

THE
RICE INSTITUTE
HOUSTON TEXAS



PRELIMINARY ANNOUNCEMENTS FOR THE
ACADEMIC YEAR BEGINNING SEPTEMBER
THIRTEENTH NINETEEN HUNDRED AND
TWENTY-TWO



THE RICE INSTITUTE

A UNIVERSITY OF
LIBERAL AND TECHNICAL
LEARNING

FOUNDED IN THE CITY OF HOUSTON TEXAS
BY WILLIAM MARSH RICE
AND DEDICATED BY HIM TO THE
ADVANCEMENT OF LETTERS
SCIENCE AND ART

OPENED FOR THE RECEPTION OF
STUDENTS IN THE AUTUMN OF
NINETEEN HUNDRED
AND TWELVE



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CALENDAR

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1922

September 13-16	. . .	Entrance Examinations
September 15	. . .	Registration of new students
September 16	. . .	Registration of old students
September 18	. . .	Lectures begin
September 20	. . .	Matriculation address
November 23	. . .	Thanksgiving Day
December 21	. . .	Autumn term ends

1923

January 3	. . .	Winter term begins
February 22	. . .	Washington's Birthday
March 2	. . .	Texas Independence Day
March 22	. . .	Winter term ends
March 26	. . .	Spring term begins
April 21	. . .	San Jacinto Day
May 21-26	. . .	Entrance Examinations
June 1	. . .	Spring term ends
June 2-4	. . .	Eighth Annual Commence- ment

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THE RICE INSTITUTE

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Bursar

THE RICE INSTITUTE

THE NAME

THE new institution bears the name of the founder, the late William Marsh Rice. It aspires to university standing of the highest grade. Dedicated to the advancement of literature, science, and art, the educational programme of liberal and technical learning now being developed may justify the designation "Institute" as representing the functions of a teaching university and, at least in some of its departments, those of the more recent research institutions established in this country and abroad.

BRIEF HISTORICAL SKETCH

It is now rather more than thirty years since several public-spirited citizens of the community asked Mr. Rice to bear the expense of building a new public high school for the city of Houston. This direct gift to the city's welfare Mr. Rice was unwilling to make, but a few months later, taking into his confidence a half-dozen friends, he made known to them his desire to found a much larger educational enterprise for the permanent benefit of the city and State of his adoption. These gen-

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tlemen were organized into a Board of Trustees for the new foundation, which was incorporated in 1891 under a broad charter granting the trustees large freedom in the future organization of a non-political and non-sectarian institution to be dedicated to the advancement of letters, science, and art. As a nucleus for an endowment fund, Mr. Rice at this time made over an interest-bearing note of two hundred thousand dollars to the original Board of Trustees, consisting of himself, Mr. James A. Baker, and the late Messrs. J. E. McAshan, E. Raphael, F. A. Rice, A. S. Richardson, and C. Lombardi. Under the terms of the charter, the board is a self-perpetuating body of seven members elected for life: vacancies since its organization have been filled by the election of Messrs. William Marsh Rice, Jr., Benjamin Botts Rice, Edgar Odell Lovett, John Thaddeus Scott, Alexander Sessums Cleveland, and Edward Andrew Peden.

It was the unalterable will of the founder that the development of the work which he had conceived should progress no further during his lifetime. However, in the remaining days of his life he increased the endowment fund from time to time by transferring to the trustees the titles to certain of his properties, and in the end made the new foundation his residuary legatee. Upon the termination of the long years of litigation which followed Mr. Rice's death in 1900, the Board of Trustees found the Institute in possession of an estate whose present value is conservatively estimated at approximately ten million dollars, divided by the provisions of the founder's will into almost equal parts available for equipment and endowment respectively. It may be remarked in passing

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that it is the determined policy of the trustees to build and maintain the institution out of the income, thus preserving intact the principal not only of the endowment fund but also that of the equipment fund. While proceeding to convert the non-productive properties of the estate into income-bearing investments, the trustees called Mr. Edgar Odell Lovett, a professor in Princeton University, to assist them in developing the founder's far-reaching plans. Before taking up his residence in Houston, the future president visited the leading educational and scientific establishments of the world, returning in the summer of 1909 from a year's journey of study that extended from England to Japan. About this time negotiations were completed by which the Institute secured a campus of three hundred acres situated on the extension of Houston's main thoroughfare, three miles from the center of the city—a tract of ground universally regarded as the most appropriate within the vicinity of the city.

Another early decision of the trustees of the Institute was the determination that the new university should be housed in noble architecture worthy of the founder's high aims; and upon this idea they entered with no lower ambition than to establish on the campus of the Institute a group of buildings conspicuous alike for their beauty and for their utility, which should stand not only as a worthy monument to the founder's philanthropy, but also as a distinct contribution to the architecture of our country. With this end in view they determined to commit to Messrs. Cram, Goodhue, and Ferguson, of Boston and New York, the task of designing a general architectural plan to embody in the course of future years the realiza-

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tion of the educational programme which had been adopted for the Institute. Such a general plan, the work of Mr. Ralph Adams Cram, L.H.D., exhibiting in itself many attractive elements of the architecture of Italy, France, and Spain, was accepted by the board in the spring of 1910. Immediately thereafter plans and specifications for an administration building were prepared, and in the following July the contract for its construction was awarded; three months later the erection of a mechanical laboratory and power-house was begun, and by the next autumn the construction of two wings of the first residential hall for men was well under way. In the preparation of preliminary plans for its initial building operations the Institute enjoyed the coöperation of an advisory committee consisting of Professor Ames, director of the physical laboratory of Johns Hopkins University; Professor Conklin, director of the biological laboratory of Princeton University; Professor Richards, chairman of the department of chemistry, Harvard University; and Professor Stratton, director of the National Bureau of Standards. In 1911, on the seventy-fifth anniversary of Texas Independence, the corner-stone of the administration building was laid by the trustees. This building, the mechanical laboratory of the engineering quadrangle, the power-house, and the first two wings of the first residential hall for men were ready for occupancy at the beginning of the first academic year in the fall of 1912. The third wing of this residential hall, begun in 1913, was occupied by the students in the autumn of 1914; while the construction of the physics laboratories and lecture amphitheater, begun also in 1913, was completed in the summer

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of 1914 from plans prepared by Messrs. Cram and Ferguson under the direction of Mr. H. A. Wilson, D.Sc., F.R.S., resident professor of physics in the Institute. In January, 1916, ground was broken for the first wing of the second residential group for men; the construction of this wing was completed by September, 1916. Further building operations were suspended during the war. In the meantime the Athletic Field House and other structures of the exhibition field were completed, in 1920. The building schedule for the nearer future includes special laboratories for instruction and investigation in chemistry and biology, and in the applications of these sciences to the arts of industry and commerce.

The actual work of instruction of the first academic year began on the 23d day of September, 1912, the anniversary of the death of the founder. In the presence of the trustees of the Institute, members of the teaching staff, and representative citizens of the community, the first class of students was received in the faculty chamber of the administration building with appropriate ceremonies on September 26th. The scholastic work of the first academic year was limited to a single class of freshmen of a standard of preparation as high as the best public and private high schools were capable of attaining.

In the early autumn of 1912 an academic festival in observance of the formal opening of the Institute was held under most favorable conditions of weather, most generous coöperation of the community and commonwealth, and the heartening encouragement of several hundred scholars and scientists who came to Houston to assist in the launching of the new university. Chief

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among these distinguished representatives of life and learning were the twelve foreign savants who had consented to participate in the inaugural programme by preparing series of lectures in the liberal humanities of philosophy, history, letters, and art, and in the fundamental sciences of mathematics, physics, chemistry, and biology. A complete account of the proceedings of the four days devoted to this celebration has been embodied in publications issued in commemoration of that occasion. In the latter appear in full the inaugural lectures of Professor Rafael Altamira y Crevea, of Madrid, Spain; Professor Emile Borel, of Paris, France; Senator Benedetto Croce, of Naples, Italy; Professor Hugo de Vries, of Amsterdam, Holland; the late Professor Sir Henry Jones, of Glasgow, Scotland; the late Privy Councillor Baron Dairoku Kikuchi, of Tokyo, Japan; Professor John William Mackail, of London, England; Privy Councillor Professor Wilhelm Ostwald, of Gross-Bothen, Germany; the late Professor Henri Poincaré, of Paris, France; the late Professor Sir William Ramsay, of London, England; Professor Senator Vito Volterra, of Rome, Italy; Professor Carl Størmer, of Christiania, Norway. In these commemorative volumes there appear also reproductions of responses from American and foreign universities and scientific societies to the invitation of the Institute; the addresses of Governor Colquitt, Chief Justice Brown of Texas, Bishop Gailor of Tennessee, the inaugural poem of Dr. Henry van Dyke of Princeton, and the dedicatory sermon by Dr. Charles F. Aked of San Francisco; together with the addresses delivered by the presidents or other official representatives of Amsterdam, Glasgow,

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London, Oviedo, Paris, Rome, Baylor, Chicago, Columbia, Lehigh, Princeton, Texas, Vanderbilt, and Virginia universities; and a variety of other literary and artistic performances which are not easily classified in a brief résumé. More recently a special volume has appeared embodying the lectures and conferences delivered at the Institute on the occasion of visits to the Rice Institute from the British Educational Mission and the Official Mission of French Scholars to the Universities of the United States. In similar publications have appeared the lectures of the late Professor Sir Henry Jones, inaugurating the public lectureship on the Sharp Foundation; those of the Honorable William Howard Taft, Chief Justice of the United States, and the Right Honorable Sir Auckland Geddes, British Ambassador to the United States, on the Godwin Lectureship in Public Affairs; the Plymouth Tercentenary Lecture by Sir Arthur Shipley, of the University of Cambridge; and a course of lectures by resident members of the Institute in observance of the six hundredth anniversary of the death of Dante. In subsequent publications will appear lectures on mathematics and mathematical physics, delivered at the Institute by Senator Vito Volterra, of the University of Rome, and Professor Jacques Hadamard, of the Collège de France; lectures on biology by Professor Edwin Grant Conklin, of Princeton University; on physics by Professor Robert Andrews Millikan, of the California Institute of Technology; on astronomy by Professor Henry Norris Russell, of Princeton University; on philosophy and education by Professor John Dewey, of Columbia University; and a commencement

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address prepared by President-emeritus Charles William Eliot, of Harvard University.

THE FACULTY¹

Edgar Altenburg, Ph.D. (Columbia), of Elizabeth, New Jersey; formerly Assistant in Biology at Columbia University; Instructor in Biology at the Rice Institute; Assistant Professor of Biology.

William Orus Andrews, B.S. in C.E. (Illinois), of Boston, Massachusetts; formerly Instructor in Rational and Technical Mechanics at Rensselaer Polytechnic Institute; Instructor in Civil Engineering.

Philip Heckman Arbuckle, Ph.B. (Chicago), of Georgetown, Texas; formerly Director of Athletics in Southwestern University; Instructor in Physical Education at the Rice Institute; Assistant Professor of Physical Education and Director of Athletics.

Stockton Axson, M.A. (Wesleyan), Litt.D. (Pittsburgh), L.H.D. (Wesleyan), LL.D. (Knox), of Princeton, New Jersey; formerly of the University of Vermont and of Adelphi College; Professor of English Literature in Princeton University; Professor of English Literature.

Lindsey Blayney, M.A. (Centre), Ph.D. (Heidelberg), of Danville, Kentucky; formerly Professor of European Literature and the History of European Art in Central University of Kentucky; Professor of German.

Hubert Evelyn Bray, B.A. (Tufts), M.A. (Harvard), Ph.D. (Rice), of Great Yarmouth, England; formerly

¹ Arranged in alphabetical order, with last address and appointment before receiving academic appointment at this institution.

PRELIMINARY ANNOUNCEMENTS

Instructor in Mathematics at Tufts College and at Lafayette College; Fellow in Mathematics at the Rice Institute; Instructor in Mathematics.

Charles Lowman Browne, B.S. (Kenyon), B.Arch. (Cornell), of Paris, France; Instructor in Architectural Construction.

Andrew Bonnell Bryan, M.A. (Rice), of Hearne, Texas; Fellow in Physics at the Rice Institute; Instructor in Physics.

Robert Granville Caldwell, B.A. (Wooster), Ph.D. (Princeton), of Wooster, Ohio; formerly Fellow of Princeton University; Professor of Economics in the College of Wooster; Assistant Professor of History at the Rice Institute; Professor of American History and Dean of the Institute.

Asa Crawford Chandler, B.A. (Cornell), Ph.D. (California), of Corvallis, Oregon; formerly Assistant Professor of Zoölogy and Physiology at Oregon Agricultural College; Instructor in Biology.

Henry Ernest Conklin, M.A. (Cornell), of Roslyn, Long Island, New York; formerly Scholar in English at Princeton University; Instructor in English.

Percy John Daniell, Sc.D. (Cambridge), of Liverpool, England; Senior Wrangler and Rayleigh Prizeman of the University of Cambridge; formerly Lecturer in Mathematics at the University of Liverpool; Research Associate and later Assistant Professor of Applied Mathematics at the Rice Institute; Professor of Applied Mathematics.

Harry Walter Dietert, M.A. (Iowa State Coll.), of the South Philadelphia, Pennsylvania, Works of the

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Westinghouse Electrical and Manufacturing Company;
Instructor in Mechanical Engineering.

Erwin Escher, M.A. (Chicago), of Jacksonville, Illinois; formerly Professor of Romance Languages at Illinois College; Instructor in Romance Languages.

Griffith Conrad Evans, Ph.D. (Harvard), of Boston, Massachusetts; formerly Instructor in Mathematics at Harvard University; Sheldon Fellow of Harvard University at the University of Rome; Assistant Professor of Pure Mathematics at the Rice Institute; Professor of Pure Mathematics.

Lester R. Ford, B.A. (Missouri), Ph.D. (Harvard), of Cambridge, Massachusetts; formerly instructor in Mathematics at Harvard University and Instructor in Life Insurance in the Graduate School of Business Administration of Harvard University; Assistant Professor of Mathematics.

Clyde Chew Glascock, Ph.D. (Johns Hopkins), of New Haven, Connecticut; formerly Fellow of Johns Hopkins University; Assistant Professor of German in Yale University; Assistant Professor of Modern Languages.

Albert Léon Guérard, Agrégé de l'Université de France, of Palo Alto, California; formerly Junior Professor of French Literature and Examiner of History, State Normal School, Paris; later Instructor in the Romanic Languages at Williams College; Associate Professor of French in the Leland Stanford Junior University; Professor of French.

Arthur J. Hartsook, M.S. (Mass. Inst. Tech.), of Cambridge, Massachusetts; formerly Instructor in

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Chemistry at the University of Nebraska; Instructor in Industrial Chemistry.

Claude William Heaps, B.S. (Northwestern), Ph.D. (Princeton), of Columbia, Missouri; formerly Class of 1860 Experimental Science Fellow of Princeton University; Instructor in Physics at the University of Missouri; Instructor in Physics at the Rice Institute; Assistant Professor of Physics.

Clark Hopkins, B.A. (Yale), of Oxford, England; Rhodes Scholar at Balliol College, Oxford; Instructor in English.

Lloyd Brelsford Howell, B.A. (Wabash), Ph.D. (Illinois), of Urbana, Illinois; formerly Fellow in Chemistry at the University of Illinois; Instructor in Organic Chemistry.

Herbert Kay Humphrey, B.S. in E.E. (Illinois), M.S. in E.E. (Union), E.E. (Illinois), of Schenectady, New York; Assistant Consulting Engineer of the General Electric Company; Instructor in Electrical Engineering at the Rice Institute; Assistant Professor of Electrical Engineering.

Reginald Norcom Lawrence, B.A. (Princeton), of Princeton, New Jersey; Instructor in English.

Edgar Odell Lovett, Ph.D. (Virginia and Leipsic), LL.D. (Drake, Tulane, and Baylor), of Houston, Texas; formerly Professor of Mathematics in Princeton University, and later Head of the Department of Astronomy in the same institution; Professor of Mathematics and President of the Institute.

Baldwin Maxwell, M.A. (North Carolina), Ph.D. (Chicago), of Chicago, Illinois; formerly Fellow in

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English at the University of Chicago; Instructor in English.

Samuel Glenn McCann, Ph.B. (Wooster), M.A. (Rice), of Dresden, Ohio; formerly Fellow in History at the Rice Institute; Instructor in Jurisprudence and Registrar of the Institute.

John Thomas McCants, M.A. (Virginia and Yale), of Houston, Texas; formerly Scholar at the University of Virginia, and University Fellow at Yale University; Instructor in English at the Rice Institute; Instructor in Business Administration and Bursar of the Institute.

Alan Dugald McKillop, Ph.D. (Harvard), of Cambridge, Massachusetts; formerly Instructor in English at the University of Illinois; Instructor in English.

Andrew Merritt McMahan, M.S. (Iowa), of Chicago, Illinois; Assistant in Physics at the University of Chicago; Instructor in Physics.

Henry Oscar Nicholas, B.A. (Oberlin), of New Haven, Connecticut; formerly Fellow and Assistant in Chemistry at Yale University; Instructor in Analytical Chemistry.

Eugene Jean Oberlé, M.A. (Stanford), of Palo Alto, California; formerly Instructor in Romanic Languages at the Leland Stanford Junior University; Instructor in French.

Fred L. Orr, B.S. in M.E. (Nebraska), of Lyons, Nebraska; Instructor in Mechanical Engineering.

Joseph Horace Pound, B.S. in M.E., M.E. (Missouri), of Pittsburgh, Pennsylvania; Instructor in the School of the Westinghouse Machine Company; Instructor in Mechanical Engineering at the Rice Institute; Assistant Professor of Mechanical Engineering.

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John Herbert Rafferty, B.S. in C.E. (Tufts), of Lynn, Massachusetts; formerly Instructor in Civil Engineering at Tufts College; Instructor in Civil Engineering.

Lewis Babcock Ryon, Jr., C.E. (Lehigh), of South Bethlehem, Pennsylvania; Instructor in Civil Engineering.

John Willis Slaughter, B.A. (Lombard), Ph.D. (Michigan), of New York City; formerly Lecturer on Sociology in the School of Economics of the University of London; Lecturer in Civics and Philanthropy.

DeWitt Talmage Starnes, Ph.D. (Chicago), of Austin, Texas; formerly Instructor in English at the University of Texas; Instructor in English.

William Curtis Swabey, B.A. (Stanford), Ph.D. (Cornell), of Lawrence, Kansas; formerly Scholar and Fellow in the Sage School of Philosophy at Cornell University; Instructor in Philosophy and Psychology at the University of Kansas; Instructor in Philosophy and Education.

Adolph Benjamin Swanson, B.A. (Augustana), M.A. (Iowa), of Chicago, Illinois; formerly Professor of German at Ellsworth College; Instructor in French.

John Clark Tidden, of Philadelphia, Pennsylvania; Fellow and Traveling Scholar of the Pennsylvania Academy of Fine Arts; Instructor in Architectural Drawing and Painting.

Radoslav Andrea Tsanoff, B.A. (Oberlin), Ph.D. (Cornell), of Worcester, Massachusetts; formerly Sage Fellow of Cornell University; Instructor in Philosophy at Clark University; Assistant Professor of Philosophy.

Patrick Henry Underwood, B.S. (Rice), formerly of the General Electric Company, Schenectady, New York; Instructor in Engineering.

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Curtis Howe Walker, Ph.D. (Yale), of Chicago, Illinois; formerly Assistant Professor of History at the University of Chicago; Lecturer in European History.

Lewis Edes Ward, M.A. (Harvard), of Cambridge, Massachusetts; formerly Sheldon Scholar at Harvard University; Instructor in Mathematics.

James Stephen Waters, B.S. (Rice), of Galveston, Texas; Instructor in Engineering.

William Ward Watkin, B.S. in Arch. (Pennsylvania), M.A.I.A., of Houston, Texas; formerly Scholar in Architecture in the University of Pennsylvania; Associate Architect with Messrs. Cram and Ferguson, the supervising architects of the Institute; Instructor in Architecture at the Rice Institute; Assistant Professor of Architecture.

Harry Boyer Weiser, M.A. (Ohio State), Ph.D. (Cornell), of Memphis, Tennessee; formerly Assistant Instructor in Chemistry at Cornell University; Assistant Professor of Chemistry in the University of Tennessee; Instructor in Chemistry, and later Assistant Professor of Chemistry at the Rice Institute; Professor of Chemistry.

Harold Albert Wilson, F.R.S., M.A. (Cambridge), D.Sc. (London), of Montreal, Canada; Fellow of Trinity College, Cambridge University; formerly Professor in King's College, London; Research Professor of Physics in McGill University; Professor of Physics.

Howard Frederick Yerges, B.Eng. (Ohio State), of Columbus, Ohio; formerly Instructor in Engineering Drawing at Ohio State University; Instructor in Engineering Drawing.

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ASSISTANTS AND FELLOWS

Bentley Barnes, B.A. (Park), of Parkville, Missouri; Fellow in Physics.

Alice Crowell Dean, M.A. (Rice), of Houston, Texas; Fellow in Mathematics.

Allen Darnaby Garrison, Ph.D. (Rice), of Austin, Texas; Fellow in Chemistry under appointment of the National Research Council.

John Broadus Hathorn, B.A. (Rice), of Kingsville, Texas; Fellow in Philosophy and Education.

Alison Pugh Hickson, M.A. (Eastern); formerly Professor of Physics in Baylor University; Fellow in Physics.

Leonard Franklin Hilty, of Pittsburgh, Pennsylvania; Assistant in Physical Education.

Olan Robert Hyndman, B.S. (Rice), of Houston, Texas; Fellow in Inorganic Chemistry.

Gaylord Johnson, B.A. (Rice), of Houston, Texas; Fellow in Organic Chemistry.

