H. Copher, A.B.**, University of Missouri, 1916; M.D., Washington University, 1918.

### *Lecturer*

**John S. Spratt, Jr., M.D.**, Southwestern Medical School of the University of Texas, 1952.

### *Associate Professors*

**John A. Collins, A.B.**, Fordham University, 1955; M.D., Columbia University, 1959. (Markle Scholar)

**William T. Newton, B.S.**, Yale University, 1947; M.D., 1950.

**Jessie L. Ternberg, A.B.**, Grinnell College, 1946; Ph.D., University of Texas, 1950; M.D., Washington University, 1953.

### *Associate Professors (Clinical)*

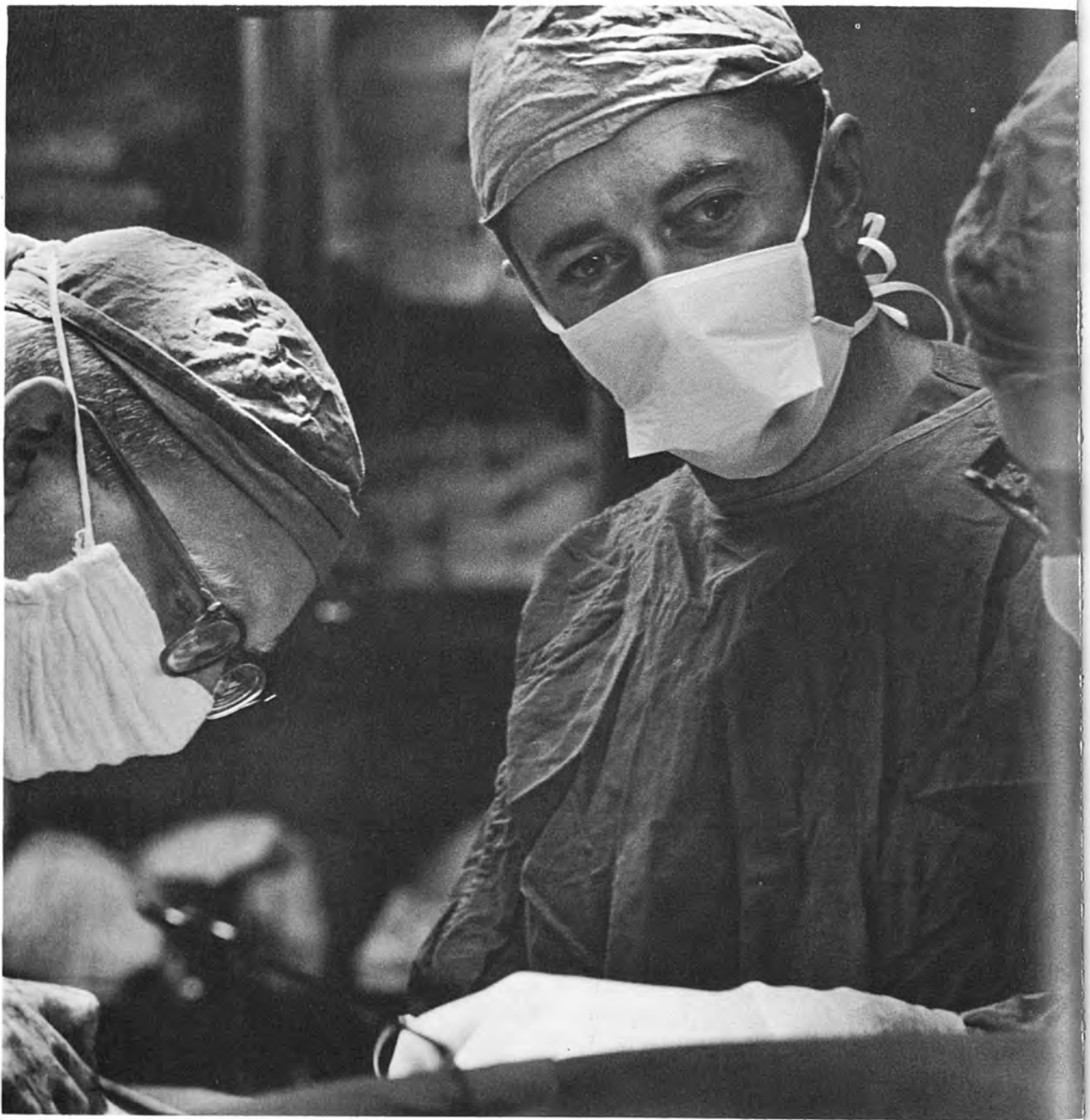
**Robert W. Bartlett, B.S.**, University of Michigan, 1926; M.D., 1930.

**Heinz Haffner, B.S.**, University of Arizona, 1931; M.D., Washington University, 1935.

**Carl J. Heifetz, B.S.**, Washington University, 1927; M.D., 1929.

**Falls B. Hershey, B.S.**, University of Illinois, 1939; M.D., Harvard University, 1943.

**Carl E. Lischer, A.B.**, University of California, 1933; M.D., Washington University, 1937.





C. Alan McAfee, B.S., Washington State College, 1938; M.D., Washington University, 1942.

Lawrence W. O'Neal, M.D., Washington University, 1946.

James M. Stokes, M.D., Washington University, 1948.

#### *Associate Professors Emeriti (Clinical)*

J. G. Probst, M.D., Loyola University, 1917.

Franklin E. Walton, B.S., Shurtleff College, 1923; M.D., Washington University, 1927; Sc.D. (Hon.), Shurtleff College, 1952.

#### *Assistant Professors*

Alexander S. Geha, B.S., American University of Beirut, 1955; M.D., 1959.

Gordon W. Philpott, B.S., Yale University, 1957; M.D., Washington University, 1961. (American Cancer Society Advanced Clinical Fellow)

Mohammed M. Sayeed, B.S., Osmania University, 1956; Ph.D., University of Miami, 1964.

Andrew D. Spencer, A.B., Indiana University, 1951; M.D., 1954.

Leslie Wise, B.S., University of Sydney; M.D., 1957.

Granville J. Womack, B.S., Oklahoma City University, 1949; M.D., University of Oklahoma, 1952.

#### *Assistant Professors (Clinical)*

Cyril J. Costello, B.S., University of Texas, 1935; M.D., 1939.

Leo. A. Sachar, A.B., Washington University, 1936; M.D., 1940.

Sam F. Schneider, A.B., Washington University, 1932; M.D., 1936.

William Shieber, M.D., Washington University, 1953.

George L. Tucker, A.B., Columbia University, 1952; M.D., Harvard University, 1956.

Willard B. Walker, M.D., Washington University, 1946.

George L. Watkins, Jr., A.B., Westminster College, 1938; M.D., Washington University, 1942.

#### *Instructors*

Robert C. Donaldson, A.B., University of Missouri, 1941; M.D., Washington University, 1944.

William L. Donegan, B.A., Yale University, 1955; M.D., 1959.

James R. Hurd, A.B., Princeton University, 1957; M.D., Harvard University, 1961.

Eugene N. Mitchell, B.S., St. Louis University, 1955; M.D., University of Missouri, 1960.

George C. Wee, M.D., University of Louisville, 1931.

#### *Instructors (Clinical)*

Robert Anschuetz, M.D., Washington University, 1940.

Richard V. Bradley, M.D., Washington University, 1952.

Arthur R. Dalton, B.S., University of Missouri, 1938; B.S. Med., Northwestern University 1940; M.D., 1941.

Clarence Eckert, M.D., St. Louis University, 1927.

Richard H. Fallon, B.S., Boston College, 1952; M.D., Harvard University, 1956.

Virgil O. Fish, M.D., Washington University, 1930.

Ralph J. Graff, M.D., Washington University, 1957.

Fleming B. Harper, M.D., Medical College of Virginia, 1950.

Allen P. Klippel, A.B., Amherst College, 1944; M.D., St. Louis University, 1946.

G. Lynn Krause, Jr., A.B., Amherst College, 1950; M.D., University of Pennsylvania, 1954.

Jerome F. Levy, A.B., Washington University, 1954; M.D., 1958.

Robert H. Lund, M.D., Washington University, 1949.

George A. Oliver, A.B., Washington University, 1948; M.D., 1952.

Joseph C. Peden, Jr., B.S., Harvard University, 1940; M.D., 1943.

Mather Pfeifferberger, Jr., A.B., Yale University, 1941; M.D., Harvard University, 1944.

George B. Rader, M.D., Washington University, 1951.

Frank O. Richards, A.B., Talladega College, 1944; M.D., Howard University, 1947.

Richard G. Sisson, A.B., Harvard University, 1943; M.D., Yale University, 1946.

#### *Research Instructor*

Paul V. Belkin, D.V.M., Vienna Veterinary College, 1944.

#### *Assistant*

Luis N. Bessone, B.S., Colegio Nacional, 1951; M.D., Universidad del Litoral—Escuela de Medicina (Argentina), 1959.

#### *Assistants (Clinical)*

Arthur I. Auer, B.S., Massachusetts Institute of Technology, 1952; M.D., Washington University, 1956.

Leslie F. Bond, A.B., University of Illinois, 1948; M.D., Meharry Medical College, 1952.



Katherine J. Crawford, B.S., Michigan State College, 1942; M.D., Woman's Medical College of Pennsylvania, 1946.

James R. Criscione, B.S., Youngstown University, 1943; M.D., St. Louis University, 1951.

Robert L. Glass, A.B., Washington University, 1955; M.D., 1958. (On leave of absence)

Frederick W. Klinge, A.B., University of Missouri, 1938; M.D., Washington University, 1942.

Stanley L. London, M.D., Washington University, 1949.

Samuel Lugo, B.S., St. Louis University, 1954; M.D., 1958.

Lester J. Nathan, B.A., University of Omaha, 1949; M.D., University of Nebraska, 1952.

Meredith J. Payne, A.B., Washington University, 1947; M.D., 1950.

Keith E. Pipes, A.B., Fresno State College, 1950; M.D., Washington University, 1954.

Robert Rainey, B.S., Yale University, 1944; M.D., Washington University, 1947.

Donald C. Sauer, A.B., Washington University, 1956; M.D., 1960.

## Anesthesiology

### *Research Professor*

Albert Roos, M.D., University of Groningen (Holland), 1940. (See Department of Physiology and Biophysics)

### *Assistant Professors*

Henry Casson, M.D., Liverpool University Medical School, 1959.

Donald J. Dickler, B.A., New York University, 1942; M.D., 1945.

Bela I. Hatfalvi, M.D., M. Kir. Tisza Istvan Tudomanyegyetem (Hungary), 1938.

Robert N. Miller, B.A., University of Missouri, 1957; M.D., 1961.

Lewis J. Thomas, Jr., B.S., Haverford College, 1953; M.D., Washington University, 1957.

Glenn R. Weygandt, M.D., Washington University, 1947.

### *Instructors*

Robert B. Holloway, B.S., LeMoyne College, 1952; M.D., Meharry Medical College, 1956.

Hugh F. S. Keister, A.B., Washington University, 1955; M.D., 1959.

Irvin C. Susman, M.D., University of Illinois, 1949.

### *Instructors (Clinical)*

Sedat Mehmet Ayata, B.S., Istanbul Lyceum, 1949; M.D., University of Istanbul, 1955.

Charles R. Blackwell, M.D., Meharry Medical College, 1965.

Francis G. Duffy, M.D., B.Ch., B.A.O., University College of Dublin, 1951.

Paul L. Friedman, A.B., Washington University, 1953; M.D., 1957.

George E. Lucas, B.S., John Carroll University, 1953; M.D., St. Louis University, 1958.

Daniel W. Platt, M.D., Chicago Medical College, 1949.

William H. Sims, Jr., A.B., University of Missouri, 1954; B.S. Med., 1955; M.D., Washington University, 1957.

## Cardiothoracic Surgery

### *Professor*

Clarence S. Weldon, A.B., University of Michigan, 1951; M.D., Johns Hopkins University, 1955. (Markle Scholar)

### *Professor (Clinical)*

Thomas H. Burford, A.B., University of Missouri, 1931; B.S. Med., 1933; M.D., Yale University, 1936.

### *Associate Professor (Clinical)*

Thomas B. Ferguson, B.S., Duke University, 1943; M.D., 1947.

### *Assistant Professor*

Richard E. Clark, B.S.E., Princeton University, 1957; M.D., Cornell University, 1960; M.S., University of Virginia, 1962.

### *Assistant Professors (Clinical)*

Martin Bergman, A.B., Washington University, 1942; M.D., 1945.

Charles L. Roper, A.B., Colorado College, 1949; M.D., University of Colorado, 1953.

### *Assistant Professors (Biomedical*

### *Engineering in Surgery)*

Dhanjoo N. Ghista, B.Eng., Bombay University, 1960; Ph.D., Stanford University, 1964. (See Department of Medicine and School of Engineering and Applied Science)

Edmond E. Spaeth, B.S., Stanford University, 1962; M.S., California Institute of Technology, 1963; Ph.D., 1967. (See School of Engineering)

## Genitourinary Surgery

### *Professors*

Saul Boyarsky, B.S., University of Vermont, 1943; M.D., 1946.

**Justin J. Cordonnier**, B.S., Washington University, 1926; M.D., 1928.

*Professor Emeritus (Clinical)*

**Dalton K. Rose**, M.D., Washington University, 1915.

*Associate Professors (Clinical)*

**Morris Abrams**, B.S., University of Illinois, 1934; M.D., 1937.

**William T. Bowles**, M.D., Stanford University, 1955.

**Carl A. Wattenberg**, A.B., University of Kansas, 1934; M.D., 1937.

*Associate Professor Emeritus (Clinical)*

**Rogers Deakin**, M.D., Washington University, 1922.

*Assistant Professor*

**Charles B. Manley, Jr.**, A.B., University of Missouri, 1955; M.D., 1958.

*Assistant Professors (Clinical)*

**Farid M. Fuleihan**, American University of Beirut, 1957; M.D., 1961.

**Robert K. Royce**, B.S., University of Mississippi, 1939; M.D., Washington University, 1942.

**J. Byron Beare**, B.S., St. Louis University, 1936; M.D., 1939; M.S., University of Minnesota, 1947.

**M. Richard Carlin**, B.A., Dartmouth College, 1944; M.D., Yale University, 1947.

**Saul Klein**, M.D., Syracuse University Medical Center, 1959.

**Richard Parsons**, B.S., Missouri Valley College, 1954; M.D., Washington University, 1958.

**Herbert Sunshine**, A.B., Washington University, 1950; M.D., 1954.

**Neurological Surgery**

*August A. Busch, Jr., Professor of  
Neurological Surgery*

**Henry G. Schwartz**, A.B., Princeton University, 1928; M.D., Johns Hopkins University, 1932.

*Professors*

**Sidney Goldring**, M.D., Washington University, 1947.

**James O'Leary** (Experimental Neurological Surgery), B.S., University of Chicago, 1925; Ph.D., 1928; M.D., 1931. (See Department of Neurology)

*Professor Emeritus (Clinical)*

**Leonard T. Furlow**, B.S., Emory University, 1923; M.D., 1925.

*Associate Professor*

**William S. Coxe**, B.S., Hampden-Sydney College, 1945; M.D., Johns Hopkins University, 1948.

*Instructor*

**Ralph A. W. Lehman**, B.A., Harvard University, 1958; M.D., 1962.

**Orthopedic Surgery**

*Professors*

**Fred C. Reynolds**, A.B., Washington University, 1931; M.D., 1934.

**H. Relton McCarroll**, A.B., Ouachita College, 1927; M.D., Washington University, 1931.

*Associate Professors (Clinical)*

**Oscar P. Hampton, Jr.**, M.D., University of Tennessee, 1928.

**Arthur H. Stein, Jr.**, A.B., Amherst College, 1946; M.D., Washington University, 1948.

*Associate Professor Emeritus (Clinical)*

**Clarence H. Crego, Jr.**, B.S., Union University, 1921; M.D., University of Michigan, 1923.

*Assistant Professors*

**Virginia M. Badger**, B.A., Occidental College, 1950; M.S., University of Southern California, 1957; M.D., Woman's Medical College of Pennsylvania, 1961.

