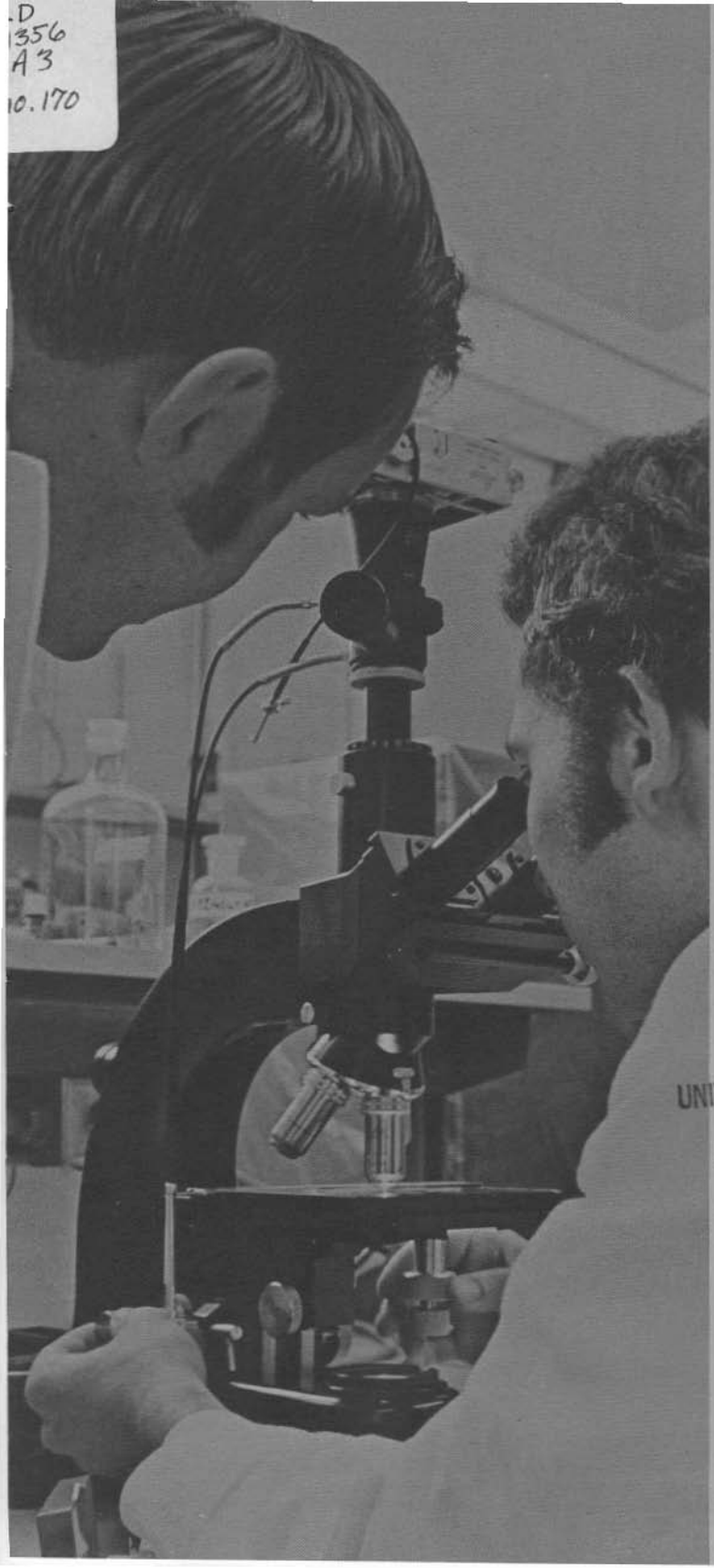

University
of Oregon

Bulletin

University
of Oregon
Medical
School

PORTLAND

GRADUATE
STUDIES
PROGRAM

1971-73

Oregon State
System of
Higher Education

UNIVERSITY OF OREGON BULLETIN

NUMBER 170 JULY 1971

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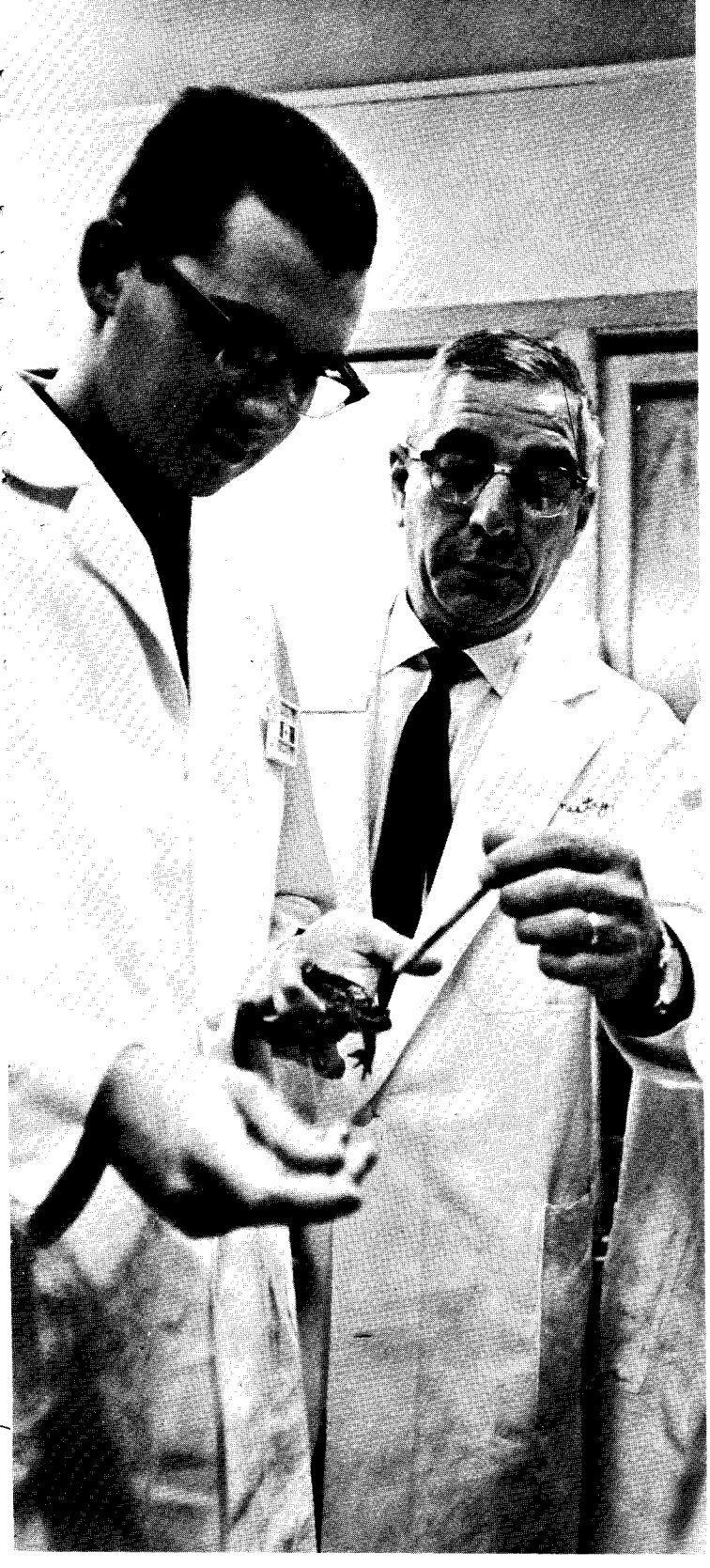

1971-73

CATALOG

GRADUATE STUDIES PROGRAM

University of Oregon MEDICAL SCHOOL

3181 S.W. Sam
Jackson Park Road
Portland 97201

Education with a Purpose

Because of the remarkable and outstanding achievements made in the prevention and control of organic disease, and a more complete understanding of mental health, the first half of the twentieth century often has been referred to as "medicine's golden age." Medicine is now in an era which holds promise of even greater future achievements. New medical techniques and methods of treating disease resulting from years of basic and clinical research have provided the tools for the practicing physician—and he has applied them with competence and effectiveness.

Since 1887, the University of Oregon Medical School has played an increasingly important role in contributing to the general medical welfare of this community and region. The Medical School initially was established to teach qualified young men and women the art and science of medicine for the purpose of making available to the citizens of this area and to the nation the highest level of medical care.

An extension of the School's educational responsibilities is to be found in the active and vital graduate studies program leading to the postbaccalaureate degrees of Master of Science and Doctor of Philosophy which exists to further the institution's fundamental objectives of discovering, conserving, and disseminating knowledge. This program provides opportunity for scholarly specialization toward the mastery of a particular field, and is planned to complement the breadth of preparatory college education and enrich professional life. The graduate program is small enough to maintain a close professor-student relationship in classes, seminars, and laboratories and in advanced study and research.

The Medical School's graduate studies program aims to close the gap between the widespread need for teachers and investigators and those actually entering the profession in the areas of biology which are basic to medical science. To this end, the program assists students in acquiring the broad profile of information and proficiency which is necessary for the development of creative contributions in a limited segment of biology and at the same time guards against the creation of individuals with a narrow range of highly specialized skills. Emphasis is placed on the philosophy and application of the scientific method in the acquisition of new knowledge—through training in the critical evaluation of older and new sources of information and in the application of special skills and techniques pertinent to the student's field of inquiry.

In the years ahead the opportunities for improving our knowledge and its application to human welfare should be greater than they have been in the past. We plan, with faith and courage, to advance existing medical techniques and methods of treating disease by expanding our knowledge of the basic processes which occur in living systems.

OREGON
STATE
SYSTEM OF
HIGHER
EDUCATION

An Overview

The Oregon State System of Higher Education, organized in 1932, provides educational opportunities to young people and adults throughout the State of Oregon. Member institutions are elements of an articulated system, parts of an integrated whole.

Opportunities for general education are distributed as widely as possible throughout the state, while specialized, professional and technical programs are centered at specific institutions.

The institutions of the State System of Higher Education are Oregon State University at Corvallis, the University of Oregon at Eugene, Portland State University at Portland, Oregon College of Education at Monmouth, Southern Oregon College at Ashland, Eastern Oregon College at La Grande, and Oregon Technical Institute at Klamath Falls. The University of Oregon Medical School and the University of Oregon Dental School are located in Portland.

The Division of Continuing Education represents all the institutions in making college level courses and special programs available to all citizens. The Division has offices in Salem and Roseburg as well as on most OSSHE campuses.

An interinstitutional booklet, "Your Education," lists fields of study at all State System institutions, and gives other important information for prospective students. For a free copy, write "Your Education," State Board of Higher Education, P.O. Box 3175, Eugene, Oregon 97403.

State Board of Higher Education

Board members are appointed by the Governor of Oregon with confirmation by the State Senate.

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	Term Expires
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Chas. R. Holloway, Jr., Portland	1973
Robert D. Holmes, Portland	1977
Elizabeth H. (Mrs. Samuel S.) Johnson, Redmond	1974
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Office of State Board of Higher Education
Post Office Box 3175
Eugene, Oregon 97403

MEDICAL AND GRADUATE STUDENTS

Fall Term, 1971

September 20, *Monday* — Registration
September 21, *Tuesday* — Instruction begins; last day for medical students to pay fees
September 24, *Friday* — Last day for graduate students to register and to pay fees
October 4, *Monday* — Last day to register for full credit or to change courses
November 25, *Thursday* — Thanksgiving Day, holiday
December 11, *Saturday* — Fall term ends

Winter Term, 1971-72

December 13, *Monday* — Instruction begins
December 14, *Tuesday* — Last day for medical students to pay fees
December 17, *Friday* — Last day for graduate students to register and to pay fees
December 22, *Wednesday* — Last day to register for full credit or to change courses
December 23, 1971, *Thursday* through January 2, 1972, *Sunday* — Christmas vacation
March 11, *Saturday* — Winter term ends

Spring Term, 1972

March 20, *Monday* — Instruction begins
March 21, *Tuesday* — Last day for medical students to pay fees
March 24, *Friday* — Last day for graduate students to register and to pay fees
April 3, *Monday* — Last day to register for full credit or to change courses
May 29, *Monday* — Memorial Day holiday
June 9, *Friday* — Commencement
June 10, *Saturday* — Spring term ends

Fall Term, 1972

September 18, *Monday* — Registration

University of Oregon Medical School

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Charles N. Holman, M.D., Dean
M. Roberts Grover, Jr., M.D., Associate Dean; Director, Continuing Medical Education
William A. Zimmerman, B.S., Associate Dean for Business Affairs
Joseph J. Adams, B.B.A., Assistant Dean
Richard L. Sleeter, M.D., Assistant Dean

Michael D. Baird, M.D., Medical Director and Administrator, Hospitals and Clinics
Jarvis Gould, M.D., Associate Medical Director and Associate Administrator, Hospitals and Clinics; Administrator, Multnomah Hospital
Gwynn C. Brice, Administrative Director, Central Services, Hospitals and Clinics
Barbara Hiatt, M.S., R.N., Administrator, University State Tuberculosis Hospital
Gary J. Rood, M.A., Administrator, University of Oregon Medical School Hospital
Max F. Kersbergen, M.S., Administrator, Outpatient Clinic
Richard L. Sleeter, M.D., Director, Crippled Children's Division

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A. J. Clemons, Director, Facilities Planning
Wilson C. Dockery, B.S., Director, Student Activities Building
John Doerfler, B.A., Director, Research Services
Dallas G. Finnell, B.S., Director, Development
Richard Herren, Director, Instructional Aids
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Robert A. Jellum, B.S., Budget Officer
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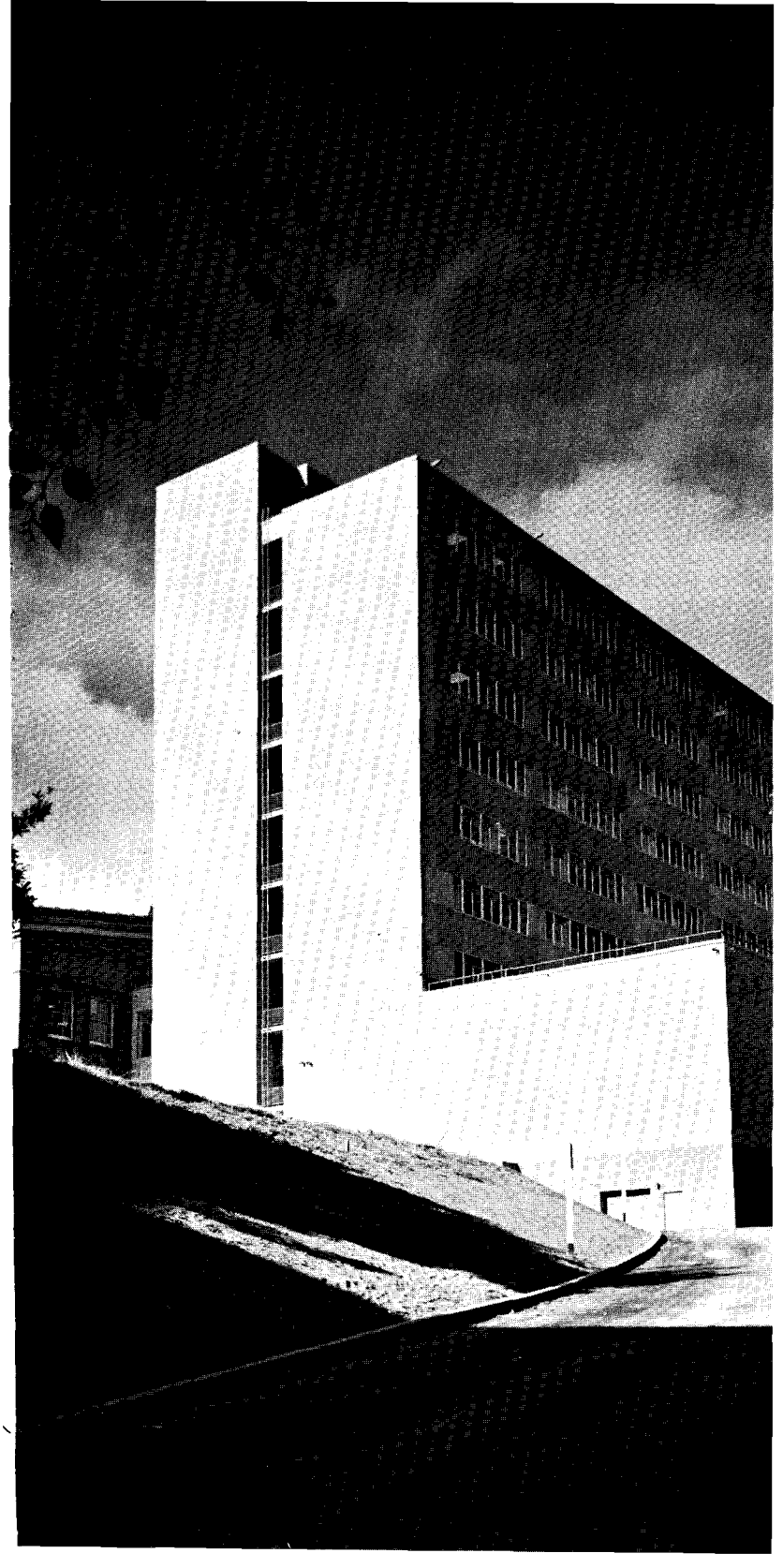
Ralph Tuomi, B.S., Director, Physical Plant



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GENERAL INFORMATION FOR STUDENTS

The University of Oregon Medical School is located in Portland (population 383,000), the largest city in the state of Oregon. Situated on the Willamette River near its junction with the Columbia River, Portland is a city of diverse business and industrial activities and, although 85 miles from the Pacific Ocean, an important seaport. The city is well-known for its beautiful homes, parks, and boulevards and for its mild climate. The foothills of the Cascade Mountains rise on the outskirts of Portland; Mount Hood, one of the major peaks of the range, towers on the southeastern horizon.

