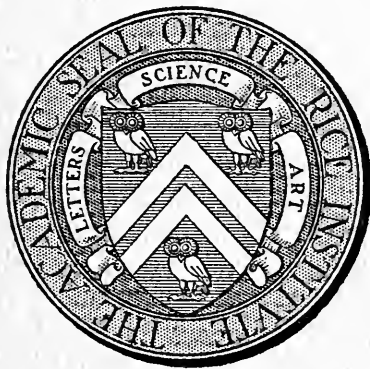
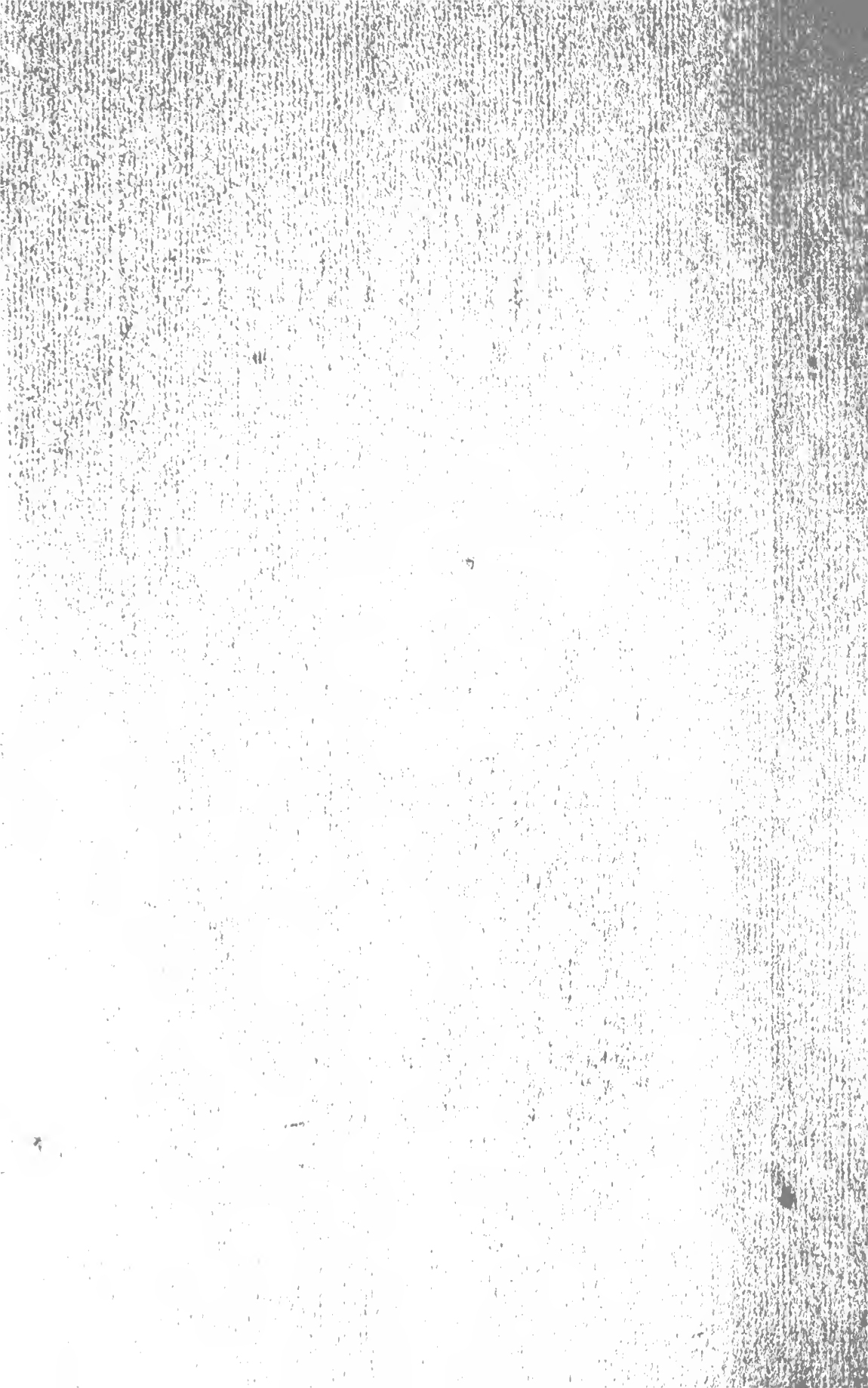


THE
RICE INSTITUTE
HOUSTON, TEXAS



ANNOUNCEMENTS FOR THE ACADEMIC
YEAR BEGINNING SEPTEMBER TENTH
NINETEEN HUNDRED AND
FORTY-TWO

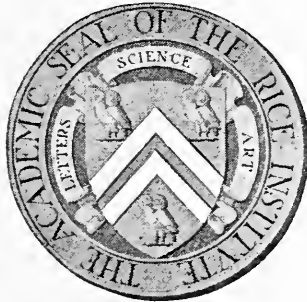


THE RICE INSTITUTE

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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WAR EMERGENCY CHANGES IN THE RICE
INSTITUTE SCHEDULE: ANNOUNCEMENT
FROM THE OFFICE OF THE PRESIDENT

IN ORDER to meet the immediate and increasing demand for college graduates in the various branches of the national service, and to assist all Rice students towards graduation prior to their entry into the service, the Faculty has recommended and the Trustees have adopted the following schedule, to be effective from February 9, 1942.

- I. The commencement exercises of the present academic year will be brought forward a week, from June 7-8 to May 31-June 1, 1942, first, to enable the great number of Rice students who are self-supporting in part or in whole to obtain the benefit of three full months of summer employment necessary for their remaining in college, and second, to enable students to obtain full credit in summer school according to the arrangement outlined in paragraphs V and VI below.
- II. The academic year of the present Seniors in engineering and in architecture will be concluded on May 2, 1942, at which time these Seniors will be free to enter the national service, and those who complete the requirements in full will be awarded their degrees at the commencement exercises on June 1, 1942.
- III. The courses offered in the next academic year will begin on Monday, September 14, 1942, with registration as usual in the week before.

THE RICE INSTITUTE

- IV. The Senior courses in engineering and in architecture beginning September 14, 1942, will be accelerated for Senior students in full standing so as to admit of their completing the requirements for their degrees by April 3, 1943; successful Senior students under this arrangement will be awarded their degrees at the following commencement.
- V. All other Juniors of the present year, men and women, who attain full Senior standing by the end of the present academic year, will be allowed to complete this summer at an approved summer school of at least twelve weeks' duration two courses for which they will receive credit towards their bachelor's degree at Rice.
- VI. On September 14, 1942, Seniors with such summer credit will be allowed to add one extra course to the regular Senior schedule in order to make possible the completion of the normal graduation requirements early in February, 1943; those students who are successful under this arrangement will be awarded their degrees at the following commencement.
- VII. All other Seniors who do not accelerate their schedules in summer schools will follow the usual schedule in the academic year 1942-43.
- VIII. Predental, prelaw, and premedical students who during the war emergency complete their Junior year and attain full Senior standing at Rice, and later receive professional degrees from approved institutions, will be awarded, on application after such professional graduation, a bachelor's degree from the Rice Institute at a subsequent Rice commencement.

ANNOUNCEMENTS

- IX. The schedules of all Juniors, Sophomores, and Freshmen in the academic year 1942-43 will be of the normal character and duration of past years.
- X. To make possible the several modes of acceleration outlined in this memorandum the number of single holidays, the length of the Christmas holiday period, and the length of the term examination periods will be reduced.
- XI. In view of the uncertainty of a variety of conditions that may arise, the Rice schedule for the academic year 1943-44 can be determined only at a later date.

February 9, 1942

EDGAR ODELL LOVETT

C A L E N D A R

1942

- September 7-10 . . . Entrance Examinations
- September 10 . . . Registration of Academic Students
- September 11 . . . Registration of Students of Architecture and Engineering
- September 14 . . . Opening of Courses
- September 16 . . . Matriculation Address
- November 26 . . . Thanksgiving Day
- December 15-22 . . . December Examinations for New Students
- December 18-23 . . . Midyear Examinations for Senior Architects and Engineers in the Accelerated Plan
- December 22 . . . Beginning of the Regular Christmas Recess at 5:00 P.M.
- December 23 . . . Beginning of Christmas Recess for Senior Architects and Engineers at 5:00 P.M.
- December 28 . . . Resumption of Courses for Senior Architects and Engineers at 8:00 A.M.

ANNOUNCEMENTS

1943

- January 4 Resumption of Courses in
the Regular Plan at
8:00 A.M.
- January 25-
February 4 February Examinations
in the Regular Plan
- March 29-April 3 Final Examinations for
Senior Architects and
Engineers
- May 3-8 Entrance Examinations
- May 17-28 Final Examinations in
the Regular Plan
- May 29-31 Twenty-eighth Annual
Commencement

OFFICERS OF ADMINISTRATION

EDGAR ODELL LOVETT, PH.D., Sc.D., LL.D.

President

HARRY BOYER WEISER, PH.D.

Dean

SAMUEL GLENN McCANN, M.A.

Registrar

JOHN THOMAS McCANTS, M.A.

Bursar

THE RICE INSTITUTE

THE RICE INSTITUTE

THE NAME

THE 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, its educational programme of liberal and technical learning 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

MORE than fifty years ago 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 little 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 gentlemen 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

THE RICE INSTITUTE

made over an interest-bearing note of two hundred thousand dollars to the original Board of Trustees, consisting of himself and the late Messrs. James A. Baker, 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, the late Edward Andrew Peden, Robert Lee Blaffer, and Harry Clay Hanszen.

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 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

ANNOUNCEMENTS

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 realization 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

THE RICE INSTITUTE

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 cooperation of an advisory committee consisting of Professor Ames, director of the physical laboratory, and now president emeritus, the Johns Hopkins University; Professor Conklin, director of the biological laboratory, and at present professor emeritus and special lecturer, Princeton University; the late Professor Richards, chairman of the department of chemistry, Harvard University; and the late Professor Stratton, director of the National Bureau of Standards, subsequently chairman of the corporation of the Massachusetts Institute of Technology. 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 first occupied by students in the autumn of 1914; while the construction of the physics laboratories and lecture amphitheatre, begun also in 1913, was completed in the summer 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

ANNOUNCEMENTS

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. At the commencement exercises of 1923 ground was broken for the new laboratory for chemistry, the plans for which were prepared by Messrs. Cram and Ferguson and Mr. W. W. Watkin, associate architects, under the direction of Mr. H. B. Weiser, Ph.D., resident professor of chemistry in the Institute. The construction of this laboratory was completed during the academic year 1924-25.

The actual work of instruction of the first academic year began on the 23rd 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 altogether 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 among these distinguished representatives of life and learning were the twelve foreign savants who had consented to participate in

THE RICE INSTITUTE

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 three commemorative volumes, in which there appear, in particular, responses and addresses from many foreign and American universities and learned societies; addresses delivered by Governor Colquitt, of Texas, Chief Justice Brown, of Texas, and Bishop Gailor, of Tennessee; the inaugural poem of Dr. Henry van Dyke, of Princeton; the dedicatory sermon of Dr. Charles F. Aked, of San Francisco; and the inaugural lectures of Professor Rafael Altamira y Crevea, of Madrid, Spain; Professor Emile Borel, of Paris, France; Senator Benedetto Croce, of Naples, Italy; the late Professor Hugo de Vries, of Amsterdam, Holland; the late Professor Sir Henry Jones, of Glasgow, Scotland; the late Privy Councilor Baron Dairoku Kikuchi, of Tokyo, Japan; Professor John William Mackail, of London, England; the late Privy Councilor Professor Wilhelm Ostwald, of Gross-Bothen, Germany; the late Professor Henri Poincaré, of Paris, France; the late Professor Sir William Ramsay, of London, England; the late Professor Senator Vito Volterra, of Rome, Italy; and Professor Carl Størmer, of Oslo, Norway.

THE FACULTY¹

Virgil Charles Aldrich, B.A. (Ohio Wesleyan), Ph.D. (California), formerly Teaching Fellow in Philosophy at

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

ANNOUNCEMENTS

the University of California; Instructor in Philosophy.

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

Joseph Lloyd Battista, B.A. (Michigan), M.A. (Washington Univ. and Harvard), Diplômé d'Études supérieures (Bordeaux), formerly Assistant Professor of Spanish and Italian at Washington University; Instructor in Spanish and Italian.

William Ernest Bennett, M.A. (Queen's, Canada), Ph.D. (Cambridge), formerly 1851 Exhibition Scholar of Queen's University, and Scholar of Trinity College, Cambridge University; Instructor in Physics.

Tom Wilkerson Bonner, B.S. (Southern Methodist), M.A. and Ph.D. (Rice), formerly Fellow in Physics at the Rice Institute; later Fellow of the National Research Council; Instructor in Physics at the Rice Institute; Fellow in Physics of the Guggenheim Foundation; Assistant Professor of Physics. Absent in War Service.

André Georges Bourgeois, Bachelier ès Lettres (Paris), Certifié d'Études supérieures de lettres (Paris), Bachelier en Droit (Paris), M.A. (Texas); Instructor in French.

Hubert Evelyn Bray, B.A. (Tufts), M.A. (Harvard), Ph.D. (Rice), formerly Instructor in Mathematics at Tufts College, and, later, at Lafayette College; successively Fellow, Instructor, and Assistant Professor of Mathematics at the Rice Institute; Professor of Mathematics.

Carroll Camden, Ph.D. (Iowa), formerly Instructor in English at the State University of Iowa; Instructor in English.

THE RICE INSTITUTE

Asa Crawford Chandler, B.A. (Cornell), Ph.D. (California), formerly Assistant Professor of Zoölogy and Physiology at Oregon Agricultural College; Instructor in Biology at the Rice Institute; later Research Associate of the School of Tropical Medicine, Calcutta, India; Professor of Biology.

James Chillman, Jr., M.S. in Arch. (Pennsylvania), F.A.A.R., A.I.A., formerly Alumni Fellow in Architecture at the University of Pennsylvania; Instructor in Freehand Drawing at the University of Pennsylvania; Instructor in Architecture at the Rice Institute; later Burnham Fellow in Architecture at the American Academy in Rome; Assistant Professor of Architecture.

Robert Rae Crookston, B.S. in M.E. (Carnegie Inst. Tech.), formerly with the Westinghouse Airbrake Company of Pittsburgh; Instructor in Mechanical Engineering. Absent in War Service.

Joseph Ilott Davies, Ph.D. (Rice), formerly Assistant in Biology at the Rice Institute; Instructor in Biology.

Edward Smith Deevey, Jr., Ph.D. (Yale), formerly Sterling Fellow in Biology at Yale University and Limnologist for the Connecticut State Board of Fisheries and Game; Instructor in Biology.

James Benedict T. Downs, M.E. and M.S. (Stevens Inst.), formerly Instructor in Mechanical Engineering at Clemson College; Instructor in Mechanical Engineering.

James Karl Dunaway, M.A. (Rice), M. Arch. (Columbia), formerly Fellow in Architecture at the Rice Institute; Instructor in Architecture.

Thomas Kevin Fitz Patrick, M. Arch. (Mass. Inst. Tech.), A.I.A., Dip. Fontainebleau School of Fine Arts,

ANNOUNCEMENTS

formerly Assistant Professor of Architecture at Clemson College; Instructor in Architecture.

Max Freund, Ph.D. (Leipsic), formerly Assistant Lecturer in the German Language and Literature at Liverpool University College; Royal Professor of German and Teutonic Philology in Queen's University of Belfast, Ireland, and Examiner in the Royal University of Ireland; later Professorial Lecturer in Modern English at the Universities of Giessen and Marburg, Germany; Professor of German.

Joseph Stephen Gallegly, Jr., M.A. (Rice); Instructor in English.

Allen Darnaby Garrison, Ph.D. (Rice), formerly Fellow in Chemistry at the Rice Institute under appointment of the National Research Council; later Instructor in Physical Chemistry at the Rice Institute; Assistant Professor of Chemical Engineering.

Earl Gascoigne Goddard, B.S. in E.E. (New Mexico State); Instructor in Electrical Engineering.

Arthur J. Hartsook, M.S. (Mass. Inst. Tech.), formerly Instructor in Chemistry at the University of Nebraska; Instructor in Industrial Chemistry and later Assistant Professor of Chemical Engineering at the Rice Institute; Professor of Chemical Engineering.

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

Joseph William Hendren, Ph.D. (Princeton); Instructor in English.

THE RICE INSTITUTE

Gilbert Leslie Hermance, B.S. (Oregon), M.A. (Columbia), formerly Instructor in Physical Education at the University of Oregon; Instructor in Physical Education.

Frank House Hurley, Ph.D. (Rice), formerly Fellow in Chemistry at the Rice Institute; Instructor in Analytical Chemistry.

John Reagan Kivlen, Lieutenant, United States Navy; B.S. (U. S. Naval Academy); Assistant Professor of Naval Science and Tactics.

Edward C. Lawson, Jr., B.S. in M.E. (Brooklyn Poly. Inst.), M. in M.E. (Rensselaer Poly. Inst.), formerly Instructor in Mechanical Engineering at the Carnegie Institute of Technology; Instructor in Mechanical Engineering.

Floyd Seyward Lear, B.A. (Rochester), M.A. and Ph.D. (Harvard), formerly Instructor in History at Harvard University; later Instructor in History at the Rice Institute; Assistant Professor of History.

Walter Leighton, Jr., B.A. (Northwestern), M.A. and Ph.D. (Harvard), formerly Instructor in Mathematics at Harvard University; later Instructor in Mathematics at the University of Rochester; Lecturer in Mathematics.

Edgar Odell Lovett, Ph.D. (Virginia and Leipsic), Hon. LL.D. (Drake, Tulane, Baylor, and Bethany), Hon. Sc.D. (Colorado College), 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.

Jarmon Alvis Lynch, B.A. (West Texas State Teachers), Ph.D. (Chicago), formerly Scholar at the University of Chicago; Instructor in Education.

Samuel Glenn McCann, Ph.B. (Wooster), M.A. (Rice),

ANNOUNCEMENTS

formerly Fellow in History at the Rice Institute; Instructor in Jurisprudence and Registrar of the Institute.

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

Milton Bowles McGinty, B.S. in Arch. (Rice), A.I.A., formerly Rice Institute Traveling Fellow in Architecture; Instructor in Architecture.

Alan Dugald McKillop, Ph.D. (Harvard), formerly Instructor in English at the University of Illinois; Instructor in English and later Assistant Professor of English at the Rice Institute; Fellow in English of the Guggenheim Foundation; Professor of English.

Szolem Mandelbrojt, Docteur ès Sciences (Paris), formerly Lecturer in Mathematics at the Rice Institute, and the Collège de France; Lecturer and Professor at the Faculty of Sciences of Lille and of Clermont. Professor at the Collège de France. Visiting Professor of Mathematics.

Heinrich Meyer, Ph.D. (Freiburg); Instructor in German.

Walter Peter Miksch, M.A. (Stanford), formerly Instructor in French and Spanish at Reed College, and later Assistant in French at Stanford University; Instructor in French.

John Marshall Miller, B.S. in E.E. (Kansas State); Instructor in Engineering Drawing.

Winfred O. Milligan, B.A. (Illinois College), M.A. and Ph.D. (Rice); Research Assistant in Chemistry.

Marcel Moraud, Agrégé de l'Université de France, Docteur ès Lettres (Paris), formerly Instructor in French

THE RICE INSTITUTE

at the University of Minnesota and at Princeton University; later Associate Professor of French at the University of Toronto; Professor of French.

James Caddall Morehead, Jr., B.A. (Princeton), B. Arch. (Carnegie Inst. Tech.), formerly Instructor in Graphics, Carnegie Institute of Technology; Instructor in Architecture. Absent in War Service.

Henry Madison Morris, Jr., B.S. in C.E. (Rice), formerly Assistant Engineer International Boundary Commission; Instructor in Civil Engineering.

Jess Claiborne Neely, LL.B. (Vanderbilt), formerly Head Coach of Intercollegiate Athletics at the Clemson Agricultural College; Director of Athletics.

Frank H. Newton, Jr., Lieutenant Commander, United States Navy, B.S. (U.S. Naval Academy); formerly Instructor in Economics and Government at the U.S. Naval Academy; Assistant Professor of Naval Science and Tactics.

Henry Oscar Nicholas, B.A. (Oberlin), Ph.D. (Yale), formerly Fellow and Assistant in Chemistry at Yale University; later Instructor in Chemistry at the Rice Institute; Assistant Professor of Chemistry.

Addison Stayton Nunn, B.S. in Arch. (Rice), A.I.A., formerly Fellow in Architecture at the Rice Institute; Instructor in Architectural Construction. Absent in War Service.

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

Frank Acklen Pattie, B.A. (Vanderbilt), M.A. (Harvard), Ph.D. (Princeton), formerly Fellow in Psychology, Gordon Macdonald Fellow, and Charlotte Elizabeth Procter

ANNOUNCEMENTS

Fellow of Princeton University, and Fellow of the National Research Council at Harvard University; Instructor in Psychology and Tutor in the Division of Philosophy at Harvard University; later Instructor in Psychology at the Rice Institute; Assistant Professor of Psychology.

George Holmes Richter, Ph.D. (Rice), formerly Fellow in Chemistry at the Rice Institute, and Fellow of the National Research Council at Cornell University; later Instructor in Organic Chemistry at the Rice Institute; Assistant Professor of Organic Chemistry.

Donald Matthew Russell, B.S. in M.E. (Pittsburgh), formerly with the Union Carbide and Carbon Corporation; Instructor in Mechanical Engineering and later Assistant Professor of Mechanical Engineering at the University of Pittsburgh; Instructor in Mechanical Engineering.

Lewis Babcock Ryon, C.E. (Lehigh), formerly Instructor in Civil Engineering and later Assistant Professor of Civil Engineering at the Rice Institute; Professor of Civil Engineering.

Harry Alexander Scott, Ph.D. (Columbia), formerly Instructor in Physical Education at Columbia University, and Professor of Physical Education at the University of Oregon; Professor of Physical Education.

Fred Vernon Shelton, M.A. (Rice); Instructor in French.

Verne Franklin Simons, M.A. (Kansas), C.P.A., formerly Instructor in Economics at the University of Kansas, and later Assistant in Accounting at the University of Chicago; Instructor in Economics.

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

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Karl Cornelius ten Brink, Ph.D. (Rice), formerly Fellow in Chemical Engineering at the Rice Institute; Instructor in Chemical Engineering.

Joseph David Thomas, M.A. (Chicago); Instructor in English.

Thaddeus Austin Thomson, Jr., Captain, United States Navy; B.S. (U. S. Naval Academy); Graduate of the Naval War College; Professor of Naval Science and Tactics.

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

Floyd Edward Ulrich, M.S. (Union), M.A. and Ph.D. (Harvard), formerly Instructor in Mathematics at Union College; later Assistant in Mathematics at the Rice Institute; Instructor in Mathematics.

James Stephen Waters, B.S. (Rice), formerly Instructor in Electrical Engineering and later Assistant Professor of Electrical Engineering at the Rice Institute; Professor of Electrical Engineering. Absent in War Service.

William Ward Watkin, B.S. in Arch. (Pennsylvania), A.I.A., 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 and later Assistant Professor of Architecture at the Rice Institute; Professor of Architecture.

Harry Boyer Weiser, M.A. (Ohio State), Ph.D. (Cornell), 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 and Dean of the Institute.

ANNOUNCEMENTS

Hugh Clayton Welsh, M.D. (Texas), F.A.C.S.; Instructor in Biology.

Russell Eugene Westmeyer, Ph.D. (Iowa), formerly Assistant in Economics at the State University of Iowa; Instructor in Economics.

Charles A. Whiteford, Lieutenant Commander, United States Navy (retired); B.S. (U.S. Naval Academy); formerly Instructor in Engineering and subsequently Instructor in French at the U.S. Naval Academy; lately Assistant Professor of Naval Science and Tactics at the University of Texas; Assistant Professor of Naval Science and Tactics.

George Wesley Whiting, B.A. (West Virginia), M.A. (Harvard), Ph.D. (Chicago), formerly Assistant Professor of English at the Michigan State College, and later Assistant in English at the University of Chicago; Instructor in English.

George Guion Williams, M.A. (Rice), formerly Instructor in English at the Rice Institute; later Teaching Fellow in English in New York University; Instructor in English.

Harold Albert Wilson, F.R.S., M.A. (Cambridge), M.Sc. (Victoria), D.Sc. (London), formerly 1851 Exhibition Scholar of Leeds University; Allen Scholar and Clerk Maxwell Student of Cambridge University; Scholar in Physics of London University; Fellow of Trinity College, Cambridge University; Professor of Physics in King's College, London; Professor of Physics in McGill University; Professor of Physics at the Rice Institute; later Professor of Natural Philosophy in the University of Glasgow; Professor of Physics.

Carl Riehle Wischmeyer, B.S. in E.E. (Rose Poly. Inst.), M.Eng. in E.E. (Yale), E.E. (Rose Poly. Inst.), formerly laboratory assistant in Electrical Engineering at Yale University; Instructor in Electrical Engineering.

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ASSISTANTS AND FELLOWS

Clarence John Addis, Jr., B.S. (Ouachita); Fellow in Biology.
Hugh Daniel Brunk, B.A. (California), M.A. (Rice);
Fellow in Mathematics.

Emmett Evander Brunson, B.A. (Rice), M.A. (Columbia);
Assistant in Physical Education. Absent in War Service.

Robert Louis Burton, B.A. (Colorado Coll.); Fellow in
Chemistry.

Weldon Burk Cabaniss, B.A. (Rice); Assistant in Juris-
prudence.

Vincent Frederick Cowling, B.A. (Rice); Fellow in
Mathematics.

Perry Davison, B.A. (Amherst); Fellow in Physics.

Alice Crowell Dean, M.A. (Rice); Fellow in Mathe-
matics.

Mayer Bear Goren, B.A. (Rice); Fellow in Chemistry.

James Colwell Harris, B.A. (Rice); Fellow in Physics.

Lee Hodges, B.S. (Harvard), M.A. (Rice); Assistant in
French and Spanish.

Robert Narvaez Little, Jr., M.A. (Rice); Fellow in Physics.

William Merrill McLamore, B.A. (Rice); Fellow in
Chemistry.

Charles Earle Mandeville, M.A. (Rice); Fellow in
Physics.

Charles Sedwick Matthews, B.S. in Ch.E. (Rice); Fellow
in Chemical Engineering.

John W. Mihelich, B.A. (Colorado Coll.); Fellow in
Physics.

Lloyd Jean Money, B.S. in E.E. (Rice); Assistant in
Electrical Engineering.

ANNOUNCEMENTS

George Piranian, M.S. (Utah State), M.A. (Rice); Samuel Fain Carter Fellow in Mathematics.

Alfred Douglas Reichle, B.S. in Ch.E. (Rice); Fellow in Chemical Engineering.

Earle Leighton Rudolph, B.A. (Arkansas), M.A. (Harvard); Assistant in English.

Warren Candler Simpson, B.A. (Rice); Eastman Kodak Company; Fellow in Chemistry.

Wolfgang Joseph Thron, B.A. (Princeton), M.A. (Rice); formerly Fellow in Mathematics at the State College of Washington; Fellow in Mathematics.

Jackson Dan Webster, B.S. (Whitworth), M.S. (Cornell); Fellow in Biology.

Thomas Percy Wier, Jr., M.A. (Rice); Fellow in Chemistry.

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,

THE RICE INSTITUTE

founded by the late 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 a student 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 \$175. The first award was made for the academic year 1918-19.