**Marshall B. Conrad**, A.B., Westminster College, 1942; M.D., Washington University, 1945.

**James C. Ellsasser**, M.D., Washington University, 1964. (On leave of absence)

**Ronald E. Rosenthal**, M.D., Washington University, 1961.

*Assistant Professors (Clinical)*

**Lee T. Ford, Jr.**, M.D., University of Tennessee, 1940.

**Earl P. Holt, Jr.**, B.A., Duke University, 1942; M.D., 1945.

**Robert E. Kuhlman**, A.B., Washington University, 1953; M.D., 1956.

**Milton I. Lenobel**, B.S., New York University, 1935; M.D., 1939.

**James O. Lottes**, Ph.B., St. Louis College of Pharmacy, 1926; Ph.G., 1928; A.B., University of Missouri 1934; B.S., 1935; M.D., University of Louisville, 1937.

**Harry C. Morgan**, B.A., University of Missouri, 1949; B.S., 1951; M.D., Harvard University, 1953.

**George Scheer**, A.B., Municipal University of Wichita, 1940; M.D., Washington University, 1943.

#### *Instructors (Clinical)*

Vilray P. Blair, Jr., M.D., Washington University, 1939.

William S. Costen, A.B., Princeton University, 1950; M.D., Washington University, 1954.

Ronald C. Hertel, A.B., Washington University, 1952; M.D., 1956.

Edward C. Holscher, A.B., University of Missouri, 1931; B.S., 1933; M.D., Harvard University, 1935.

W. Edward Lansche, A.B., Washington University, 1948; M.D., 1952.

Stanley M. Leydig, B.A., Montana State University, 1930; M.D., Washington University, 1934.

Marvin Mishkin, M.D., University of Illinois, 1955.

Newton B. White, M.D., University of Cincinnati, 1957.

#### *Assistants (Clinical)*

John P. Arnot, B.A., Rice University, 1954; M.D., Yale University, 1958.

Alan H. Morris, M.D., University of Illinois, 1963.

Herman E. Russell, B.A., New York University, 1950; M.D., University of Geneva, 1956.

George R. Schoedinger III, M.D., University of Oregon Medical School, 1962.

### **Plastic and Reconstructive Surgery**

#### *Professor (Clinical)*

Minot P. Fryer, A.B., Brown University, 1936; M.D., Johns Hopkins University, 1940.

#### *Professor Emeritus (Clinical)*

James Barrett Brown, M.D., Washington University, 1923.

#### *Assistant Professor (Clinical)*

Marcy A. Goldstein, M.D., Washington University, 1951.

#### *Consultant in Oral Surgery*

Leroy W. Peterson, D.D.S., University of Michigan, 1940. (See School of Dentistry)

#### *Instructors (Clinical)*

Joseph W. Eades, A.B., Amherst College, 1952; M.D., Washington University, 1960.

George H. Zografakis, M.S., Rutgers University, 1955; M.D., State University of New York, Upstate Medical College, 1959.

### **SECOND YEAR**

*Introduction to Surgery.* Panel discussions present certain fundamental principles of physiology, biochemistry, and pathology as applied

to surgery. Recitations and demonstrations are included. Two hours weekly for eighteen weeks during the second and third trimesters of the second year.

### **THIRD YEAR**

*Surgical Clinic.* A weekly exercise throughout two trimesters. These clinics serve as a general introduction to the surgical specialties and to anesthesiology. (Surgery Staff)

*Surgical Wards.* For twelve weeks the students serve as clerks in surgery, working on the wards of the hospitals of the Medical Center. The students take the case histories and make the physical examinations and the usual laboratory examinations on the patients assigned to them. They are assigned patients with diseases treated by both surgical specialists and general surgeons. They assist at operations and do some surgical dressings. Surgical pathological material is followed as an integral part of the case study. At regular intervals the students meet with residents and attending staff in informal conferences, when questions which have arisen during the day are discussed and various aspects of the care of the patient considered. They follow their patients after discharge in the postoperative and outpatient clinic. Particular effort is made to see that students have some experience with the more frequent and important surgical lesions, and that the cases assigned to them are sufficiently diversified to afford an accurate perspective of surgery. Students are encouraged to consult the library frequently in the solution of problems concerning patients. One afternoon a week students participate in the tumor clinic and attend a tumor conference held jointly by the Departments of Surgery, Pathology, and Radiology. Students may attend the general surgery staff conferences held on Tuesdays at 4:00 p.m. (Surgery Staff)

### **FOURTH YEAR**

The electives offered senior students are principally clinical clerkships or research.

*Surgical Seminar.* An open-end student-oriented seminar in surgery is offered to groups of not more than six students. Any number

of such groups can be organized if required. Students select the subject and prepare material for discussion in the presence of, but with minimal participation by, the faculty preceptor. One period a week, one to three hours, usually in the evening, in the office or the home of the preceptor.

(Dr. Ballinger and Staff)

*Surgical Preceptorship Elective.* Each student is assigned to one of four or five selected general surgeons. The student sees patients in the physician's office, takes histories, performs physical examinations on the patients, and follows them in the hospital. The student is expected to attend the surgeon's office hours, operate with him, and make rounds with him. Reading assignments are evaluated by the surgeon to whom the student is assigned. Projects of a clinical nature may be undertaken during this preceptorship.

(Dr. Ballinger and Staff)

*Surgical Research Elective.* The aim of this elective is to introduce the student to the general approach of analyzing clinical problems of surgery in the laboratory and to familiarize him with some of the investigative methods in surgery. In general, the student gains more experience by working with an established investigator on a current project. Students are encouraged, however, to plan and execute a laboratory solution to a specific problem within the limitations of his elective time.

The student participates in the weekly departmental research seminars, where investigators describe current laboratory approaches to a wide variety of problems, and in the weekly surgical journal club, where are presented varying results of critical reading of current surgical publications, clinical and experimental.

(Drs. Ballinger, Butcher, Collins, Hoopes, Ternberg, Weldon)

*Pediatric Surgery Elective.* This elective consists of a clerkship on pediatric surgery. The emphasis is placed on the different problems this age group presents in respect to type of surgical diseases and their care. In addition to the daily ward rounds, conferences are arranged twice a week to discuss the etiology, diagnosis, and treatment of disorders that have

not been encountered on the ward. The student also attends the General Surgery Pediatric Clinic, where he participates in postoperative followup of patients. Once a week the student attends the Pediatric Oncology Clinic. Pertinent pediatric X-ray films are reviewed regularly.

(Dr. Ternberg)

*Principles of Thoracic and Cardiac Surgery.* Designed to present a broad background in surgical disease of the thorax. The student follows his patients through all phases of diagnosis, surgical treatment, and postoperative management. He is at liberty and indeed is encouraged to pursue special areas of interest. For example, a patient with a pulmonary problem may provoke a critical study of the various tests of pulmonary function. A cardiac surgery patient may kindle interest in catheterization techniques, physiology of cardiopulmonary bypass, or a comparative evaluation of surgical methods. There are a number of regularly scheduled conferences and seminars the student may attend. In addition, seminars are held twice weekly for the purpose of discussing pertinent literature and resolving problems. Each student is asked to select a topic for review at the beginning of the elective, and to present a seminar on his work in the final week.

(Dr. Weldon and Staff)

*Plastic and Reconstructive Surgery Preceptorship.* The aim of this elective is to familiarize the student with some of the problems in plastic and reconstructive surgery. The student has an opportunity to discuss the application of principles of tissue repair to a variety of surgical conditions, including burns and other forms of trauma, and major soft tissue injury associated with cancer surgery. There is a constant personal relationship between the student and the attending staff during the period.

(Dr. Hoopes and Staff)

*Orthopedic Surgery Elective.* Clinical clerkship electives are available for six weeks, during which time the student attends conferences and outpatient clinics and serves in the various orthopedic clinical divisions. The Orthopedic Service does not have interns, and medical students electing this clerkship serve as an active and integral part of the team. The conferences that they are expected to attend consist of:





X-ray conference, 12:00 to 1:00 p.m., Monday, Tuesday, and Friday.

Saturday morning conferences at Barnes Hospital and at Shriners Hospital.

Amputee clinic, Tuesday afternoon.

Hand conference, 1:00 p.m., Thursday.

Children's Clinic, Wednesday afternoon.

(Dr. Reynolds and Staff)

*Neurosurgery Elective.* The goal is to provide an overview of neurological surgery. Responsibilities include patient work-up, pre- and post-operative care, and attendance at selected neurosurgical operations. Daily morning rounds are held with a member of the attending staff. At these rounds a patient is presented and the disease entity discussed in detail. Students also work in the Neurosurgical Clinic and attend the weekly combined conference in neuropathology, neurology, and neurosurgery. In addition they attend the junior class Saturday morning lectures, which include patient presentation.

(Dr. Schwartz and Staff)

*Urology Elective.* A six-week clinical clerkship in urology offers the interested student an adequate knowledge of the type of problems with which the clinical urologist deals. The student is taught the basic diagnostic procedures and the management of surgical and nonsurgical patients on both the private and ward services under the supervision of the attending staff and house officers. The experience involves direct care of patients in the clinics, as well as of urologic admissions to the hospital. Daily morning and evening rounds of all patients on a particular service are conducted by the responsible resident. Two additional teaching rounds for the house staff and students are held weekly. In addition, the student attends daily X-ray conferences, the weekly staff conference, and the pathology conference and journal club conducted every other week. The student is given an opportunity to assist in open and endoscopic surgery, as well as in the various diagnostic procedures performed in the cystoscopy and urography section.

(Dr. Cordonnier and Staff)



*Oncology Elective.* Students electing to study the theoretical and practical aspects of the epidemiology, diagnosis, treatment, and prognosis of neoplastic diseases in man may select a program (subject to the approval of the Tumor Committee) which includes interdepartmental experience in several of the following areas of knowledge:

1. Surgical Pathology of Neoplasms.  
(Dr. Ackerman)
2. Surgical Pathology of Gynecologic Neoplasms.  
(Drs. Rosai, Lagos)
3. Neoplasms in Children.  
(Dr. Vietti)
4. Head and Neck Cancer.  
(Dr. Ogura)
5. Radiation Therapy of Neoplasms.  
(Dr. Powers)
6. Hematologic Neoplastic Disease.  
(Dr. Reinhard)

All students attending the oncology elective will be expected to attend regularly the following conferences:

1. Tumor conference, 3:00 to 4:00 p.m.,  
Wednesday.
2. GYN cancer conference, 8:00 to 9:00 a.m.,  
Monday.
3. E.N.T. tumor conference, 12:00 noon every  
other Thursday.
4. Neoplastic hematologic conference, 8:00 to  
9:00 a.m., Wednesday.
5. Cancer workshop, 6:30 to 8:00 p.m., first  
Monday of each month, September to June.

Each student taking an elective in oncology must select (or be assigned) a problem for study in the field. Each student is expected to report to his peers and instructors on the selected subject at the end of the elective period. Members of the Tumor Committee evaluate the report, as well as the student's performance during the elective

(Drs. Ackerman, Butcher, and Staff)

*Ellis Fischel Elective.* The Ellis Fischel State Cancer Hospital and its Cancer Research Center jointly have departments of Surgery, Medicine, Radiotherapy, Anatomical Pathology, Biostatistics, and Biochemistry, with full-time teaching-research oriented staffs. Active training programs are available in all of these departments. Students are welcome to take electives in any department. The staff is of

the opinion that medical students derive the greatest benefit from a split elective, including surgery, radiation therapy, anatomical or tumor pathology, and internal medicine (with emphasis on cancer chemotherapy and hematology). Since the Hospital attends approximately ten per cent of the cancer patients in the State and maintains a comprehensive follow-up in the outpatient clinic, the clinical experience derived from participation as a working member of the clinical teams in these various departments gives the students an excellent training experience in clinical oncology. A short-term clinical research project during the clerkship is encouraged. This is either initiated by the student or is assigned by a member of the clinical staff. Training in the design of a clinical experiment and analysis of clinical data is co-ordinated through the Department of Biostatistics. The student has the choice of concentrating his entire elective experience on a single service if he desires.

(Dr. Spratt and Staff)



# Teaching and Research Divisions

## BIOMEDICAL COMPUTER LABORATORY

The Biomedical Computer Laboratory collaborates with research investigators in the application of modern information-processing techniques to problems in biology and medicine. Research and training is offered to medical students and graduate students in applications of mathematical techniques to biomedical problems and in applications concerning information processing in the research laboratory.

Currently one of the foremost aids in laboratory applications of digital computers is the LINC (Laboratory Instrument Computer), a small stored-program computer which was designed specifically for the biology laboratory. Four LINC computers are available to students. Five Programmed Consoles, a smaller computer designed at BCL, are also available and are connected by telephone lines to an IBM 360/50 at the Washington University Information Processing Center.

Externships in biomedical computing of two or three months duration are offered during the summer for students who have completed the first year of the medical school curriculum. Opportunities to carry out research are also available to graduate students on a year-round basis. For other related courses see the Interdepartmental Program in Biomedical Engineering.

The Biomedical Computer Laboratory is affiliated with the Computer Systems Laboratory located in nearby quarters at the School of Medicine. The mission of the Computer Systems Laboratory is the design and development of advanced computer systems with a current focus on the development of a compatible set of "macromodules" from which arbitrary large, complex, or specialized computer systems can be assembled. These systems are being applied to several challenging problems in physiology and medicine.