History

The year 1867 saw the beginning of medical education in Oregon. In that year Willamette University, Salem, first offered courses and lectures to medical students through its medical department. A lack of clinical facilities and variety of patients caused the Willamette medical department to move to Portland after only ten years of operation, to take advantage of the greater population and hospital facilities.

During this same period a group of Portland physicians petitioned the Board of Regents of the University of Oregon to grant a charter for a medical school to be located in Portland. In 1887 the charter was granted and the University of Oregon Medical School became a reality—in a two-room building in northwest Portland.

In 1895 the Willamette University medical department returned to Salem. Because of limited facilities in that city and the lack of funds to continue operation, it merged with the University of Oregon Medical School in 1913. Under terms of the merger, the students of Willamette medical department were transferred to the University of Oregon Medical School and received diplomas indicating the consolidation. At the same time the two alumni groups also merged.

The Medical School moved to its present campus, on a 101-acre tract in Sam Jackson Park overlooking the city of Portland, in 1919. The original tract included 20 acres donated in 1914 by the Oregon-Washington Railroad and Navigation Company and 88 acres given by the late Mrs. C. S. Jackson and the late Philip Jackson in memory of C. S. Jackson, publisher of the *Oregon Journal*. In 1958, the Oregon State Board of Higher Education accepted the gift of an additional 27 acres from the Journal Publishing Company.

Because the location, away from the congested area but within one and one-half miles of the business district, provided an ideal setting for medical center buildings and affiliated units, the University of Oregon Medical School in 1920 conveyed to Multnomah County 9 acres of the campus for construction of a general charity hospital; in 1926 a 25-acre tract was deeded to the United States government as the site of a U.S. Veterans Hospital.

Graduate education, leading to Master of Science and Doctor of Philosophy degrees, was offered as early as 1920. The first Master of Science degree was awarded in 1922 and the first Ph.D. in 1924. Until the middle 1940s the number of graduate students was small, with degrees awarded by the University of Oregon. During World War II it became obvious that there was an increasing need for more vigorous attention to the education of teachers and investigators in the fields of the basic medical sciences. In recognition of certain administrative needs, the University of Oregon Medical School was given authority to supervise its own graduate training activities although degrees continued to be awarded by the University of Oregon.

This growth at the University of Oregon Medical Schol typifies the experience of institutions of medical education and research throughout the country, directly resulting from the rising population and greater emphasis on human health as a valuable national resource. Paralleling the growth of medical education, facilities and funds for graduate education in the medical sciences have also received increasing attention; the number of graduate degrees awarded at the University of Oregon Medical School in the basic medical sciences has increased significantly over the past 10 years.

Physical Facilities

Constantly expanding in educational, service, and research programs since its founding in 1887, the University of Oregon Medical School today has physical facilities valued at more than $42,400,000 on its campus.

The first unit of *Mackenzie Hall*, named in honor of the late Dean Kenneth A. J. Mackenzie, was completed in 1919. The three-story structure was financed through an appropriation of $110,000 by the 1917 State Legislature and by cash donations of $25,000 from Portland citizens. The second unit (1922) was financed through an appropriation of $113,000 by the 1921 State Legislature, matched by an equal gift from the General Education Board of New York. It is five stories high, similar in construction to the first unit, with twice the capacity. A three-story laboratory wing was added in 1939. Today Mackenzie Hall houses basic classrooms and laboratories and offices of the departments of Anatomy, Biochemistry, Microbiology, and Pharmacology. The Department of Surgery and the School of Nursing are also located in this building.

The *Library and Auditorium* (1939) was erected through a gift of $100,000 from Dr. John E. Weeks, a gift of $100,000 from the Rockefeller Foundation, and a grant of $163,500 from the Public Works Administration. (See also page 15.)

The *Auditorium* with a seating capacity of just over 600, affords facilities for lectures and scientific meetings.

Renovation and expansion of Library facilities was completed in 1967 at a cost of $305,000. As a result, one large and six small study rooms were added as were typing, work and duplicating rooms and additional stack tiers.

The *Laboratory and Administration Building* (1949) was financed through a state appropriation of $663,000. The building houses classrooms, research and teaching laboratories, and offices for the departments of Pathology and Physiology, together with administrative offices of the Medical School.

The *Medical Research Laboratories Building* (1962), built at a cost of $2,611,955, was financed through a state appropriation and matching funds from the National Institutes of Health, U.S. Public Health Service. The entire nine-story structure houses laboratories devoted to medical research.

Air-conditioned quarters for animals occupy two floors of the building. This area contains a modern surgery with five operating stations and the most modern operating room equipment. In the animal quarters is a special surgery for open-heart procedures, complete with heart-lung machine and other instruments exactly like those used in human surgery.

The Medical School supports a centralized *Research Instrument Service* which provides for the engineering design, fabrication, maintenance and repair of scientific instruments. Engineering consultation is offered to faculty members and students. A mechanical shop, a glass-blowing shop and electronics shop carry out fabrication of new instruments and maintenance and repair of existing instruments.

Operated as a unit under the Research Instrument Service, the institution supports an IBM 1130 Computing System with peripheral equipment. This facility is available to investigators at the Medical School. The *Computer Service* also provides programming and operational assistance to users.

The *Student Activities Building* (1960), built at a cost of $358,000, is a two-story structure providing recreational and athletic facilities for all student groups on the campus. There are outstanding facilities for most indoor activities, including a full-size gymnasium, a meeting room that can be used for dancing, with kitchen nearby, a beautiful lounge, a game room, a well-equipped exercise room, and shower facilities.

Clinical facilities of the University of Oregon Medical School include:

The *Outpatient Clinic* (1931, 1968), open to patients from throughout the state of Oregon who are without funds to provide for their medical care or who are referred by their physician for consultation and treatment, affords teaching facilities for the clinical branches of the Medical School. More than 200,000 patient visits are recorded annually. A $2.5 million, seven-story addition to the Clinic was completed in 1968.

Multnomah Hospital (1923, 1950, 1969), constructed through funds supplied by Multnomah County, has a capacity of 334 beds with facilities for general, medical, surgical, and obstetrical patients. Under terms of a contractual arrangement between the commissioners of Multnomah County and the Oregon State Board of Higher Education, the Medical School has access to the hospital for teaching purposes and the professional staff of the hospital is appointed by the Medical School. Included in the Multnomah Hospital group are the *Heating Plant* (1923) and the *Emma Jones Hall* (1927).

The *Crippled Children's Division* (1954) has modern office space and clinical facilities for the statewide crippled children's service administered by the Medical School.

The *Child Development and Rehabilitation Center* (1970) provides facilities for primary diagnostic treatment and rehabilitation services for multiply handicapped retarded children under the age of 21 and for the demonstration and teaching of students of all medical, dental and allied health disciplines. The $3,720,000 Center was financed by a State appropriation of $981,000 and a $2,736,000 construction grant from the U.S. Public Health Service.

The *University of Oregon Medical School Hospital* (1955), a 262-bed teaching and research hospital, contains 126 beds for general, medical, and surgical patients 26 beds for psychiatric care, and 110 beds for pediatrics (Doernbecher Memorial Hospital for Children).

The *Clinical Laboratories Building* (1926) originally housed Doernbecher Hospital. In 1957 the structure was remodeled for use as clinical laboratory facilities departmental offices, clinical facilities, and student teaching laboratories.

Although not a part of the physical facilities of the University of Oregon Medical School proper, the *U. S. Veterans Administration Hospital,* located adjacent t

the campus, serves as one of the teaching units of the Medical School. This government-owned hospital has 555 beds. The teaching program includes clinical experience for medical students as well as advanced residency programs.

The *University State Tuberculosis Hospital* (1939) has an 79-bed capacity and a large outpatient unit, the Julius L. Meier Memorial Clinic. The hospital has medical and surgical facilities for teaching medical students, interns, residents, and nurses.

Other buildings on the campus include the *Physical Plant* (1953), *Gaines Hall* (1943) and the *Women's Residence Hall* (1964).

The *Medical School Farm,* on 180 acres southwest of Portland, was purchased in 1961 to house and breed animals for teaching and investigative programs. The farm is ideally suited to the raising and breeding of animals in their natural environments.

Associated with the University of Oregon Medical School is:

The *Oregon Regional Primate Research Center* (1960), on a 250-acre tract 10 miles west of Portland, was the first of its kind in the United States. The University of Oregon Medical School is the host institution for the Center with the Dean of the Medical School administratively responsible for its operation. The Center offers an unusual opportunity for the training of qualified research personnel and at the same time enables these researchers to investigate primates in depth throughout their life cycle and to correlate the efforts of the many scientific disciplines involved. The Center provides an optimum environment where scientists and students of science may advance all possible areas of knowledge relating to the biological characteristics of these animals and appropriate related species.

Administration

Although the Medical School, chartered by the Board of Regents of the University of Oregon in 1887, has administrative and faculty autonomy, the academic position of the school as an integral part of the University of Oregon is established in its charter and is recognized under the organizational plan of the Oregon State System of Higher Education. A legislative act more than thirty years ago combined all of Oregon's state-operated institutions of higher education into the Oregon State System of Higher Education, which is administered by a nine-member lay board appointed by the Governor. The Chancellor is the chief executive officer.

Under this organizational plan, the Dean of the Medical School is its chief executive officer, reporting to the Chancellor and to the Board of Higher Education in all matters pertaining to general administration, budgets, and appointments of faculty and staff. The University of Oregon, created by an act of the Oregon State Legislature in 1872 and located in Eugene, grants the Medical School degrees.

As executive officer of the Medical School, the Dean is also responsible for the development of graduate training activities. In this capacity he seeks the advice of the Graduate Council, a standing committee of the faculty. This group is responsible for the maintenance of the high standards of quality in the graduate studies program, defines the requirements for graduate degrees and sets the standards for acceptable academic performance. The Graduate Council examines requests from various departments for permission to initiate programs of training leading

to graduate degrees and makes appropriate recommendations to the Executive Faculty. It also acts as an admissions committee for the graduate studies program, supervises oral examinations of candidates for degrees, and recommends students to the Executive Faculty for the receipt of graduate degrees.

Instruction

The Medical School offers graduate programs in the basic medical sciences, leading to the Master of Science and and Doctor of Philosophy degrees; the degrees are conferred by the University of Oregon upon recommendation of the faculty of the Medical School. Work leading to the M.S. or Ph.D. degree is offered in anatomy, biochemistry, medical psychology, microbiology, pathology, pharmacology, and physiology. Work toward the master's degree is offered in medical technology.

The University of Oregon School of Nursing offers training leading to the Master of Science degree in nursing education. The School of Nursing catalog should be consulted for further information concerning this program.

All faculty members having appointments in those departments authorized to grant graduate degrees are available for guidance of graduate students. In addition to formal advanced courses, each department offers more informal seminar-type courses and specialized reading and conference instruction. A most important aspect of the training program for a graduate degree is the research work which leads to the thesis. Credit hours are granted for thesis research under the courses numbered 501.

All of the instructional facilities of the Medical School are available for the support of the graduate studies program. Graduate student research is conducted in special laboratories or in reseach laboratories assigned to faculty members.

To supplement their educational programs, graduate students at the University of Oregon Medical School may take advantage of the facilities of Reed College and Portland State University, both in Portland, and the University of Oregon, Eugene. and Oregon State University, Corvallis, for needed course work in mathematics, physics, chemistry, and languages not available at the Medical School.

The needs of the physician-scientist are considered in the conduct of the graduate studies program as well. Some medical students plan their education to prepare themselves for careers in academic medicine as physicians, teachers, and investigators. These students are given an opportunity to participate in a program of training which combines the medical and graduate curricula. A student may elect to spend five years in residence and include six academic terms of work toward the two degrees of M.S. and M.D. A student may also elect to combine work toward the Ph.D. degree with that leading to the M.D. The latter program is more rigorous and usually requires seven years in residence. These programs of study result in a broadening and enrichment of the student's experience and knowledge in a basic science, and prepares him to utilize the philosophy and techniques of science in a basic science or in a clinical field (see also page 28).

The University of Oregon Medical School also offers a curriculum leading to the degree of Doctor of Medicine. It conducts training programs for interns and residents in the School's hospitals and clinics, courses in medical technology, and radiologic technology, cytotechnology, nuclear medicine technology, orthoptics, radiation therapy technology, a dietetic internship, and a clinical affiliation in occupational therapy, as well as an extensive continuing education program for physicians

from the states of the Pacific Northwest, British Columbia, and Alaska. The University of Oregon School of Nursing is located on the Medical School campus and offers both baccalaureate and masters degree programs.

Research

Although the primary purpose of the University of Oregon Medical School is education, another vital function is investigation into any area of knowledge having potential importance to the problems of human biology.

In the world-wide struggle to improve the health and happiness of mankind, millions of research dollars are expended annually in the nation's medical schools. Oregon is no exception. Investigations underway at the Medical School are supported by gifts and grants amounting to more than $4.7 million annually. These funds are made available by private individuals and industry, by foundations and societies, and by state and Federal governments.

Currently over 300 research projects are being conducted at the School in virtually every area of biomedical science. Contributions made to knowledge in the health-related sciences by the University of Oregon Medical School investigators have been numerous and have received world-wide recognition. Traditionally, the highest earned degree is awarded for independent, original, scholarly contributions to knowledge. Education of the graduate student in the basic medical science disciplines, therefore, includes training as an investigator in search of new information. Unlike the learning of established fact, the most effective framework in which to learn the philosophy and techniques of scientific problem solving involves a close personal relationship with a trained investigator. This philosophy is reflected by the extremely low student/faculty ratio that characterizes this kind of training. Graduate students are encouraged to participate in ongoing projects, but only as a preliminary to the development of their own and independent thesis projects. They are expected to grow into competent research workers during their training period in order to be qualified for professional employment after graduation.

Library

The Medical School Library's responsibility is to provide its clientele with literature in the fields of medicine and allied sciences for the purpose of study, reference and research. It exists to perform professional medical library service for an institution concerned with medical education, research and patient care. The extent of coverage depends on the strength of the teaching departments and the demands made upon the Library by those who use it. Research coverage is available in most areas to carry on extensive investigative work at the doctoral level to fill the needs of physicians, medical educators, medical research workers, medical students, graduate students in the basic sciences, nursing faculty, student nurses, graduate nurses.

Instruction is given in the use of the indexes and in the location of material. Medical library service is offered to physicians in Oregon and the Pacific Northwest, through cooperation with the Pacific Northwest Regional Health Sciences Library at the University of Washington in Seattle. Medical books and periodicals may be borrowed from the Library. Reference service is provided. Bibliographic serv-

ices include the preparation of demand searches for MEDLARS (Medical Literature Analysis and Retrieval System) searching at the National Library of Medicine for all members of the health manpower community.

The Library, containing 130,000 volumes of books, bound and unbound periodicals, and subscribing to 2,500 current publications is the only public general medical library in Oregon for research and use by the health sciences community, both basic and clinical. Contributing to the Library are the Oregon Medical Association, the Oregon State Board of Medical Examiners, the Portland Academy of Medicine and, for the past five years, the Federal government, through the Medical Library Assistance Act of 1965.

Alumni Association

Founded in 1913, the Alumni Association of the University of Oregon Medical School also includes graduates of the Willamette University department of medicine. The Association is devoted to the interests of students and graduates and to the encouragement of scientific and professional progress among members of the medical profession generally. Its membership numbers more than 3,000.

In 1962, the Association was expanded to include all recipients of Master of Science and Doctor of Philosophy degrees from the University of Oregon Medical School as affiliate members, enjoying all privileges of active members except holding office and voting. All Association members receive the quarterly *Report to the Alumni.*

In the spring of each year, the Alumni Association sponsors a three-day scientific meeting on the Medical School campus. Alumni Association offiers for 1971-72 are:

Willis J. Irvine, M.D., '48, Portland ..... President
Albert A. Oyama, M.D., '53, Portland ..... Vice President
Fred H. Bishop, M.D., '47, Longview, Washington ..... Vice President
Roger D. Engberg, M.D., '57, Jamestown, North Dakota ..... Vice President
Ronald J. Lowell, M.D., '58, San Francisco, California ..... Vice President
Robert L. Mueller, M.D., '48, Salem ..... Vice President
Ernest T. Livingstone, M.D., '51, Portland ..... Secretary
Richard A. Lalli, M.D., '56, Portland ..... Treasurer

Cultural and Recreational Activities

General invitations are extended to all students to attend special lectures and meetings in the Medical School Auditorium and in various lecture halls on the campus. Notices of these events are posted on student bulletin boards.

Because of enrollment limitations each year and the highly specialized and concentrated nature of medical and graduate subjects, the Medical School is unable to sponsor athletics officially. However, students may participate in an active intramural sports program at the Student Activities Building.

Holidays and other time away from studies can be spent in a variety of ways: trips to Oregon's beaches (two hours from Portland), or swimming, sailing, and water skiing in nearby rivers. Oregon's Blue, Wallowa, and Cascade mountains with their lakes and streams, scenic views, and snowy mountain trails, provide ideal settings for hiking, fishing, mountain climbing, and skiing.

Within the greater Portland area are many recreational and cultural opportunities: beautiful green golf courses and cool city parks, Portland Civic Theatre and a number of other amateur theatrical groups, known for their excellent productions, the city's Symphony and Junior Symphony orchestras, the Portland Art Museum and several private galleries, a zoo, and a Museum of Science and Industry. Tickets to artists' series, lectures, road companies of Broadway theater productions are readily available, usually at special student prices. There are nine fully accredited undergraduate colleges and universities located in the immediate area.

Housing

While no facilities for housing male students are provided on the Medical School campus, many apartments and boarding houses are located near the School. An up-to-date list of rental housing is maintained in the Public Affairs Office in the Administration building. Women graduate students may live in the *Women's Residence Hall* (1964) on campus if there is space available.

