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# THE UNIVERSITY OF MISSOURI BULLETIN

VOLUME 18 NUMBER 18

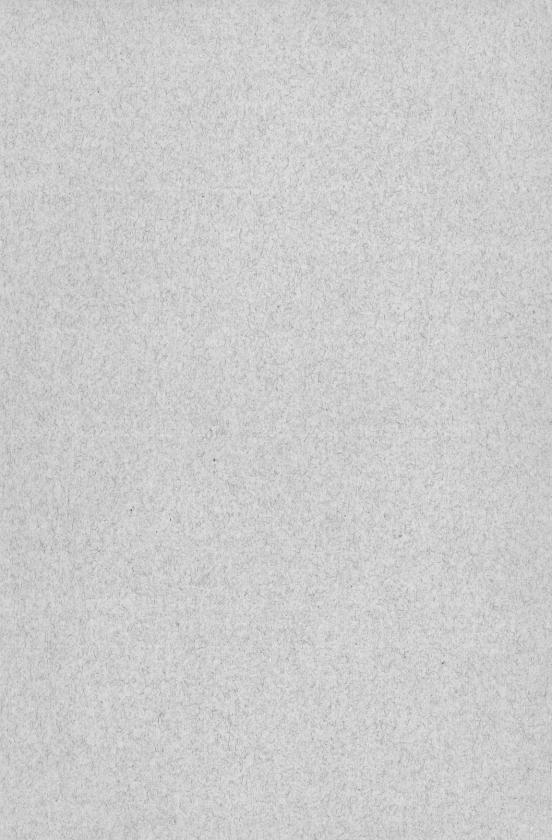
# GENERAL SERIES

1917, NO. 11

# SCHOOL OF MEDICINE

ANNOUNCEMENT 1917-1918





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VOLUME 18 NUMBER 18

# GENERAL SERIES

1917, NO. II

# SCHOOL OF MEDICINE

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# UNIVERSITY CALENDAR

## Session at Columbia

## Summer Session

Summer Session
1917
June 7Thursday, registration.
June 8 Friday, organization of classes.
June 9 Saturday, regular class work begins.
August 3Friday, examinations.
First Semester
September 13, 14, and 15 Thursday, Friday and Saturday, entrance examinations.
September 17, 18, and 19 Monday, Tuesday and Wednesday, registration.
September 19 Wednesday, 11, A. M., opening convocation.
September 20Thursday, 8 A. M., class work in all divisions begins.
October 31
December 21 Friday ter course in agriculture.
November 29 Thursday, Thanksgiving Day, holiday.
December 21 Friday, 4 P. M.
1918 to Christmas holidays.
January 3 Thursday, 8 A. M.
January 2
March 1 friday ter course in agriculture.
January 19 Saturday
to Midyear examinations.
January 26 Saturday
Second Semester
January 28 and 29 Monday and Tuesday, registration.
January 29 Tuesday, 11 A. M., opening convocation.
January 30 Wednesday, 8 A. M., class work in all divi-
sions begins.
February 22Friday, Washington's Birthday, holiday.
March 27 Wednesday, 4 P. M. to Easter holidays.
April 2 Tuesday, 8 A. M.
May 25 Saturday to Final examinations.
June 1 Saturday
June 2 Sunday, Baccalaureate address.
June 5 Wednesday, Commencement Day.

# THE PROFESSION OF MEDICINE

The following pages will be devoted to a brief consideration of certain questions of interest to all who expect to follow the profession of medicine. It is important that all prospective medical students should know the present status of medicine, its advantages and disadvantages as a profession, the opportunities which it offers and the qualifications necessary for success. It is especially important that the general principles underlying sound medical education be clearly understood and that data be made available which will enable those interested to judge of the relative merits of the numerous medical schools in this country.

# ADVANTAGES AND DISADVANTAGES OF MEDICINE AS A PROFESSION

Some of the more obvious disadvantages of medicine as a profession may first be mentioned. Among these are the irregularity of the work, the exposure and danger, the severity of physical and mental strain, and the relatively poor remuneration in comparison with the necessary skill and education. It should be clearly understood that competition is severe, for the medical profession (like most others) is overcrowded. Moreover, with the increase of popular knowledge regarding hygiene and preventive medicine, the need for medical service is in some respects diminishing.

As an offset to the foregoing, however, the medical profession has numerous advantages to offer to those properly qualified. In the first place, for those who achieve eminence by reason of unusual ability and thoro training, the financial rewards are great. Every really well qualified practitioner is reasonably sure of a good income.

Money, however, is by no means the chief attraction which the profession of medicine has to offer. There is a fascination about the work which is difficult to explain, but which is nevertheless characteristic. Successful practitioners enjoy their work, in spite of hardships and difficulties. Moreover, even in this materialistic age, the philanthropic aspect of the practice of medicine appeals strongly to many. From this point of view, no profession offers greater opportunity for public and private service.

Another phase of medical work, which to many is more attractive than the ordinary practice, is that of teaching and investigation in the various medical sciences. There is at present a strong demand, which is likely to continue, for well-trained men who will devote them-

selves to anatomy, physiology, pathology, and other branches of medical science. While not so remunerative as the practice of medicine, positions in these and similar branches offer good salaries and an attractive career to those whose tastes and talents incline toward teaching and research.

Finally, so far as competition is concerned, there is no question that the medical profession is overcrowded, but it is overcrowded with incompetents. It is true that our leading physicians rank among the best in the world. But on the other hand, owing to the low standards of medical education which have prevailed during the past, it must be confessed that the rank and file of medical practitioners average very low in efficiency. Nowhere is it more emphatically true that "there's plenty of room at the top." No man of reasonable ability with thoro collegiate and professional training need fear the competition. And as the general public is learning to discriminate more carefully, the demand for well qualified physicians grows stronger. It is therefore exceedingly important for the prospective medical student to consider carefully the qualifications necessary for success in this profession, in order that he may prepare himself accordingly.

#### PREMEDICAL EDUCATION

For success in any applied science, two things are necessary: first, to master the science; and second, to learn how to apply it. To master the difficult science of modern medicine, it is absolutely necessary to have a thoro preliminary scientific training.

The amount and character of the necessary preliminary training for medicine is a theme which has been much discussed in recent years. While there are still different views concerning details, there is with reference to the essentials points a general consensus of opinion among those entitled to speak with authority in this matter. The first point which should be emphasized is that a high-school education alone is insufficient, especially in science, to prepare a student for the difficult medical curriculum of today. The necessity for collegiate work preliminary to medicine is so important and so clearly recognized that it is now required by law in many states.