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 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 students of high standing in scholarship who are earning a substantial part of their college expenses. Each of the six now available carries with it an annual stipend of \$116.66. The first awards were made for the academic year 1918-19.

THE D.A.R. SCHOLARSHIP

The John McKnitt Alexander Chapter of the Daughters of the American Revolution has provided an endowed undergraduate scholarship at the Rice Institute. Under the present conditions of this scholarship it is awarded to a young woman student on admission to the Institute and

ANNOUNCEMENTS

carries with it an annual stipend of \$175. The first award was made for the academic year 1919-20.

THE ELLEN AXSON WILSON SCHOLARSHIP

The Axson Club, an organization of Houston women in the interests of literary pursuits, recently concluded a successful campaign for the endowment of a permanent scholarship at the Rice Institute in memory of Ellen Axson Wilson (the late Mrs. Woodrow Wilson), the scholarship to be awarded from year to year to a young woman student of the Institute. The annual stipend of the Ellen Axson Wilson Scholarship is \$350, and the first award of the scholarship was made for the academic year 1922-23.

THE ELIZABETH BALDWIN LITERARY SOCIETY SCHOLARSHIP

The Elizabeth Baldwin Literary Society of the Rice Institute is maintaining annually a scholarship with a view to providing permanent endowment therefor. This scholarship is available to a student of the Rice Institute, either a young man or a young woman, the candidate to be chosen by the Faculty on grounds of scholarship, personality, and physical vigor. The present annual stipend of the Elizabeth Baldwin Literary Society Scholarship is \$200, and the first award of the scholarship was made for the academic year 1926-27.

THE PALLAS ATHENE LITERARY SOCIETY SCHOLARSHIP

The Pallas Athene Literary Society of the Rice Institute is providing an annual scholarship at the Rice Institute, with the intention of raising a permanent endowment for the scholarship. This scholarship is open to a young woman

THE RICE INSTITUTE

student of the Rice Institute, to be selected by the Faculty on grounds of scholarship, personality, and physical vigor. The present annual stipend of the Pallas Athene Literary Society Scholarship is \$175, and the first award of the scholarship was made for the academic year 1926-27.

THE DANIEL RIPLEY SCHOLARSHIP

In memory of her husband, the late Daniel Ripley, for many years a prominent citizen of Houston, Mrs. Edith Ripley established by the donation to the Institute of \$10,000, the Daniel Ripley Scholarship. The annual income of this trust fund is to be awarded to that self-supporting young man or woman student completing the Freshman year at the Rice Institute who receives the highest grades, and the candidate is to be selected by the Faculty. The first award of the Daniel Ripley Scholarship was made for the academic year 1927-28.

THE JUNIOR ENGINEERING SCHOLARSHIP

To foster interest in engineering education at the Rice Institute and to provide for recognition for work well done, an anonymous donor is contributing to the Rice Institute the sum of \$175 annually as a stipend for the Junior Engineering Scholarship, to be awarded to that male student in a regular engineering course of the Junior year who has the highest scholastic standing in his courses taken that year. This scholarship is restricted to no particular field of engineering, the selection of the scholar is made by the Faculty, and in making the selection account is taken of individual qualifications of character and personality, but no consideration is to be given to the financial circumstances of the

ANNOUNCEMENTS

student. The first award of the Junior Engineering Scholarship was made for the academic year 1928-29.

THE EDITH RIPLEY SCHOLARSHIPS

Mrs. Edith Ripley, of Houston, established three Edith Ripley Scholarships by the donation of \$10,000 to the Rice Institute, the income of which is to be distributed equally and annually to three young women students of the Institute to be selected by the Faculty. In selecting the beneficiaries of this donation, consideration is to be given to the mental, moral, and womanly qualities of the candidates, as well as to their financial necessities. The first awards of the three Edith Ripley Scholarships were made for the academic year 1928-29.

THE MARY PARKER GIESEKE SCHOLARSHIP

Mr. Fred A. Gieseke, of Houston, and his daughter, Mrs. James Carter Boone, a graduate of the Rice Institute, established the Mary Parker Gieseke Scholarship in memory of the late Mrs. Fred A. Gieseke, by a gift to the Rice Institute of \$5000. This memorial scholarship is to be awarded annually for high standing in scholarship to a student of the Rice Institute who has been in residence at least one year. The first award of the Mary Parker Gieseke Scholarship was made for the academic year 1929-30.

THE THOMAS AUBREY DICKSON AND PAULINE MARTIN DICKSON SCHOLARSHIPS

The late Mrs. Pauline Martin Dickson, of Houston, in execution of the wishes of herself and her husband, the late Dr. Thomas Aubrey Dickson, bequeathed to the San Jacinto Trust Company a sum of \$10,000, the income of

THE RICE INSTITUTE

which is to be paid semi-annually to the Rice Institute for the support of scholarships to be known as the Thomas Aubrey Dickson and the Pauline Martin Dickson Scholarships, to be awarded by the Faculty, on the basis of scholarship, to self-supporting students of the Institute, young men or young women. The first awards of the Dickson Scholarships were made for the academic year 1932-33.

THE FRIENDS OF RICE SCHOLARSHIPS

The Friends of Rice, an association dedicated to the encouragement and perpetuation of the purposes, activities, and ideals of the Rice Institute on the part of an extensive group of men and women of this community, is maintaining three annual scholarships in the sum of \$200 each. The Friends of Rice Scholars are selected by the Faculty on grounds of scholarship, general intelligence, and physical vigor. The first awards of these three scholarships were made for the academic year 1935-36.

THE CHAPMAN-BRYAN MEMORIAL SCHOLARSHIP

By bequest of the late Miss Johnelle Bryan of Houston made on behalf of herself and her sister, the late Mrs. Caro Bryan Chapman, the Rice Institute has received the sum of \$2500 for the endowment of the Chapman-Bryan Memorial Scholarship at this institution. The scholar on this foundation, a student of the Institute, is to be selected by the Faculty on the basis of high standing, personality, and physical fitness. The first award of the scholarship was made for the academic year 1937-38.

THE LADY WASHINGTON TEXAS CENTENNIAL AWARD

From the Lady Washington Chapter of the Daughters of the American Revolution the Rice Institute has received

ANNOUNCEMENTS

the sum of \$1000 in endowment of the Lady Washington Texas Centennial Award. This award is to be made yearly for scholarship to a young woman student of the Rice Institute, preference to be given to Houston students of Sophomore standing. The first award was made for the academic year 1937-38.

THE KATIE B. HOWARD SCHOLARSHIP

The Axson Club has undertaken to endow a second scholarship at the Rice Institute. Towards the permanent endowment thereof a sum of approximately \$5000 has been raised. The income of this fund is to be awarded from year to year to a young woman student of the Institute. The Axson Club was organized by Mrs. A. R. Howard, and by unanimous vote of her associates the new scholarship bears her name. The first award of the Katie B. Howard Scholarship was made for the academic year 1937-38.

THE SAMUEL S. ASHE SCHOLARSHIP

Mrs. Sallie Ashe Fitch has endowed a scholarship at the Rice Institute in memory of her father, Samuel S. Ashe, who for many years and until his death was a prominent citizen of Houston, and in full sympathy with the purposes and aspirations of the Rice Institute. This scholarship is to be awarded annually to a deserving but necessitous young man or young woman of the Freshman class of the Institute on completing the work of that year with highest grades. The first award of the Samuel S. Ashe Scholarship was made for the academic year 1939-40.

ENGINEERING ALUMNI SCHOLARSHIP

As evidence of their continued interest in engineering education at the Rice Institute, the Engineering Alumni are

THE RICE INSTITUTE

providing an annual stipend of \$300 for that engineering student, of good character and personality, entering his Senior year, who shows by his scholastic record and his interest and participation in student affairs that he gives promise of being a credit to the engineering profession. Consideration is to be given to the financial circumstances of the student and the award is to be contingent on his continuing his work at the Rice Institute. The first award of the Engineering Alumni Scholarship was made for the academic year 1938-39.

THE THOMAS RICHARD FRANKLIN AND JULIA HADLEY FRANKLIN SCHOLARSHIPS

The late Mrs. Mabel Franklin Asten, daughter of a family distinguished in the history of the City and Commonwealth, has bequeathed to the Rice Institute approximately \$62,000 to constitute, as a memorial to her father and mother, the Thomas Richard Franklin and Julia Hadley Franklin Scholarship Fund. The income of this fund is to be devoted to the awarding of annual scholarships to properly qualified students of the Institute. Both male and female students shall be eligible to Franklin Scholarships, and in awarding them, the Institute shall take into consideration not only the scholarly standing but also the financial necessities of the candidates. The recipients are known as the Thomas R. Franklin and Julia H. Franklin Scholars. The first awards were made for the academic year 1939-40.

THE WALSH SCHOLARSHIP IN ARCHITECTURE

The Walsh Scholarship in Architecture, in memory of the late Timothy Walsh, F.A.I.A., of the firm of Maginnis and

ANNOUNCEMENTS

Walsh of Boston, Massachusetts, is being established by his son, Mr. James A. Walsh, of Houston. The scholarship provides a stipend of \$100 annually to be awarded by the Faculty by means of a formal competition, to a student completing his fourth year in architecture, for the purpose of assisting him to carry on through his fifth year. The first award was made for the academic year 1941-42.

THE R ASSOCIATION SCHOLARSHIP

The R Association, composed of present and former students of the Institute who have received a letter in a major sport, is providing annually a scholarship in the sum of \$175. This scholarship is to be awarded by the Committee on Examinations and Standing of the Institute on grounds of high scholarship either to a member of an athletic team or to a member of the Rice Institute Band. The first award of the R Association Scholarship was made for the academic year 1941-42.

THE PREMEDICAL SOCIETY SCHOLARSHIP

The Premedical Society, consisting of students looking forward to the study and practice of medicine, are providing biennially a scholarship in the sum of \$200. This scholarship is to be awarded by the Committee on Examinations and Standing of the Institute to the student with the highest scholarship record in the premedical course, and without reference to financial need. The first award of the Premedical Society Scholarship has been made for the academic year 1942-43.

THE RICE INSTITUTE

THE MAX AUTREY MEMORIAL SCHOLARSHIPS

Under the last will and testament of the late Mrs. Nettie S. Autrey, for many years a resident of Houston, the Rice Institute received a cash bequest of \$20,000 to be known as the Max Autrey Scholarship Fund, from the income of which scholarships are to be awarded, on such terms as the authorities of the Institute may determine, as a memorial to the donor's son, Max Autrey, in service in the first world war and since deceased. The students receiving such awards are to be designated as Max Autrey Memorial Scholarship students. From the income of this bequest the first awards of three Max Autrey Memorial Scholarships, based on character, personality, and high scholastic standing, have been made, in the sum of \$200 each, for the academic year 1942-43.

THE COLLEGE WOMEN'S CLUB FUND OF THE RICE INSTITUTE

In January 1942 the Trustees of the Institute received from the College Women's Club of Houston a check for \$5,000 for the endowment of a fund to be known as the College Women's Club Fund of the Rice Institute, to be held in trust by the Trustees and kept invested by them. From the income of this fund an award is to be made annually to some woman Senior at Rice whom the President of the Institute and his committee may select as an outstanding student, to be used by her in working on her master's degree, either at Rice or some university of the same rank. The first award, in the sum of \$175, of a scholarship from the College Women's Club Fund will be made for the academic year 1943-44, and announced at the commencement exercises of 1943.

ANNOUNCEMENTS

SCHOLARSHIP OF THE HOUSTON CHAPTER OF THE AMERICAN PETROLEUM INSTITUTE

From the Houston Chapter of the American Petroleum Institute a gift of \$100 has been received for a scholarship available to a Junior engineering student, conditioned on class standing, extracurricular activities, and his continuing his Senior year at Rice. This scholarship has been awarded for the academic year 1942-43.

THE LADY GEDDES PRIZE IN WRITING

The Right Hon. 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 first award of the Lady Geddes Prize in Writing was made at the end of the academic year 1922-23, the competition of this award being open to members of the Freshman and Sophomore classes of the Rice Institute, and the subjects assigned pertaining to the relations between Great Britain and the United States.

THE OWEN WISTER LITERARY SOCIETY FUND

The Owen Wister Literary Society of the Rice Institute is providing an annual donation at the Rice Institute, with the intention of raising a permanent endowment for the donation. The annual gift is at present devoted to the purchase of books on the history of Texas and the West. The first appropriation of \$250 from this fund was available in the academic year 1929-30. The Society has made available the sum of \$100 for the academic year 1942-43.

THE RICE INSTITUTE

THE RICHARDSON FUND FOR RICE STUDENTS

Mrs. Libbie A. Richardson, wife of the late Alfred S. Richardson, who was a charter member of the Board of Trustees of the Rice Institute, bequeathed in trust to the Houston Land and Trust Company as trustee, approximately \$51,000 to constitute the Richardson Fund, the income therefrom to be used in educating necessitous young men and women at the Rice Institute. The present annual income of the Richardson Fund is about \$2600.

THE GRANT WILLIAM JORDAN AND CORA JORDAN MEMORIAL FUND

Under the will of the late Mrs. Cora Jordan, a resident of Houston, the bulk of her estate was left in trust with the Houston Land and Trust Company as trustee, the income therefrom to be used in assisting worthy young men and women in obtaining an education at the Rice Institute. The Jordan Memorial Fund amounts at present to approximately \$56,000 and the net annual income therefrom is about \$3000.

THE SARA STRATFORD FUND

The Sara Stratford Fund for Women Students of the Rice Institute, in memory of the late Mrs. Sara Stratford, first Adviser to Women, who served faithfully and efficiently in that capacity from the opening of the Institute, is being established by her daughter, Mrs. William Bradshaw Torrens, her immediate successor as Adviser to Women. For the present \$100 per year will be available at the time of registration in September, for laboratory or other fees of courses, science courses in particular, which the candidates,

ANNOUNCEMENTS

selected by the Committee on Examinations and Standing, could not otherwise afford to take. The first awards from the Sara Stratford Fund were made in the autumn of 1931.

THE MARY ALICE ELLIOTT LOAN FUND

In memory of their daughter, the late Mary Alice Elliott, who at the time of her death was a student in architecture at the Rice Institute in the class attaining, at the graduation of 1931, the degree of Bachelor of Science in Architecture, Mr. and Mrs. Card G. Elliott, of Houston, are establishing the Mary Alice Elliott Loan Fund for Foreign Travel and Study in Architecture, in the amount of \$2500. A loan of \$500 from this fund is to be available each year, on recommendation of the Faculty, to an architectural graduate who has received honourable mention in the annual competition for the regular Traveling Fellowship.

The first award from the Mary Alice Elliott Loan Fund was made for the academic year 1931-32.

THE ROBERT PILCHER QUIN AWARD

By a group of student friends of the late Robert Pilcher Quin, a member of the Class of 1933, provision is being made for an annual "Bob Quin Award," in the form of a medal, for qualities in athletics, leadership, scholarship, and sportsmanship in which he himself excelled. The first of these medals was awarded for the academic year 1930-31.

FELLOWSHIPS

THE Rice Institute seeks to interpret in a large way its dedication to the advancement of letters, science, and art.

THE RICE INSTITUTE

It not only looks 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 have always been associated with the staff of the Institute advanced students in training for careers both as teachers and researchers: with this end in view, graduate fellowships have been awarded from time to time to degree-bearing students of the Institute and other educational foundations. In addition to the foregoing fellowships, there are available several memorial fellowships which have been founded and endowed by gift or bequest on the part of friends of the Rice Institute.

THE WALTER B. SHARP MEMORIAL FUND FOR RESEARCH IN PURE AND APPLIED SCIENCE

In memory of her husband, the late Walter B. Sharp, one of the earliest and most successful of the pioneers in the development of the petroleum industry in this country, Mrs. Estelle B. Sharp, of Houston, has endowed at the Rice Institute the Walter B. Sharp Memorial Fund for Research in Pure and Applied Science. The income from this fund is to be used for the maintenance of resident or traveling fellowships in scientific research, preference to be given geological research, the production of petroleum and the products closely allied thereto. A requisite for eligibility to these fellowships is the degree of Doctor of Philosophy, or similar standing in this or other institutions. The awards are to be known as the Walter B. Sharp Fellowships, and the holders thereof as the Walter B. Sharp Fellows of the Rice

ANNOUNCEMENTS

Institute. The first Walter B. Sharp Fellow, at a stipend of \$2500, was appointed for the academic year 1931-32.

THE SAMUEL FAIN CARTER FELLOWSHIP

In memory of her husband, the late Samuel Fain Carter, one of the first promoters of the lumber industry in Texas and the founder of the Second National Bank of Houston, Mrs. Carrie B. Carter has established at the Rice Institute, the Samuel Fain Carter Fellowship, with an endowment of \$20,000 to be administered in trust by the Second National Bank. The annual income of this trust fund is to be awarded to a graduate student of the Rice Institute, or a white graduate of an approved institution of learning, for the purpose of enabling the student to continue in post-graduate work, preferably at the Rice Institute, and, when the appropriate graduate schools shall have been organized, precedence is to be given to candidates in banking, business administration, and forestry. In the meantime, the award is to be made for the prosecution of postgraduate work in history and allied subjects, in science or engineering, or other branches of liberal and technical learning for which facilities for advanced work may be available at the Rice Institute. Should a graduate of any institution other than the Rice Institute receive the award, then the postgraduate work shall be done only at the Rice Institute. The holder is to be known as the Samuel Fain Carter Fellow of the Rice Institute. The award is to be made by the Faculty, on the basis of highest standing in scholarship, with consideration of financial circumstances, personality, and physical fitness. The first Samuel Fain Carter Fellow was appointed for the academic year 1933-34.

THE RICE INSTITUTE

THE TRAVELING FELLOWSHIP IN ARCHITECTURE

Provision for a Rice Institute Traveling Fellowship in Architecture has been made by the Alumni of the Department of Architecture and the Architectural Society of the Rice Institute, who have pledged themselves to raise funds to be given each year to a student in architecture for the purposes of foreign and domestic travel and study. The selection of the holder of the Traveling Fellowship is to be made annually by the Faculty by means of a formal competition, in which students or graduates of the Rice Institute are eligible to participate. This fellowship is in continuance of the Traveling Scholarship in Architecture, the first award of which scholarship was made for the academic year 1928-29.

THE JAMES A. BAKER AND ALICE GRAHAM BAKER BEQUEST

By the last will and testament of the late Captain James A. Baker, for more than fifty years President of the Board of Trustees of the Institute, the Trustees have received a fund in excess of \$60,000 to be known as the James A. Baker and Alice Graham Baker Bequest. The fund is to be kept invested by the Trustees and the income thereof "used in part, by the Institute, in establishing scholarships and fellowships, and to pay in whole or in part the salaries of its professors, teachers and lecturers, and in the payment of annual prizes to the students to stimulate their interest in their work." The first awards from the income of the James A. Baker and Alice Graham Baker Bequest will be made for the academic year 1943-44 and announced at the commencement exercises of 1943. These first awards will consist of two graduate fellowships, each bearing a stipend of \$750.

ANNOUNCEMENTS

THE CATHARINE WITHERS ROPER AND BENJAMIN E. ROPER MEMORIAL FUND

The late Mary Withers Roper has bequeathed to the Rice Institute the residue of her estate in a sum in excess of \$11,000 as a memorial to her mother and father, Catharine Withers Roper and Benjamin E. Roper, pioneering contemporaries of the Founder of this institution. Only the income of this fund may be expended; the principal thereof is to be kept intact in the permanent endowment fund of the Institute. Miss Roper passed away at the advanced age of eighty-four years. She began teaching very early in life, and at the time of her retirement a few years ago she had spent an active life of sixty years in teaching in the schools of this vicinity. Through this memorial there become associated in perpetuity the family names of two long lives that were lived for the children of others. The first award from the income of the bequest of Miss Mary Withers Roper will be made for the academic year 1943-44. The award will be a graduate fellowship carrying a stipend of \$750.

THE EASTMAN KODAK COMPANY FELLOWSHIP

From the Eastman Kodak Company the Rice Institute has received for the academic year 1942-43 a gift of \$750 for one of the research fellowships that company is awarding this year to the departments of chemistry of several universities and colleges of the country.

THE PHI BETA KAPPA SOCIETY

THE Senate of the United Chapters of Phi Beta Kappa at its meeting in December, 1927, voted to recommend the establishment of a chapter at the Rice Institute, and at a

THE RICE INSTITUTE

meeting of the National Council held in September, 1928, the institution of the Rice, or Beta of Texas, chapter was duly authorized. The chapter was formally installed on March 1, 1929, by the Secretary of the United Chapters.

THE SOCIETY OF THE SIGMA XI

THE Society of the Sigma Xi, for the promotion of research in science, on the occasion of its thirty-eighth annual convention in December, 1937, acting upon the recommendation of the Executive Committee, duly authorized the establishment of a chapter of the Society at the Rice Institute. The formal installation of the Rice chapter by the president of the national organization took place on March 23, 1938.

THE TAU BETA PI ASSOCIATION

THE Tau Beta Pi Association, organized about half a century ago to interest engineering students in competing for high standing in scholarship, authorized, at its annual convention, in October, 1940, the establishment of a chapter of the Association at the Rice Institute. The Rice chapter, the Gamma of Texas, was formally installed on December 18, 1940, by the national secretary of the Association.

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 a number of citizens of Houston,

ANNOUNCEMENTS

there are available several student loan funds. Inquiries concerning the administration of these funds should be addressed to the Bursar.

GENERAL REQUIREMENTS FOR ADMISSION

ALL candidates for admission to the Institute are required to present satisfactory testimonials as to their character, and either to present a certificate of graduation from an approved public or private high school, or, in lieu thereof, to pass examinations in the entrance subjects. 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. Appropriate application forms may be secured from the Registrar.

Fifteen units are required for entrance in full standing to the Freshman class of the Institute. No candidate for admission will be accepted with fewer than fifteen units. And towards this total of fifteen units, every candidate will be required to present, from the lists of subjects printed below, at least three units in English, three units in mathematics,¹ including 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. It is recommended that candidates offer from one to three units in science. Variation in the distribution of units may be considered in individual cases.

¹Students 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.

THE RICE INSTITUTE

METHOD OF PROCEDURE FOR ADMISSION

I. General Policy of Competitive Admission of Students

With the rapid growth in population of Houston and the Southwest, accompanied by an even more rapid increase in the demand for college training, the Rice Institute is brought face to face with the problem of maintaining high standards of instruction without shutting the door of opportunity to properly qualified students. It is therefore proposed, for the immediate future, to meet this problem by a plan of admission based on the following principles:

1. The maintenance, as in the past, of standards for entrance on a high plane.
2. The adoption in advance for each academic year or group of years of a specific number of new students to be admitted on a competitive basis. This number should be slightly smaller than the demand but not so far below that demand as to cause injustice to well qualified students.
3. The division of students into still smaller groups, especially in the classes in elementary subjects. The adoption of this principle makes necessary the acceptance of a smaller total number, but means that a larger number will receive careful and adequate instruction.

II. Specific Plan for the Admission of Four Hundred New Students in the Autumn of 1942

The Rice Institute will accept four hundred new students in September, 1942. The total student body will thus consist of about fourteen hundred members, which was approximately the enrollment in September, 1941.

ANNOUNCEMENTS

In selecting the members of the Freshman class the Committee will be guided by such principles as the following:

1. As at present, no candidate to be accepted with fewer than fifteen units.
2. Preference to be given to candidates who present the maximum number of units in English, mathematics, foreign languages, science, and history.
3. Preference to be given to candidates who show special promise and capacity for leadership, especially those in the upper half of their high-school class.
4. Of candidates not in one of the above preferential groups, special preference to be given to those who prove fitness by taking entrance examinations in one or more subjects.
5. Preference to be given to candidates whose applications are received early.

Candidates, once chosen, are received without conditions.

LIST OF SUBJECTS WITH VALUES IN UNITS

BOTANY 1; Chemistry 1; Civics ($\frac{1}{2}$ or 1); English (3 or 4); French (Elementary 2, Intermediate 1, Advanced 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 (Elemen-

THE RICE INSTITUTE

tary 2, Intermediate 1, Advanced 1); Physics 1; Physical Geography $\frac{1}{2}$; Physiology $\frac{1}{2}$; General Science 1; Zoology 1. Substitutes for certain of these subjects may be considered in individual cases.

Entrance examinations will be held at the Institute beginning September 7, 1942, and again during the week beginning May 3, 1943. 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.

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.

Advanced credit may be granted to students coming from other recognized colleges and universities 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.

EXPENSES

THE opportunities for study and research offered by the Rice Institute are open without tuition both to young men and to young women. Students, of course, are expected to meet all expenses incurred in the purchase of text books, drafting instruments, note books, examination papers, certificates and diplomas, and the laboratory expenses in the

ANNOUNCEMENTS

experimental courses in pure and applied science. An annual registration fee of twenty-five dollars is required of all students. A student blanket-tax of eight dollars and forty cents is required of all students to meet the expenses of the Students Association. A gymnasium fee of sixteen dollars is required at registration time of every new male student, entering as a Freshman, for the use of gymnasium equipment during his residence; students transferring from other institutions and ranked as Freshmen at the Rice Institute pay this full fee on admission; those classified as Sophomores pay twelve dollars; those classified as Juniors pay eight dollars; those classified as Seniors pay four dollars. A fee of ten dollars, payable at the beginning of each year, is required by the Institute of every student of naval science and tactics.

A contingent deposit of ten dollars, payable at registration, must be maintained by each student. In addition to this general contingent deposit, laboratory deposits, also payable at registration, must be maintained at the Office of the Bursar as follows: a deposit of ten dollars for Biology 360, 400, and 410, for Physics 300, 310a, 340, and 350, for Psychology 300 and 410, and for Architecture 310, 340, 410, 440, and 450; a deposit of twenty-five dollars for each laboratory course taken in biology, chemistry, physics, and chemical engineering; a deposit of twenty-five dollars for Engineering 110, covering also the purchase of approved drawing instruments; a deposit of twenty-five dollars for Mechanical Engineering 310 and for Electrical Engineering 300, 330, and 450; and a deposit of twenty-five dollars on the part of every student in architecture, and every Sophomore, Junior, and Senior in engineering, chemical engineering excepted.

THE RICE INSTITUTE

These deposits, contingent and laboratory, will ordinarily cover the charges against the student for materials, et cetera, but whenever the charges against any particular deposit approach the amount of that deposit, the student will be required to make such additional payment as will bring the deposit to its original amount: this is what is meant by maintaining a deposit. Any balances on these deposits are returned in July following the academic year. For delayed registration a penalty is required.

No student in arrears in his bills, including obligations to loan funds, will be admitted to any of the examinations, or be given any certificate or report of academic standing.

Men students registering for the first time will be expected to live in the residential halls on the campus for not less than one year. The period of residence, however, may be postponed for one year in case the parent or guardian certifies that the student is financially unable to live in the halls, but in such circumstances the student will be expected to live with relatives.

Rooms in the residential halls for men, completely furnished exclusive of linen, may be had for ninety dollars per year, twenty-five dollars of the rental being paid when the lease is signed, thirty-five dollars paid on September ninth, and the remainder paid on February fifth. As the charge for table board will be made at actual cost, the monthly price, payable in advance, will probably vary during the year. Until November first, a blanket-charge of one dollar and eight cents per day will be made. An annual medical fee of ten dollars is required of all students living in the residential halls.

ANNOUNCEMENTS

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. Rooms in the halls will be let in the order of applications received. Such applications should be addressed to the Office of the Bursar.