### *Professor and Director of the Laboratory*

**Jerome R. Cox, Jr., S.B.**, Massachusetts Institute of Technology, 1947; S.M., 1948; Sc.D., 1954. (See Department of Physiology, Biophysics and School of Engineering)

### *Associate Professor*

**Donald L. Snyder, B.S.**, University of Southern California, 1961; M.S., Massachusetts Institute of Technology, 1963; Ph.D., 1966. (Also School of Engineering)

### *Assistant Professors*

**William F. Holmes, A.B.**, Princeton University, 1953; Ph.D., University of Pennsylvania, 1960. (See Department of Biochemistry)

**Maxine L. Rockoff, B.S.**, George Washington University, 1958; M.A., University of Pennsylvania, 1960; Ph.D., 1964. (Also School of Engineering)

### *Research Assistant*

**Michael D. McDonald, B.S.**, St. Louis University, 1957.

### *Assistant Director for Engineering*

**Vernon W. Gerth, Jr., B.E.**, Vanderbilt University, 1960; M.S., 1964.

### *Administrative Officer*

**Edward L. MacCordy, B.S.**, Tufts University, 1947; M.S., Rensselaer Polytechnic Institute, 1957.

## Elective Courses

*Digital Computers for Laboratory Use.* (Identical with Biochemistry 512.) Methods of using small digital computers with laboratory instruments. Basic programming, data collection and conversion, data processing, digital control, output techniques. Calculus is desirable. One class hour and two laboratory periods a week. Credit 3 units. (Dr. Holmes)

*Biomedical Mathematics.* Basic mathematics for investigators in the life sciences, with particular emphasis on the mathematics required in the formulation of kinetic models of physiological systems. Logic, number systems, elementary algebra, trigonometry, complex num-

bers, vectors, matrices, calculus, and differential equations. Use of a small digital computer. No mathematical background required. Three class hours a week. (Dr. Rockoff)

*Compartmental Analysis.* (Identical with Applied Mathematics and Computer Science 525.) A critical study of some methods currently in use for the analysis of isotope tracer data from physiological and other intact systems. Students work in teams with graduate students in engineering to analyze real data. Topics covered are: Assumptions for tracer studies, differential equation formulation, fitting data with linear combinations of exponentials, integral equation formulation, relationship to network theory. Biomedical mathematics (above) or equivalent mathematical preparation required. Three class hours a week. Credit 3 units. (Dr. Rockoff)

*Programming Techniques for Laboratory Computers.* Topics covered are: Generalized description of logical design of digital computers; decimal, octal, and binary number systems; machine language programming for the LINC; usage and design of algorithms for programming. Three class hours and one laboratory period a week for six weeks.

(Mr. M. McDonald)

## INTERDEPARTMENTAL PROGRAM IN BIOMEDICAL ENGINEERING

This course of graduate study is designed to provide education and training for students wishing to apply principles of modern engineering and mathematics to theoretical and practical problems in biology and medicine. Participating in the Program are students and faculty of both the School of Engineering and Applied Science and the School of Medicine.

Every student must be admitted to one of the participating departments of the Sever Institute of Technology, the graduate division of the School of Engineering and Applied Science. Most students obtain the D.Sc. degree; however, the Program permits the student to earn both the M.D. and the D.Sc. degree.

Graduate study plans are tailored to the individual's needs and interests, and will provide essential background in the related areas of life and medical sciences. Students with diverse undergraduate backgrounds may be admitted provided they have adequate preparation and experience in mathematics and the physical sciences. Areas of specialization include sensory communications, flow and diffusion in biological systems, biological control systems, and applications of advanced computer techniques to biology and medicine. Research facilities available to the Program are located in the School of Engineering and Applied Science, the School of Medicine, and the Washington University Computer Laboratories. The faculty includes representatives from the Biomedical Computer Laboratory; the departments of Biological Chemistry, Microbiology, Physiology and Biophysics, Preventive Medicine and Public Health, Radiology, and Surgery in the School of Medicine; and the departments of Applied Mathematics and Computer Science, Chemical Engineering, Electrical Engineering, and Mechanical Engineering in the School of Engineering and Applied Science.

Complete course listings and information about application and degree requirements may be found in the Bulletin of the School of Engineering and Applied Science.

*Faculty:* Associate Professor Russell R. Pfeiffer, Chairman; Professors J. Cox, Sterling, Ter-Pogossian, Vagelos, Wette, Suter; Associate Professors Molnar, Pickard, Ghista; Assistant Professors Arthur, R. Clark, Hochmuth, G. Little, M. Rockoff, Spaeth, K. Woo.

**BMed 600.** *Research* for doctoral dissertation.

**BMed 644.** *Surgical Techniques for Biomedical Experimentation.* A course of instruction in aseptic surgical techniques necessary for basic experimental applications. Topics covered are: Chronic surgery, implant techniques for telemetry and monitoring agents; the humane care, handling and housing of animals; choice and induction of anesthesia; techniques of ligation, suturing, and cannulation; use of respirators, gas analyzers, and other associated instruments. Permission of instructor required. One class hour and four laboratory hours a week. Credit 3 units.

**BMed 660.** *Biomedical Applications of Laboratory Digital Computers.* Introduction to the use of digital computers in the laboratory. Considerations in the choice of computer equipment and algorithms for the solution of laboratory and clinical problems. Examples of applications in data gathering and processing, control of experiments, modeling and simulation. Prerequisite, Electrical Engineering 460, Applied Mathematics and Computer Science 132, or permission of instructor. Credit 3 units.

**BMed 675.** *Mathematical Methods in Physiology.* Application of analytical technique to the solution of problems in engineering physiology. Irreversible thermodynamics of living systems; subcellular physiology; cellular neurophysiology; structure and function of muscle; circulatory dynamics; respiration; kidney; sys-

tems theory in biology. Prerequisite, advanced calculus; co-requisite, Biology 401 or Physiology 502.

**BMed 693.** *Special Topics in Biomedical Engineering.* Individual or group instruction, by members of the faculty, devoted to topics not covered in the formal courses. Topics chosen from: Mechanics of the musculo-skeletal system and human body kinetics; mechanics of the cardio-vascular system; biomedical instrumentation; etc. Hours and credit to be arranged.

Other Biomedical Engineering course offerings:

**BMed 560.** *Introduction to Biomechanics*

**BMed 573.** *Electrobiology*

**BMed 576.** *Sensory Communication*

**BMed 578.** *Biological Control Mechanisms*

For additional related courses, see Biomedical Computer Laboratory in this Bulletin and the Bulletin of the School of Engineering and Applied Science.



## **INTERDEPARTMENTAL PROGRAM IN NEUROBIOLOGY**

The graduate program in Neurobiology leads to the degree of Master of Arts or Doctor of Philosophy. The participating departments are: Anatomy, Biology, Neurology, Ophthalmology, Otolaryngology, Pathology, Physiology, Psychiatry, Psychology, and Surgery; the School of Engineering and Applied Science; the Washington University Computer Laboratories; and Central Institute for the Deaf.

The program of study is adjusted to the particular aims of individual students, and includes investigations into the organization and function of the nervous system, such as mechanisms of sensing the external and internal environments; the conversion of adequate stimuli into signals and the transmission of coded information; information storage and retrieval; evaluation of information and initiation of responses; gross anatomy and microstructure; development, organization, and regeneration; biochemical features of structure, action, and control in neural tissues and systems.

Because of the diversity of the study and research programs, students of such varied fields as biology, chemistry, physics, psychology, mathematics, and engineering, and graduates of schools of medicine, veterinary medicine, and dentistry may be admitted.

It is recommended that during the first two years all neurobiology students take courses in biochemistry (Biological Chemistry 503), microscopic anatomy (Anatomy 503), neural sciences (Anatomy 504 and Physiology 504), and in one of the following: physiology, pathology, pharmacology, biology, microbiology, or a behavioral science, e.g., psychology. A list of acceptable courses is maintained by the Executive Secretary. In addition, all students are required to attend the seminar course Current Topics in Neurobiology for at least

one year (preferably for two years). Further course work is left to the discretion of the individual with the approval of the Administrative Committee.

### **Administrative Committee**

Professor H. Davis, Chairman; Professor Eliasson, Executive Secretary; Professors Cowan, J. R. Cox, Eldredge, Enoch, S. Goldring, Hamburger, Hunt, Landau, Levi-Montalcini, O. Lowry, O'Leary, E. Robins, Sandel, Stern, Torack; Associate Professors A. I. Cohen, McDougal, Molnar, Pfeiffer, Prensky, W. Sherman, Thalmann; Assistant Professors Laatsch, Schlaepfer.

Interested students should consult the Executive Secretary, Committee on Neurobiology, Washington University School of Medicine.

## **WILLIAM GREENLEAF ELIOT DIVISION OF CHILD PSYCHIATRY**

The Division of Child Psychiatry offers a varied teaching program for Residents in Psychiatry and Fellows in Child Psychiatry through its Child Psychiatry Clinics at 369 North Taylor Avenue, the St. Louis County Division of Mental Diseases, and the Youth Center at the St. Louis State Hospital. Trainees are assigned to these various units where they participate in complete diagnostic evaluations and see patients in treatment under the supervision of the unit doctor and the Professor of Child Psychiatry. Seminars in child psychiatry, child development, individual and group treatment, clinical psychology, social work, and research are held weekly. New methods of teaching and observation (video-taped sessions, one-way screens, clinical films) are in regular use. The Child Development Research Center, attached to the Division of Child Psychiatry, is carrying out systematic research in child psychiatry with the help of funds from the National Institute of Health. Fellows in Child Psychiatry with

special research interests can participate in the various research programs.

*Director and Blanche F. Ittleson Professor*

**E. James Anthony**, B.S., University of London, 1938; M.R.C.S., L.R.C.P., 1941; M.B., B.S., 1942; D.P.M., 1947; M.D., 1949.

*Director of the Child Psychiatry Clinics and Assistant Professor of Child Psychiatry*

**Thomas C. Brugger**, B.S., University of Wisconsin, 1950; MD., 1953.

*Assistant Professors*

**Loretta Cass** (Medical Psychology), B.A., Colorado College, 1934; M.A., 1942; Ph.D., Ohio State University, 1950. (Also College of Arts and Sciences)

*Assistant Professors (Clinical)*

**Roy M. Mendelsohn** (Child Psychiatry), B.S., University of Illinois, 1950; M.D., 1952.

**Paul H. Painter** (Child Psychiatry), M.D., St. Louis University, 1947. (See Department of Pediatrics)

*Research Assistant Professors*

**Manon McGinnis** (Psychiatric Social Work), B.A., Westhampton College, 1927; M.S.W., Pennsylvania School of Social Work, 1929.

**Boaz Kahana** (Medical Psychology), B.A., Yeshiva University, 1955; M.S., 1957; Ph.D., University of Chicago, 1966.

*Consultants*

**Eleanor T. Kenney** (Medical Psychology), A.B., Bryn Mawr College, 1937; Ph.D., Washington University, 1964.

**Robert E. Lefton** (Medical Psychology), A.B., Washington University, 1953; Ph.D., 1958.

*Instructors*

**Jane Stuart Barr** (Psychiatric Social Work), B.A., Southwestern College, 1958; M.S.W., Washington University, 1967.

**Adele Feldman** (Psychiatric Social Work), B.A., New York University, 1945; M.S.W., University of Denver, 1957.

**Douglas R. Gowler** (Child Psychiatry), M.D., Manitoba Medical College, 1948.

**Willy Hoffmeister** (Child Psychiatry), M.D., University of Buenos Aires, 1958.

**Janet S. Portell** (Psychiatric Social Work), B.A., Southern Illinois University (Edwardsville), 1965; M.S.W., Washington University, 1967.

**Adolfo E. Rizzo** (Child Psychiatry), M.D., Buenos Aires University, 1955.

**Eve Love Sutton** (Psychiatric Social Work), B.A., University of Kentucky, 1957; M.S.W., St. Louis University, 1964.

**Marylyn Voerg** (Medical Psychology), B.A., University of Florida, 1950; Ph.D., 1964.

*Instructor Emeritus and Lecturer*

**Louetta Berger** (Psychiatric Social Work), B.S., University of Wichita, 1941; M.S.W., Washington University, 1946.

*Instructors (Clinical)*

**Doris C. Gilpin** (Child Psychiatry), B.S., Drury College, 1944; M.D., University of Chicago School of Medicine, 1948.

**John B. Lewis** (Medical Psychology), B.S., Northwestern University, 1949; M.S.W., Washington University, 1952.

**Edith C. Robinson** (Child Psychiatry), A.B., Randolph-Macon College, 1927; M.S., University of South Carolina, 1928; M.D., Johns Hopkins University, 1932. (See Department of Pediatrics)

*Research Instructors*

**Lois E. Franklin** (Medical Psychology), B.A., Blackburn College, 1950; M.A., MacMurray College, 1952.

**Cynthia L. Janes** (Medical Psychology), B.A., University of Oklahoma, 1965; Ph.D., 1970.

**John K. Lescow** (Psychiatric Social Work), B.A., Concordia Senior College, 1962; B.D., Concordia Seminary, 1966; M.S.W., Washington University, 1968.

*Assistants*

**Nancy C. Kurtz** (Psychiatric Social Work), B.A., University of Cincinnati, 1958; M.S.W., Ohio State University, 1968.

**Madeline G. Pesanti** (Psychiatric Social Work), B.A., University of Illinois, 1967; M.A., University of Chicago, 1969.

### DIVISION OF GERONTOLOGY

The Division of Gerontology is located at the St. Louis Chronic Hospital, 5600 Arsenal Street. The Division conducts a research laboratory at the Hospital.

Through a bequest from the late Mrs. Ina Champ Urbauer, a fund has been established for research in gerontology and allied fields.

#### *Director of Research*

**John E. Kirk, M.D.**, University of Copenhagen, 1929. (See Department of Medicine)

#### *Research Instructor*

**Teofil Kheim, M.D.**, University of Budapest, 1934. (See Department of Medicine)



### DIVISION OF HEALTH CARE RESEARCH

The Division of Health Care Research of the Washington University School of Medicine is an extradepartmental unit of the School, directly responsible to the Dean. Staff members hold appointments in a variety of departments of the School of Medicine and the University; indeed, broad multi-disciplinary staffing is considered appropriate for address to the complicated sociomedical and economic problems of health care and education. The primary function of the divisional staff is to contribute to the solution of such problems. As such, its responsibilities include:

#### *1. Experimental Programs in Medical Care.*

One experiment now under way is a small group practice conducted within the present Washington University Clinics facility. Known as the Medical Care Group of Washington University, it cares for 500 families. The group is staffed by pediatricians, internists, and obstetricians on the Washington University faculty, and utilizes for all other medical services existing specialty groups within the Medical Center. One important objective of the practice is the evaluation of an experimental health insurance plan for ambulatory care.