Health Service

The Health Service of the University of Oregon Medical School is available to meet the medical needs of students. Outpatient evaluation and treatment can be obtained at the Health Service daily. An insurance program provides coverage for hospitalization and emergency services.

Nurses and physicians (including a psychiatrist) are available during the school day. The Multnomah Hospital Emergency Department can be used for emergencies when the Health Service is closed.

Students registered for nine or more hours graduate credit pay a Health Service fee and are eligible for all services of the Health Service. Students' spouses may establish eligibility for the Health Service (including insurance coverage) upon payment of a quarterly Health Service fee. Hospital insurance may also be provided for students' children.

Detailed information is provided in the Health Service pamphlet.

Fees and Expenses

The Board of Higher Education reserves the right to make changes in the fee schedule without notice.

Fees and deposits paid by the students in the graduate studies program are as follows:

Graduate Fees[1]

Graduate students (candidates for M.S., Ph.D.), per term	$184.00
Health Service fee, per term	$ 33.00
Incidental fee, per term	$ 11.00

1 There is no nonresident fee for graduate students.

Building fee, per term	$ 10.00
Total graduate charge	$238.00

Graduate students enrolled for 8 term hours of work or less ..... $20.00 per term hour (minimum, $40.00)

Graduate students employed as research assistants or fellows, per term ..... $ 54.00

Special Fees

Evaluation fee (charges for the evaluation of transcripts submitted with the application for admission; not refundable)	$ 10.00
Late registration fee, per day (no maximum) after an initial charge of $5.00 for the first day[2]	$ 1.00

Deposits

Breakage deposit, per year	$ 5.00

Fee Refunds

Students who withdraw from the graduate studies program and who have complied with the regulations governing withdrawals are entitled to certain refunds of fees paid, depending upon the time of withdrawal. The refund schedule has been established by the Oregon State Board of Higher Education and is on file in the Business Office of the Medical School. Refunds are subject to the following regulations:

(1) Any claim for refund must be made in writing before the close of the term in which the claim originated.

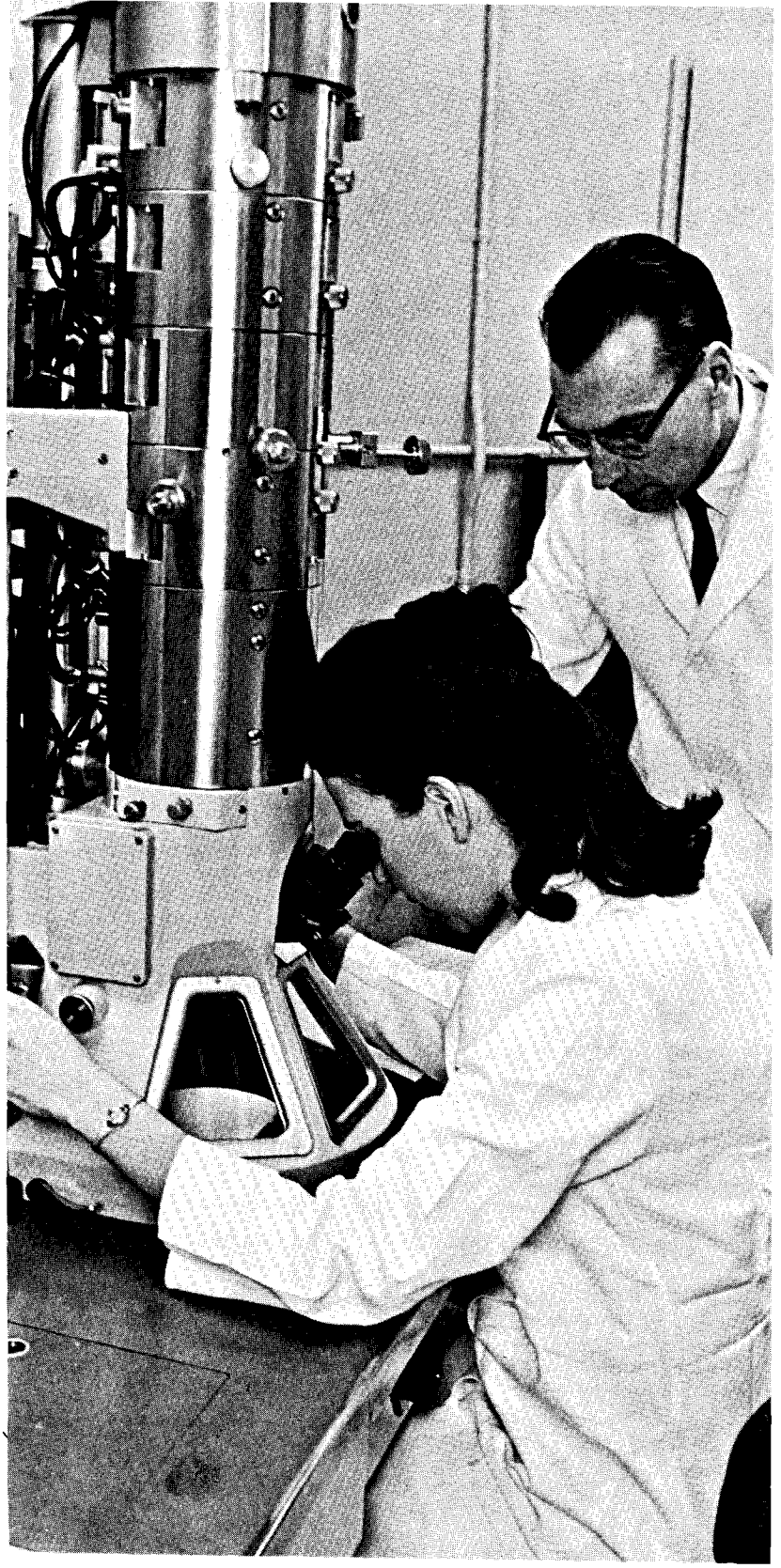
(2) Refunds in all cases are calculated from the date of application for refund and not from the date when the student ceased attending classes, except in unusual cases when formal withdrawal has been delayed through causes largely beyond the control of the student.

Fellowships, Traineeships, Assistantships

Financial assistance of several varieties is available for qualified graduate students. Many departments in the Medical School receive grant funds in support of their research training programs. Traineeships are made available to qualified students at the discretion of the department in which the student is registered. Since both fellowships and traineeships are free of service obligations to the Medical School, the stipends received are not considered as taxable income. Many investigators in the institution have provisions in their research grants for student help. Graduate students may make arrangements with these investigators to be of service to the research projects and thus acquire financial assistance during their period of study.

The following paragraphs describe the general operating rules which guide the conduct of the graduate studies program at the University of Oregon Medical School. *Requests for further information should be directed to the chairman of the department of interest to the student.*

2 Registration day is the first day of each term (see Calendar page 7). Registration is not complete until the student pays his tuition and fees. The first penalty day for graduate students is one week after the first day of the term.



2

ADMISSION AND SCHOLASTIC REGULATIONS

Admission to the Graduate Studies Program

Preparation

For admission to the graduate studies program an applicant must have earned a Bachelor of Arts or a Bachelor of Science degree from an accredited academic institution.

The courses to be taken in undergraduate work in preparation for graduate studies cannot be rigidly specified. In general, advanced work in any of the health-related sciences demands a thorough training and background in the quantitative sciences. Since one of the requirements of the degree of Doctor of Philosophy is an ability to read pertinent scientific literature in one modern foreign langauge, it is to the applicant's interest to have prepared himself in a foreign language during his undergraduate training. It is also highly desirable that all applicants have completed a course in elementary statistics. Some departments require specific courses in preparation for graduate work. Further details concerning recommended preparation are to be found under individual department headings.

Admission

Students desiring admission to the graduate studies program should complete an application form which may be obtained from the Director of Admissions. As a part of the application the applicant must supply: (1) official transcripts of all previous college and university work, (2) letters of appraisal from former teachers on forms which are furnished as a part of the application, and (3) Graduate Record Examination scores.

The Graduate Record Examination is offered several times a year in many colleges and universities throughout the United States. Information concerning the examination is available at the applicant's institution or from the Educational Testing Service, Princeton, New Jersey 08540 or Los Angeles, California 90027. The applicant must furnish scores for Aptitude Tests and for the Advanced Test required by the individual department. In special cases, scores from the Medical College Admission Test or evidence of satisfactory graduate work at another institution may be substituted for the Graduate Record Examination scores.

The completed application form should be returned to the Director of Admissions with the evaluation fee. When all the data have been assembled, the application is forwarded by the Director of Admissions to the department in which the applicant wishes to study. A preliminary decision about the suitability of the applicant is made at the departmental level. Following approval by the chairman of the department, the application is forwarded to the Graduate Council. The recommendation of the Graduate Council is furnished to the Dean for his final decision and the applicant is informed by the Director of Admissions concerning the decision.

Recommendations from the Graduate Council to the Dean for admission will take one of three forms:

1. *Graduate Student:* Admission as a graduate student will be afforded selected students whose performance records show evidence of superior abilities and promise and whose application materials are all in order and complete. They will be expected to take full course loads, will pay regular graduate student fees, and will be entitled to all student benefits.
2. *Provisional Graduate Student:* Admission as a provisional graduate student will be afforded students of two general types:

a. Those whose application materials are incomplete in some minor respect but require early notification of their acceptability.

b. Those whose records give evidence of promise but involve inconsistencies which appear to justify a trial period before full graduate status is granted.

Transfer from status of Provisional Graduate Student to that of Graduate Student may be recommended by the chairman of the department in which the student is studying, on the basis of superior academic performance, at the end of the first or second term of study. The departmental recommendations will be examined by the Graduate Council and forwarded to the Dean for his action. Failure to achieve this change of status by the end of the second term of study will result in the dismissal of the student. Provisional graduate students are permitted to take full course loads, pay regular graduate student fees and will be entitled to all student benefits.

3. *Non-degree Student:* Admission as a non-degree student will be afforded students of two general types:

a. Students who are enrolled for graduate credit at other institutions who wish to take courses offered in the graduate studies program at the University of Oregon Medical School for credit to be transferred to their records at their home institutions.

b. Students with baccalaureate degrees who are not enrolled in other institutions but wish to take courses offered in the graduate studies program at the University of Oregon Medical School.

Those seeking admission as non-degree students need furnish only the basic application form and original transcripts of college work. The application must be approved by the chairman of the department offering the desired courses and by the Graduate Council. The complete application must be in the hands of the Director of Admissions ten days before registration for the term in which the course is offered. Non-degree students will not be permitted to take full course loads (9 hours or more) nor will they be entitled to student benefits. They will pay course fees on an hourly basis as indicated in the fee schedule.

Only applicants with superior undergraduate records, or presenting other clear evidence that they have a capacity for productive scholarship, will be considered. Acceptance by a student as a graduate student or provisional graduate student is regarded as a declaration of intent to complete a program of graduate study prior to application for enrollment in other Medical School training programs.

Transfer of graduate credits from other institutions is permitted upon recommendation to the Graduate Council by the chairman of the student's major department.

It will be to the student's advantage to file an early application.

Registration

Registration for graduate study is required at the beginning of each term and study programs are arranged at this time. Dates for registration and payment of fees are given in the Calendar on page 7 of this Catalog. The student is responsible for arranging his course schedule in consultation with the chairman of his major department, his representative, or the professor directing his thesis work. The student must obtain registration forms from the Office of the Registrar, obtain the permission of the faculty member giving the desired course, and return the forms to the Office of the Registrar.

Standards of Performance

Superior academic performance is expected of every student in the graduate studies program. Graduate credit is granted only for course work in which grades of *A*, *B*, or *C* are earned. A yearly minimum weighted grade-point average of 3.00 must be maintained in courses in the student's major subject; a minimum grade-point average of 2.00 must be maintained in courses in the student's minor subjects. Failure to maintain an adequate grade-point average will result in action by the Graduate Council, after consultation with the chairman of the student's major department.

Any student may be dismissed from the graduate studies program for unacceptable conduct. Such dismissal follows review by the Graduate Council and the Dean.

Grading System

Grades are recorded as *A* (excellent), *B* (good), *C* (average), *D* (barely passing), *F* (failure), *P* (Pass). Grade points are related to the letter grades in the following manner; *A*—4 points per credit hour; *B*—3 points per credit hour; *C*—2 points per credit hour; *D*—1 point per credit hour; *F*—0 points. Grade-point averages are computed by adding all grade points and dividing by the number of credit hours for which the student is enrolled each term. If the work required in a course is not completed within the allotted time, a notation of Incomplete (Inc) may be entered on the student's record. Incompletes not removed within one year will be automatically graded as Failure (*F*).

Course Work

The graduate course work to be completed by each student is determined at the departmental level. A normal course load is considered to be 12-15 credit hours per term. Special permission of the Graduate Council is required for a work load in excess of 18 hours per term.

The performance of graduate students in courses which form a part of the regular medical curriculum will be evaluated on the same basis as that of medical students. No courses in the Medical School with identification numbers in the 600 range may be taken for graduate credit except by special permission of the Graduate Council.

Advancement to Candidacy for a Graduate Degree

A student who has been admitted to the graduate studies program may take courses for graduate credit. To obtain a graduate degree the student, after suitable preparation, must be formally admitted to candidacy for the graduate degree. Advancement to candidacy for a graduate degree is granted only after the student has demonstrated knowledge of the fundamentals of his field and the ability to do work of graduate caliber. Two major steps are required to qualify for advancement to candidacy for a graduate degree, (1) language and (2) qualifying examinations.

Language Requirement

A candidate for the degree of Doctor of Philosophy must demonstrate his ability to appreciate the contributions of scientists in other countries by developing a reading knowledge of modern scientific languages. A reading knowledge of one

language other than English must be demonstrated through written examination. Arrangements for foreign language examinations are made through the office of the chairman of the Graduate Council. The examinations are administered by faculty members in the foreign language departments of the colleges and universities in the Oregon State System of Higher Education.

Qualifying Examination

A written qualifying examination is required of students desiring to become candidates for the degree of Doctor of Philosophy, and may be required, at the discretion of the major department, of students desiring to become candidates for the degree of Master of Science. The qualifying examination is given by the major department in which the student is registered and covers the broad field of his background preparation. Students should plan to take the qualifying examination at the earliest possible date after finishing their basic preparatory course work.

Advancement to candidacy for the degree of Master of Science is granted when the chairman of the student's major department considers the student to be adequately prepared. Although written qualifying and language examinations are not required for the Graduate Council's approval of this recommendation, these examinations may be required at the discretion of the student's major department.

Advancement to candidacy for either graduate degree is determined by the Graduate Council upon recommendation of the chairman of the student's major department. The decision is based upon review of the student's academic record and of the written qualifying examination.

Requirements for Graduate Degrees

Residence

Academic residence is established by registration for credit in the graduate studies program. For the Master of Science degree, a minimum of three academic terms in residence is required. For the Doctor of Philosophy degree, a minimum of six academic terms in residence is required. Interruptions in residence are undesirable but may be permitted by joint agreement of the major department and the Graduate Council.

Duration of Candidacy

A student working toward a master's degree must be a candidate for that degree for at least one academic term; a student working toward a doctor's degree must be a candidate for the degree at least three academic terms.

Hours of Graduate Work Required

For the degree of Master of Science, 30 term hours of graduate credit in the major department and 15 hours of credit in a minor department are required.

For the degree of Doctor of Philosophy, 135 term hours of graduate credit are required. Of this total, a minimum of 100 hours must be credit in the major department. The student must also complete a minimum of 20 hours of credit in a minor field if he wishes to graduate with a single minor. Arrangements may be made for fulfilling the minor credit requirements in more than one field, subject to the approval of the Graduate Council.

Thesis Requirement

The candidate for a graduate degree must present a written description of experimental investigations carried out during the course of graduate study. Ordinarily, the thesis for the degree of Master of Science is a report of original experimental work conducted by the student under the close supervision of his major professor. The thesis for the Doctor of Philosophy degree must show evidence of originality on the part of the student in the planning and execution of independent experimental work, and the results must represent a definite contribution to knowledge. General instructions on the preparation of the thesis may be obtained from the office of the chairman of the Graduate Council. The thesis must be approved by the chairman of the major department and by the Graduate Council.

The thesis must be submitted to the Graduate Council on or before the first of May in the year in which the degree is to be granted.

Oral Thesis Examination

An oral thesis examination covering the subject of the thesis is required of all candidates for advanced degrees. The examining committee is appointed by the chairman of the Graduate Council with the advice of the chairman of the major department. The oral thesis examination must take place at least ten days prior to the date of the Commencement exercises at which the degree is to be granted.

Summary of Procedures for Graduate Degrees

For the Master of Science

Procedure	*Initiated by*	*Chronology*
Application for admission, transcripts, letters, Graduate Record Examination scores	Student, in correspondence with Director of Admissions	During senior year in college or university
Admission to graduate studies program	Chairman of department indicated by student, Graduate Council, Dean	Upon acceptance of application
Registration, approval of courses and study program	Student	First day of *each* term
Advancement to candidacy for graduate degree	Chairman of major department with approval of Graduate Council	At least one academic term before receipt of degree
Submission of thesis	Student, with approval of chairman of major department	On or before May 1 prior to receipt of degree
Oral thesis examination	Graduate Council, with advice of chairman of major department	More than ten days prior to Comemncement
Recommendation for degree	Graduate Council to Executive Faculty	More than ten days prior to Commencement
Receipt of degree	Executive Faculty	Commencement exercises

For the Doctor of Philosophy

Procedure	*Initiated by*	*Chronology*
Application for admission, transcripts, letters, Graduate Record Examination scores	Student, in correspondence with Director of Admissions	During senior year in college or university
Admission to graduate studies program	Chairman of department indicated by student, Graduate Council, Dean	Upon acceptance of application
Registration, approval of courses and study program	Student	First day of *each* term
Language examinations	Student	As soon as possible after admission. Required before advancement to candidacy
Qualifying examination	Major department	Upon completion of preparatory course work
Advancement to candidacy for graduate degree	Chairman of major department with approval of Graduate Council	Following qualifying examination at least three academic terms before receipt of degree
Submission of thesis	Student, with approval of chairman of department	On or before May 1 prior to receipt of degree
Oral thesis examination	Graduate Council, with advice of chairman of major department	More than ten days prior to Commencement
Recommendation for degree	Graduate Council to Executive Faculty	More than ten days prior to Commencement
Receipt of degree	Executive Faculty	Commencement exercises

3

PROGRAMS OF STUDY

The University of Oregon Medical School offers three programs of graduate study leading to postbaccalaureate degrees.