In these states, in order to be admitted to examination for license to practice, one must show that he took at least one or two years of collegiate work, in addition to the equivalent of a four years' high school course, before entering a medical school. Before the time when those now entering medicine will be graduated, this legal requirement will doubtless be established in many other states. Students should therefore beware of entering medicine without preliminary collegiate work.

While it is generally recognized that at least one or two years of preliminary collegiate work are necessary, few will urge, as a general requirement, the completion of four years of college work before entering medicine. Indeed it is probable that as a general rule this is

an unnecessary expense of time and money, and postpones unduly the age at which practice begins.

Taking all things into consideration, it is the consensus of opinion that the requirement of two years of collegiate work for entrance best meets present conditions. This, it may be noted, is approximately equivalent to the entrance requirement for medicine in the leading European nations. An admirable solution of the problem of preliminary medical education is found in the "combined curriculum" in arts and medicine, whereby it is possible to secure the A. B. degree and also the M. D. within six years.

As to the character of the collegiate work preparatory to medicine, there is now a general agreement of opinion. The old idea that there exists an ideal collegiate course, classical or otherwise, which prepares for any vocation is now abandoned. The present elective system makes it desirable for one to decide upon his future career as early as possible, and to plan his college course so as to prepare himself for the greatest possible efficiency in his life work.

What subjects, then, should the premedical college course include? First and foremost, it should be so planned as to give a thoro training in biology, especially zoology. Most of the accurate and useful knowlege we have concerning the laws of life is derived from careful study and experimentation upon lower forms of life.

In order to understand the nature and conditions of life, it is therefore further evident that one must have a thoro knowledge of physics and chemistry. As time goes on, biology in general and medicine in particular are based more and more upon the fundamental laws of physics and chemistry. Having laid a good foundation in physics, chemistry, and zoology, the student is prepared for the more specialized biological sciences, anatomy, physiology, and pathology; and these in turn lead up to the technical courses in clinical medicine.

Other sciences valuable for the medical student are botany and experimental psychology. Of mathematics, enough should be taken to facilitate the work in physics and chemistry. In languages, excepting an elementary knowledge of Latin (usually taken in the high school), French and German are most valuable. This is especially true of German, since much of the most important biological and medical work is published in that language.

The advantages of a premedical scientific college course as outlined above are well summarized by the following quotation (from the Journal of the American Medical Association, May 27, 1911): "As a part of the education which should be preliminary to the study of medicine, courses in physics, chemistry, biology, and modern languages have been especially urged during the last several years by the Council on Medical Education. The importance of the sciences named does not depend so much on the bare knowledge obtained from them as on training the student receives. In the work in these sci-

ences, and particularly in the laboratory work, the student, under able instructors, acquires the ability to think for himself; he develops the scientific spirit; he learns the use of the microscope and become acquainted with the methods and value of experimentation. A reading knowledge of French and German is an invaluable aid to the medical knowledge, a large portion of which appears in the lan-That is the minimum preliminary education which guages named. should be insisted upon in this country, not because it is the minimum requirement in every other civilized nation, which is a fact, but because the student really needs that training in order to master the complex courses in the modern medical curriculum and to do his part in solving the intricate problems which now confront the medical world. In the medical course of today the ability of the student to think, to observe and to do research work is very essential. Experience has shown that the needed qualifications are best developed by thoro courses, under expert teachers, in physics, chemistry, biology, and modern languages. These are the reasons for urging those courses as a part of the minimum requirement for admission to the medical schools in this country."

#### MEDICAL EDUCATION

Presupposing the preliminary college training as above outlined, the medical education proper may next be considered. What are the subjects included in the medical curriculum, and what facilities are necessary in order that they may be successfully taught? As previously stated, medicine is an applied science. Broadly speaking, therefore, it is necessary first to master the subject matter, the fundamental medical sciences, and then to learn how to apply these in clinical medicine, in the prevention and cure of disease. Medical education therefore falls naturally into two subdivisions, the fundamental work occupying the first two years, and the clinical work the last two (or three, if a hospital year be added). Each of these periods will be considered briefly, following which some data will be cited whereby the relative merits of the various medical schools may be judged.

Fundamental Medical Education: The fundamental sciences upon which medicine is directly based may be grouped under three headings. The first of these, the anatomical group, includes those which concern primarily the normal form and structure of the human body. These include gross anatomy (dissection, osteology, neurology, topographic anatomy, etc.), microscopic anatomy (histology) and devolopmental anatomy (embryology). The second, or physiological group, includes those studies which concern primarily the normal functions of the living organism. In this group, in addition to physiology in the narrower sense, we may place organic and physiological chemistry, and also pharmacology, which deals with the effects of drugs upon the normal organism. The third group, known as pathology (includ-

ing bacteriology) deals with the abnormal conditions of construction and function which are associated with disease. Finally, there is the subject of hygiene and preventive medicine, which lies in the borderland between the fundamental sciences previously mentioned, and the succeeding subjects in clinical medicine.

It is impossible within the limits of this bulletin to discuss in detail the requisites for thoro instruction in the fundamental sciences. Those desiring to look into this matter more fully are referred to a work entitled A Model Medical Curriculum, a report of a committee of one hundred leading educators, issued by the Council on Medical Education of the American Medical Association, 535 Dearborn Ave., Chicago, III.

It may be noted briefly that the old-fashioned didactic method of teaching by lectures and recitations from books has been completely revolutionized and replaced by the laboratory method, whereby the student directly observes and studies the phenomena for himself. The laboratory method of instruction requires for success two essential factors. First and most important, the teachers in the various laboratory subjects must be thoroly trained specialists, who are paid salaries to devote their entire time to this work, and are not allowed to practice They should moreover be active investigators whose enthusiam will be an inspiration to their students. The second factor includes the facilities, buildings, equipment, and materials for thoro work in each of the laboratories for the various fundamental medical These two factors, the full-time, thoroly trained teachers and the numerous well-equipped laboratories are so costly as to be out of the reach of most medical schools, but they are necessary in order to obtain the thoro laboratory instruction which is essential in modern medical education.

Another necessity, the importance of which is becoming more clearly recognized, is a good medical library. This should include several thousand well chosen volumes for reference, including files of one hundred or more of the leading medical periodicals of the world. A good medical library is also very expensive, but is necessary for the best work in instruction, and absolutely essential for research.