Frederick R. Lummis, M.D. (Pennsylvania), of Houston, Texas; Medical Adviser to the Committee on Outdoor Sports.

Aristotle Michal, M.A. (Clark), of Worcester, Massachusetts; formerly Assistant in Physics and Fellow in Mathematics at Clark University; Fellow in Mathematics.

Francisco Montau, B.A. (Chile), of Urbana, Illinois; formerly Acting Instructor in Spanish at the University of Illinois; Assistant in Spanish.

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SCHOLARSHIPS

WHILE seeking to develop its students in character, in culture, and in citizenship, the Rice Institute will reserve for scholarship its highest rewards and in particular for evidences of creative capacity in productive scholarship. To encourage this devotion to learning there have been devised through the donations of friends of the Institute a number of undergraduate scholarships to be awarded preferably to those students who have been in residence at the Institute for at least one year. Moreover, honorary scholarships without stipend may be granted to students whose scholastic standing shows marked ability.

THE GRAHAM BAKER STUDENTSHIP

The first of these undergraduate scholarships to be established at the Institute is the Graham Baker Studentship, founded by Captain and Mrs. James A. Baker, of Houston, in memory of their eldest son, the late Frank Graham Baker. This studentship is awarded annually to students of the Rice Institute upon the basis of highest standing in scholarship, and the holder is known as the Graham Baker Student for the year. The award is announced at the commencement convocation in June, and the annual stipend is \$300.

THE HOHENTHAL SCHOLARSHIPS

The Hohenthal Scholarship Fund is a gift to the Rice Institute made through the good offices of Mr. William M. Rice, Jr., from the estate of the late Lionel Hohenthal, of Houston, who in his last will and testament instructed

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his executor, Mr. Rice, to devote the residue of his estate to the founding of a permanent memorial to Mr. Hohenthal's mother, father, and brother. The scholarships provided by this fund are known as the Hohenthal Scholarships, and the holders as the Hohenthal Scholars of the Institute. These scholarships are awarded annually to necessitous students on a basis of high standing in scholarship. Each of the six now available carries with it an annual stipend of \$200.

SCHOLARSHIPS IN CIVICS AND PHILANTHROPY

In establishing the Sharp Lectureship in Civics and Philanthropy at the Institute, Mrs. Estelle B. Sharp, of Houston, has undertaken also to associate with this lectureship four scholarships in civics and philanthropy. On Mrs. Sharp's invitation, these scholarships have been provided during the last academic year by the following gentlemen of Houston: Messrs. Joseph S. Cullinan, Will C. Hogg, Abe M. Levy, and a scholarship by an anonymous donor. The scholarships bear an annual stipend of \$250 and are awarded preferably to graduates of high standing intending to prepare for work in social service.

THE D.A.R. SCHOLARSHIP

The John McKnitt Alexander Chapter of the Daughters of the American Revolution has undertaken to provide an endowed undergraduate scholarship at the Rice Institute. Under the present conditions of the scholarship it is awarded to necessitous young women students on admission to the Institute and carries with it

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an annual stipend of \$250. The first award was made for the academic year 1919-20.

THE LADY GEDDES PRIZE IN WRITING

The Right Honorable Sir Auckland Geddes, British Ambassador to the United States, Godwin Lecturer of the Rice Institute in 1921, has endowed at Rice a prize in writing, which is to bear the name of Lady Geddes. This prize is to be awarded annually from the income of the endowment of one thousand dollars.

The competition for the award of the Lady Geddes Prize in Writing for the academic year 1922-23 will be open to members of the freshman and sophomore classes of the Rice Institute; and the subject, to be announced in the autumn of 1922, will pertain to relations between Great Britain and the United States.

FELLOWSHIPS

THE Rice Institute would interpret in a very large way its dedication to the advancement of letters, science, and art. It would not only look to the employment of these disciplines in the development of the life of the individual and in that of the race, but it would also play its part in the progress and enlargement of human knowledge by contributions of its own resident professors and scholars. Accordingly there should always be associated with the staff of the Institute a group of advanced students in training for careers both as teachers and researchers: with this end in view, graduate fellowships will be awarded from time to time to degree-bearing

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students of the Institute or other educational foundations of similar standing.

OPPORTUNITIES FOR SELF-HELP

IN addition to the stipends of fellowships and endowed scholarships, there are on the campus and in the city opportunities in considerable variety for worthy and deserving students to earn a part of their living expenses while attending the Institute. Information concerning such openings may be obtained from the Bursar. Thanks also to the generosity of several citizens, there is available at the Institute a growing student loan fund. Inquiries concerning the administration of this fund should be addressed to the Bursar.

REQUIREMENTS FOR ADMISSION

CANDIDATES for admission to the Institute who present satisfactory testimonials as to their character will be accepted either upon successful examination in the entrance subjects or by certificate of graduation from an accredited public or private high school. The standard requirements for matriculation are determined by the system of units given below. A unit represents a course of study pursued five hours a week for an academic year.

Fifteen units are required for entrance in full standing to the freshman class of the Institute. A limited number of candidates offering at least thirteen units may be accepted conditionally on presentation of a certificate of graduation accompanied by evidence of careful preparation and of ability to carry the courses of the fresh-

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man year. Such students are advised to send in their credentials to the Registrar as early as possible.

From the list of subjects printed below every candidate will be required to present three units in English, three units in mathematics,¹ two in algebra and one in plane geometry, two units in history, and three units in one foreign language or two units in each of two foreign languages. No student will be admitted to a special schedule who has not satisfied in full the requirements for admission to the freshman class.

Advanced credit will be granted to students coming from other recognized colleges and universities only when the work presented is equivalent in content and quality to a full year course at the Institute. Such prospective students should make early application to the Registrar and submit official statements of their preparatory and college work, together with catalogues of the institutions attended.

Entrance examinations will be held at the Institute beginning September 13, 1922, and again during the week beginning May 21, 1923. Applications for the privilege of taking these examinations must be received at the Registrar's Office three weeks in advance of the beginning of the examinations. Such applications must be accompanied by statements and records from schools attended by candidates. Appropriate blanks for such applications and records may be obtained from the Registrar's Office of the Rice Institute on request.

¹ Students expecting to enter the Institute are advised to elect mathematics during their fourth year. If possible, this course should include training in algebra and trigonometry.

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LIST OF SUBJECTS WITH VALUES IN UNITS

BOTANY 1; Chemistry 1; English (3 or 4); French (Elementary 2, Intermediate 1); German (Elementary 2, Intermediate 1); Greek (Grammar and Elementary Prose Composition 1, Xenophon 1, Homer—*Iliad*, Books I—III 1); History (Ancient 1, Mediæval and Modern 1, English 1, American 1); Latin (Grammar, Elementary Prose Composition and Cæsar 2, Cicero 1, Virgil 1); Mathematics (Algebra 2, Plane Geometry 1, Solid Geometry $\frac{1}{2}$, Trigonometry $\frac{1}{2}$); Spanish (Elementary 2, Intermediate 1); Physics 1; Physical Geography $\frac{1}{2}$; Physiology $\frac{1}{2}$; Zoölogy 1. Substitutes for certain of these subjects may be considered in individual cases.

The terms of admission to the Institute are based on the recommendations of the Carnegie Foundation for the Advancement of Teaching as expressed in the Documents of the College Entrance Examination Board. Complete information with respect to further details of these requirements will be forwarded by the Institute to any candidate upon receipt of a request addressed to the Registrar of the Institute.

EXPENSES

THE opportunities for study and research offered by the Rice Institute are open without tuition both to young men and to young women. A contingent deposit of ten dollars, payable at matriculation, must be maintained by all students; the contingent deposit will be retained so

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long as the student continues his connections with the Institute. In addition to this contingent deposit a laboratory deposit of ten dollars must be maintained for each course in physics, chemistry, biology, or other experimental sciences. The balances on these deposits are returnable on July first. For delayed registration in any term of the academic year a penalty is required. See pages 69 and 70 for nominal expenses in connection with physical training.

Students, of course, are expected to meet all expenses incurred in the purchase of text books, drafting instruments, note books, registration and examination papers, certificates and diplomas, and the materials actually used up in the experimental courses in pure and applied science.

No student in arrears in his bills to the Institute will be admitted to any of the examinations.

At the time of registration a fee of twelve dollars and fifty cents is assessed each student by the Students' Association to meet the expenses of the Students' Association, the Honor Council, and the student publications. This assessment is made with the approval of the Faculty and the Board of Trustees, but the payment of the fee is not compulsory. However, students who thus become members of the Students' Association are entitled to admission to all athletic contests of Rice Institute teams held in Houston, and they receive the weekly paper and the college annual.

Rooms in the residential halls for men, completely furnished exclusive of linen, may be had at prices ranging from fifteen to forty dollars for each of the three terms into which the year is divided, payable by the term in advance. As the charge for table board will be listed at

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actual cost, the monthly price, payable in advance, will probably vary during the year. For the first two weeks, until cost charges can be estimated, a blanket charge of one dollar per day will be made.

These residential halls are of absolutely fireproof construction, heated by steam, lighted by electricity, cleaned by vacuum apparatus, and equipped with the most approved form of sanitary plumbing, providing adequate bathing facilities on every floor. The rooms will be let in the order of applications received. Applications must be accompanied by deposits of ten dollars. Inasmuch as each year the accommodations now adequate to house some three hundred and fifty men have all been engaged before the opening of the session, reservations should be made early. Diagrams showing the floor plans will be sent to any one who may be interested on application to the Office of the Bursar.

Accommodations for the residence of young women on the university grounds are not available at present. However, while attending to their duties on the campus the young women of the university have access to adequate rest rooms, tennis courts, and other forms of recreation under the constant supervision of Mrs. Sara Stratford, Adviser to Women. Information concerning desirable places of residence for young women students may be had at the Office of the Bursar.

COURSES OF INSTRUCTION FOR DEGREES

ALTHOUGH it is the policy of the new institution to develop its university programme rather more seriously

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from the science end, there are also being provided facilities for elementary and advanced courses in the so-called humanities, thereby enabling the Institute to offer both the advantages of a liberal general education and those of special and professional training. Extensive general courses in the various domains of scientific knowledge will be available, but in the main the programme consists of subjects carefully coördinated and calling for considerable concentration of study. These programmes have been so arranged as to offer a variety of courses in arts, in science, in letters, and in their applications to the several fields of engineering, architecture, and other regions of applied science, leading after four years of undergraduate work to the degree of Bachelor of Arts. Degrees will also be offered in architecture and in chemical, civil, electrical, and mechanical engineering. Furthermore, for the degrees of Master of Arts, Doctor of Philosophy, and Doctor of Engineering, every facility will be afforded properly qualified graduate students to undertake lines of study and research under the direction of the Institute's resident and visiting professors.

The academic programmes of study leading to the degree of Bachelor of Arts after four years of study are of a common type for the first two years, but for the third and fourth years are differentiated into two forms: first, general courses leading to the degree of Bachelor of Arts, either with some grade of distinction or without special mention, and second, honors courses leading to the degree with honors in certain subjects. These two types will be referred to in the sequel as general courses and honors courses respectively.

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The general course leading to the degree of B.A. has been arranged to give thorough training to those students who are seeking university instruction in literary and scientific subjects either as a part of a liberal education or as preliminary to entering upon a business or professional career. The general course therefore involves the study of several subjects up to a high university standard but does not include a highly detailed specialized study of any one subject such as is necessary before research work or university teaching can be profitably undertaken. Students wishing to specialize with a view to research work and university teaching may either complete an honors B.A. course and then proceed by graduate study to the degrees of M.A. and Ph.D., or they may first take a general B.A. course and after completing it proceed by graduate study to the higher degrees.

The attention of students intending to enter the profession of engineering or architecture is called to the great advantages in first taking a general or honors academic course before beginning special study in engineering or architecture. At present the Institute is not offering courses leading to degrees in law and medicine, but students looking forward to such careers will find in the earlier years of the B.A. course all the requirements for admission to many medical and law schools, provided suitable subjects are chosen. However, attention is called to the fact that several professional schools of law and medicine are now requiring bachelor degrees for admission.

As has already been intimated, the course for the degree of B.A. extends over four years. During the first

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two years a considerable part of the work is prescribed, while during the last two years each student is allowed, within certain restrictions, to select the subject he studies. In the majority of the courses the formal instruction offered consists of three lectures a week together with laboratory work in certain subjects. Examinations are held from time to time and at the end of each term. These examinations are conducted under a student honor system. In determining the standing of a student in each class both his work during the term and the record of his examinations are taken into account.

Of subjects included in the B.A. courses the following are now available :

GROUP A

1. English
2. French
3. German
4. Italian
5. Latin
6. Spanish
7. Economics
8. Education
9. History
10. Philosophy
11. Architecture

GROUP B

1. Pure Mathematics
2. Applied Mathematics
3. Physics
4. Chemistry
5. Biology
6. Chemical Engineering
7. Civil Engineering
8. Electrical Engineering
9. Mechanical Engineering

Candidates for the degree of Bachelor of Arts of the Rice Institute will be required to select studies from the preceding groups according to the yearly programmes exhibited below.

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At the beginning of each year of his residence at the Institute, each student is assigned to some member of the faculty who will act as the student's personal adviser in the selection of his studies and courses and in other matters pertaining to life at the Institute.

First Year

- (1) Pure mathematics
- (2) English
- (3) A modern language
- (4) A science
- (5) One other subject

Second Year

- (1) Pure mathematics or a science
- (2) English
- (3) A modern language¹
- (4-5) Two other subjects

At the beginning of the third year students may elect to take either a general course or an honors course.

Third Year General B.A. Course

Four subjects, of which two must have been taken in the second year and one in both first and second. At least one subject from each of the groups A and B must be taken. Students will receive advice in the selection of their subjects.

¹ Students who enter with credit in two modern languages may substitute another subject for (3) in the second year; on the other hand, students must take at least one second year language course for graduation.

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Fourth Year General B.A. Course

Four subjects, two of which must have been taken in the third year and one in both second and third or in first and third. At least one subject from each of the groups A and B must be taken. However, students will be allowed to specialize in their senior year, provided they substitute an advanced course for the required group A or group B subject.

A student who wishes to become a candidate for a general B.A. degree should report his candidacy in writing at the beginning of the year in which he expects to take his degree.

To students who have completed a general four years' course the B.A. degree will be awarded either with some grade of distinction or without special mention.

The third and fourth year honors courses are intended for students who wish to specialize in particular branches of knowledge with a view to research work or teaching or later professional studies.

In view of these special objects the requirements in such courses will be more severe than in the general courses in the same subjects. For this reason it is recommended that students exercise due caution and seek advice before electing to take an honors course. Only those students who have shown in their first and second years that they are especially well qualified will be permitted to take an honors course. A student proposing to take an honors course must satisfy the department concerned that he is qualified to proceed with the study of that subject. He will be required to take the lectures and practical work provided for honors students in that subject during each

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of the two years and in addition certain courses in allied subjects.

In 1922-23 honors courses will be available as follows :

- (1) Pure and applied mathematics
- (2) Theoretical and experimental physics
- (3) Modern languages and literatures
- (4) Biology
- (5) Chemistry
- (6) Economics and mathematics
- (7) English

The following programme in honors courses in physics may be taken as typical of such courses :

Third year, five subjects : (1) mathematics, (2) physics 300, (3) physics 310, (4) physics 400, (5) one other subject.

Fourth year, five subjects : (1) mathematics, (2) physics 400, (3) physics 420, (4) physics 500, (5) one other subject.

A student who wishes to become a candidate for a degree with honors should report his candidacy at the beginning of his Junior year and renew his application at the beginning of his Senior year.

The degree of B.A. with honors will be awarded at the end of the fourth year to students who have completed an honors course. Candidates for honors who fail may be excused such part of a general course as may be equivalent to the work they have done. Candidates for honors who are not making satisfactory progress may be required to discontinue their honors course and may be excused

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such part of a general course as may be equivalent to the work they have done.

For courses leading to the degree of Bachelor of Science, see pages 70 and 85.

A student who has completed a general or an honors course for the B.A. degree may obtain the Master of Arts degree after the successful completion of one year of graduate work.

A candidate for the M.A. degree must elect a principal subject, and submit his schedule in writing when he reports his candidacy. Such schedule must represent the equivalent of four advanced courses to be passed with high credit. The work shall consist of (*a*) personal investigation, the results of which must be submitted as a thesis, and (*b*) at least two advanced courses of lectures, one of which must be a graduate course in the principal subject.

For courses leading to the degree of Master of Science, see page 70.

A student who has completed a course for the B.A. degree may be admitted as a candidate for the degree of Doctor of Philosophy. In addition to high attainment, preparation for the Ph.D. degree involves usually at least three years of graduate work. Candidates for the degree must submit a thesis and pass a public examination. The thesis must present a distinctly original contribution to the subject. It must be published in an accredited journal or series, and fifty printed copies must be deposited in the Institute Library.

Candidates who successfully complete the first four years of the engineering course will receive the degree of

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Bachelor of Science. The B.S. degree with distinction will be awarded to students whose work is of a high standard. Candidates who successfully complete a five-year engineering course will receive the M.S. degree in a specified branch of engineering, under requirements conforming to those for the M.A. degree, namely, very high standing and a thesis.

Candidates who successfully complete the five-year course in architecture will be awarded the degree of Bachelor of Science in Architecture. Students in architecture who satisfy all the requirements for the degree of M.A. may elect to take that degree if they prefer.

STANDING IN SCHOLARSHIP OF UNDER-GRADUATE STUDENTS

SCHEDULE of Undergraduate Students.—The regular schedule of undergraduate students is five courses in the Freshman year, five courses in the Sophomore year, four courses in the Junior year, and four courses in the Senior year. The regular schedules for students of Engineering and Architecture may be found in these Announcements beginning on pages 70 and 85 respectively. One extra course may be taken in the second year and one in the third year by students who are not on probation. Deficiencies of the first two years must be removed before the year in which a student is a candidate for a degree, and may not be removed by extra courses in that year.¹ An excess schedule must be reduced if, during the first term, a stu-

¹This regulation applies to students who entered in September, 1921.

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dent fails to attain a grade of III or better in three courses, or if he fails to pass any course without at the same time doing work of exceptional quality in his other courses. No credit is given toward graduation for less than a full year's course in any subject, but a course which has been dropped by permission at the end of either of the first two terms and in which a student's standing is satisfactory may be carried to completion in a succeeding year. Summer school courses will be accepted to remove not more than one Freshman or Sophomore deficiency. To remove a college deficiency no credit will be given for a course unless it is the equivalent in content and quality of a full year course at the Institute.

Dropping of Students for Deficiencies in Scholarship.— A student will be required to withdraw from the Institute if he fails in as much as one half of the work of his schedule. He may also be dropped for failure to improve while on probation, or for poor scholarship due to absences from the exercises of his schedule. Any student who withdraws from the Institute during the last five weeks of any term on account of failure in his courses will be regarded as dropped from the Institute. A student dropped at the end of the first or second term will not be readmitted before the beginning of the following academic year, and then only to the standing attained at the beginning of the academic year in which the student was dropped. A student dropped from the Institute at the end of the third term for (*a*) failure in as much as half the term's work, or (*b*) failure to improve while on probation, may reënter the Institute at the beginning of the following year but without any credit for the past year

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except in courses in which his grade for the year is III or better.¹ Dropped students, when allowed to return, are received only on probation. Students who have been dropped twice are not entitled to readmission.

Probation.—A student who is carrying five courses will be placed on probation if among his grades for the term there are two V's or no grade better than IV. A student who is carrying four courses will be placed on probation if he has one V and one other grade below III, or has failed to obtain a grade of III or better in at least one course. A student with less than four courses will be placed on probation if he has one V, or if he does not obtain at least two grades of III or better. A student who is dropped from a course by the instructor on account of inability to carry the work of the course is given a grade of V for the term in the course from which he is dropped. Should a student fail a course for two terms he may not continue that course with the view of securing a year's credit in that subject.

Promotion.—To attain Sophomore standing, a student must have obtained in four of the five courses of the Freshman year, passing grades of which two must have been III or better. To attain Junior standing, a student must have obtained in at least nine of the ten courses of the Freshman and Sophomore years, passing grades of which four must have been III or better. To attain Senior standing, a student must have obtained passing grades, of which six must have been III or better, in at least thirteen courses of the five courses of the

¹ The symbols have the following meanings: I Very high standing, II High standing, III Medium standing, IV Low standing, V Failure.

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Freshman year, the five courses of the Sophomore year, and the four courses of the Junior year, required for full Senior standing. To obtain the degree of Bachelor of Arts, a student must have obtained passing grades, of which eight must have been III or better, in five Freshman courses, five Sophomore courses, four Junior courses, and four Senior courses, required for the first degree. Attention is called to the fact that this four years' course is built up by years. Accordingly four courses of the Freshman and Sophomore years respectively will not be credited as the equivalent of four courses of the Junior and Senior years respectively, a higher standard and wider range of collateral work being required of Juniors and Seniors who elect in either of those years an elementary subject of the Freshman and Sophomore years.

No student shall attain Sophomore, Junior, or Senior standing in Engineering and Architecture who lacks more than one course of the standard schedule required for full standing in those years.

SUBJECTS OF INSTRUCTION FOR 1922-23

OF the courses to be offered during the scholastic year 1922-23 it is possible to announce those described below. The numbers designating the courses have the following signification: courses whose numbers begin with 1 are open to all students of the Institute; courses whose numbers commence with 2 are open to Sophomores, Juniors, and Seniors; those beginning with 3 are open to Juniors and Seniors; those beginning with 4 are Senior courses.

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Unless otherwise indicated, all courses consist of at least three exercises a week.