Master of Science

This program requires at least one and more often two years of study. Basic and advanced courses are required, as well as the successful completion of an experimental investigation carried out under faculty supervision. The program is designed to give students a deeper background in the disciplines of their choice and to afford introductory experiences in the conduct of laboratory investigation.

Doctor of Philosophy

This program usually requires three or more years of postbaccalaureate study, leading to the highest earned academic degree which can be awarded by an educational institution. It involves course work designed to increase the student's depth and breadth of understanding of the discipline which he has chosen for his studies, and the completion of an experimental investigation, conceived and prosecuted by the student operating at a high level of independence. The program leading to the Ph.D. degree is designed to prepare students to develop careers as investigators and teachers in the health-related sciences.

Combined Program Leading to the M.D. and a Graduate Degree

The University of Oregon Medical School for many years has offered to selected medical students a combined program of graduate and medical studies which leads to the degrees of Master of Science and Doctor of Medicine. The purposes and advantages of the program are to afford medical students the opportunity to participate in advanced courses and to receive training in laboratory investigation in a basic science area; to strengthen their preparation in a basic science area through more intimate contact with problems of investigation and teaching in that area; to provide greater insight into their own motivations and potentialities with regard to research and teaching; and to evaluate more realistically the opportunities offered by a career in academic medicine.

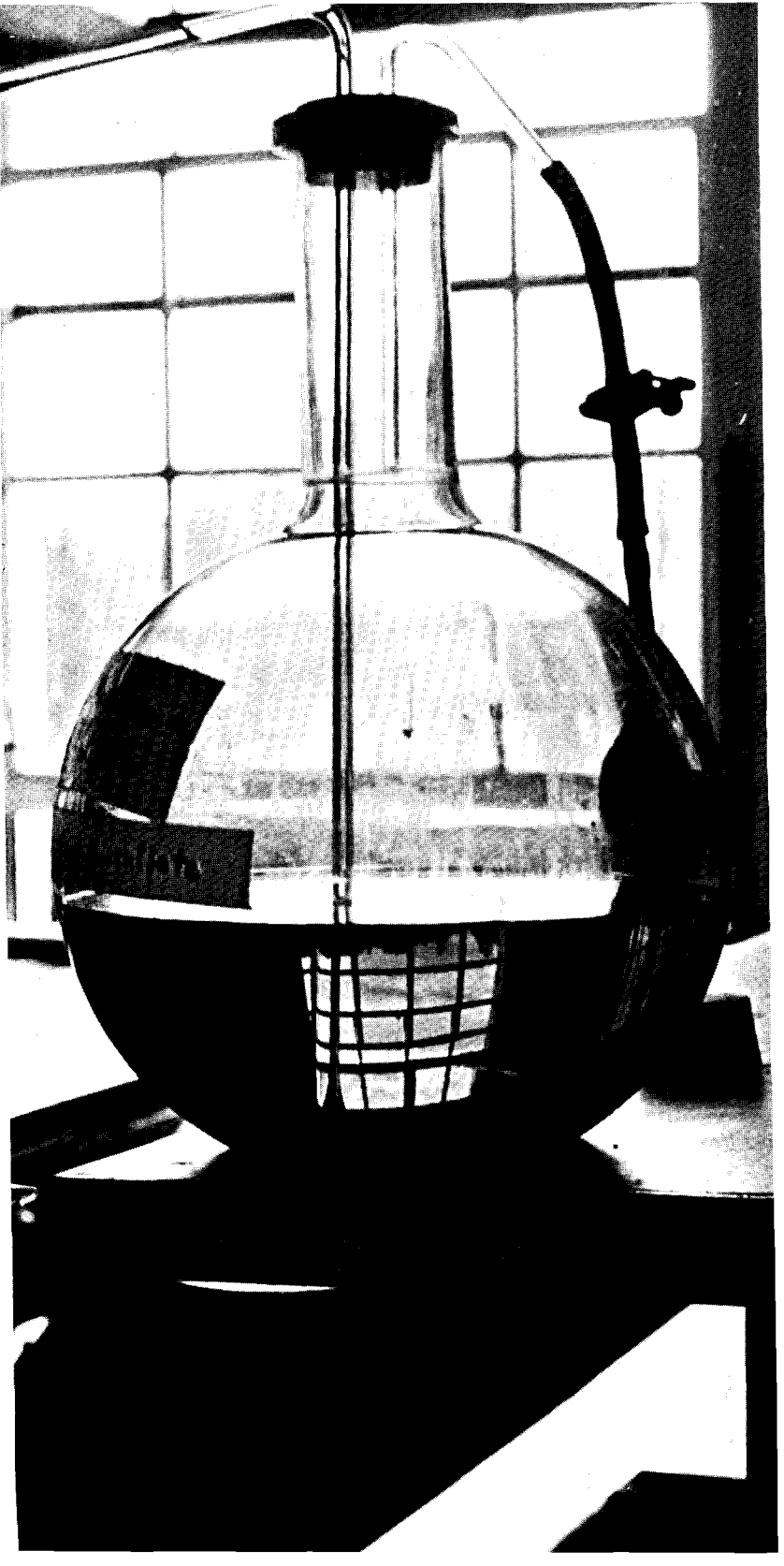
To provide training for those medical students who wish to prepare themselves more completely for careers as physician-scientists, a program leading to the combined M.D. and Ph.D. degrees has been activated. This course of training may require a total time span of seven years of post baccalaureate study. It affords opportunity for advanced course work in the fundamental sciences of mathematics, physics and chemistry, and for advanced course work in the basic medical sciences that cannot be incorporated into the M.D.-M.S. program.

Each student must provide evidence of sincere motivation and interest coupled with an acceptable performance record. In addition he must complete all the requirements for the graduate degree as outlined earlier on page 23. Credit hours may be earned in advanced courses, reading and conference, and thesis research. The student conducts a research project to be presented as a thesis for the degree. He may hold no outside job while in the program. Medical students wishing to enter this program must be accepted as graduate students by the Graduate Council and the Dean.

Candidates for the Doctor of Philosophy degree who have already earned the Doctor of Medicine degree may apply a maximum of 45 term hours of credit (one academic year) in the basic medical sciences toward the advanced degree.

Continuing Medical Education

The Medical School also offers courses of postgraduate medical education for physicians, designed to keep them abreast of the changing character of medical science. This program does not lead to a degree and should not be confused with the programs of study identified above.



4

DESCRIPTION OF COURSES

Course Numbering System

Medical School courses are numbered in accordance with the uniform course-numbering system of the Oregon State System of Higher Education. The numbering system as it applies to the Medical School courses is as follows:

400–499 Upper-division courses primarily for first-year students in medicine but to which graduate students may be admitted on approval of the graduate advisor and department chairman concerned.

500–599 Courses primarily for graduate credit towards an advanced academic degree (M.S. or Ph.D.) but which may be elected by medical students for credit towards the M.D. degree with permission of the department chairman concerned.

600–699 Courses primarily for the medical curriculum but which can also be applied toward an advanced academic degree (M.S. or Ph.D.) with the permission of the graduate advisor and the Graduate Council. Required courses for the second, third, and fourth years of the medical curriculum are designated by numbers 610-619, 620-629, and 630-649, respectively. Numbers 601, 605, 607, 609, and 650-699 are used for elective courses.

Certain numbers are reserved for courses that may be taken through successive terms under the same course number, credit being granted according to the amount of acceptable work done. These course numbers are as follows:

501 and 601	Research
503	Thesis
505 and 605	Reading and Conference
507 and 607	Seminar
609	Clinical Experience

DEPARTMENT OF ANATOMY

Robert L. Bacon, *Acting Chairman of Department*

Professors: **Robert L. Bacon, David L. Gunberg, Ellis B. Jump** (Dental School), **Anthony A. Pearson, William A. Stotler**

Associate Professors: **Robert Quinton-Cox** (Dental School), **Archie R. Tunturi**

Assistant Professors: **Reid S. Connell, Jr., Howard W. Davis, Robert J. Iorio**

Research Assistants: **Laurie DeLorme, Ronald W. Sauter**

The Department of Anatomy offers graduate work leading to the Doctor of Philosophy degree. Under certain circumstances a Master of Science program may be arranged. The departmental faculty is qualified to offer opportunities for advanced study and research in the following fields: neuroembryology, functional neuroanatomy, electronic and statistical analysis of central nervous system functions, reproductive endocrinology, experimental teratology, embryonic microcirculation, and biochemistry and electron microscopy of development. Extensive modern facilities are available for the conduct of thesis research in these areas. This program is intended to train students for the teaching of the anatomical sciences

and for the carrying out of original scholarly research in one of the above areas. It usually requires at least four years of study.

In addition to meeting the general requirements for admission (see page 20), candidates must have satisfactorily completed courses in: general biology or general zoology (9 term hours including laboratory); general or cellular physiology; genetics or embryology; inorganic chemistry through quantitative analysis (some research fields also require physical chemistry); organic chemistry (with laboratory); mathematics (9 term hours) (some fields require calculus); college physics (with laboratory).

A limited number of deficiencies may be satisfied after admission by course work in local undergraduate institutions.

In addition to aptitude scores on the Graduate Record Examination, the department requires an advanced test score in either biology, chemistry, or physics.

For the degree of Doctor of Philosophy, all students are required to take courses in gross and developmental anatomy, histology, cell biology, and neuroanatomy, and advanced courses in the department appropriate to their areas of investigation. In addition, they must elect a minor field and complete 20 hours of course work in one of the other basic medical sciences. A distributed minor may be elected and consists of course work in two or more of the basic sciences other than anatomy. Requirements for foreign language are indicated on page 22 of this Catalog as are general requirements.

After appropriate preparation, students are required to obtain teaching experiences in the courses in gross anatomy, histology, and neuroanatomy. Qualified students will be appointed as assistants in these courses.

The general requirements for the dissertation are as presented on page 24 of this Catalog. The subject is to be chosen from a field in which the members of the department have some experience. The topic is usually selected during the second year of study.

Selected medical students may enter the graduate program in the department of anatomy and work toward a master's degree in the five-year combined M.S.-M.D. program (see page 28).

An 410. **Anatomy.** 20 hours, fall, winter and spring.

Gross Anatomy: Regional dissection of the human body. Each pair of students dissects the lateral half of the human body. The student is furnished with a loan collection of disarticulated bones for the study of osteology. Lectures and demonstrations will include surface, developmental and radiological anatomy. 144 hours fall term, 144 hours winter term.

Applied Anatomy: A series of lectures will be devoted to the clinical significance of anatomy. These lectures will be given by the clinical staff and will be programmed to correlate with gross anatomy. 12 hours fall term, 12 hours winter term.

Histology and Organology: Lectures and demonstrations concerned with the microscopic anatomy of the tissues and organs. Student loan sets of microscopic preparations and microscopes will be available for student use. 24 hours fall term, 24 hours winter term.

Neurology and Organs of Special Senses: Study of the structure and functions of the organs of special senses and of the central nervous system. This is accomplished by gross dissections and stained sections of the human brain, spinal cord, and organs of special senses. Pathological conditions illustrating lesions of the nervous system are demonstrated. 48 hours, spring term.

Lectures, demonstrations, laboratories, quizzes. 408 hours.

An 416. **Microscopic Technique.** 2 hours spring.

The theory and practice of preparing animal tissue for histological study. Limited to 4 students, registration only after consultation with instructor. Laboratory, 6 hours a week: 72 hours.

An 501. **Research.** Any term, hours to be arranged.

An 505. **Reading and Conference.** Any term, hours to be arranged.

An 507. **Seminar.** Any term, hours to be arranged.

Journal Club.
History of Medicine.

An 512. **Analytical Embryology.** 4 hours spring.

Lectures and assigned readings on cytology and physiology of gametes, gamete transport, fertilization, cleavage and cell division, and on cell tissue and organ interaction in embryonic systems. The laboratory work is designed to introduce the advanced student to both classical and new techniques for the investigation of embryonic processes. Prerequisites: An 410, BCh 410, or equivalent. Lectures, 2 hours a week; laboratory, 6 hours a week: 96 hours.

An 513. **Analytical Histology.** 4 hours spring.

Lectures on the theory of fixation and staining; survey of physical and chemical techniques employed in modern histology. Practical experience with some of these techniques provided by laboratory exercises. Lectures and quizzes, 2 hours a week; laboratory, 6 hours a week: 96 hours. Prerequisites: An 416, BCh 410 or equivalent. Limited to 10 students.

An 514. **Special Dissections.** Term and hours to be arranged.

Human anatomical material dissected and certain parts of the body studied more thoroughly. Conferences and quizzes arranged with the instructor. Registration limited by available material. Prerequisites: An 410.

An 515. **Advanced Neuroanatomy and Computer Techniques.** Any term, hours to be arranged.

Set theory, probability theory and information theory are presented as the basis for the study of the behavior of neural networks in the auditory system and other parts of the brain. 3-6 hours per week.

An 516. **Computers in Medicine.** Any term, hours to be arranged.

After a brief description of the computer the course will analyze those requirements that a scientist or physician needs in order to make the computer part of his integral tools. An introduction to multiviarate statistics, set and probability theory will be presented. 3-6 hours per week. Six weeks.

An 517. **Embryology.** 4 hours spring.

Lectures on reproductive cycle, fertilization, normal and abnormal human development, correlated with detailed laboratory study of pig, mouse, and human embryos and fetuses. Primarily for graduate students. Lectures, 2 hours a week; laboratory, 6 hours a week: 96 hours. Limited to 10 students.

An 518. **Mammalian and Human Cytogenetics.** 3 hours winter.

Methods of chromosomal study; chromosomal structure; chromosomal function in meiosis and mitosis; genetic activity and inactivity; use of chromosomes in the study of genetics; gene mapping; sex determination; spontaneous and induced chromosome aberrations; chromosomal evolution. Student recitations on special topics such as the X-chromosome, somatic cell genetics, chromosomal variation, and cytogenetic studies in leukemia.

DEPARTMENT OF BIOCHEMISTRY

Richard T. Jones, *Chairman of Department*
Professor Emeritus: **Edward S. West**
Professors: **Jack H. Fellman, A. Wesley Horton, Richard T. Jones, George**

W. Kittinger (Primate Center), **Michael Litt, Howard S. Mason, Oscar W. Portman** (Primate Center), **Demetrios A. Rigas, Wilbert R. Todd, John T. Van Bruggen.**

Associate Professors: **Clarissa H. Beatty** (Primate Center), **J. Peter Bentley***, **Dale D. Hoskins** (Primate Center), **Geoffrey V. F. Seaman**

Assistant Professors: **John A. Black, Rose Mary Bocek** (Primate Center), **Charles F. Howard, Jr.** (Primate Center), **David Kabat**

Instructors: **Thomas Fujita, Russell L. Jolley, Jr.**

Affiliates: **C. Keith Claycomb** (Biochemistry, Dental School), **Walter L. Gabler** (Dentistry, Dental School)

Research Associates: **Bernadine Brimhall, Marie Duerst, Albert Hanson, Charlotte Head, Yoshiyuki Ichikawa, Takashi Iyanagi, Paul McMahill, Jeffrey Pinto, Bohumila Rokosova, Toshihiro Tsudzuki, Walter Vanneste**

Research Assistants: **June Boyett, Leonard Evans, Pauline Gaskill, Kathryn Johnson, James Joyce, Carrol Platz, Jr., Esther Roth, Jean Scott, Sandra Siegner**

The Department of Biochemistry offers graduate work leading to the Master of Science and Doctor of Philosophy degrees. The purpose of the departmental curriculum is to inculcate firm grounding in modern knowledge of the chemical and physical basis of life, and to develop mastery of contemporary techniques of biochemical research.

For admission to the department as a graduate student, the applicant should have completed standard courses in general, organic, physical, and quantitative analytical chemistry, general physics, mathematics through calculus, and general biology or zoology. Opportunity to make up deficiencies may be given to the applicant who is otherwise acceptable. The Graduate Record Examination must include scores in the special test area of chemistry. Although not required, advanced courses in chemistry, biology, mathematics, and electronics will be found to be valuable.

Requirements for the degrees of Master of Science and Doctor of Philosophy in the major field of biochemistry include experimental research leading to a thesis, a course in general medical biochemistry (BCh 410), and advanced courses in biochemistry sufficient to provide training in breadth and depth, to meet credit requirements (see general requirements), and to pass the qualifying examination. The thesis for the Ph.D. degree is expected to represent a positive contribution to biochemical knowledge publishable in a standard journal. Graduate students must take a seminar (BCh 507) throughout the period of residence. Qualified students may proceed directly to the Ph.D. degree without first obtaining the master's degree.

Students requiring financial assistance should ask for information regarding support available in the department. The departmental graduate program is partially supported by a U.S. Public Health Service training grant. Research assistantships supported by research grant funds are also generally available. Stipends are consistent with the national levels for predoctoral fellowships and include dependency allowances. In general, stipends for students working toward the Ph.D. degree range from $2,500 to $4,000 depending on the number of dependents.

Two years are generally necessary for completion of requirements for the M.S. degree, and fours years for the Ph.D. degree; however, the programs may be completed in less time under some circumstances.

* Leave of absence July 1, 1971 to June 30, 1972.