#### CRITERIA FOR JUDGING SCHOOLS

Having in mind the essential elements involved in a thoro premedical and medical education, it devolves upon the prospective student to select the school which he will attend. This is a critical problem, and grave mistakes are often made thru lack of knowledge regarding the various schools. With regard to the premedical college work, the problem is less difficult, but it is essential to choose a college well equipped for teaching the fundamental sciences of biology, physics, and chemistry. In general, these are best taught in the stronger universities, such as those in the Association of American Universities.\*

In choosing a school for the medical curriculum proper, the problem is much more complicated. Bearing in mind the essential principles previously outlined, the most important information desirable is indicated in the following questions:

- 1. As to organization, is it an independent medical school, or an integral (not merely nominal) department of a strong university?
- 2. What is the amount of the income and expenditure? Is the income dependent solely upon students' fees, or is it supported liberally by endowment or state appropriations?
- 3. What is the extent and character of the laboratory and clinical facilities, its buildings, equipment, library?
- 4. What is the character of the faculty? Are the teachers fultime salaried experts, or are they allowed to engage in the private practice of medicine? To what extent are they contributing to the advancement of medical science by original research?
- 5. Do the entrance requirements include a minimum of two years of college work, and are they strictly enforced?
- 6. What is the character of the curriculum, stress laid upon practical work in laboratory and clinics, opportunity for research, etc.?
- 7. Are the classes large, or are they small, allowing individual attention to each student?
  - 8. What are the tuition fees and expenses?
- 9. What is the general standing of the school, its rating by competent and disinterested organizations, and its efficiency as measured by the results of the examination of its graduates before the various state licensing boards?

#### WHERE TO FIND INFORMATION

Where can the prospective student find reliable data in answer to the preceding questions? Much can of course be learned from the catalogs of the various schools, but in many cases it must be confessed that the information contained therein is incomplete, and even misleading. It may therefore be of service to those interested in this matter to know where to find reliable data from disinterested sources.

In the first place, a list of the medical schools of the United States together with brief information (furnished, however, by the schools themselves) is published in the chapter on "Professional Schools" in the annual report of the Commissioner of Education, U. S. Bureau of Education, Department of the Interior, Washington, D. C. A reprint of this chapter is obtainable and is useful for reference.

<sup>\*</sup>This association includes the following universities: California, Catholic University of America, Chicago, Clark, Columbia, Corñell, Harvard, Illinois, Indiana, Iowa, Johns Hopkins, Kansas, Leland Stanford, Jr., Michigan, Minnesota, Missouri, Nebraska, Pennsylvania, Princeton, Virginia, Wisconsin, and Yale.

Similar information, which is more complete in some respects, is published each year during August in the "Educational Number" of the Journal of the American Medical Association (Chicago).

The Council on Medical Education of the A. M. A. has made a thoro personal inspection and investigation of the various medical schools of the country, and has rated them in three classes: Class "A" colleges are those which are acceptable (67 colleges); class "B," those which need improvement in certain respects, but which are otherwise acceptable (15 colleges); and class "C," those which require a complete reorganization to make them acceptable (12 colleges).

Another basis for judgment is to be found in the membership of the Association of American Medical Colleges, with about 50 schools, including nearly all of the better class. A list of the members is published annually in the Educational Number of the Journal A. M. A. above referred to, or may be obtained from the Secretary, Dr. F. C. Zapffe, 3431 Lexington St., Chicago, Ill.

# THE SCHOOL OF MEDICINE

In the foregoing pages the profession of medicine has been considered with especial reference to the principles underlying sound medical education, and the facilities necessary according to modern standards. Attention is now called to the School of Medicine of the University of Missouri, and to the advantages which it offers in providing facilities for obtaining at low cost both premedical and medical education measuring up to the high standards previously outlined.

Aim of the School of Medicine: The aim of the School of Medicine is threefold:

- (1) To give a thoro laboratory training in those scientific subjects which are fundamental to medicine and form an indispensable preparation for the clinical work.
- (2) To contribute to the advancement of medicine by original investigation in the various sciences upon which modern medicine is based.
- (3) To promote the diffusion of medical knowledge among the citizens of the state.

#### HISTORICAL STATEMENT

The Medical Department of Kemper College ("McDowell Medical College"), founded in St. Louis in 1840, was the first medical school established west of the Mississippi River. In 1845 this school became the Medical Department of the University of Missouri. In 1855, however, it was discontinued, but was re-established in Columbia in December, 1872. The curriculum was at first only two years in length, but was extended to three years in 1891, and to the full four years in 1899.

Owing to the limited clinical facilities available at present, the last two (clinical) years of the medical curriculum have been temporarily suspended. A plan for the establishment of a general state hospital has been adopted by the University, and the clinical portion of the work will be resumed as soon as it is practicable to establish it with adequate clinical facilities. In the meantime, the first two years of the medical curriculum will be continued at Columbia and still further strengthened.

The School of Medicine has always stood for the highest standards of medical education, and was a pioneer in introducing and reveloping the laboratory method. Laboratory work in anatomy, chemistry, and microscopy was required of students from the date of reestablishment in 1872. A few years later laboratory work in pathology and in physiology was added, and in 1891 the laboratories of histology and bacteriology were established. The School of Medicine of

the University of Missouri was also one of the first schools to place these fundamental medical sciences in charge of specialists who are not allowed to practice medicine, but devote their time exclusively to teaching and investigation.

Organization and Support: As has been previously emphasized, the nature of the organization and support of a medical school is a matter of primary importance. The medical school of the University of Missouri is an integral part of the University, whose total income from all sources is about \$1,125,000 a year. The medical school is supported from this income, about \$50,000 being expended annually for this purpose (including hospital), while less than \$3000 is collected in fees from the medical students.

As a result of this liberal support, it has been possible for many years to organize and maintain the medical work on a proper University basis. The course of study is carefully planned, modern laboratory methods being used thruout. The high standards of admission result in small classes (not more than twenty-five in each) prepared for the highest type of work. Women are admitted on equal terms with men.

#### HIGH STANDING OF THE SCHOOL OF MEDICINE

The School of Medicine of the University is rated in the highest class by the Council on Medical Education of the American Medical Association. It is also a member or the Association of American Medical Colleges. In the report of the Carnegie Foundation published in 1910, the facilities of the School of Medicine of the University of Missouri are summarized (p. 251) as follows: "The medical department occupies a new and well equipped building, excellently adapted to its purposes. The teaching is in charge of full-time instructors of modern training and ideas. A university hospital of forty-five beds gives the department the advantage of clinical material and connection, even tho the actual instruction is limited to the work of the first two years, a feature of great importance. There is a library supplied with important current periodicals, domestic and foreign."