Accommodations for the residence of young women on the university grounds are not available at present, but there is access to rest rooms, and to tennis courts and other forms of recreation under the supervision of Miss Sarah Louise Lane, B.A. (Rice), B.S. in Library Service (Columbia), 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 institution to develop its university programme rather more seriously 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

THE RICE INSTITUTE

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, Master of Science, 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, honours courses leading to the degree with honours in certain subjects. These are types that will be referred to in the sequel as general courses and honours courses respectively.

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 honours B.A. course and then

ANNOUNCEMENTS

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 honours 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 now require bachelor degrees for admission.

As has already been intimated, the course for the degree of B.A. extends over four years. During the first 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 subjects 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. Preliminary examinations for all new undergraduates are held in December, examinations for all students are given in February, and final examinations for all are held in June. Other examinations are given from time to time at periods determined by the instructors.

These examinations are conducted under a student honor system. In determining the standing of a student in each

THE RICE INSTITUTE

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. Spanish
6. Economics
7. Education
8. History
9. Philosophy
10. Architecture

GROUP B

1. Pure Mathematics
2. Applied Mathematics
3. Physics
4. Chemistry
5. Biology
6. Psychology
7. Chemical Engineering
8. Civil Engineering
9. Electrical Engineering
10. 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.

First Year

- (1) Pure mathematics
- (2) English
- (3) A modern language
- (4) A science¹
- (5) One other subject²

¹Naval R.O.T.C. students must elect Physics 100 in either the first or the second year.

²Naval R.C.T.C. students elect Naval Science.

ANNOUNCEMENTS

Second Year

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

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

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 fourth 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.

¹Students 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.

²Naval R.O.T.C. students elect Naval Science.

THE RICE INSTITUTE

HONOURS COURSES

THE third and fourth year honours 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 honours 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 honours course. A student proposing to take an honours 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 honours students in that subject during each of the two years and in addition certain courses in allied subjects. It is a decided advantage for students in honours courses to have had some preparation in French or German before entering college.

In 1942-43 honours 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
- (8) History
- (9) Philosophy

ANNOUNCEMENTS

The following programme of the honours course in physics may be taken as typical of such courses:

Third and fourth years: Two or three half-year Physics 300 courses in each half-year and one or two other subjects, preferably mathematics and chemistry.

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

The degree of B.A. with honours will be awarded at the end of the fourth year to students who have completed an honours course. Candidates for honours who fail may be excused such part of a general course as may be equivalent to the work they have done. Candidates for honours who are not making satisfactory progress may be required to discontinue their honours course and may be excused 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 110, 114, and 137.

A student who has completed a general or an honours 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 a 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

THE RICE INSTITUTE

a graduate course in the principal subject. In addition, candidates for the M.A. degree must pass a public examination.

For courses leading to the degree of Master of Science, see page 114.

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 a copy must be deposited in the Institute library.

Candidates who successfully complete the first four years of the engineering course will receive the degree of Bachelor of Science in a specified branch of engineering. This degree will be awarded with distinction to students whose work is of a high standard. Candidates who successfully complete the five years' engineering course will receive the degree of Ch.E., C.E., E.E., or M.E. according to the branch of engineering taken. Under requirements conforming to those for the M.A. degree, namely, high standing, a thesis, and a public examination, the M.S. degree in a specified branch of engineering may be awarded.

Candidates who successfully complete the five years' 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.

ANNOUNCEMENTS

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 114 and 137 respectively. Admission to less than the regular schedule is rarely granted, and then only in the most exceptional circumstances. 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. An excess schedule must be reduced if a student 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 after the February examinations 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.

Examinations.—All courses at the Rice Institute are year

THE RICE INSTITUTE

courses. Preliminary examinations are given in December to all new undergraduates. Regular written examinations are given to all students in February and at the close of the academic year in June. In Junior and Senior courses (listed as 300 or 400 courses), the June examinations cover the work of the whole year. In elementary courses (listed as 100 or 200 courses), examinations cover the work done from the time of the preceding examination.

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 will also be dropped for failure to come off probation within one year, or for poor scholarship due to absences from the exercises of his schedule. Any student who withdraws from the Institute within five weeks of the beginning of any regular examination period on account of failure in his courses will be regarded as dropped from the Institute.

A student dropped from the Institute is not entitled to readmission. Exceptions may be made and a student granted readmission on presentation of satisfactory evidence that previous deficiencies have been removed. 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's¹ or no grade better than IV. A student who is carrying four courses will be placed on probation if

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

ANNOUNCEMENTS

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 fewer 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. Probation is terminated only at regular examination periods and must be terminated within one year's time or the student will be dropped from the Institute. A student who is on probation may also be dropped at any time during the probation period for inattention to the requirements of his schedule. A student who is on probation is not permitted to be a candidate for or to hold any elective office, or to serve as editor, assistant editor, business manager, or assistant business manager of a college publication.

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 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'

THE RICE INSTITUTE

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 1942-43

OF the courses to be offered during the scholastic year 1942-43 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. 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.

ENGLISH 100. The Theory and Practice of English Composition, with the study of fundamental literary forms. The primary purpose of the course is to give students the command of written English which is necessary for later work in college. A secondary but still important purpose is to examine the chief types of prose and poetry, as a foundation

ANNOUNCEMENTS

for further courses in literature or for private reading. Required of Freshmen. M W F 8:00, 9:00, or 11:00 or
T Th S 9:00 or 11:00

ENGLISH 110. A course similar to English 100, meeting two hours per week. For students of engineering and architecture who are taking a course in naval science and tactics. M W 9:00 or T Th 9:00

ENGLISH 200. Outlines of the History of English Literature, with collateral reading of major authors representative of the various periods. M W F 10:00

ENGLISH 210. Argumentation and Public Speaking. Practical training in the fundamentals of effective speech, written argument, and debate. Designed to prepare the student for the ordinary demands of business life. Platform speaking, themes, conferences. This course is planned primarily for students of physical education. T Th S 9:00

ENGLISH 300. English Drama from its Beginnings to 1642. The development of the drama will be traced from the miracle plays and the moralities through the plays of Shakespeare and his contemporaries to the closing of the theaters. Some emphasis will be placed upon the development of Shakespeare as a dramatist, and upon the indebtedness of Shakespeare to the earlier drama.

(Not offered 1942-43.)

ENGLISH 310. Modern British and American Poetry. A survey of poetic development in Great Britain and America from 1890 to 1930: the revolt of the 1890's, the Irish Renaissance, the Georgians, the poetry of the Great War, the "new" American poetry. M W F 11:00

THE RICE INSTITUTE

ENGLISH 320. Modern Drama. Special Study of Ibsen, Strindberg, Shaw, Barrie, Galsworthy, O'Neill, and Anderson; reading of representative recent English, American, and Continental plays; lectures upon theatrical history, acting, and dramatic tendencies. T Th S 10:00

ENGLISH 330. Advanced Writing. The writing of essays, stories, plays, and novels. Time is given also to problems of marketing manuscripts. Stories will be read and analyzed, and critical theories discussed. Frequent conferences. Open to Juniors and Seniors, and to Sophomores upon recommendation of an instructor. M W F 12:00

ENGLISH 340. The Novel in England and America. The major novelists of the eighteenth, nineteenth, and early twentieth centuries. M W F 12:00

ENGLISH 360. English Drama from 1660 to 1900. This course begins with the opening of the theaters after the Puritan Revolution and covers the drama of the Restoration, the eighteenth century, and the nineteenth century. T Th S 11:00

ENGLISH 370. Milton and his Contemporaries. Special study of Milton and some of the minor writers of the seventeenth century, including Donne, Herbert, Cowley, Bunyan, Pepys, and Dryden. T Th S 8:00

ENGLISH 380. Composition and Expression for Engineers. Training in the writing of business and technical reports, and in written and oral argument. Discussion of selected reading in engineering subjects and platform speaking. Half-year course. Prerequisite: English 100.

First half-year: M W F 10:00

Second half-year: M W F 8:00

ANNOUNCEMENTS

ENGLISH 390. American Literature. After a brief survey of the colonial period, the major authors of the nineteenth and early twentieth centuries will be studied in some detail. The emphasis throughout will be on the historical and social significance of American literature. M W F 11:00

ENGLISH 400. Shakespeare. A close study of certain of the comedies, histories, and tragedies, with lectures on the interpretation of these plays in the light of the Elizabethan mind. Open only to Seniors. M W F 9:00

ENGLISH 420. Later Romantic and Victorian Literature, with special study of the poetry from Coleridge to Swinburne and reading and discussion of selected prose from Lamb to Pater. Study of the biographical, social, and political background. (Not offered 1942-43.)

ENGLISH 500. Chaucer. Extensive reading in the *Canterbury Tales*, the *Troilus*, and other works. While due attention will be given to the language, the emphasis will be on Chaucer's literary art in relation to mediaeval culture. Strongly recommended for honours students and prospective teachers of English. Hours to be arranged.

ENGLISH 510. Old English: *Beowulf*. The elements of Old English, followed in the second half-year by a reading of *Beowulf*. (Not offered 1942-43.)

ENGLISH 530. Topics in English Literary History. Graduate Research.

Requirements for Honours Course in English: four courses in English; two courses in Modern Languages, preferably French, German, or Italian; two courses in

THE RICE INSTITUTE

philosophy or history; all to be Junior or Senior courses and to be passed with high grades. Individual schedules and quality of work must be satisfactory both to the department and to the Committee on Honours Courses and Advanced Degrees.

FRENCH 100. First Year French. Oral exercises, dictation, grammar, composition, and study of French texts.

M W F 8:00 or 10:00 or
T Th S 8:00, 9:00, or 10:00

FRENCH 110. Elements of grammar and rapid reading of scientific French. Open to beginners. T Th S 10:00

FRENCH 200. Second Year French. Oral exercises, dictation, review of grammar, composition, study of representative authors, supplementary reading under the supervision of the instructor.

M W F 12:00 or
T Th S 8:00, 10:00, or 11:00

FRENCH 300. Third Year French. Composition and study of modern French texts with special emphasis on the syntax and the difficulties of the French language. A considerable amount of outside reading will be required. Reports and essays in French.

M W F 9:00 or T Th S 11:00

FRENCH 380. A Survey of the History of French Literature up to 1715. T Th S 8:00

French 470. French Literature from 1850 to 1940.

T Th S 9:00

ANNOUNCEMENTS

FRENCH 560. French Civilization from 1850 to 1940.

Hours to be arranged.

Requirements for Honours Course in French: Two 300 and two 400 courses passed with high credit (grades of I or II). Individual schedules and quality of work must be satisfactory both to the department and to the Committee on Honours Courses and Advanced Degrees.

GERMAN 100. Elementary German. Pronunciation, grammar, dictation, conversation, composition. Reading of a book.

M W F 10:00 or

T Th S 9:00 or 10:00

GERMAN 200. Second Year German. Reading of two works of literary importance. German script, grammar review, discussion and composition in German.

M W F 11:00 or T Th S 8:00

GERMAN 300. Classical German Literature from Klopstock to Goethe. Study of eighteenth-century classical works. Collateral and outside reading. The work will be carried on mainly in German. (Not offered 1942-43.)

GERMAN 310. Nineteenth Century Literature: From Romanticism to Naturalism. Lectures. Reading and study of some outstanding works. Collateral and outside reading. The work will be carried on mainly in the German language. (Not offered 1942-43.)

GERMAN 330. Advanced Composition. Phonetic drill, script, grammar, reading, writing, and conversation. Excursions into German history and literature. The work will

THE RICE INSTITUTE

be carried on mainly in German. The hour may be changed to suit the participants. M W F 12:00

GERMAN 430. Twentieth Century Literature including Gerhart Hauptmann and Thomas Mann. Reading of representative works, literary translation, free composition, and discussion. Conducted largely in German.

M W F 9:00

GERMAN 520. Seminar: Any one or two of the following: Phonetics; Gothic; Old High German; Middle High German. Mainly for graduates. (Not offered 1942-43.)

GERMAN 530. Graduate study and research. Chiefly for M.A. candidates.

The requirements for the Honours Course in German comprise five advanced courses: four in German, all to be passed with high credit, and one in English. Individual schedules and quality of work must be satisfactory both to the department and to the Committee on Honours Courses and Advanced Degrees.

ITALIAN 300. Elementary Italian. Open to students who have had at least two years of French, Spanish, or Latin. Oral exercises, grammar, composition, and reading of representative Italian authors. M W F 10:00

PORTUGUESE 100. Elementary Portuguese. Grammar, reading, and composition. T Th S 10:00

SPANISH 100. Beginning Spanish. Oral exercises, grammar, composition, and study of elementary Spanish texts. M W F 8:00 or 12:00

ANNOUNCEMENTS

SPANISH 200. Second Year Spanish. Oral exercises, dictation, grammar, composition, translation, and study of modern Spanish texts. Open to students who have had two years of high-school Spanish or Spanish 100.

M W F 10:00 or T Th S 11:00

SPANISH 300. Third Year Spanish. Open to all students who have completed Spanish 200 or 210. Review of grammar, composition, essays, study of representative authors, collateral readings, and reports.

T Th S 9:00

SPANISH 320. A Survey of the History of Spanish Literature. Open to Juniors and Seniors who have taken Spanish 300 and to Sophomores upon special recommendation.

T Th S 11:00

SPANISH 410. Hispano-American Civilization and Literature. Open to students who have already taken Spanish 300 or 430. Lectures, collateral readings, reports and discussions. Conducted in Spanish. (Not offered 1942-43.)

SPANISH 430. Commercial Spanish. A general survey of the economic conditions in Spain and in Latin American countries. Reading of reviews and bulletins, reports, and practical exercises. Open to students who have already taken Spanish 300 or 320 or have been accepted by the Department.

T Th S 8:00

SPANISH 440. The Spanish Drama of the Nineteenth Century. (Not offered 1942-43.)

Honours Courses in Spanish may be granted to students who have done exceptionally good work in Spanish and

THE RICE INSTITUTE

whose work in another language has been of high standing. The Spanish courses required are: Spanish 300, 320, 410, 430, and 440. Individual schedules and quality of work must be satisfactory both to the department and to the Committee on Honours Courses and Advanced Degrees.

MATHEMATICS 100. Elementary Analysis. Plane and spherical trigonometry, analytic geometry, and elementary calculus. This course is required for Freshmen because it forms a necessary introduction to work in mathematics and pure and applied science, and assists the students in developing habits of self criticism in thinking and writing. As one of the most modern of sciences and, at the same time, one of the most ancient of humanities, mathematics is regarded as an integral part of any general education. Engineering sections meet in three two-hour periods.

M W F 11:00 or 12:00 or T Th S 11:00 or 12:00

MATHEMATICS 200. Differential and Integral Calculus. Derivatives, differentials, definite integrals, infinite series, and their applications, especially to mechanics. Prescribed for engineers who do not take Mathematics 210.

This course continues the work of Mathematics 100 in calculus and analytic geometry, with applications to Newton's laws of motion and calculation of moments of forces and of inertia, centers of gravity, etc.

Students who have considerable facility in mathematical reasoning should register for Mathematics 210.

T Th S 9:00, 10:00, or 11:00

MATHEMATICS 210. Differential and Integral Calculus. This course covers the ground of Mathematics 200 but is

ANNOUNCEMENTS

more complete and goes further. It is open to students who obtain high grades in Mathematics 100, or otherwise satisfy the instructor of their fitness to take the course. A feature of this course is the writing of theses on the applications of mathematics to science, engineering, and philosophy. T Th S 10:00

MATHEMATICS 220. Algebra and Mechanics. Solutions of equations, vectors, invariants, determinants, and interpolation; systematic statics and parts of dynamics. The second half deals with statics and parts of dynamics. The algebraic technique necessary for the mechanical applications is provided in the work of the first half. T Th S 8:00

MATHEMATICS 230a. Algebra. The first half of Mathematics 220. Open to all engineering students.

(First half-year) T Th S 8:00

(Second half-year) M W F 8:00

MATHEMATICS 240. Algebra and Geometry. The work of the first half-year is algebra, the same as the work of Mathematics 230a. In the second half-year, general algebraic methods are applied to plane and solid analytic geometry and to the projective study of conics. This course is especially recommended to students who are preparing to teach mathematics in high school. It may be counted as a Junior course if the student makes studies of additional thesis and problem subjects. (Not offered 1942-43.)

MATHEMATICS 240a. Algebra. The first half of Mathematics 240 and the same as Mathematics 230a. Open to all engineering students. (Not offered 1942-43.)

THE RICE INSTITUTE

MATHEMATICS 300. Advanced Calculus and Differential Equations. Multiple integrals, infinite series, and partial differentiation, with many applications, and the geometry of three dimensions; differential equations. This course, or Mathematics 310, is prescribed for electrical engineering students; civil and mechanical engineers are required to take the first half of it. Open to those who have passed Mathematics 200 or 210 or otherwise satisfy the instructor of their fitness to take the course. M W F 8:00

MATHEMATICS 300a. The first half of Mathematics 300. Open to civil and mechanical engineers. M W F 8:00

MATHEMATICS 310. Advanced Calculus and Dynamics. Students with considerable facility in mathematical reasoning should take this course rather than Mathematics 300, the ground of which it covers. Such students may take Mathematics 220 during the same year. Opportunity to write theses is given. M W F 12:00

MATHEMATICS 400. Theory of Functions, real and complex variable. The important functions of analysis and modern general methods. M W F 12:00

MATHEMATICS 410. Differential Geometry. The problem of area; subharmonic functions; the problem of Plateau. (Not offered 1942-43.)

MATHEMATICS 420. Infinite Processes. Sequences, series, improper integrals, summability, and related topics. (Not offered 1942-43.)

ANNOUNCEMENTS

MATHEMATICS 500. Theory of Functions of a Complex Variable. Normal families of functions. Theorems of Montel; theorems of Stieltjes, Vitali. Theorems of Picard, Schottky, Landau, Carathéodory, and others. Theorems of Julia and Ostrowski. Quasi-normal families. Families of derivatives. Conformal mapping. Univalent functions. Applications, including the theory of iteration.

(Not offered 1942-43.)

MATHEMATICS 510. Theory of Functions of a Real Variable. Summable functions, Lebesgue and Stieltjes integrals, general integrals, functions of point sets and of plurisegments; Fourier series. Hours to be arranged.

MATHEMATICS 520. Series expansions in terms of orthogonal systems of functions. Trigonometric series. The course is based upon Mathematics 510.

(Not offered 1942-43.)

MATHEMATICS 530. Differential Equations and Introduction to the Calculus of Variations. (Not offered 1942-43.)

MATHEMATICS 540. Introduction to Modern Algebra. The purpose of this course is to provide the student with a knowledge of the foundations of modern algebra. The topics to be presented will include the theory of sets, groups, rings and fields, polynomials, algebraic numbers and ideals. The course will be open to graduate students and, with the consent of the instructor, to well-qualified Seniors.

(Not offered 1942-43.)

MATHEMATICS 540b. Topics selected from Mathematics 540 covering a half year's work. (Second half-year)

M W F 10:00

THE RICE INSTITUTE

MATHEMATICS 550. Seminar on Continued Fractions. This seminar meets once a week for a two-hour period. It is open to graduate students who satisfy the instructor of their fitness for the course. (Not offered 1942-43.)

MATHEMATICS 560. Infinitely differentiable functions and singularities of analytic functions. Regularization of sequences. Problem of equivalence of classes. Quasi-analyticity. Watson's Problem. Applications to Fourier series. Singularities of Taylor series. Relationship between singularities of Taylor series and quasi-analyticity. (Not offered 1942-43.)

MATHEMATICS 570. Analytical theory of numbers. General theory of Dirichlet series. The Riemann zeta function. Study of various functions of number theory, Euler-Mangoldt function, Möbius-Landau functions. Theorems of Hadamard and de la Vallée Poussin on the number of prime numbers less than a given number. Hours to be arranged.

MATHEMATICS 590. Thesis.

APPLIED MATHEMATICS 310. Finance, Statistics, and Probability. Mathematical theory of investment, analysis of statistics as applied to economics and biology, theory of probability. Hours to be arranged.

APPLIED MATHEMATICS 410. Partial differential equations of mathematical physics. A study of classical partial differential equations which arise in the flow of heat, in the vibrations of strings and membranes, and in related problems. (First half-year) M W F 10:00

ANNOUNCEMENTS

APPLIED MATHEMATICS 420. First half: Review of elementary kinematics and dynamics of a particle. Dynamics of systems. Principle of d'Alembert. General equations of analytical dynamics. Principles of Hamilton. Second half: Hydrostatics. General theorems on perfect fluids. Theory of elasticity, elastic equilibrium, interior motions. Equations of the motion of a viscous fluid.

Hours to be arranged.

APPLIED MATHEMATICS 510. Integral Equations; Potential Theory. Laplace's and related equations. Boundary value problems. (Not offered 1942-43.)

MATHEMATICAL COLLOQUIUM. The colloquium meets every other week in order to allow the exposition of original investigations by its members. W 2:00-5:00

Besides these courses as listed above, to be given during the academic year 1942-43, 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, and in the teaching of high-school mathematics.

PHYSICS 100. Heat, Light, Mechanics, Sound, Magnetism, and Electricity. A course of three experimental lectures, and two hours of practical work per week (students preparing for medicine take three hours of laboratory work per week). 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

THE RICE INSTITUTE

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. Students taking Physics 100 must have taken or be taking Mathematics 100. T Th S 10:00 Laboratory M or T 1:30-3:30 or 3:30-5:30 or W 2:00-5:00 (for premedical students)

PHYSICS 200. Electricity and Magnetism. A course of three lectures and three hours of practical work per week. This course with Physics 100 makes 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 in 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, electronics, and electrical theory of matter. Certain parts of dynamics required for the electrical theory are also included. In the laboratory the students are taught how to make measurements of all the important electrical quantities such as current, resistance, potential, capacity, inductance, magnetic intensity, magnetic properties of iron and steel, electro-chemical equivalents, characteristics of triodes, etc. Thirty 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. M W F 9:00 Laboratory Th or F 2:00-5:00 or F 10:00-1:00

ANNOUNCEMENTS

The following six Physics 300 courses each consists of three lectures per week with laboratory work in certain cases. Each of these courses is divided into two half-year courses designated by the letters a and b. Either half of each course may be taken separately but two half-year courses must be taken to obtain degree credit.

Students taking the honours course in physics take at least two half-year courses in each half year of their Junior and Senior years or a total of at least eight out of the twelve half-year courses offered.

These courses include a study of the branches of physics important in war problems, and graduates who have specialized in physics have been and probably will continue to be eligible for commissions in the armed forces or for appointments as civilians in army, navy, university, commercial, and government laboratories investigating war problems.

Students taking the honours course in physics or doing graduate work in physics are eligible under present regulations for deferment to enable them to complete their training for such war work.

Students taking the honours course in physics should take Physics 100, Physics 200, Mathematics 100, and Mathematics 200 or 210 in their Freshman and Sophomore years. They should also take Mathematics 300 or 310 and another mathematics course or a course in Chemistry in their Junior and Senior years. Some knowledge of chemistry is desirable for students majoring in physics.

The honours course in physics may be taken up by students who have completed the first two years of an engineering course, and, during the war emergency, the first two

THE RICE INSTITUTE

years of an engineering course are accepted as equivalent to the first two years of an academic course, in the case of students specializing in physics in their Junior and Senior years.

PHYSICS 300a. Sound. Analogy between electrical, mechanical, and acoustical systems. Acoustical impedance. Microphones and loud speakers. Perception of direction of sound. Supersonics. Piezoelectric and magnetostriction oscillators. Applications to war problems. Three hours of laboratory work weekly. M W F 11:00

PHYSICS 300b. Electronics. Electron tubes. Amplifiers. Oscillators. Modulation. Transmission lines. Frequency monitors. Ultra high frequency oscillators and detectors. Radio measurements. Electromagnetic waves. Antennae. Applications to aircraft navigation and war problems. Six hours of laboratory work weekly. M W F 11:00

PHYSICS 310a. Geometrical Optics. Theory of lenses. Chromatic and spherical aberration. Telescopes, microscopes, photometers, spectroscopes, periscopes, range-finders, cameras, sextants, and other optical instruments. Measurement of high temperatures with optical pyrometers, resistance thermometers and thermocouples. Three hours of laboratory work weekly. T Th S 8:00

PHYSICS 310b. Thermodynamics. Free energy and chemical equilibrium. Theory of dilute solutions. Theory of cracking petroleum. T Th S 8:00

PHYSICS 320a. Theory of Waves in Solids and Fluids. Velocity potential. Seismographs, geophones, and hydro-

ANNOUNCEMENTS

phones. Applications to geophysical prospecting and war problems. T Th S 11:00

PHYSICS 320b. Gravitation. Gravimeters. Applications to geophysical prospecting. Magnetic, electric, and chemical methods of geophysical prospecting. Applications to war problems. T Th S 11:00

PHYSICS 330a. Particle Dynamics. Planetary orbits. Vibrating systems. Coupled oscillators. Rigid dynamics. Exterior ballistics. Bomb dropping. Internal ballistics. (Offered 1943-44.)

PHYSICS 330b. Gyroscopes. Gyrocompass. Applications to aircraft navigation. Hydrodynamics. Stability of ships and aircraft. (Offered 1943-44.)

PHYSICS 340a. Properties of Matter. Gravitation. Elasticity. Surface tension. Vapor pressure. Heat conductivity of solids, liquids, and gases. Osmotic pressure. Viscosity. Diffusion. Relations between pressure, volume, and temperature of gases. Three hours of laboratory work weekly. (Offered 1943-44.)

PHYSICS 340b. Physical Optics. Electromagnetic theory of light. Interference. Diffraction. Polarization. Optical properties of crystals. Dispersion. Quantum theory of spectra. Heat radiation. Three hours of laboratory work weekly. (Offered 1943-44.)

PHYSICS 350a. Electrical Measurements. Capacity. Inductance. Determination of electrical units. Conductivity of metals and solutions. Three hours of laboratory work weekly. (Offered 1943-44.)

THE RICE INSTITUTE

PHYSICS 350b. Electrical Properties of Gases. X-rays. Radioactivity. Nuclear physics. Three hours of laboratory work weekly. (Offered 1943-44.)

PHYSICS 360. Ten lessons on glass blowing of one hour each. This course will be given from time to time as required. No credit is given for this course. Students taking this course must have taken or be taking a Physics 300 course.

PHYSICS 400. Physics Colloquium. One meeting a week at which present-day researches in physics will be discussed. No credit is given for this course but graduate students and students taking honours courses in physics are expected to attend the course.

PHYSICS 500. Electron Theory and Theory of Optical Spectra. Two lectures per week. Hours to be arranged.

PHYSICS 510. Electricity in Gases, X-rays, and Crystal Structure. Two lectures per week. (Offered 1943-44.)

PHYSICS 520. Quantum Mechanics and Theory of Relativity. Two lectures per week. Hours to be arranged.

PHYSICS 530. Statistical Mechanics, Radioactivity, and Nuclear Physics. Two lectures per week. (Offered 1943-44.)

PHYSICS 540. Research work.

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

ANNOUNCEMENTS

maintain research laboratories for the carrying on of such work. Among these may be mentioned the General Electric Company, the Bell Telephone Company, the Eastman Kodak Company, the National Bureau of Standards, and petroleum companies in this vicinity and in other sections of the country. Students desiring to qualify for positions in such establishments should take the honours 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, in the exploration work of the oil industry, and at the National Bureau of Standards are open to men who have taken the B.A. degree with honours in physics.