#### *2. Health Care Planning, Ambulatory Services, Washington University Medical School and Associated Hospitals.*

The Division of Health Care Research will conduct studies to provide a factual basis for planning improvements in the use of ambulatory medical facilities of the center. In this way it is hoped that more effective medical care can be achieved.

#### *3. Research in Health Care.*

Studies of several broad areas are conducted by the staff of the Division, including investigations into effects of various methods of practice on medical care costs, factors in the organization of medical care, studies of triage in emergency



rooms, sociologic aspects of medical care, and methods of education for comprehensive care.

**4. Medical and Paramedical Education.** Educational activities include the collection and cataloguing of literature related to medical care for the library of the Division, the provision of elective courses for medical students and graduate students of hospital administration, planning for clinical training in comprehensive medical care, plus the integration of training experience in comprehensive care with in-hospital programs in the classical specialties of medicine. An active program for training pediatric nurse practitioners is under way.

#### *Director*

**Gerald T. Perkoff, M.D.,** Professor of Medicine and of Preventive Medicine and Public Health.

#### *Associates*

**Bernard Garfinkel, M.D.,** Associate Professor of Clinical Medicine.

**Lawrence Kahn, M.D.,** Assistant Professor of Clinical Pediatrics, Program Director, Pediatric Nurse Practitioner Program.

**Robert S. Mendelsohn, M.D.,** Assistant Professor of Clinical Medicine.

**James Swift, Ph.D.,** Assistant Professor of Sociology.

**M. Frances Watson, M.S.W.,** Assistant Professor of Social and Environmental Studies in Preventive Medicine.

**M. Anita Whitney, Ph.D.,** Assistant Professor of Health Services in Preventive Medicine (Communications).

**Morris Alex, M.D.,** Instructor in Clinical Medicine.

**Arnold M. Goldman, M.D.,** Instructor in Clinical Medicine.

**Maurice J. Lonsway, Jr., M.D.,** Instructor in Clinical Pediatrics.

**Stanley B. Lyss, M.D.,** Instructor in Clinical Pediatrics.

**Ruben Marmet, M.D.,** Instructor in Clinical Obstetrics and Gynecology.

**Samad Momtazee, M.D.,** Instructor in Obstetrics and Gynecology.

**Frederick D. Peterson, M.D.,** Instructor in Clinical Pediatrics.

**Gerald Wool, M.D.,** Instructor in Clinical Pediatrics.

#### *Assistant*

**Mary Anderson,** Statistical Assistant.

#### *Participating Faculty*

**William H. Danforth, M.D.,** Vice Chancellor for Medical Affairs and Professor of Medicine.

**James O. Hepner, Ph.D.,** Assistant Professor and Director, Graduate Program in Health Care Administration.



## DIVISION OF TUMOR SERVICES

The Division of Tumor Services was organized as a co-ordinating committee for the Cancer Teaching Program. Inasmuch as cancer, like other subjects in the medical curriculum, is given in an interdepartmental manner, the Tumor Clinic is the principal site on which these Services function. Using the Tumor Clinic facility, an attempt is made to supplement and co-ordinate problems relating to neoplastic disease as it exists today. In the junior year, time is allotted to students for working in the Tumor Clinic, where they gain firsthand experience with such problems. The Tumor Conference is held each week for members of the junior class, postgraduate students, and visitors, and serves as a forum for demonstrating some of the more complex problems in diagnosis and therapy which arise in patients with malignant disease. In the senior year, students may elect periods of study which expose them to the theoretical and practical aspects of the epidemiology, diagnosis, treatment, and prognosis of various human neoplasms in man. This program is tailored to the particular interests of each student with the approval of the Executive Committee of the Tumor Services. These oncological electives for seniors may include studies in any of the following fields: Surgical Pathology, Neoplasms in Children, Surgical and Radiational Therapy, Hematologic Neoplastic Disease and the Epidemiology of Cancer.

*Cancer Co-ordinator, Director of Division,  
and Chairman of the Executive Committee*

Harvey R. Butcher, Jr.

*Executive Committee*

Edward Reinhard

*Internal Medicine*

Willard Allen

*Obstetrics and Gynecology*

Joseph Ogura

*Otolaryngology*

Lauren Ackerman

*Pathology*

Teresa Vietta

*Pediatrics*

William Powers

*Radiology*



*McMillan Hospital and Oscar Johnson Institute*

## INSTITUTE OF NEUROLOGY

The Beaumont-May Institute of Neurology was established in 1955 by gifts from the Louis D. Beaumont Foundation, the late Mrs. Charles M. Rice, and Morton J. May. It is the purpose of the Institute to foster basic and clinical research in neurology with special reference to defects in the structure of the nerve cell which occasion important neurological disorders having a high incidence of prolonged disability.



## THE IRENE WALTER JOHNSON INSTITUTE OF REHABILITATION

The teaching of rehabilitation is conducted for second-, third-, and fourth-year medical students by the Department of Preventive Medicine and Public Health in collaboration with various specialty services. The Irene Walter Johnson Institute of Rehabilitation is a modern, two-story facility that is air-conditioned and well equipped for the care of disabled patients. Students of medicine, house officers, and students of paramedical services have an opportunity to affiliate with the Institute.

### *Director*

**Hugh Chaplin, Jr.**, A.B., Princeton University, 1943; M.D., Columbia University, 1947. (See Departments of Medicine and Preventive Medicine and Public Health)

### *Associate Medical Director*

**John O. Holloszy**, M.D., Washington University, 1957. (See Departments of Medicine and Preventive Medicine and Public Health)

### *Associate Director for Education and Administration*

**Lorraine Lake**, B.S., Washington University, 1950; M.A., 1954; Ph.D., 1962. (See Department of Anatomy and Physical Therapy)

**Traineeship Elective.** Traineeships in Physical Disability and Rehabilitation of eight weeks' duration may be elected during the interval between the end of the spring semester and beginning of the fall semester by up to five students who have completed the first year of the Medical School curriculum. Specific instruction is given by means of informal lectures, demonstrations, and seminars.

**Senior Elective.** The elective in physical disability and rehabilitation is of six-weeks' duration. The student becomes familiar at first hand with the techniques for defining the extent of physical disability and with various

approaches to its treatment. Emphasis is placed on methods used in physical, occupational, and speech therapy, and on the specialized contributions to be made by rehabilitation, social work, nursing, and vocational testing and counseling. (Drs. Chaplin, Holloszy)



## Allied Health Professions

Programs conducted by the School in the Allied Health Professions include Health Care Administration, Occupational Therapy, Physical Therapy, and Radiologic Therapy. All courses are approved by the American Medical Association or other certifying agencies, and graduates qualify for certifying examinations. For further information write to the director or educational director listed under the particular program, 660 South Euclid Avenue, St. Louis, Missouri 63110.

### GRADUATE PROGRAM IN HEALTH CARE ADMINISTRATION

The Washington University Graduate Program in Health Care Administration is composed of the Program in Hospital Administration and the Program in Comprehensive Health Planning.

#### Program in Hospital Administration

The program was established in 1946 and is fully approved by the National Accrediting Commission on Graduate Education for Hospital Administration. It is one of a few hospital and health administration programs that has its locus in a medical school, thus affording students an opportunity to mingle with students of medicine and allied professions with whom the hospital and health administrator will be predominantly associated throughout his career. The program also offers opportunities for interdisciplinary integration with the Graduate School of Arts and Sciences and the Graduate School of Business Administration.

The primary goal is to prepare administrators for careers as generalists, with the aim that they will eventually function in leadership roles.

The twenty-one month sequence, consisting of twelve months of on-campus academic study and a nine-month in-hospital administrative residency, leads to the degree Master of Health Administration.

#### Program in Comprehensive Health Planning

The program was initiated in July, 1969, with the help of a five-year grant from the U. S. Department of Health, Education and Welfare. The primary goal is to prepare students for careers in comprehensive health resource planning. The twenty-four month interdisciplinary academic sequence, with a practicum during the summer between the first and second years, leads to the degree Master of Health Administration.

#### *Assistant Professor and Director*

James O. Hepner, B.A., University of Iowa, 1955; M.H.A., Washington University, 1959; Ph.D., University of Iowa, 1964.

#### *Instructor and Assistant Director*

Robert J. Nelson, A.B., Washington University, 1957; M.H.A., 1967.

#### *Professor Emeritus*

Frank R. Bradley, M.D., Washington University, 1928; LL.D., Central College, 1943.

#### *Assistant Professor*

David A. Gee, B.A., DePauw University, 1949; M.H.A., Washington University, 1951.

#### *Instructor*

Colin C. Rorrie, Jr., B.A., Beloit College, 1964; M.A., University of Iowa, 1966; Ph.D., 1968.

#### *Lecturers*

Harry E. Davis, Jr., B.S., St. Bonaventure University, 1950; M.H.A., Washington University, 1961.

Paul R. Donnelly, B.M. Ed., American Conservatory of Music, 1951; M.S., Northwestern, 1957.

Harold Hinderer, B.A., College of St. Thomas, 1952.

Donald J. Horsh, B.S.B.A., University of Nebraska, 1941; M.H.A., Washington University, 1951; J.D., St. Louis University, 1953.

Herbert E. Metz, B.A., City College of New York, 1942; M.A., University of Iowa, 1947.

Harry E. Panhorst, A.B., Central College, 1936; B.S., University of Missouri, 1938; M.H.A., Washington University, 1949.

**Robert Parker**, B.S., Arkansas State University, 1958; M.P.H., University of North Carolina, 1962.

**Colonel James W. Polkinghorn**, USAF, MSC.

**Paul I. Robinson**, B.S., Washington University, 1926; M.D., 1928.

**Crofford O. Vermillion**, B.A., DePauw University, 1939; M.D., Washington University, 1947.

**Paul H. Wunderlich**, B.A., Valparaiso University, 1962; M.H.A., Washington University, 1967.

*Assistant Professor (Adjunct)*

**Robert E. Frank**, B.S., St. Louis University, 1950; M.H.A., 1962.

*Instructors in Hospital*

*Administration (Adjunct)*

**Louis B. Blair**, B.A., Maryville College (Tennessee), 1932.

**Ted Bowen**, B.S., Austin College, 1941; M.H.A., Washington University, 1948.

**Anthony L. Bunker**, B.A., College of St. Thomas, 1954; M.H.A., St. Louis University, 1960.

**James A. Canedy**, B.A., Hastings College, 1950; M.H.A., Washington University, 1952.

**Donald W. Cordes**, A.B., Hope College, 1940; M.A., University of Michigan, 1941.

**John R. Eckrich**

**Thomas W. Fourqurean**, B.B.A., Texas College Arts and Industries, 1939; M.B.A., University of Chicago, 1949.

**Joe S. Greathouse, Jr.**, B.S., University of Kentucky, 1951; M.S., Northwestern University, 1957.

**Thomas L. Hawkins, Jr.**, M.D., Albany Medical College of Union University, 1953.

**David H. Hitt**, B.S., University of Alabama, 1949; University of Minnesota, 1952.

**Roy C. House**, A.B., Evansville College, 1939; M.S., Northwestern University, 1949.

**Matthew W. Hubler**, B.A., College of St. Thomas, 1954; M.H.A., St. Louis University, 1961.

**Sister Estelle Marie**, B.S., St. Louis University, 1962; M.H.A., 1964.

**Richard D. O'Hallaron**, B.S., St. Louis University, 1952; M.H.A., 1957.

**Roland D. Olen**, B.A., College of St. Thomas, 1952; M.S., Catholic University of America, 1956.

**Boone Powell**, LL.D., Baylor University, 1958.

**Sister Mary Roch Rocklage**, B.S., St. Xavier College, 1961; M.H.A., St. Louis University, 1963.

**Glenn N. Scott**, B.A., Oklahoma Baptist University, 1956; M.H.A., Washington University, 1962.

**Gail L. Warden**, A.B., Dartmouth College, 1960; M.H.A.; University of Michigan, 1962.

*Participating Faculty*

**Gerald T. Perkoff**, M.D., Washington University, Director, Division of Health Care Research and Professor of Medicine.

**James W. Swift**, Ph.D., Washington University, 1968; Assistant Professor of Sociology and Acting Director, Medical Care Research Center.

**Jack Botwinick**, Ph.D., New York University, 1953; Professor of Psychology.

**David B. Carpenter**, Ph.D., University of Wisconsin, 1951, Professor of Sociology.

**Carl A. McCandless**, Ph.D., University of Iowa, 1942; Professor of Political Science.

**Joseph W. Towle**, Ph.D., Northwestern University, 1948; Professor of Management.

**Rodney M. Coe**, B.S., Iowa State University, 1955; M.A., Southern Illinois University, 1959; Ph.D., Washington University, 1962; Associate Professor of Sociology.

**Raymond L. Hilgert**, D.B.A., Washington University, 1963; Associate Professor of Management.

**Gerald Gutenschwager**, Ph.D., University of North Carolina at Chapel Hill, 1969; Assistant Professor of Architecture.

**Walter R. Nord**, Ph.D., Washington University, 1967; Assistant Professor of Organizational Psychology.

**Frederick A. Schiff**, B.A., Reed College, 1964; M.A., University of California at Los Angeles, 1966; Instructor in Sociology.

The curriculum leading to the M.H.A. degree consists of a sequence of required courses and elective study.