The faculty of the Department of Biochemistry includes authorities in a number of active fields of modern biochemistry, including carbohydrate, lipid, and protein biochemistry, biological oxidation-reduction, adaptive enzymology, the biochemistry of hormone action, biochemical genetics, chemical carcinogenesis, and biophysical chemistry. As soon as possible, the student should select, with the advice of the chairman of the department, a faculty preceptor, a subject for his thesis research in accordance with his interests. The student will have opportunity for intensive training in modern physical, biophysical, and biochemical instrumentation, and the research philosophies which guide the effective use of this instrumentation.

Qualified medical students may also undertake graduate work in biochemistry. Upon successful completion of an experimental thesis, they may qualify for the combined M.S.-M.D. degree in the five-year program of the Medical School. (See page 28.)

BCh 410. **Basic Biochemistry.** 3 hours fall.

Physical chemistry pertaining to biochemistry, particularly acid-base, buffers and equilibrium reactions. Chemistry of macromolecules and their subunits including proteins, carbohydrates, nucleic acids and lipids. Introduction to enzymology. This course is the beginning of a series of courses in which biochemical topics will be taught on an integrated basis with other basic medical science subjects. Lectures, laboratory, and seminars. 66 hours.

BCh 501. **Biochemistry Research.** Any term, hours to be arranged.

BCh 505. **Reading and Conference.** Any term, hours to be arranged.

BCh 507. **Seminar.** Any term, hours to be arranged.

BCh 511. **Nucleic Acids and Protein Synthesis.** 2 hours, term to be arranged.

The biochemistry and biosynthesis of nucleic acids and proteins, and selected topics in the biochemistry of heredity, growth, aging and differentiation.

BCh 512. **Bioenergetics.** 2 hours, term to be arranged.

Principles of biological energy transduction. Respiratory biochemistry, biological oxidation-reduction and oxidative phosphorylation.

BCh 513. **Advanced Intermediary Metabolism and Nutrition.** 2 hours.

Advanced aspects of the metabolism of lipids, sterols, carbohydrates, amino acids and proteins; interrelationships of metabolism and mechanisms of control.

BCh 514. **Enzymology.** 3 hours.

The physical and chemical properties of enzymes and the reactions they catalyze.

BCh 515. **Biophysical Chemistry.** 4 hours spring.

An overview of biophysical chemistry. Intermolecular interactions in liquid and liquid-crystalline phases. Thermodynamics of biological systems. Physics and chemistry of interfacial phenomena. Biophysical characterization of macromolecules. Physical behavior of cells as biocolloids including biorheology and cellular contact phenomena.

BCh 516. **Biochemical and Biophysical Techniques.** Hours and term to be arranged.

Selected laboratory exercises concerned with the preparation and characterization of substances of biochemical importance. Biophysical study of macromolecules and surface phenomena. Instrumentation theory and practice, including optical methods of analysis, electrokinetic techniques, and isotopic methods.

BCh 517. **Topics in Advanced Biophysical Chemistry.** Hours and term to be arranged.

Current concepts and theoretical foundations in selected topics of biophysical chemistry. Prerequisite: BCh 515.

BCh 518. **Biochemical and Biophysical Properties of Proteins.** 4 hours, term to be arranged.
Properties of proteins in solution, purification, criteria of purity, levels of protein structure, methods for characterization. Current concepts of protein evolution, genetics, and relationship of structure to function.

BCh 519. **Biochemical Mechanisms of Disease.** 2 hours, term to be arranged.
Biochemical mechanisms underlying selected human diseases.

BCh 520. **Structure and Function of Biological Membranes.** 2 hours, term to be arranged.
The composition of biological membranes and the functional aspects of their composition; models of membrane structure; membrane function and mechanism of membrane transport.

DIVISION OF EXPERIMENTAL BIOLOGY

William Montagna, Head of Division

Professor: **William Montagna**

Associate Professors: **Mary Bell** (Primate Center), **Robert M. Brenner** (Primate Center), **Wolf H. Fahrenbach** (Primate Center)

Research Associates: **Hideo Nakagawa, Bohumila Rokosova**

Research Assistants: **Albert Hanson, Antonia M. Lammerts Van Bueren**

This division offers courses intended to complement the work of students enrolled in other graduate disciplines. Credits obtained in Experimental Biology may be used to fulfill the minor requirements for advanced degrees.

Areas of specialized study in which research may be carried out include neuroendocrinology, protein and carbohydrate metabolism, enzyme histochemistry, and ultrastructure research. The division has very modern facilities and equipment and offers access to subhuman primates at the Oregon Regional Primate Research Center of which the divisional chairman is director.

EB 501. **Research.** Any term, hours to be arranged.

EB 505. **Reading and Conference.** Any term, hours to be arranged.

EB 507. **Seminar.** Any term, hours to be arranged.

EB 510. **Biological Ultrastructure.** 2 hours, term to be arranged.
A detailed presentation of the fine structure of cells, their organelles and inclusions with emphasis on the correlation of ultrastructural specialization and function. Lectures, 2 hours a week: 24 hours.

EB 511. **Comparative Neuroendocrinology.** 2 hours, term to be arranged.
A course in comparative endocrinology with emphasis on neuroendocrine control systems in both vertebrates and invertebrates. The various lines of physiological, biochemical and morphological evidence including electron microscopy which support the neurohemal theory will be presented in detail. Metamorphosis in insects, ovulation in mammals, lactation in mammals and adrenocortical secretion in vertebrates will be covered.

EB 512. **Connective Tissue.** 2 hours, term to be arranged.
This course will cover the structure, function and metabolism of connective tissues in general. Their major constituents: collagen, elastin, and mucopolysaccharides will be covered in detail. The structure of these constituents will be discussed at various levels of organization with emphasis placed upon their molecular architecture, cellular origin, and biosynthetic mechanisms. Specialized areas, such as bone formation and mineralization, and wound healing will also be analyzed.

DEPARTMENT OF MEDICAL PSYCHOLOGY

Joseph D. Matarazzo, Chairman of Department

Professors: **Robert D. Boyd, F. Robert Brush, Robert D. Fitzgerald, Ann M. Garner, Joseph D. Matarazzo, Ruth G. Matarazzo, Charles H. Phoenix** (Primate Center), **Jack A. Vernon, Arthur N. Wiens**

Associate Professors: **Constance Hanf, Norman Henderson, James E. Lindemann, James H. O'Brien, David S. Phillips, Leif G. Terdal**

Assistant Professor: **Russell H. Jackson**

The Department of Medical Psychology offers graduate training leading to the Doctor of Philosophy degree. Broadly viewed, the Department's program stresses general experimental psychology with specialization in (1) physiological psychology, (2) learning and motivation, or (3) experimental personality. Regardless of the student's field of concentration he is expected to become well trained in statistics, research design, history, learning, motivation, physiological psychology, individual differences, personality, sensory processes, and laboratory techniques. Because the other basic medical science departments provide an environment particularly suited to the education of experimentally and physiologically oriented psychologists, students are expected to enrich their programs of study with courses in physiology, biochemistry, neuroanatomy, and pharmacology. Minor courses of study in one or more of these allied fields provide a unique doctoral training experience.

The department focuses upon the training of students committed to obtaining the Ph.D. degree and, therefore, individuals seeking only the M.S. degree will not be admitted to graduate standing. However, all doctoral candidates in psychology must complete the course of study leading to the M.S. degree, including the writing of an acceptable research thesis. This work is designed to assist the student during the planning and execution of his doctoral research project and the writing of his dissertation. The M.S. degree is also awarded to medical students enrolled in the five-year combined M.D.-M.S. program who satisfy Graduate Council and departmental regulations. (See page 28.) With rare exceptions, four years of academic work will be required to fulfill all requirements of the Ph.D. program. Financial support for students is available in the form of traineeships from a departmental training grant (National Institute of General Medical Sciences) and from part-time research assistantships that are competitive with those awarded by other graduate departments of psychology.

Current research training in the physiological area stresses analyses of the relations between central nervous system activity and behavior in a variety of species, especially as reflected in electrophysiological studies of cortex and associated structures and in neuroendocrinological and neurobiochemical analyses of behavior. In the fields of learning-motivation and experimental personality there are active research programs in classical conditioning, avoidance learning, discrimination, conflict, punishment, comparative social behavior, verbal behavior and communication. Supporting facilities for these activities are provided by an animal care department, animal surgery, histology laboratory, mechanical and electronic shop, soundproof rooms, laboratories for personality research, electrophysiological and behavioral research equipment and an electronic digital computer.

Students desiring admission to the program in Medical Psychology must arrange to take the Graduate Record Examination and to have their test scores forwarded to the Director of Admissions. No specific number of undergraduate courses in psychology is required and training in the biological and physical sciences is given special emphasis in evaluating applicants.

During his first year the student must take the courses numbered 511 and 514 through 521 below. These comprise the basic core program for all students. The additional courses (MPs512 and 513) and seminars (MPs 507), selected by the student in consultation with his academic adviser and the Doctoral Studies Committee, are taken during the second, third, and fourth years. A large portion of the student's effort will be devoted to training in research.

MPs 410. **Medical Psychology.** *2* hours fall

Basic psychological and behavorial principles derived from laboratory research and their applications in clinical practice and research in medicine. Examined within the latter context are pre- and postnatal influences, early development, intellectual processes, learning and conditioning, anxiety and other motivational states, and influences associated with man as a social organism. Lectures, demonstrations, and laboratory. 49 hours.

MPs 501. **Research.** Any term, hours to be arranged.

MPs 505. **Reading and Conference.** Any term, hours to be arranged.

MPs 507. **Seminar.** Any term, hours to be arranged.

Neurophysiology of Motivation
Neurophysiology of Learning
Sensory Processes
Psychopharmacology
Hormones and Behavior
Neurological Basis of Reproduction
Comparative Psychology
Sensory Development
Human Learning
Conditioning
Cognitive Processes
Punishment
Learning and Motivation
Developmental Psychology
Verbal Behavior
Social Psychology
Social Process Applications
Individual Behavior Modification
Abnormal Psychology
Quantitative Methods
Laboratory Methods
Computer Methods

MPs 511. **Statistics.** 3 hours fall.

Statistical methods for scientific research, including scales of measurement; tests of significance; correlation and regression; analysis of variance and design of experiments; distribution-free techniques; Type I error, Type II error and Power.

MPs 512. **Research Design.** 3 hours winter.

Basic concepts of the linear model (including linear regression) and its application to the design and analysis of experiments. Topics covered include essentials of matrix algebra; bivariate and multivariate linear regress analysis; introduction to experimental design using repeated and non-repeated measures; the non-parametric model, introduction to univariate scaling theory. Prerequisite: MPs 511 or equivalent.

MPs 513. **Advanced Statistics.** 3 hours, term to be arranged.

Analysis of the foundations of measurement, quantitative methods, correlation and regression theory, factor analysis, basis of psychophysical methods, set theory, and special topics.

MPs 514. **Sensation and Perception.** 3 hours winter.

Review of the basic psychophysical and neurological mechanisms of audition, somatic senses, vision, olfaction, and gustation, followed by a survey of the major experimental and theoretical works in perception.

MPs 515. **Learning and Conditioning.** 3 hours fall.

A critical examination of evidence relating to basic learning phenomena in both classical and instrumental conditioning.

MPs 516. **Motivation.** 3 hours spring.

A critical examination of motivation as an explanatory construct in behavior theory, together with a review of experimental and physiological determinants of motivational phenomena.

MPs 517. **History of Psychology.** 3 hours fall.

Examined are developments in the history of psychology necessary for an understanding of some of the main currents in contemporary psychology. Prominent ideas from structuralism, functionalism, associationism, early behaviorism, gestalt psychology, psychoanalysis, and neo-behaviorism are analyzed and their relevance to modern ideas critically evaluated.

MPs 518. **Physiological Psychology.** 3 hours spring.

Survey of the basic literature in the field, with emphasis on the role of the central nervous system in behavior; fundamentals of neuroanatomy and neurophysiology basic to physiological psychology.

MPs 519. **Theories of Personality.** 3 hours spring.

Critical review of the major theories of personality, including current behavioral approaches, and empirical evidence supporting these theories.

MPs 520. **Individual Differences.** 3 hours winter.

Introduction to individual differences in humans, their distribution in the general population, and methods of measuring such differences in intelligence, personality, aptitudes, interests, and other traits; characteristics of good tests, and their uses and limitations.

MPs 521. **Theories of Learning.** 3 hours winter.

Analysis and comparison of the major theories of learning, covering their logical and systematic properties as well as their empirical foundations.

MEDICAL TECHNOLOGY (DEPARTMENT OF CLINICAL PATHOLOGY)

Tyra T. Hutchens, Chairman of Department of Clinical Pathology

Margaret E. Berroth, Assistant Director of Educational Programs

Professors: **James L. Bramhall** (Veterans Hospital), **Tyra T. Hutchens**

Associate Professors: **Margaret E. Berroth, James E. Haines, Martha L. Hamilton, Victor C. Marquardt, Jr., Abdel L. Rashad**

Assistant Professors: **John P. Aitchison, Mary E. Baptist** (Medical Technology), **John D. Koontz, Kirtikant V. Sheth, J. Robert Swanson**

Instructors (Medical Technology): **Patricia A. Chadwick, Rose M. Parker, Marian S. Thomas, James A. Wilkinson**

The Master of Science degree in Medical Technology is designed to provide superior medical technologists with bachelor's degrees advanced study and training in a medical technology subspecialty of their choice as the basis of their future involvement in clinical laboratory personnel instructional programs or in clinical laboratory supervision. The work is arranged to meet the institutional requirements for the degree of Master of Science (see page 23). This program consists of 30 term hours of graduate credit in the major department and 15 hours of graduate credit in a minor department. The 30 major credit hours include credit given for research to enable the candidate to meet the requirements of a written thesis. In addition, two term hours of credit are required in an advanced statistics course dealing with the design of experiments and the analysis and interpretation of experimental data. A program of course work and research activity is developed by consultation with the student's faculty advisor in his area of specialization.

A minimum of three academic terms in residence is required; however, since a thesis based on an original research project is mandatory for the Master of Science degree, it is more usual to spend six academic terms in residence.

In addition to the general requirements for admission to graduate study (see page 20), it is recommended that undergraduate work include a basic course in statistics, physics and the recommended college courses to qualify for the Registry examination of Medical Technologists of the American Society of Clinical Pathologists.

In addition to providing all clinical laboratory services to the Medical School Hospitals and Clinics, the Department of Clinical Pathology has modern facilities with specialized equipment for research and study.

Trainee stipends are available for qualified students.

MT 501. **Research.** Any term, hours to be arranged.

MT 505. **Reading and Conference.** Any term, hours to be arranged.

MT 507. **Seminar.** Any term, hours to be arranged.

MT 520. **Advanced Nuclear Medicine Techniques.** Any term, hours to be arranged.

MT 521. **Advanced Nuclear Medicine Laboratory.** Any term, hours to be arranged.

DEPARTMENT OF MICROBIOLOGY

Arthur W. Frisch, *Chairman of Department*

Professors: **Arthur W. Frisch, Evelyn L. Oginsky, Lyle Veazie***

Associate Professors: **Terence M. Joys, Arthur Malley** (Primate Center), **Ernest A. Meyer, Marvin Rittenberg** (Medicine), **R. Bradley Sack** (Medicine)

Assistant Professors: **Denis R. Burger** (Veterans Hospital), **Barbara J. Iglewski, Wallace Iglewski**

Assistant Clinical Professor: **Thomas E. Frothingham**

Instructor: **Nancy B. Gerhardt**

Affiliates: **Howard Creamer** (Microbiology, Dental School), **Richard Parker** (Oral Biology and Microbiology, Dental School)

Research Assistants: **Lynn Elwell, Eric Fortress, David Oldenburg, Lois Penttila**

Microbiology is of importance not only in the study of infectious disease and host-pathogen interactions but also has come to serve as a primary source of model systems for the exploration and understanding of the basic properties of all living systems at the molecular level. The Department of Microbiology offers graduate training, leading to the Master of Science and Doctor of Philosophy degrees, designed to provide a broad background in the experimental and theoretical aspects of microbiological science, in preparation for professional careers in research and teaching.

In addition to the general requirements for admission to graduate study (see page 20), it is recommended that undergraduate work include the following courses: microbiology or bacteriology; general biology; genetics; general chemistry, quantitative analysis, organic chemistry, physical chemistry, and biochemistry; one year of college mathematics; elementary statistics. Reading knowledge of French, Spanish, or German is also recommended. Satisfactory Graduate Record

* Leave of absence.

Examination scores must be obtained in both the verbal and quantitative aptitude tests, and either the biology or chemistry field tests.

The program of study for the M.S. and Ph.D. degrees consists of advanced courses and seminars, and of independent investigation leading to the completion of a thesis.

Selection of appropriate course work is made in consultation with the student's faculty advisor in his area of research specialization. All candidates for either the M.S. or Ph.D. degree must complete the following courses: Mb 610; the interdisciplinary course in cell biology, Con 410; two credit hours each in Mb 505 and 507; all of the relevant advanced courses offered by the department during the student's period of residence. The courses to be completed in other basic medical sciences are not rigidly specified, but rather are selected for the purpose of broadening and strengthing the student's training and knowledge.

Areas of specialized study in which the thesis research may be carried out include the following: immunology, immunochemistry, virology, parasitology, mycology, microbial physiology, microbial genetics, pathogenesis, ecology, and taxonomy. The student is allowed a wide choice in the subject of his research, and receives guidance and training from members of the Department of Microbiology as well as faculty of other departments. Current areas of research interest of the departmental faculty are: immunosuppression, tolerance; physical and chemical structure and regulation in immunological systems; interrelationships between enteric bacteria; genetic control and chemical structure of bacterial flagella; characterization and regulation of metabolic systems in bacteria; physiology and nutritional requirements of pathogenic protozoa; biophysical and biochemical characterization of viruses.

Although the minimum residence requirement for the M.S. degree is three academic terms, it is customary to spend two years in residence. Well qualified students may proceed directly to the Ph.D. degree without the M.S. degree after a usual residence of three to four years. Relevant course work completed during study for the M.S. degree, at this institution or elsewhere, may be applied with special permission towards fulfillment of the course work requirements for the Ph.D. degree.