CHEMISTRY 100. Introductory Chemistry and Qualitative Analysis. Three lectures and three hours of laboratory work weekly. (Chemists and chemical engineers take six hours of laboratory work weekly the second half-year.) 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 8:00 Laboratory M 10:00-1:00 or M or F 2:00-5:00

Laboratory for chemists and chemical engineers:

First half-year: M 2:00-5:00

Second half-year: M Th 2:00-5:00

CHEMISTRY 110. General Chemistry. Two lectures, one recitation, and five hours of laboratory work weekly. This

THE RICE INSTITUTE

is a general introductory course differing from Chemistry 100 only in giving more attention to elementary organic chemistry and biochemistry. It is designed especially for and open only to students taking the course in physical education. T Th S 8:00 Laboratory T Th 9:00-11:30

CHEMISTRY 220. Quantitative Analysis. Three lectures and eight hours of laboratory work weekly (chemists: ten hours of laboratory work). The course aims to familiarize the student with the fundamental principles of analytical chemistry and, by extensive laboratory and problem work, with the application of these principles to a variety of representative analytical processes. Special emphasis is placed on chemical mathematics and stoichiometry and throughout the work attention is given to general analytical technique. This course is required of all chemical engineers and premedical students and of academic students who expect to take further work in chemistry. Prerequisites: Chemistry 100 and Physics 100.

M W F 8:00 Laboratory M T or W Th 1:30-5:30
Chemists: Hours to be arranged.

CHEMISTRY 300A. Organic Chemistry. Three lectures and six hours of laboratory work weekly. The course is designed to give a thorough survey of aliphatic and aromatic chemistry with an introduction to the heterocyclic compounds, and to present the theories relating to their structure and reactions. Prerequisite: Chemistry 220.

M W F 8:00 Laboratory M T or W Th 2:00-5:00

CHEMISTRY 300B. Organic Chemistry. Three lectures and three hours of laboratory work weekly. A course ar-

ANNOUNCEMENTS

ranged primarily for premedical students and academic students not specializing in chemistry. This course differs from Chemistry 300A only in the type of laboratory preparations. The laboratory work is devoted chiefly to the synthesis of typical examples of general and local anesthetics, disinfectants, analgesics, arsenicals, biological preparations, alkaloids and dyes. Prerequisites: Chemistry 220 or special permission from the Department of Chemistry. (See page 95 for course recommended for premedical students.)

M W F 8:00 Laboratory M T W or Th 2:00-5:00

CHEMISTRY 310. Physical Chemistry. Three hours of lectures and recitation and four hours of laboratory work weekly. A quantitative study of theoretical and physical chemistry dealing with the forms of matter, changes of state and energy, kinetics, equilibrium, electrochemistry, photochemistry, and atomic structure. Prerequisites: Chemistry 220 and Physics 200.

M W F 9:00 Laboratory M or Th 1:30-5:30

CHEMISTRY 320. Introductory Physical and Physiological Chemistry. Three lectures and three hours of laboratory work weekly. This course is open to academic students who wish to elect a second course in chemistry, and to premedical students desiring another chemistry course in addition to those specifically recommended. The lectures and laboratory work of the first half-year deal with the physical properties of gases, liquids, and solids; solutions; etc. The lectures and laboratory work of the second half-year are devoted to a study of the physiological processes of the

THE RICE INSTITUTE

animal body, such as digestion, metabolism, and nutrition, and to blood and urine chemistry. Prerequisite: Chemistry 100. M W F 11:00 Laboratory M or F 2:00-5:00

CHEMISTRY 410. Colloid Chemistry. Three lectures and four hours of laboratory work weekly during the first half-year. An introductory course dealing with the theories of colloid chemistry and their applications. Prerequisite: Chemistry 310.

M W F 9:00 Laboratory T or W 1:30-5:30 (first half-year)

CHEMISTRY 420. Advanced Physical Chemistry. Two lectures and one conference on problems weekly during the second half-year. Structure of matter, methods in physical chemistry, phase rule, X-ray and electron diffraction analysis, electro- and optical methods.

Hours to be arranged (second half-year).

CHEMISTRY 430. Advanced Inorganic Qualitative Analysis. Two lectures and four to six hours of laboratory work weekly during the second half-year. The course includes the use of semi-micro technique involving the application of organic reagents for the identification of metallic ions and a study of the detection of some of the less familiar elements.

W F 10:00 Laboratory M 10:00-1:00, 2:00-5:00 or Th F 2:00-5:00 (second half-year)

CHEMISTRY 440. Advanced Organic Chemistry and Qualitative Analysis. Two lectures and six hours of laboratory work weekly during the second half-year. This course embodies a systematic procedure for the separation and identification of pure organic compounds. It aims to

ANNOUNCEMENTS

review, by actual laboratory contact, the important reactions of the main series of organic substances.

T Th 8:00 Laboratory M T or W Th 2:00-5:00 Laboratory for chemical engineers: W and alternate T 1:30-5:30 (second half-year)

CHEMISTRY 450. Advanced Quantitative Analysis. Two lectures and six hours of laboratory work weekly during the first half-year. A study of advanced topics in quantitative analysis with emphasis on recent methods. The laboratory work includes examples of the types of analyses covered in the lectures. Prerequisites: Chemistry 300 and 310.

T S 9:00 Laboratory hours to be arranged (first half-year).

CHEMISTRY 470. Experimental Problems. Students who are specializing in chemistry may elect in their Senior year at least nine hours weekly during the first or second half-year, or both, in experimental problems under the direction of some member of the staff of instruction.

CHEMISTRY 480. Chemical Literature. One lecture weekly during the first half-year. The course is devoted to a study of the arrangement of chemical literature and its use in industrial and research work. A topic will be assigned to each student every week for a thorough library investigation. A fee of two dollars is required to cover certain expenses in connection with the library work.

This course is required of all students specializing in chemistry or chemical engineering in either the Junior or Senior year. Th 9:00 (first half-year)

THE RICE INSTITUTE

GRADUATE COURSES IN CHEMISTRY. Courses numbered 500 and 600 (listed below) are open only to students of full graduate standing. Senior courses in chemistry and chemical engineering (courses numbered 400) may be taken by graduate students for only partial graduate credit.

CHEMISTRY 500. M. A. Thesis. Graduate students who are working toward the M. A. degree in chemistry are expected to elect at least nine hours a week in research under the direction of some member of the staff of instruction. Prerequisite: Satisfactory completion of qualifying examinations. (See pages 89-91.)

CHEMISTRY 510. Adsorption. Three lectures or conferences weekly during the second half-year. A course in advanced colloid chemistry dealing with the nature and mechanism of adsorption and its relation to such phenomena, among others, as the stability of colloidal systems and contact catalysis. M W F 9:00 (second half-year)

CHEMISTRY 520. Theory of Valence. Three lectures weekly during the second half-year. A consideration of inter-atomic forces and their relationship to the structure and properties of matter. (Alternates with Chemistry 530.) T Th S 9:00 (second half-year)

CHEMISTRY 530. Heterogeneous Equilibrium. Two lectures weekly during the second half-year. A study of the problems of heterogeneous equilibrium from the standpoint of the phase rule. (Alternates with Chemistry 520.) (Not offered 1942-43.)

ANNOUNCEMENTS

CHEMISTRY 540. Advanced Organic Chemistry. Two lectures weekly during the first half-year. A consideration of some of the theoretical aspects of organic chemistry with particular reference to such topics, among others, as tautomerism, geometrical and optical isomerism, and the chemistry of carbohydrates. (Alternates with Chemistry 560.) (Not offered 1942-43.)

CHEMISTRY 550. Microchemical Analysis. One lecture and six hours of laboratory work weekly during the first half-year. A course in quantitative micro-analysis based on the procedures of Fritz Pregl. Prerequisite: Chemistry 440. M 11:00 Laboratory hours to be arranged (first half-year).

CHEMISTRY 560. Advanced Physiological Chemistry. Two lectures weekly during the first half-year. The course is open to graduate students only who have some knowledge of the fundamentals of physiological chemistry. The course deals with the chemistry of blood, respiration, urine, energy metabolism, and the endocrines. (Alternates with Chemistry 540.) Hours to be arranged (first half-year).

CHEMISTRY 600. Ph.D. Thesis. Graduate students who are working toward the Ph.D. degree in chemistry are expected to elect at least twelve hours a week in research under the direction of some member of the staff of instruction. Prerequisite: Satisfactory completion of qualifying examinations. (See pages 89-91.)

CHEMISTRY 610. Application of X-ray Diffraction Methods. Three lectures weekly. Application of X-ray diffraction methods to inorganic and colloid chemistry. Identifi-

THE RICE INSTITUTE

cation of solid phases, determination of particle size, X-ray analysis of simple types of structures, electron diffraction, and principles and operation of modern X-ray apparatus.

T Th S 11:00

CHEMISTRY 620. Advanced Inorganic Chemistry. Two lectures weekly and a seminar fortnightly. A study of the chemical elements and their compounds from the standpoint of the periodic law. Modern developments in inorganic chemistry will receive special attention.

Hours to be arranged.

CHEMISTRY 640. Heterocyclic Chemistry. Two lectures weekly. A consideration of the chemistry of heterocyclic systems. (Not offered 1942-43.)

To meet the requirements for professional training of chemists, students should select their courses according to the following arrangement:

First Year

- (1) Chemistry 100
- (2) Physics 100
- (3) Mathematics 100
- (4) English 100
- (5) Elective:¹ Biology 100,² Engineering 110, History 100, or a language

¹Naval R.O.T.C. students elect Naval Science.

²This course can be scheduled only in the Freshman year.

ANNOUNCEMENTS

Second Year

- (1) Chemistry 220
- (2) Physics 200
- (3) German 100
- (4) Mathematics 200 or 210
- (5) Academic elective:¹ Business Administration 200, Economics 200, English 200, or Philosophy 210

Third Year

- (1) Chemistry 300
- (2) Chemistry 310
- (3) German 200 or French 100
- (4) Science elective
- (5) Academic elective

Fourth Year

First Half-Year

- (1) Chemistry 410
- (2) Chemistry 450-480
- (3) English 380
- (4) Science elective
- (5) Academic elective

Second Half-Year

- (1) Chemistry 440
- (2-3) Chemistry 420, 430, 470
(Elect two)
- (4) Science elective
- (5) Academic elective

Academic students desiring to take a general course in chemistry involving one subject each year should take Chemistry 100, 220, 300, and 310.

In addition to the general requirements for advanced degrees given on pages 57 and 58, the following specific requirements must be met by candidates taking their major work in chemistry:

¹Naval R.O.T.C. students elect Naval Science.

THE RICE INSTITUTE

(1) For admission to full graduate standing, candidates for advanced degrees must have completed general courses equivalent to Chemistry 100, 220, 300A, and 310 of the Rice Institute, and two additional full-year advanced courses equivalent to the corresponding 400 courses in chemistry of the Rice Institute.

(2) For admission to Chemistry 500 and 600 (Thesis), a graduate student must pass satisfactorily comprehensive qualifying examinations covering inorganic, analytical, organic, and physical chemistry, and scientific German. The examinations for Chemistry 600 cover more advanced topics such as are included in the 400 and 500 courses in chemistry. These examinations will be given at the beginning of the academic year before October first.

(3) An accepted candidate for the M.A. degree must complete, in addition to a thesis, two full-year graduate courses in chemistry (partial credit will be given for Senior courses taken during the graduate years) and one approved 300 or 400 course in mathematics, physics, or biology. The first week in May of the last year of residence, the candidate will be given three-hour written examinations in general chemistry and organic chemistry, and must also pass a final public oral examination.

(4) An accepted candidate for the Ph.D. degree must complete, in addition to a thesis, a total of five full-year graduate courses in chemistry, two of which must be 600 courses, and one approved 300 or 400 course in mathematics, physics, or biology. He must satisfy the members of the staff under whom he is working that he possesses a reading knowledge of scientific French and German. The first week in May of the last year of residence, the candidate

ANNOUNCEMENTS

will be given comprehensive written examinations covering the main branches of chemistry, with special emphasis on the branch in which the candidate is working, and must also pass a final public oral examination.

Graduate assistants and fellows who devote as much as six hours per week to teaching will, in general, be expected to spend two years in residence for the master's degree and four years in residence for the doctor's degree.

BIOLOGY 100. General Biology. An introductory course in biology on the general principles underlying living things. A general vertebrate type is considered first, and this is used as a basis for an introduction to physiology, immunology, embryology, cytology, genetics, ecology, and classification. Structure and function are, when possible, considered together; emphasis is placed on the former in the laboratory, and the more dynamic aspects are presented in lecture with the aid of demonstrations and motion pictures. Plants are briefly considered in comparison with animals. The latter part of the course deals with various animal forms and their evolution, with emphasis on progressive differentiation of structure and adaptation to environment.

M W F 9:00 Laboratory W Th or F 1:30-5:00

BIOLOGY 220. Parasitology, and the Biology of Public Health. The first part of the year is devoted to a study of the relation of insects and their allies to the spread of disease, with special emphasis on such important disease transmitters as mosquitoes, flies, etc. Following this the parasitic worms and protozoa are studied, especially those of local importance, causing hookworm disease, malaria,

THE RICE INSTITUTE

sypphilis, etc. The final part of the year is devoted to an introduction to bacteriology, particularly the sanitary aspects of it. A general cultural course for academic students and for Sophomore premedical students.

M W F 9:00 Laboratory F 2:00-5:00

BIOLOGY 240. Animal Biology. An introductory course in general zoology, including a study of anatomy, physiology, ecology, and classification of animals. An attempt is made to correlate the studies in comparative structure and comparative physiology in such a way as to give the student a more comprehensive understanding of general biological principles. In the first half-year the members of the animal kingdom are considered systematically. The second half-year is devoted to various aspects of natural history, including the biology of populations, cycles, migration, protective and aggressive resemblance, animal behavior, ecological communities, and animal societies. The laboratory work is supplemented by a limited number of field trips.

M W F 11:00

Laboratory first half-year: T or W 2:00-5:00

Second half-year: M or T 2:00-5:00

BIOLOGY 290. Physiology and Anatomy, for Physical Education students. A study of the structure and functions of the human body. (Alternates with Biology 390.)

(Not offered 1942-43.)

BIOLOGY 340a. Comparative Anatomy. A study of the structure of vertebrate animals, beginning with simple forms and leading up to an understanding of mammalian

ANNOUNCEMENTS

anatomy, with emphasis on the origin and phylogenetic development of the organs and structures of the human body. Designed for Junior premedical students. First half-year, to be followed by Biology 470b in the second half-year.¹ T Th S 8:00 Laboratory M 2:00-5:00

BIOLOGY 360. Evolution. The genetical basis of evolution is first briefly considered. The study of evolution itself is then taken up, with chief emphasis on palaeontology. It includes a consideration 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. This course will carry half the usual laboratory credit. Open to Junior and Senior students who have had Biology 100.

M W F 11:00 Laboratory M 1:00-3:00

BIOLOGY 380b. Physiology and Histology. The functions of various organs are studied and correlated with microscopical structures. Students are familiarized with physiological apparatus and methods, including the making of graphic records. In addition to a systematic study of microscopical structures, the usual procedures in histological technique are taught. Recommended for premedical students, and for all students specializing in biology. Second half-year, following Biology 450a in the first half-year.

T Th S 10:00 Laboratory T 2:00-5:00

¹For the duration of the war emergency, certain advanced biology courses will be given in half-year units instead of full year courses. In meeting graduation requirements two such half-year courses must be taken to receive credit for a year's work.

THE RICE INSTITUTE

BIOLOGY 390. Hygiene and Public Health. A course of lectures for physical education students. Such subjects are discussed as the care of the body, infection and resistance, epidemiology, care of water, milk and other foods, sewage disposal, housing and ventilation, health legislation, social problems, vital statistics, etc. (Alternates with Biology 290.) T Th S 8:00

BIOLOGY 400. Special work. This course will consist of advanced work in special fields of biology for students specializing in the subject, and will be adapted to the needs of the particular student. Hours to be arranged.

BIOLOGY 410. Genetics and Eugenics. This course is devoted to a study of heredity, with frequent references to human material. This course will carry half the usual laboratory credit. Open to Junior and Senior students who have had Biology 100.

M W F 9:00 Laboratory hours to be arranged.

BIOLOGY 450a. General Embryology. A comparative study of the early development of animals, with special reference to the higher vertebrates. The principles and important results of experimental embryology are also discussed. Recommended for premedical students in the Junior year. First half-year, to be followed by Biology 380b in the second half-year.

T Th S 10:00 Laboratory T 2:00-5:00

BIOLOGY 470b. General Bacteriology and Immunology. Sterilization, preparation of media, and methods of cultivation; disinfection; nature and relationships of various

ANNOUNCEMENTS

types of micro-organisms; introduction to bacteriology of air, soil, water, sewage, dairy products and other foods, and important human, animal, and plant diseases; the principles of immunology and their application to preventive and curative medicine. Special emphasis on public health and hygienic aspects of the subject. Prerequisites: Biology 100, Biology 220, and Chemistry 100. Recommended for premedical students in the Junior year. Second half-year, preceded by Biology 340a in the first half-year.

T Th S 8:00 Laboratory W 2:00-5:00

BIOLOGY 510. Graduate Research in Genetics.

BIOLOGY 530. Graduate Research in Embryology or Physiology.

BIOLOGY 560. Graduate Research in Parasitology.

To students looking forward to the study of medicine on graduation from the Rice Institute, a four years' course is available leading to the B.A. degree and meeting the requirements for admission to all medical, dental, and nursing schools. In the present national emergency, however, in order to expedite the training of professional men and women urgently needed by the armed forces, a three-year schedule has been arranged which satisfies the requirements of nearly all such professional schools. For the duration of the emergency, students who have full Senior standing upon entrance to medical or dental schools may, after satisfactory completion of their professional courses in approved schools, be awarded a B.A. degree from the Rice Institute upon application for it, the degree to be awarded at the next following commencement exercises.

THE RICE INSTITUTE

The following three-year schedule is recommended for students preparing for medical or dental schools:¹

First Year

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

Second Year

- (1) Biology 220
- (2) Chemistry 220
- (3) Psychology 300
- (4) English 200
- (5) Foreign language

Third Year

- (1) Biology 450a (first half-year)
Biology 380b (second half-year)
- (2) Biology 340a (first half-year)
Biology 470b (second half-year)
- (3) Chemistry 300
- (4) Foreign language (second year course)
- (5) Elective

¹Attention is called to the fact that under the state law the University of Texas Medical School requires a course in government before the M.D. degree is awarded. History 310 meets this requirement. But it is recommended that this course be obtained in summer school so that all of the courses recommended above may be taken.

ANNOUNCEMENTS

For students preparing to enter collegiate schools of nursing leading to the degree of Bachelor of Science in Nursing, two years of work are required. The recommended courses for the first year are Biology 100, Chemistry 100, English 100, Mathematics 100, and German or Spanish 100; for the second year, Biology 220, German 200 or Spanish 200, Psychology 300, Sociology 200, and English 200.

For students preparing to enter graduate schools of nursing leading to the M.N. degree, a course similar to the above is recommended for the first two years. The courses of the third year should include one additional course in biology and one in chemistry. Attention is called to the fact that one graduate school (Western Reserve) will admit students on the Senior year in absentia plan which, as in the case of other graduate professional courses, will be acceptable at Rice during the emergency.

PSYCHOLOGY 300. General Introduction to Psychology. In this course both the introspective and the behaviouristic approaches to the subject are taken into account. The lectures will be supplemented by demonstrations and class experiments. The main topics discussed are: the physiology of the nervous system and the sense-organs, reflexes, instinctive activity, sensation and perception, feeling and emotion, memory, learning, intelligent behaviour, and personality. It is strongly advised, though not at present required, that students take Biology 100 either before or concurrently with this course. T Th S 10:00

PSYCHOLOGY 400. Experimental Psychology and Abnormal Psychology. In the first half-year the following

THE RICE INSTITUTE

topics will be studied: visual and auditory sensation and perception, feeling and emotion, and memory and learning. Laboratory exercises will be held weekly on these topics. In the second half-year the following topics in abnormal psychology are to be studied: the psychoneuroses and psychoses and theories of their origin, mental deficiency, hypnosis, and dreams. (Not offered 1942-43.)

PSYCHOLOGY 410. Psychological Tests and Applied Psychology. A. In the first half-year the subject of the course will be psychological and educational tests and measurements and the theory of such tests. The elementary statistical method needed for the interpretation of the results of testing will be included. Students will be given the opportunity to take and to learn to administer a number of tests. B. In the second half-year the subject will be the applications of psychology to education, law, criminology, and industrial problems. This course is open to students who have passed Psychology 300 and is designed especially for those who intend to enter any type of educational work as a career or who intend to become personnel managers.

M W F 11:00

ECONOMICS 100. A general course of introductory nature designed to introduce the student to practical economic problems as they affect the individual. The work includes readings, lectures, and discussions in the elements of economic theory, business organization, banking, investments, insurance, consumer buying problems, and the like. This course is planned primarily for students of physical education.

M W F 8:00

ANNOUNCEMENTS

ECONOMICS 200. Elements of Economics. An introductory course analyzing and interpreting our present economic system. The first half-year is devoted to a study of the traditional principles of economics, modified in the light of recent developments. During the second half-year the principles of economics are applied to current economic problems, such as marketing, banking, business organization, taxation, transportation, consumer's problems, etc.

T Th S 11:00

ECONOMICS 330. Modern Economic and Social Systems. This course is designed to acquaint the student with the various economic, social, and political ideologies that have come into prominence in recent years. The history, theory, and practical aspects of each of the more important ideologies are considered, and special reference is made to their significance in the United States. Prerequisite: Economics 200.

M W F 10:00

ECONOMICS 450. Transportation. This course is devoted in part to a study of the development of modern transportation systems, in part to a study of the development of common carrier regulation, and in part to a study of practical traffic problems. Separate consideration is given to rail, motor, water, air, and pipe line transportation. The course is designed to meet the needs of the general economics and business administration student as well as the student who contemplates traffic management as a possible career.

T Th S 9:00

SOCIOLOGY 200. An Introduction to Sociology. The course includes an analysis of the geographical and biolog-

THE RICE INSTITUTE

ical 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, one course in college history, and Economics 200.

M W F 11:00

BUSINESS ADMINISTRATION 200. An Introduction to Business Management. The course follows the generally accepted theory that the study of accounting principles and methods furnishes the most satisfactory approach to a knowledge of business administration. After the principles developed in connection with the sole-proprietorship have been applied to the partnership and corporate forms of business enterprise, the course introduces such special subjects as sinking funds and reserves, segregation of surpluses, manufacturing accounts and statements, buying, manufacturing and financial control, installment, consignment and branch sales, negotiable instruments, the principles of valuation, internal organization for control, and the interpretation of financial and operating statements. While the course is primarily accounting, the organization and procedure of modern business are emphasized throughout.

T Th S 8:00 or 9:00

BUSINESS ADMINISTRATION 210. This course is planned along the same lines as Business Administration 200 but is open only to those who have had the background offered in Economics 100.

M W F 8:00

ANNOUNCEMENTS

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. M W F 9:00

BUSINESS ADMINISTRATION 400. Advanced Accounting and Auditing. The course covers such subjects as the construction and interpretation of financial and operating statements, valuation of assets and liabilities, sinking funds, surpluses and reserves, budgeting, application of funds, analysis of changes in rates of profit, accounting for estates and trusts, municipal accounts, the liquidation and dissolution of partnerships and corporations, consolidation and combination, and consolidation of financial and operating statements. The course closes with a study of the theory and practice of modern auditing. The course is designed to meet the needs of the general business or legal student as well as the student who contemplates a possible career as a corporation comptroller or auditor, or as a certified public accountant. M W F 11:00

EDUCATION 310. The History of Education. First half-year: a survey of educational thought and practice from ancient to modern times. Second half-year: a continuation of the history of modern education with special attention to American institutions. Recommended: History 100 or Philosophy 300. M W F 8:00

THE RICE INSTITUTE

EDUCATION 410. Basic Principles of Secondary Education. First half-year: emphasis is put upon H. C. Morrison as an exponent of the learning-product approach, with J. F. Herbart, K. V. Stoy, Tuiskon Ziller, Wilhelm Rein, Karl Lange, Charles McMurry, Frank McMurry, Charles De Garmo, S. C. Parker, and C. H. Judd as background. Second half-year: the learning-process approach, featuring John Dewey and his followers, with the historical background extended to Froebel, Hegel, and Auguste Comte. Throughout the course, the emphasis is put upon the contrast between the learning-product and the learning-process approaches. Term papers and reports are based upon the literature connected with these two traditions. Prerequisite: Psychology 300 or Philosophy 300.

M W F 11:00 or 12:00

The Department of Education of the State of Texas will grant, under the Certificate Law of 1921, the following certificates to students of the Institute:

1. Four-year Elementary Certificate. An elementary certificate valid for four years will be granted to students who have satisfactorily completed five full courses, one of which must be in education and bear on elementary teaching, another of which must be in English, and of which not more than two courses are in the same subject.

2. Six-year Elementary Certificate. An elementary certificate valid for six years will be granted to those who have satisfactorily completed two full years of college work, including two full courses in education.

3. Permanent Elementary Certificate. A permanent elementary certificate will be granted to the holders of the

ANNOUNCEMENTS

six-year certificates after five years of successful teaching or after four years of successful teaching and one year of college work taken after the issuance of the certificate.

4. Two-year High-School Certificate. A high-school certificate valid for two years (valid only in the elementary grades and in third-class and unclassified high schools) will be granted to any student who has completed five full college courses, one of which is in education, another of which is in English, and not more than two of which are in any one subject.

5. Four-year High-School Certificate. A high-school certificate valid for four years will be granted to any student who completes two years of college work, including two courses in education, one of which bears on high-school teaching.

6. Permanent High-School Certificate. A permanent high-school certificate will be granted to those who have a B.A. degree (or any equivalent Bachelor's degree or higher academic degree) and have had two full courses in education, one of which bears on high-school teaching, and who have completed three years (27 months) of successful teaching subsequent to taking the degree.

Students desiring to secure a permanent high-school certificate before beginning teaching should have, in addition to the courses mentioned above, two additional courses in education, one of which must deal with methods, observation, and practice teaching, one-third of the work of this latter course bearing on secondary education.

It should be noted that high-school certificates are valid for the elementary grades and the holder of an elementary certificate, based on two years of college work, can teach in third-class and unclassified high schools.

THE RICE INSTITUTE

Certificates which are expiring may be renewed repeatedly by completing six semester hours of college work in any college or university recognized as first-class by the State Department of Education, provided the certificate has not expired by the beginning of the summer term during which the said work is done.

Attention should also be called to the fact that a college course in "Constitutions" is required for the issuance of a teacher's certificate in Texas. History 310 is planned to meet this requirement.

Students expecting to secure the Institute's recommendation for a teaching position should consult the department offering the work of their primary interest in order that their course of study may be properly planned.

HISTORY 100. Foundations of Western Civilization. This course is intended as an introduction to historical methods of thinking, and includes a survey of human achievement from prehistoric times through antiquity and the Middle Ages to the eighteenth century. The chief emphasis is placed upon those formative influences which constitute the basis of the modern world-structure. T Th S 8:00

HISTORY 200. Europe since 1789. This course emphasizes the revolutions against autocracy, the spread of democracy, the completion of nationalism, and the development of imperialism. Much attention is given to the antecedents of the world war, the history of the war, and the situation in Europe since 1919. (Alternates with History 250.)

(Not offered 1942-43.)

ANNOUNCEMENTS

HISTORY 250. English History. A survey tracing the development of the English people, from their origins to the present, with emphasis upon imperial expansion and upon the evolution of those social, economic, and political forms and concepts which have basically influenced Western civilization. This course is especially recommended to students preparing for the study of law. (Alternates with History 200.) (Not offered 1942-43.)