**HCA 510. Statistics for Health Care.** Introduction to statistics, with emphasis on professional managerial statistics for health agencies and hospitals. Credit 3 units. (Staff)

**HCA 520. *Electronic Data Processing.*** Operating principles of computers, programming, fundamentals of computer languages and internal systems, as viewed by management. Credit 3 units. (Staff)

**HCA 530. *Research Methodology*** (required). Introduction to research methods in the area of health care administration. Specific emphasis on formulation of a research problem, specifications of hypothesis, instrumentation formulation, data gathering, analysis of data, and an accepted thesis proposal. Credit 3 units. (Dr. Rorrie)

**HCA 540. *Organizational Theory*** (required). Concepts and theories of management applicable to complex large-scale organizations. Social psychology of organizations and organizational stress and conflict, as related to the health care environment. Credit 3 units. (Dr. Hepner, Mr. Nelson, Dr. Rorrie)

**HCA 541. *Hospital Management*** (required). Organizational aspects of the operation of a general acute hospital; history of the hospital; role of the board of trustees, medical staff, house staff, administrator; components of patient care, hospital controls, and criteria; function of hospital departments, such as admitting, nursing, purchasing, clinical laboratories, pharmacy, medical records. Credit 3 units. (Mr. Gee, Mr. Nelson, Dr. Rorrie)

**HCA 543, 544. *Financial Management for Hospitals*** (required). Accepted practices in hospital financial management. The use of cost analysis and cost accounting as an aid to administration in planning, organizing, and controlling the hospital organization. Relationship with third-party payors and the accounting aspects of purchasing. Credit 3 units each semester. (Mr. Hinderer)

**HCA 545. *Organizational Behavior*** (required). Attitudinal change, structure and behavior in organizations. Managerial decision-making

and problem-solving through analysis of an organization. Personnel administration and leadership development. Credit 3 units. (Staff)

**HCA 550. *Medical Care Administration*** (required). Course deals with all kinds of public and private health agencies, and with the structure and organization of health services, their costs, and methods of financing. Journal papers are written and presented. Case studies are also used. Credit 3 units. (Dr. Hepner)

**HCA 560. *Group Dynamics*** (required). Conference and discussion techniques for both leaders and participants. Conference direction, including preparation of agenda, pre-conference organization, parliamentary procedure, and committee techniques. Credit 2 units. (Mr. Metz)

**HCA 570. *Seminar in Health Care Delivery.*** Senior medical students and health care administration students investigate aspects of health care delivery in low-income communities. Each student presents his study at a seminar. Credit 1 unit. (Dr. Perkoff)

**HCA 575. *Health Care Delivery Systems.*** Course provides the student with an understanding of foreign health care systems, with particular emphasis on those fundamentals having applicability to our own system. Students are required to make an in-depth study of one particular system. The course is team taught by members of the full-time faculty and visiting professors. Credit 2 units. (Staff)

**HCA 580, 581. *Comprehensive Health Planning*** (required). A study of social process directed toward the improvement of the health system by allocating scarce resources for provision of health care in the community. Problem solving and case studies as related to community health problems. Utilization of theoretical tools in analyzing problems, determining alternatives, and defining feasible solutions. Credit 3 units each semester. (Mr. Nelson)



**HCA 582, 583. Comprehensive Health Planning Seminar** (required). Review and discussion of political, economic, sociological, and legal aspects of comprehensive health planning. Graduate students act as discussion leaders. Students develop models for comprehensive health planning. Credit 3 units each semester. (Mr. Nelson)

**HCA 585. Preventive Medicine and Public Health.** Emphasis is on the relative significance of the specific causes of physical and mental diseases within the framework of multiple etiological and environmental factors. Study of epidemiology as an aid in the diagnosis, prognosis, and prevention of disease. Credit 3 units. (Staff)

**HCA 590. Health Care Legislative Process** (required). Essentials of the law in hospital administration. The hospital is approached from a legal standpoint as a business organization, medical-service institution, social institution, a government institution and as a total legal entity. Recent legislation is surveyed along with the legislative process as it pertains to health. Credit 3 units. (Staff)

**HCA 600, 601, 602. Independent Study** (thesis). Credit to be arranged. (Staff)

**HCA 610, 611. Clinical Practicum in Hospital and Health Administration** (required). Opportunity to observe and possibly implement, under clinical faculty supervision, the principles learned in the prerequisite academic

sequence. Credit 1 unit each semester.

(Preceptors)

**GBA 560. Introductory Accounting Concepts** (required). Business organization, operations, and terminology. A survey of the broad area of accounting, including its mechanism. Intensive study of balance sheet, income statement, and other financial reports, together with the accounting principles underlying them. Analysis of statements designed for stockholders and creditors. Credit 3 units. (Staff)

**HCA 561. Persuasion** (required). A systematic examination of methods of argumentation aimed at improving the ability to persuade others. Credit 2 units. (Mr. Metz)

Applicants are required to have a bachelor's degree from an accredited university or college acceptable to Washington University, including a minimum of six units of undergraduate accounting and three units of statistics. The aptitude test of the Graduate Record Examination is required of all applicants.

**Tuition: Hospital Administration**

Per semester (three semesters).....\$1,100  
Residency (nine months)..... 380

**Tuition: Comprehensive Health Planning**

Per semester (four semesters)..... 1,100  
Summer practicum..... 190  
Books and supplies (per semester) ... 50 - 75  
Application fee (nonrefundable)..... 15  
Some financial aid is available. (See page 28.)





## PROGRAM IN OCCUPATIONAL THERAPY

*Assistant Professor and Elias Michael Director*  
**Martha E. Matthews, A.B.**, Winthrop College 1933.

*Assistant Professor and Associate Director*  
**Elizabeth Withers, B.S.**, Memphis State University, 1957; M.A., 1959.

*Assistant Professor*  
**Margaret S. Nelson, B.S.**, Ohio State University, 1956; M.S., San Jose State College, 1966.

*Instructor*  
**Garth D. Tubbs, B.S.**, Wisconsin State College, 1953.

*Lecturers*  
**Gene Speckert, B.S.**, Washington University, 1944.  
**Pauline Goetz.**

Applicants must present sixty semester hours of college credit, including a specified number of units in English, biology, physical science, psychology, and sociology.

The degree of Bachelor of Science in Occupational Therapy is conferred upon the completion of three academic semesters at the School of Medicine and nine months of supervised clinical application. During the academic and clinical programs, emphasis is placed on the patient's physical and psychological problems resulting from disease and trauma. Basic understanding of the techniques of creative, manual, and pre-vocational media and of how these are correlated therapeutically to provide desired treatment is stressed.

The role of occupational therapy as it functions with various medical and social resources within the broad concepts of patient rehabilitation is an important part of the course.

The curriculum includes sciences such as anatomy, physiology, psychology, and neurology; clinical subjects such as general medicine, orthopedics, and psychiatry; interpretation of

principles and practices of occupational therapy; technical instruction in manual, creative, and prevocational activities. The period of supervised clinical application is spent in approved affiliation centers.

Tuition (three semesters), per semester.....\$1,100  
 Tuition (9-month clinical period)..... 750





## PROGRAM IN PHYSICAL THERAPY

### *Assistant Professor and Director*

**Beatrice F. Schulz, B.S.**, Washington University, 1949; M.A., 1955.

### *Assistant Professor and Assistant Director*

**D. LaVonne Jaeger, B.S.**, University of Minnesota, 1951; M.A., Washington University, 1966.

### *Assistant Professor*

**Lorraine F. Lake, B.S.**, Washington University, 1950; M.A., 1954; Ph.D., 1962. (See Department of Anatomy and Institute of Rehabilitation)

### *Instructors*

**Isabelle M. Bohman, B.S.**, Skidmore College, 1951; M.S., University of Illinois, 1954.

**Robert T. Hickock, B.S.**, Washington University, 1953.

The program of instruction in physical therapy in the School of Medicine consists of the junior and senior years of a four-year college curriculum leading to the degree of Bachelor of Science in Physical Therapy.

Students entering this program must have satisfactorily completed sixty semester hours in an accredited college or university. Required are courses in English composition, literature, psychology, and the physical, biological, and social sciences.

The program in the School of Medicine includes courses in the basic medical sciences, medical and surgical lectures as applied to the practice of physical therapy, theory and application of physical therapy procedures, and a minimum of 800 hours of clinical experience.

The aim of the program is the development of competent physical therapists whose broad cultural background and thorough professional training prepare them to accept the appropriate responsibilities in the comprehensive care program of modern medicine.

Tuition (three semesters), per semester . \$1,100

Tuition, final clinical semester . . . . . 750

## PROGRAM IN RADIOLOGIC TECHNOLOGY

*Educational Director and Lecturer  
in Radiologic Technology*

Armand Diaz, R.N. and R.T., Havana University  
School of Medicine, 1948.

The Department of Radiology, which has its headquarters in the Edward Mallinckrodt Institute of Radiology, offers a basic course in X-ray technology and two one-year postgraduate courses. Each course leads to a certificate awarded by the Washington University School of Medicine, Department of Radiology.

*X-ray Technology.* This two-year, A.M.A. approved course covers by lectures and group discussion the following subjects:

Anatomy and physiology, radiographic technique, radiation physics, darkroom processing procedures, nursing procedures, administration, radiation therapy, professional ethics, medical terminology, medical isotopes, survey of medical and surgical diseases, and radiographic positioning. Course work totals 400 hours.

During the first six months a student is on probation. Upon satisfactory completion of this work, he will be paid a monthly stipend of \$50 for the next six months. This stipend increases to \$75 for the third six months and \$100 for the last six months. During the twenty-four months, the student is assigned tours of duty in various diagnostic and therapeutic areas for practical experience amounting to a total of 30 contact hours a week.

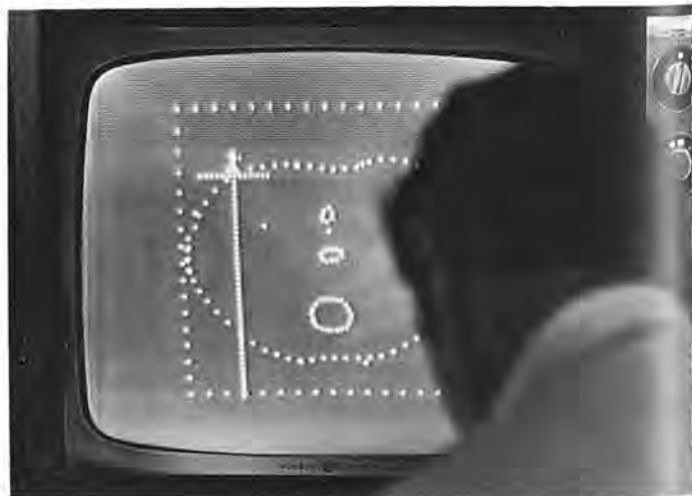
Candidates for admission must be graduates of an accredited secondary school and should rank in the upper third of their class. Special consideration is given to graduates of schools of nursing that are recognized by the State

Board of Nurse Examiners and to students who have passed a college entrance examination. A one-year postgraduate course is offered in the fields of therapy, nuclear medicine, and special procedure radiology.

*Nuclear Medicine Technology.* This course covers twelve consecutive months divided between didactic course material (295 hours) and practical experience. The student receives a monthly stipend of \$300.

Candidates for admission must be registered technicians (ARRT) or registered nurses with two years of college or with a baccalaureate degree. Medical technologists or persons having a B.S. degree with a major in biology, chemistry, or physics may also be considered if they have completed basic courses in human anatomy and physiology of at least 60 class hours.

*Radiation Therapy Technology.* This course covers twelve consecutive months divided between didactic course material (264 hours) and practical experience. The student receives a monthly stipend of \$350. Candidates for admission must be registered X-ray technicians (ARRT) or registered nurses.



# Officers and Committees of the Faculty of Medicine

## Executive Faculty

Thomas H. Eliot

*Chancellor*

Carl A. Dauten

*Executive Vice Chancellor*

M. Kenton King

*Dean*

William H. Danforth

*Vice Chancellor for Medical Affairs*

Willard M. Allen

Walter F. Ballinger II

Bernard Becker

W. Maxwell Cowan

Philip R. Dodge

Herman N. Eisen

Samuel B. Guze

Carl G. Harford<sup>1</sup>

John C. Herweg

Richard W. Hudgens

Carlton C. Hunt

Paul E. Lacy

William M. Landau

Oliver H. Lowry

James S. McDonnell<sup>2</sup>

Carl V. Moore

Joseph H. Ogura

Eli Robins

David Schlessinger<sup>1</sup>

Robert E. Shank

Juan Taveras

P. Roy Vagelos

## Faculty Council

The Faculty Council consists of all full-time members of the faculty with the rank of professor, associate professor, assistant professor, and those instructors who have been on the faculty for at least three years. The officers and executive committee are:

Mark A. Stewart, *Chairman*

Stanford Wessler, *Vice Chairman*

David E. Kennell, *Secretary*

David Schlessinger, *Preclinical Representative to the Executive Faculty*

Carl G. Harford, *Clinical Representative to the Executive Faculty*

Sondra Schlesinger, *Representative to the Senate Council of Washington University*

Luis Glaser

J. Russell Little, Jr.

Herbert Lubowitz

Philip W. Majerus

Morton Smith

George Winokur

## Faculty of Medicine

The Faculty is composed of all members of the staff holding University appointments.

## Standing Committees<sup>3</sup>

### Committee on Admissions and Financial Aid

John C. Herweg, *Chairman*

John A. Collins

Luis Glaser

Duane C. Hellam

Rex L. Jamison

George H. Klinkerfuss

Robert H. Laatsch

Philip W. Majerus

George E. Murphy

John L. Schultz

Jessie L. Ternberg

Robert A. Woodruff, Jr.

<sup>1</sup>Representing the Faculty Council during 1970-71.

<sup>2</sup>Honorary member.

<sup>3</sup>The Dean is ex officio a member of all standing committees.

**Committee for the Beaumont-May  
Institute of Neurology**

James L. O'Leary, *Chairman*  
William M. Landau  
Irwin Levy  
Oliver H. Lowry  
Henry G. Schwartz

**Committee on Fellowship and Awards**

George R. Drysdale, *Chairman*  
David Apirion  
Harvey R. Butcher  
William H. Daughaday  
William M. Landau  
P. Roy Vagelos

**Committee for Laboratory Animal Care**

M. Kenton King, *Chairman*  
David H. Brown  
Marguerite A. Constant  
Arpad I. Csapo  
William B. Hardin, Jr.  
Phyllis M. Hartroft  
Joseph E. Harvey  
P. Ruben Koehler  
Franz M. Matschinsky  
J. Neal Middelkamp  
Vernon J. Perez  
Roy R. Peterson  
Mabel Purkerson  
Ernest S. Simms  
Jessie L. Ternberg

**Committee on Medical Education**

Samuel B. Guze, *Chairman*  
Walter F. Ballinger II  
W. Maxwell Cowan  
Herman N. Eisen  
Carl Frieden  
David Goldring  
John C. Herweg, *ex officio*  
Richard W. Hudgens, *ex officio*  
Carlton C. Hunt  
David M. Kipnis  
John L. Schultz, *ex officio*

Robert E. Shank  
Four student representatives

**Committee for the Review of  
Research on Human Beings**

Fred C. Reynolds, *Chairman*  
Willard M. Allen  
David Goldring  
Carl G. Harford  
Eugene N. Mitchell  
Joseph H. Ogura  
Juan Taveras  
John D. Vavra  
Stanford Wessler  
George Winokur

**Medical Advisory Committee  
to the Clinics**

M. Kenton King, *Chairman*  
Walter F. Ballinger II  
William H. Danforth, *ex officio*  
Robert E. Frank  
Samuel B. Guze  
Dorothy J. Jones  
William M. Landau  
Carl V. Moore  
Joseph H. Ogura  
Robert E. Shank  
Morton E. Smith  
Juan Taveras  
Ralph B. Woolf