Traineeships are awarded on a competitive basis to highly qualified students for either the M.S. or Ph.D. degrees; these include stipends exempt from federal tax, allowance for dependents, and funds to cover the cost of tuition and research supplies.

Mb 501. **Research.** Any term, hours to be arranged.

Mb 505. **Reading and Conference.** Any term, hours to be arranged.

Mb 507. **Seminar.** 1 hour any term.

Mb 508. **Advanced Virology.** 4 hours, term to be arranged.
Biochemical and biophysical nature of viruses, mechanisms of viral infection, enumeration and statistical interpretation of the infectious unit, virus, antibody reactions, biochemical consequences of infection, viral genetics, and interference phenomena. Lectures and laboratories. Open to a limited number of students with consent of instructor.

Mb 509. **Bacterial Physiology.** 4 hours, term to be arranged.
Cytochemistry and ultrastructure, patterns of growth, metabolic pathways of degradation and synthesis, energy mechanisms, genetic controls and their regulation, physiological mechanisms for environmental adaptation. Lectures and laboratories. Open to a limited number of students with consent of instructor.

Mb 510. **Microbial Genetics.** 4 hours, term to be arranged.

The molecular basis of heredity. The genetic control of biochemical activities in bacteria. Systems of recombination in bacteria, bacteriophage, actinomycetes, and fungi. The theory and practice of genetic mapping and fine structure analysis. Population genetics as applied to micro-organisms. Lecture and laboratories.

Mb 511. **Pathogenesis.** Term and hours to be arranged.

Study of selected areas of medical microbiology with emphasis on pathogenesis of infectious agents. Control of production and mode of action of virulent products: exotoxins, endotoxins, viral and rickettsial toxins, hemolysins, leucocidins, nucleases, coagulases, kinases, etc. Inhibition of host cell macromolecular synthesis following virus infection and its relationship to cytopathic effect and viral virulence; inhibition of DNA, RNA and protein synthesis; induction of new t RNA's, activitation of lysosomal enzymes; non-immune host factors involved in infection; the macrophage and its products, lysosomes and non-globin serum components.

Mb 512. **Immunochemistry.** 4 hours, term to be arranged.

Chemical and physical nature of antigen, antibody, antigen-antibody complexes; physical and kinetic measurements of antigen-antibody interaction; current methods of antibody isolation; immunochemical techniques; quantitative precipitation, gel-diffusion, immunoelectrophoresis, ultracentrifugation, equilibrium dialysis, and column chromatography. Lectures and laboratories. Open to a limited number of students with consent of instructor. Prerequisites: elementary physical chemistry and biochemistry.

Mb 513. **Advanced Microbiology and Immunology.** Term and hours to be arranged.

Study of selected areas of microbiology with emphasis on contemporary concepts of the basic nature of microbial and host systems and their interactions. Open to a limited number of students with consent of instructor. Prerequisites: Mb 610.

Mb 610. **Introduction to Medical Microbiology.** 4 hours.

An introduction to medical microbiology involving a discussion of the basic properties of microorganisms and their relation to the infective process. Lecture, laboratory and case presentation: 92 hours.

DEPARTMENT OF PATHOLOGY

Richard D. Moore, *Chairman of Department*

Professor Emeritus: **Frank R. Menne**

Professors: **George C. Buchan, Peter J. Dawson, Richard D. Moore, Nelson R. Niles, Benjamin V. Siegel, Vinton D. Sneeden**

Associate Professors: **Thelma N. Fisher, David Linder, Wilbur P. McNulty** (Primate Center), **James L. Palotay** (Primate Center)

Assistant Professor: **Robert E. Brooks**

Instructor: **Claire Langston**

Lecturer: **Jan E. Cordell**

Pathology is the biologic science concerned with the etiology, pathogenesis and effects of disease. Broadly characterized it is the study of injurious agents, their effects on cells and tissues and the subsequent reaction of the biologic system at the structural, chemical and functional levels.

The Department offers courses and study opportunities that complement the work of students in other graduate disciplines. Credits obtained in pathology may be used to fulfill the minor requirements for advanced degrees.

Current research interests in the department include viral and chemical carcinogenesis; biologic effects of herbicides and pesticides; genetics; immunology and immunopathology; and the effects of injury on myocardial cell structure and metabolism.

Pth 410. **General Pathology.** 3 hours spring.
This course is designed to introduce the student to the principles and concepts of disease. Broadly characterized, it is the study of the effects of injury on cells and tissue and their subsequent reaction. The topics considered will include: cellular injury, abnormal division and differentiation, disturbances in cellular metabolism, disturbances in circulation, inflammation and neoplasia. This will prepare the student for the detailed study of the functional and structural abnormalities to be covered in the Systems Pathophysiology course during the second year. The material will be presented in conferences, lectures and demonstrations with reinforcement and illustration by selected laboratory experiments. 66 hours.

Pth 501. **Research.** Any term, hours to be arranged .

Pth 505. **Reading and Conference.** Any term, hours to be arranged.

Pth 507. **Seminar.** Spring, hours to be arranged.

Pth 516. **Advanced Systemic Pathology.** Any term, hours to be arranged.
Study of the detached pathology of one system.

Pth 517. **Advanced Pathological Histology.** Any term, hours to be arranged.
Systematic study of microscopic sections of autopsy tissues. Open to students who have had at least one term's work in pathology.

Pth 518. **Special Pathology of Heart and Circulation.** Hours to be arranged.
Systematic and inclusive study of the pathologic states affecting the circulatory system, illustrated by sections and gross materials.

Pth 519. **Introduction to Electron Microscopy.** 2 hours fall.
An introductory course including illustrated lectures and demonstrations dealing with the electron microscope, its technical operations, and broad applications in biological studies and research. Offered alternate years.

Pth 520. **Principles and Techniques of Tissue Culture.** 2 hours fall.
Lectures, demonstrations, and conferences dealing with techniques of cell and tissue culture; designed to provide a background of general information on cultured cells and instruction in application of the methods to problems in current areas of research in cell biology. Offered alternate years.

Pth 521. **Biology of Cancer.** 1 hour spring.
Lectures and discussions on the natural history of cancer, geographic and ethnologic aspects, tumor genetics, and etiologic concepts and mechanisms of carcinogenesis.

Pth 522. **Viral Oncology.** 2 hours, term to be arranged.
Systematic study of viruses in relation to cancer in animals and man. Biological aspects of tumor induction by viruses, intracellular and extracellular factors in neoplasia; biochemical and biophysical properties of tumor viruses.

Pth 523. **Biochemical Pathology.** 2 hours, term to be arranged.
This course deals with the biochemical abnormalities characteristic of selected examples of both genetic and nongenetic diseases. Particular emphasis is placed on the role of nucleic acids in the processes involved. A short series of introductory lectures reviews nucleic acid biochemistry and metabolism, and is followed by a group of lectures dealing with our current knowledge of biochemical abnormalities related to chromosomal diseases, blood proteins, urinary products, storage diseases, viral infections, neoplasia, irradiation, and aging.

DEPARTMENT OF PHARMACOLOGY

William K. Riker, *Chairman of Department*
Professor Emeritus: **Norman A. David**
Professors: **John D. Gabourel, Elton L. McCawley, William K. Riker**
Associate Professors: **Kaye E. Fox, Ralph T. Tanz, Herbert A. Wendel**
Assistant Professors: **Robert E. Brummett, Hall Downes, George D. Olsen**
Visiting Assistant Professor: **Sergio Guerrero**

The Department of Pharmacology offers graduate training leading to the Ph.D. degree to a limited number of well qualified students. The program usually requires four years of post-baccalaureate study but this is variable and depends upon the preparation of the student and the nature of the dissertation problem. A combined M.S.-M.D. program is also offered to regularly enrolled medical students. (See page 28.) This program requires a minimum of five years of study. Application should be made on the completion of the first year of medical studies.

Preparation for graduate study in pharmacology consists of a bachelor's degree in one of the physical or natural sciences, or a B.S. degree in pharmacy. Although course requirements for entrance as a graduate student are not rigidly defined, a strong undergraduate background in biology, chemistry (both physical and organic) and mathematics (through calculus) is recommended. Courses in statistics and German or French are also desirable. Minor deficiencies in preparation can be made up through course work in neighboring institutions after entering the program.

The requirements for the Ph.D. degree are outlined in the general requirements section of this bulletin. (See page 23.) First year medical courses in cell organization and function, biochemistry, physiology, genetics, developmental biology, anatomy, neuroanatomy, immunology and pathology are required for all pharmacology graduate students. Second year medical courses in pharmacology (Phc 610) and microbiology and infectious diseases are also required. In addition, selected blocks in the pathophysiology (Con 610) course will be required (for example, central nervous system, cardiovascular and respiratory, endocrine, renal.) Following successful completion of these required first two-year medical courses, a planned course of study will be worked out for each student to provide a sound basis in general pharmacology as well as a foundation for further pursuit of a particular field of interest.

Current research interests of the pharmacology faculty include biochemical and cellular pharmacology drug metabolism, cardiovascular pharmacology, neuropharmacology and clinical pharmacology.

Predoctoral fellowships when available, will be awarded on a competitive basis. Prospective students are urged to have their applications completed by mid-February for admission in July or September of that year. More detailed information can be obtained by writing to the department chairman.

Phc 501. **Research.** Term and hours to be arranged.
Students who are properly qualified and who can devote an adequte amount of time to the work are encouraged to pursue original investigations.

Phc 505. **Reading and Conference.** Term and hours to be arranged.
General Principles of Pharmacology.
Drug Metabolism.
Molecular Pharmacology.

Pharmacogenetics.
Advanced Cardiovascular Pharmacology.
Neuropharmacology.
Clinical Pharmacology.

Phc 507. **Seminar.** 2 hours fall, winter and spring.

Phc 514. **Factors Modifying Drug Action.** 2 hours, term to be arranged.
Lectures on drug metabolism, distribution and excretion, drug protein interaction pharmacogenics, and drug allergy and idiosyncrasy. Prerequisite: consent of instructor.

Phc 515. **Pharmacological Control of Biological Information Transfer.** 2 hours, term to be arranged.
Lectures on the basic mechanisms for nucleic acid and protein biosynthesis, mechanisms of repression and derepression, and the effect of hormones and other drugs on these systems. Applications to chemotherapy will also be discussed. Prerequisite: consent of instructor.

Phc 516. **Receptor Therapy and Conformational Analysis.** 2 hours, term to be arranged.
Lectures on modern receptor therapy, kinetics of drug receptor interactions, drug antagonism, allosteric receptor concept, and conformational analysis of receptor sites. Prerequisite: consent of instructor.

Phc 610. **Pharmacology.** 3 hours, fall.
Lectures, laboratory and demonstration on pharmacological principles. 48 hours. Prerequisite: completion of required first-year medical courses (as outlined above).

DEPARTMENT OF PHYSIOLOGY

John M. Brookhart, *Chairman of Department*

Professors: **John M. Brookhart, Alfred J. Rampone, Benjamin B. Ross**

Associate Professors: **J. Job Faber, Robert E. Swanson, Joseph B. Trainer**

Assistant Professors: **Walter A. Petersen, John A. Resko** (Primate Center)

Research Associate: **Richard E. Talbott**

Clinical Research Associates: **J. David Bristow, Miles J. Edwards, Monte Greer, James Metcalfe, George A. Porter, Patrick J. Reynolds** (Dental School)

The program of graduate study in the Department of Physiology leading to the Doctor of Philosophy degree is designed to prepare students for careers as teachers and investigators in the area of organ and system functions, and in the underlying mechanisms and control of those functions. Primary emphasis is placed on studies of mammalian systems, although other life forms are utilized when appropriate. Training for the degree of Master of Science is permitted to be undertaken only under special circumstances. It is expected that students completing the Ph.D. program will be qualified to accept positions in departments of physiology at the university or medical school level.

Undergraduate preparation for the program is not rigidly specified. The "state of the art" in physiological investigation demands a thorough foundation in mathematics (through calculus and preferably, differential equations), chemistry (including physical chemistry), biology (through comparative anatomy), and physics. Minor deficits in preparation can be made up through course work in neighboring

institutions after entering the program. Graduate Record Examination scores on both aptitude tests and on one of the advanced tests are required as part of the application for admission. The advanced tests acceptable for physiology include biology, chemistry, engineering, mathematics and physics. In certain circumstances, the scores obtained on the Medical College Aptitude Test may be accepted in lieu of the Graduate Record Examination.

The program of study involves courses in introductory and advanced physiology, as well as courses in other disciplines which are regarded as essential to the broad preparation of the student for his thesis research. The program also involves the conduct of an experimental project and a written thesis based on the research undertaken. The time required to complete the program of study and research is four to five calendar years. However, individual circumstances have an important influence on the duration of training. A maximum number of 60 credit hours of thesis research may be applied toward the requirements for the degree.

Choice of thesis topic is made by the student in conformity with his own interests, limited only by the capabilities of the staff members to offer the student adequate guidance and supervision. A thesis committee of several faculty members is available to the student for advice on topic selection, experimental design, methodology and performance. The areas of competence currently represented on the faculty include neurophysiology, respiratory physiology, renal physiology, gastrointestinal physiology, cardiovascular physiology, and endocrine physiology. Space and modern instrumentation are available for student research in any of these areas. Provisions are made for the acquisition of teaching experience as a part of the training program.

The graduate studies program in physiology is partially supported by a grant-in-aid from the National Institutes of Health. This grant affords tax-free training stipends, dependency allowances, and funds for tuition, equipment, supplies, and travel. The basic stipend rate is initially $2,400 per calendar year, $2,600 during intermediate years and $2,800 in the terminal year of training. The dependency allotment is $500 for each dependent. Trainee appointments are made on a competitive basis only to the best qualified applicants. Prospective students are urged to have their applications for graduate admission completed by April.

Phy 410. **Human Physiology.** 7 hours winter, spring.
Lectures, laboratory exercises, and conferences devoted to mammalian physiology, with special application to the human. Consideration is given to the fundamental properties of cellular membranes, the basic elements of nerve and muscle activity, and general information essential to the understanding of the respiratory, cardiovascular, renal, gastrointestinal, and endocrine systems. Lectures, 4-5 hours a week; laboratory, 3-6 hours a week: 150 hours.

Phy 501. **Research.** Any term, hours to be arranged.
Prerequisite: Phy 410.

Phy 505. **Reading and Conference.** Any term, hours to be arranged.
Prerequisite: Phy 410.

Phy 507. **Seminar.** Any term, hours to be arranged.
Prerequisite: Phy 410.

Phy 515. **Physiological Instrumentation and Techniques.** I. 4 hours, term to be arranged.
Lectures and laboratory work covering basic principles of measurements using transducers of various types, signal processing and display and applications to specific problems of physiologic measurements. Lectures and demonstrations, 3-4 hours a week; laboratories as scheduled: 48 hours.

Phy 516. **Physiological Instrumentation and Techniques.** II. 4 hours, summer term.

Lectures and laboratory work in basic electronics covering both vacuum tube and solid state technology. Lectures and conferences, 2-4 hours a week; laboratory 6 hours a week: 48 hours.

Phy 517. **Advanced Cardiovascular Physiology.** 4 hours, term to be arranged.

Emphasis on this course is on the physics of the cardiovascular system. Techniques of measurement and current views on cardiac performance, aortic and local blood flows, hydrostatic pressures, and the micro-circulation. Origin and conduction of heart sounds. Regulatory mechanisms. Conference, 2 hours a week; laboratory, 6 hours a week: 96 hours. Prerequisites: To be determined by instructor.

Phy 518. **Biological Transport Processes.** 4 hours, term to be arranged.

Topics include: Fick's law of diffusion; membrane effects (diffusion of ions through an electrical field, molecular sieving, carrier-mediated diffusion, active transport, osmosis through "leaky" membranes); irreversible thermodynamic treatment of diffusion processes. Pertinent examples from the literature on artificial membranes, frog skin, muscle capillaries, and the renal tubule. Reading from monographs and original literature. Conference, 3 hours a week; laboratory, 6-hour periods on alternate weeks: 72 hours. Prerequisites: To be determined by instructor.

Phy 519. **Advanced Neurophysiology.** 4 hours, term to be arranged.

A study of principles of investigation, observation, and inference and an extensive review in depth of the integrative functions of the central nervous system. Conference, 2 hours a week; laboratory, 6 hours a week: 96 hours. Prerequisites: Phy 410, An 410, Neurology and Organs of Special Senses.

Phy 520. **Digestion and Absorption.** 3 hours, fall term.

Intestinal absorption processes with emphasis on nutrient materials. Modern methods and techniques of investigation, dynamics of intestinal transport, the specialized functions of the gastrointestinal system in the assimilation of dietary nutrients. Prerequisites: Phy 410, BCh 410.

Phy 521. **Respiratory Gas Transport.** 3 hours, term to be arranged.

Dynamics of transport of respiratory gases, with emphasis on graphical analysis of pulmonary and circulatory phases of transport. Ventilation-perfusion relationships, unsteady state, gas stores of the body, and exchange and equilibrium of inert gases. Conference, 2 hours a week; laboratory, 3 hours a week: 60 hours. Prerequisite: Phy 410.

Phy 522. **Fetal and Neonatal Physiology.** 3 hours, spring.

Special physiology of the *in utero* state and of the transition to an independent existence. Placental gas exchange; acid-base homeostasis; fetal and neonatal circulation, anoxia tolerance, thermal homeostasis, and renal functions. Conference, 2 hours a week; laboratory, 3 hours a week: 60 hours. Prerequisites: To be determined by instructor.

CONJOINT COURSES—
BASIC MEDICAL SCIENCE

Con 410. **Cell Organization and Function.** 5 hours, fall and winter.