HISTORY 300. History of the United States. A survey of the growth of the American nation, with attention to such major developments as the establishment of the federative republic, westward expansion and the dominance of frontier attitudes, the growth of democracy, the triumph of nationalism over sectionalism, and the transition from agrarianism to industrialism. Recommended to students preparing for the study of law. Open to Juniors who have completed one college course in history or economics.

T Th S 11:00

HISTORY 310. American Government. A study of the history and operation of constitutional government in the United States with special emphasis on the historical background of the Federal government, the structure of the government, the formation of public policy, and the conduct of public business. For additional background and for contrast, reference is made to English constitutional history and to the present structure of the English government. This year course in American government, planned for the general student of government, is also designed to enable

THE RICE INSTITUTE

prospective lawyers, physicians, and teachers to meet the state requirement of a course in "Constitutions."

M W F 10:00

HISTORY 320. Trends in European Culture during Antiquity and the Middle Ages. This course traces selected aspects of European thought from Periclean Athens to the later Middle Ages, with special reference to Græco-Roman influences. Hellenistic, Byzantine, and Mohammedan contributions to the Latin West are considered. Religious, philosophical, and scientific implications are examined in some detail. Recommended: Philosophy 300 or Architecture 510. (Not offered 1942-43.)

HISTORY 330. Topics in Classical and Mediæval Letters. This course deals with selected phases of classical and mediæval literature, including satire, chronicles and histories, the romances and epic cycles, and lyric poetry. Attention is given also to the rôle of the Latin language in the Middle Ages, the preservation of letters in manuscripts and libraries, and the evolution of the mediæval scripts. The subject-matter is considered from the historical point of view. M 2:00-5:00

HISTORY 420. Mediæval Latin. Survey and translation of typical mediæval sources. The selections are studied from the point of view of historical significance and of literary appreciation. Also intensive reading and reports on special topics in mediæval literature and intellectual history. This course is intended for students of history and the modern languages who desire to acquire some familiarity

ANNOUNCEMENTS

with ordinary mediæval Latin texts. Open only to advanced students after consultation with the instructor.

(Not offered 1942-43.)

HISTORY 500. Topics in American History. Graduate Research.

HISTORY 510. Topics in Mediæval History. Graduate Research.

JURISPRUDENCE 300. An Elementary Course in Jurisprudence. The course is 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, bailments, sales, and negotiable instruments. T Th S 8:00

PHILOSOPHY 210. Introduction to Philosophy. This course combines an elementary analysis of the fundamental principles of deductive and inductive logic with an introductory study of the development of moral ideas and of the problems of morality in our civilization. M W F 9:00 or T Th S 11:00

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 9:00

THE RICE INSTITUTE

PHILOSOPHY 320. Contemporary Philosophy. An analysis and criticism of current philosophical problems, with special emphasis on theories of knowledge in their historical setting. M W F 10:00

PHILOSOPHY 340. Philosophy of Science. An examination of the basic principles of scientific method, and a consideration of the relations of science to philosophy, religion, and ethics, with special emphasis on modern developments. M W F 11:00

PHILOSOPHY 400. Philosophy of Religion. An historical-critical study of the main problems of religion, dealing more especially with the belief in God, the idea of immortality, and the problem of evil. T Th S 8:00

PHILANTHROPY 300. Social Problems. An intensive treatment of the following topics: child welfare, immigration, recreation, delinquency and crime, public health, and housing. This course aims to equip the student of social activities as well as the prospective social worker with a knowledge of important types of social maladjustment. Prerequisites: Economics 200, one course in college history, and Sociology 200. M W F 10:00

PHILANTHROPY 400. Social Forces and Modern Social Trends. Lectures, readings, essays. Prerequisites: Philanthropy 300 or the equivalent, with adequate preparation in American history, economics, or government. Limited to Seniors. M W F 9:00

ANNOUNCEMENTS

PHYSICAL TRAINING AND PHYSICAL EDUCATION

THE equipment of the athletic field house not only makes provision for the university athletic teams but also affords opportunity for systematic physical training on the part of other members of the institution. Facilities in or near the field house are available for basketball, football, track and field work, baseball, handball, tennis, golf, and other athletic and recreative games.

PHYSICAL TRAINING. All men entering the Institute for the first time, except new students in engineering or architecture who are taking naval science and tactics, are required to take a year's course in physical training. This course, Physical Training 100, is also open to any other male student in the Institute. Students participating in intercollegiate athletics will receive appropriate credit for the duration of their participation. However, the required course offers a programme of games and intramural sports for those who are not competing in intercollegiate athletics but for whom the benefits of recreation, exercise, and athletic competition are also desirable.

The certificate of medical examination required of a student on admission will determine in a large measure the character of the work that the individual student is permitted to take. In certain special cases, a supplementary physical examination may be required. In cases where the student is physically or organically unfit for a normal programme of physical activity, he will be assigned to a restricted exercise group where special activities will be made

THE RICE INSTITUTE

to serve his needs. In all cases, the work will be so organized as to eliminate direct competition between the physically weaker and the physically stronger among the students.

A gymnasium fee of sixteen dollars, payable at registration time, is required, entitling the student during his residence as an undergraduate to the use of the field house and playing fields, to the use of a complete gymnasium uniform (excepting only gymnasium shoes, which are also required) and towels, and to laundry service for the preceding items of equipment.

PHYSICAL TRAINING 100. This course is designed to teach the student skill in various forms of athletic and recreative games and contests. Required of all men in the Freshman class and transfers who have not had the equivalent elsewhere.

Two two-hour periods each week. Hours to be arranged.

PHYSICAL EDUCATION. The Rice Institute offers a four years' course in health and physical education and recreation leading to the degree of Bachelor of Science in Physical Education, designed to prepare men for careers in health and physical education, including coaching, in high schools and colleges, municipal recreation departments, and other similar organizations. In each of its four years there is at least one required course in physical education, and, in the last two years courses in education and government which are necessary for a state teacher's certificate. The required work in biology and chemistry serves not only as a basis for the work in physical education, but also affords further

ANNOUNCEMENTS

subjects for high-school teaching. The laboratory work in these science courses is held in the morning hours, in order not to interfere with physical education laboratory work in the afternoons. Considerable emphasis is placed on economics and business administration for the benefit of those who ultimately, if not immediately, go into business. Students looking forward to medicine or law are permitted to make substitutions enabling them to meet the ordinary premedical and prelegal requirements.

The schedule of the four years' course in physical education is as follows:

First Year

- (1) English 100
- (2) French, German, or Spanish
- (3) Chemistry 110
- (4) Economics 100¹
- (5) Physical Education 100

Second Year

- (1) English 210
- (2) French, German, or Spanish²
- (3) Biology 100
- (4) Business Administration 210
- (5) Physical Education 200

¹Naval R.O.T.C. students take Naval Science 100 instead of economics. They must also take Mathematics 100 in the first year and Physics 100 in either the first or the second year.

²The language begun in the first year should be continued.

THE RICE INSTITUTE

Third Year

- (1) Biology 290
- (2) Physical Education 300¹
- (3) Physical Education 310
- (4-5) Two other subjects²

Fourth Year

- (1) Biology 390
- (2) Physical Education 400¹
- (3-5) Three other subjects²

PHYSICAL EDUCATION 100. Three lectures and six laboratory hours weekly. An introductory course to the professional study of health and physical education, and recreation. The laboratory periods will be devoted to intensive instruction in a wide variety of games and to methods of teaching games and other physical activities.

M W F 10:00

PHYSICAL EDUCATION 200. Three lectures and six laboratory hours weekly. This course deals with fundamentals of health and physical education, foundation of methods in health and physical education, and playground and community recreation. The laboratory periods will be devoted to intensive instruction in a wide variety of games and to methods of teaching games and other physical activities.

T Th S 8:00

¹Forty-five hours of practice teaching at the high-school level must be completed during either the Junior or Senior year.

²Students planning to enter public school work should elect education in the third and fourth years and History 310 in the third or fourth year.

ANNOUNCEMENTS

PHYSICAL EDUCATION 300. Three lectures and six laboratory hours weekly. This course includes the study of body mechanics, individual physical education, and tests and measurements in health and physical education. The laboratory periods will be devoted to intensive instruction in a wide variety of games and to methods of teaching games and other physical activities. T Th S 10:00

PHYSICAL EDUCATION 310. Three lectures weekly. The first half-year is devoted to a study of general psychology, the history of the development of the various schools of psychological thought, and a consideration of the psychology of childhood and adolescence. The second half-year is devoted to a study of the principles of educational psychology and the educational implications of recent developments in biology and sociology with special reference to materials and methods in teaching health and physical education and recreation. (Not offered 1942-43.)

PHYSICAL EDUCATION 400. Three lectures and six laboratory hours weekly. This course deals with the principles of organization and administration of programmes of health and physical education and recreation. The laboratory periods will be devoted to intensive instruction in a wide variety of games and to methods of teaching games and other physical activities. T Th S 11:00

PHYSICAL EDUCATION 410. Health and Physical Education in Elementary and Secondary Schools. This course is designed for prospective teachers who desire certification in physical education by the State Department of Educa-

THE RICE INSTITUTE

tion in Texas. To meet the requirement of the Department in full, students taking the present half-year course should also have credit in Biology 100. The course includes a study of the purpose, content, and methods of instruction in a programme of health and physical education in the elementary and secondary schools. Offered during the second half-year in case of sufficient demand.

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 the degree of Bachelor of Science in a specified branch of engineering, and after successfully completing the remaining year of his course he is awarded the degree of Ch.E., C.E., E.E., or M.E. Students with high standing may receive the M.S. degree in a specified branch of engineering under the same requirements as for the M.A. degree. No student is admitted to a fifth year schedule without the approval of the head of the department in which he is specializing. 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

ANNOUNCEMENTS

establishments and in the field. The courses in engineering are not intended 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 middle of the third 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 design machinery, to employ mechanics, and to superintend manufacturing processes.

THE RICE INSTITUTE

Students who can afford the time are recommended to 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 honours 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 honours course in physics is strongly recommended for those who wish to become either electrical or mechanical engineers.

The Southwest affords ample opportunities for the practice of engineering in its several branches, but these opportunities call for well-informed and thoroughly trained scientific workers. It is with such a double object in view that the engineering courses scheduled and described below have been designed and developed under actual experience of some twenty years. These programmes of study and training have justified themselves, for the engineering graduates, chemical, civil, electrical, and mechanical, of this institution are successfully engaged in professional work in many parts of the country, and especially in the Southwest.

In particular, for example, more than half of the Rice Institute graduates in engineering are identified with some phase of the petroleum industry and allied industrial enterprises. Nor is this surprising, and for two reasons: first, the petroleum industry is by far the major industry of this vicinity, and second, the courses in science and engineering offered at the Rice Institute have been found to provide

ANNOUNCEMENTS

first-rate preparation for the practice of petroleum engineering. Such successful application of these courses was to have been anticipated because the petroleum industry's problems of exploration and discovery call for physics and electrical engineering, those of production and manufacture for mechanical engineering, those of transportation and storage for civil engineering, while chemist and chemical engineer man the research laboratories of the industry from which issue its processes of refining and the manufacture of its manifold by-products.

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

First Year

- | | |
|------------------------------|----------------------------------|
| (1) Mathematics 100 | (4) Chemistry 100 |
| (2) Physics 100 | (5) Engineering 110 ¹ |
| (3) English 100 ¹ | (6) Engineering 120 |

Second Year

MECHANICAL, ELECTRICAL, AND CIVIL ENGINEERING

- (1) Mathematics 200 or 210
- (2) Engineering 230a (first half-year)
Mathematics 230a (second half-year)
- (3) Physics 200
- (4) Business Administration 200²
- (5) Engineering 240

¹N.R.O.T.C. students take English 110 and are excused from two hours of laboratory work in Engineering 110.

²N.R.O.T.C. students substitute Naval Science 200.

THE RICE INSTITUTE

CHEMICAL ENGINEERING

- (1) Mathematics 200 or 210
- (2) Mathematics 230a (first half-year)
Engineering 230b (second half-year)
- (3) Physics 200
- (4) German 100¹
- (5) Chemistry 220

Third Year

MECHANICAL ENGINEERING

- (1) Mathematics 300a (first half-year)
English 380 (second half-year)
- (2) Mechanical Engineering 300
- (3) Mechanical Engineering 310
- (4) Electrical Engineering 300
- (5) Civil Engineering 300a and 300b

ELECTRICAL ENGINEERING

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

CIVIL ENGINEERING

- (1) Mathematics 300a (first half-year)
English 380 (second half-year)
- (2) Mechanical Engineering 300
- (3) Electrical Engineering 300

¹N.R.O.T.C. students substitute Naval Science 200.

ANNOUNCEMENTS

- (4) Civil Engineering 300a and 300b
- (5) Civil Engineering 320a and 320b

CHEMICAL ENGINEERING

- (1) Chemistry 300A
- (2) Chemistry 310
- (3) Chemical Engineering 305-315
- (4) Mechanical Engineering 330 (first half-year)
Civil Engineering 330 (second half-year)
- (5) Economics 200

Fourth Year

MECHANICAL ENGINEERING

- (1) Senior Mechanical Laboratory (M.E. 400)
- (2) Machine Design (M.E. 410)
- (3) Heat Engines (M.E. 420)
- (4) Industrial Engineering (M.E. 460), or an approved elective
- (5) Engineering Materials, and Internal Combustion Engines and Fuels (M.E. 440)
- (6) Economics 200
- (7) Mechanical Processes (M.E. 450)

ELECTRICAL ENGINEERING

- (1) Circuit Analysis (E.E. 400)
- (2) Direct and Alternating Current Machinery (E.E. 410)
- (3) Electric and Magnetic Fields and Electrical Machine Design (E.E. 420)¹
Theoretical Electrical Engineering (E.E. 430)
Electrical Communication (E.E. 440)

¹One course to be elected from E.E. 420, 430, and 440.

THE RICE INSTITUTE

- (4) Advanced Electrical Engineering Laboratory (E.E. 450)
- (5) Industrial Engineering (M.E. 460) or an approved elective
- (6) Economics 200
- (7) English 380 (first half-year)

CIVIL ENGINEERING

- (1) Municipal Engineering (C.E. 420)
- (2) Masonry Construction (C.E. 440)
- (3) Structural Design (C.E. 460)
- (4) Approved elective
- (5) Economics 200

CHEMICAL ENGINEERING

- (1) Colloid Chemistry (Ch. 410) (first half-year)
Advanced Organic Chemistry (Ch. 440) (second half-year)
- (2) English 380 and Plant Inspection (Ch. E. 445) (first half-year) Plant Design (Ch. E. 415) (second half-year)
- (3) Unit Operations (Ch.E. 405)
- (4) Chemical Engineering Thermodynamics (Ch.E. 425) (first half-year)
Principles of Engineering Chemistry (Ch.E. 435) (second half-year)
- (5) Direct and Alternating Current Machinery and Circuits (E.E. 330)
- (6) Chemical Literature (Ch. 480) (first half-year)
Seminar (Ch.E. 485) (second half-year)

ANNOUNCEMENTS

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
- (5) Approved elective

ELECTRICAL ENGINEERING

- (1) Advanced Circuit Analysis (E.E. 500)
- (2) Thesis (E.E. 510)
- (3) Heat Engines (M.E. 420) or Machine Design (M.E. 410)
- (4) Approved electrical engineering elective
- (5) Approved elective

CIVIL ENGINEERING

- (1) Structural Design (C.E. 500)
- (2) Hydraulic and Sanitary Engineering (C.E. 510)
- (3) Approved elective
- (4) Approved elective
- (5) Thesis (C.E. 530)

CHEMICAL ENGINEERING

- (1) Experimental Problem and Thesis (Ch.E. 475)
- (2) Advanced Topics in Chemical Engineering (Ch.E. 515)
- (3) Elective (an advanced course in chemistry, chemical engineering, physics, or mathematics)
- (4) Approved engineering elective
- (5) Seminar (Ch.E. 485)

THE RICE INSTITUTE

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. T Th 8:00

Section 1: W and F 10:00-1:00

Section 2: W and F 2:00-5:00

Section 3: Th 1:00-5:00

For students of naval science and tactics there will be a separate, single laboratory section of four hours, to be arranged.

ENGINEERING 120. Lectures by faculty members from the several divisions of engineering. These lectures explain local problems of the engineering student and describe the various fields of engineering work. This course is required of all Freshman engineers. The hours will be arranged in the second half-year.

ENGINEERING 230a. Plane Surveying. The study of the theory of plane surveying and practice in the uses of surveying instruments and of office methods. Problems to familiarize the student with transit, level, tape, compass, and plane table. Plotting of notes and computation of courses, areas, and volumes of earthwork. (First half-year.) Prerequisites: Engineering 110 and Mathematics 100.

M W F 8:00 T and W 2:00-5:00

ENGINEERING 230b. Engineering Mechanics. Systems of concurrent and non-concurrent forces. Couples, vectors,

ANNOUNCEMENTS

and vectorial sums. Center of gravity and moment of inertia of areas and volumes. Friction, work, and energy. Angular movements, momentum and impulse. (Second half-year.) Prerequisites: Engineering 110, Physics 100, and registration in Mathematics 200 or 210. T Th S 8:00

ENGINEERING 240. Kinematics of Machines and Engineering Mechanics.

Kinematics of Machines. The study of relative motion of parts of machines, instant centers, velocities, gearing and wrapping connectors. (Approximately the first fourteen weeks of the year.)

Engineering Mechanics. Statics and dynamics. Concurrent and non-concurrent force systems in a plane and in space, by algebraic and graphical methods. Centroids and moments of inertia of areas and bodies. Friction, work, and energy. Applications of Newton's second law in problems of translation, rotation, and plane motion of rigid bodies. Impulse and momentum. (Remaining twenty-two weeks of the year following Kinematics.)

Prerequisites: Engineering 110, Physics 100, and registration in Mathematics 200 or 210.

T Th S 11:00 M 1:00-4:00

MECHANICAL ENGINEERING 300. Elementary Heat Power. 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

THE RICE INSTITUTE

discussed. Prerequisites: Full Junior standing and Physics 100, Chemistry 100, and Kinematics. One laboratory fortnightly. M W F 10:00 M or T 2:00-5:00

MECHANICAL ENGINEERING 310. Engineering Shop. Textbook and lectures dealing with metallurgy, general forge, foundry, welding, heat-treating, and machine-shop practice, and their effects on machine design and manufacturing. Practice with a variety of bench and machine tools, carefully selected for their fitness in illustrating the principles studied, for affording actual contact with machine work, and for developing a certain degree of skill and resourcefulness in the student. Plant inspection trips. Prerequisites: Full Junior standing in engineering and Engineering 240. Recitations, all sections, T Th S 9:00

Shop Section A: T Th S 10:00-12:00

Shop Section B: Th F 2:00-5:00

MECHANICAL ENGINEERING 330. Heat Machinery. A half-year course for chemical engineering students only. Elementary thermodynamics of vapors; characteristics and operation of power plant equipment. (First half-year.) Prerequisites: Full Junior standing and Physics 100. One laboratory fortnightly. T Th S 10:00 M or F 10:00-1:00

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 or preceded by Mechanical Engineering 420.

W Th 2:00-5:00

ANNOUNCEMENTS

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. Design of several complete assemblies, such as crown blocks, brakes, or transmission units used in the oil-fields. Prerequisites: Engineering 240, Mathematics 220a or 230a, Mechanical Engineering 310, and Civil Engineering 300a and b.

M W F 10:00-1:00

MECHANICAL ENGINEERING 420. Heat Engineering. General thermodynamics; applications of thermodynamics to the design and operation of air compressors, steam engines and steam turbines; commercial forms of such machines; principles of air conditioning and refrigeration. Lectures, text, and problems. Prerequisite: Mechanical Engineering 300.

M W F 9:00

MECHANICAL ENGINEERING 440. Engineering Materials, and Internal Combustion Engines and Fuels. Engineering materials: a brief study from current references of the metallurgy, physical properties, applications, and commercial forms of metals, alloys, protective coatings, and important non-metallic materials, emphasizing those features most interesting to the design and application engineer. Internal combustion engines and fuels: a study of the theory, design, and operation of gasoline, gas, and oil-burning engines for automotive, stationary, and marine service, including the production and characteristics of the

THE RICE INSTITUTE

fuels used. Must be accompanied or preceded by Mechanical Engineering 420 and Civil Engineering 300a and b.

T Th S 8:00

MECHANICAL ENGINEERING 450. Mechanical Processes. Each student investigates and reports orally on specific mechanical processes or equipments, securing his data from the library or other specified sources. Inspection trips and special lectures. Prerequisite: Credit or enrollment in Mechanical Engineering 410 and 420.

F 2:00-5:00

MECHANICAL ENGINEERING 460. Industrial Engineering. Typical organizations of manufacturing plants; location and layout of works; the selection of equipment for such plants, including tools and material conveying equipment; building types and service equipment; production control methods; personnel activities; wage systems; labor laws. Prerequisites: Mechanical Engineering 310 and Business Administration 200. Two recitations a week. Senior elective.

T Th 10:00

MECHANICAL ENGINEERING 490. Mechanical Engineering Problems. If conditions are favorable, mechanical engineering students may elect at least nine hours a week in approved investigations or designs under the direction of a member of the staff.

MECHANICAL ENGINEERING 500. A study of Fundamental Principles in Advanced Strength of Materials, Kinematics, and Machine Design. Analytical and graphical analyses are applied to problems of stress concentrations,

ANNOUNCEMENTS

of balance and vibration, and of stress due to dynamical causes. Comparison is made with experimental results. The mechanical properties of metals are emphasized in problems involving fatigue, high temperatures, strain, hardening, etc. Prerequisite: Mechanical Engineering 410.

MECHANICAL ENGINEERING 510. Mechanical Plants and Processes. A general course dealing with special plants and processes, such as oil production, transportation, and refining, textiles, metal products, material handling, refrigeration, not covered thoroughly in other courses. Details of design and operation of special power and heating plants. Prerequisite: Mechanical Engineering 420.

MECHANICAL ENGINEERING 530. Thesis. The investigation, under direction of the 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 library.

ELECTRICAL ENGINEERING 300. Introduction to Direct and Alternating Current Machinery and Circuits. The fundamental principles of electrical engineering for electrical, civil, and mechanical engineering students. Prerequisites: Full Junior standing and Physics 200 and Mathematics 200 or 210. Laboratory fortnightly.

M W F 9:00 M or T 2:00-5:00
or T 10:00-1:00

THE RICE INSTITUTE

ELECTRICAL ENGINEERING 330. Introduction to Direct and Alternating Current Machinery and Circuits. The fundamental principles of electrical engineering designed to meet the special needs of chemical engineering students. Prerequisites: Full Junior standing and Physics 200 and Mathematics 200 or 210. Laboratory fortnightly.

T S 9:00 T 2:00-5:00

ELECTRICAL ENGINEERING 400. Circuit Analysis. Fundamental alternating current theory applied to linear, lumped constant, and distributed constant circuits. Applications of the complex variable to alternating current theory. The generalized four-terminal network and the reduction of transformers, transmission lines, etc., to four-terminal networks. Fourier series applied to circuit theory. Introduction to symmetrical components, filter circuits, and transient analysis. Prerequisites: Electrical Engineering 300 and Mathematics 300 or 310.

M W F 9:00

ELECTRICAL ENGINEERING 410. Direct and Alternating Current Machinery. Engineering Electronics. Theory of direct and alternating current machinery and calculation of their characteristics, together with the theory of electronic devices and of electrical measurements. Must be accompanied or preceded by Electrical Engineering 400.

M W F 11:00

ELECTRICAL ENGINEERING 420. Electric and Magnetic Fields and Electrical Machine Design. Discussion of electric, magnetic, and heat fields and the application of graphical methods to the solution of field problems. Application

ANNOUNCEMENTS

of fundamental principles in the design of electrical equipment including direct and alternating current machinery. Must be accompanied or preceded by Electrical Engineering 400 and 410. T Th S 9:00 T 2:00-6:00

ELECTRICAL ENGINEERING 430. Theoretical Electrical Engineering. A more complete mathematical treatment of alternating current phenomena than is given in Electrical Engineering 400. Open only to students registered in Electrical Engineering 400 and 410 who show capacity in mathematics and electrical theory. Three lectures and one four-hour laboratory period per week. (Not offered 1942-43.)

ELECTRICAL ENGINEERING 440. Electrical Communication. The principles of communication by telegraph and telephone over wires, and by radio. Open only to students registered in both Electrical Engineering 400 and 410 who show aptitude for communication work.

T Th S 8:00 M 2:00-6:00

ELECTRICAL ENGINEERING 450. Advanced Electrical Engineering Laboratory. Direct and alternating current machinery, electronic devices, and electrical measurements. A laboratory study of the principles considered in Electrical Engineering 410. Prerequisite: Registration in Electrical Engineering 410. W Th 2:00-6:00

ELECTRICAL ENGINEERING 490. Electrical Engineering Problems. If conditions are favorable, students of electrical engineering may elect at least nine hours a week in approved investigations, usually experimental, under the direction of a member of the staff. Hours to be arranged.

THE RICE INSTITUTE

ELECTRICAL ENGINEERING 500. Advanced Circuit Analysis. This course includes a study of Heaviside's Operational Calculus, machine and circuit transients, non-linear circuits, symmetrical components, three and four winding transformer theory, transmission networks in steady state, and transient stability. Three lectures and one four-hour laboratory period per week. Hours to be arranged.

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. Two copies of the accepted report will be required for deposit in the Institute library.

CIVIL ENGINEERING 300a. Strength of Materials. Theory of beams, columns, and shafts. Stresses and deformations due to tensile, compressive and shearing forces; distribution of shears, bending moments, deflections, torsional stresses, and combined stresses. Laboratory physical tests of cast iron, steel, wood, cement, bricks, and concrete. First half-year. Prerequisites: Full Junior standing and Physics 100, Mathematics 200 or 210, and Engineering 240. Laboratory fortnightly. T Th S 8:00 M or W 2:00-5:00

CIVIL ENGINEERING 300b. Hydraulics. Principles of hydrostatics and hydrodynamics; the flow of water through orifices, pipes, nozzles, in open channels, and over weirs. Laboratory tests of weirs, Venturi meters, and simple hydraulic machinery. Second half-year. Prerequisites and

ANNOUNCEMENTS

recitation and laboratory hours are the same as for Civil Engineering 300a.

CIVIL ENGINEERING 320a. Advanced Surveying. Theory and practice of base line and triangulation measurements; stadia, and plane table. Topography. Simple, compound, reversed, and spiral easement curves for railway and highway use. Mass diagrams and earthwork. First half-year. Prerequisites: Full Junior standing and Engineering 230a.

M W F 9:00 Th and F 2:00-5:00

CIVIL ENGINEERING 320b. Graphic Statics and Stresses in Framed Structures. Algebraic and graphic statics applied to beams and trusses. Fixed and moving loads. Load systems. Influence diagrams. Portals, transverse bents, and determination of maximum and minimum stresses in roof and bridge trusses. Second half-year, following Civil Engineering 320a. Prerequisites: Full Junior standing and Engineering 240 and Civil Engineering 300a.

M W F 9:00 Th and F 2:00-5:00

CIVIL ENGINEERING 330. Strength of Materials. For chemical engineering students only. Theory of beams, columns, and shafts. Stresses and deformations due to tensile, compressive, and shearing stresses; distribution of shears, bending moments, deflections, torsion. Laboratory physical tests of various metals and of concrete. Second half-year. Prerequisites: Full Junior standing and Physics 100, Engineering 110, Mathematics 200, and Mathematics 220a or 230a. Laboratory fortnightly.