For each course the days of the week and the hours have been indicated. The Roman numerals refer to the group in the examination schedule. In general, subjects which fall in the same group may not be taken in the same year. Any possible exceptions to this rule must be arranged through the Registrar's Office at or before the time of registration.

ENGLISH 100. The theory and practice of English composition, and the study of fundamental literary forms. Required of Freshmen.

M W F 8:30, 9:30 or 10:30; or
T Th S 8:30 or 10:30 I

ENGLISH 200. Outlines of the history of English Literature, with collateral reading of authors representative of the various periods.

M W F 11:30 XI

ENGLISH 300. A study of representative English plays, from the sixteenth century to modern times. (Alternates with English 310. Not offered in 1922-23.)

ENGLISH 310. A study of the English Drama, exclusive of Shakespeare, from its beginnings to the closing of the theaters in 1642. (Alternates with English 300.)

T Th S 11:30 IV

ENGLISH 320. Exposition and Argumentation. The study of contemporary problems in society and govern-

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ment, and, somewhat later, of the principles of argument and debate, the collection and weighing of evidence, fallacies, refutations. Themes and briefs. Conferences. (Offered in alternate years. Not offered in 1922-23.)

ENGLISH 340. The English Novel, with especial reference to the chief novelists of the nineteenth century.

M W F 10:30 VII

ENGLISH 350. Translations from the classics. A study in translation of selected Greek and Latin authors.

T Th S 10:30 I

ENGLISH 360. Tudor prose and poetry. A study of the historical backgrounds and critical and cultural ideals of the sixteenth century, of medieval traditions, humanistic influences, and new types introduced in the literature from Caxton to Spenser. (Alternates with English 370.)

T Th S 8:30 III

ENGLISH 370. Spenser and Milton. A systematic study of the works of Spenser and Milton. (Alternates with English 360. Not offered in 1922-23.)

ENGLISH 400. Shakespeare and Modern Drama. A systematic study of Shakespeare with especial emphasis on the tragedies, followed by a rapid survey of Modern Drama.

M W F 9:30 XI

ENGLISH 410. First term, Eighteenth-century Prose. Second and third terms, Victorian Literature. (Alternates with English 420.)

M W F 11:30 IX

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ENGLISH 420. First term, Eighteenth-century Poetry. Second and third terms, Nineteenth-century Literature, from the publication of the *Lyrical Ballads*, 1798, to Queen Victoria's accession, 1837. (Alternates with English 410. Not offered in 1922-23.)

ENGLISH 430. An introductory course in Old English, followed by a careful reading of *Beowulf*. (Alternates with English 440. Not offered in 1922-23.)

ENGLISH 440. An introductory study of Chaucer and other Middle English authors, with a brief sketch of Middle English literature. (Alternates with English 430.) Hours to be arranged.

ENGLISH 450. Seminar in Literary Criticism. The examination and application of selected critical theories, beginning with those of Aristotle. Written reports and critical papers. Hours to be arranged.

ENGLISH 460. Seminar in American Literature, with a first term study in English backgrounds of the Colonial period. Discussions and written reports. T 2:00-5:00

FRENCH 100. Elementary French. Grammar, composition, dictation, translation of simple French.

M W F 8:30 or T Th S 8:30, 10:30 VI

FRENCH 200. Second Year French. A continuation of French 100. A considerable amount of outside read-

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ing will be assigned besides translation in the class. Review of grammar, composition, dictation.

M W F 9:30 or T Th S 9:30 VI

FRENCH 300. Third Year French. Open to students who have passed French 200 with a grade of III or better. A survey of the entire history of French Literature, with its social background. Lectures in English. Extensive reading of representative texts in French.

T Th S 9:30 V

FRENCH 310. Advanced Composition. Open to students who have passed French 200 with a grade of III or better. Advanced Composition, both oral and written. Writing of themes and abstracts. Review of grammar. Rapid survey of phonetics and historical grammar. This course is specially recommended to those who intend to teach French.

T Th S 8:30 III

FRENCH 400. French Literature. Open to students who have passed French 310 with a grade of III or better, and who can understand spoken French. Students must also have passed French 300 with a grade of III or better, or else take French 300 in connection with French 400. A representative author will be studied each term. In 1922-23 these authors will be Molière, Voltaire, Victor Hugo. Lectures, collateral readings, reports, and essays, all in French.

T Th S 11:30 IV

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GERMAN 100. Elementary German. Grammar, reading, conversation, and composition. Collateral reading in history. T Th S 11:30 IV

GERMAN 200. Second Year German. Historical, descriptive, and narrative prose. Composition and conversation. Lectures and collateral reading. T Th S 10:30 XII

GERMAN 300. Third Year German. The literature of the eighteenth and nineteenth centuries in Germany. Introduction to history of German civilization. Written reports in German, lectures, and collateral reading. Hours to be arranged.

GERMAN 400. Fourth Year German. Intensive study of some period or group of writers in the eighteenth or nineteenth century. Lectures and discussions; essays and reports in German; collateral reading. Hours to be arranged.

GERMAN 410. Contemporary and recent German literature. A discussion of modern tendencies in German letters, especially as reflecting the political and moral psychology of present-day Germany. Hours to be arranged.

ITALIAN 300. Elementary Italian. Open to students who have had at least two years of French, Spanish, or Latin. Grammar and composition. A large amount of reading will be required. It is proposed to read the *Inferno* of Dante in the spring term. M W F 10:30 VI

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SPANISH 100. Elementary Spanish. Grammar, composition, and selections for reading from modern Spanish authors. Emphasis is laid on accurate pronunciation, on the essentials of grammar, and on careful study of simple Spanish prose. Oral exercises and composition.

M W F 8:30, 10:30 or 11:30 or T Th S 8:30 II

SPANISH 200. Second Year Spanish. Lectures on Spanish Literature. Reading: selections from Cervantes and recent Spanish novelists. Review of grammar; composition and dictation. Occasional reports and essays in Spanish.

M W F 8:30 or 10:30 T Th S 10:30 or 11:30 II

SPANISH 300. Open to students who have passed 200 with a grade of III or better. A survey of the entire history of Spanish literature. Reading and explanation of representative texts beginning with the Golden Age. Advanced composition, essays and reviews in Spanish.

T Th S 11:30 II

SPANISH 310. Advanced composition. Open to students who have passed Spanish 200 with a grade of III or better. Conversational and commercial Spanish. Study of pronunciation, grammar, and vocabulary on the basis of some typical works of nineteenth-century literature and current periodicals. Reports on parallel reading.

M W F 8:30 II

SPANISH 400. Thorough study of classic and recent Spanish literature. Elements of historical grammar. Selections from the *Cid* and old Spanish ballads. Brief

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survey of Spanish civilization. Lectures, reports, discussions, and essays in Spanish.

M W F 11:30 II

LATIN 100. Selections from Nepos, Sallust, Livy, Cicero, and Ovid. Latin grammar, composition and essays. Roman literature. Collateral reading, lectures.

M W F 9:30 XI

LATIN 200. Selections from Cicero, Livy, Horace, and Tacitus. Roman literature. Latin composition and essays. Collateral reading, lectures. Hours to be arranged.

LATIN 300. Extensive reading in Horace, Juvenal, Cicero, Livy, Tacitus, Plautus, and Terence. Essays and advanced composition. Versification, Roman literature. Chapters in J. E. Sandys' *Companion to Latin Studies* on epigraphy, palæography, art, and textual criticism. Hours to be arranged.

MATHEMATICS 100. Elementary Analysis. This course includes Trigonometry and Analytic Geometry and constitutes the required Freshman course in mathematics. With the second term a section is formed for students who have considerable facility in mathematical reasoning.

M W F 8:30 or 9:30, or T Th S 8:30 or 9:30 III

MATHEMATICS 200. Differential and Integral Calculus. This course is a continuation of Mathematics 100, and deals with derivatives, integrals and series, with their

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applications. Mathematics 210 is designed for students who have considerable facility in mathematical reasoning.

T Th S 8:30 or 9:30 X

MATHEMATICS 210. Differential and Integral Calculus. This course covers the ground of Course 200, but is more complete and goes further. It is intended for students who have considerable facility in mathematical reasoning. It is a sufficient introduction to Mathematics 310 and 340, and is open to students who obtain high grades in Mathematics 100 or otherwise satisfy the instructor of their fitness to take the course.

T Th S 8:30 X

MATHEMATICS 300. Advanced Calculus and Differential Equations. Differentiation and integration of functions of several variables; multiple integrals; introduction to the theory of differential equations. This course or Mathematics 310 should be taken by students whose major interest lies in physics or engineering; it is open to those who pass successfully in Course 200 or 210 in mathematics.

M W F 8:30 XII

MATHEMATICS 310. Advanced Calculus and Differential Equations. Applications to Mechanics. This course is intended for students with special ability in mathematics who have had Mathematics 210. Mathematics 340 is also a desirable preparation.

M W F 8:30 XII

MATHEMATICS 340. Modern Geometry and Algebra. General algebraic methods applied to geometry. Elemen-

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tary vector analysis. This course is designed for students who have demonstrated their ability in mathematics: as much for those who are interested in engineering and physics as those primarily interested in mathematics. It should be taken in the Sophomore year if possible.

M W F 11:30 IX

MATHEMATICS 400. Theory of functions, real and complex variable. The important functions of analysis and modern general methods. Hours to be arranged.

MATHEMATICS 500. Theory of functions of a complex variable. The algebraic functions and their integrals, functions of two or more complex variables, and differential equations. Hours to be arranged.

MATHEMATICS 510. Theory of functions of a real variable. Summable functions, Lebesgue and Stieltjes integrals, general integrals, and integral equations; Fourier Series. Hours to be arranged.

APPLIED MATHEMATICS 200. Mechanics. A study of the fundamental principles, with applications to machines and structures. It includes elementary statics, dynamics, and hydraulics. This course is ordinarily prescribed as part of the engineering course, but students who have demonstrated special mathematical ability should take Mathematics 340 instead and follow it in the Junior year with Mathematics 310 instead of Mathematics 300.

M W F 11:30 VI

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APPLIED MATHEMATICS 300. Advanced Mechanics. This course does not presuppose Applied Mathematics 200, but does assume good training in mathematics. It should be taken with or after Mathematics 310. Hours to be arranged.

APPLIED MATHEMATICS 310. Statistical and theoretical economics. An analysis of statistics as applied to economics and biology, theory of probability, mathematical theory of investment; economic principles and theory. Hours to be arranged.

APPLIED MATHEMATICS 500. Theories of Radiation, Motion of Electrons, Gravitation. A study of some of the more modern hypotheses in theoretical physics. (Not offered in 1922-23.)

APPLIED MATHEMATICS 510. Relativity. This course assumes some knowledge of differential geometry, and gives the theory of Einstein and Weyl, based on the absolute calculus of Ricci and Levi-Civita. Hours to be arranged.

Besides these courses as listed above, to be given during the academic year 1922-23, others may be given to suit the needs of students. Reading courses are also offered in analysis, geometry, and applied mathematics in connection with research in those fields.

PHYSICS 100. A course of three lectures and three hours of practical work per week on experimental dy-

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namics, heat, sound, light, magnetism, and electricity. This course is intended for those who wish to obtain some general knowledge of the principles of natural philosophy on which the modern applications of science to human activities are based. The scientific method of dealing with facts and theories is explained and made familiar by numerous experimental demonstrations and laboratory exercises. For the practical work thirty complete sets of apparatus are available for simple experiments in heat, light, sound, mechanics, magnetism, and electricity. This course is not open to Juniors or Seniors.

T Th S 9:30 Laboratory T W or Th 1:30-4:30 V

PHYSICS 200. A course of three lectures and three hours of practical work per week on electricity, magnetism, sound, light, and heat. This course forms a continuation of Physics 100 and the two together make up a complete course on the principles of physics which is required of all engineering students and should be taken by students intending to specialize on physics, chemistry, medicine, law, biology or mathematics. In this course the fundamental principles of electrical theory are explained and illustrated, including the elementary theory of direct and alternating currents, electric transmission of power, wireless telegraphy, Roentgen rays, the electrical properties of gases, and other modern developments. This course also includes parts of the elementary theory of sound, light, and heat not adequately treated in Physics 100. In the Laboratory the students are taught how to make measurements of all the important electrical quantities such as current, resist-

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ance potential, capacity, magnetic intensity, magnetic properties of iron and steel and electrochemical equivalents, etc. Twenty-five complete sets of apparatus are available for this work. Students taking Physics 200 must have completed Mathematics 100 and must take Mathematics 200 or 210 at the same time as Physics 200. Juniors and Seniors wishing to begin the study of physics must take this course and must have completed Mathematics 100 and 200 or be taking Mathematics 200.

M W F 9:30 Laboratory M or F 1:30-4:30 VIII

PHYSICS 300. A course of three lectures and three hours of practical work per week on properties of matter, heat and thermodynamics, theory of vibrations and geometrical optics. This course and Physics 310 together make up a more advanced course on physics supplementing the elementary work done in Physics 100 and 200. The laboratory work includes exact measurements of such quantities as elastic properties of metals, surface tension of liquids, viscosity of liquids, mechanical equivalent of heat, conductivity for heat of solids and liquids, vapor pressure of liquids, temperatures with resistance thermometers, thermocouples and radiation pyrometers, optical constants of lens systems, etc. Students taking this course must have completed Mathematics 200 or 210.

M W F 9:30 Laboratory F 1:30-4:30 III

PHYSICS 310. A course of three lectures and three hours of practical work per week on electricity and magnetism and physical optics. This course includes the ele-

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ments of the mathematical theory of electrostatics and of direct and alternating electric currents. Also the electromagnetic theory of electric waves and light and the theory of interference, diffraction, and polarization of light. The laboratory work includes exact experiments on the electric conductivity of salt solutions, self and mutual induction, absolute determination of resistance, ratio of the electromagnetic and electrostatic units, conduction of electricity through gases, electric waves, spectroscopy, interference and diffraction of light, infra red and ultra violet light, Roentgen rays, etc. Students taking this course must have completed Mathematics 200 or 210.

M W F 10:30 Laboratory F 1:30-4:30 VII

PHYSICS 400. Physics Colloquium. One meeting a week at which researches in physics will be discussed.

T 4:30

PHYSICS 410. This course consists of about nine hours a week practical work on exact measurements and research work in some branch of physics. Hours to be arranged.

PHYSICS 500, 510. A course consisting of three lectures a week extending over two years, on various modern developments in physics, including theory of heat conduction, advanced thermodynamics, general electromagnetic theory, discharge of electricity through gases, Roentgen rays, electrical properties of flames and hot bodies, photo-electricity, quantum theory of radiation,

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electron theory of properties of insulators and conductors, and constitution of matter. General and special theories of relativity and gravitation.

T Th S 11:30 IV

PHYSICS 520. Research work in physics.

PHYSICS 530. Special course for graduates on recent researches. F 4:30

Attention is invited to the fact that many opportunities exist at the present time for persons possessing adequate training in physics and mathematics to engage in industrial research. A large number of industrial corporations now maintain research laboratories for the carrying on of such work. Among these may be mentioned the General Electric Company, the Western Electric Company, the Eastman Kodak Company, the Bureau of Standards, and others. Students desiring to qualify for positions in such establishments should take the Honors course in physics and then, if possible, take a graduate course in physics leading to the M.A. or the Ph.D. degree. However, positions in research laboratories and at the Bureau of Standards are open to men who have taken the B.A. degree with honors in physics. The Honors course in physics may be taken up by students who have completed the first two years of an engineering course as well as by academic students. Two fellowships in physics are available at the Institute to enable students to take graduate work in physics.

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CHEMISTRY 100. Introductory Chemistry. Two lectures, one recitation and five hours' laboratory work weekly. A general introductory course dealing with the fundamental phenomena and principles of the science. During the first half-year the laboratory exercises are arranged to verify and illustrate the principles and facts which are discussed in the lectures. During the last half-year the laboratory work deals with the general principles and methods of qualitative analysis.

M W F 10:30 Laboratory M and Th or
W and F 1:30-4:30 VII

CHEMISTRY 210. Advanced General Chemistry and Qualitative Analysis. Two lectures and six hours' laboratory work weekly. (Prerequisite: Chemistry 100.) The first two terms deal with the fundamental principles of chemistry, such as kinetic molecular theory, gas laws, valence, solutions, ionization, chemical and physical equilibrium, periodic system, atomic structures, and electrochemistry. The laboratory work involves special quantitative experiments, illustrating the theory. The third term is devoted to qualitative analysis from the standpoint of the theories of precipitation and ionization and the law of mass action. In the laboratory the student will analyze ores, minerals, and industrial products. Students specializing in chemistry should elect both Chemistry 210 and 220 in the Sophomore year.

M F 10:30 Laboratory W and F 1:30-4:30 VII

CHEMISTRY 220. Quantitative Inorganic Analysis. Two lectures and six hours' laboratory work weekly.

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(Prerequisite: Chemistry 210 or taking Chemistry 210.) One lecture is devoted to a theoretical discussion of the different processes, and the other lecture deals with chemical arithmetic and stoichiometry. The laboratory work consists of typical volumetric and gravimetric analytical processes for the common metals and acids. Particular stress is laid on the care and accuracy necessary for successful quantitative work. Electro-analysis is included in the course.

T Th 10:30 Laboratory T and Th 1:30-4:30 I

CHEMISTRY 300. Elementary Organic Chemistry. Three hours' lecture and recitation, and six hours' laboratory work weekly. (Prerequisite: Chemistry 210. Students who have completed the work in Chemistry 100 with a grade of II or better may be admitted to this course, upon the advice of the instructor, without previously taking Chemistry 210.) The course is designed to cover the introductory chemistry of the principal classes of organic compounds, and to present the more important theories relating to their structure and reactions.

M W F 10:30 Laboratory M Th 1:30-4:30 VII

CHEMISTRY 310. Physical Chemistry. Two lectures, one recitation and six hours' laboratory work weekly. (Prerequisites: Chemistry 220, Physics 200 or taking 200.) A systematic presentation of modern chemical theories and their applications.

M W F 8:30
Laboratory Th and S 9:30-12:30 V

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CHEMISTRY 410. Colloid Chemistry. Two lectures and three hours' laboratory work weekly. (Prerequisite: Chemistry 220 or taking 220.) The course treats of the theories of colloid chemistry and their applications in biology and the arts. Hours to be arranged.

CHEMISTRY 420. Electrochemistry and Industrial Chemistry. Two lectures and six hours' laboratory work weekly. (Prerequisite: Chemistry 310.) The first two terms of the course consist of a thorough development of the theories of the subject and the application of these theories to industrial processes. The laboratory work includes practice in the measurement of electrical constants; the conditions affecting electrolytic reactions; determination of current and energy efficiencies in electrolytic and electrothermal work; electroplating and electrorefining; tests of storage batteries; electrolytic and electrothermal preparations.

The third term consists of a study of the more important industrial chemical processes from the point of view of both the chemical reactions forming the basis of the process and the plant necessary to carry on these reactions. The laboratory work consists of analytical procedures of particular importance in the industries. A number of trips to commercial establishments are arranged for and numerous reports are required.

T Th 8:30 Laboratory M W 1:30-4:30 XI

CHEMISTRY 430. Chemical Engineering. Three lectures and three hours' laboratory work weekly. (Prerequisite: Chemistry 310.) In this course are consid-

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ered the principles upon which the mechanical operations involved in the chemical manufacturing industries depend, together with a study of the types of equipment available for such operations and the kind of work for which each is best adapted. The application of these principles is illustrated both by discussion in the classroom and by the solution of typical problems. Among the subjects considered are applied stoichiometry, furnaces and combustion, the flow of heat, crushing and grinding, the separation of solids, extraction, filtration, distillation, evaporation, the flow of fluids, humidification, and air drying. The laboratory course involves experiments in commercial analysis, in instrument calibration, in measurement of flow of liquids and gases, in evaporation, filtration and drying, and in electric furnace work.

M W F 8:30 Laboratory T 1:30-4:30 III

CHEMISTRY 440a. Organic Analysis. One hour of conference and nine hours of laboratory work weekly. (Prerequisites: Chemistry 300, Chemistry 310 or taking 310.) The work of the first two terms is in Qualitative Organic Analysis. A systematic procedure, based on the principles of homology, for the separation and identification of pure organic compounds. During the third term each student is assigned an actual problem in experimental research whereby he may apply the principles learned in the preceding terms to the accomplishment of some definite objective. The entire course aims at two results: (1) to review by actual laboratory contact the important reactions of the chief series of organic com-

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pounds; and (2) to develop in the student such spirit of confidence and initiative in the use and application of his knowledge as is usually lacking in one who attempts organic research work with but a year's preparation in elementary organic chemistry. (Offered in 1922-23 and in alternate years thereafter.)

T 11:30 Laboratory T W F 1:30-4:30 II

CHEMISTRY 440b. Advanced Organic Chemistry. Two lectures and one conference per week. (Prerequisite: Chemistry 300 and 310.) A seminar course dealing with a more advanced study of the mechanism, applications and limitations of organic reactions. The course also includes the consideration of such special fields as tautomerism, geometric and optical isomerism, divalent and trivalent carbon and the recent chapters on the chemistry of the carbohydrates. (Not offered in 1922-23.)

CHEMISTRY 450. Advanced Quantitative Analysis. Two lectures and nine hours' laboratory work weekly. (Prerequisite: Chemistry 220.) The exact determination of a number of constituents in complex and difficultly soluble minerals and practice in the uses of the more refined procedures and instruments in volumetric, gravimetric, and gasometric analyses.

CHEMISTRY 470. Experimental Problems. Chemical engineers and students who are specializing in chemistry may elect in their Senior year at least nine hours a week in experimental problems under the direction of some member of the staff of instruction.