An integrated course emphasizing aspects of cellular structure, organization, metabolism, and function essential to an understanding of human biology in health and disease. General and special features of cell structure; biochemical and structural properties of membranes; biological transport processes; bioenergetics; mitochondrial metabolism; functions of intracellular membranous organelles; cytoplasmic metabolism of carbohydrates, lipids, amino acids, purines, pyrimidines; nuclear functions—DNA replication and transcription,

protein synthesis, meiosis and mitosis; the life cycle of the cell. Lectures, laboratory and conference: 99 hours.

Con 411. **Medical Genetics.** 2 hours winter.

Chromosomal basis of inheritance, chromosome structure and function, autosomal, X-linked and polygenic inheritance, population genetics, control of gene expression, mutation, genetic polymorphism, inborn errors of metabolism. Lectures, laboratory and conferences: 32 hours.

Con 412. **Developmental Biology.** 2 hours winter.

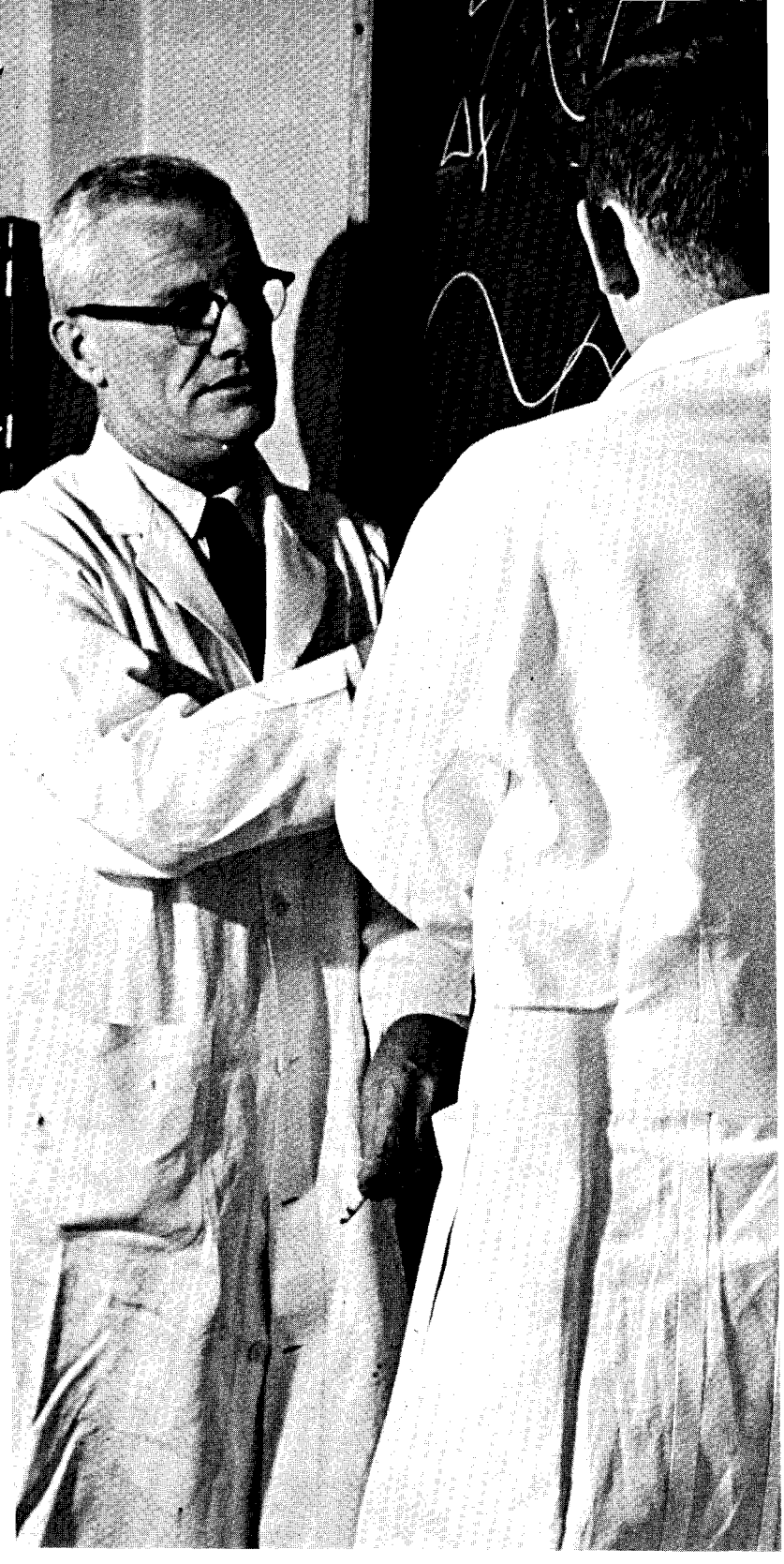
An introduction to current concepts of the processes involved in growth and development. The functional and chemical aspects of these processes are presented within the framework of morphologic development with emphasis on the mammalian organism whenever feasible. Lectures, quizzes and laboratory correlated and continuous with laboratory sessions in Cell Organization and Function and Medical Genetics: 40 hours.

Con 414. **Immunology.** 2 hours spring.

The major goal of this course is to introduce the medical student to the required semantics and terminology of immunological theory and to teach him an immunological approach to current and future medical problems. The student will learn how to investigate immunological events as they apply to human disease syndromes. Lectures, laboratory sessions and teaching seminars: 35 hours.

Con 610. **Systems Pathophysiology.** 42 hours.

A multidisciplinary course designed to correlate basic science with disease processes in man, and to introduce the student to clinical medicine. The material is presented in organ and system blocks; within each block, a series of selected case presentations serves to introduce and to focus attention on specific disease entities. Associated lectures, laboratory exercises, demonstrations, and conferences are designed to integrate and to correlate clinical manifestations of disease with the physiological, biochemical, pathological, pharmacological and microbiological information that is pertinent to the system under study. Faculty members from basic science and clinical departments cooperate in presenting this course: 986 hours.



5

GRADUATE FACULTY

Executive Faculty

Charles N. Holman, Dean of the Medical School; **Joseph J. Adams, Clifford V. Allen, Michael D. Baird, Ralph C. Benson, Norman A. Bergman, J. David Bristow, John M. Brookhart, David D. DeWeese, Charles T. Dotter, Arthur W. Frisch, Jarvis Gould, M. Roberts Grover, Jr., Hance F. Haney, Tyra T. Hutchens, Richard T. Jones, Robert D. Koler, William W. Krippaehne, Walter C. Lobitz, Jr., Joseph D. Matarazzo, Richard D. Moore, Richard W. Olmsted, Harold T. Osterud, William K. Riker, George Saslow, Richard L. Sleeter, Kenneth C. Swan, William A. Zimmerman**

STANDING COMMITTEES OF THE FACULTY

The following standing committees of the Medical School faculty, appointed by the Dean, are pertinent to the Graduate Studies program.

Animal Care—**Roy L. Swank** (Chairman), **William S. Fletcher, Monte A. Greer, M. Ronald Parelius, Bernard Pirofsky, Alfred J. Rampone, Marvin B. Rittenberg, Allan L. Rogers, Ralph D. Tanz**

Computer—**W. A. Zimmerman** (Chairman), **John M. Brookhart, John B. Isom, George I. Johnston, Max Kersbergen, William J. Kimberling, Wilbur McNulty, Victor C. Marquardt, Jr., Walter A. Petersen, George A. Porter, William H. Prentice, David Phillips, Gary Rood, Archie Tunturi**

Curriculum and Schedule—**William W. Krippaehne** (Chairman), **John A. Benson, Jr., Paul H. Blachly, Howard W. Davis, John de Maria, Richard T. Jones, Ernest A. Meyer, Richard D. Moore, Harold T. Osterud, William Riker, Richard L. Sleeter, William E. Snell, John T. Van Bruggen, M. Roberts Grover, Jr.** (ex officio), **Joseph D. Matarazzo** (ad hoc); *Students:* **Francis Kenyon, John Lobitz, Ronald J. Sharp**

Educational Methods—**Tyra Hutchens** (Chairman), **Margaret Berroth, Paul Blachly, Hall Downes, Georgann Chase, M. Roberts Grover, Jr., Richard Herren, Herold Lillywhite, Arthur Seaman**

Graduate Council—**John M. Brookhart** (Chairman), **Robert D. Fitzgerald, David Gunberg, Terence Joys, Howard S. Mason, Richard D. Moore, Mae Rawlinson, Ralph D. Tanz, Joseph J. Adams** (ex officio)

Patent—**William A. Zimmerman** (Chairman), **George I. Johnston, M. Ronald Parelius, Bernard Pirofsky, Benjamin B. Ross, Roy L. Swank, John T. Van Bruggen**

Planning Council—**Joseph J. Adams** (Chairman), **Jean E. Boyle, J. David Bristow, John M. Brookhart, Robert P. Burns, A. J. Clemons, Dallas G. Finnell, Kaye E. Fox, M. Roberts Grover, Jr., Tyra T. Hutchens, William W. Krippaehne, Harold T. Osterud, William H. Prentice, Richard L. Sleeter, Louis G. Terkla**

Research—**Robert D. Koler** (Chairman), **William S. Fletcher, Wallace Iglewski, John W. Kendall, Jr., James Metcalfe, Alfred J. Rampone, Jack A. Vernon, John Doerfler** (ex officio)

Research Instrument Service—**Don C. Wood** (Chairman), **Demetrios A. Rigas, Benjamin B. Ross, John G. Roth**

Emeritus Graduate Faculty

Frank R. Menne, M.D., Professor Emeritus of Pathology.
B.S. (1913), Wisconsin; M.D. (1915), Rush (University of Chicago).

Edward S. West, Ph.D., Professor Emeritus of Biochemistry.
A.B. (1917), Randolph-Macon; M.S. (1920), Kansas State; Ph.D. (1923), Chicago.

*Graduate Faculty**

John P. Aitchison, Ph.D., Assistant Professor of Clinical Pathology (1969).
B.A. (1957), British Columbia; Ph.D. (1969), California.

Robert L. Bacon, Ph.D., Professor of Anatomy; Acting Chairman of Department (1955).
B.S. (1940), Hamilton; Ph.D. (1944), Yale.

Mary E. Baptist, B.A., Assistant Professor of Clinical Pathology (Medical Technology) (1950).
B.A. (1944), Montana State University.

†**Clarissa H. Beatty,** Ph.D., Associate Professor of Biochemistry (Primate Center) (1953).
B.A. (1941), Sarah Lawrence; M.S. (1942), Ph.D. (1945), Columbia.

†**Mary Bell,** A.B., Associate Professor of Experimental Biology (Primate Center) (1964).
A.B. (1958), Brown.

¶**J. Peter Bentley,** Ph.D., Associate Professor of Biochemistry (1964).
B.Sc. (1952), Royal College of Technology (England); M.S. (1961), Ph.D. (1963), Oregon.

Margaret E. Berroth, M.D., Associate Professor of Clinical Pathology; Assistant Director of Educational Programs, Medical Technology (1966).
Abitur (1947), Griefswald Lyceum; M.D. (1954), Heidelberg.

John A. Black, Ph.D., Assistant Professor of Biochemistry (1968).
B.Sc. (1961), Ph.D. (1964), Glasgow.

‡**Rose Mary Bocek,** Ph.D., Assistant Professor of Biochemistry (Primate Center) (1957).
B.S. (1946), Marylhurst; M.S. (1954), Ph.D. (1964), Oregon.

Robert D. Boyd, Ph.D., Professor of Medical Psychology (1964).
B.A. (1938), Linfield; M.A. (1941), Southern California; M.A. (1947), Ph.D. (1953), Michigan.

‡**James L. Bramhall,** M.B., Professor of Clinical Pathology (Veterans Hospital) (1962).
M.B., Ch.B. (1951), Victoria University of Manchester Medical School (England).

†**Robert M. Brenner,** Ph.D., Associate Professor of Experimental Biology (Primate Center) (1964).
A.B. (1950), A.M. (1951), Ph.D. (1955), Boston.

John M. Brookhart, Ph.D., Professor of Physiology; Chairman of Department (1949).
B.S. (1935), M.S. (1936), Ph.D. (1939), Michigan.

Robert E. Brooks, Ph.D., Assistant Professor of Pathology (1960).
B.S. (1948), California; Ph.D. (1967), Oregon.

Robert E. Brummett, Ph.D., Associate Professor of Otolaryngology and Assistant Professor of Pharmacology (1964).
B.S. (1949), M.S. (1960), Oregon State; Ph.D. (1964), Oregon.

F. Robert Brush, Ph.D., Professor of Medical Psychology (1965).
B.A. (1951), Princeton; M.A. (1953), Ph.D. (1956), Harvard.

---

* The year in parentheses following the name of each faculty member indicates the date of original appointment to the faculty.
†Volunteer.
‡ Part-time.
¶ Leave of absence July 1, 1971 to June 30, 1972.

George C. Buchan, M.D., Professor of Pathology; Head, Division of Neuropathology (1965).
M.D. (1958), McGill.

†**Denis R. Burger,** Ph.D., Assistant Professor of Microbiology (Veterans Hospital) (1969).
B.A. (1965), California (Berkeley); M.S. (1968), Ph.D. (1969), Arizona.

Patricia A. Chadwick, B.S., Instructor in Clinical Pathology (Medical Technology) (1966).
B.S. (1950), Massachusetts.

†**C. Keith Claycomb,** Ph.D., Affiliate in Biochemistry (Biochemistry, Dental School) (1971).
B.S. (1954), Wittenberg; Ph.D. (1967), Ohio State.

Reid S. Connell, Jr., Ph.D., Assistant Professor of Anatomy and Neurology (1966).
B.S. (1959), M.S. (1962), Oregon State; Ph.D. (1967), Oregon.

Jan E. Cordell, Lecturer in Pathology (1971).

†**Howard Creamer,** Ph.D., Affiliate in Microbiology (Microbiology, Dental School) (1971).
B.Sc. (1954), Ph.D. 1967), Ohio State.

‡**Norman A. David,** M.D., Professor of Pharmacology (1937).
A.B. (1925), M.D. (1931), California.

Howard W. Davis, Ph.D., Assistant Professor of Anatomy (1966).
B.S. (1956), M.S. (1959), Ph.D. (1969), Oregon.

Peter J. Dawson, M.D., Professor of Pathology (1964).
B.A. (1949), Selwyn (England); M.B., B.Chir. (1952), St. George's; M.A. (1953), Cambridge; D.C.P. (1955), London; M.D. (1960), Cambridge.

Hall Downes, M.D., Ph.D., Assistant Professor of Pharmacology (1969).
B.A. (1955), M.D. (1959), Harvard; Ph.D. (1969), Utah.

J. Job Faber, Ph.D., Associate Professor of Physiology (1966).
M.B. (1960), Amsterdam; Ph.D. (1963), Western Ontario.

†**Wolf H. Fahrenbach,** Ph.D., Associate Professor of Experimental Biology (Primate Center) (1963).
B.A. (1954), California; Ph.D. (1961), University of Washington.

Jack H. Fellman, Ph.D., Professor of Biochemistry (1955).
B.A. (1948), M.A. (1952), Ph.D. (1954), Kansas.

Thelma N. Fisher, Ph.D., Associate Professor of Pathology (1966).
A.B. (1942), Missouri; M.A. (1948), Kansas; Ph.D. (1953), Southern California.

Robert D. Fitzgerald, Ph.D., Professor of Medical Psychology (1962).
B.A. (1958), M.A. (1959), South Dakota; Ph.D. (1962), Indiana.

Kaye E. Fox, Ph.D., Associate Professor of Pharmacology (1964).
B.S. (1954), Michigan; Ph.D. (1964), Stanford.

Arthur W. Frisch, M.D., Ph.D., Professor of Microbiology; Chairman of Department (1946).
B.A. (1931), M.A. (1933), Ph.D. (1935), M.D. (1937), Wisconsin.

†**Thomas E. Frothingham,** M.D., Assistant Clinical Professor of Microbiology and Pediatrics (1969).
M.D. (1951), Harvard.

†Volunteer.
‡ Part-time.

Thomas S. Fujita, M.S., Instructor in Biochemistry and Neurology (Neurochemistry) (1963).
B.S. (1956), Reed, M.S. (1959), University of Washington.

†**Walter L. Gabler,** D.D.S., Ph.D., Affiliate in Biochemistry (Dentistry, Dental School) (1971).
D.D.S. (1956), Ph.D. (1964), Northwestern.

John D. Gabourel, Ph.D., Professor of Pharmacology (1964).
B.S. (1950), California; M.S. (1951), San Francisco; Ph.D. (1957), Rochester.

Ann M. Garner, Ph.D., Professor, Crippled Children's Division; Professor of Medical Psychology (1968).
A.B. (1936), Carleton; A.M. (1938), Radcliffe, Ph.D. (1941), Stanford.

Nancy B. Gerhardt, M.S., Instructor in Microbiology (1966).
B.S. (1950), Oregon State; M.S. (1971), Oregon.

David Gowing, M.D., Assistant Professor of Anesthesiology and Pharmacology (1962).
A.B. (1958), Boston; M.D. (1959), Yale.

Sergio Guerrero, D.D.S., Visiting Assistant Professor of Pharmacology (1970).
D.D.S. (1955), Chile.

David L. Gunberg, Ph.D., Professor of Anatomy (1955).
B.A. (1949), Redlands; M.A. (1952), Ph.D. (1954), California.

James E. Haines, M.D., Associate Professor of Clinical Pathology and Radiation Therapy (Nuclear Medicine) (1966).
B.S. (1950), M.D. (1955), Stanford.

Martha L. Hamilton, M.D., Associate Professor of Clinical Pathology (1957).
B.S. (1945), Texas Wesleyan; M.D. (1952), Texas.

Constance Hanf, Ph.D., Associate Professor of Medical Psychology; Associate Professor, Crippled Children's Division (1963).
B.A. (1938), M.A. (1943, New York University; M.A. (1952), College of City of New York; Ph.D. (1961), Pennsylvania State.