Low Cost of Medical Education: Another advantage is the unusually low cost at which premedical and medical education of the highest type may here be obtained. In order to show what it actually costs, statistics have been collected from both predemical and medical students of the University of Missouri, showing the total expenses for the school year. The approximate average cost per student is indicated for each item.

Tuition at the University of Missouri is free to residents of the state, but a library, hospital and incidental fee of \$12 a semester is

charged.	Nonresident	students	must	also	pay	a	tuition	fee	$\mathbf{of}$	\$10	a
semester.											

Average cost for	Premedical (1st and 2d yrs. of combined course)	Medical (3rd and 4th yrs. of combined course)		
Board	\$112	\$112		
Room	48	48		
Library, hospital and incidental fees	24	24		
Laboratory fees	30	40		
Books and stationery	20	30		
Clothing	50	50		
Incidentals	65	75		
Average total	\$349	\$379		

From the above table it is evident that the average total cost for the school year is about \$349 in the premedical, and \$379 in the medical years. The average is, of course, considerably higher than necessary, due to those who are able to afford many luxuries. The minimum figures show that by economy the cost may easily be reduced \$100 below the total average given above. Thus the total cost for the four years is less than for two years of medicine alone in many of the prominent schools.

Opportunity of Self-Support: In the case of students working their way thru (about half of the class) the net cost is even reduced considerably lower. It is therefore evident that by earning at least \$100 more during the summer vacation it is possible for the average student to pay his entire way thru the premedical and medical years. This is actually accomplished by a considerable number of students. Students who desire work should apply to the Employment Bureau, Y. M. C. A., University of Missouri. As a rule, every student should have at least \$100 ahead at the start, and those who come before school opens have the best chance for employment. Board and room may be obtained in the University dormitories and The Commons for about \$3.25 a week, but applications for rooms must be filed early, as the space is limited.

Rollins Scholarship: The Rollins Scholarship in the School of Medicine is a prize of \$50 which is awarded by vote of the medical faculty to that member of the first year class (third year of combined curriculum) who has made the best record during the course.

Register of Students: At commencement in June, 1917, the Medical Certificate was awarded to seventeen students. During the session 1916-17 there were enrolled 47 in the first year class, 32 in the second

year class, a total of 79. The names of these students are published in the general catalog of the University.

#### BUILDINGS AND EQUIPMENT

Next to the faculty, among the factors which determine the efficiency, come the buildings and material equipment. The School of Medicine is located upon the same campus with other divisions of the University. Of the various buildings on the campus, a group of three—the Medical Laboratory Building, the Parker Memorial Hospital and the animal house—are devoted primarily to the School of Medicine. These will be described in some detail. Several other buildings are also utilized in part for medical instruction.

Medical Laboratory Building: The Medical Laboratory Building is a stone and brick building, 48 x 150 feet, three stories high. It was especially designed for the medical laboratories, and is well equipped to meet the needs of modern laboratory instruction and research. The following is a brief list of the various roms and equipment in this building.

The department of anatomy and histology occupies a large dissecting room, well lighted and ventilated, with dissecting tables, students' lockers, display cases for specimens, models; an advanced anatomical laboratory, especially equipped for the study of topographic anatomy, including serial sections thru formalin hardened bodies; histological laboratory, with preparation and store-room in connection, thoroly equipped with lockers, tables, microscopes, microtomes, and other apparatus for instruction and research in microscopic work; lecture room for anatomy and histology, equipped with Auzoux manikin, projection apparatus, charts; museum and study room; with adjacent preparation room, containing a large number of models and specimens in human anatomy; research laboratory; embalming and storage rooms, with an abundance of well preserved cadavers for the work in dissection.

The department of physiology, physiological chemistry, and pharmacology occupies the following rooms: a large laboratory with adjoining store-room, equipped with tables, lockers, and sets of apparatus for the students in physiology and pharmacology; a blood-pressure room, particularly for mammalian experiments; a research laboratory, thoroly equipped, for advanced students in physiology and pharmacology; research laboratory in physiological chemistry; large students' laboratory with adjacent store-room, thoroly equipped for work in physiological chemistry; animal room; mechanic's shop; lecture room (in common with pathology).

The departments of pathology and bacteriology, occupy a large students' laboratory for bacteriology and pathological histology, well equipped with lockers, microscopes with oil immersion lenses; a preparation room for bacteriology, with sterilizers, incubators; private laboratory, well equipped for research work in pathology; room for autopsies and work in gross pathology, including a collection of pathological specimens in glass cases; an animal room and storeroom; office and research laboratory for bacteriology; lecture room (in common with physiology); laboratory room for work of preventive medicine.

Medical Library: No medical school of today can be considered well equipped without a good library. The medical library is placed in a room on the opper floor of the Medical Laboratory Building, and is open eight hours daily, except Sunday. It contains 5,752 bound volumes, and a large number of pamphlets. The principal medical works of reference are included and 100 leading medical periodicals of the world are received regularly and placed on file. Complete sets of most of these journals are available. The main University Library also contains many works of interest and value to the medical sciences.

A complete catalog of the books and periodicals in the medical library will be furnished free by the University Librarian upon request. The journals and books in the library will be lent free to any reputable physician of the state. The borrower is required to pay the transportation charges both ways.

Provision is also made for sending out circulating libraries to county medical societies arranged in circuits. For information, address the University Librarian, or Dean of the Faculty of Medicine, University of Missouri, Columbia, Missouri.

Animal House: The animal house is located near the Medical Laboratory Building. It is a brick structure, well lighted, heated, and ventilated. This building provides excellent facilities for rearing and preserving animals, and for investigations in the various lines of medical science. It is of especial value for the experimental work in physiology, pathology and bacteriology.

Other Buildings: The resources of the Parker Memorial Hospital and the department of physics have been combined to create a very satisfactory and complete X-ray equipment for purposes of diagnostic photographic work and instruction is now being given in the theory and use of X-ray apparatus and in other fields of medical electrology.

In several other buildings on the University campus (chemistry, zoology, etc.), instruction is offered in many lines open to medical students as electives, and of especial service to those taking the combined curriculum in medicine and in arts and science. The gymnasium and athletic grounds are open for the use of all students, and special opportunities are offered to those interested.

#### ENTRANCE REQUIREMENTS

The requirements for admission to the School of Medicine include:

<sup>(1)</sup> Fifteen units, the equivalent of a four years' high school course, including at least 3 units of English, 1 unit in mathematics, 2

units in one foreign language, the remaining being elective. For further details, see general catalog of the University.