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CHEMISTRY 480. Chemistry Seminar. One hour each week. Participation in the seminar is required of all chemical engineers and students specializing in chemistry after the completion of their third year. Attendance is open to all members of the Institute. Discussions of general topics or of recent advances in the progress or the applications of chemistry.

CHEMISTRY 500. Chemical Research. Chemical engineers or students who are specializing in chemistry are expected in their fifth year to elect at least nine hours a week in research under the direction of some member of the staff of instruction.

Students who desire to take their major work in chemistry should select their courses according to the following arrangement: First year, Chemistry 100; Second year, Chemistry 210 and Chemistry 220; Third year, Chemistry 300 and Chemistry 310; Fourth year, Chemistry 420 and Chemistry 430. The related courses in mathematics and physics should also be taken during the first two years if possible.

BIOLOGY 100. About half the year is given to the study of human physiology in connection with the study of structure, both gross and microscopic. A brief survey of the general principles of infection and immunity is included. The other half of the year is given to a study of morphology, ecology, embryology, and physiology, both animal and plant. The evolutionary point of view is presented at the very start; and, wherever feasible, is made the basis for the presentation, or of the inter-

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pretation, of the subject-matter at hand. Emphasis is placed on such topics as are of human interest or application. Three lectures and one three-hour laboratory period per week.

T Th S 11:30 Laboratory W Th or F 1:30-4:30 IV

BIOLOGY 110. Same as Biology 100, but with additional laboratory work to meet the needs of pre-medical students.

T Th S 11:30 Laboratory W Th or F 1:30-5:30 IV

BIOLOGY 200. A continuation of Biology 100. The study of the behavior, including that of the lower animals and of man, is approached from an evolutionary point of view and leads finally to a brief consideration of the general principles of psychology. The science of heredity is considered next. Wherever practicable, cases of human inheritance are referred to and used in illustrating or in leading to the general principles. Applications are made to evolution, both past and present. Further topics discussed and interpreted from the viewpoint of the principles of genetics are twinning, regeneration, morphogenesis, asexual and sexual reproduction, and fertilization. There follows next a study of cosmic and geological evolution, the succession of animal and plant forms in time, including man's place in this process and his present and possible future evolution. Three lectures and one three-hour laboratory period per week. (Prerequisite: Biology 100.)

M W F 9:30 Laboratory M 1:30-4:30 XI

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BIOLOGY 330. Sanitary Biology. (Prerequisite: Biology 100.) A study of the relation of Biology to sanitation and human health. The first term is devoted to a study of the relation of insects and their allies to disease, including the rôle of insects in the transmission of disease, an examination of important disease-transmitting species, and an investigation of their life histories and control measures against them. The animal parasites of man are taken up in the second term, special attention being given to modes of infection and prevention. The third term is devoted to a general introduction of bacteriology, with a discussion of the principles of immunity, and the prevention of disease by personal care and community effort.

M W F 8:30 Laboratory T 1:30-4:30 XII

BIOLOGY 340. Vertebrate Zoölogy. (Prerequisite: Biology 100.) A study of vertebrate animals, with special reference to local forms. The various classes of vertebrates will be discussed with regard to their systematic position, morphology and correlation of structure and habit, embryology and life history, geographic distribution, economic relationships, and methods of propagation or control.

M W F 10:30 Laboratory F 1:30-4:30 VII

BIOLOGY 350. General Embryology. A general course covering both vertebrate and invertebrate embryology. (Not offered in 1922-23.)

BIOLOGY 420. Cellular Biology. This course is very general in scope, including a study of all the important

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features of cell structure and activities, such as the constitution of protoplasm; its nutrition, metabolism, and mode of motion; irritability and the properties of nerve cells; the mechanism of development; youth and old age; and the physical basis of reproduction and heredity. Recent lines of experimental work in general physiology, embryology, and cytology will receive special attention. In the laboratory students will have an opportunity to study living and prepared specimens illustrating the course, and to become acquainted with some of the methods of modern biological experiment and technique. A knowledge of physics and of theoretical and organic chemistry is necessary. Three lectures and four to six hours of laboratory a week. (Not offered in 1922-23.)

BIOLOGY 510. General Problems of Biology. Reading, themes, and seminar work on advanced general topics of biology. Graduate course.

BIOLOGY 520. Special work in Biology. This course will consist of advanced work in some special field of biology and will be adapted to the needs of the particular student.

ECONOMICS 200. Elements of Economics. An introduction to the fundamental theories of economics and to their applications, with special reference to the problems of money, banking, transportation, international trade, and business organizations. T Th S 8:30 III

ECONOMICS 300. An introduction to Sociology. The course includes an analysis of the geographical and bi-

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ological factors in social evolution, social psychology, and a study of the functions of citizenship. There is added a rapid survey of modern social problems such as those of poverty, industry, immigration, public health and delinquency. Students expecting to take this course are advised to take Biology 100, History 100, and Economics 200.

M W F 11:30 IX

BUSINESS ADMINISTRATION 200. Business Management. The promotion and organization of business enterprises and the administration of such enterprises in operation. The course considers in particular marketing, financing, personnel management, risk-bearing, community and state relationships, accounting, and the interpretation of financial reports.

T Th S 9:30 V

BUSINESS ADMINISTRATION 300. Money and Banking. History of the currency. Organization and regulation of commercial and investment banks. The Federal Reserve System. Credit and instruments of credit, corporate securities, capitalization, reorganization, depreciation and reserves. Open to students who have completed Business Administration 200 or Economics 200.

T Th S 8:30 X

EDUCATION 100. History of Education. A survey is made of the historical development of educational theory and practice from the earliest times to the present.

T Th S 9:30 or 10:30 VIII

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EDUCATION 210. Educational Psychology. A survey is made of the leading facts and principles of psychology in their application to education. M W F 9:30 VIII

The Department of Education of the State of Texas will grant, without further examination, a State first grade teachers' certificate, valid for two years, to students who complete at the Institute a year's work consisting of one course in Education and four other courses. A person who has received two State first grade teachers' certificates valid for four years based upon four full college courses and one full course in the department of education may receive another such certificate by offering one additional course in education and four other courses, no one of which was offered for the first certificate. Applications for such certificates may be made at any time following the completion of the necessary work; the certificates expire on the second anniversary of the thirty-first day of August of the calendar year in which they are issued.

The Department of Education of the State of Texas will grant, without further examination, a State permanent teachers' certificate to persons holding the B.A. degree from the Rice Institute who have completed four of its courses in education and also to persons holding the B.A. degree from the Rice Institute who have taught three full years of not less than nine months each. The three years' teaching experience may be secured prior to, during the time of, or after the completion of the college work leading to the B.A. degree.

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HISTORY 100. European History. A general survey of the intellectual, social, and political development of Europe from the fourth century through the nineteenth. Lectures and required reading. T Th S 8:30 X

HISTORY 200. Constitutional Government. The origins and operation of constitutional government, the formation of public policy, and the conduct of public business in England, France, Germany and the United States. To alternate with Jurisprudence 300. (Not offered in 1922-23.)

HISTORY 220. The political, constitutional, social and economic history of England and the British Empire. To alternate with History 230. (Not offered in 1922-23.)

HISTORY 230. Modern European History. A study of social, political, and economic history of Europe since the beginning of the French Revolution.

T Th S 9:30 V

HISTORY 300. The historical development of the United States, with special reference to the period since the adoption of the Constitution. T Th S 10:30 I

HISTORY 400. Mediæval England after the Norman Conquest. Studies in political and constitutional history from the Conquest through Magna Charta. Characteristic features of Mediæval Civilization as illustrated in England. Some training in historical method.

T Th S 11:30 IV

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HISTORY 500. The interpretation of the Constitution by the courts. An advanced seminar course. Hours to be arranged.

HISTORY 510. American history since 1850. A seminar course for the intensive study of selected topics. Prerequisites: History 100, History 300, Economics 200 or their equivalents. (Not offered in 1922-23.)

JURISPRUDENCE 300. A course planned to give the student a knowledge of the history of the development and of the philosophy of law, together with a knowledge of the essentials of selected divisions of modern law, including Criminal Law, Torts, Contracts, Agency, Partnership, Negotiable Instruments, and Private Corporations.
M W F 8:30 XII

PHILOSOPHY 210. Logic and Ethics. First half-year: a study of the process of thinking, the laws of inductive and deductive reasoning, and the nature of truth. Second half-year: an examination of the development of moral ideas, the essentials of the main ethical theories and the problem of morality at the present time.

T Th S 10:30 I

PHILOSOPHY 300. History of Philosophy. An historical survey of the essential features and main currents of philosophical thought, ancient, mediæval, and modern.

T Th S 9:30 V

PHILOSOPHY 410. Philosophy of Religion. An introduction to the historical-philosophical study of relig-

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ion, dealing with the main facts in the evolution of religion and the more fundamental problems of the religious consciousness. T Th S 11:30 VI

PHILOSOPHY 420. Theory of Knowledge. An intensive critical study is made of selected portions of the writings of the classical epistemologists, notably Locke, Berkeley, Hume, and Kant. (Not offered in 1922-23.)

PHILOSOPHY 430. Advanced Logic. A critical study will be made of the system of some contemporary logician. Supplementary readings and papers on various assigned topics. M W F 10:30 II

PHILOSOPHY 500. Seminar. Hours to be arranged.

PHILANTHROPY 500. A course designed to train the student for professional social work. It includes the history of public and private relief, the functions of the more important social agencies, and the technique of social diagnosis and treatment. Theoretical instruction in the case method will be accompanied by field work under the direction of experts connected with the social agencies of the city of Houston. This course is limited to advanced students who are expecting to undertake professional social work. M W F 9:30 III

PHILANTHROPY 510. Social Problems. An intensive treatment of the following topics: Child Welfare, Industry, Immigration. This course aims to equip the student of social activities as well as the prospective

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social worker with a knowledge of important types of social maladjustment. It is open to qualified seniors who wish to pursue advanced work in social science. Prerequisites: History 100, Economics 200, Economics 300. (Not offered in 1922-23.)

PHILANTHROPY 520. Social Problems. This course is given alternately with Philanthropy 510, and applies the same methods of study to the following topics: Recreation, Delinquency and Crime, Public Health and Housing. M W F 10:30 VII

PHYSICAL TRAINING

THE athletic Field House, completed in the fall of 1920, with its ample locker and shower facilities, and with its gymnasium floor and modern athletic apparatus, not only meets the needs of the university athletic teams but also furnishes ample opportunity for systematic physical training on the part of all members of the institution. A charge of two dollars per academic year is made for the use of a locker.

One period of physical training each week is required of all men of the Freshman class and voluntary classes are formed for the benefit of all other members of the Institute. The classes are organized in such divisions as to eliminate direct competition between the physically weaker and the physically stronger among the students. The classes take up regular gymnastic work including boxing, wrestling, athletic dancing, basket-ball, indoor and outdoor base-ball, track work and the like. Appropriate emblems are awarded to students showing various

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degrees of efficiency. Numerous intramural games and contests are arranged between classes and other organizations to utilize the competitive spirit in the development of athletic and gymnastic proficiency. Each student is subjected to a thorough physical examination, and this examination determines in a large measure the character of work that the individual student is permitted to take. A fee of two dollars is required for each of these special physical examinations, and these medical examinations are made by the Medical Adviser to the Committee on Outdoor Sports. Lectures are given on personal hygiene and the principles of health.

COURSES IN ENGINEERING

COURSES are offered in chemical, civil, electrical, and mechanical engineering. A complete course in any one of these branches extends over five years. A student who has successfully completed the first four years of a course is awarded a bachelor's degree, and after successfully completing the remaining year of his course he is awarded a master's degree. It is intended in the engineering courses to pay special attention to the theoretical side, because experience has shown that theoretical knowledge is difficult to obtain after leaving the university, and without it a rapid rise in the profession of engineering is almost impossible. It is recommended that students obtain employment in engineering work during the summer vacations, for it should be remembered that no amount of university work can take the place of practical experience in engineering establishments and in the field. The courses in engineering are not intended

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to take the place of learning by practical experience, but are designed to supply a knowledge of the fundamental principles and scientific methods on which the practice of engineering is based and without which it is difficult, if not impossible, to succeed in the practice of the profession. The work of the first year is alike for all branches, in order that students may defer choice of a particular engineering course as long as possible. It is necessary for chemical engineers to make this choice at the beginning of the second year, civil engineers at the beginning of the third year, and electrical and mechanical engineers at the beginning of the fourth year.

The work of the first two years consists chiefly of courses in pure and applied mathematics, physics, chemistry, and other subjects, an adequate knowledge of which is absolutely necessary before the more technical courses can be pursued with advantage. Technical work is begun in the third year with courses of a general character in mechanical engineering, civil engineering, and electrical engineering, all three of these branches to be taken by all engineering students, with a slight change in schedule for those in chemical engineering. In the third year instruction of students in mechanical and electrical engineering is begun in shopwork. The classes in shopwork are intended to give familiarity with workshop methods. The object of these classes is not primarily to train students to become skilled mechanics, but to provide such knowledge of shop methods as is desirable for those who may be expected as engineers to employ mechanics and to superintend engineering shops.

Students who can afford the time are recommended to

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devote three or four years to preliminary work instead of two, taking the B.A. at the end of four years and an engineering degree at the end of six or seven years. Students proposing to do this are advised to take a course devoted largely to mathematics, physics, and chemistry, or an honors course in either mathematics, physics, or chemistry. The subjects taken during the years of preparatory work must include those of the first two years in the general engineering course, which may be substituted for options in the academic course. The honors course in physics is strongly recommended for those who wish to become either electrical or mechanical engineers. Typical schedules permitting such combination courses will be furnished by the Registrar on request.

The following are the schedules for the five-year course leading to a bachelor's degree in four years and an engineering degree in five years :

First Year

- (1) Mathematics 100
- (2) Physics 100
- (3) English 100
- (4) Chemistry 100
- (5) Engineering 110

Second Year

- (1) Mathematics 200 or 210
- (2) Applied Mathematics 200¹
- (3) Physics 200

¹ Chemical Engineers take Chemistry 210.

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- (4) French or Spanish²
- (5) Engineering 210³

Third Year

MECHANICAL ENGINEERING AND ELECTRICAL ENGINEERING

- (1) Mathematics 300
- (2) Mechanical Engineering 300
- (3) Electrical Engineering 300
- (4) Civil Engineering 300
- (5) Mechanical Engineering 310

CIVIL ENGINEERING

- (1) Mathematics 300
- (2) Mechanical Engineering 300
- (3) Electrical Engineering 300
- (4) Civil Engineering 300
- (5) Civil Engineering 310

CHEMICAL ENGINEERING

- (1) Chemistry 300
- (2) Chemistry 310
- (3) Electrical Engineering 300
- (4) Civil Engineering 300

² Chemical Engineers take German 100, other Engineers may substitute Chemistry 210.

³ Chemical Engineers take Chemistry 220.

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Fourth Year

MECHANICAL ENGINEERING

- (1) Mechanical Engineering Laboratory (M.E. 400)
- (2) Machine Design (M.E. 410)
- (3) Heat Engine (M.E. 420)
- (4) Industrial Management (M.E. 430) or an approved Elective
- (5) Gas Engines and Producers (M.E. 440)
- (6) Economics 200
- (7) Seminar (Eng'g 400)

ELECTRICAL ENGINEERING

- (1) Alternating Currents (E.E. 400)
- (2) Electrical Engineering Laboratory (E.E. 410)
- (3) Electrical Design (E.E. 420)
- (4) Industrial Management (M.E. 430) or an approved Elective
- (5) Economics 200
- (6) Seminar (Eng'g 400)

CIVIL ENGINEERING

- (1) Municipal Engineering (C.E. 420)
- (2) Masonry Construction (C.E. 440)
- (3) Graphic Statics and Structural Design (C.E. 450)
- (4) An approved Elective
- (5) Economics 200
- (6) Seminar (Eng'g 400)

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CHEMICAL ENGINEERING

- (1) Chemistry 420
- (2) Chemistry 430
- (3) Mechanical Engineering 300
- (4) Economics 200
- (5) Chemistry 480
- (6) Engineering 400 (Seminar)

Fifth Year

MECHANICAL ENGINEERING

- (1) Advanced Machine Design (M.E. 500)
- (2) Mechanical Plants and Processes (M.E. 510)
- (3) Thesis (M.E. 530)
- (4) Seminar (Engineering 400)
- (5) Elective (M.E. 520, or an advanced C.E., E.E., or science course)

ELECTRICAL ENGINEERING

- (1) Advanced Alternating Currents (E.E. 500)
- (2) Thesis (E.E. 510)
- (3) Heat Engines (M.E. 420)
- (4) Seminar (Eng'g 400)
- (5) Elective

CIVIL ENGINEERING

- (1) Structural Design (C.E. 500)
- (2) Hydraulic and Sanitary Engineering (C.E. 510)
- (3) Railway Engineering (C.E. 520)

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- (4) Elective (Must be approved)
- (5) Thesis (C.E. 530)

CHEMICAL ENGINEERING

- (1) Chemistry 500
- (2) Chemistry Elective
- (3) Chemistry Elective
- (4) Engineering Elective
- (5) Chemistry 480
- (6) Engineering 400 (Seminar)

ENGINEERING 110. Mechanical Drawing and Descriptive Geometry. Mechanical Drawing: the use of drafting instruments; lettering; drawing figures in isometric, cabinet, and orthographic projection; intersections and developments. Descriptive Geometry: orthographic projections of points, lines, planes, warped surfaces, etc., in the four angles of projection.

Section 1

W and F 11:30 and 1:30-4:30

Section 2

T and Th 11:30 M and T 1:30-4:30

ENGINEERING 210. Kinematics of Machines, Structural Drawing, and Plane Surveying.

KINEMATICS. The study of relative motion of parts of machines, instant centers, velocities, gearing and wrapping connectors.

T and Th 9:30 Th 1:30-4:30 (First half-year)

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STRUCTURAL DRAWING. Lettering; working drawings and tracings of structural details, and lectures on the manufacture and uses of the common structural materials. S 9:30-12:30 (First half-year)

PLANE SURVEYING. The study of the uses and adjustments of surveying instruments and of office methods. Problems are given in field work to familiarize the student with chain, compass, level, and transit. Plotting and compilations from field notes. Prerequisites: Engineering 110 and Mathematics 100.

T and Th 9:30 Th 1:30-4:30 S 9:30-12:30
(Last half-year)

ENGINEERING 400. Seminar. A weekly meeting conducted by the fourth year engineering students for the discussion of current topics from the technical periodicals, and of scientific and technical papers of general engineering interest. This course must be taken during the year in which the student is a candidate for the B.S. degree. F 1:30-4:30

MECHANICAL ENGINEERING 300. Prime Movers. A general course of lectures, recitations from text, and laboratory covering the characteristics, fields of usefulness, operation, and tests of fuels, steam engines and turbines, boilers, pumps, condensers, and auxiliaries; properties of steam; valve gears; simple internal combustion engines and accessories. Numerous problems illustrate the theory discussed. Prerequisites: Physics and Chemistry 100, Mathematics 200 or 210. Laboratory fortnightly.

M W F 10:30 M or T 1:30-4:30 VII

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MECHANICAL ENGINEERING 310. Engineering Shop. Text-book and lectures dealing with general shop practice and its effect on machine design, metallurgy, forge and foundry work. Practice with a variety of metal-working bench and machine tools, carefully selected for their fitness in illustrating the principles studied, affording actual contact with machine work and developing a certain degree of skill and resourcefulness in the student.

Recitations, all sections, T Th 9:30

Shop Section A W Th 1:30-3:30 F 1:30-4:30 V

Shop Section B T Th 10:30-12:30 S 9:30-12:30

MECHANICAL ENGINEERING 400. Senior Mechanical Laboratory. An advanced course in general steam, air, oil, water, and power-transmission machinery operation and testing. Recitations from text, reports, and laboratory. Prerequisite: Mechanical Engineering 300. Must be accompanied with or preceded by Mechanical Engineering 420.

T W 1:30-4:30 IX

MECHANICAL ENGINEERING 410. Machine Design. Recitations from text and references, also calculations and drafting involved in the design of machine parts, considering both the theory and its modifications due to shop practice and financial limitations. Prerequisites: Engineering 210, Mechanical Engineering 310, Civil Engineering 300.

M W F 8:30-11:30 XII

MECHANICAL ENGINEERING 420. Heat Engines. General thermodynamics; applications of thermodynamics to the design and operation of steam engines and tur-

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bines, air compressors; commercial forms of such machines, with special emphasis on steam turbines; elementary steam plant design. Prerequisite: Mechanical Engineering 300. Lectures, text, and problems.

T Th S 10:30 I

MECHANICAL ENGINEERING 430. Industrial Management. A study of the principles and practice in the management of manufacturing plants; location and layout of works; organization of administration, sales, cost and production departments; selection of machinery, materials, and labor; wage systems; cost analysis; welfare work; a short survey of the law of sales and contracts. Two recitations a week. Senior elective.

M W 11:30 II

MECHANICAL ENGINEERING 440. Gas Engines and Producers. A study of the theory, design, and operation of internal combustion engines, and gas-producers. Must be accompanied with or preceded by Mechanical Engineering 420.

T Th S 8:30 VII

MECHANICAL ENGINEERING 500. Advanced Machine Design. The investigation of elaborate complete machines; original design of complete machines; design of mill-building trusses, floors, and structural details.

MECHANICAL ENGINEERING 510. Mechanical Plants and Processes. A general course dealing with special plants and processes, such as the manufacture of cement, metallurgy, water-softening, oil production, etc., not cov-

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ered by other special courses. Details of design and operation of special power and heating plants. Prerequisite: Mechanical Engineering 420.

MECHANICAL ENGINEERING 520. Advanced Heat Engines. The design and operation of heating, ventilating, and refrigerating equipment and plants; design of standard types of steam turbines, engines, and boilers. Elective.