## Register of Students

### FOURTH-YEAR CLASS 1969-70 INTERNSHIP 1970-71

**Alderson, Philip Otis**, A.B., Washington University, '66-Jewish Hospital, St. Louis, Missouri

**Alex, Neil Steven**, B.A., Yale University, '65-Yale-New Haven Medical Center, New Haven, Connecticut

**Anderson, Donald Carroll**-St. Louis Children's Hospital, St. Louis, Missouri

**Atwood, James DeHaven**-Harkness Community Hospital and Medical Center, San Francisco, California

**Becker, Bruce Harlan**, A.B., Washington University, '67-Barnes Hospital, St. Louis, Missouri

**Bell, John Carl**, A.B., Washington University, '66-Boston City Hospital, V and VI Medical Service, Boston University, Boston, Massachusetts

**Birns, Robert Isack**, B.A., Queens College, '68-Boston City Hospital, II and IV Medical Service, Harvard, Boston, Massachusetts

**Blair, William Edward, Jr.**, B.S.Ed., Indiana University, '66-University of Stellenbosch, Bellville, Cape Province, Republic of South Africa

**Blattner, William Albert**, A.B., Washington University, '66-Strong Memorial Hospital, Rochester, New York

**Brasch, Robert Charles**, B.A., Miami University, '66-University Hospital of San Diego County, San Diego, California

**Brick, Jeffrey Michael**, B.S.E.E., Duke University, '66-University of Colorado Medical Center, Denver, Colorado

**Brodie, Bruce Rogers**, B.S.E.E., Purdue University, '65-William A. Shands Teaching Hospital and Clinics, Gainesville, Florida

**Bruceckner, David Armstrong**, B.S., Ohio University, '60-Jewish Hospital, St. Louis, Missouri

**Burney, Donald Patrick**, B.S., Texas A and M University, '67-Vanderbilt University Affiliated Hospitals, Nashville, Tennessee

**Campbell, Stephen Edward**, A.B., Duke University, '66-William A. Shands Teaching Hospital and Clinics, Gainesville, Florida

**Castellanet, Mark John**, B.A., Lawrence University, '66-Jewish Hospital, St. Louis, Missouri

**Chambers, Aubrey Pat**, B.A., University of Oklahoma, '66-University Hospitals of Cleveland, Cleveland, Ohio

**Cloninger, Claude Robert**, B.A., University of Texas, '66-Barnes Hospital, St. Louis, Missouri

**Cowan, Bruce Milton**, A.B., Cornell University, '61-Georgetown University Hospital, Washington, D.C.

**Crews, Eugene Lyndon III**, A.B., University of Missouri, '66-Barnes Hospital, St. Louis, Missouri

**Crofoot, Aaron Brooks**, B.A., DePauw University, '66-Kings County Hospital, Brooklyn, New York

**Data, Joann Lucille**, B.S., Purdue University, '66-Buffalo General Hospital, E. J. Meyer Memorial, Buffalo, New York

**Deem, Shirley Klemp**, B.S., Washington State University, '66-St. Luke's Hospital, St. Louis, Missouri

**Dierberg, Dale Francis**, B.A., Rice University, '66-Parkland Memorial Hospital, Dallas, Texas

**DiGioia, Richard Adolph**, A.B., Columbia University, '66-New England Deaconess Hospital, Boston, Massachusetts

**Dunlop, Stephen Richard**, A.B., Harvard University, '67-Montefiore Hospital, New York, New York

**Elder, William Cowden**, B.A., University of North Dakota, '66; B.S.Med., '68-City of Memphis Hospitals, Memphis, Tennessee

**Escobedo, Marilyn Barnard**, B.A., Baylor University, '66-St. Louis Children's Hospital, St. Louis, Missouri

**Ewing, Stephen Lee**, B.A., Northwestern University, '66-Barnes Hospital, St. Louis, Missouri

**Fisher, Bruce David**, B.A., Johns Hopkins University, '66-State University, Kings County Hospital Center, New York, New York

**Flake, Kathryn Kinlock**, A.B., Washington University, '66-Mount Sinai Hospital, New York, New York

**Friesen, Marlyce Kasper**, B.A., Tabor College, '66-Jewish Hospital, St. Louis, Missouri

**Garriga, Francisco Javier**, B.S., University of Puerto Rico, '66-University of Miami Affiliated Hospitals, Miami, Florida

**Gaskin, Ronald Jay**, A.B., Washington University, '66-Jewish Hospital, St. Louis, Missouri

- Glenn, William Vincent, Jr., B.A.,** Johns Hopkins University, '65-St. Luke's Hospital, St. Louis, Missouri
- Gumbelevicius, John Peter, B.A.,** Northwestern University, '66-St. Louis Children's Hospital, St. Louis, Missouri
- Harmon, Robert Gerald, A.B.,** Washington University, '66-Colorado Medical Center, Denver, Colorado
- Harris, Clifton Gordon III, A.B.,** Stanford University, '66-Boston University Hospital, Boston, Massachusetts
- Hickman, Scot George, A.B.,** Duke University, '66-Barnes Hospital, St. Louis, Missouri
- Hieb, Barry Randall, B.A.,** Bethel College, '66-Barnes Hospital, St. Louis, Missouri
- Hilliker, Elizabeth, A.B.,** Washington University, '65-Charity Hospital of Louisiana, Tulane University Division, New Orleans, Louisiana
- Ikossi, Maria Georgiou-Boston City, First Surgical Tufts, Boston, Massachusetts**
- Kamenetzky, Stephen Allen, A.B.,** Washington University, '67-Beth Israel Hospital, Boston, Massachusetts
- Katz, Jay Alan, B.A.,** Vanderbilt University, '66-Barnes Hospital, St. Louis, Missouri
- Kelley, James Norling, B.S.,** University of Idaho, '66-Harborview Medical Center, Seattle, Washington
- Kelly, Stephen Euleess, B.S.,** University of Oklahoma, '66-Lenox Hill Hospital, New York, New York
- Kelsey, Judith Ann-University of Chicago Hospitals and Clinics, Chicago, Illinois**
- Kotner, Steven Alfred, A.B.,** Washington University, '66-Barnes Hospital, St. Louis, Missouri
- Kurz, Larry Stephen, A.B.,** Washington University, '66
- Larson, Dana, B.A.,** Macalester College, '66-Good Samaritan Hospital, Portland, Oregon
- Lavorgna, Lorenzo Sebastian, A.B.,** Boston University, '66-Presbyterian Hospital, New York, New York
- Lusk, Rodney Hammond, A.B.,** Duke University, '66-D.C. General, Georgetown University, Washington, D.C.
- MacDonald, Michael John, B.S.,** Notre Dame University, '66-Children's Hospital, Buffalo, New York
- Macmanus, Quentin, B.S.,** University of Notre Dame, '66-University of Oregon Medical School Hospitals, Portland, Oregon
- Margul, Betty Lee, A.B.,** Washington University, '66-Michael Reese Hospital and Medical Center, Chicago, Illinois
- Marshall, Ronald Paul Alfred, B.S.,** University of Washington, '65-Jewish Hospital, St. Louis, Missouri
- McMahan, Thomas Keith, A.B.,** Columbia University, '66-William A. Shands Teaching Hospital and Clinics, Gainesville, Florida
- Mennes, Paul Arthur, B.S.,** University of Wisconsin, '66-Barnes Hospital, St. Louis, Missouri
- Mick, James Michael, B.S.,** University of Dayton, '66-University Hospitals, Madison, Wisconsin
- Milder, Michael Stuart, A.B.,** Princeton University, '66-University Hospital of San Diego County, San Diego, California
- Miller, Alexander Lewis, B.A.,** Yale University, '65-Jewish Hospital, St. Louis, Missouri
- Mollman, Marilyn Agnes, B.A.,** Northwestern University, '66-Naval Hospital, Oakland, California
- Moreland, John Porter-Barnes Hospital, St. Louis, Missouri**
- Ortbals, David William, B.S.,** St. Louis University, '66-Jewish Hospital, St. Louis, Missouri
- Pahnke, Lyle Douglas, Jr., B.S.,** University of Texas, '66-Bellevue Hospital Center, New York University, New York, New York
- Pheifer, Terrence Albert, A.B.,** University of South Dakota, '67-Harborview Medical Center, Seattle, Washington
- Robinson, John Charles-Jewish Hospital, St. Louis, Missouri**
- Scharp, David William-Barnes Hospital, St. Louis, Missouri**
- Shearer, William Thomas, B.S.,** University of Detroit, '60; Ph.D., Wayne State University, '66-St. Louis Children's Hospital, St. Louis, Missouri
- Simon, Toby Lee, B.A.,** Johns Hopkins University, '66-Temple University Hospitals, Philadelphia, Pennsylvania
- Simpson, Paul Cooper, Jr., A.B.,** Davidson College, '66-Massachusetts General Hospital, Boston, Massachusetts
- Smith, Richard Lee, B.S.,** St. Louis University, '66-University of Utah Affiliated Hospitals, Salt Lake City, Utah
- Snyder, Rush Alexander, Jr., B.A.,** Rice University, '66-Bernalillo County Medical Center, Albuquerque, New Mexico
- Stanton, William III, A.B.,** Harvard University, '65-University Hospital of San Diego County, San Diego, California
- Stern, Peter Joseph, B.A.,** Williams College, '66-Beth Israel Hospital, Boston, Massachusetts

**Strauss, Arnold Wilbur, A.B.**, Stanford University, '66—University of Minnesota Hospitals, Minneapolis, Minnesota

**Sumner, Hatton William, B.S.**, St. Edwards University, '66—Barnes Hospital, St. Louis, Missouri

**Swenson, Keith Howard, B.S.**, University of Idaho, '66—Michael Reese Hospital and Medical Center, Chicago, Illinois

**Throop, George Reeves III, B.A.**, Hanover College, '66—D.C. General, Georgetown University, Washington, D.C.

**Tuttle, William Montgomery**—Children's Hospital and Adult Medical Center, San Francisco Calif.

**Udesky, Robert Alan, A.B.**, Oberlin College, '66—New York Medical College, Metropolitan Hospital Center, New York, New York

**Vogel, Stanley John, B.A.**, Wabash College, '66—University of Michigan Affiliated Hospitals, Ann Arbor, Michigan

**Weissbluth, Marc, A.B.**, Stanford University, '65—St. Louis Children's Hospital, St. Louis, Missouri

**West, Hugh Hopkins, B.S.**, Tulane University, '65—Barnes Hospital, St. Louis, Missouri

**Wicks, Thomas William, B.A.**, Northwestern University, '65—Barnes Hospital, St. Louis, Missouri

**Wood, Dennis Edward**—Bernalillo County Medical Center, Albuquerque, New Mexico

**Zurbrugg, Eric Brinton, B.S.**, U.S. Air Force Academy, '65—St. Louis Children's Hospital, St. Louis, Missouri

**Zurbrugg, Jo Beamer, A.B.**, Indiana University, '66—St. Louis Children's Hospital, St. Louis, Missouri

### THIRD-YEAR CLASS 1969-70

**Anderson, Dixie Jane, B.A.**, Hendrix College, '67—Fayetteville, Arkansas

**Aronberg, Jerome Milton, A.B.**, Washington University, '67—University City, Missouri

**Beasley, Clifton Harold, Jr., A.B.**, Stanford University, '67—Fort Worth, Texas

**Beechie, Carla Anne, B.A.**, University of Texas, '67—Mexico City, D.F., Mexico

**Berger, Jack Edwin, B.A.**, Indiana University, '66—Bend, Oregon

**Berquist, Thomas Henry, B.A.**, Concordia College, '67; B.S. Med., '69—Garrison, North Dakota

**Berrier, Jane Elizabeth, B.S.**, Arizona State University, '67—Scottsdale, Arizona

**Blake, Robert Lincoln, Jr., A.B.**, Duke University, '67—Durham, North Carolina

**Blanke, Thomas Joseph, A.B.**, Rockhurst College '67—St. Louis, Missouri

**Blath, Richard Alan, B.A.**, Miami University, '68—University City, Missouri

**Blevins, William Leonard, B.S.**, College of Idaho, '67—Weiser, Idaho

**Bloom, Marshall Elliott, A.B.**, Washington University, '67—Dallas, Texas

**Brewer, Lucy Eileen Doyle, B.A.**, Rice University, '67—Houston, Texas

**Brown, Richard Arthur, A.B.**, Stanford University, '67—Chicago, Illinois

**Bushyhead, James Butler III, B.A.**, Wesleyan University, '67—St. Louis, Missouri

**Carnesale, Sandra Mae, A.B.**, University of Michigan, '62—New York, New York

**Cassell, Sidney Lee Isaacson, B.S.**, University of Michigan, '67—Tunica, Mississippi

**Clamon, Gerald Henry**—Hartford, Connecticut

**Clark, Edward Coe, Jr., B.S.**, Purdue University, '67—Cheverly, Maryland

**Cleary, Thomas George, B.S.**, St. Louis University, '67—St. Louis, Missouri

**Cohen, Alan Robert, B.A.**, Vanderbilt University, '61; M.A., '61; B.D., Harvard University, '67—Nashville, Tennessee

**Conway, Oren Michael, A.B.**, University of Michigan, '67—Munster, Indiana

**Cooper, Dennis Charles**—Ballwin, Missouri

**Corder, Clinton Nicholas, B.S.**, University of Kansas, '65—Oberlin, Kansas

**Corrigan, Joseph Louis, B.A.**, St. Louis University, '67—Sikeston, Missouri

**Crespo, Jose Batacan, A.B.**, University of South Dakota, '66—Manila, Philippines

**Crissey, Michael Merrill, A.B.**, Colorado State College, '67—Littleton, Colorado

**Daughaday, Carlos Colton III, A.B.**, Harvard College, '67—San Diego, California

**DeJohn, James Paul, B.S.**, Loyola University, '67—St. Louis, Missouri

**Diedrichsen, David Lloyd**—Sparks, Nevada

**Eggebrecht, Russell Ernest, B.S.**, University of Illinois, '67—Staunton, Illinois

**Eiser, Thomas John**—Gardena, California

**Ferguson, Ronald Morris, B.A.**, Augsburg College, '67—Milaca, Minnesota

**Freidin, Miriam Ross**—Lakewood, New Jersey

**Friesen, Arthur David, A.B.**, Tabor College, '65; M.A., University of Kansas, '67—Clearbrook, British Columbia, Canada