T Th S 10:00 M or F 10:00-1:00

[131]

THE RICE INSTITUTE

CIVIL ENGINEERING 405. Seminar. A course devoted to the purpose of training civil engineering students in collecting and presenting orally formal papers and discussions on topics of general engineering interest. The papers and discussions are given by the students, using acceptable material secured from technical periodicals or transactions. The course meets weekly and is conducted in the form of an engineering society meeting. Open to others who have the necessary engineering background.

(Not offered 1942-43.)

CIVIL ENGINEERING 420. Municipal Engineering. The course covers three subjects. Highways: design, construction and maintenance of earth, sand-clay, macadam, bituminous macadam, asphaltic concrete, brick, wood-block, stone-block, and cement concrete roads. Legislation and methods of financing. Water Supply: a study of rainfall, evaporation, yield, water-bearing strata, etc. Water analysis and stream pollution. Design, construction, operation, and maintenance of purification systems, storage facilities, and distribution systems. Sewerage: a study of storm flow, modern methods of sanitation, disease epidemics, etc. Water carriage systems, separate and combined. Design, construction, and maintenance of sewers and sewage disposal plants. Prerequisites: Civil Engineering 300a and b.

T Th S 8:00 M 2:00-5:00

CIVIL ENGINEERING 440. Masonry Construction. A study of concrete and concrete aggregates. Theory and design of reinforced concrete slabs, beams, and columns. A study of foundations. Theory, investigation, and design of

ANNOUNCEMENTS

retaining walls, dams, and arches. Design of typical parts of buildings and beam and girder bridges. Prerequisites: Civil Engineering 300a and b.

M W F 8:00 F 10:00-1:00

CIVIL ENGINEERING 460. Structural Design. Design of tension and compression members and of riveted and welded connections. Design of roof trusses, simple bridge trusses, plate girders, and tall office frames. Detailed drawings and estimates of cost and weight. Deflection diagrams for trusses. Three lectures and two three-hour laboratory periods per week throughout the year. Prerequisites: Civil Engineering 300a and b and 320b.

T Th S: 10:00 M and W 10:00-1:00

CIVIL ENGINEERING 490. Civil Engineering Problems. Under certain favorable conditions civil engineering students may elect an approved investigation of some civil engineering problem under the direction of a member of the civil engineering staff. (Not offered 1942-43.)

CIVIL ENGINEERING 500. Structural Design. Design of steel office and mill buildings. Analysis of stresses in statically indeterminate structures such as swing, cantilever, arch, and suspension bridges. A study of secondary stresses. Two lectures and one design period a week. Prerequisite: Civil Engineering 460 or its equivalent.

(Not offered 1942-43.)

CIVIL ENGINEERING 510. Hydraulic and Sanitary Engineering. Investigation and development of water power.

THE RICE INSTITUTE

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 such as garbage disposal, public health, street cleaning. Three lectures and one design period a week. Prerequisite: Civil Engineering 420 or its equivalent.

(Not offered 1942-43.)

CHEMICAL ENGINEERING 305. First half-year: Stoichiometry, Fuels and Combustion. Second half-year: Chemical Engineering Mathematics and Economics; Flow of Fluids. Two lectures and three hours of laboratory work weekly. The laboratory work consists of the testing and analysis of gas, oil, coal, minerals, and water, the measurement of such fundamental quantities as temperature, pressure, viscosity, etc., and the application of these methods to developing stoichiometric relations, weight balances, and heat balances. Prerequisites: Full Junior standing and Chemistry 220. Taken with Chemical Engineering 315.

T S 8:00 Laboratory W or F 2:00-5:00

CHEMICAL ENGINEERING 315. Industrial Chemistry. One lecture weekly. The more important industrial chemical processes are considered from the point of view of both the chemical reactions forming the basis of the process and the industrial plant necessary to carry on the reactions. In this way the interrelationships of the different industries as to raw materials, sources of energy, and standard types of apparatus are developed and a general survey of the field obtained. Problem work is included. Prerequisite: Taken with Chemical Engineering 305.

Th 8:00

ANNOUNCEMENTS

CHEMICAL ENGINEERING 405. Unit Operations. Three lectures and six hours of laboratory work weekly. This course deals with the principles upon which the mechanical operations involved in the chemical manufacturing industries depend, and with the types of equipment available for such operations and the kind of work for which each is best adapted. The application of the principles is illustrated both by discussion in the class room and by the solution of typical problems. Among the subjects considered are: heat transmission; evaporation; humidification and dehumidification; air conditioning; drying; distillation and fractionation; filtration; absorption; extraction; crystallization; crushing; grinding; separation; agitation; transportation of solids, liquids, and gases; water softening; corrosion and water treatment for boiler use; pyrometry, etc. The laboratory work consists of experimental studies of the various types of unit operations equipment from the standpoint of operation, testing, and theory. Prerequisites: Chemical Engineering 305 and 315.

M W F 8:00 Laboratory M Th 2:00-5:00

CHEMICAL ENGINEERING 415. Plant Design. Two lectures and six hours of drafting weekly during the second half-year. The lectures consider the development of chemical manufacturing processes and the design of chemical manufacturing plants from the point of view of location, building, equipment, economics, and organization. The laboratory work consists of problems in calculating and drawing up fundamental data, qualitative and quantitative flow sheets, specifications, plant layout, and cost estimates for typical processes. A fee of five dollars is required to

THE RICE INSTITUTE

cover certain expenses in connection with the drafting work, etc. Prerequisite: Chemical Engineering 405 or taking 405.
M W 9:00 Drawing M W 10:00-1:00 (second half-year)

CHEMICAL ENGINEERING 425. Chemical Engineering Thermodynamics. Three hours of lectures weekly during the first half-year. A course in theoretical and applied thermodynamics. Prerequisite: Chemistry 310.

T Th S 10:00 (first half-year)

CHEMICAL ENGINEERING 435. Principles of Engineering Chemistry. Three hours of lectures weekly during the second half-year. This course consists of the application of chemical principles to selected modern industrial and engineering processes. Prerequisite: Chemistry 310.

T Th S 10:00 (second half-year)

CHEMICAL ENGINEERING 445. Plant Inspection. One lecture and one inspection trip weekly during the first half-year. The work consists of: (1) a critical examination, in conference, of processes, equipment, and problems of each industrial plant to be visited; (2) the inspection of the plant supplemented by discussions by plant officials; (3) a comprehensive report, by squads, consisting of flow-sheets, individual unit descriptions, and general specifications of interest. Types of industries inspected are: sewage, sugar, petroleum refining, cement, brewing and malting, steel pouring, plastics, heavy chemicals, fertilizers, etc. Prerequisite: Chemical Engineering 405 or taking 405.

T 8:00 Laboratory F 2:00-5:00 (first half-year)

ANNOUNCEMENTS

CHEMICAL ENGINEERING 475. Experimental Problem and Thesis. Chemical Engineers in their fifth year will be required to devote at least nine hours per week to an experimental problem and to prepare a thesis.

CHEMICAL ENGINEERING 485. Seminar. One hour weekly during the second half-year. A course for training chemical engineering students in the preparation and oral presentation of formal papers and discussions on topics of engineering interest. The papers and discussions are given by the students, using acceptable material secured from technical publications. This course is required of all Senior chemical engineers. F 9:00 (second half-year)

CHEMICAL ENGINEERING 505. Research and Thesis. At least nine hours of work weekly under the direction of a member of the staff on a problem of chemical engineering importance.

CHEMICAL ENGINEERING 515. Advanced Topics in Chemical Engineering. Three lectures weekly on advanced topics in chemical engineering such as advanced unit operations and plant design, petroleum refining, pulp and paper industries, graphical methods of problem solution, plastics, water treatment, and corrosion. Prerequisite: Chemical Engineering 405. Hours to be arranged.

COURSES IN ARCHITECTURE

To students of architecture the Institute offers a course 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.

THE RICE INSTITUTE

It is the purpose of the course to lead students during their residence to an understanding of the art of modern building. It seeks to acquaint them with the history of architecture and to develop within them an appreciation of those conceptions of beauty and utility which are fundamental 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 as well as such technical subjects as are becoming more necessary to the general education of a practising architect. Of the more strictly architectural subjects, design and construction are given the largest place. 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 to increase more and more his ability to express architectural form.

Particular emphasis is being given to the continuity of instruction in construction and structural engineering in an effort to prepare the student for the practice of his profession.

The following are the schedules leading to a B.A. degree on the completion of the required work of the first four years and to a professional degree, B.S. in Architecture, on the completion of the entire five year schedule.

First Year

- (1) Mathematics 100
- (2) English 100¹
- (3) French or Spanish

¹Naval R.O.T.C. students take English 110, and are excused from two hours of Architecture 100 (c). Such students must also take Physics 100 in the first or the second year.

ANNOUNCEMENTS

- (4) Chemistry 100 or Physics 100
- (5) Architecture 100: consisting of
 - (a) Drawing and Elementary Construction
 - (b) Descriptive Geometry
 - (c) Freehand Drawing¹

Second Year

- (1) Pure Mathematics
- (2) English or a modern language²
- (3) A science³
- (4) Architecture 200: consisting of
 - (a) Design
 - (b) Drafting Room Practice
- (5) Architecture 210: consisting of
 - (a) History of Architecture
 - (b) Freehand Drawing and Modeling

Third Year

- (1) English or a modern language.
- (2) Architecture 300: Design
- (3) Architecture 310: consisting of
 - (a) Freehand Drawing
 - (b) Water-Color
 - (c) History of Architecture

¹Naval R.O.T.C. students take English 110, and are excused from two hours of Architecture 100 (c). Such students must also take Physics 100 in the first or the second year.

²Students in second year shall continue the language chosen in first year course. Naval R.O.T.C. students substitute Naval Science 200.

³Naval R.O.T.C. students must take Physics 100 in the first or the second year.

THE RICE INSTITUTE

- (4) Architecture 330: Construction—Structural Analyses
- (5) Architecture 340: History of the Fine Arts

Fourth Year

- (1) Architecture 400: Design
- (2) Architecture 410-450: History
- (3) Architecture 420: Construction
 - (a) Materials and Methods
 - (b) Specifications
- (4) Architecture 430: Construction
 - (a) Steel
 - (b) Reinforced Concrete
- (5) Architecture 440: consisting of
 - (a) Historic Ornament
 - (b) Water-Color
 - (c) Life Drawing

Fifth Year

- (1) Architecture 500: Advanced Design
- (2) Architecture 520: Thesis Design
- (3) Architecture 530: Construction
- (4) Architecture 550: Seminar

Accelerated Course During the War

Students of architecture may complete the courses listed on pages 138, 139, and 140 within the accelerated four year schedule providing three required academic courses are taken at approved summer schools, no more than two being taken in any one year. Upon successful completion of this course the degree of B.S. in Architecture will be awarded to the student.

ANNOUNCEMENTS

ARCHITECTURE 100.

(a) Drawing and Elementary Construction. Training in drawing and elementary construction. Six laboratory hours. M Th 3:00–6:00

(b) Descriptive Geometry. Introductory course, including shades and shadows and perspective. M Th 2:00–3:00

(c) Freehand Drawing. Elementary drawing in pencil and charcoal of simple objects and block groups and casts. Four hours a week. W F 11:00–1:00

ARCHITECTURE 200.

(a) Design. Problems embracing the design and construction of small buildings. Eight hours a week. T Th 2:00–6:00

(b) Drawing room practice in construction and materials. A three-hour period, including one lecture each week. W 8:00–11:00

ARCHITECTURE 210.

(a) History of Architecture. Two lectures a week on the history of ancient and mediaeval architecture, illustrated by lantern slides, and three hours a week of research and tracing of historic buildings. Five hours a week. W 2:00–3:00
F 2:00–6:00

(b) Freehand Drawing and Modeling. Drawing in charcoal from simple casts. Modeling in clay. Six hours a week. M W F 11:00–1:00

ARCHITECTURE 300.

Design. The design of buildings of moderate requirements and dimensions. The problems average five weeks in dura-

THE RICE INSTITUTE

tion with twenty-four hours for the sketch problems at the end of major problems. Twelve hours a week.

M W F 2:00-6:00

ARCHITECTURE 310.

(a) Freehand Drawing. Drawing from casts of antique sculpture. Four hours a week. M F 10:00-12:00

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

W 8:00-10:00

(c) History of Renaissance and Contemporary Architecture. Two lectures a week, illustrated by lantern slides, and three hours a week of research in the study of historic buildings. Five hours a week. T Th 2:00-4:30

ARCHITECTURE 330.

Structural Analyses. Three lectures a week on mechanics relating to structural members and properties of structural materials, and three hours a week research.

M W F 12:00-1:00

ARCHITECTURE 340.

History of the Fine Arts. Three lectures a week on the history and philosophy of architecture, painting, and sculpture. Open also to Academic Juniors and Seniors.

T Th S 10:00

ARCHITECTURE 400.

Design. Problems averaging six weeks in duration. Commercial and public buildings or group of buildings. Sixteen hours a week. T Th 2:30-6:00

M W F 3:00-6:00

ANNOUNCEMENTS

ARCHITECTURE 410.

A History of Painting and Sculpture of the Middle Ages in Europe. This course traces the development of the art styles generally known as Byzantine, Romanesque, and Gothic, and covers the period from the fall of the Western Roman Empire through the fifteenth century. Emphasis is placed upon the contributions of the Near East and upon the twelfth and thirteenth centuries in Western Europe. Open also to academic Juniors and Seniors. (Alternates with Architecture 450.) T Th S 11:00

ARCHITECTURE 420.

(a) Materials and Methods of Construction. Three lectures a week on construction details. First half-year.

(b) Specifications. Three lectures a week on specification writing. Second half-year. M W F 2:00-3:00

ARCHITECTURE 430.

(a) Three lectures a week on steel construction. First half-year.

(b) Three lectures a week on reinforced concrete structures. Second half-year. M W F 12:00-1:00

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. Four hours a week.

M W 10:00-12:00

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

W 9:00-11:00

(c) Life Drawing.

S 8:00-11:00

THE RICE INSTITUTE

ARCHITECTURE 450.

A History of Painting and Sculpture of the Renaissance. A critical survey of the art of the Renaissance, and subsequent development, with particular emphasis upon the period between the years 1400 and 1700. Open also to academic Juniors and Seniors. (Alternates with Architecture 410.) (Not offered 1942-43.)

ARCHITECTURE 500.

Advanced Design. Problems of major building importance averaging eight weeks in duration and with frequent sketch problems of eight to twelve hours each. Fifteen hours a week.

M F 8:00-12:00

T Th 2:30-6:00

ARCHITECTURE 520.

Thesis Design. The subject of the architectural thesis problem shall be chosen by the student with the approval of the faculty, and shall consist of continued research and study in its design and construction.

W 8:00-12:00

M 2:00-5:00

ARCHITECTURE 530.

Construction and Working Drawings. A lecture and laboratory course in professional practice and preparation of working drawings and details. Three lectures a week on mechanical specification writing, professional practice, and building costs.

M W F 11:00-12:00 W F 3:00-6:00

ARCHITECTURE 550.

Seminar. A course devoted to the purpose of training architects in collecting and presenting orally formal papers and discussions on topics of architectural interest. The

ANNOUNCEMENTS

papers and discussions are given by the students of the fifth year, using acceptable materials procured from technical periodicals or translations. Meets bi-weekly and is open to students of the third and fourth years.

Hours to be arranged.

ARCHITECTURE 600.

A course for students who have received the Bachelor of Science degree in Architecture. Research with weekly seminars upon a written thesis chosen with the approval of a member of the Faculty.

COURSES IN NAVAL SCIENCE AND TACTICS

A Department of Naval Science and Tactics maintained by the United States Navy with U.S. Naval Officers as instructors was established at the Rice Institute in 1941. A four-year course is prescribed by the Navy Department, and satisfactory completion of this four-year course qualifies students for appointment as commissioned officers in the United States Naval Reserve or in the Marine Corps Reserve.

The Navy Department prescribes the quota each year for the incoming class of Freshmen. For the 1941-42 academic year the quota was 110. For the 1942-43 year it will be approximately 90.

Any qualified student of the Institute, pursuing a course leading to a degree (except premedical, pre dental, and theological), may apply for admission to the four-year course in Naval Science and Tactics. All courses leading to a bachelor's degree at the Institute will be so modified as to

THE RICE INSTITUTE

admit of credit for courses in Naval Science and Tactics. Such modifications for the first and second year in all courses of study appear on pages 54, 55, 88, 89, 111, 112, 117, 118, 138, and 139. Similar modifications for the third and fourth year students of Naval Science and Tactics will be announced in due time.

Summer cruises of about three weeks' duration, in Navy ships, if available, will afford practical experience. The ocean cruise at the end of the Junior year is requisite; other cruises are optional.

Equipment, including uniforms and textbooks, is furnished by the Government. During the Junior and the Senior years students receive a subsistence allowance, which averages approximately \$90.00 a year, plus subsistence on cruises.

BASIC COURSES

NAVAL SCIENCE 100. Naval History (customs and traditions). Seamanship. Administration. Navy Regulations. Communications.* Drill. M W F 9:00, 11:00 or 12:00
M 4:15 One hour battalion drill
One hour additional drill T 12:00-1:00,
F 9:00-10:00, or S 9:00-10:00

NAVAL SCIENCE 200. Navigation Communications.* Drill. T Th S 8:00, 9:00, or 11:00
M 4:15 One hour battalion drill
One hour additional drill period to be arranged.
Two hour laboratory period once per month to be arranged.

*Five minute buzzer and/or blinker period each recitation hour during the entire four-year course.

ANNOUNCEMENTS

ADVANCED COURSES

NAVAL SCIENCE 300. Ordnance. Gunnery. Engineering. Electricity. Communications.* Drill. (Not offered 1942-43.)

NAVAL SCIENCE 400. Aviation. Military law. Naval Reserve. Naval Leadership. International Law. Tactics. Drill. Communications.* (Not offered 1942-43.)

An illustrated brochure, descriptive of the Rice Naval R.O.T.C. Unit, has been issued by the Institute, copies of which may be had on request addressed to the Professor of Naval Science and Tactics or to the Registrar of the Institute.

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 homes not represented on the rolls of its undergraduate or post-graduate 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, non-technical and popular in treatment, and on subjects of current interest as well as of assured and permanent value, from various domains of literature, history, science, art, philosophy, and politics.

PUBLIC LECTURESHIPS

THREE public lectureships have been founded at the Rice Institute. The first of these, established in 1918 by Mrs.

*Five minute buzzer and/or blinker period each recitation hour during the entire four-year course.

THE RICE INSTITUTE

Estelle B. Sharp, of Houston, has to do primarily with topics in the social sciences; 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; while the third, founded anonymously in 1922 by a citizen of Houston, is dedicated to the promotion of interest in music both in the university and in the community. 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 the late Sir Henry Jones, F.B.A., professor in the University of Glasgow. Subsequent lectures on the Sharp Foundation have been delivered by the late Professor Andrew C. McLaughlin, of the University of Chicago, by Dr. T. R. Glover, of Cambridge University, by Sir Robert Falconer, of the University of Toronto, and by Professor Edwin G. Conklin of Princeton University. 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. Further lectures on the Godwin Foundation have been delivered by Sir Auckland Geddes, British Ambassador to the United States, and by President A. Lawrence Lowell, of Harvard University. The Lectureship in Music was inaugurated in the spring of 1923 by a course of lectures on music in the life of the community and of the nation, delivered by Mr. John Powell, the American composer and pianist; the Lectureship in Music has also been held by Mlle. Nadia Boulanger, of Paris, by Sir Henry Hadow, Vice-Chancellor

ANNOUNCEMENTS

of the University of Sheffield, by MM. Maurice Ravel and A. Honegger, of Paris, by Professor George D. Birkhoff, of Harvard University, and by Mr. Harold Morris.

THE 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 twenty-seventh volume, is published quarterly in January, April, July, and October, with a view to giving wider publicity in permanent form to inaugural and other lectures in letters, science, and art by resident and visiting lecturers and professors of the university. In this connection the reader may wish to turn to an earlier paragraph on the formal opening of the Institute.

LIBRARY

TEMPORARY quarters for the library of the Institute have been provided in the administration building. The affairs of the library are administered through a committee of the Faculty, and Miss Alice C. Dean, M.A., is 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. For works of general and more popular interest the shelves of the Houston Public Library are accessible to all members of the Institute.

THE RICE INSTITUTE

Besides several hundred current literary and scientific journals, the library of the Institute contains at present about sixty thousand volumes in back files of serial publications; among these are sets of the following: Abstracts of Bacteriology, L'Académie des Sciences de Paris Comptes Rendus, Acta Mathematica, Allgemeine Deutsche Biographie, American Academy of Political Science Annals, American Anthropological Association Memoirs, American Anthropologist (New Series), American Antiquarian Society Proceedings and Transactions, American Association of Petroleum Geologists Bulletin, American Economic Association Publications, American Economic Review, American Chemical Society Journal, American Electric Railway Engineering Association Proceedings, American Electro-Chemical Society Transactions, American Historical Association Annual Reports, American Historical Review, American Institute of Chemical Engineers Transactions, American Institute of Electrical Engineers Transactions, American Institute of Mining and Metallurgical Engineers Transactions, American Journal of Education, American Journal of International Law, American Journal of Mathematics, American Journal of Microscopy and Popular Science, American Journal of Philology, American Journal of Psychology, American Journal of Science, American Journal of Tropical Medicine, American Machinist, American Mathematical Monthly, American Mathematical Society Transactions and Bulletin, American Naturalist, American Political Science Review, American Quarterly Review, American Review of Reviews, American Society for Testing Materials Proceedings, American Society of Civil Engineers Transactions, American Society of Mechanical

ANNOUNCEMENTS

Engineers Transactions, American State Papers, Analyst, Anatomical Record, Anglia, Annali di Matematica, Annalen der Chemie, Annalen der Physik, Annales de Chimie et de Physique, Annals of Collective Economy, Annals of Mathematical Statistics, Annals of Mathematics, Année Biologique, Année Philosophique, Année Psychologique, Annual of Scientific Discovery, Annual Register, Annual Review of Physiology, Antologia, Architectural Record, Archiv des Criminalrechts, Archiv für das Studium der Neueren Sprachen, Archiv für Entwicklungsmechanik der Organismen, Archiv für Geschichte der Philosophie, Archiv für Mikroskopische Anatomie und Entwicklungsmechanik, Archiv für Protistenkunde, Archiv für Schiffs- und Tropen-Hygiene, Archiv für Zellforschung Archives Néerlandaises des Sciences Exactes et Naturelles, Archives of Pathology and Laboratory Medicine, Arkiv för Matematik, Astronomi och Fysik, Aristotelian Society Proceedings, Arnold Foundation Studies in Public Affairs, Art and Understanding, Arts and Decoration, Asiatic Annual Register, Astrophysical Journal, Atlantic Monthly, Bangor Historical Magazine, Baptist Quarterly, Bee, Behavior Monographs, Beiträge zur Geophysik, Beiträge zur Geschichte der Deutschen Sprache und Literatur, Bell Telephone System Technical Publications, Bentley's Miscellany, Berichte über die Wissenschaftliche Biologie, Bibelot, Bibliographer, Bibliographical Society (London) Transactions, Bibliotheca Belgica, Bibliotheca Mathematica (Neue Folge), Biochemische Zeitschrift, Biologica, Biological Bulletin, Biologisches Zentralblatt, Biometrika, Bird-lore, Blackwood's Edinburgh Magazine, Bookman, Le Botaniste, British Academy Proceedings, British Association for the Advancement of Science Reports,

THE RICE INSTITUTE

British Chemical Abstracts, British Journal of Psychology, British Quarterly Review, Bulletin of Entomological Research, Calcutta Mathematical Society Bulletin, California University Publications in History, California University Publications in Zoology, Camden Society Publications, Canadian Journal of Research, Carnegie Institution of Washington Publications, La Cellule, Central-blatt für Bakteriologie, Chemical Abstracts, Chemical Engineer, Chemical News, Chemisches Zentral-blatt, Church Quarterly Review, Circolo Matematico di Palermo Rendiconti, Civiltà Cattolica, Classical Journal, Classical Philology, Classical Quarterly, Classical Review, Comparative Psychology Monographs, Compositio Mathematica, Contemporary Review, Copeia, Corpus Juris, La Critica, Current History Magazine, Deutsche Chemische Gesellschaft Berichte, Deutsche Nationalbibliographie, Deutsche Rundschau, Early English Text Society Publications, L'École Normale Supérieure Annales Scientifiques, L'Éclairage Électrique, Ecology, Economic Journal, Economic Review, Edinburgh Mathematical Society Proceedings, Edinburgh Philosophical Journal, Edinburgh Review, Educational Administration and Supervision, Educational Research Bulletin, Educational Review, Electric Journal, Electrical World, Elektrotechnische Zeitschrift, Electrician, Engineering Index Annual, Engineering News-Record, L'Enseignement Mathématique, Englische Studien, English Historical Review, Entomological News, Entomologists' Monthly Magazine, Ethnological Society of London Transactions (New Series), Ergebnisse der Anatomie und Entwicklungsgeschichte, Essex Antiquarian, Eugenics Review, Experiment Station Record, Filosofia delle Scuole Italiane, Folk-lore Society (London)

ANNOUNCEMENTS

Publications, Fortnightly, Fortschritte der Mathematik, Forum, Fundamenta Mathematicae Redaktorowie, Gazzetta Chimica Italiana, Genetic Psychology Monographs, Genetics, Gentlemen's Magazine, Gesellschaft für Ältere Deutsche Geschichtkunde Neues Archiv, Giornali di Matematiche di Battaglini, Golden Book Magazine, Great Britain Royal Commission Historical Manuscripts, Green Bag, Harper's Monthly Magazine, Harvard Graduates' Magazine, Harvard Law Review, Harvard Studies and Notes in Philology and Literature, Harvard Studies in Classical Philology, Harvard Theological Review, Helminthological Society of Washington Proceedings. Hibbert Journal, Historical Magazine, Huntington Library Quarterly, India Medical Department Scientific Memoirs, Indian Journal of Medical Research, Industrial Management, Institute of Metals Journal, Institution of Electrical Engineers Journal, L'Intermediare des Mathematiciens, International Catalog of Scientific Literature, International Journal of Ethics, International Monthly Magazine of Literature, Science and Art, International Studio, International Sugar Journal, Jahrbuch der Radioaktivität und Elektronik, Jefferson Physical Laboratory Contributions, Johns Hopkins University Studies in Historical and Political Science, Journal de Chimie Physique, Journal de Mathématiques, Journal de Physique, Journal für die Reine und Angewandte Mathematik, Journal für Praktische Chemie, Journal of Animal Behavior, Journal of Bacteriology, Journal of Comparative Psychology, Journal of Economic Entomology, Journal of English and Germanic Philology, Journal of Experimental Biology, Journal of Experimental Medicine, Journal of Pathology and Bacteriology, Journal of Physiology, Journal