(2) Two years (60 hours' credit) of college work, including French or German, 8 hours; general zoology, 8 hours; general physics, 8 hours; inorganic chemistry, 8 hours; general bacteriology, 3 hours; and such other subjects as are included in the undergraduate requirements of the College of Arts and Science of the University of Missouri. See page 119, general catalog of the University.

All correspondence regarding admission should be addressed to The Registrar, University of Missouri, Columbia, Missouri.

Advanced Standing: Every applicant for advanced standing is required to present credentials from an accredited college, and to pass such examinations as may be required to show satisfactory completion of courses equivalent to those for which he seeks credit.

Moreover, the usual entrance requirements to the first year class must be satisfied, and evidence of a good moral character must be presented to the dean of the faculty of medicine.

Special students will not be admitted to the school.

#### COMBINED WORK IN ARTS AND MEDICINE

Students who have completed the secondary school work, as above outlined, but not the college work, are advised to enter the College of Arts and Science of the University to secure this work.

By the proper choice of electives in the College of Arts and Science, students may within four years complete the two years' college work required for admission, do the two years' work in medicine, and at the same time meet the requirements for the degree of Bachelor of Arts. Such students are registered during the first two years in the College of Arts and Science only. During the last two years, however, they must register both in the School of Medicine and in the College of Arts and Science and must meet the requirements of both. Students are recommended to elect the subjects required, or which lead up to subjects required in medicine, in approximately the order suggested by the following tabulated statement. The work outlined for the first and second years includes all the college work which is required for entrance to the regular medical curriculum.

The entrance requirement for the combined curriculum outlined above is that specified for the College of Arts and Science, i. e., a high school course equivalent to fifteen units. A student who follows this curriculum will, at the end of four years, have completed the requirements for the A. B. degree. He will also have completed the two years' work in medicine, and will require only two years more (or six years in all) for the M. D. degree. Students who wish to do more than the required amount of premedical collegiate work may extend the time to the amount desired. All students who contemplate taking this work should consult the dean of the faculty of medicine.

Curriculum Leading to the Degrees of A. B. and M. D. Recommended by the Medical Faculty:

	First	Second	
FIRST YEAR	Semester	Semester	
	Hours	Hours	
	Credit	Credit	
English	3	3	
German 1a and 2b, or French 1a and 2b	5	. 5	
Physics 1a and 2b	5	3	
Logic 1a, or Mathematics 1a	3	0	
History 1b, or Latin 10b or 20b, or Greek 1b	0	5	
Military Science and Tactics	. 1	1	
	17	17	
SECOND YEAR			
Zoology 1a and 4b	5	5	
Chemistry 4a and 25b	5	5	
General Bacteriology, (Botany 3b)	0	3	
Greek 1a, or Latin 10a or 20a, or History 1a	5	0	
Military Science and Tactics	1	1	
Elective	0	2	
	10	10	
	16	16	
THIRD YEAR			
Same as first year of regular medical curriculum $% \left( \mathbf{r}\right) =\left( \mathbf{r}\right) $			
FOURTH YEAR			
Same as second year of regular medical curriculum			

Premedical students should keep in mind the desirability of observing certain sequences when planning the work of the first two years of the combined curriculum. The proper sequences are the following: *The Physical Group*.

- (1) Elementary Physics, 1a or b.
- (2) Elementary Physics, 2b.
- (3) General Laboratory Physics, 20a and b.
- (4) X-rays and High-frequency Currents, 118a or b. The Chemical Group.
  - (1) Elementary Inorganic Chemistry, 4a and b.
  - (2) Analytical Chemistry, 25a or b.
  - (3) Organic Chemistry, 111.
  - (4) Physiological Chemistry, 101a.

#### The Biological Group.

- (1) General Zoology, 1a or b.
- (2) Comparative Anatomy of Vertebrates, 4b.
- (3) Cytology, 103b.
- (4) Protozoology, 105a.
- (5) Parasitology, 106b.
- (6) Embryology of Vertebrates, 101a.
- (7) Gross Anatomy, 102a.
- (8) Normal Histology, 103b.
- (9) Neurology, 104b.
- (10) Experimental Physiology, 103a.

#### The Bacteriological-Pathological Group.

- (1) General Bacteriology, 3a or 3b.
- (2) Medical Bacteriology, 102b.

The work above outlined in the regular medical curriculum provides a thoro training in the various subjects usually included in the first two years of medicine. It meets the requirements of the Association of American Medical Colleges, of which this school is a member, and follows closely the ideal courses in the laboratory subjects recommended by the Council on Medical Education of the American Medical Association. The individual courses are described in detail on the following pages.

#### MEDICAL CURRICULUM

	Semester credits		Total hours			
FIRST YEAR	1st	2nd	Lec-	Labo-	Total	
	Sem.	Sem.	ture	ratory	Total	
Organic Chemistry	3	3	68	85	153	
Embryology	3		17	68	85	
Gross Anatomy	10		34	348	382	
Histology		6	17	170	187	
Neurology		3	17	68	85	
Bacteriology	••	4	34	85	119	
Totals	16	16	187	824	1011	
SECOND YEAR						
Physiological Chemistry	4		34	85	119	
Physiology, 102a	2		17	42	59	
Physiology, 103a	6		51	127	178	
Pathology	3	5	51	238	289	
Pharmacology		4	34	85	119	
Hygiene		2	34		34	
Physical Diagnosis		3	34	42	76	
Minor Surgery	••	2	17	42	59	
Totals	15	16	272	661	933	

#### STATEMENT OF COURSES

Courses preceded by a number with the letter a attached, thus, 100a, are given the first semester only. Those preceded by a number with the letter b attached, thus, 100b, are given the second semester only. Those preceded merely by a number are continuous courses and are given both semesters. The number of hours' credit given for a course for each semester is indicated by the Arabic numerals following the statement of the course. Courses numbered 200 and above are strictly graduate in character.

#### ANATOMY

102a. Gross Anatomy. The study of the gross anatomy of the human body, excepting the central nervous system. For use in the study of osteology, which is correlated with the work in dissection, a complete disarticulated human skeleton is issued to every two students. (10). Mr. CLARK; Mr. BLOOMER; Mr. WILLIAMSON.

103b. Normal Histology. The study of the microscopic anatomy of the tissues and organs of the human body. (6) Mr. Johnson; Mr. Appleby.

104b. Neurology. A study of the gross and microscopic anatomy of the central nervous system and sense organs. (3) Mr. Johnson; Mr. Bloomer.

105a or b. Topographic Anatomy. Elective. Open only to students who have completed the course in gross anatomy, histology and neurology. (2) or (3) (a) Mr. Johnson; (b) Mr. Clark.