MECHANICAL ENGINEERING 530. Thesis. The investigation, under the Mechanical Engineering staff, of some undeveloped engineering problem, either through experiment, design, or compilation of available information. The time required will be at least that necessary for a standard advanced course. Two copies of the accepted report will be required for deposit in the Institute libraries.

ELECTRICAL ENGINEERING 300. The fundamental principles of dynamo machinery, both direct and alternating current. The course includes laboratory work, which as far as possible parallels the class-room work. Prerequisites: Physics 200 and Mathematics 200 or 210. Laboratory fortnightly.

T Th S 8:30 M or T 1:30-4:30 X

ELECTRICAL ENGINEERING 400. Alternating Currents. A mathematical treatment of the theory of alternating current phenomena, using Steinmetz's symbolic method. The various types of alternating current generators and

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motors; their characteristics and operation. Transformers. Synchronous converters. Prerequisite: Electrical Engineering 300. M W F 9:30 VIII

ELECTRICAL ENGINEERING 410. Electrical Engineering Laboratory. A laboratory study of alternating current circuits, instruments, and machines. Standard testing of direct and alternating current machinery. Prerequisite: Registration in Electrical Engineering 400. W Th 1:30-4:30 VI

ELECTRICAL ENGINEERING 420. Electrical Design. Design of machinery for direct and alternating current. Calculation of characteristics. Prerequisite: Electrical Engineering 300. T Th S 8:30 X

ELECTRICAL ENGINEERING 500. A continuation of Electrical Engineering 400. Advanced alternating currents. Transients. Attention will be given to special branches such as high voltage installations, high frequency, illumination, telephony, wireless telegraphy, etc. Three lectures and one laboratory period per week.

ELECTRICAL ENGINEERING 510. Thesis. A thorough report on an engineering investigation selected and carried out by the individual student. It is expected that a great deal of time will be given to thesis work. The course is considered the equivalent of a three-hour course.

CIVIL ENGINEERING 300. Strength of Materials and Hydraulics. Strength of Materials: a course given pri-

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marily for the study of the theory of beams, columns, and shafts. In the theory are considered stresses and deformations due to tensile, compressive, and shearing forces; the distribution of shear, bending moments, deflections, combined stresses, and torsional stresses. Physical tests of steel, wrought iron, cast iron, cement, and concrete are made in the laboratory. Hydraulics: a course devoted to the principles of hydrostatic and hydrodynamic pressures; the flow of water through orifices, pipes, nozzles, open channels, and over weirs. Prerequisites: Physics 100 and Mathematics 200. Laboratory fortnightly.

M W F 11:30 M or T 1:30-4:30 VI

CIVIL ENGINEERING 310. Topographic, Geodetic, and Railroad Surveying. In this course are given the theory and practice of base line and triangulation measurements, determination of meridian, traversing with transit and stadia and with a plane-table, and mapping. Simple, compound, reversed, vertical, and spiral easement railroad curves. Computation of earth work. (Prerequisite: Engineering 210.)

T Th 11:30 W Th 1:30-4:30 IV

CIVIL ENGINEERING 420. Municipal Engineering. The course is divided into three parts. Highways: Design, construction and maintenance of earth, sand-clay, macadam, bituminous macadam, asphaltic concrete, brick, wood-block, stone-block, and cement concrete roads. Soil analysis, materials, inspection, municipal, state, and federal highway legislation, methods of financ-

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ing. Water Supply Engineering: A study of rainfall, evaporation, yield, water-bearing strata, etc. Theory of the rain cycle, water analysis, methods of determining pollution, water power and irrigation methods. Design, construction, operation, and maintenance of purification systems, storage facilities, etc. Sewerage: A study of storm flow, modern methods of sanitation, disease epidemics, etc. Water-carriage system, separate and combined. Design, construction, maintenance of sewer elements and sewage disposal plants.

M W F 10:30 M 1:30-4:30 VII

CIVIL ENGINEERING 440. Masonry Construction. A study of the geology of common rocks and clays, the physical properties of common building stones, bricks, concrete, and concrete aggregates. A study of foundations. Theory and investigation of masonry retaining walls, dams, and arches. Theory of reinforced concrete beams, slabs, and columns. Prerequisite: Civil Engineering 300. T Th S 10:30 T 1:30-4:30 VI

CIVIL ENGINEERING 450. Graphic Statics and Structural Design. Algebraic and Graphic Statics. Theory and design of simple roof trusses, bridge trusses, and plate girders. Detailed drawings and estimates of cost and weight. Prerequisite: Civil Engineering 300.

M W F 9:30 W 1:30-4:30 VIII

CIVIL ENGINEERING 500. Structural Design. Design of steel office and mill buildings. Analysis of stresses in statically indeterminate structures such as swing, canti-

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lever, arch, and suspension bridges. A study of secondary stresses. Two lectures and one design period a week. Prerequisite: Civil Engineering 450 or its equivalent.

CIVIL ENGINEERING 510. Hydraulic and Sanitary Engineering. Investigation and development of water power. Design of dams and irrigating systems. Hydraulic turbines and pumps. Preliminary design for a water supply and sewerage system for a small city. Study of general sanitary problems including: garbage disposal, public health, street cleaning, etc. Three lectures and one design period a week. Prerequisite: Civil Engineering 420 or its equivalent.

CIVIL ENGINEERING 520. Railway Engineering. A study of the principles of economic location and construction, railway maintenance, railway structures. Design of terminals and signalling systems. Railway organization and valuation. Three lectures and one design period a week. Prerequisite: Civil Engineering 310 or its equivalent.

CIVIL ENGINEERING 530. Thesis. This will consist of an original investigation along some approved line of civil engineering work, an original design, or a critical review of existing work. In every case a complete type-written or printed report will be required, and this will become the property of the Institute and be deposited in the general or departmental library.

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COURSES IN ARCHITECTURE

To students of architecture the Institute offers a full course extending over five years, leading to a bachelor's degree at the end of the fourth year and to an architectural degree at the end of the fifth year. It is the purpose of the course in architecture to lead students during their residence to a comprehensive understanding of the art of building; to acquaint them with the history of architecture from early civilization to the present age; and to develop within them an understanding and appreciation of those conceptions of beauty and utility which are fundamental to the cultivation of ability in the art of design.

In arranging the courses which follow it will be observed that there are included certain indispensable elements of a liberal education and also such engineering and technical subjects as are becoming more and more necessary to the general education of a practising architect. Of the more strictly architectural subjects, design is given by far the largest place. As a matter of fact, the courses in history and design and those in freehand drawing, in water color, in drawing from life, and in historic ornament have all a double object: to create in the student an appreciation of architectural refinement and dignity, and to increase constantly his ability to express conceptions of architectural form. Accordingly, the training of the student is not limited to training in draftsmanship alone, but all courses conspire to the cultivation of creative and constructive ability in expression and design. With a view to keeping the student in touch

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with the progress of his profession and with the daily routine and detail of its practice, it is strongly recommended that he spend a portion of each of his summer vacations in the office of some practising architect.

The following are the schedules for the five-year course leading to a bachelor's degree in four years and a degree in architecture in five years:

First Year

- (1) Mathematics 100
- (2) English 100
- (3) French
- (4) Physics 100
- (5) Architecture 100: consisting of
 - (a) Elements of Architecture
 - (b) Freehand Drawing

Second Year

- (1) Pure Mathematics
- (2) English
- (3) French¹
- (4) A science
- (5) Architecture 200: consisting of
 - (a) Design
 - (b) Freehand
 - (c) History of Architecture

¹ Students who enter with credits in two modern languages may substitute another subject.

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Third Year

- (1) English
- (2) History or Economics
- (3) Architecture 300—Design
- (4) Architecture 310: consisting of
 - (a) Freehand Drawing
 - (b) Water Color
 - (c) History of Architecture

Fourth Year

- (1) English or History
- (2) Architecture 400—Design
- (3) Architecture 410¹: consisting of
 - (a) History of Painting
 - (b) FreehandArchitecture 510²: consisting of
 - (a) History of Sculpture
 - (b) Freehand
- (4) Architecture 430: consisting of
 - (a) Construction
 - (b) Special Lectures
- (5) Architecture 440: consisting of
 - (a) Historic Ornament
 - (b) Water Color

Fifth Year

- (1) Architecture 410³: consisting of

¹ Given in 1922-23 and in alternate years thereafter.

² Given in 1923-24 and in alternate years thereafter.

³ Given in 1922-23 and in alternate years thereafter.

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- (a) History of Painting
- (b) Life Drawing
- (c) Water Color
- (2) Architecture 500—Thesis Design
Architecture 510¹: consisting of
 - (a) History of Sculpture
 - (b) Life Drawing
 - (c) Water Color
- (3) Architecture 530: consisting of
 - (a) Construction
 - (b) Special Lectures

ARCHITECTURE 100.

(a) Elements of Architecture. Elementary training in drawing of order plates, wash drawings, lettering, with a series of lectures on descriptive geometry, shades and shadows, and perspective. Six hours a week.

M F 1:30—4:30 VIII

(b) Freehand Drawing. Elementary drawing in pencil and charcoal of single simple objects and block groups and casts. Four hours a week. T S 10:30—12:30

ARCHITECTURE 200.

(a) Design. Rendered drawings embracing the design of simple elements of buildings, together with advanced work in the use of the orders and in composition. Six hours a week. T Th 1:30—4:30

(b) Freehand. Drawing in charcoal from simple casts of classical ornament. Four hours a week.

T Th 10:30—12:30

¹ Given in 1923-24 and in alternate years thereafter.

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(c) History of Architecture. Two lectures a week on the history of ancient architecture, illustrated by lantern slides, and two hours a week of research and tracing of historic buildings. Four hours a week.

W F 3:30-4:30 II

ARCHITECTURE 300.

Design. The design of small buildings. The problems average five weeks in duration with twenty-four hours for the sketch problems at the end of major problems. Nine hours a week.

M W F 1:30-4:30 II

ARCHITECTURE 310.

(a) Freehand Drawing. Drawing from casts of antique sculpture. Four hours a week. MF 8:30-10:30

(b) Water Color. Elementary training in color drawing and simple groups of still life. Two hours a week.

W 8:30-10:30

(c) History of Architecture. Two lectures a week in the history of mediæval and modern architecture, illustrated by lantern slides, and two hours a week of research in the study of historic buildings. Four hours a week.

T Th 2:30-4:30 III

ARCHITECTURE 400.

Design. The design of public buildings and groups of buildings. The problems average six weeks in duration, alternating with twelve-hour sketch problems. Twelve hours a week.

M 1:30-5:30 T W Th F 3:30-5:30 II

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ARCHITECTURE 410. (Given in 1922-23 and in alternate years thereafter.)

(a) History of Sculpture. Two lectures a week on the History of Sculpture. A critical survey of the historic schools of sculpture and their influence on modern artistic effort. T Th 2:30-3:30 VIII

(b) Freehand. Drawing from casts of full figure and group, antique sculpture. Four hours a week.

M F 9:30-11:30

ARCHITECTURE 430. (Given in 1922-23 and in alternate years thereafter.)

(a) Methods of Construction. Three lectures a week on materials and construction, with one plate a week.

M W F 2:30-3:30

(b) Special Lectures. Lectures on the professional practice of architecture, including the business relations of architect with client and contractor. One lecture a week.

ARCHITECTURE 440.

(a) Historic Ornament. The study of the history of ornament, with a series of design plates in ornament from historic periods of architecture. Six hours a week.

T Th S 8:30-10:30 VI

(b) Water Color. Water-color drawing and sketching in color, work advanced, subjects varied. Two hours a week.

W 9:30-11:30

ARCHITECTURE 500.

Thesis Design. The problem for a thesis may consist

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of a single building or group of buildings, and must include large-scale studies as well as general drawings. The student may select his own problem, but his entire programme is subject to the approval of the instructors in design. Sixteen hours a week.

T Th S 8:30-12:30 M F 1:30-3:30

ARCHITECTURE 510. (Given in 1923-24 and in alternate years thereafter.)

(a) History of Sculpture. Identical with Architecture 410 (a). T Th 2:30-3:30 VIII

(b) Life Drawing. M W 10:30-12:30

(c) Water Color. Rendered architectural details and measured drawings in color. Two hours.

F 10:30-12:30

ARCHITECTURE 530.

(a) Construction. Two lectures a week on mechanics of construction, with one construction plate a week.

T Th 1:30-2:30

(b) Special Lectures. Identical with Architecture 430 (b).

Included in the work of design of the second, third, and fourth years with a special study of the theory of design.

UNIVERSITY EXTENSION LECTURES

To bring the people of the city and community into more intimate touch with the academic life of the university, and to carry the influence of that life directly to many

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homes not represented on the rolls of its undergraduate or postgraduate students, regular series of public lectures, in the form of university extension lectures, are offered without matriculation fee or other form of admission requirement. These performances are authoritative in character, but as non-technical and popular in treatment as their subjects will permit. From domains of literature, history, science, art, philosophy, and politics subjects of current interest as well as those of assured and permanent value are chosen. The present plan for these university extension lectures consists in giving each academic year two regular series of thirty-six lectures each on Mondays, Wednesdays, and Fridays, from the middle of November to the middle of February, the second series running similarly from the middle of February to the middle of May. All these lectures are delivered in the lecture halls and amphitheaters of the Institute, each afternoon lecture beginning promptly at 4:30 and closing not later than 5:30. In addition to the afternoon lectures, occasional Thursday evening lectures are given. The Rice Institute Pamphlet for January, 1918, contains a detailed record of the university extension lectures delivered at the Institute during the academic years 1913-14 to 1917-18, inclusive. These performances were partially interrupted during the war, but have been resumed under some modifications of the original plan as to time and place.

ENDOWED PUBLIC LECTURESHIPS

Two endowed public lectureships have been founded at the Rice Institute. The first of these, established in 1918

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by Mrs. Estelle B. Sharp, of Houston, has to do primarily with topics in the social sciences, while the second, founded in 1919 by Herbert Godwin, Esq., of Houston, is to be devoted initially to subjects of public concern during the period of reconstruction. The Sharp Lectureship was inaugurated in the autumn of 1918 by a course of lectures on "The Obligations and Privileges of Citizenship—a plea for the study of social science," by Sir Henry Jones, F.B.A., professor in the University of Glasgow. The Sharp lectures for the academic year 1919–20 were delivered by Professor Andrew Cunningham McLaughlin, of the University of Chicago. The Godwin Lectureship was inaugurated in the spring of 1920 by lectures on "The Conservation of the Institutions of the Republic," and "World-wide Coöperation among the Nations," by the Hon. William Howard Taft, twenty-seventh President of the United States of America. The Godwin Lectures for the year 1921 were delivered by Sir Auckland Geddes, the British Ambassador to the United States, and for the year 1922 by President A. Lawrence Lowell, of Harvard University.

RICE INSTITUTE PUBLICATIONS

AMONG the publications of the Rice Institute are at present included the Announcements, the Descriptive Brochure, the Programmes of University Extension Lectures, and the Rice Institute Pamphlet. The first three of these have appeared at intervals and in several editions; the Pamphlet, now in its eighth volume, is published quarterly in January, April, July, and October, with

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a view to giving wider publicity in permanent form to inaugural and other lectures in letters, science, and art by visiting lecturers and professors to the University. In this connection the reader may wish to turn to the paragraph of this Announcement concerning the formal opening of the Institute.

LIBRARY

QUARTERS for the Library of the Institute have been provided in the Administration Building. The affairs of the Library are administered by a committee of the Faculty and Miss Alice C. Dean, M.A., as Acting Librarian. In providing the initial equipment of the Library the policy is being followed of supplying such books as are necessary to supplement the courses of instruction and to support the independent investigations of members of the Faculty and advanced students. In this manner a high degree of efficiency becomes possible at the very beginning of the Library's existence. Moreover, for work of general and more popular interest the shelves of the Carnegie Library of Houston are accessible to all members of the Institute.

Besides several hundred current literary and scientific journals, the Library of the Institute contains at present above ten thousand volumes in back files of serial publications; among these may be mentioned complete files of the following: L'Academie des Sciences de Paris—Comptes Rendus, Acta Mathematica, American Academy of Political Science—Annals, American Anthropologist (New Series), American Electro-Chemical Society—

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Transactions, American Chemical Society—Journal, American Historical Association—Annual Reports, American Historical Review, American Institute of Chemical Engineers—Transactions, American Institute of Electrical Engineers—Transactions, American Journal of International Law, American Journal of Mathematics, American Journal of Philology, American Journal of Science, American Machinist, American Mathematical Society—Transactions and Bulletins, American Naturalist, American Political Science Review, American Review of Reviews, American Society for Testing Materials—Proceedings, American Society of Civil Engineers—Transactions, American Society of Mechanical Engineers—Transactions, *Annalen der Chemie*, *Annalen der Physik*, *Annals of Mathematics*, *Architectural Record*, *Archiv für Entwicklungsmechanik der Organismen*, *Archiv für Geschichte der Philosophie*, *Archiv für Zellforschung*, *Arts and Decoration*, *Astrophysical Journal*, *British Association for the Advancement of Science—Reports*, *California University—Publications in Zoölogy*, *Carnegie Institution of Washington—Publications*, *Chemical Abstracts*, *Chemical News*, *Circolo Matematico di Palermo—Rendiconti*, *La Critica*, *Current History Magazine*, *Educational Administration and Supervision*, *Educational Review*, *Electric Journal*, *Electrical World*, *Electrician*, *Engineering Index Annual*, *Engineering News-Record*, *L'Enseignement Mathématique*, *Ergebnisse der Anatomie und Entwicklungsgeschichte*, *Fortschritte der Mathematik*, *Gentleman's Magazine*, *Green Bag*, *Harvard Studies and Notes in Philology and Literature*, *Harvard Theological Review*, *Harvard*

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University—Contributions from the Jefferson Physical Laboratory, Hibbert Journal, Institution of Electrical Engineers—Journal, International Journal of Ethics, International Studiò, Jahrbuch der Radio-aktivität und Elektronik, Jahrbuch über die Fortschritte der Mathematik, Journal de Mathematiques, Journal de Chimie Physique, Journal de Physique, Journal of American Folklore, Journal of Animal Behavior, Journal of Economic Entomology, Journal of Industrial and Engineering Chemistry, Journal of Parasitology, Journal of Philosophy, Psychology, and Scientific Methods, Journal of Physical Chemistry, Journal of Speculative Philosophy, Journal of the Society of Chemical Engineers, Koninklijke Akademie (Amsterdam)—Proceedings, Larousse Mensuel, London Mathematical Society—Proceedings, La Lumière Électrique (and L'Éclairage Électrique), Mathematische Annalen, Metallurgical and Chemical Engineering, Millard's Review, Mind, Mississippi Valley Historical Association—Proceedings and Reviews, Monist, Modern Philology, Nation, National Electric Light Association Bulletin (New Series), National Municipal Review, National Society for the Study of Education—Yearbooks, Nature, New Republic, New York Times Index, Niles' Weekly Register, Notes and Queries, Philosophical Magazine and Journal of Science, Philosophical Review, Physical Review, Physiological Abstracts, Physikalische Zeitschrift, Political Science Quarterly, Power, Print Collectors' Quarterly, Quarterly Journal of Microscopical Science, Quarterly Review, Reale Accademia dei Lincei—Rendiconti, Revue General de l'Electricité, Revue Philosophique de la France et de

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l'Étranger, *Revue Semestrielle des Publications Mathématiques*, *Romanic Review*, *Royal Society of London—Philosophical Transactions and Proceedings*, *School and Society*, *Science Abstracts*, *Société Mathématique de France—Bulletin*, *Société Chimique de France—Bulletin*, *Social Hygiene*, *Society for the Promotion of Engineering Education—Proceedings*, *Society of Chemical Industry—Journal*, *Southwestern Historical Quarterly*, *Studien zur vergleichenden Litteraturgeschichte*, *Texas Supreme Court Reports*, *The Times Weekly (London)*, *United States Supreme Court Reports*, *Unpopular Review*, *Yale Review (New Series)*, *Zeitschrift für Analytische Chemie*, *Zeitschrift für Angewandte Chemie*, *Zeitschrift für Anorganische Chemie*, *Zeitschrift für Elektrochemie*, *Zeitschrift für Physikalische Chemie*, *Zoologischer Anzeiger*, *Zoologische Jahresberichte*.

LABORATORY INSTALLATION

THE physics laboratories are located on the north side of the academic court, adjoining the administration building, and are connected with the latter by a continuation of the original cloister. The buildings are constructed of brick and marble, corresponding in design to the style as defined in the administration building, but of a simpler character expressing their purpose as laboratories. The physics laboratory proper is a two-story building 275 x 56 feet, connected with a large lecture amphitheater 121 x 72 feet. The main building contains four large students' laboratories, two lecture rooms equipped for giving illustrated lectures, two class rooms, two dark

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rooms, a library, and administrative offices. The principal room of the amphitheater wing is a large lecture hall with seating capacity for about four hundred auditors. The room is fully equipped for giving illustrated lectures and is arranged with seats properly elevated to command a 28-foot lecture table which is supplied with gas, hot and cold water, compressed air, vacuum, and direct and alternating electric currents. In this wing also are six rooms fitted for research work in physics, a battery room in which a battery of 60 Edison storage cells of 300 ampere-hours' capacity has been installed with space provided for another equal battery, a switchboard room where the wires from the battery can be connected in any desired manner for use in the laboratories, motor generators for charging the batteries and supplying direct current to the lecture rooms and laboratories, a vacuum pump, liquid air plant, constant temperature rooms, a preparation room, a large dark room, and a fully equipped workshop. The floor of the workshop is supported free from contact with the surrounding walls so that vibration from the machines does not affect the building. Elevators for moving heavy apparatus are provided, and all laboratories, lecture rooms, and research rooms are equipped with individual service, for the students, of gas, water, steam, compressed air, vacuum, and both direct and alternating currents of electricity. The laboratory now contains a fine collection of modern apparatus suitable for teaching and research work in all branches of physics. This collection includes about seventy ammeters and voltmeters of all types, including a Kelvin gauge reading up to 30,000 volts and standard Weston instru-

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ments. About forty resistance boxes of all kinds are also provided, and numerous galvanometers, electrometers, and electroscopes of various types. High potential batteries and generators are available for research work. A large Weiss electromagnet, a Leeds and Northrup potentiometer, and complete equipment for the accurate measurement of the conductivity of solutions, a precision electric wave meter and precision air condenser, may be specially mentioned among the other electrical instruments. The optical instruments include a Hilger's wave length spectrometer, monochromatic illuminator, spectrophotometer, and quartz spectrograph; also a set of interferometers of various types. For work in heat, electrical furnaces, various types of radiation pyrometers, resistance thermometers, and standard thermocouples are available. The apparatus for general work includes several Gaede and diffusion pumps; also standards of weight, length, etc. The collection of apparatus for illustrating lectures is exceptionally complete. An instrument maker and a glass blower are employed in the construction of special apparatus for research work.