THE RICE INSTITUTE

of Experimental Psychology, Journal of Experimental Zoölogy, Journal of General Psychology, Journal of Hellenic Studies, Journal of Helminthology, Journal of Hygiene, Journal of Industrial and Engineering Chemistry, Journal of Immunology, Journal of Infectious Diseases, Journal of Medical Research, Journal of Morphology, Journal of Nutrition, Journal of Parasitology, Journal of Philology, Journal of Philosophy, Psychology and Scientific Methods, Journal of Physical Chemistry, Journal of Roman Studies, Journal of Science, Journal of Speculative Philosophy, Journal of the Society of Chemical Engineers, Journal of Theological Studies, K. Akademie van Wetenschappen te Amsterdam Proceedings, Kansas University Geological Survey Contributions to the Paleontology of Kansas, Kansas University Humanistic Studies and Science Bulletin Kolloidchemische Beihefte, Kolloid-zeitschrift, Larousse Mensuel, Das Literarische Echo, Literary and Theological Review, Literary Miscellany, London Mathematical Society Proceedings, La Lumière Électrique, Massachusetts Historical Society Proceedings, Mathematical Reviews, Mathematische Annalen, Mathematische Zeitschrift, Mathesis, Merchants' Magazine and Commercial Review, Messenger of Mathematics, Metallurgical and Chemical Engineering, Midland Naturalist, Mikrochemie, Mind, Mississippi Historical Society Publications, Mississippi Valley Historical Association Proceedings and Review, Modern Language Association of America Publications, Modern Language Review, Modern Philology, Monatshefte für Mathematik and Physik, Monist, Monthly Anthology and Boston Review, Monumenta Germaniae Historica, Mount Weather Observatory Bulletin, Municipal Affairs, Museum of Foreign Literature,

ANNOUNCEMENTS

Science and Art, Nation, National Electric Light Association Bulletin (New Series), National Municipal Review, National Society for the Study of Education Yearbooks, Natural History, Nature, Die Naturwissenschaften, Neophilologus, Neudrucke Deutscher Literaturwerke, New England Magazine, New Republic, New Shakspeare Society Publications, New York Review, New York Times Index, Niederländisches Archiv für Zoologie, Niles' Weekly Register, Nineteenth Century, Notes and Queries, Nouvelles annales de Mathématiques, Novitates Zoologicae, Oregon Historical Quarterly, Palaestra, Parasitology, Pedagogical Seminary, Pennsylvania State College Studies, Percy Society Publications, Philobiblion, Philosophical Magazine and Journal of Science, Philosophical Review, Philosophie Positive, Philosophische Monatshefte, Physical Review, Physical Society of London Proceedings, Physiological Abstracts, Physikalische Zeitschrift, Political Science Quarterly, Print Collectors' Quarterly, Progressive Education, Psychological Abstracts, Psychological Bulletin, Psychological Index, Psychologische Forschung, Psychometrika, Public Opinion (Washington), Punch, Quarterly Journal of Microscopical Science, Quarterly Journal of Pure and Applied Mathematics, Quarterly Review, R. Accademia dei Lincei Rendiconti, R. Accademia delle Scienze Fisiche e Matematiche (Naples) Atti, R. Accademia di Scienze Morali e Politiche (Naples) Atti, R. Accademia di Scienze, Lettere ed Arti (Padua) Atti (Nuova Seri), R. Accademia Lucchese di Scienze, Lettere ed Arti Atti, R. Scuola Normale Superiore (Pisa) Annali, Raccolta d'Opuscoli Scientifici e Filologici, Recueil des Travaux Chimiques des Pays-Bas, Reliquary, Review of Applied Entomology, Series B, Review

THE RICE INSTITUTE

of Bacteriology, Protozoology and General Parasitology, Revue de Mathématiques Spéciales, Revue de Paris, Revue de Philosophie, Revue de Synthèse Historique, Revue des Deux Mondes, Revue Générale de l'Électricité, Revue Historique, Revue Moderne, Revue Musicale, Revue Philosophique de la France et de l'Étranger, Revue Politique et Parlementaire, Revue Semestrielle des Publications Mathématiques, Rivista di Filosofia e Scienze Affini, Romanic Review, Royal Historical Society Transactions, Royal Microscopical Society Journal, Royal Society of London Philosophical Transactions and Proceedings, Royal Society of Medicine Proceedings, Royal Society of Tropical Medicine and Hygiene, School and Society, School Review, Science, Science Abstracts, Scientific Monthly, Scottish Text Society Publications, Select Journal of Foreign Periodical Literature, Sleeping Sickness Bureau (London) Bulletin, Smith College Studies in History, Social Hygiene, Società Entomologica Italiana Memorie, Société Chimique de France Bulletin, Société de Biologie Comptes Rendus, Société de Pathologie Exotique (West Africa) Bulletin, Société l'Histoire de France Annuaire Historique, Société Mathématique de France Bulletin, Society for the Promotion of Engineering Education Proceedings, Society of Chemical Industry Journal, Soil Science, Southwestern Historical Quarterly, Southwestern Political and Social Science Quarterly, Southwestern Reporter, Strand Magazine, Studien zur vergleichenden Literaturgeschichte, Studio, Temple Bar, Texas Folklore Society Publications, Texas Law Review, Texas Supreme Court Reports, The Times Weekly (London), Tropical Diseases Bulletin, Tropical Veterinary Bulletin, United States Bureau of American Ethnology Annual Reports,

ANNOUNCEMENTS

United States Daily, United States National Advisory Committee for Aeronautics Annual Reports, United States Supreme Court Reports, Unpopular Review, Vierteljahrsschrift für Wissenschaftliche Philosophie und Soziologie, Virginia University Philosophical Society Scientific Section Transactions, Washington Academy of Science Journal, Washington Academy of Sciences Proceedings, Wilhelm Roux' Archiv für Entwicklungsmechanik der Organismen, Wisconsin Academy of Sciences, Arts and Letters Transactions, World's Work, Yale Review (New Series), Yellow Book, Zeitschrift der Savigny-Stiftung für Rechtsgeschichte, Zeitschrift für Analytische Chemie, Zeitschrift für Angewandte Chemie, Zeitschrift für Angewandte Mathematik und Mechanik, Zeitschrift für Anorganische Chemie, Zeitschrift für Elektrochemie, Zeitschrift für Exacte Philosophie, Zeitschrift für Geophysik, Zeitschrift für Geschichtliche Rechtswissenschaft, Zeitschrift für Instrumentenkunde, Zeitschrift für Kristallographie, Zeitschrift für Mathematik und Physik, Zeitschrift für Physikalische Chemie, Zeitschrift für Psychologie und Physiologie der Sinnesorgane, Zeitschrift für Wissenschaftliche Insektenbiologie, Zeitschrift für Wissenschaftliche Photographie, Zoologica, Zoological Bulletin, Zoological Record, Zoological Society of London Proceedings, Zoologischer Anzeiger, Zoologischer Jahresbericht.

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

THE RICE INSTITUTE

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 275×56 feet, connected with a large lecture amphitheater 121×72 feet. The main building contains four large students' laboratories, two lecture rooms equipped for giving illustrated lectures, and four research rooms, two dark rooms, a library reading room, 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 100 Edison storage cells of 300 ampere-hours' capacity has been installed, 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, liquid air plant, constant temperature rooms, a preparation room, a large dark room, a fully equipped workshop, and a students' 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

ANNOUNCEMENTS

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 two hundred ammeters and voltmeters of all types, including a Kelvin gauge reading up to 30,000 volts and standard Weston instruments. About fifty 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 large electromagnet with poles 20 cms. in diameter, a large Pye magnet, a large cobalt steel permanent magnet, 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. Several modern X-ray generators are available for research work. For work in heat, electrical furnaces, various types of radiation pyrometers, resistance thermometers, and standard thermocouples are available. The equipment includes a supply of radium, radiothorium, and polonium for work on radioactivity. For work on nuclear physics a 200,000 volt d. c. source and a 2,000,000 volt generator are available. Also automatic cloud expansion chambers for photographing proton and other tracks. An Eötvös torsion balance is available for work in

THE RICE INSTITUTE

geophysics. This machine was the gift of Mr. Robert McM. Gillespie of New York City. The apparatus for general work includes rotary 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 library contains all important textbooks, works of reference, and complete sets of journals.

The laboratories for chemistry and chemical engineering are housed in a three-story building of maximum rectangular dimensions of 307 and 181 feet, with ample attic and basement accommodations, built around several open courts facing the south. Of brick and stone, steel and concrete construction, the building embodies the prevailing architectural beauty and simplicity of technical plan exhibited in the earlier science laboratories of Rice. Provision is made for adequately equipped, separate laboratories both for research and instruction in the half-dozen major branches of chemistry and chemical engineering, with an even larger number of smaller laboratories for corresponding work in the more highly specialized subjects of the science. In all the laboratories there is an abundance of natural light, while an elaborate system of artificial ventilation removes all fumes through a central draft tower, so designed as to constitute of itself one of the architectural features of the building. Careful consideration has been given both to the anticipated growth of the institution and the normal development of the department. The plans thus studiously prepared may bear comparison with those of extensive establishments erected recently at other universities and

ANNOUNCEMENTS

scientific centres of the country. The department is well equipped with modern apparatus and materials for research and for lecture room and laboratory work in inorganic, organic, analytical, physical, colloid, electro-, physiological, and industrial chemistry, and chemical engineering. Some of the more special apparatus includes two General Electric X-ray diffraction units, a Seemann X-ray diffraction analysis apparatus, a Seemann electron diffraction apparatus with high voltage supply consisting of a constant potential kenetron rectifying unit operated from a motor-generator, two Philips-Metalix crystal analysis units, an X-ray diffraction camera for colloidal solutions, an X-ray diffraction camera using focused monochromatic x-radiation, recording photo densitometer, Moll recording microphotometer, Mattson Cataphoresis apparatus, Hilger X-ray spectrograph, Zeiss auto collimating spectrograph, Zeiss and Bausch and Lomb ultramicroscope outfits, Zeiss interferometer, refractometer, Leitz micro- and macro-motion photographic outfit, complete facilities for developing and projecting motion pictures, Reichert metallographic microscope, quadrant electrometer, Leeds and Northrup type K potentiometers, Youden capillary glass electrode hydrogen ion apparatus, Coleman glass electrode pH electrometer, Beckman glass electrode acidimeter, Richard's high pressure compressibility apparatus, special research laboratory for atomic weight determinations, Sharples super-centrifuges, porcelain basket type centrifuge, specially designed thermostats for precise solubility determinations over wide temperature ranges, Pregl micro-analytical outfits including several Kuhlman balances, Bruun 100-plate bubble-cap fractional distillation apparatus complete, basal metabolism appa-

THE RICE INSTITUTE

ratus, experimental double effect Swenson evaporator with vertical and horizontal effects, Buflovak standard vacuum shelf drier, Sperry plate and frame and Kelly filter presses, experimental humidification, dehumidification, and air conditioning apparatus, 15-plate Stokes experimental fractionating column and distillation apparatus complete, equipment for crushing and grinding including jaw, roll, disc, and ball mills, Tyler screening equipment, heat and fluid flow equipment, experimental rotary dryer, experimental cabinet dryer, stoneware packed absorption tower, adsorption tower, flotation unit, spiral scraper thickener with "Lightnin" direct-drive mixer, Pyrex flanged-pipe hydraulic separator with Jeffrey-Traylor electric vibrator feeder, Kane gas fired automatic steam boiler, Sargent calorimeter. Orsat flue gas apparatus, throttling calorimeter, stoneware suction filter, water softening and water treating equipment, gas and electric furnaces, etc. 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 textbooks on the different branches of chemistry and chemical engineering. 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 has laboratories capable of seating one hundred and fifty students; lecture rooms with lantern for microscopic and other forms of projection; research rooms, preparators'

ANNOUNCEMENTS

room, store rooms, etc. Undergraduate courses of cultural nature are offered for academic students, and more technical courses for premedical and physical education students. Laboratory work is available in almost all of the courses, and modern and fully equipped microscopes are provided. Facilities are available for advanced research work in such subjects as parasitology, bacteriology, entomology, physiology, genetics, and ecology. The department is also equipped with an extensive series of specimens, casts, and charts for the study of zoology. Binocular microscopes, microtomes of various kinds, thermostats, embedding baths, and considerable accessory equipment, including physiological apparatus, are available for research work. Most of the important current zoological periodicals are to be found in the library.

The psychological laboratory at present occupies six rooms on the first floor of the chemical laboratory adjoining the large lecture hall of that building. The equipment consists of the apparatus necessary for the laboratory exercises and demonstrations in an advanced course in human experimental psychology. A number of instruments suitable for research are available, and more apparatus is being added for research as needed. A large dark room is provided for experiments on vision.

The department of architecture is located on the second floor of the chemistry laboratory, and is equipped with large general drafting rooms modern in all their appointments, and a large studio for freehand drawing and watercolor. The library of architecture adjoins the drafting rooms and is equipped with the standard architectural publications necessary for reference and research, current files of

THE RICE INSTITUTE

architectural periodicals, plates, photographs, and lantern slides. The freehand studio is well equipped with plaster casts from the antique and examples of historic ornament. The department also possesses models for elementary instruction and models for the teaching of construction.

The drafting rooms for instruction in engineering drawing are located in the mechanical laboratory building and its annex. These rooms are equipped with drawing tables, lockers, and racks in such number that all students may work independently. Special equipment includes blue printing machines, universal drafting machines, parallel attachments, folding and rolling parallel rules, ellipsographs, beam compasses, section liners, and an 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 the A. Lietz Company. 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, and calculating machines. The materials testing laboratory of this depart-

ANNOUNCEMENTS

ment is equipped with one 50,000 pound Riehle universal machine; one Olsen 15,000 pound universal machine; one 100,000 pound Olsen universal machine; one 200,000 pound Olsen universal machine; and one 60,000 inch-pound Riehle torsion machine; a Riehle standard paving brick rattler; a Riehle two-gang Deval abrasion machine; a Bureau of Standards flow table; suitable equipment for tension tests of belting; also an Olsen-Boyd 1000 pound automatic briquette testing machine; a Tyler Ro-tap testing sieve shaker, and the necessary auxiliary apparatus for making the usual tests. All of these machines except the cement testing machine are operated by directly connected individual motors so as to avoid all shafting and belting. The hydraulics laboratory is equipped with a Worthington 200 gallon per minute, 100 ft. head volute centrifugal pump with a direct connected slip ring motor; a simplex Venturi meter; trapezoidal, triangular, and rectangular weirs; a Pelton-Doble impulse turbine; a Gould ram; storage reservoir; overhead calibrated tank; and necessary gauges and other usual equipment. It is planned to add from time to time such additional equipment as is necessary for tests by advanced students and for research.

The equipment of the electrical engineering laboratory is ample for a thorough study of direct and alternating current circuits and machines. All the common types are represented and some of the less usual. In some of the types, older machines may be compared with the more modern and the trend of development noted. There are examples of the practice of each of the leading manufacturers, including Crocker-Wheeler, Holtzer-Cabot, Roth, Sprague, Western Electric, General Electric, Westinghouse, Wagner, Robbins

THE RICE INSTITUTE

and Myers, Commercial, Electric Manufacturing Company, Fairbanks-Morse, Kuhlman Electric, Pittsburgh Transformer, Roller-Smith, Condit, Cutter, Cutler-Hammer, Ward-Leonard, Jewell, Biddle, Leeds-Northrup, and Weston. Among the direct current machines are generators rated: 50 kilowatts 250 volts; 35 kilowatts 250/125 volts (three wire); two alike, 5 kilowatts 125 volts, for parallel operation either flat- or over-compound; 5 kilowatts 110 volts; $4\frac{1}{2}$ kilowatts 125 volts flat-compound; $3\frac{1}{2}$ kilowatts 125 volts flat-compound; 1 kilowatt 500 volts; 4 kilowatts 8 volts (500 amperes) with Tirrill regular; $1\frac{1}{2}$ kilowatts 2000/1200/800 volts; a set of three direct-connected machines for 90/150 and 20/25 volts direct current and 90/110 volts three-phase 170/250 cycle alternating current; and motors rated: 25 horse-power 250 volts (compound); 5 horse-power 500 volts (old type); two alike, 13 horse-power 230 volts; 10 horse-power, $7\frac{1}{2}$ horse-power, 2 horse-power, all shunt wound for 230 volts; 3 horse-power 230 volts, variable speed; 4 horse-power 220 volts, series. The alternating current equipment includes: a 60 horse-power 2300 volt synchronous motor, with push button starter, direct coupled to two 25 kilovolt-ampere 220 volt 3-phase alternators; two phase-displacement sets, one consisting of two identical $7\frac{1}{2}$ kilovolt-ampere, 220 volt, 1-2-3-6-phase synchronous generators, with shifting stators, which may be direct connected or operated without mechanical connection, the other similar, except that the generators are 15 kilovolt-ampere and one is mounted for use as a cradle dynamometer; a 5 kilovolt-ampere 220 volt 3-phase synchronous generator with distributed field (round rotor); a 4 kilovolt-ampere 3-phase 110 volt 200 cycle generator; a $7\frac{1}{2}$ horse-power

ANNOUNCEMENTS

3-phase squirrel cage induction motor; a 5 horse-power 3-phase slip ring induction motor with controller; another of the same rating with starter; a 10 horse-power induction motor with internal starting resistance; a $7\frac{1}{2}$ horse-power Fynn-Weichsel 3-phase motor; a $7\frac{1}{2}$ horse-power unity power factor single-phase motor; a 3 horse-power 220 volt single-phase condenser type motor; a 50 horse-power induction motor with internal starting resistance; a 50 kilovolt-ampere synchronous motor; three 2 kilovolt-ampere and six 3 kilovolt-ampere 110/220:110/220 volt transformers; two 3 kilovolt-ampere 460/230:230/115 volt 3-phase transformers of the shell type; six 5 kilovolt-ampere 110/220 volt transformers with taps for Scott and other connections; three 10 kilovolt-ampere 2300/440/220 volt transformers. Of particular interest are: a 15/35 horse-power oil field induction motor with control equipment; a 25 horse-power 250 volt cradle dynamometer; a dynamotor operated from a 110 volt direct current supply and delivering 18 amperes at 110 volts 500 cycles; two synchronous converters or double current generators, one compound wound and with commutating fields, rated 10 kilowatts 250 volts direct current 1-3-4-6-phase, the other of the split or regulating pole type, rated 8 kilowatts 110 volts 1-3-4-phase; a six anode grid controlled metal tank mercury arc rectifier, rated 12.5 kilowatts 250 volts; a set consisting of two direct connected induction motors, one 10 horse-power 1200 rev. per min. slip ring type, the other $5/10$ horse-power 600/1200 rev. per min. squirrel cage type, for cascade operation at several speeds; three 220 volt 3-phase induction regulators for raising or lowering voltage 100 per cent, of 15, 13, and 10 kilovolt-ampere capacity, respectively; a 1 kilovolt-ampere

THE RICE INSTITUTE

20 volt phase advancer; a 3 kilovolt-ampere 30,000 volt oil testing transformer; an oscillograph equipped for taking either rectangular or circular records. Miscellaneous apparatus includes: condensers for power-factor correction; reactances, both air and iron core; rheostats; and starting devices. Meters are available for making any reading likely to be needed and include voltmeters (a. c. and d. c.), ammeters (a. c. and d. c.), wattmeters (single-phase and poly-phase), current and voltage transformers, power-factor meters, frequency meters, watt-hour meters, tachometers, stroboscopes, and a synchroscope. For checking and calibrating these instruments there is an assortment of precision instruments, including a potentiometer and laboratory standards. Included in the equipment of the communications laboratory are: a 20 to 10,000 cycle beat frequency oscillator; a 7 to 70,000 cycle oscillator; a 35 to 50,000 cycle oscillator; an artificial line; transmission measuring sets; a comparison vacuum tube voltmeter; a standard signal generator; two telephone repeaters; bridges including a precision capacity bridge; a 1 kilowatt short wave radio transmitter; a 5000 volt, one ampere power supply; radio receivers; radio frequency oscillators; dummy antennae; cathode ray oscillographs; attenuation networks; wave analyzer; a Fairchild recorder and associated apparatus; and instruments necessary to measure the quantities desired.

The mechanical engineering laboratory equipment falls into seven general classes: steam, internal combustion, hydraulic, air, refrigeration, fuel, metallurgical, and lubricants testing machinery. 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

ANNOUNCEMENTS

gear, two 6×7 vertical engines, and a 7×10 horizontal slide-valve engine, all with Prony brakes; a 6×4×6 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 16 horse-power Lee impulse turbine driving a two-stage centrifugal pump; a 4 kilowatt Turbolite turbo-generator unit; a steam turbine nozzle arranged for experimental work; a similar equipment for calibration of steam orifices; a Westinghouse locomotive type air-compressor arranged for economy test; a demonstration set-up of standard air-brake equipment; an air-lift pump model; a 205 cubic foot Ingersoll-Rand 2 stage steam driven air compressor; and a 6×10×6 vertical compound Sturtevant engine. The machines are piped to exhaust either into the power-house stack or into four surface condensers served by circulating and wet vacuum pumps and a steam jet ejector.

Internal combustion engines are represented by an ethyl series 30 knock testing engine, with bouncing-pin equipment; a 39 horse-power Waukesha Hesselman oil field type oil engine; 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 gas, kerosene, or gasoline as fuel; a 3 horse-power Novo gasoline engine; Hall-Scott, Lawrance, Union, and Wright aeronautical engines; Chrysler, Ford V-8, and Willys-Knight automobile engines; and a Chevrolet automobile engine with water-brake load. High speed automobile and aeroplane engines are tested with a 100 horse-power Sprague cradle dynamometer equipped with slotted bed-

THE RICE INSTITUTE

plate, gasoline metering device, and adjustable engine supports. A Hopkinson optical indicator with photographic attachment is also provided. The refrigerating equipment includes a motor-driven 3-ton York compression machine with double-tube condenser, shell brine-cooler, brine-heater, and brine-pump. 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 steam turbine driven 200 g.p.m. two stage centrifugal boiler-feed pump; a concrete storage cistern; four Venturi meters; a single tube manometer; a steam pulsometer; two weir boxes and notches; 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; a Navy type oil endurance testing machine; Bureau of Mines and Cleveland flash point testers; Conradson carbon residue equipment; hydrometers and specific gravity apparatus; a Junker type gas calorimeter; platinum ware, drying oven, ball mill, etc.

Boiler tests are made on a 20 horse-power vertical fire tube boiler equipped with the necessary pumps and weighing equipment. Tests of heat-treated steel may be made with the aid of the several electric and gas furnaces, pyrometers of electric, expansion, optical, potentiometer, and gas pressure types, scleroscope, Rockwell, and two Brinell ball machines. A metallurgical microscope with specimen grinders, camera, and the usual accessories is available, also three Huggenberger tensometers.

ANNOUNCEMENTS

In addition, the laboratories contain a Morley fan-draft cooling tower, a Sirocco blower driven by a calibrated motor, a plate blower, Pitot tubes, orifices, air Venturi meter, large and small gas meters, anemometers, injectors, dead weight pressure gauge testers, mechanical and neon stroboscopes, a heat-insulating test equipment, thermometer calibration apparatus, hoists, tachometers, steam calorimeters, the most popular gas and steam engine indicators, planimeters, standard gauges and thermometers. An insulated chamber with calibrated nozzle allows tests of the steam and gas-fired unit heaters available. For classroom demonstrations, a Cussons valve-setting model, 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. Six drafting machines are lent to Senior students.

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 eighteen 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 Prentice motor-driven 15×6 lathe; one Flather motor-driven 14×5 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; a Monarch 14×5

THE RICE INSTITUTE

motor-driven quick-change lathe; one 16×6 Sidney, one 15×5 Carrol-Jamieson, two 13×5 South Bend, one 13×5 Regal, and one 14×6 Rockford lathes, each motor-driven and with taper attachments; 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-geared Rockford shaper with compound head, and a 22×22×8 foot Gray planer. All kinds of plane surfaces can also be cut upon two Kemp-smith, two Van Norman, and two Cincinnati 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. One Kempsmith machine is supplied with a universal milling attachment. Two motor-driven universal grinders (LeBlond and No. 12 Brown and Sharpe), and a Greenfield cutter grinder serve as practical examples of high-class precision machine tools. A graphical watt-meter permits tests of tool shapes and machinery conditions. A tilting brass-furnace, core oven, moulders' benches, wood lathes, band saw, jointer, sander, and the necessary small tools provide for simple pattern and foundry work. The metallurgical furnaces and equipment listed with the mechanical laboratory apparatus are also available for shop use. For miscellaneous work, a double-disc motor-driven disc grinder, a power oil-stone, work benches and vises, two hand-tool grinders, a power hack-saw, down-draft forges, a 20-inch drill-press, a sensitive drill, an arbor press, an air hammer, air and electric drills, portable electric grinders, a 100 pound Smith acetylene generator, twelve complete oxy-acetylene welding outfits, and four electric arc welders (G. E. and Lincoln) are available. A sufficient supply of small

ANNOUNCEMENTS

hand and machine tools, lathe sets, reference standards and precision measuring instruments is issued on checks from a separate tool-room. About half the machine tools have individual motor drive. The others are grouped about a line-shaft and a 15 horse-power motor.

STUDENT ORGANIZATIONS

FROM the opening days of the Rice Institute the students have participated in the various forms of intramural and intercollegiate athletic contests, with the coöperation of the Committee on Outdoor Sports. Of other student organizations, the first society actually to be formed was the Young Men's Christian Association. This step on the part of the young men was speedily followed by a similar one 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 place, was followed in the course of the early years by the forming of several literary societies: three by the young women, the oldest society bearing the name of Elizabeth Baldwin, wife of the founder of the Institute, a later organization known as the "Pallas Athene Literary Society," and the youngest, named the "Owen Wister Literary Society"; and three by the young men, known respectively as "The Owl Literary Society," 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 leading public issues as they arise before Congress. Under the auspices of these first literary

THE RICE INSTITUTE

societies the first of the undergraduate periodical publications was undertaken, namely, "The Thresher," which appeared fortnightly from its initial number in January, 1916, to June, 1918, and has been published weekly since. 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, one of the earliest of these being the Engineering Society, which was started in 1914, and which in recent years has been conducting as a student enterprise the biennial Rice Engineering Show, a public exhibition of the activities of the engineering and science laboratories. The students also maintain active local student branches of the several national engineering societies. The student body is organized into a Students Association which serves as the official organ for the expression of student opinion and for the promotion of student enterprises; in particular, the undergraduate publications are now maintained under its auspices. A Students Council, elected by the Association, provides leadership in the Association. The president of the Association is president of the Council. The halls of residence for men are governed by a student Hall Committee, under the general supervision of the Dean.

Mr. William M. Rice, Jr., has provided a cabinet for the

ANNOUNCEMENTS

preservation and exhibition of trophies won by Rice teams in 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.

Through the generosity of the late Mrs. James L. Autry, as a memorial to her husband, the late James L. Autry, of Houston, the Diocese of Texas of the Protestant Episcopal Church is maintaining in the immediate vicinity of the Rice Institute, Autry House, as a social and religious center. The corner stone of Autry House was laid during the commencement ceremonies of the Class of 1921. To this community group of the Episcopal Church, Mrs. E. L. Neville, of Houston, in memory of her brother, the late Edward Albert Palmer, has contributed the beautiful Edward Albert Palmer Memorial Chapel, which was dedicated November 27, 1927. All the opportunities of these establishments are available to the students of the Rice Institute irrespective of religious affiliation. Other religious bodies have intimated that they are considering future provision for similar undertakings in the neighborhood of the Rice Institute.

Through personal association with several generations of Rice students, Mr. George Cohen, of Houston, was led to make generous provision for the Robert and Agnes Cohen House in honor of his parents, for long years well-known and highly respected citizens of Texas. This beautiful building, constructed in the materials and architecture of the first of the Rice quadrangles, designed to afford to the faculty the advantages of a club-house on the campus, was dedicated at the Annual homecoming meeting of the Association of Rice Alumni on Thanksgiving Day of the year 1927.