**Gephardt, Gordon Neal**—Muskogee, Oklahoma

**Goldstein, Paul David, B.S.**, Massachusetts Institute of Technology, '67—New Orleans, Louisiana

**Harris, John Thomas**, B.A., Johns Hopkins University, '67-Arlington, Texas

**Hertzman, Phillip Alan**, A.B., Washington University, '67-St. Louis, Missouri

**Hill, Thomas Charles**, B.S.Ch.E., Purdue University, '67-Gary, Indiana

**Johnson, Gregory Lawrence**, B.A., Northwestern University, '67-Virginia, Minnesota

**Johnson, James Howard**, B.S., Southern Methodist University, '67-Casey, Illinois

**Keller, Harrison Bradley**-Falls Church, Virginia

**Kilpatrick, William Robert**, B.S. Med., University of South Dakota, '69-Huron, South Dakota

**Kowaloff, Edward Mark**, A.B., University of Rochester, '67-West Orange, New Jersey

**Kralovic, Mary Lee Holland**, A.B., West Virginia University, '65-Ripley, West Virginia

**Laibovitz, Robert Alan**, A.B., Washington University, '67-Austin, Texas

**Lembeck, Lance James**, A.B., San Diego State College, '67-San Diego, California

**Levy, Robert Milton**, B.A., New York University, '65; M.S., '66-Sunnyside, New York

**Ludwig, Barry Irwin**, A.B., Washington University, '67-St. Louis, Missouri

**Mayfield, Douglas Eugene**, A.B., Harvard College, '67-St. Louis, Missouri

**Merrell, David Marx**, B.A., Wabash College, '67-Evansville, Indiana

**Merritt, Joe Paul**-Oklahoma City, Oklahoma

**Moscoe, Newton Dee**-Norman, Oklahoma

**Noller, David William**-St. Louis, Missouri

**Nugent, Kenneth Michael**, B.A., University of Texas, '67-Sugarland, Texas

**Oda, James Edward**, A.B., Georgetown University, '67-Honolulu, Hawaii

**Okamoto, Gary Akio**, B.A., University of Hawaii, '66-Honolulu, Hawaii

**Patton, Allen James**, A.B., Washington University, '67-Morton, Illinois

**Peden, Joseph Carroll III**, A.B., Colgate University, '67-St. Louis, Missouri

**Phelan, Elna Therene**, B.A., Pomona College, '67-La Mesa, California

**Potkin, Steven Garth**-Lincolnwood, Illinois

**Quillin, William Henry**, A.B., Washington University, '67-San Diego, California

**Richman, Edward Merle**, B.S., Massachusetts Institute of Technology, '67-Cleveland Heights, Ohio

**Rigg, Lee Allen**, B.A., Arizona State University, '61; Ph.D., University of Colorado, '65-St. Francisville, Illinois

**Rose, Edward Phillip**, B.S., University of Notre Dame, '67-Creve Coeur, Missouri

**Rouse, Ernest Tuttle**, A.B., Princeton University, '67-St. Louis, Missouri

**Rubenstein, Morton Jerome**, B.A., Johns Hopkins University, '67-Baltimore, Maryland

**Ryan, Thomas Edwards**, B.S.C.E., Southern Methodist University, '67-North Little Rock, Arkansas

**Saltzman, Stephen James**, B.S., Tulane University, '67-Tucson, Arizona

**Schreiner, Richard Lawrence**, B.S., St. Louis University, '67-Hammond, Indiana

**Seale, Robert Holt**, B.S., University of Idaho, '67-Moscow, Idaho

**Shapiro, Larry Jay**, A.B., Washington University, '68-Skokie, Illinois

**Shaw, James Thomas**, B.A., Westminster College, '67-Hermann, Missouri

**Simpson, Robert Marshall**, B.S., University of Wisconsin, '67-Sheboygan, Wisconsin

**Sneid, David Sabara**, A.B., Stanford University, '67-Shawnee Mission, Kansas

**Sonneborn, Robert Edgar**, A.B., Washington University, '67-Winnetka, Illinois

**Spencer, Dennis Dee**, A.B., Grinnell College, '67; B.S. Med., University of South Dakota School of Medicine, '69-Bedford, Iowa

**Spiegel, Gregory W.**, A.B., Washington University, '67-Kirkwood, Missouri

**Stenson, William Frederick**, B.S., Providence College, '67-Levittown, New York

**Stephens, Robert Frederic**, B.S., University of Oklahoma, '67-Lawton, Oklahoma

**Stephenson, Gary Sherman**, B.A., University of Oklahoma, '67-Oklahoma City, Oklahoma

**Summers, William Koopmans**, A.B., Westminster College, '66-Jefferson City, Missouri

**Swartout, Michael**, A.B., Stanford University, '67-Temple City, California

**Taylor, Stever John**, A.B., Stanford University, '67-Mexico, Missouri

**Telfer, James Gavin, Jr.**, A.B., Washington University, '68-Wilmette, Illinois

**Thorne, David Lee**, A.B., Indiana University, '67-Fort Wayne, Indiana

**Uhleman, John Hosley**, A.B., Grinnell College, '67-Lake Forest, Illinois

**Warnke, Roger Allen**, B.S., University of Illinois, '67-Peoria, Illinois

**Weiner, Allen Benjamin**, A.A., Los Angeles City College, '61 Ph.D., University of Southern California at Los Angeles, '65-Los Angeles, California



Weisenberger, Anthony Joseph, B.S., St. Louis University, '67-Chillicothe, Ohio  
 Wellauer, Robert Edward, B.S., University of Wisconsin, '67-Wauwatosa, Wisconsin  
 Wexler, Laura Fooner, A.B., Barnard College, '67-New York, New York  
 Wharton, Thomas Parker, Jr., B.S., Yale University, '67-Neenah, Wisconsin  
 Wong, Winslow Hung Chung, A.B., Washington University, '67-Honolulu, Hawaii  
 Zimmermann, George Jay, B.S., Texas Wesleyan College, '67-Fort Worth, Texas

## SECOND-YEAR CLASS 1969-70

Achterman, Christopher Alan, B.S., Oregon State University, '70-Salem, Oregon  
 Alving, Barbara Nelson, B.S., Purdue University, '67-Fort Wayne, Indiana  
 Avery, David Hartford, B.A., Wabash College, '68-Portage, Indiana  
 Baron, Roy Clifford, B.S., University of Wisconsin, Madison, '68-Staten Island, New York  
 Basolo, Mary Susan, B.S., University of Oklahoma, '68-Muskogee, Oklahoma  
 Benoist, Walter Fischel, A.B., University of Pennsylvania, '68-St. Louis, Missouri  
 Bialecki, Leon, B.S., Long Island University, '68-Antwerp, Belgium  
 Bieri, Michael David, B.A., Kansas University, '68-California, Missouri  
 Biggs, Fred Douglas, A.B., Vanderbilt University, '68-Poplar Bluff, Missouri  
 Blinn, John Ferguson III, B.A., University of Colorado, '68-Stockton, California  
 Blohm, Janet Christina, A.B., University of California at Berkeley, '65-San Francisco, California  
 Brahos, George James, B.S., Loyola (Chicago), '68-Hammond, Indiana  
 Brazy, Jane Elmlade, B.S., University of Colorado, '67-Greeley, Colorado  
 Brazy, Peter Coffin, B.S., University of Wisconsin, '68-Menomonee Falls, Wisconsin  
 Brodsky, Richard Dean, B.A., Johns Hopkins University, '68-West Haven, Connecticut  
 Burke, Larry Dale, B.A., University of Iowa, '68-Clarinda, Iowa  
 Campbell, Edward Joseph, B.S., Purdue University, '69-Hoopeston, Illinois  
 Coble, Robert Vaughn, B.A., Emory University, '68-Frankewing, Tennessee  
 Cohen, David John, B.A., Rice University, '68-San Antonio, Texas

Collins, Myra Lou, B.S., Duke University, '68-Marshville, North Carolina  
 Crown, Loren Arthur-Kansas City, Kansas  
 DeCroes, Charlotte George, B.A., University of Rochester, '68-Kingsport, Tennessee  
 Doisy, Edward Adelbert III, B.A., Central Methodist College, '68-Webster Groves, Missouri  
 Don, Irl Joseph-University City, Missouri  
 Eikrem, Margaret Anne, B.S., Massachusetts Institute of Technology, '68-La Canada, California  
 Eisenberg, John Meyer, A.B., Princeton University, '68-Memphis, Tennessee  
 Faul, Robert Louis, B.A., Wabash College, '68-Evansville, Indiana  
 Feldman, Charles Alan, B.S., Bradley University, '68-Sheboygan, Wisconsin  
 Fleckman, Philip Howard, B.A., University of Texas, '68-Port Arthur, Texas  
 Freed, Avery Morton, B.A., University of California (Santa Barbara), '69-Mill Valley, California  
 Fry, Robert Dean, B.A., Oklahoma City University, '68-Beaver, Oklahoma  
 Fuller, David Lee, B.S., University of Notre Dame, '68-Mt. Carmel, Illinois  
 Fulmer, Adrian Arthur, B.S., University of Illinois, '68-Rantoul, Illinois  
 Gaunt, Frank Peyton III, A.B., Oberlin College, '68-Webster Groves, Missouri  
 Glode, Leonard Michael, Jr.-Chadron, Nebraska  
 Glode, Mary Patricia Rose-Rolling Meadows, Illinois  
 Golden, Jeffrey Austin, B.A., Yale University, '68-New York, New York  
 Gollhofer, John Gordon, B.S., Yale University, '68-Rochelle, Illinois  
 Gottlieb, Charlene Chang, A.B., Radcliffe College, '66-Morton Grove, Illinois  
 Gradman, Alan Howard, A.B., Duke University, '68-Jacksonville, Florida  
 Hafken, Louis, A.B., Washington University, '68-San Antonio, Texas  
 Hammerman, Marc Randall, A.B., Washington University, '69-Olivette, Missouri  
 Harder, Eric Michael, B.S., University of Illinois, '68-Glen Ellyn, Illinois  
 Hawkins, Calvin Dale, Jr., B.A., Westminster College, '68-Norman, Oklahoma  
 Herbold, David Robert, A.B., Washington University, '68-Shaker Heights, Ohio  
 Hertel, Bruce Frederick-Scottsdale, Arizona  
 Hill, Geoffrey William, B.S., Tufts University, '68-Zanesville, Ohio



- Hill, Thomas Clark**, B.A., Southern Illinois University, '68-Edwardsville, Illinois
- Holekamp, Louis Robert, Jr.**, B.A., Amherst College, '68-Kirkwood, Missouri
- Jacobs, Richard Alan**, B.S., Oberlin College, '68-St. Louis, Missouri
- Kaiser, Jay Albert**, A.B., University of Illinois, '68-West Frankfort, Illinois
- Kapusta, George Rudolph**, B.S., Loyola University, '68-Chicago, Illinois
- Kauffman, Edward Charles**, B.A., University of Arizona, '68-Tucson, Arizona
- Kiddoo, Charlene Kaiser**, B.A., University of Colorado, '67-Palatine, Illinois
- Lisberg, Kenneth Jay**, B.S., University of Wisconsin, '68-Milwaukee, Wisconsin
- Long, Dallas Crutcher II**, D.D.S., University of Southern California, '66-Phoenix, Arizona
- Maher, Chauncey Carter III**, B.A., Wabash College, '67-Springfield, Illinois
- Mannino, Frank Louis**, A.B., Knox College, '68-Chicago, Illinois
- Maurer, Marvin M., Jr.**, B.A., Washington University, '68-Bloomington, Illinois
- McWilliams, Jane Ogden**, B.S., Rensselaer Polytechnic Institute, '68-Paducah, Kentucky
- Meyers, James Howard**, B.S., Trinity College, '68-Los Alamos, New Mexico
- Miller, Douglas Kent**, A.B., Stanford University, '68-Wichita, Kansas
- Mollman, Joan Elsie**, B.A., Northwestern University, '68-Brentwood, Missouri
- Mosley, Julian Cedell, Jr.**, B.S., St. Louis University, '66-St. Louis, Missouri
- Murfin, Wesley Warren**, A.B., Washington and Lee University, '68-Decatur, Illinois
- Musser, Wayne Eugene, Jr.**, A.B., University of California (Berkeley), '68-Petaluma, California
- Nathan, Toby Janet**, B.A., Barnard College, '66-New York, New York
- Nelson, Robert J.**, A.B., Grinnell College, '68-Chicago, Illinois
- Nikaitani, Peter Kenjiro**, B.A., Whitman College, '68-Seattle, Washington
- Osborn, Thomas Grant**, B.S., Purdue University, '68-Elkhart, Indiana
- Parker, John Anthony**, B.A., Yale University, '68-Wilmette, Illinois
- Porchey, Carl Joseph, Jr.**, B.S., Westminster College, '68-Festus, Missouri
- Potts, Daniel Eldon**, B.S., Baylor University, '68-Waco, Texas
- Rappaport, Allan Harvey**, B.A., Oberlin College, '68-Toledo, Ohio
- Roperts, William Virgil, Jr.**, Columbus, Ohio
- Robinson, Lary Allen**, B.A., University of Kansas, '68-Iola, Kansas
- Rosenbaum, Robert Allen**, A.B., Washington University, '68-Anderson, Indiana
- Rosenthal, Stuart Louis**, B.S., Michigan State University, '68-Tulsa, Oklahoma
- Ross, William Joseph**, B.A., Miami University, '68-Antwerp, Ohio
- Sainz, Claudia Lizbeth**, A.B., Washington University, '68-Florissant, Missouri
- Santa Maria, Maria Dolores**, B.S., College of Idaho, '68-Lagrono, Spain
- Scheible, Robert Frank**, A.B., Johns Hopkins University, '68-Racine, Wisconsin
- Shaw, Ronald Ahrend**, B.S., University of Toledo, '68-Toledo, Ohio
- Sheehan, Michael Bernard**, B.S., Rockhurst College, '68-Kansas City, Missouri
- Shield, Charles Franklin III**, B.S., University of Oklahoma, '66-Huntsville, Alabama
- Solis, George Patrick**, B.S., Centenary College, '65-Port Arthur, Texas
- Tepper, Joel Elliott**, B.S.E.E., Massachusetts Institute of Technology, '68-Fall River, Massachusetts
- Van Amburg, Albert Lee III**, A.B., Washington University, '68-Creve Coeur, Missouri
- Wachsmann, Richard Murray**, A.B., University of California at Los Angeles, '68-North Hollywood, California
- Wallace, Bruce James**, B.S., University of Nevada, '68-Minden, Nevada
- Warfel, Kathleen Anderson**, B.S., Butler University, '67-Indianapolis, Indiana
- White, Richard Harvey**, B.A., University of California (Santa Barbara), '68-Portland, Oregon
- Whitehead, Victor Bruce**, B.S., Michigan State University, '68-Knoxville, Tennessee
- Wicks, Rita Addison**, B.S., Purdue University, '67-Carthage, Indiana
- Wiesmann, William Paul**, A.B., University of Cincinnati, '68-Kettering, Ohio
- Wright, Sydney Thurman, Jr.**, B.A., Raymond College, '67-Selma, California
- Zalcman, Steven Jay**, A.B., Washington University, '68-Kansas City, Missouri