The department of chemistry is for the present housed in the mechanical laboratory and in an annex adjoining the same. It contains three large laboratories with locker space for three hundred and fifty students; two lecture rooms; six research rooms; a department library room; a spacious stock room, offices, apparatus rooms. The department is splendidly equipped with modern apparatus and materials for research and for lecture room and laboratory work in inorganic, organic, analytical, physi-

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cal, electro-, and industrial chemistry. Each laboratory room is equipped with the necessary conveniences, such as water, gas, alternating and direct current, air blast, hoods, suction pumps, etc. The lecture rooms are suitably arranged for the illustration of lectures by experiment and lantern projection. In the department library will be found the more important journals, works of reference, and standard text-books on the different branches of chemistry. These books and periodicals are accessible to all students.

The department of biology is for the present situated in the west end of the main wing of the physics laboratories. It contains a laboratory capable of seating sixty students; a lecture room with lantern for microscopic and other forms of projection; three research rooms, a preparator's room, store rooms, etc. The undergraduate courses are cultural in their aim. Laboratory work is given in all; microscopes of the most modern type are provided for the students. The department is equipped with an extensive series of specimens, casts, and charts for the study of zoölogy. Six binocular microscopes, seven microtomes of various kinds, thermostats, embedding baths, and considerable accessory equipment, including physiological apparatus, are available for research work. Most of the important current zoölogical periodicals are to be found in the library.

The department of architecture is located on the second floor of the mechanical laboratory, and is equipped with a large general drafting room modern in all its appoint-

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ments, and with a large studio for freehand drawing and water color. A working library of architecture adjoins the drafting room and is equipped with the standard architectural publications; current files of architectural periodicals; plates, photographs, and lantern slides. The freehand studio is well equipped with plaster casts from the antique, and of historic ornament. The department also possesses models for elementary instruction in the orders, and models for the teaching of construction.

In the equipment for instruction in Engineering Drawing may be mentioned a new, elaborate set of Olivier models including the war mast, hyperbolic paraboloid, elliptical, and conchoidal hyperboloid, conoid, groined, and cloistered arch, intersecting cylinders, raccording, warped surface and corne de vache.

The civil engineering laboratory is fully equipped with the usual surveying instruments, transits, levels, compasses, traverse tables and plane-tables, all of standard American makes. These include C. L. Berger and Sons, Buff and Buff, W. and L. E. Gurley, Bausch and Lomb, Keuffel and Esser, Eugene Dietzgen and Company, William Ainsworth and Sons, and Heller and Brightly. There is also a large assortment of the necessary auxiliary equipment such as tapes, rods, range poles, etc. The drafting room is fully equipped with instruments not required by each individual student, such as planimeters, protractors, special slide rules, military sketching boards, railroad curves and irregular curves consisting of splines and weights. The materials testing laboratory of this

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department is equipped with one 50,000 pound Riehle universal machine; one 100,000 pound Olsen machine; and one 60,000 inch-pound Riehle torsion machine; also a Fairbanks 2000 pound cement testing machine and the necessary auxiliary apparatus for making the usual tests. All these machines except the cement testing machine are operated by 220 volt, 3 phase, 60 cycle motors, directly connected so as to avoid all shafting and belting. It is planned to have a road materials testing laboratory and also a sanitary engineering laboratory for advanced students and research.

The electrical engineering laboratory is on the first floor of the engineering building. The laboratory power supply, arranged to be independent of the general Institute lighting and power system by running from a separate generator in the power house, is 220 and 110 volts, 3 phase, 60 cycles. From a central switchboard, the distribution of power is accomplished by open overhead busses to small switchboards conveniently located about the laboratory. The circuit breakers on these distribution boards are of varied make, representing Westinghouse, General Electric, I-T-E, Condit, and Roller-Smith practice. The laboratory equipment is ample for a thorough study of both direct and alternating current circuits and machinery. Direct current for laboratory use is obtained from a General Electric three wire generator, of 35 kilowatts capacity, 125 and 250 volts, driven from the alternating current source by a direct connected induction motor. The direct current equipment includes a 50 kilowatt 250 volt General Electric generator; two similar 5

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kilowatt 125 volt Western Electric generators with commutating poles, either flat or over-compounded, for parallel operation; a 5 kilowatt 110 volt Commercial shunt generator; a $3\frac{1}{2}$ kilowatt 125 volt Westinghouse flat compounded generator; a 1 kilowatt 500 volt Commercial generator; a $4\frac{1}{2}$ kilowatt Westinghouse generator with interpoles flat compounded for 125 volts; a 5 kilowatt 110 volt Commercial shunt generator; a 5 horse-power 500 volt Crocker-Wheeler generator; and a 6 volt General Electric generator with Tirrill voltage regulator capable of delivering 500 amperes, driven by a direct connected induction motor. A $7\frac{1}{2}$ horse-power Western Electric motor and a 2 horse-power Roth motor are both shunt wound for 220 volts; a 3 horse-power 230 volt General Electric variable speed shunt motor with commutating poles; a 10 horse-power Robbins and Myers motor, and two similar 13 horse-power Crocker-Wheeler motors, all three shunt wound for 230 volts; and a 4 horse-power 220 volt Sprague series motor. The equipment of alternating current machinery includes: two similar $7\frac{1}{2}$ kilowatt 220 volt General Electric 1-2-3-6 phase synchronous generators which may be direct connected as a frequency-changer set, or, by means of shifting stators, as a phase-displacement set, or used without mechanical connection for parallel and other operation; a 5 kilowatt 220 volt General Electric 3 phase synchronous generator with distributed field (round rotor); a $7\frac{1}{2}$ horse-power 220 volt Fairbanks-Morse 3 phase squirrel cage induction motor; a 5 horse-power 220 volt Westinghouse 3 phase slip-ring induction motor; a 10 horse-power 220 volt General Electric 3 phase induction motor with internal starting resist-

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ance; a $7\frac{1}{2}$ horse-power 220 volt Wagner unity power factor single-phase motor. Among the rather special alternating current machines may be mentioned, a dynamotor which when operating from a 110 volt direct current supply line is capable of delivering up to 18 amperes of current at 110 volts at a frequency of 500 cycles; an 8 kilowatt 110 volt General Electric 2-3-6 phase synchronous converter of the split or regulating pole type which may be driven by the direct current winding or by belt from an external source; and a 10 kilovolt-ampere General Electric 220 volt 3 phase induction regulator for raising or lowering voltage 100%. Other equipment includes: three 2 kilovolt-ampere Kuhlman 110/220:110/220 volt transformers; three 5 kilovolt-ampere General Electric transformers with taps for Scott and other connections; six 3 kilovolt-ampere Western Electric 110/220:110/220 volt transformers, reactances, both air and iron core; condensers; rheostats; and starting devices. Loads for testing purposes may be obtained by lamp banks, rheostats, or by three large iron water-boxes. The supply of meters consists of volt-meters (a.-c. and d.-c.), ammeters (a.-c. and d.-c.), watt-meters (single phase and polyphase), current and voltage transformers, power-factor meters, frequency meters, watt-hour meters, tachometers, synchronoscope, and several precision instruments for checking those used in the laboratory. An oscillograph is completely equipped for taking and developing both rectangular and circular records. Through a gift of Mr. Howard E. Hughes, of Houston, Texas, to the Institute, the electrical engineering department has a completely equipped radio communicating set. The gift

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of this apparatus promptly stimulated the organization, on the initiative of students of this department, of an intercollegiate radio association for the dissemination of news among the several colleges of this section. To the original set numerous additions have been made, the most recent of which is a 200-watt radio telephone and telegraph set.

The mechanical engineering laboratory equipment falls into five general classes: steam machinery, internal combustion engines, hydraulic machinery, air machinery, and apparatus for testing fuels and lubricants. The first class contains an 8×18 Murray-Corliss engine equipped with rope brake; a 7×7 vertical Wachs slide valve engine with Stephenson reversing gear, and a 7×10 horizontal slide-valve engine, both with Prony brakes; a $6 \times 4 \times 6$ duplex boiler feed pump; a 20 kilowatt direct current De Laval turbo-generator set, nozzled for condensing and non-condensing operation and fitted with a brake-pulley which may be substituted for the generator; a steam turbine nozzle arranged for experimental work; a Westinghouse locomotive type air-compressor; a 205 cubic foot Ingersoll-Rand 2 stage steam driven air compressor; and a $6 \times 10 \times 6$ vertical compound Sturtevant engine. The machines are piped to exhaust either into the power-house stack or into three Wheeler surface condensers served by circulating and wet vacuum pumps. Internal combustion engines are represented by a 20 horse-power fuel oil engine (Chicago Pneumatic Tool Co.); a 15 horse-power Foos oil engine equipped with two types of governors giving opportunity for engine tests using either kerosene

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or gasoline as fuel; a 3 horse-power Mietz and Weiss two-stroke cycle unit; a 100 horse-power Hall-Scott aëroplane engine; a Maxwell automobile engine; and a Ford automobile engine with water-brake load. A slotted iron bed-plate with adjustable engine supports aids in tests of borrowed engines. The hydraulic machinery consists of a 3 inch centrifugal pump and a 4 × 6 triplex pump, both driven by variable speed D. C. motor; a calibrated overhead tank; a concrete storage cistern; three Venturi meters; a single tube manometer; a steam pulsometer; a hydraulic ram; two weir boxes and notches; a Pelton-Doble water wheel with plate glass sides; orifices, water meters, weighing tanks and scales, gauges, and the usual small accessories. In a separate fuel laboratory room is the equipment for testing fuels and oils. It includes complete Atwater and Parr coal-calorimeter outfits; analytical balances; two types of Orsat flue-gas apparatus; Scott and Saybolt viscosimeters; a Thurston coefficient of friction machine; Bureau of Mines flash-point tester; hydrometers and specific gravity apparatus; a Junker type gas calorimeter; platinum ware, drying oven, ball mill, etc. In another small room is a 20 horse-power vertical fire-tube boiler with the pumps and weighing equipment necessary for boiler tests. Tests of heat-treated steel may be made with the aid of the electric and gas furnaces, pyrometers of electric, expansion, optical, and gas pressure types, scleroscope, and Brinell ball machine.

In addition, the laboratory contains a Sirocco blower driven by calibrated D. C. motor, Pitot tubes, air Venturi meter, anemometer, injectors, dead weight pressure gauge tester, thermometer calibration apparatus, hoists, tachom-

PRELIMINARY ANNOUNCEMENTS

eters, steam calorimeters, the most popular gas and steam engine indicators, planimeters, standard gauges and thermometers. For classroom demonstrations, a Cussons valve-setting model, an automobile engine, several dozen sectioned models of intricate machines, and a collection of lantern slides, blue-prints, and curves are available.

A standard moving picture machine permits the exhibition of the many films now loaned by manufacturers of engineering equipment.

The machine shop contains machine tools of quite varied character, each selected for its peculiar fitness to illustrate the principles and common details of modern shop tools and methods. The lathe equipment consists of ten machines: one 14 × 8 Le Blond cone-head lathe with taper attachment and double back gears; one 14 × 6 Hendey cone-head quick-change lathe; one 14 × 8 standard lathe; one 14 × 7 Prentice geared head quick-change lathe; one 14 × 6 geared head quick-change Lodge and Shipley lathe; one 14 × 6 motor-driven Lodge and Shipley selective head lathe; a Rivett bench lathe; and two individual drive 14 × 6 American high duty geared head engine lathes, one of these with turret attachment. The planer type of machine is represented by a 16 inch back-gear Rockford shaper with compound head, and a 22 × 22 × 8 foot Gray planer. All kinds of plane surfaces can also be cut upon the two Kempsmith universal milling machines, which are fitted with dividing heads for gear cutting, differential indexing, spiral grooving, etc., as well as a good variety of cutters. A No. 12 Brown and

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Sharp motor-driven cutter and universal grinder serves as a practical example of a high-class precision machine tool. A graphical wattmeter permits tests of tool shapes and machining conditions. A tilting brass-furnace, moulders' benches, wood lathe, and the necessary small tools provide for simple pattern and foundry work. The metallurgy equipment is listed above. For miscellaneous work, a double-disc motor-driven disc grinder, work benches and vises, two hand-tool grinders, a power hack-saw, forges, a 20-inch drill-press, a sensitive drill, an arbor press, an air hammer and air drill, portable electric grinders, and a complete oxyacetylene welding outfit are available. A sufficient supply of small hand and machine tools, lathe sets, reference standards and precision measuring instruments is issued on checks from a separate tool-room. About half the machines have individual motor drive. The others are grouped about a line-shaft and a 15 horse-power motor.

STUDENT ORGANIZATIONS

IN the residential halls for men, students and instructors are already living in a common society a common life under conditions the most democratic. They sit at a common table; they lounge in common club-rooms; they frequent the same cloisters; in games they meet again upon the same playing fields. The quadrangle is self-governed, with no other machinery of government than is necessary to conduct a gentleman's club. To the quadrangle, as to the college, the only possible passports are intellect and character. In the quadrangle, as on the

PRELIMINARY ANNOUNCEMENTS

campus, the business of life is regulated by no other code than the common understanding by which gentle folk determine their conduct of life, constantly under the good taste, the good manners, the enduring patience of gentle minds, among strong men who believe that he lives most who works most, labors longest, worries least.

From the very opening days of the new institution the students of the Rice Institute, irrevocably committed to canons of clean sport, have participated in the several forms of intercollegiate athletic contests. The first society of students to be organized at the new University was the Young Men's Christian Association. This step on the part of the young men was speedily followed by a similar step on the part of the young women in the organization of their branch of the college Young Women's Christian Association. The founding of these religious societies, both of which have contributed to the social life and the religious spirit of the new University, has been followed in the course of the early years by the forming of some four or five literary societies: two by the young women, the older society bearing the name of Elizabeth Baldwin, wife of the founder of the Institute, and a later organization known as the "Pallas Athene Literary Society," and three by the young men, known respectively as "The Owl Literary Society" and the "Riceonian Literary and Debating Society," and a later organization, "The Congressional Club," organized after the order of the House of Representatives and considering in debate the leading public issues as they arise before Congress. Under the auspices of the first societies mentioned was formed the first of the undergraduate periodical publica-

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tions, namely, "The Thresher," which appeared fortnightly from its initial number in January, 1916, to the present year, during which it has been published weekly. Previous to the organization of the staff of "The Thresher," the Class of 1916 made arrangements for the publication of the first class annual of the Institute, "The Campanile," which appeared in the spring of 1916. The second and third volumes were issued by the classes of 1917 and 1918 respectively, and subsequent annual editions have been published by the representatives of the student body as a whole. In addition to the student organizations mentioned above, various departmental clubs and scientific societies have been contributing to the intellectual life of the Institute. The student body is organized into a Student Association which includes all students of the Institute and serves as the official organ for the expression of their views and for the promotion of student enterprises. In particular the undergraduate periodicals are now maintained under the auspices of this association. A Students' Council, elected by the Association, provides leadership in the Association. The President of the Students' Council is also President of the Association.

The extra-curriculum academic and athletic activities of the Rice students have been stimulated by several prizes donated by friends of the Institute; namely, the Lechenger silver cup, the gift of Mr. L. Lechenger, for the winning debating team in the annual commencement contest of the literary societies; the Shotwell and Harris gold medal, the gift of Messrs. W. I. Shotwell and I.

PRELIMINARY ANNOUNCEMENTS

Harris, for the winner of the annual oratorical contest of the literary societies; the Wilson silver cup, the gift of Mrs. H. A. Wilson, for the winning team of the annual class debate of the young women's literary society; the Kalb basketball memorial silver cup, the gift of Mr. E. F. Kalb; and the Sweeney silver cup, the gift of the J. J. Sweeney Company, to be contested for annually in class track athletics. Mr. William M. Rice, Jr., has provided a cabinet for the preservation and exhibition of these and similar gifts and trophies of Rice local and intercollegiate contests. This elaborate cabinet, designed by Mr. R. A. Cram, supervising architect of the Institute, is a most beautiful example of wood carving.

THE UNIVERSITY OF CHICAGO PRESS
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SIXTH
ANNUAL COMMENCEMENT

THE
CITY OF BOSTON

OFFICE OF THE COMMISSIONER OF PUBLIC WORKS

1911

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SIXTH ANNUAL COMMENCEMENT

DEGREES IN COURSE CONFERRED

JUNE 6, 1921

At the sixth annual commencement convocation of the Rice Institute held at the conclusion of the ninth academic session the baccalaureate sermon was preached by Dr. Herbert Lockwood Willet, Professor of the Semitic Languages and Literatures in the University of Chicago, Chicago, Illinois, and the commencement address was prepared by Dr. Charles William Eliot, President Emeritus of Harvard University, Cambridge, Massachusetts. On recommendation of the Faculty and by authority of the Trustees, the President of the Rice Institute, at the final ceremonies in the Academic Court on the morning of June 6, 1921, conferred the following degrees respectively:

BACHELOR OF ARTS

Charles Harold Atkinson	Chester Eaves Bradley
Marguerette Hoover Atkinson	Edward Vandiver Brown— with distinction
James Lockhart Autry	Nora Louise Cabaniss
Helen Huntington Batjer	Maude Terry Campbell
Patricia Beaumont	Helene Demetrios
Joseph Chaffin Benson	Caranagnostis
Gertrude Boxley—with distinction	Margaret Beatrice Coghlan

THE RICE INSTITUTE

Henry Andrien Renshaw Drouilhet	Robert Kennedy Maddrey
Helen Freyer	Gloria Irene Norvell
George Conklin Gaines, Jr.— with distinction	Addison Stayton Nunn
Kathleen Helena Gemmer	Joseph Tryon Overcash
Inez Goodman—with distinction	George Blanton Powell
Norma Ruth Greenhill	William Shaw Ragland
Hanna Marie Harder	Helen Marie Roney
Rudolph Keener Harlan	Charles Frederick Roos
Rosalee Hemphill	Volney James Rose
Marie Louise Hogg	Ottis Pearson Secor
Idawynne Howard	Helen Emma Shriner
Sue Roselle Hurley—with distinction	Leonard Smidth
Dudley Crawford Jarvis	Helen South
Gaylord Johnson	Charles Lowery Suttles
Daniel Le Roy Jones	Fernley Asbury Tatum
Lola Taylor Kennerly	Roy Alfred Taylor
Otto John Lottman	Emily Otway Thomas
Henry Malcolm Lovett	Tracy Yerkes Thomas— with honors in mathe- matics and physics
James Lewis Caldwell McFaddin—with distinction	Roy Tipton
Mildred Elizabeth McPhillips	Reginald Banks Upshaw
Albert William McWhorter	Clarence Edwin Wademan
	Norris Austin West
	Robert Oliver Wilford, Jr.
	Willett Wilson, Jr.
	Lucy Madalyn Zimmer— with distinction

BACHELOR OF SCIENCE

Pierre Numa Almeras	Clarence Leon Carson
John Joseph Beshara	Dick Kendall Cason, Jr.
William Nathaniel Bush	Jesse Ions Cornelison

PRELIMINARY ANNOUNCEMENTS

Walter Bart Cunningham	Melvin Raymond Peterson
Cleo Lafoy Dowell	Louis Henry Schlom
Louis Ehrenfeld—with distinction	Charles Bernard Schram
Olan Robert Hyndman— with distinction	Ben Ivor Still
Bert Marsh Mutersbaugh	Henry Davis Timmons
	Charles Patton Wilson, Jr.