106b. Study-room Course in Anatomy. Elective. Prerequisite course 102a. Dissected parts of the body are preserved and are available for informal study or review. This study may be combined with a study of cross-sections. (2 or 3) Mr. CLARK.

206a and 207b. Advanced Anatomy. Elective. Prerequisites, courses 102a, 103b, or 104b. Advanced work will be given in any of the special fields of anatomy, the amount and character of which will be varied to suit individual needs. Mr. CLARK; Mr. JOHNSON.

208a and 209b. Research. Problems for original investigation will be assigned in anatomy, histology, or embryology. A reading knowledge of French and German is required. Mr. CLARK; Mr. JOHNSON.

#### BACTERIOLOGY AND PREVENTIVE MEDICINE

102b. Medical Bacteriology. Prerequisite, botany, course 3a or b. Subjects studied include relation of bacteria to disease; the fundamental principles of immunity, serum diagnosis, serum and vaccine therapy. The different diseases are discussed, and the micro-organisms causing them are studied in the laboratory, with animal inoculations and demonstrations. The course includes also the study of the best known diseases caused by protozoa. (4) Mr. RAVENEL; Mr. BRADFORD.

- 101b. General Hygiene. Prerequisite, course 102b. Deals in a more detailed manner with the fundamental principles of public and personal hygiene and with the regulatory measures directed toward the improvement of general health. (2) Mr. RAVENEL.
- 201. Advanced Bacteriology. Elective. Prerequisite, course 102b. Amount and character of work will depend on needs and qualifications of student. The manufacture of autogenous vaccines, the determination of the apsonic index, making and use of various sera, study of milk and water are among the subjects suggested for study. Hours to be arranged. Mr. RAVENEL; Mr. BRADFORD.
- 202. Research. Elective. Prerequisite, course 102b. Students who are sufficiently prepared will be given problems requiring original investigation in the fields of bacteriology and public health. A reading knowledge of French and German recommended. Hours to be arranged. Mr. RAVENEL; Mr. BRADFORD.
- 203. Conduct of Public Health Laboratories. Elective. Prerequisites, course 102b and 201. Designed for those who expect to take up such work as a profession or for teaching purposes. Graduates in medicine preferred. The collection and shipment of various specimens, their examination, milk, and water problems, etc., will be discussed and the practical work carried out in the laboratory. Hours to be arranged. Mr. RAVENEL; Mr. BRADFORD.



#### CHEMISTRY

11. Organic Chemistry. General survey of the principal classes of organic compounds, such as hydrocarbons, alcohols, phenols, ethers, aldehydes, acids, esters, fats, carbohydrates. Student prepares in the laboratory representatives of the various classes of compounds and studies their reactions. (3) Mr. Calvert.

For other courses of chemistry, which may be elected, see courses in chemistry, College of Arts and Science.

#### CLINICAL MEDICINE AND SURGERY

- 101b. Physical Diagnosis. Lectures, demonstration and practical exercises covering the field of the physical examination of the thorax. Practice in the use of instruments ordinarily used in auscultation and percussion especially with reference to the recognition of the physical signs of normal and disease processes in the respiratory and circulatory organs. (3) Mr. STINE.
- 102b. Minor Surgery. The lectures on the general principles of surgery include the consideration of asepsis and antisepsis, inflammation, healing of wounds, hemorrhage and sepsis. Material for the demonstration of the minor surgical lesions is obtained from the dispensary. The laboratory periods are devoted to a study of bandaging and the preparation and use of surgical material and dressings. Each

student will have twelve lessons on the practical application of bandages, including the general principles in the use of plaster bandages, adhesive dressings, splints, etc. The preparation of dressings and instruments is studied in the hospital. Practical work in preparation for operation and surgical technic is carried out in the animal operating rooms. Co-operation with the bacteriological laboratory makes it possible to emphasize the importance of careful technic by requiring the students to keep a complete bacteriological check on their work.

(2) Mr. Myer.

#### PATHOLOGY

101. Pathology and Pathological Anatomy. A laboratory course, supplemented by lectures and recitations, for the histological study of the general and special manifestations of disease. Each student is supplied with about 300 sections which become his property. The corresponding gross material is afforded by a well equipped museum and by autopsies. (8) Mr. Dolley; Mr. Simmons.

201a and b. Advanced Pathology. Elective. The amount and character of the work will depend upon the needs and qualifications of the student. In connection, opportunity will be afforded for practical experience in the handling of all kinds of morbid material. Hours to be arranged. Mr. DOLLEY; Mr. SIMMONS.

- 202. Research. Elective. Opportunity is afforded to students sufficiently prepared for original investigation of unsolved problems in the fields of pathology and pathological physiology. A reading knowledge of German is required and one of French is recommended. A seminary is held once a week. Mr. Dolley.
- 203. Normal and Abnormal Neurocytology. Elective. The application of the general principles and theories of biology to the nerve cell in health and disease. The work will necessarily consist largely of original investigation and will be adjusted to the training of the student. Hours to be arranged. Mr. Dolley.

204a. Pathological Physiology. Elective. An experimental course.
(2) Mr. Dolley; Mr. Simmons.

#### PHYSIOLOGY AND PHARMACOLOGY

101a. General Physiological Chemistry. Prerequisite, organic chemistry, course 111 or its equivalent. Physiological chemistry of the carbohydrates, fats, and proteins; of the cell and special tissues; of the blood; of respiration; of secretions and of excretions; a quantitative study of the urine in relation to diet. (4) Mr. Gulick; Mr. Johnson.

102a. Physiology of Secretion, Alimentary Mechanisms, and Reproduction. Physiology of secretory processes, digestion, absorption, excretion, respiration, metabolism and energy exchange, heat regulation, and production. (2) Mr. Greene; Mr. Thompson.

103a. Experimental Physiology. Physiology of the circulation, respiration, muscle, and nerve; nervous system, and sense organs. (6) Mr. Greene; Mr. Brown.

104a and 104b. Advanced Physiological Chemistry. Elective. A course supplementing and extending course 101a. The preparation and chemistry of the proteins, a quantitative study of the tissues and secretions, of enzymes, of putrefaction and putrefaction products, analysis of typical foods, and the detection of food preservatives and adulterants. The prosecution of a short investigation and formal report on the same are required. (2 to 4) Mr. Gulick.

105b. Experimental Pharmacology. Physiological action of drugs. The experimental method is used thruout, the demonstrations being made on man and lower animals. (4) Mr. Greene; Mr. Brown.