## FIRST-YEAR CLASS 1969-70

- Anderson, Lynn Ellen, B.S., Muhlenberg College, '70-Staten Island, New York
- Anderson, Wilfred Louis, B.A., Fisk University, '69-Montgomery, Alabama
- Ayer, Patrick Craig, B.A., University of Notre Dame, '69-Chesterfield, Missouri
- Baenziger, Jacques Ulrich, B.A., New College, '69-Knoxville, Tennessee
- Barnes, William Whitley III, A.B., Washington University, '69-St. Louis, Missouri
- Beall, Gregory Duncan, B.A., Johns Hopkins University, '69-Richfield, Minnesota
- Benz, Edmund Woodward, Jr., B.A., Vanderbilt University, '68-Nashville, Tennessee
- Birkenmeier, Edward Henry, A.B., Washington University, '69-Clayton, Missouri
- Black, John Scott, B.A., University of California (San Diego), '69-San Diego, California
- Blumberg, Lesley Zlotta, B.A., University of California (Riverside), '69-Los Angeles, California
- Blumhagen, Joel Dean, A.B., Stanford University, '69-Puyallup, Washington
- Boyd, James Clark, B.S., University of Colorado, '69-Mandan, North Dakota
- Boyers, Jerold Edmund, B.A., Knox College, Teaneck, New Jersey
- Bussmann, Donald William, Jr., B.A., College of the Holy Cross, '67-St. Louis, Missouri
- Caplan, William Mark, B.S., University of Wisconsin, '69-Columbus, Ohio
- Carlson, David John, B.A., Wabash College, '69-Evansville, Indiana
- Classen, Yvonne Lois, B.A., Tabor College, '69-Wichita, Kansas
- Cohen, Milton Tepper, B.A., University of California (Berkeley), '69-Madison, Wisconsin
- Collins, Robert Leo, B.A., College of the Holy Cross, '69-Albany, New York
- Condit, John Michael, B.A., University of Arkansas, '69-DeRidder, Louisiana
- Cooper, Barbara Joan, A.B., Washington University, '69-South Orange, New Jersey
- Cooper, Byron Stanley, B.A., Johns Hopkins University, '69-Chevy Chase, Maryland
- Cramer, Stewart Frederick, A.B., Cornell University, '69-Utica, New York
- DeLozier, Howard Luther, B.S., Juniata College, '69-Duncansville, Pennsylvania
- Earl, Arthur David, B.S., University of Idaho, '69-Burley, Idaho
- Farber, Barry Scott-Overland Park, Kansas
- Fazzio, Frank James, Jr.-Rockford, Illinois
- Finkel, Michael Francis, A.B., Washington University, '69-St. Louis, Missouri
- Fisher, Mina Lee, B.A., Lake Forest College, '69-Jordon, Michigan
- Glogovac, S. Vic, A.B., Washington University, '69-St. Louis, Missouri
- Guletz, John Dennis, B.A., University of Notre Dame, '69-St. Louis, Missouri
- Hill, Edward Feldin, B.S., U.S. Military Academy, '63-Olympia, Washington
- Hirsch, John David-St. Louis, Missouri
- Holland, Edward Irving, B.S., University of Chicago, '69-New York, New York
- Hooper, David Crittenden, B.A., University of Texas (Austin), '69-Lubbock, Texas
- Hosler, Mark Wayne, A.B., University of Missouri (Columbia), '69-Higginsville, Missouri
- Huddleston, Howard Lee, B.S., Texas A. and M., '69-Houston, Texas
- Jacobi Mark David, B.S., University of Michigan, '69-LaPorte, Indiana
- Jacobs, Arthur Elliott, B.A., University of Kentucky, '69-Lexington, Kentucky
- Jenkins, Mark Schering, B.A., University of Texas, '69-Houston, Texas
- Kaplan, David, A.B., Case-Western Reserve University, '69-South Euclid, Ohio
- Karin, Daniel S., B.S., Tulane University, '69-San Antonio, Texas
- Karl, Robert Harry, B.A., Northwestern University, '69-Milwaukee, Wisconsin
- Kerns, Gale Gordon-Chinook, Montana
- Knowlton, Edward Welk-Dayton, Ohio
- Knudson, Donald Henry, B.A., Iowa State University, '69-Yankton, South Dakota
- Koskella, Kenneth Ray, B.S., University of Idaho, '69-McCall, Idaho
- Krusack, Louisa May-LaGrange Park, Illinois
- Lee, King Tak, B.S., University of Hong Kong (Chung Chi College), '68-Kowloon, Hong Kong
- Lehman, Judith Anne-Loves Park, Illinois
- Lenhardt, Jeanne Helene, B.A., Spelman College, '68-Greenville, South Carolina
- Levine, Marc Albert, B.A., Rice University, '69-Houston, Texas
- Lipson, Ace, B.A., New York University, '69-Fall River, Massachusetts
- Martin, Samuel Kofele-Buea, West Cameroon
- McCarty, Michael Allan, A.B., Washington University, '69-St. Louis, Missouri

Michael, John Mark, B.A., University of Kansas, '69-Wichita, Kansas

Milder, Barry David, B.S., Massachusetts Institute of Technology, '69-University City, Missouri

Miller, Douglas Parker, B.A., University of California (San Diego), '69-San Diego, California

Miller, Jeffrie Davis III-St. Louis, Missouri

Miller, Robert Allen, B.A., University of Rochester, '69-Syracuse, New York

Minkes, Mark Stanley-University City, Missouri

Moran, Jon Frederick, B.A., Yale University, '68-South Bend, Indiana

Moses, Alan Charles, B.S., Duke University, '69-Gardner, Massachusetts

Namey, Thomas Curtis-Farrell, Pennsylvania

Nichols, Steven Henry, B.A., Vanderbilt University, '69-Largo, Florida

Novack, Mark Alan-University City, Missouri

Nuelle, Douglas Gregory, B.S., University of Missouri (St. Louis), '69-St. Louis, Missouri

Nunnelee, Keith Hunter, B.S., Carroll College, '69-New Berlin, Wisconsin

Obiaya, Patrick Chukuma, B.S., University of Dayton, '68-Asaba, Nigeria

Paulin, Julius Fredrick, B.A., University of Colorado, '69-Buena Vista, Colorado

Peterson, Alan Carl, B.S., University of Michigan, '69-Ludington, Michigan

Plasse, Terry Freeman, A.B., Brandeis University, '69-Great Neck, New York

Rassen, Joshua Herbert, A.B., Harvard College, '68-Brookline, Massachusetts

Reinhard, John D'Arcy, B.A., Cornell College, '69-Webster Groves, Missouri

Richmond, Dennis, B.S., Purdue University, '69-Wakarusa, Indiana

Rollings, John William-Springfield, Missouri

Root, Paul Everett, B.A., University of California (San Diego), '69-San Diego, California

Rubenstein, William Allan, A.B., Washington University, '69-Forest Hills, New York

Schmidt, Robert Edward, A.B., Washington University, '69-Normandy, Missouri

Schroer, Kenneth Ray-Kearney, Nebraska

Scruggs, Karen LaFrance, B.A., Macalester College, '68-Selma, North Carolina

Seegers, James Victor, B.A., Concordia Senior College, '67-Hoyleton, Illinois

Shapiro, Allan James, A.B., Stanford University, '69-Los Angeles, California

Shepherd, Eugene Meredith III, B.A., David Lipscomb College, '69-Nashville, Tennessee

Shuck, Edwin Haywood III, B.A., New College, '69-Lookout Mountain, Tennessee

Simpson, Lucien Caldwell, B.A., David Lipscomb College, '69-Nashville, Tennessee

Stempel, Jerrold Martin, B.S., University of Illinois, '69-Northbrook, Illinois

Turi, George Kenneth, A.B., Columbia University, '69-Woodmere, New York

Twitchell, Annette, B.S., Washington State University, '69-Waimanalo, Hawaii

Vine, William H.-Dallas, Texas

Waldbaum, Lawrence Sidney-Cedarhurst, New York

Walters, Richard Coburn, B.S., University of Illinois, '69-Monticello, Illinois

Weaver, Nancy E., B.S., Montana State University, '69-Billings, Montana

Weintraub, Jonathan, B.A., Reed College, '69-Flushing, New York

Weisman, Robert Alan, A.B., Washington University, '69-Tulsa, Oklahoma

Weiss, Jay Harlan, A.B., Washington University, '69-University City, Missouri

White, William Gregory, B.A., College of the Holy Cross, '69-River Forest, Illinois

Wilhelm, James Paul, B.S., University of Idaho, '69-Post Falls, Idaho

Wittenborn, John Richard, Jr., A.B., Rutgers University, '69-Highland Park, New Jersey

Yanover, Robert Alan-Roslyn Heights, New York

Zerdecki, John Wells, B.A., Rice University, '69-Fort Worth, Texas

Ziman, Ronald Bert-Los Angeles, California

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# Washington University

All schools are located on the main campus at Lindell and Skinker Boulevards, St. Louis, Missouri 63130, except Medicine (660 South Kingshighway, 63110, and Dentistry (4559 Scott Avenue, 63110).

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## **The Faculty of Arts and Sciences**

The College of Arts and Sciences

The Graduate School of Arts and Sciences

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## **The School of Engineering and Applied Science**

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## **The Sever Institute of Technology**

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## **The School of Architecture**

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## **The School of Business and Public Administration**

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## **The Graduate School of Business Administration**

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## **The School of Fine Arts**

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## **The School of Social Work**

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## **The School of Law**

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## **The School of Medicine**

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## **The School of Dentistry**

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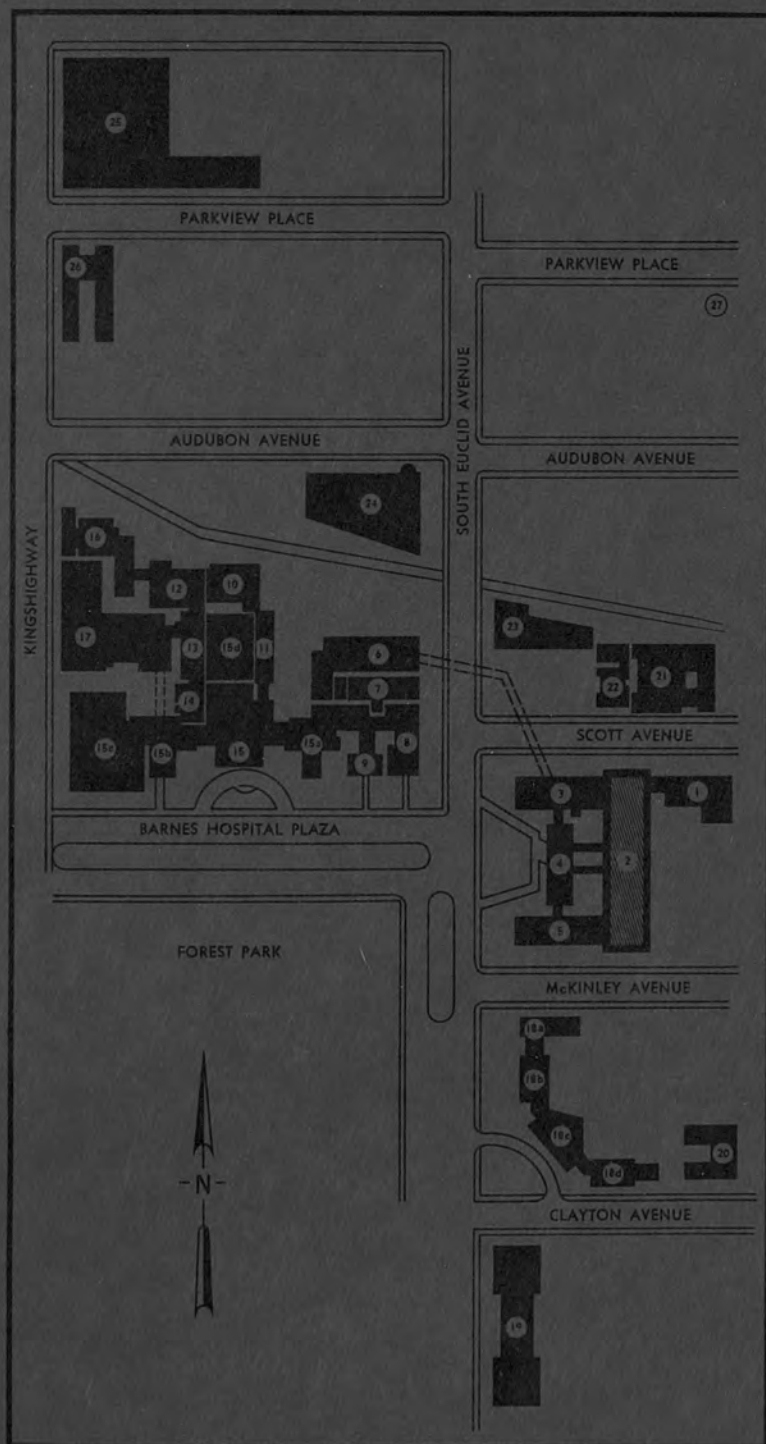
## **University College**

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## **The Summer School**

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# WASHINGTON UNIVERSITY MEDICAL CENTER



- 1 Spencer T. Olin Residence Hall
- 2 McDannell Medical Science Building
- 3 North Building (Anatomy, Auditorium, Library)
- 4 Cancer Research Building (Administrative Offices)
- 5 South Building (Biological Chemistry, Pharmacology, Physiology and Biophysics)
- 6 West Building (Microbiology, Pathology, Preventive Medicine)
- 7 Irene Walter Johnson Rehabilitation Center
- 8 McMillan Hospital and Oscar Johnson Institute (Neurology, Ophthalmology, Otolaryngology)
- 9 St. Louis Maternity Hospital (Obstetrics and Gynecology)
- 10 David P. Wohl, Jr., Memorial — Washington University Clinics
- 11 Renard Hospital (Psychiatry)
- 12 Wohl Hospital (Departments of Internal Medicine and Surgery)
- 13 Bernard Free Skin and Cancer Hospital
- 14 Edward Mallinckrodt Institute of Radiology
- 15 Barnes Hospital
  - a. Medical Wing
  - b. Rand-Johnson Memorial Surgical Wing
  - c. Queeny Tower
  - d. Diagnostic Laboratories; Service Center
- 16 Clinical Research Building
- 17 St. Louis Children's Hospital (Pediatrics)
- 18 700 and 724 South Euclid Buildings
  - a. Biomedical Computer Laboratory
  - b. Physical Therapy
  - c. Hospital Administration, Biostatistics
  - d. Computer Systems Laboratory
- 19 Central Institute for the Deaf
- 20 Central Institute for the Deaf Residence
- 21 School of Dentistry
- 22 Occupational Therapy
- 23 Power Plant
- 24 Parking Garage
- 25 Jewish Hospital
- 26 Jewish Hospital Nurses Residence
- 27 William G. Eliot Division of Child Psychiatry  
369 N. Taylor Ave.