Norman Henderson, Ph.D., Associate Professor of Medical Psychology (1967).
B.A. (1938), Fresno State; M.A. (1948), Occidental; Ph.D. (1953), U.C.L.A.

A. Wesley Horton, Ph.D., Professor of Biochemistry and Environmental Medicine; Acting Head, Environmental Medicine (1962).
B.S. (1940), Wisconsin; M.S. (1947), Ph.D. (1949), Yale.

†**Dale D. Hoskins,** Ph.D., Associate Professor of Biochemistry (Primate Center) (1963).
B.S. (1953), M.S. (1955), Oregon State; Ph.D. (1960), Colorado.

†**Charles F. Howard, Jr.,** Ph.D., Assistant Professor of Biochemistry (Primate Center) (1965).
B.A. (1954), Colorado State College of Education; M.A. (1958), Colorado State; M.S. (1961), Ph.D. (1963), Wisconsin.

Tyra T. Hutchens, M.D., Professor of Clinical Pathology; Chairman of Department (1953).
B.S. (1943), M.D. (1945), Oregon.

Barbara Iglewski, Ph.D., Assistant Professor of Microbiology (1968).
B.S. (1960), Allegheny; M.S. (1962), Ph.D. (1964), Pennsylvania State.

Robert J. Iorio, Ph.D., Assistant Professor of Anatomy (1971).
A.B. (1963), Brown; Ph.D. (1968), S.U.N.Y. (Syracuse).

†Volunteer.

Wallace Iglewski, Ph.D., Assistant Professor of Microbiology (1968).
B.A. (1961), Western Reserve; B.S. (1963), Ph.D. (1965), Pennsylvania State.

Russell H. Jackson, Ph.D., Assistant Professor of Medical Psychology (1968).
B.S. (1963), M.S. (1964), Brigham Young; Ph.D. (1968), Ohio State.

Russell L. Jolley, Jr., Ph.D., Instructor in Biochemistry (1968).
B.S. (1943), Texas A & M; M.S. (1954), Ph.D. (1958), Oregon State.

Richard T. Jones, M.D., Ph.D., Professor of Biochemistry; Chairman of Department (1961).
B.S. (1953), M.S., M.D. (1956), Oregon; Ph.D. (1961), California Institute of Technology.

Terence M. Joys, Ph.D., Associate Professor of Microbiology (1965).
B.Sc. (1957), Leeds (England); Ph.D. (1961), London.

†**Ellis B. Jump,** D.M.D., Ph.D., Professor of Anatomy (Dental School) (1969).
B.A. (1932), Dartmouth; D.M.D. (1936), Harvard; Ph.D. (1944), Chicago.

David Kabat, Ph.D., Assistant Professor of Biochemistry (1969).
Sc.B. (1962), Brown; Ph.D. (1967), California Institute of Technology.

†**George W. Kittinger,** Ph.D., Professor of Biochemistry (Primate Center) (1965).
B.S. (1948), M.S. (1950), Northwestern; Ph.D. (1953), Oregon.

John D. Koontz, B.S., Assistant Professor of Clinical Pathology (1963).
B.S. (1954), Oregon.

Claire Langston, M.D., Instructor in Pathology (1971).
B.A. (1963), Oberlin; M.D. (1967), Jefferson.

James E. Lindemann, Ph.D., Associate Professor of Medical Psychology (1963).
B.S. (1950), M.S. (1951), Ph.D. (1954), Pennsylvania State.

David Linder, M.D., Associate Professor of Pathology (1970).
M.D. (1951), Rochester.

Michael Litt, Ph.D., Professor of Biochemistry and Medical Genetics (1967).
B.A. (1954), Oberlin; Ph.D. (1958), Harvard.

Elton L. McCawley, Ph.D., Professor of Pharmacology (1949).
A.B. (1938), M.S. (1939), Ph.D. (1942), California.

†**Wilbur P. McNulty,** M.D., Associate Professor of Pathology (Primate Center) (1964).
B.S. (1947), Michigan; M.D. (1952), Yale.

†**Arthur Malley,** Ph.D., Associate Professor of Microbiology (Primate Center) (1964).
B.A. (1953), B.S. (1957), San Francisco State; Ph.D. (1961), Oregon State.

Victor C. Marquardt, Jr., M.D., Associate Professor of Clinical Pathology (1964).
B.A. (1953), Wesleyan; M.D. (1957), Nebraska.

Howard S. Mason, Ph.D., Professor of Biochemistry (1952).
B.S. (1935), M.S. (1936), Ph.D. (1939), Massachusetts Institute of Technology.

Joseph D. Matarazzo, Ph.D., Professor of Medical Psychology; Chairman of Department (1957).
B.A. (1946), Brown; M.S. (1950), Ph.D. (1952), Northwestern.

†Volunteer.

Ruth G. Matarazzo, Ph.D., Professor of Medical Psychology (1957).
B.A. (1948), Brown; M.S. (1952), Ph.D. (1955), Washington University.

Ernest A. Meyer, ScD., Associate Professor of Microbiology (1958).
A.B. (1949), California; M.S. (1953), Purdue; Sc.D. (1958), Johns Hopkins.

‡**William Montagna,** Ph.D., D.Sc., Professor of Experimental Biology; Head of Division (Director, Oregon Regional Primate Center) (1963).
B.A. (1936), Ph.D. (1944), Cornell; D.Sc. (1960), Bethany.

Richard D. Moore, M.D., Professor of Pathology; Chairman of Department (1969).
M.D. (1947), Western Reserve.

Nelson R. Niles, M.D., Professor of Pathology (1952).
M.D. (1947), Cornell.

James H. O'Brien, Ph.D., Associate Professor of Medical Psychology (1968).
B.A. (1959), M.A. (1963), Ph.D. (1967), Michigan.

Evelyn L. Oginsky, Ph.D., Professor of Microbiology (1957).
B.A. (1938), Cornell; M.S. (1939), Chicago; Ph.D. (1946), Maryland.

George D. Olsen, M.D., Assistant Professor of Pharmacology (1970).
A.B. (1962), B.M.S. (1964), Dartmouth; M.D. (1966), Harvard.

†**James L. Palotay,** D.V.M., Associate Professor of Pathology (Primate Center (1968).
D.V.M. (1950), Kansas State; M.S. (1958), Colorado State.

‡**Richard Parker,** Ph.D., Affiliate in Microbiology (Oral Biology and Microbiology, Dental School) (1969).
B.S. (1950), M.S. (1952), Ph.D. (1956), Oregon State.

Rose Marie Parker, A.R.T., Instructor in Clinical Pathology (Medical Technology) (1967).

Anthony A. Pearson, Ph.D., Professor of Anatomy (1946).
(1946).
B.S. (1928), Furman; M.A. (1930), Ph.D. (1933), Michigan.

Walter A. Petersen, M.S., Assistant Professor of Physiology; Director of Computer Center (1968).
B.S. (1957), California Institute of Technology; M.S. (1965), Oregon State; M.S. (1968), Portland State.

David S. Phillips, Ph.D., Associate Professor of Medical Psychology (1963).
A.B. (1958), Wabash; M.S. (1960), Ph.D. (1962), Purdue.

‡**Charles H. Phoenix,** Ph.D., Professor of Medical Psychology (Primate Center) (1965).
B.A. (1945), Connecticut; M.A. (1950), Ph.D. (1954), Boston.

†**Oscar W. Portman,** M.D., Professor of Biochemistry (Primate Center) (1965).
B.S. (1945), U.S. Military Academy; M.D. (1954) Harvard.

†**Robert Quinton-Cox,** Ph.D., Associate Professor of Anatomy (Dental School) (1968).
Int. B.S. (1956), Woolwich Poly (London); Ph.D. (1963), Emory.

Alfred J. Rampone, Ph.D., Professor of Physiology (1955).
B.A. (1947), M.A. (1950), British Columbia; Ph.D. (1954), Northwestern.

†Volunteer.
‡ Part-time.

Abdel L. Rashad, M.D., Ph.D., Associate Professor of Clinical Pathology (1969).
M.D. (1959), Cairo; M.S., Ph.D. (1960), University of Washington.

‡**John Allen Resko,** Ph.D., Assistant Professor of Physiology (Primate Center) (1965).
B.A. (1955), St. Charles Seminary; M.S. (1960), Marquette; Ph.D. (1963), Illinois.

Demetrios A. Rigas, Ph.D., Professor of Biochemistry and Medical Genetics (1953).
Ch.E. (1941), Ph.D. (1943), National University of Engineering Science (Greece).

William K. Riker, M.D., Professor of Pharmacology; Chairman of Department (1969).
B.A. (1949), Columbia; M.D. (1953), Cornell.

Marvin B. Rittenberg, Ph.D., Associate Professor of Microbiology and Medicine (1966).
B.A. (1954), M.A. (1959), Ph.D. (1961), California.

Benjamin B. Ross, Ph.D., Professor of Physiology (1954).
B.S. (1949), Union; Ph.D. (1954), Rochester.

R. Bradley Sack, M.D., Sc.D., Associate Professor of Medicine and Microbiology; Head, Division of Infectious Diseases (1970).
B.S. (1956), Lewis and Clark; M.S., M.D. (1960), Oregon; Sc.D. (1968), Johns Hopkins.

Geoffrey V. F. Seaman, Ph.D., Associate Professor of Biochemistry and Neurology (Neurochemistry) (1966).
B.Sc. (1955), Royal College of Science, London; Ph.D. (1959), Cambridge.

Benjamin V. Siegel, Ph.D., Professor of Pathology (1961).
B.S. (1934), Georgia; M.A. (1937), Columbia; Ph.D. (1950), Stanford.

Kirtikant V. Sheth, M.B.B.S., Assistant Professor of Clinical Pathology (1970).
M.B.B.S. (1964), Seth G. S. Medical School (India).

Vinton D. Sneeden, M.D., Professor of Pathology (1939).
B.A. (1932), Linfield; M.D. (1936), Oregon.

William A. Stotler, Ph.D., Professor of Anatomy (1946).
A.B. (1935), Westminster; M.S. (1937), St. Louis; Ph.D. (1942), Cornell.

J. Robert Swanson, Ph.D., Assistant Professor of Clinical Pathology (1969).
B.S. (1961), Colorado State; Ph.D. (1965), Washington State.

Robert E. Swanson,Ph.D., Associate Professor of Physiology (1961).
B.A. (1949), Ph.D. (1953), Minnesota.

Ralph D. Tanz, Ph.D., Associate Professor of Pharmacology (1969).
B.A. (1948), Rochester; Ph.D. (1958), Colorado.

Leif G. Terdal, Ph.D., Associate Professor of Medical Psychology; Associate Professor, Crippled Children's Division (1965).
B.A. (1959), Taylor; M.A. (1961), Ph.D. (1965), Michigan State.

Marian S. Thomas, B.S., Instructor in Clinical Pathology (Medical Technology) (1969).
B.S. (1965), Southern Oregon; M.A. (A.S.C.P.) (1965).

Wilbert R. Todd, Ph.D., Professor of Biochemistry (1936).
B.S. (1925), Ph.D. (1933), Wisconsin.

‡ Part-time.

Joseph B. Trainer, M.D., Associate Professor of Physiology and Professor of Medicine (1949).
B.S. (1939), M.S. (1941), University of Washington; M.D. (1946), Oregon.

Archie R. Tunturi, M.D., Ph.D., Associate Professor of Anatomy (1945).
B.A. (1939), Reed; M.S. (1943), Ph.D. (1944), Oregon.

John T. Van Bruggen, Ph.D., Professor of Biochemistry (1947).
B.A. (1937), Linfield; M.A. (1939), Oregon; Ph.D. (1944), St. Louis.

***Lyle Veazie,** Ph.D., Professor of Microbiology (Parasitology) (1942).
B.A. (1928), M.A. (1930), Ph.D. (1947), Oregon.

Jack A. Vernon, Ph.D., Professor of Otolaryngology and Medical Psychology (1966).
A.B. (1948), M.A. (1950), Ph.D. (1952), Virginia.

Herbert A. Wendel, M.D., Associate Professor of Pharmacology (1969).
Physikum (1935), Heidelberg; Med. Nat'l Exam (1939), Berlin.

Arthur N. Wiens, Ph.D., Professor of Medical Psychology (1958).
B.A. (1948), M.A. (1952), Kansas; Ph.D. (1956), Portland.

James A. Wilkinson, B.S., Instructor in Clinical Pathology (Medical Technology) (1966).
B.S. (1963), Oregon.

* Leave of absence.

Oregon State System of Higher Education

Roy E. Lieuallen, Ed. D., L.H.D., Chancellor

Robert D. Clark, Ph.D.
President, University of Oregon

Robert W. MacVicar, Ph.D.
President, Oregon State University

Leonard W. Rice, Ph.D.
President, Oregon College of Education

Charles N. Holman, M.D.
Dean, University of Oregon Medical School

Averno M. Rempel, Ph.D.
President, Eastern Oregon College

Louis G. Terkla, D.M.D.
Dean, University of Oregon Dental School

James K. Sours, Ph.D.
President, Southern Oregon College

Gregory B. Wolfe, Ph.D.
President, Portland State University

Winston D. Purvine, A.B., LL.D.
President, Oregon Technical Institute

Miles C. Romney, Ph.D. ..... Vice Chancellor for Academic Affairs

Freeman Holmer, M.A. ..... Vice Chancellor for Administration

J. I. Hunderup, M.B.A., C.P.A. ..... Vice Chancellor for Facilities Planning

Donald R. Larson, B.A. ..... Assistant Chancellor; Director of Public Services

Richard L. Collins, M.A., C.P.A. ..... Secretary, Board of Higher Education

Keith Jackson, M.S. ..... Budget Director

FORMER CHANCELLORS
OREGON STATE SYSTEM OF HIGHER EDUCATION

William J. Kerr, D.Sc., LL.D. 1932-1935

Frederick M. Hunter, Ed.D., LL.D. 1935-1946

Paul C. Packer, Ph.D., LL.D. 1946-1950

Charles D. Byrne, Ed.D. 1950-1955

John R. Richards, Ph.D. 1955-1961

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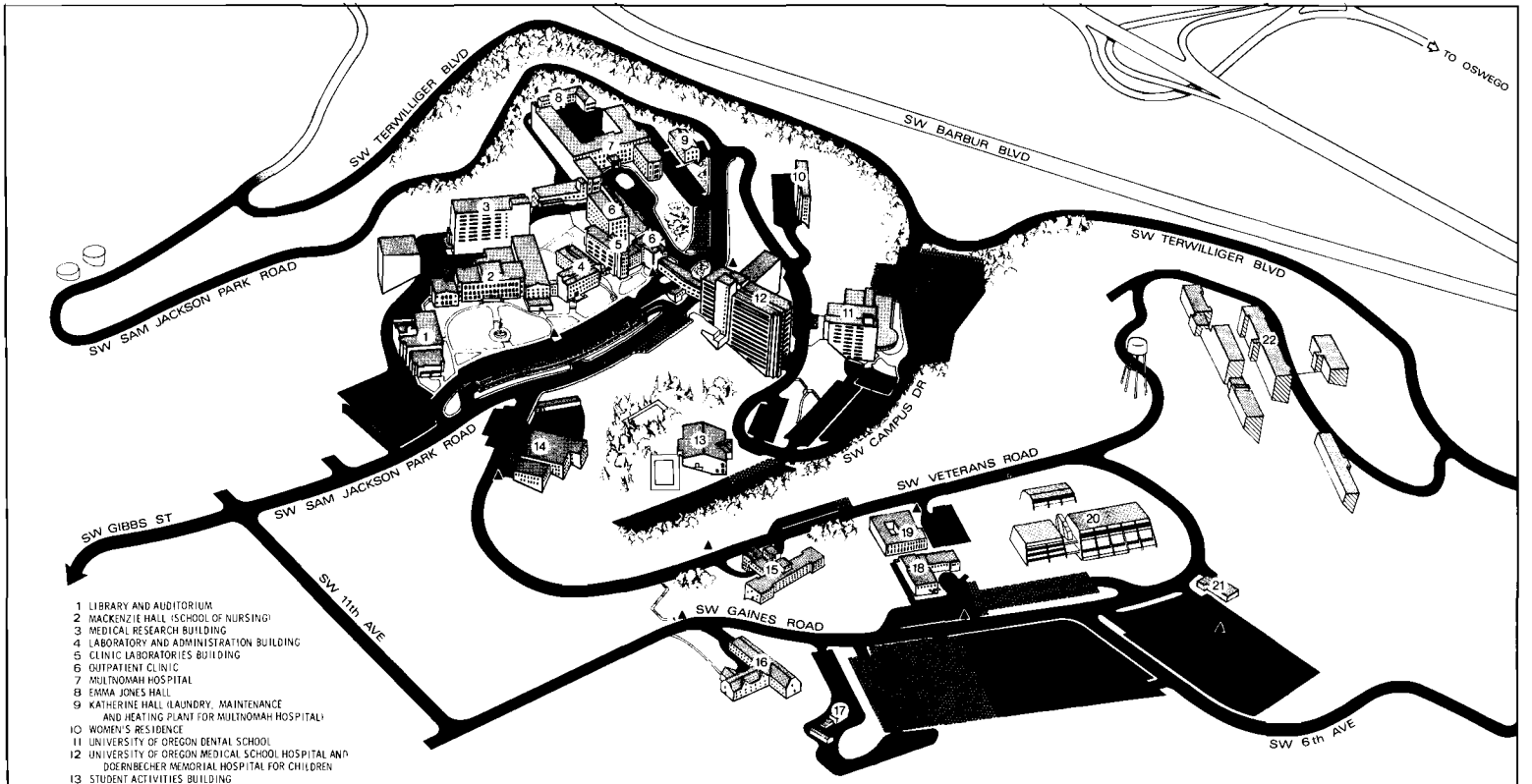

University of Oregon Medical School

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