MASTER OF ARTS

Charles Flinn Arrowood	Nellie Opal Porter
Paul Edward Boucher	Elizabeth Snoddy
Maud Lee Woods	

DOCTOR OF PHILOSOPHY

Allen Darnaby Garrison

THE RICE INSTITUTE

SCHOLARSHIPS AWARDED FOR 1921-22

THE GRAHAM BAKER STUDENT

Margaret Outhwaite Blackwell, Class 1922, of La Porte,
Texas

THE HOHENTHAL SCHOLARS (*alphabetical*)

Sybil Marie Denniston, Class 1924, of Houston, Texas
Harry Eugene Durham, Class 1923, of Texarkana, Texas
Emily Burns Gard, Class 1923, of Houston, Texas
Hugh Raleigh McKean, Class 1922, of Mykawa, Texas
Alma Nemir, Class 1922, of Waco, Texas
Kenneth Rowe, Class 1922, of McAllen, Texas

THE SHARP SCHOLARS IN CIVICS AND PHILANTHROPY (*alphabetical*)

James Ludwell Davis, Class 1922, of San Augustine, Texas
Sara Williams Davison, Class 1922, of Hubbard, Texas
Roselle Hurley, B.A. (Rice), 1921, of Houston, Texas
Mabel Virginia Wilson, B.A. (Rice), 1920, of Houston,
Texas

THE SCHOLAR OF THE JOHN MCKNITT ALEXANDER CHAPTER, DAUGHTERS OF THE AMERICAN REVOLUTION

Genevieve Friedenthal, Class 1923, of Houston, Texas

LIST OF STUDENTS

1921-1922

LIST OF STUDENTS

GRADUATE STUDENTS

- Barnes, Bentley Tiffany* *Indiana, Pennsylvania*
B.A., Park College, 1917
- Dunlay, Edward Erik *Houston, Texas*
B.A., University of Texas, 1920
- Goodman, Inez *Houston, Texas*
B.A., Rice, 1921
- Harder, Hanna Marie *Houston, Texas*
B.A., Rice, 1921
- Hathorn, John Broadus* *Sonora, Texas*
B.A., Rice, 1918
- Hickson, Alison Pugh *Houston, Texas*
B.A., Furman University, 1901
M.A., Eastern College, 1908
- Hurley, Sue Roselle *Houston, Texas*
B.A., Rice, 1921
- Hyndman, Olan Robert *Houston, Texas*
B.S., Rice, 1921
- Johnson, Gaylord* *Houston, Texas*
B.A., Rice, 1921
- Lee, Lenoir Valentine* *Houston, Texas*
B.A., Richmond College, 1913
B.D., Theological Seminary of
Virginia, 1916
- McElroy, William Addison *Idabel, Oklahoma*
B.A., Austin College, 1918

* Candidacy for advanced degree approved.

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- Maddrey, Robert Kennedy . . . *Bonham, Texas*
B.A., Rice, 1921
- Michal, Aristotle* *Springfield, Mass.*
B.A., Clark College, 1920
M.A., Clark University, 1921
- Nunn, Addison Stayton *Saint Jo., Texas*
B.A., Rice, 1921
- Roos, Charles Frederick *Houston, Texas*
B.A., Rice, 1921
- Taylor, Roy Alfred *Houston, Texas*
B.A., Rice, 1921
- Underwood, Patrick Henry . . *Galveston, Texas*
B.A., Rice, 1917
- Wilson, Mabel Virginia* *Houston, Texas*
B.A., Rice, 1920
- Young, Thelma Katherine . . . *Houston, Texas*
B.A., University of Texas, 1921

*Candidacy for advanced degree approved.

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SENIORS*

Abernathy, Louis Randolph	<i>Houston, Texas</i>
Attwell, Martha Virginia	<i>Houston, Texas</i>
Barrett, Chester Arthur	<i>Gainesville, Texas</i>
Berleth, Francis Hancock	<i>Houston, Texas</i>
Blackwell, Margaret Outhwaite	<i>Houston, Texas</i>
Breed, Augusta Uglow	<i>Houston, Texas</i>
Brogniez, Frantz Philip	<i>Houston, Texas</i>
Brown, Ila Cloyce	<i>Galveston, Texas</i>
Bushong, Paul Donner	<i>Port Arthur, Texas</i>
Carson, Robert Baker	<i>Houston, Texas</i>
Carter, Emmett Finley	<i>Elgin, Texas</i>
Chrisman, Wilma Lena	<i>Trinity, Texas</i>
Cooperman, Eva Ella	<i>Houston, Texas</i>
Crallé, Robert	<i>Groesbeck, Texas</i>
Crofton, Walter Montgomery	<i>Houston, Texas</i>
Cunyus, George Grady	<i>Longview, Texas</i>
Dain, James Warren	<i>Smithville, Texas</i>
Damiani, Caesar Andrew	<i>Dallas, Texas</i>
Dargan, Alfred Neal	<i>Houston, Texas</i>
Davidson, Alma	<i>Corsicana, Texas</i>
Davis, James Ludwell	<i>San Augustine, Texas</i>
Davis, William Owen	<i>Gainesville, Texas</i>
Davison, Sara Williams	<i>Hubbard, Texas</i>
Dawson, Dixie Dorothy	<i>Logansport, Louisiana</i>
De Prato, Edwin William	<i>Texarkana, Texas</i>
Duggan, Earnest Russell	<i>Belton, Texas</i>
Dutton, Clinton LeRoy	<i>Duncan, Oklahoma</i>
Dutton, James Richard	<i>Houston, Texas</i>
Eaton, Marion Lois	<i>Houston, Texas</i>
Etchison, Roy Pardo	<i>Waco, Texas</i>
Filson, Martha	<i>Houston, Texas</i>

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Fulmer, Harry Wilbur	<i>Billings, Montana</i>
Giezendanner, Stuart Sawyer . . .	<i>Houston, Texas</i>
Gresham, Hill Campbell	<i>Temple, Texas</i>
Hargis, Fred D.	<i>Dallas, Texas</i>
Henry, Jake	<i>Denison, Texas</i>
Heyck, Theodore Richard	<i>Houston, Texas</i>
Higgins, Lula	<i>Reagan, Texas</i>
Hilswick, Moselle Margaret	<i>Houston, Texas</i>
Hirsch, Marvyn Lister	<i>Houston, Texas</i>
Hodges, Dan Littleton	<i>Mexia, Texas</i>
Hughes, James Hearne	<i>Sherman, Texas</i>
Humason, Lawrence Wilfred	<i>Houston, Texas</i>
Humber, Jason	<i>Houston, Texas</i>
Hunt, Helen Mar	<i>Houston, Texas</i>
Lane, Gessner	<i>Houston, Texas</i>
Lee, Robert Woodson	<i>Houston, Texas</i>
Lehman, Clay Hughey	<i>Texarkana, Texas</i>
Leland, Anah Marie	<i>Houston, Texas</i>
Lindsey, Marion Lee	<i>Beaumont, Texas</i>
McKean, Hugh Raleigh	<i>Houston, Texas</i>
Marshall, Logan Patton	<i>Houston, Texas</i>
Marshall, William Beatty	<i>Houston, Texas</i>
Mathieu, Henry Philip	<i>Houston, Texas</i>
Mayer, Benjamin Foster	<i>Bartlesville, Oklahoma</i>
Mellinger, John Sweeney	<i>Houston, Texas</i>
Merritt, William Edward, Jr.	<i>Houston, Texas</i>
Meyer, John Nicholas	<i>Dallas, Texas</i>
Miller, Lucille Marie	<i>Bellville, Texas</i>
Moore, Louise Gillespie	<i>Houston, Texas</i>
Moore, Ruth	<i>Houston, Texas</i>
Moore, Thomas William	<i>Houston, Texas</i>
Morrison, George Lyon	<i>El Paso, Texas</i>
Nemir, Alma	<i>Grand Island, Nebraska</i>
Payne, Brittain Ford	<i>Houston, Texas</i>

PRELIMINARY ANNOUNCEMENTS

Pelletiere, Joseph Anton	<i>Houston, Texas</i>
Pleasants, Julia Atkinson	<i>Houston, Texas</i>
Pollard, Albert Harrison	<i>Temple, Texas</i>
Randall, La Baume Elliott	<i>Dallas, Texas</i>
Randlett, Marion Randall	<i>Lancaster, Texas</i>
Reinhardt, John Caspar	<i>Texarkana, Texas</i>
Rommel, Marie Rose	<i>Houston, Texas</i>
Riddick, Campbell Wiley	<i>Houston, Texas</i>
Rowe, Kenneth Thorpe	<i>McAllen, Texas</i>
Rudersdorf, William Morrison . .	<i>Houston, Texas</i>
Scharnberg, Lester Nathan	<i>Houston, Texas</i>
Schneider, Werner Alexander . .	<i>Houston, Texas</i>
Shacklett, John Wilson	<i>Houston, Texas</i>
Shaw, John Feary	<i>Canyon, Texas</i>
Shelburne, Samuel Ainslie	<i>Sherman, Texas</i>
Smith, Grace Crawford	<i>Houston, Texas</i>
South, Dudley Pritchett	<i>San Marcos, Texas</i>
Stuart, James Blair	<i>Houston, Texas</i>
Swinford, Jerome Kenneth	<i>Houston, Texas</i>
Tidwell, Wyatt Rodney	<i>Mexia, Texas</i>
Trussell, Hughie Dunn	<i>Mount Calm, Texas</i>
Underwood, John Arthur, Jr. . . .	<i>Honey Grove, Texas</i>
Vanzant, Frances Ralston	<i>Houston, Texas</i>
Wall, Hilda Joyce	<i>Houston, Texas</i>
Wear, Hally Rosalie	<i>Brownwood, Texas</i>
Webb, Charles Galloway	<i>Dallas, Texas</i>
Williams, Robert Parks	<i>Leesburg, Florida</i>
Woodruff, Kate Hooper	<i>Houston, Texas</i>

JUNIORS*

Aitken, Melvin Nichol	<i>Houston, Texas</i>
Alexander, Miller Hutchins	<i>Decatur, Georgia</i>
Barnes, J. Peyton	<i>Houston, Texas</i>

* As classified October 1st, 1921.

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Barrick, Dale Larimore	<i>Houston, Texas</i>
Batjer, Arch Dunbar	<i>Abilene, Texas</i>
Batsch, Frank Ferdeline	<i>Houston, Texas</i>
Beard, Bernice	<i>Houston, Texas</i>
Bell, Burnice	<i>Houston, Texas</i>
Best, Frances Lenita	<i>Houston, Texas</i>
Bickford, Reginald Scott	<i>Boston, Massachusetts</i>
Black, Fanny Hamlin	<i>Houston, Texas</i>
Bloxsom, Allan Penny	<i>Houston, Texas</i>
Boettcher, Fred Charles	<i>Houston, Texas</i>
Bradshaw, Dorothy Stutzman . . .	<i>Houston, Texas</i>
Bradshaw, Margaret Naomi	<i>Houston, Texas</i>
Brown, Charles Ewing	<i>Houston, Texas</i>
Burch, Bernard Owen	<i>Port Arthur, Texas</i>
Cain, Arthur Benton	<i>Yoakum, Texas</i>
Calvin, Dea Bailey	<i>Houston, Texas</i>
Campbell, Thomas Holland	<i>Temple, Texas</i>
Cashion, Martin Henry Lyle	<i>Texarkana, Texas</i>
Cecil, Lamar Ryan	<i>Houston, Texas</i>
Coleman, Walter Leslie	<i>Corpus Christi, Texas</i>
Cook, Alfred Adolphus	<i>New Waverly, Texas</i>
Doehring, Carl Frederic	<i>Houston, Texas</i>
Dunlap, Bernard Price	<i>Dallas, Texas</i>
Durham, Harry Eugene	<i>Texarkana, Texas</i>
Dutton, Catherine Elizabeth	<i>Houston, Texas</i>
Dyer, Edwin Hawley	<i>Houston, Texas</i>
Earthman, Addie May	<i>Houston, Texas</i>
Ellis, Athna Bryan	<i>Palestine, Texas</i>
Farrar, Ellen Taylor	<i>Houston, Texas</i>
Fischl, Gladys	<i>Ardmore, Oklahoma</i>
Fitzgerald, William James	<i>Houston, Texas</i>
Flaxman, Theodore Alexander . . .	<i>Shreveport, Louisiana</i>
Francisco, George Carl, Jr.	<i>Dallas, Texas</i>

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Friedenthal, Genevieve	<i>Houston, Texas</i>
Gard, Emily Burns	<i>Houston, Texas</i>
Gillman, Joseph Leviness	<i>Atlanta, Georgia</i>
Goodwin, James Buford	<i>Houston, Texas</i>
Goss, Henry Frank, Jr.	<i>Abilene, Texas</i>
Harrison, Elizabeth	<i>Houston, Texas</i>
Hinkley, Burt Eardly, Jr.	<i>Brownsville, Texas</i>
Hornbuckle, John Spence	<i>Houston, Texas</i>
Jamerson, Stewart Marquis	<i>Edna, Texas</i>
Johnson, Fred W.	<i>El Campo, Texas</i>
Johnson, Tresmer	<i>De Ridder, Louisiana</i>
Jones, Herbert Sinnigson	<i>Houston, Texas</i>
Jordan, Pauline	<i>Houston, Texas</i>
Kennedy, Alson Rankin	<i>Sabinal, Texas</i>
Killingsworth, Mary Louison	<i>Houston, Texas</i>
King, Allie	<i>Houston, Texas</i>
King, Geane	<i>Houston, Texas</i>
King, Ruby Gordon	<i>Houston, Texas</i>
Kingsland, Aline	<i>Houston, Texas</i>
Kinnear, Reginald Augustus	<i>Beaumont, Texas</i>
Kochan, Millie	<i>Houston, Texas</i>
Kropp, Richard	<i>Houston, Texas</i>
Landram, Charles Scott	<i>Houston, Texas</i>
Lay, Mary Courtenay	<i>Houston, Texas</i>
Lee, Katheryn	<i>Houston, Texas</i>
Lee, Marguerite	<i>Kirbyville, Texas</i>
Leftwich, James Brooks	<i>Comanche, Oklahoma</i>
Lieb, Herbert James	<i>Houston, Texas</i>
Luecke, Theodore Edward	<i>Wichita Falls, Texas</i>
McCollough, Byron Godfrey	<i>Houston, Texas</i>
McElroy, Bertholde Bracken	<i>Belton, Texas</i>
McFarland, Van Haile	<i>Eagle Pass, Texas</i>
McGee, Graves Alphus	<i>Abilene, Texas</i>

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Mackenzie, Mary Lee	<i>Houston, Texas</i>
Maury, Cora Hunton	<i>Houston, Texas</i>
Mount, Allen Wade	<i>Corpus Christi, Texas</i>
North, Marjorie	<i>Phænix, Arizona</i>
O'Brien, William Henry	<i>Dublin, Texas</i>
Oliphint, Tannie Lee	<i>Houston, Texas</i>
Ratcliff, Dorothy	<i>Houston, Texas</i>
Ritter, Joseph Crocker	<i>Ferris, Texas</i>
Robertson, Ernest Milton	<i>Wichita Falls, Texas</i>
Schwartz, Frances Louise	<i>Houston, Texas</i>
Sewell, David Walter	<i>Mexia, Texas</i>
Shacklett, Mary Le Grande	<i>Houston, Texas</i>
Sherry, Frank Bertrom	<i>Jonesboro, Arkansas</i>
Shult, Ernest Leonard	<i>El Campo, Texas</i>
Smith, Bessie Woodman	<i>Houston, Texas</i>
Spencer, Carey Forbes	<i>Houston, Texas</i>
Steen, Arthur Benjamin, Jr.	<i>Houston, Texas</i>
Stockard, Maude Ernestine	<i>Santa Anna, Texas</i>
Stockard, Mildred Estelle	<i>Santa Anna, Texas</i>
Streusand, Bernard	<i>Houston, Texas</i>
Stricker, Katyruth	<i>Houston, Texas</i>
Supple, Charles M., Jr.	<i>Waxahachie, Texas</i>
Taylor, Eleanor Kendrick	<i>Houston, Texas</i>
Taylor, Harold Spencer	<i>Orange, Texas</i>
Thibodeaux, Janice Elizabeth	<i>Houston, Texas</i>
Todd, Wallace Wainright	<i>Houston, Texas</i>
Turnbull, Margaret	<i>Houston, Texas</i>
Udoff, Abram	<i>Houston, Texas</i>
Uhl, Alfred Wallace	<i>Dallas, Texas</i>
Walker, Henry Donald	<i>Denison, Texas</i>
Walton, Gerard Ray	<i>Fort Worth, Texas</i>
Warn, Richard Edward	<i>Pecos, Texas</i>
Waters, William Alpheus	<i>Galveston, Texas</i>

PRELIMINARY ANNOUNCEMENTS

Watt, James Silas	<i>El Campo, Texas</i>
Wellborn, Christine	<i>Alvin, Texas</i>
Wells, Nicholas Weekes	<i>Galveston, Texas</i>
Werlin, Reuben	<i>Houston, Texas</i>
White, Ernest Gordon	<i>Waco, Texas</i>
Williams, George Guion	<i>Houston, Texas</i>
Wilson, Florence Ray	<i>Houston, Texas</i>
Wilson, Roy Thomas	<i>Houston, Texas</i>
Winn, W. H.	<i>Temple, Texas</i>
Winsborough, Robb Mauzy	<i>St. Louis, Missouri</i>
Winston, John McClure	<i>Weatherford, Texas</i>
Woods, Gorham Witter	<i>Appleby, Texas</i>
Young, Ruth Gladys	<i>Houston, Texas</i>

SOPHOMORES*

Acheson, Marcus Alexander	<i>Denison, Texas</i>
Akin, William Frank	<i>Nash, Texas</i>
Alexander, William Thomas, Jr.	<i>Cade, Louisiana</i>
Alpha, Emmet, Jr.	<i>Franklin, Louisiana</i>
Ander, Hans F.	<i>Houston, Texas</i>
Arnold, E. Oren	<i>Henderson, Texas</i>
Asbell, Virginia Beatrice	<i>Houston, Texas</i>
Baker, Clarence	<i>Franklin, Louisiana</i>
Baker, Juston Allen	<i>Houston, Texas</i>
Ballew, Homer R.	<i>Troup, Texas</i>
Barnett, Charles A.	<i>Dallas, Texas</i>
Bennett, Jack Gordon	<i>Houston, Texas</i>
Bennett, Zuline Minyon	<i>Houston, Texas</i>
Berry, Albert Henry	<i>Mexia, Texas</i>
Bishkin, Sam Leon	<i>Houston, Texas</i>
Blayney, Lindsey, Jr.	<i>Houston, Texas</i>
Boatner, James Polk	<i>Timpson, Texas</i>

* As classified October 1st, 1921.

THE RICE INSTITUTE

Bowling, Leonard C.	<i>Bonham, Texas</i>
Brenner, Henry	<i>San Antonio, Texas</i>
Bridgwater, Ann	<i>Danbury, Texas</i>
Brown, Arthur Lee	<i>Tyler, Texas</i>
Brown, De La Motta	<i>Houston, Texas</i>
Brown, Hart	<i>Houston, Texas</i>
Brown, Reuben Alec	<i>Houston, Texas</i>
Brown, Sadie Drewery	<i>Houston, Texas</i>
Bryan, Austin Y., Jr.	<i>Houston, Texas</i>
Bybee, John Clinton	<i>Houston, Texas</i>
Campbell, James Ira	<i>Houston, Texas</i>
Capell, Lida Margaret	<i>Denver, Colorado</i>
Carson, Morgan Steele	<i>Texarkana, Texas</i>
Chapman, Edwin Marion	<i>New Orleans, Louisiana</i>
Chavanne, Edward Faucett	<i>Lake Charles, Louisiana</i>
Cohen, Chester	<i>Houston, Texas</i>
Cohen, Ike	<i>Houston, Texas</i>
Colley, Audrey Merle	<i>Houston, Texas</i>
Cook, John S.	<i>Texarkana, Arkansas</i>
Copeland, Harry Elbert	<i>Leesville, Louisiana</i>
Creekmore, Paul Caswell	<i>Houston, Texas</i>
Cummings, John William	<i>Houston, Texas</i>
Dargan, Mildred Hale	<i>Houston, Texas</i>
Darling, William McKinney	<i>Temple, Texas</i>
Darnall, Beverly Smith	<i>Franklin, Louisiana</i>
Davis, Marie Longino	<i>Houston, Texas</i>
Del Barto, Mary Antoinette	<i>Orange, Texas</i>
Delhomme, Daniel Locke	<i>Houston, Texas</i>
Denniston, Sybilmarie	<i>Houston, Texas</i>
Depew, Maxwell Vernon	<i>Houston, Texas</i>
Dippel, Alfred	<i>Houston, Texas</i>
Dixon, Alfa Elizabeth MicZanko	<i>Houston, Texas</i>
DuBose, Charles Rains	<i>San Antonio, Texas</i>

PRELIMINARY ANNOUNCEMENTS

Duggan, Benjamin Hardy	<i>San Antonio, Texas</i>
Dunkerley, Allen Keton	<i>Houston, Texas</i>
du Perier, Anna Marie	<i>Beaumont, Texas</i>
Eddleman, Richard Neat	<i>Louisville, Kentucky</i>
Edwards, Ivan Reo	<i>Houston, Texas</i>
Edwards, Thomas Cook	<i>Alvin, Texas</i>
Elliott, Charles Emmett	<i>Houston, Texas</i>
Embree, Elisha Davant	<i>Belton, Texas</i>
Erickson, Julius Lyman Edward	<i>Lake Charles, Louisiana</i>
Fall, Mary Elizabeth	<i>Orange, Texas</i>
Feld, Jeannette Vivienne	<i>Houston, Texas</i>
Ford, Anna Jo	<i>Houston, Texas</i>
Foster, Juanita Estelle	<i>Houston, Texas</i>
Frosch, Alex	<i>Houston, Texas</i>
Fulton, Elizabeth Lee	<i>Houston, Texas</i>
Galbreath, William Aubrey	<i>Wharton, Texas</i>
Gallegly, Joseph Stephen, Jr.	<i>San Antonio, Texas</i>
Garriga, Hattiemae	<i>Houston, Texas</i>
Gary, Lillian Frances	<i>Big Spring, Texas</i>
Geller, Goldie Rose	<i>Houston, Texas</i>
Gerson, Gertrude Augusta	<i>Houston, Texas</i>
Gibson, Ethlyn	<i>Houston, Texas</i>
Giddings, Harold Dewitt	<i>Brenham, Texas</i>
Gillette, Frances	<i>Houston, Texas</i>
Glass, Mildred	<i>Waco, Texas</i>
Godley, Edgar Bartlett	<i>Dallas, Texas</i>
Grant, William Dewitt	<i>Fort Worth, Texas</i>
Guffy, Fred Hudson	<i>Belton, Texas</i>
Hair, William Wilbern	<i>Temple, Texas</i>
Hammond, Janice	<i>Houston, Texas</i>
Harlan Rotzien	<i>Houston, Texas</i>
Hart, Paul Bryan	<i>Pensacola, Florida</i>
Hathaway, Margaret Eugenia	<i>Houston, Texas</i>