107a and 107b. Toxicology. Elective. Prequisite, physiology, course 101a or 105b. (2) or (3) Mr. Gulick.

109b. Child, Growth and Development. Elective. Prerequisite, elementary physiology, course 1a or 1b. (1) Mr. Greene.

206b. The Physiology of the Nervous System. Elective. (2) or (3) Mr. Greene.

208. Journal Club. Elective. (1) Mr. Greene.

209a. The Physiology and Pharmacology of the Circulatory System. Elective. (3) Mr. Greene.

210a and 210b. Advanced Physiology. Elective. Advanced courses in physiology, pharmacology and physiological chemistry. Individual problems will be assigned to students of sufficient preparation. Mr. Greene; Mr. Gulick.

#### ZOOLOGY

101a. Embryology of Vertebrates. Foundation of vertebrate embryology. Successive stages in the development of the frog, the chick, and the pig are studied from preparations of entire embryos and from serial sections. These observations are used as a basis of comparison for the study of human embryology. (3) Mr. Lefevre; Mr. Tanneruther.

For comparative anatomy, cytology, and other courses in zoology open to medical students as electives, see announcement under College of Arts and Science.

#### ELECTIVES

Courses in botany, psychology, zoology, may be elected by students in the School of Medicine who are prepared to pursue them. See announcement of the College of Arts and Science in the annual catalog. With the consent of the dean, medical students may take any accessory work offered in other departments of the University.

#### MEDICAL CERTIFICATE

On completing the work outlined in the regular medical curriculum, the student is awarded a Medical Certificate at the following commencement. This certificate will admit him, with full credit for the first two years of medicine, to the leading medical schools, where abundant clinical facilities are available for the last two years' work. Care should be taken, however, to meet the detailed entrance requirements for the particular school chosen.

#### GRADUATE WORK IN MEDICAL SCIENCES

Special opportunity is given, and every encouragement is offered, to students who desire to do advanced work in any of the fundamental medical sciences. By a year of graduate work, the Master's Degree (A. M.) may be secured, and in three years the degree of Ph. D. Advanced work of the research type in the fundamental medical sciences is highly desirable as a basis for the most thoro work in clinical medicine. It is especially advantageous, however, for those students who desire to specialize with a view to becoming teachers in any of these branches. As previously mentioned, the demand for such teachers far exceeds the supply, and offers an attractive career which many graduates of this school have followed with success. Fellowships and scholarships are available to those who are qualified for graduate work. For further details, see general catalog or separate announcement of the Graduate School, University of Missouri.

To conduct research work successfully, it is self-evident that the teachers themselves should be active investigators. Such teachers are, moreover, as is proved by experience, those whose interest and enthusiasm for their work is also the source of inspiration for their undergraduate students. From every point of view the encouragement of research work is therefore a matter of highest importance.

# PARKER MEMORIAL HOSPITAL

#### Staff

Woodson Moss and Dan G. Stine
MAX W. MYERSurgery and Obstetrics
GUY L. NOYESEye, Ear, Nose and Throat
A. W. KampschmidtAnesthesia
M. P. RAVENELBacteriology
D. H. DolleyPathology
H. C. Rentschler Electrology and Photography

#### Officers

GUY L. NOYES, M. DSuperintendent
ELLEN M. ANDERSON, R. N Principal of the School for Nurses
NELLE SAPP, R. N

By the gift of William L. Parker, the University has an excellent hospital. In the words of the donor, the hospital is "for the benefit of the School of Medicine." The building is a handsome, modern structure, on high ground at the west side of the campus.

A surgical amphitheater adjoining the hospital has been provided by the gift of the late Adolphus Busch. The interior has been remodeled recently.

The Parker Memorial Hospital is owned and operated by the University primarily for the benefit of the University students. It is also open to the sick of Missouri for the treatment of acute and chronic curable diseases. Those who suffer from chronic incurable, or dangerous communicable diseases, are not admitted to the hospital.

Patients are admitted to the hospital at any hour of the day. Application for admission should be addressed to the superintendent of the hospital.

Rates and Terms: The following rates are for the maintenance of patients who are not students of the University, including bed, board, and general nursing, but not including medical or surgical service.

General medical and surgical cases. Single rooms, \$15 a week and upward. Wards, \$10 a week and upward.

Obstetrical cases, \$25 a week.

Special nursing may be arranged at the regular rates for registered nurses.

Clinical patients, \$7 per week, including medical and surgical attention when given by members of the staff.

Extra fees will be charged for medicines, special nursing, dressings and the use of the operating room or its equipment. Fees for maintenance are payable invariably in advance.

Physicians who hold consultation with or give treatment to patients not residents in the hospital, and require therefor the attendance of a nurse or the use of the equipment of the hospital, must pay a minimum fee of \$1 for such privilege.

#### THE SCHOOL FOR NURSES

The school for nurses of the University of Missouri was organized in 1901. The school is conducted in connection with the Parker Memorial Hospital.

Pupil nurses receive their training in the hospital and laboratories of the University.

The course of instruction is thoro and familiarizes the pupils with the theory and practice of nursing. The course covers a period of three full years. The first three months of residence in the school are probationary; at the expiration of that time the pupil is regularly enrolled as a member of the school, provided she is found to be acceptable.

Recently the nurses have been established in a residence situated close to the hospital. The house has been rearranged so as to make it especially well adapted as a home for nurses.

Requirements for Entrance to School for Nurses: A high school education or its equivalent is required for entrance to the school for nurses. Men are not admitted. Candidates must be between the ages of 20 and 30 years and submit an acceptable statement concerning general health, civil state, and other things. Blank forms for this statement will be furnished upon application.

A special announcement giving detailed information concerning the school for nurses will be sent in response to requests for the same, addressed to the Principal of School for Nurses, Parker Memorial Hospital, University of Missouri, Columbia, Missouri.

#### PRELIMINARY COURSE FOR NURSES

This course of studies, given in the first semester, is intended primarily for the entering class of students in the regular school for nurses but is open for such other students as can satisfy the requirements for entrance, whether they propose to complete their study of nursing in the University or not.

Provision is made especially for such student nurses as may be recommended for admission to the course by the superintendents of schools for nurses. With such students the purpose is to give them the advantages of the course and after its completion to have them return to the schools from which they came, for the further study of nursing.

Upon the satisfactory completion of the course, arrangement can be made for the admission to other first-class schools for nurses of such students as do not immediately enter the curriculum of the school for nurses at the University.

Graduate nurses in good standing are admitted to the course and are allowed to do the work in part or in whole.