THE RICE INSTITUTE

Heard, Arthur Field	<i>McKinney, Texas</i>
Heisig, Doris	<i>Houston, Texas</i>
Henderson, Joseph Calvin	<i>Houston, Texas</i>
Hickey, Charles Middleton	<i>Houston, Texas</i>
Holt, Elizabeth Victoria	<i>New Braunfels, Texas</i>
Hurley, Clara Pearl	<i>Houston, Texas</i>
James, Gillian Janette	<i>Houston, Texas</i>
James, Robert Judson	<i>Houston, Texas</i>
Jantzen, Marius Julian	<i>Houston, Texas</i>
Jaschke, Lillie Ellen	<i>Houston, Texas</i>
Johnson, Lon Portivent	<i>Kingsville, Texas</i>
Kass, Paul	<i>Houston, Texas</i>
Kaufman, Gus	<i>Houston, Texas</i>
Kelsey, Joseph Kathalo	<i>Salamanca, New York</i>
Kennerly, Luddye	<i>Houston, Texas</i>
Kiibler, John Sheehan	<i>Houston, Texas</i>
King, Allen Dupree	<i>Karnes City, Texas</i>
King, Lloyd Allen	<i>Idabel, Oklahoma</i>
Kinser, Joe Harlan	<i>Dallas, Texas</i>
Klotz, Harry Leslie	<i>Mexia, Texas</i>
Lack, George Joseph	<i>Beaumont, Texas</i>
Lange, Fred William	<i>Dallas, Texas</i>
Lawrence, Daniel Clarence	<i>Lolita, Texas</i>
Letts, Bessie Lucille	<i>Houston, Texas</i>
Lichtenstein, Morris Levy	<i>Corpus Christi, Texas</i>
Lighthouse, Teddy Fred	<i>Houston, Texas</i>
Locke, Jim C.	<i>Wharton, Texas</i>
Logan, Samuel Douglas	<i>Weatherford, Texas</i>
Lowman, Cliett A.	<i>Staples, Texas</i>
McCarthy, William Henry, Jr.	<i>Houston, Texas</i>
McCollough, Edward Heron	<i>Houston, Texas</i>
McKaughan, Beulah Gertrude	<i>Houston, Texas</i>
McKean, Anna Gertrude	<i>Houston, Texas</i>

PRELIMINARY ANNOUNCEMENTS

McKean, James Percival	<i>Houston, Texas</i>
McKellar, Marion Sloan	<i>Elizabeth, Louisiana</i>
McKenna, Helen Julia	<i>Houston, Texas</i>
McNulty, Ruby Pearl	<i>Houston, Texas</i>
Madsen, Alva	<i>Houston, Texas</i>
Mathews, Mildred Alleen	<i>Houston, Texas</i>
Matthews, Dorothy Louise	<i>Houston, Texas</i>
Melton, Henry Palmer	<i>Houston, Texas</i>
Merritt, Harry Warner	<i>Houston, Texas</i>
Miller, Guinevere	<i>Houston, Texas</i>
Miller, Mildred	<i>Waco, Texas</i>
Millican, Alma	<i>Beaumont, Texas</i>
Mills, Marie	<i>Houston, Texas</i>
Mitchell, Ben Hickman	<i>Dallas, Texas</i>
Montgomery, Jeff Ervin	<i>Welsh, Louisiana</i>
Moore, Harold	<i>Shreveport, Louisiana</i>
Morgan, Edna Rebecca	<i>Houston, Texas</i>
Morrison, Leona	<i>Timpson, Texas</i>
Muckelroy, Arnold	<i>Nacogdoches, Texas</i>
Owen, Martha Irma	<i>Houston, Texas</i>
Patterson, Oriel Catherine	<i>Houston, Texas</i>
Penix, Henry Bennett	<i>Mineral Wells, Texas</i>
Perry, Robert Marvey	<i>Dallas, Texas</i>
Reed, Robert Craig	<i>Houston, Texas</i>
Reinhart, Vivienne	<i>Houston, Texas</i>
Rhodes, Celeste Eleanor	<i>Houston, Texas</i>
Roberts, Clint Miller	<i>Duncan, Oklahoma</i>
Robinson, Edward Pilley	<i>San Benito, Texas</i>
Roensch, Max Moss	<i>Houston, Texas</i>
Roos, Albert Ernest	<i>Houston, Texas</i>
Rountree, Ray Lynch	<i>Dallas, Texas</i>
Rushing, John Bryan	<i>Groveton, Texas</i>
St. John, Rayward Powell	<i>Houston, Texas</i>

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Sammons, Bonnie Katherine	<i>Palestine, Texas</i>
Sanders, Dewitt Arthur	<i>Houston, Texas</i>
Schaler, Charlotte M.	<i>Houston, Texas</i>
Schellhardt, John Standish	<i>Smithville, Texas</i>
Schmidt, Rodney Albert	<i>Houston, Texas</i>
Sears, Alice Gray	<i>Houston, Texas</i>
Shaner, Ryburn Cass	<i>Joplin, Missouri</i>
Shipman, James Walker	<i>Houston, Texas</i>
Shult, Walter Rudolph	<i>El Campo, Texas</i>
Simpson, William Riley	<i>Denison, Texas</i>
Smith, Marian Ewing	<i>Houston, Texas</i>
Smith, Robert Wilbur	<i>Houston, Texas</i>
Springall, Walter Forneret	<i>San Antonio, Texas</i>
Sproule, Jean Acheson	<i>Denison, Texas</i>
Stallings, Kenneth	<i>Houston, Texas</i>
Stephenson, Douglas Joseph	<i>Beaumont, Texas</i>
Stevenson, Allan Henry	<i>Alvin, Texas</i>
Stoner, Charles Irvin	<i>Altoona, Pennsylvania</i>
Studdert, Leola Eileen	<i>Houston, Texas</i>
Swartz, Charles Yancey	<i>San Antonio, Texas</i>
Tadlock, Charles Pattillo	<i>Stamford, Texas</i>
Thomas, Lonnie	<i>Greenville, Texas</i>
Tidwell, Wilmer Thurmond	<i>Mexia, Texas</i>
Tierney, John Taylor, Jr.	<i>Beaumont, Texas</i>
Tisdale, Clayton	<i>Handley, Texas</i>
Turner, Herbert Goss	<i>Houston, Texas</i>
Upchurch, Joseph Judd	<i>Mart, Texas</i>
Warden, William Andrew	<i>Houston, Texas</i>
Waterman, Robert Harold	<i>Texarkana, Texas</i>
Weir, Elise	<i>Houston, Texas</i>
Wells, Edward Lytton	<i>Houston, Texas</i>
Werlin, Joseph Sidney	<i>Houston, Texas</i>
Werner, Winifred	<i>Houston, Texas</i>

PRELIMINARY ANNOUNCEMENTS

West, Milton Austin	<i>San Antonio, Texas</i>
Whitefield, Franklin Wolcott . .	<i>Midland, Texas</i>
Wilkens, Werner, Jr.	<i>Fort Worth, Texas</i>
Willis, Noel Charles	<i>Hydro, Oklahoma</i>
Wilson, Guy	<i>Prescott, Arkansas</i>
Wilson, Margaret Elizabeth . .	<i>Houston, Texas</i>
Withinton, William Doris . . .	<i>Houston, Texas</i>
Witt, Fred Louis	<i>Houston, Texas</i>
Wolf, Marion Lucile	<i>Houston, Texas</i>
Zuber, Max	<i>Houston, Texas</i>

FRESHMEN*

Abbey, William Campbell	<i>Del Rio, Texas</i>
Abell, Joseph Miles	<i>Houston, Texas</i>
Adams, Fisher Dunham	<i>Houston, Texas</i>
Aderhold, James Paulette	<i>Del Rio, Texas</i>
Allen, Janet	<i>Houston, Texas</i>
Ander, Bertha Weiss	<i>Houston, Texas</i>
Armstrong, Gladys Phylena . . .	<i>Houston, Texas</i>
Arnold, Carrie Lou	<i>Houston, Texas</i>
Arrants, Edward Bowers	<i>Houston, Texas</i>
Arthur, Dora	<i>Nacogdoches, Texas</i>
Asbury, George Gordon	<i>Denison, Texas</i>
Asbury, Thomas Neilson, Jr. . .	<i>Oklahoma City, Okla.</i>
Austin, Francis Marion	<i>Houston, Texas</i>
Autrey, Mamie Boyd	<i>Houston, Texas</i>
Autry, Allie May	<i>Houston, Texas</i>
Bailey, Avis Albert	<i>Galveston, Texas</i>
Bailey, Ouida Izelle	<i>Galveston, Texas</i>
Bauer, Edward	<i>El Campo, Texas</i>
Bauer, George	<i>El Campo, Texas</i>
Bauer, Willie	<i>El Campo, Texas</i>

* As classified October 1st, 1921.

THE RICE INSTITUTE

Beall, Gordon Roy	<i>Trinity, Texas</i>
Beckenbach, Charlie G.	<i>Dallas, Texas</i>
Becker, Edwin Martin	<i>Houston, Texas</i>
Bekeschus, Herbert John	<i>Houston, Texas</i>
Bemus, Norma Leone	<i>Houston, Texas</i>
Bennett, David Stribling	<i>Stamford, Texas</i>
Berleth, Nelson Bagby	<i>Houston, Texas</i>
Berry, Clay Johnson	<i>Mexia, Texas</i>
Berry, Louie Lee	<i>Houston, Texas</i>
Biggs, Gladys Lee	<i>Humble, Texas</i>
Binyon, Mary Semmes	<i>Houston, Texas</i>
Biollin, Arthur Reading	<i>Galveston, Texas</i>
Black, Charles Joseph	<i>Houston, Texas</i>
Blain, Spencer Hayward	<i>Beaumont, Texas</i>
Bloomfield, Benjamin	<i>Houston, Texas</i>
Bloxsom, Dan Edgar	<i>Houston, Texas</i>
Bodet, Edward	<i>Galveston, Texas</i>
Bogart, Catherine	<i>Houston, Texas</i>
Bostick, Aldeane	<i>Houston, Texas</i>
Bowling, Jack Frank	<i>Bonham, Texas</i>
Bradley, Clarence Leslie, Jr.	<i>Houston, Texas</i>
Brandes, Carl Henry	<i>Liberty, Kansas</i>
Breed, Laura Files	<i>Houston, Texas</i>
Briscoe, Barney Wray	<i>Rockwall, Texas</i>
Brooks, James Andrew	<i>New York, New York</i>
Brown, George Wesley	<i>Houston, Texas</i>
Brown, Roger Milton	<i>Houston, Texas</i>
Brown, Theodore St. John	<i>Texas City, Texas</i>
Bugg, Joel Harrison	<i>Groesbeck, Texas</i>
Buhler, Elizabeth	<i>Victoria, Texas</i>
Buhler, George Theodore	<i>Edna, Texas</i>
Bush, Leonard Ewing	<i>Huntsville, Texas</i>
Bute, Elizabeth	<i>Houston, Texas</i>

PRELIMINARY ANNOUNCEMENTS

Calhoun, Marguerite	<i>Houston, Texas</i>
Campbell, Douglas Alexander . . .	<i>Houston, Texas</i>
Campbell, Edward Maxwell . . .	<i>Temple, Texas</i>
Cannan, Hazel Bell	<i>Houston, Texas</i>
Canterbury, Chester Lawson . . .	<i>Houston, Texas</i>
Castle, Mary Wilma	<i>Houston, Texas</i>
Chambers, Bertie Mary	<i>Houston, Texas</i>
Chambers, Roy Edward	<i>Port Arthur, Texas</i>
Chandler, Dorothy Renfro	<i>Houston, Texas</i>
Chapman, William Payne	<i>Elizabeth, Louisiana</i>
Chatham, Lee Randolph	<i>Houston, Texas</i>
Chivers, Fay	<i>Houston, Texas</i>
Christenson, Gladys	<i>Houston, Texas</i>
Clarke, Corinne Muldrow	<i>Houston, Texas</i>
Cleghorn, Katherine	<i>Houston, Texas</i>
Clemons, Walter Carl	<i>Houston, Texas</i>
Clifford, Maud Clayton	<i>Houston, Texas</i>
Cobb, Candler	<i>Grove Hill, Alabama</i>
Cobb, Thomas Giles	<i>Leonard, Texas</i>
Cohen, Charles Samuel	<i>Trinity, Texas</i>
Colley, Ross Edmund	<i>Houston, Texas</i>
Collier, Robert Lee	<i>Ennis, Texas</i>
Collins, Mayme	<i>Houston, Texas</i>
Compton, Wilburn Jefferson . . .	<i>Timpson, Texas</i>
Coole, Walter Alton	<i>Houston, Texas</i>
Cooper, Margaret	<i>Houston, Texas</i>
Corkins, Tracy Wilson	<i>Houston, Texas</i>
Cornelius, Gerald Roy	<i>Weatherford, Texas</i>
Cottingham, Robert Herbert . . .	<i>Houston, Texas</i>
Cowen, Shirley Lucille	<i>Helena, Arkansas</i>
Cox, Aaron Burke	<i>Nacogdoches, Texas</i>
Cox, William Lester	<i>Groesbeck, Texas</i>
Crump, Fred Maurice	<i>Mart, Texas</i>

THE RICE INSTITUTE

Cuenod, Emile M.	<i>Houston, Texas</i>
Cullum, Eugene Shawner	<i>Houston, Texas</i>
Cummings, Walter Morrow . .	<i>Houston, Texas</i>
Daab, Amelia	<i>Houston, Texas</i>
DaCamara, Harry Shirley . . .	<i>Laredo, Texas</i>
Dalmasso, Frank Paul	<i>Vernon, Texas</i>
Davis, Clara	<i>Houston, Texas</i>
Davis, James Carl	<i>Houston, Texas</i>
Davis, Myra Weldon	<i>Eagle Lake, Texas</i>
Davis, Nell Vance	<i>San Augustine, Texas</i>
Dawson, Will Raymond	<i>Sinton, Texas</i>
de Mankowski, Marguerite . . .	<i>Houston, Texas</i>
Dennie, Dorothy Cannaday . . .	<i>Houston, Texas</i>
DePoyster, George Reaves . . .	<i>Fort Worth, Texas</i>
Digby-Roberts, Frederick William	<i>Abilene, Texas</i>
Disch, Oran Dorsett	<i>Franklin, Louisiana</i>
Dissen, William Julius	<i>Houston, Texas</i>
Dixon, Bryan D.	<i>Houston, Texas</i>
Dobias, Ruth Olivia	<i>Houston, Texas</i>
Dodds, Olaf Herbert	<i>Houston, Texas</i>
Dodge, Charles Morse	<i>San Antonio, Texas</i>
Doherty, Raymond	<i>Mercedes, Texas</i>
Donigan, Mesog Vartan	<i>Corpus Christi, Texas</i>
Dorsey, Henry, Jr.	<i>Dallas, Texas</i>
Drouilhet, Paul Raymond . . .	<i>Galveston, Texas</i>
Dryden, Allison	<i>Fort Worth, Texas</i>
Duggan, Abby Hardy	<i>San Antonio, Texas</i>
Dunlap, Mayo Gene	<i>Ennis, Texas</i>
Dupré, Charles Albert	<i>Lubbock, Texas</i>
Dupuy, Fleda	<i>Houston, Texas</i>
Dyer, Virginia Carr	<i>Houston, Texas</i>
Eaker, Jack Everett	<i>Temple, Texas</i>
Earthman, James Bradshaw . .	<i>Houston, Texas</i>

PRELIMINARY ANNOUNCEMENTS

Eaton, Thomas Benton	<i>Houston, Texas</i>
Edmundson, William Leonard, Jr.	<i>Houston, Texas</i>
Eiser, Howard William	<i>San Antonio, Texas</i>
Eiser, Ralph Leslie	<i>San Antonio, Texas</i>
Elliott, Robert Henry	<i>Winnfield, Louisiana</i>
Ellis, Marie Frances	<i>Houston, Texas</i>
Ellis, Samuel Darwin, Jr.	<i>Houston, Texas</i>
Emison, Sam Shannon	<i>Houston, Texas</i>
Falligant, Andree Clotilde	<i>Houston, Texas</i>
Federman, Richard Louis	<i>Brookville, Indiana</i>
Fields, John Belcher	<i>Cristobal, Canal Zone</i>
Fisher, Lewis Dallam	<i>Houston, Texas</i>
Fitch, Sam Ashe	<i>Houston, Texas</i>
Fitze, Shelby	<i>Houston, Texas</i>
Flaxman, Marcellus Theodore . . .	<i>Houston, Texas</i>
Flint, Donald Barnard	<i>Elko, Nevada</i>
Floca, Theodore	<i>Temple, Texas</i>
Folse, Johnnie Louise	<i>Houston, Texas</i>
Forbes, Archibald Alexander . . .	<i>Houston, Texas</i>
Forester, Calvin Guy	<i>Houston, Texas</i>
Fory, Frank Marion	<i>Timpson, Texas</i>
Frank, Philip Heakes	<i>Houston, Texas</i>
Freeman, Mary	<i>Houston, Texas</i>
Frick, Helmar Albert	<i>Eagle Pass, Texas</i>
Fuller, Mary	<i>Lufkin, Texas</i>
Galendo, Homero J.	<i>Saltillo, Coahuila, Mexico</i>
Galloway, Clara Elizabeth	<i>Houston, Texas</i>
Gambrell, Eric Corbell	<i>Dallas, Texas</i>
Gann, James Chess	<i>Vernon, Texas</i>
Garrett, Virginia	<i>Houston, Texas</i>
Gaunt, Harry Lester	<i>Lake Charles, Louisiana</i>
George, Charles Dimmitt	<i>Temple, Texas</i>

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Gerhart, John Porter	<i>Dallas, Texas</i>
Gibbon, Harry Aydelotte	<i>Ardmore, Oklahoma</i>
Gibbs, Joe T.	<i>Houston, Texas</i>
Giles, Charles Lindsay	<i>Beaumont, Texas</i>
Girardey, Camille Carter	<i>Houston, Texas</i>
Glenn, Jack	<i>Houston, Texas</i>
Granbury, Merlee Alicia	<i>Houston, Texas</i>
Gray, Lottie A.	<i>Houston, Texas</i>
Gray, Sarah Gagne	<i>Houston, Texas</i>
Griffin, Virgil Monroe	<i>Houston, Texas</i>
Grossman, Abe	<i>Houston, Texas</i>
Hagan, Herbert Raymond	<i>Nacogdoches, Texas</i>
Halbert, Geneva	<i>Houston, Texas</i>
Hale, William Lindsay	<i>Mayfield, Kentucky</i>
Hallman, Alvin D.	<i>Houston, Texas</i>
Hamburger, Mary Louise	<i>Houston, Texas</i>
Hamilton, Kathryn Dorothea	<i>Houston, Texas</i>
Hannon, Robert Hal	<i>Texarkana, Texas</i>
Harding, William Gibson	<i>Houston, Texas</i>
Harford, Louise	<i>Houston, Texas</i>
Harris, Nell	<i>Houston, Texas</i>
Haynes, Robert Briley	<i>Houston, Texas</i>
Heaner, William Ernest	<i>Laredo, Texas</i>
Heard, Elma Leah Beatriz	<i>Lufkin, Texas</i>
Heard, Ola Mabel	<i>Sabinal, Texas</i>
Heflin, William Cecil	<i>Lometa, Texas</i>
Hellman, Bertha Louise	<i>Houston, Texas</i>
Henderson, Donald Vines	<i>Houston, Texas</i>
Henry, Thomas J.	<i>Timpson, Texas</i>
Hill, Robert A.	<i>Houston, Texas</i>
Hill, Troy David	<i>Bonham, Texas</i>
Hillyer, Ray Hauton	<i>Rosenberg, Texas</i>
Hipp, William S., Jr.	<i>Houston, Texas</i>

PRELIMINARY ANNOUNCEMENTS

Hobbs, William Franklin	<i>Wharton, Texas</i>
Holt, Adelaide Elizabeth	<i>Houston, Texas</i>
Hoover, William Wesley	<i>Houston, Texas</i>
Horkan, Jack F., Jr.	<i>Beaumont, Texas</i>
Houseman, Kathleen Alexandra .	<i>Houston, Texas</i>
Howe, Anna Evelyn	<i>Houston, Texas</i>
Howze, Mary Louise	<i>Houston, Texas</i>
Hutts, Jesse Boone	<i>Houston, Texas</i>
Ingram, Mercer Thomas	<i>Mart, Texas</i>
Irvine, James Wilson	<i>San Antonio, Texas</i>
Jackson, Bruce Maxwell	<i>Beaumont, Texas</i>
Jackson, Laurence Wood	<i>Brownwood, Texas</i>
Jackson, Mollie	<i>Houston, Texas</i>
James, Lester Wade	<i>Plainview, Texas</i>
Janes, Rosa Lenore	<i>Houston, Texas</i>
Jarrett, Joe Sherrill	<i>Waxahachie, Texas</i>
Jenkins, William Herndon . . .	<i>Caldwell, Texas</i>
Jennings, Geraldine	<i>Houston, Texas</i>
Jensen, Esther F.	<i>Houston, Texas</i>
Joekel, Harriet Marie	<i>Houston, Texas</i>
John, Edward Brooks	<i>Houston, Texas</i>
Johnson, Clarence Alfred	<i>El Campo, Texas</i>
Johnson, Clarence Wade	<i>Harrisburg, Texas</i>
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