Entrance Requirements for Preliminary Course: All candidates for entrance must submit satisfactory evidence of fitness for entering the course as set down in the regular application blank furnished upon request. The candidate must further present evidence of having been graduated from a grammar school or its equivalent. Men will not be admitted to the course.

Expenses: No entrance, tuition, or laboratory fees will be charged for this course.

The cost for the necessary textbooks will be about \$10.

Students in the preliminary course will not live in the Nurses' Home, but will be required to engage board and room in houses approved by the principal of the school. They will also be required to conform to all the regulations established by the same authority concerning hours for study, recreation, etc.

Board and room may be obtained in Columbia at very reasonable rates.

#### Studies of the Preliminary Course:

Anatomy Fundamental principles and practice of nurs-

ing

Physiology Materia medica and weights and measures

Bacteriology Preventive medicine

Dietetics Voice training and reading

Practical handcraft Physical training

For further information concerning the preliminary course, address the Principal, School for Nurses, University of Missouri, Columbia, Missouri.

# FACULTY OF THE SCHOOL OF MEDICINE

ALBERT ROSS HILL, A. B., Ph. D., LL. D.,

President of the University.

GUY LINCOLN NOYES, M. D.,

Professor in the Department of Clinical Medicine and Surgery, Superintendent of Parker Memorial Hospital, Dean of the Faculty.

SIDNEY CALVERT, B. S., A. M.,

Professor of Organic Chemistry.

ELIOT ROUND CLARK, A. B., M. D., Professor of Anatomy.

DAVID HOUGH DOLLEY, A. B., A. M., M. D., Professor of Pathology.

CHARLES WILSON GREENE, A. B., A. M., Ph. D., Professor of Physiology.

George Lefevre, A. B., Ph. D., Professor of Zoology.

Woodson Moss, M. D., LL. D.,

Professor in the Department of Clinical Medicine and Surgery.

MAX WASHINGTON MYER, A. B., M. D.,

Professor in the Department of Clinical Medicine and Surgery.

MAZYCK PORCHER RAVENEL, M. D.,

Professor of Medical Bacteriology and Preventive Medicine, Director of the Public Health Laboratory.

Franklin Paradise Johnson, A. B., A. M., Ph. D., Associate Professor of Anatomy.

DAN GISH STINE, A. B., M. D.,

Associate Professor in the Department of Clinical Medicine and Surgery.

Addison Gulick, A. B., A. M., Ph. D.,

Assistant Professor of Physiology.

OSCAR FRANKLIN BRADFORD, A. B., M. D.,

Instructor in Bacteriology and Preventive Medicine.

RALPH RAYBURN SIMMONS, A. B., A. M., M. D., Instructor in Pathology.

George Washington Tannreuther, A. B., A. M., Ph. D., Instructor in Zoology.

John Isaac Appleby, A. B., Assistant in Anatomy.

GAYLORD TALMADGE BLOOMER, Assistant in Anatomy. GLENN DELOP JOHNSON, A. B.,

Assistant in Physiology.

LLOYD JAMES THOMPSON, A. B.,

Assistant in Physiology.

CARL SNEED WILLIAMSON,

Assistant in Anatomy.

ELLEN MARIE ANDERSON, R. N.,

Principal of the School for Nurses.

NELLE FRANCIS SAPP, R. N.,

Head Nurse, Parker Memorial Hospital.

#### THE UNIVERSITY OF MISSOURI

The University of Missouri stands at the head of the educational systems of the state. It is one of the oldest institutions in the West.

The University was founded at Columbia in 1839 and instruction in academic work was begun in 1841. Few schools in the United States have made the advancement that Missouri has made during the last twenty years. In 1897 the enrollment was only 805 and in the session of 1916-17 it was 4349. The increased enrollment is but indicative of the development of the school in educational efficiency.

The work of the University is now carried on in the following schools and colleges:

College of Arts and Science

College of Agriculture

School of Education

School of Law

School of Medicine

School of Engineering

School of Mines and Metallurgy

School of Journalism

School of Business and Public Administration

Graduate School

Extension Division

All of these divisions are at Columbia with the exception of the School of Mines and Metallurgy, which is located at Rolla. In addition, emphasis is given particular lines of work by the establishment of minor divisions, the chief of which are the Agricultural Experiment Station, the Engineering Experiment Station, and the Missouri State Military School.

The fundamental aim of the University is the development of the highest and most efficient type of citizen. The school is supported by the state and endeavors to return to the state practical service. Of later years the University has endeavored to go beyond the campus in its influence on the welfare of the people of Missouri. Extension courses, experiment farms, and free literature on practical subjects

are some of the methods adopted. The various extension courses have proved highly satisfactory and have rendered real service to people of the state who previously benefited only indirectly from the University.

The University is located at Columbia, a town situated half way between St. Louis and Kansas City near the center of the state. It is reached by the Wabash, and the Missouri, Kansas and Texas railways. Columbia is a progressive and prosperous town having doubled its population in the last few years. It has nearly forty miles of paved streets.

The University grounds cover more than 800 acres. The main divisions are in the West Campus, the East Campus, the athletic fields, and the University farm.

The following University buildings are located at Columbia: Academic Hall; Laws Observatory; separate buildings for chemistry, physics, biology, business and public administration and geology, engineering, manual arts, law; two power houses; Library Building; Medical Laboratory Building; Parker Memorial Hospital; Agriculture Building; Horticulture Building; Schweitzer Hall for agricultural chemistry; green houses; Live Stock Judging, Poultry, Dairy, Farm Machinery, and Veterinary buildings; the University farm barns and buildings; Switzler Hall for the School of Journalism; Gordon Hotel Building for home economics; Benton and Lathrop halls, dormitories for men; Read Hall, dormitory for women; Rothwell Gymnasium; the houses for the President of the University and the Dean of the Faculty of Agriculture; the High School and the Elementary School buildings, used for practice schools in the School of Education.

#### FOR FURTHER INFORMATION

For further information concerning the School of Medicine, address Dean, Faculty of Medicine,

University of Missouri,

COLUMBIA, MISSOURI.

Full information regarding the University is given in the University catalog, which will be sent on request without charge. For this or special bulletins of the College of Arts and Science, College of Agriculture, School of Education, School of Law, School of Engineering, School of Journalism, School of Business and Public Administration, Extension Division and the Graduate School, write to

THE REGISTRAR,
UNIVERSITY OF MISSOURI,
COLUMBIA, MISSOURI.

# THE UNIVERSITY OF MISSOURI BULLETIN

#### GENERAL SERIES

EDITED BY
H. H. KINYON
University Publisher

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