TWENTY-SIXTH
ANNUAL COMMENCEMENT

TWENTY-SIXTH ANNUAL COMMENCEMENT

DEGREES IN COURSE CONFERRED

JUNE 9, 1941

At the twenty-sixth annual commencement convocation of the Rice Institute held at the conclusion of the twenty-ninth academic session, the baccalaureate sermon was delivered by A. Frank Smith, D.D., LL.D., President of the Council of Bishops of the Methodist Church, and the commencement address was delivered by Isaiah Bowman, Ph.D., Sc.D., LL.D., President of the Johns Hopkins University.

On the recommendation of the Faculty and by the authority of the Trustees, the President of the Rice Institute, at the final ceremonies in the Academic Court on the morning of June 9, 1941, conferred the following degrees respectively:

BACHELOR OF ARTS

Burt Thorning Angell	Frances Eva Bass—with
Barbara Louise Archer	distinction
John Kenneth Stuart	Sarah Anne Behr
Arthur	Nicholas Joseph Bellegie—
Leon Trotzky Atlas	with honours in Biology
Elsie Juanita Barabash	Bennie Nanette Berry

THE RICE INSTITUTE

Alvin Beyer, Jr.	Robert Edward Fowler
Judy Ellen Biossat	James Byrne Francis
Hugh Cleon Black—with distinction	John Clinton Freeman, Jr.
Joe Wilmeth Blagg	Marion Settegest Frost
Mary Kathleen Braden	Edward Wilson Fry—with distinction
Robert Loren Brandon	Marjorie Louise Fulks
Cathryn Aileen Breit	Betty Marion Gartner
William Edgar Bremer, Jr.	Stanley Stuart Gillis—with distinction
Elizabeth Butler—with distinction	Louis Joseph Girard
Lee Wesley Capps, Jr.	Hugh Ernest Gragg
Joseph John Carter, III	Archie Edward Groff— with distinction
Catherine Virginia Cashman	Marietta Clare Hannon
Charles Soon Chan—with distinction	Mildred Hargrove
Berry Chandler	Mary Patricia Helton
Monroe George Cheney, Jr.	Emeronce Murentine Heyne
Tyler Thatcher Clark	Claud Edwin Highsmith
Carolyn Conway	James Felter Hogg—with honours in Chemistry
Vincent Frederick Cowling	Marjorie Olga Hogge
James Hartwell Craddock	Dorothy Holmes
Harriet Claire Cuenod	Anne Frances Holt
Lucy Lillian Love Doyle	Harry Lewis Holt
Bedford King Duff	Marjorie Cary Holt
Charlotte Mae Murdock Dunn	Francis T. Nicholas Hood, Jr.
Marion Albert Floyd	Frederick Albert Horner
Frank Goss Ford	Betsy Jane Jameson
Frances Lansden Bishop Fowler	Patricia Spaulding John

ANNOUNCEMENTS

Mary Elizabeth Johnston	Ruth Minton
Mary Celeste McAshan Jones	Marjorie Emeline Moeller
Martha Joanne Storm Julian	Wiley Cooper Mohrmann
William Howard Keenan	Kirby Dayle Monroe
Bernard Fred Kessler	Emily Katharine Montgomery
Joseph Willis Kopecky	John Rayburn Mooney
Kenneth Otto Ladig	Shirley Edith Moskowitz
Charlotte Janice Lehmann	Irl Holden Mowery, Jr.
Jane Procter Leigh	Helen Johanna Elizabeth Muller
Gustave Aaron Linenber- ger, Jr.—with honours in Physics	William Maston Murphy, Jr.
Robert Warren Long	Mary Evelyn Nelson
Vera Estelle Luce	Joan Nichols
Flora Olivia Jackson McCants	Marshall Edward Parker
Grace Ellen McIntyre	Marjorie Maxine Parsons
William Merrill McLamore —with honours in Chemistry	Mildred Aleene Parsons
Gertrude Anita Maas	Billie Bess Whatley Pattie
Johanna Katherine Mans- feld	Josephine Lloyd Perkins
John Marvin Marshall, Jr.	Robert Browning Perkins
Robert Gerald Marshall— with honours in French	Mary Elizabeth Petrie
Georgia Gertrude Miller	Lida Means Picton
James Pinckney Miller	Dorothy Isabell Pike— with honours in English
Hugh Wellington Millis	Charlotte Anne Pope
	Leah MacAllen Powell
	Neely Laura Procter
	Adair Wynne Reynaud— with honours in French
	James Robert Richardson, Jr.

THE RICE INSTITUTE

Ed Davis Roberts—with distinction	William Frederick Sorsby
James Augustus Rosborough	Charles Morgan Stamey Roderick Alexander Stamey, Jr.
Jerome Lee Rosenbloom	Annie Laura Stone
Louise Beraud Roser	Helen Claire Sullivan— with distinction
Nealie Edward Ross, Jr.	Zylla Alcinda Swartz
William Earl Ross, Jr.	Walter Stout Symonds, Jr.
Moses Maimon Rudy	Frank Heckford Taylor
Henry Leon Runnels	Gloria Van Pelt
John Seay Sandifer, Jr.	Ernest Lee Vogt, Jr.
Albin Francis Sartor, Jr.	Dennis Michael Voulgaris
Margaret Ellen Schiller— with honours in English	Fred Moon Wallis
Jessie Bell Schmidt	John Whalen
Edward Schulenburg	Roland Livesay White
Bonnie Elloise Mohr Scott	Mary Ellen Buchanan Whiteside
Maurice Seliger	Evelyn Louise Williams
Warren Candler Simpson	Herschel Rutherford Winslett
Betty Jane Sims	Marion Starnes Wright, Jr.
Marian Sinclair	Frank Edgar Zumwalt, Jr.
Bruce Monarch Smith	
Martha Clark Smith	

BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING

Howell Redus Appling, Jr.	David Duncan Dawson, Jr.
Paul Davidson Bybee, Jr.	Gilbert Francis Gruenke
William Hodge Caraway	Gilbert Lee Heidler, Jr.
Jimmy Tobin Carney	Kenneth King Keneaster
Houston Norvel Clark	Samuel Isadore Kohen

ANNOUNCEMENTS

Norman Albert Koneman, Jr.	Ralph Mason Pritchett
Robert Marshall Love, III	William Parker Redmond
Robert LeRoy Magovern	Keith Ellis Rumbel—with distinction
George Edward Martin— with distinction	Guy Fremont Salisbury
John Raymond Martin	Eli Schaffer
Charles Sedwick Matthews	Charles Zachary Scheps
—with distinction	Haskell Sheinberg
Dick Seale Mattiza	Brooke Blackburn Smith
James Nathaniel Miller	John Walter Steck
Nicholas Peter Peet—with distinction	Willis Taylor Stewart, Jr.
	John Winfred Talbert
	Harris LeRoy Taylor
	William David Van Vorst

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

Walter James Austin	Joseph Archie Sale
Olney Joseph Dean, Jr.	James Redding Sims

BACHELOR OF SCIENCE IN ELECTRICAL ENGINEERING

Carden Lamar Jenkins	Everett Cavett Whatley, Jr.
James Beverly Owens	Albert George Wilson— with distinction
Ross Orville Parker, Jr.	Robert Edward Zagst
Earle Bayne Reese	
George Harry Thomen	

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

Jack Almeron Amerman	Harry U. Crissman
Paul Richard Bock	Walter Elsworth Cubberly, Jr.
Campbell Marmion Carothers	James Joseph Duffy

THE RICE INSTITUTE

Charles David Ehrhardt, Jr.—with distinction	Burton Thompson Mast
Roger Quarless Fields	William Rambo Mercer
Ray Munn Fitzgerald, Jr.	Vaughan Benjamin Meyer
Warren Gillespie, Jr.	Harold Edwin Murphree, Jr.—in absentia
William Dwight Hilborn	Obert Layne Nordin
Vincent Carl Horner	William Frederick Phillips
Herbert Brooks Jackson	William Gentry Robbins, Jr.
Carl Owen Jones	Maurice Carrol Sullender
Leo Paul Kleiber	Henry Herman Urech
John Edward Loeffler, Jr.— with distinction	

BACHELOR OF SCIENCE IN PHYSICAL EDUCATION

Livingston Gardner Bassett	William Patrick McGarahan
Frank Willis Carswell	John Warren Morris, Jr.
George William Cline	Fred Woodrow Pepper
John Earl Glassie, Jr.	Edward Lee Singletary
Durwood Stokes Green	Joe Franklin Staley
Fred Lilburn Hartman	James Douglas Tipton
Louis Kunetka	Richard Horace Vestal
Joseph Bloomfield McCue	Kenneth Moody Whitlow
Fred Arrington Wolcott	

BACHELOR OF SCIENCE IN ARCHITECTURE

Raymond Hector Brogniez	Anthony Graham Scott
Richard Taylor Hanna, Jr.	Adolph Dietrich Stuermer
Alonzo August Leifeste, Jr.	Charles Fitzsimon Sullivan
Leon Blum Wootters	

ANNOUNCEMENTS

ELECTRICAL ENGINEER

Donald Lewis Hall

MASTER OF SCIENCE IN CHEMICAL ENGINEERING

Sam Rice Bethea

Ervon Jacob Henry

Eggimann

MASTER OF ARTS

Reba Alice Beeler

George Piranian

John Dietrich Bland

Knud Christian Poulsen

Evin Lee Cook

William Robert Purcell

Thomas Franklin Glass, Jr.

Floy King Rogde

Charles Earle Mandeville

Matthew Linzee Sands

Armin Guschel Wilson

DOCTOR OF PHILOSOPHY

James Douglas Bankier

Henry Francis Dunlap

John Bertram Bates

Price Bush Elkin

James Fred Denton, Jr.

James Holmes

James Curtiss Schiller

THE RICE INSTITUTE

SCHOLARSHIPS AWARDED FOR 1941-42

THE GRAHAM BAKER STUDENT

Coralie Rose Durno McConnell, Class 1942, of Houston,
Texas

HONOURABLE MENTION FOR THE GRAHAM BAKER STUDENTSHIP

(Alphabetical)

Henry Ernest Baumgarten, Class 1943, of Houston, Texas
Robert Dilworth Bonner, Class 1943, of Fort Worth, Texas
Aubrey Meyer Farb, Class 1942, of Houston, Texas
Mayer B. Goren, Class 1942, of Dallas, Texas
Marion Joseph Greve, Class 1942, of Houston, Texas
Howard Edward Taylor, Class 1942, of Fort Worth, Texas
Ann Tuck, Class 1943, of Houston, Texas
Aline Leonie van Meldert, Class 1942, of Baytown, Texas
James Benjamin Walker, Class 1943, of Dallas, Texas

THE HOHENTHAL SCHOLARS

(Alphabetical)

Patricia McAlpin Crady, Class 1943, of Fort Worth, Texas
Anna Louise Fox, Class 1942, of Houston, Texas
Mayer B. Goren, Class 1942, of Dallas, Texas
John Alexander Graves, III, Class 1942, of Fort Worth,
Texas
George Harold Hacke, Class 1944, of Tomball, Texas
Nat Wetzel Krahl, Class 1942, of Houston, Texas

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

Mary Elizabeth Baxter, class 1944, of Houston, Texas

ANNOUNCEMENTS

THE ELLEN AXSON WILSON SCHOLAR

Ann Tuck, Class 1943, of Houston, Texas

THE ELIZABETH BALDWIN LITERARY SOCIETY SCHOLAR

Raymond Hamilton Skaggs, Class 1942, of Houston, Texas

THE PALLAS ATHENE LITERARY SOCIETY SCHOLAR

Reta Wagner, Class 1942, of Houston, Texas

THE DANIEL RIPLEY SCHOLARS

(Alphabetical)

William Lamar Davis, Jr., Class 1944, of Houston, Texas

Ralph Vernon Ford, Class 1944, of Houston, Texas

THE JUNIOR ENGINEERING SCHOLAR

Jennings Alvin Massingill, Class 1942, of Houston, Texas

THE EDITH RIPLEY SCHOLARS

(Alphabetical)

Mary Aileen Norton, Class 1944, of Houston, Texas

Mary Louise Smith, Class 1942, of Houston, Texas

Lura Margaret Turner, Class 1942, of Houston, Texas

THE MARY PARKER GIESEKE SCHOLAR

Charles William Daeschner, Jr., Class 1942, of Houston,
Texas

THE THOMAS AUBREY DICKSON AND PAULINE MARTIN

DICKSON SCHOLARS

Alphabetical

Meador Dean Francis, Class 1944, of Abilene, Texas

Maurice Guinn Koneman, Class 1942, of Houston, Texas

THE RICE INSTITUTE

THE FRIENDS OF RICE SCHOLARS

(Alphabetical)

John Cabot McDonald, Jr., Class 1944, of Fallon, Nevada
Chester LeRoy Palmer, Class 1942, of Houston, Texas
Mitchell Olen Sadler, Class 1942, of Huntsville, Texas

THE CHAPMAN-BRYAN MEMORIAL SCHOLAR

Mary Frances Dunnam, Class 1942, of Houston, Texas

THE LADY WASHINGTON TEXAS CENTENNIAL AWARD

Bonnie Sue Wooldridge, Class 1944, of Houston, Texas

THE KATIE B. HOWARD SCHOLAR

Hazel Earle Cooksey, Class 1942, of Houston, Texas

THE SAMUEL S. ASHE SCHOLAR

William Russell McBride, Class 1943, of Houston, Texas

THE ENGINEERING ALUMNI SCHOLAR

Thomas Norman Whitaker, Class 1942, of Grapeland, Texas

THE THOMAS R. FRANKLIN AND JULIA H. FRANKLIN SCHOLARS

(Alphabetical)

Henry Ernest Baumgarten, Class 1943, of Houston, Texas
Robert Dilworth Bonner, Class 1943, of Fort Worth, Texas
Gordon Lake Bushey, Class 1943, of Mission, Texas
Arthur L. Draper, Class 1944, of Dallas, Texas
Hazel Wilma Dupre, Class 1942, of Houston, Texas
Hazel Roberta Gilstrap, Class 1943, of Gregory, Texas
Bob Gindratt, Class 1943, of Leona, Texas
Archie Hood, Class 1943, of Columbus, Kansas
Robert Henry Kyle, Class 1943, of McAllen, Texas

ANNOUNCEMENTS

Donald Davis Mitchell, Class 1943, of Corpus Christi, Texas
Burton Leroy Mobley, Class 1942, of Houston, Texas
Barbara Cecile Morrissey, Class 1943, of Bellaire, Texas
Patricia Mae Nyberg, Class 1943, of Houston, Texas
Howard Edward Taylor, Class 1942, of Fort Worth, Texas
Aline Leonie van Meldert, Class 1942, of Baytown, Texas
Katharine Louise Wakefield, Class 1944, of Houston, Texas
James Benjamin Walker, Class 1943, of Dallas, Texas

THE "R" ASSOCIATION SCHOLAR

Robert Edward Tresch, Class 1943, of East Cleveland, Ohio

THE LADY GEDDES PRIZE IN WRITING

Harold William Kincher, Jr., Class 1944, of Houston, Texas

THE WALTER B. SHARP FELLOW

(The award of the Walter B. Sharp Fellowship has been postponed.)

THE SAMUEL FAIN CARTER FELLOW

George Piranian, B.S. (Utah State) 1936, M.A. (Rice) 1941,
of Salt Lake City, Utah

THE WALSH SCHOLARSHIP IN ARCHITECTURE

Herschel Rutherford Winslett, Class 1941, of Dallas, Texas

HONOURABLE MENTION FOR

THE WALSH SCHOLARSHIP IN ARCHITECTURE

First Alternate: Hugh Ernest Gragg, Class 1941, of Dallas,
Texas

Second Alternate: Charles Soon Chan, Class 1941, of Hous-
ton, Texas

THE RICE INSTITUTE

THE TRAVELING SCHOLARSHIP IN ARCHITECTURE

John Dietrich Bland, B.S. (Spring Hill) 1937, B.S. in Architecture (Rice) 1940, M.A. (Rice) 1941, of Memphis, Tennessee

Alonzo August Leifeste, Jr., B.A. (Southwestern) 1934, B.S. in Architecture (Rice) 1941, of Houston, Texas

THE MARY ALICE ELLIOTT LOAN FUND FOR FOREIGN TRAVEL AND STUDY IN ARCHITECTURE

John Dietrich Bland, B.S. (Spring Hill) 1937, B.S. in Architecture (Rice) 1940, M.A. (Rice) 1941, of Memphis, Tennessee

Alonzo August Leifeste, Jr., B.A. (Southwestern) 1934, B.S. in Architecture (Rice) 1941, of Houston, Texas

LIST OF STUDENTS

1941-42

LIST OF STUDENTS

GRADUATE STUDENTS

- Black, Hugh Cleon* *Childress, Texas*
B.A., Rice, 1941
- Brunk, Hugh Daniel* *Geyserville, California*
B.A., University of California, 1940
- Chan, Charles Soon *Houston, Texas*
B.A., Rice, 1941
- Collins, Francis Albert, Jr. . *Houston, Texas*
B.A., Rice, 1939
- Cowling, Vincent Frederick* . *Mount Carmel, Illinois*
B.A., Rice, 1941
- Davis, Helen Johanna Elizabeth Muller*
. *Houston, Texas*
B.A., Rice, 1941
- Denman, Mary Claire *Lufkin, Texas*
B.A., University of Texas, 1941
- Evans, Robert Thomas* . . . *Fort Worth, Texas*
B.A., Texas Christian University, 1941
- Floyd, Marion Albert *Midland, Texas*
B.A., Rice, 1941
- Frost, Marion Settegast . . . *Houston, Texas*
B.A., Rice, 1941
- Gragg, Hugh Ernest *Dallas, Texas*
B.A., Rice, 1941
- Greer, Roy Benson *Galveston, Texas*
B.A., Rice, 1936

*Candidacy for advanced degree approved.

THE RICE INSTITUTE

- Holmes, Dorothy *Houston, Texas*
B.A., Rice, 1941
- Little, Robert Narvaez, Jr.* . *Houston, Texas*
B.A., Rice, 1935
- Long, Robert Warren* . . . *Houston, Texas*
B.A., Rice, 1941
- McLamore, William Merrill* *Shreveport, Louisiana*
B.A., Rice, 1941
- Mandeville, Charles Earle* . *Houston, Texas*
B.A., Rice, 1940
M.A., Rice, 1941
- Marsh, Nat Huyler* *Houston, Texas*
B.A., Rice, 1938
M.A., Rice, 1940
- Marshall, John Marvin, Jr.* . *Kingsville, Texas*
B.A., Rice, 1941
- Marshall, Logan Patton . . . *Houston, Texas*
B.A., Rice, 1922
- Marshall, Robert Gerald* . . *Houston, Texas*
B.A., Rice, 1941
- Matthews, Charles Sedwick* *Houston, Texas*
B.S. in Ch.E., Rice, 1941
- Moore, Donald Vincent* . . *Hastings, Nebraska*
B.A., Hastings College, 1937
M.A., University of Nebraska, 1939
- Muir, Andrew Forest* . . . *Houston, Texas*
B.A., Rice, 1938
- Piranian, George* *Salt Lake City, Utah*
B.S., Utah State Agricultural
College, 1936
M.A., Rice, 1941

ANNOUNCEMENTS

- Rector, James Knight . . . *Houston, Texas*
B.A., Rice, 1940
- Richards, Hugh Taylor* . . *DeRidder, Louisiana*
B.A., Park College, 1939
M.A., Rice, 1940
- Simpson, Warren Candler* . *Sulphur Springs, Texas*
B.A., Rice, 1941
- Smart, George Houston . . . *Waxahachie, Texas*
B.A., Trinity University, 1939
- Smith, Edgar Rollins Dumont* *Covington, Louisiana*
B.S., Tulane University, 1939
M.S., Tulane University, 1941
- Sykes, Lyde Gene *Houston, Texas*
B.A., Southern Methodist University, 1935
- Symonds, Walter Stout, Jr. . *San Antonio, Texas*
B.A., Rice, 1941
- Thron, Wolfgang Joseph* . . *Princeton, New Jersey*
B.A., Princeton University, 1939
- Van Vorst, William David . . *Houston, Texas*
B.S. in Ch.E., Rice, 1941
- Voulgaris, Dennis Michael . *Houston, Texas*
B.A., Rice, 1941
- Webster, Jackson Dan* . . . *Newark, California*
B.S., Whitworth College, 1939
M.S., Cornell University, 1941
- Wier, Thomas Percy, Jr.* . . *Houston, Texas*
B.S. in Ch.E., Rice, 1940
- Winslett, Herschel Rutherford *Dallas, Texas*
B.A., Rice, 1941
- Woodring, Carl Ray* *San Angelo, Texas*
B.A., Rice, 1940

THE RICE INSTITUTE

SENIORS*

Abell, John Curthbert, Jr. . . .	<i>Houston, Texas</i>
Ahlrich, Edward Will	<i>Houston, Texas</i>
Ammerman, Harvey Howard . . .	<i>Victoria, Texas</i>
Anderson, James Homer	<i>Houston, Texas</i>
Anderson, James Robertson, Jr.	<i>Galveston, Texas</i>
Anderson, Joe Milton	<i>Houston, Texas</i>
Anderson, Reader Gene	<i>Mission, Texas</i>
Asper, William Lawrence	<i>Fort Worth, Texas</i>
Baird, Hoyt Vernon	<i>Fort Worth, Texas</i>
Baker, Jesse James	<i>Houston, Texas</i>
Baker, Norvil Arnold	<i>College Station, Texas</i>
Baldwin, Robert John	<i>Houston, Texas</i>
Barber, Robert Lowry	<i>Jacksonville, Texas</i>
Barnett, Joseph Charles	<i>Houston, Texas</i>
Barrow, Quentin Keith	<i>Pelahatchee, Mississippi</i>
Bartholomew, Charles Kane . . .	<i>Huntington, New York</i>
Bartley, Charles Owen	<i>Houston, Texas</i>
Bell, Lee	<i>Houston, Texas</i>
Bickel, Robert Erwin	<i>El Paso, Texas</i>
Bickley, Margaret Louise	<i>Houston, Texas</i>
Blair, Allen Homer	<i>Houston, Texas</i>
Blake, Larkin LaFayette, Jr. . .	<i>Kilgore, Texas</i>
Bloss, Richard Ralph, Jr. . . .	<i>Beaumont, Texas</i>
Blouin, Glenn Morgan	<i>Houston, Texas</i>
Blunt, Robert Francis	<i>Houston, Texas</i>
Bock, Marguerite Anadine	<i>Houston, Texas</i>
Bolton, Walter Wildee, Jr. . . .	<i>Beaumont, Texas</i>

*As classified October 1, 1941

ANNOUNCEMENTS

- Bottler, Joseph Sebastian, Jr. *Tulsa, Oklahoma*
Boudreaux, Dorothy Jean . . *Houston, Texas*
Boyd, John Emerson, Jr. . . *Houston, Texas*
Boyer, John Leslie *Houston, Texas*
Bremer, Carolyn Knox
 Sturdivant *Houston, Texas*
Brewer, Gerald Averitt . . . *Vernon, Texas*
Brill, Harry Kale, Jr. *Houston, Texas*
Britain, J. W. *Houston, Texas*
Britton, John Claude *Galion, Ohio*
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Aarts, Dorothy Ann	<i>Houston, Texas</i>
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Blakemore, Nancy Allen . . .	<i>Houston, Texas</i>
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Bonner, Robert Dilworth . . .	<i>Fort Worth, Texas</i>
Bratten, Thomas Obadiah . . .	<i>Houston, Texas</i>
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Brown, Phillip Royal	<i>Houston, Texas</i>
Brown, William Knox	<i>Houston, Texas</i>

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- Cadwallader, Oscar Julius, Jr. *Houston, Texas*
- Camp, Collins Creth *Houston, Texas*
- Campbell, Kenneth Aldridge . *Houston, Texas*
- Carpenter, Eugenia McIntyre *Houston, Texas*
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- Cavenagh, Lucy Craig *Houston, Texas*
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- Cobb, Jack Marshall *Houston, Texas*
- Coburn, Catherine *Dallas, Texas*
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Wittlinger, Robert Charles. . *Houston, Texas*
Wohlt, William Frederick, Jr. *Houston, Texas*
Woodson, Clinton Elwood, Jr. *Cleveland, Texas*
Word, Jack Adolphus *Houston, Texas*
Wright, Loyd Athelstan, Jr. . *Sulphur Springs, Texas*
Wright, Robert James. *Oakfield, New York*
Young, Elizabeth Jean *Liberty, Texas*
Young, Ralph Madison *Houston, Texas*
Zagst, Edward Francis *Houston, Texas*
Zimmerman, William Raymond *Houston, Texas*

SOPHOMORES*

- Adams, Robert Paul *Dallas, Texas*
Alexander, George Spurlock . *Houston, Texas*
Alhart, Harold Edwin *Houston, Texas*

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- Amerman, Robert Abel . . . *Houston, Texas*
Anderson, Elizabeth Ann . . . *Houston, Texas*
Anderson, John Alfred, Jr. . . *Alta Loma, Texas*
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Armstrong, Dorothy Jeannette *Houston, Texas*
Arnold, William Hendrick, III *Texarkana, Arkansas*
Atkinson, Gladys Russell . . . *Houston, Texas*
August, Mary Quinn *Houston, Texas*
Badger, Harry Sprague . . . *Houston, Texas*
Bagwell, William Charles . . . *Nocona, Texas*
Bailey, Dorothy Vernon . . . *Houston, Texas*
Barnes, Marjorie Jane. . . . *Houston, Texas*
Barnes, Oliver Roderick . . . *Kinston, North Carolina*
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Bates, Anne Lillian *Houston, Texas*
Baumgartner, Ernest Allen . *Houston, Texas*
Baxter, Mary Elizabeth . . . *Houston, Texas*
Beall, James Henry *Houston, Texas*
Bell, Barbara Ellen *Houston, Texas*
Bell, Robert William *Houston, Texas*
Bennett, Walter Root *Fort Worth, Texas*
Benson, Barney *Houston, Texas*
Benthall, Gayden Frank. . . . *Houston, Texas*
Bentz, Peggy *Houston, Texas*
Bergeron, Claudia Helen. . . . *Houston, Texas*
Berwick, Joe Anne *Houston, Texas*
Best, Jewell Boyd, Jr. *Houston, Texas*
Biser, Roy Hamilton, Jr. . . . *Beaumont, Texas*
Black, DeLores Wanda *Houston, Texas*

ANNOUNCEMENTS

- Blackburn, William Whitford,
Jr. *Houston, Texas*
Blonstein, Maurice Louis . . . *Houston, Texas*
Boelsche, Idell Harriet . . . *Houston, Texas*
Bonner, William Neely, Jr. . . *Houston, Texas*
Bottler, Edgar Owen *Tulsa, Oklahoma*
Bowen, Lindsay Lee *McKinney, Texas*
Bowman, Wayne Franklin, Jr. *Houston, Texas*
Boyd, Robert Edward. . . . *Berea, Ohio*
Bradley, Bryant West. . . . *Joplin, Missouri*
Brady, Betty Jo *Houston, Texas*
Brannon, Ted Charles. . . . *Coleman, Texas*
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Brevard, Horace Eddy, Jr.. . *Houston, Texas*
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Brown, Joseph Chenoweth . . *Houston, Texas*
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Bunker, Frank Cecil, Jr.. . . *Houston, Texas*
Bunte, William Skain *Houston, Texas*
Burges, Ellis Gray, Jr. . . . *Beaumont, Texas*
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Burr, Jesse Herndon *Houston, Texas*
Call, Earl Emmett, Jr. . . . *Houston, Texas*
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Chapman, Lawrence Evans, Jr. *Galveston, Texas*
Child, James Winfield, Jr. . . *Houston, Texas*
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Coor, Thomas, Jr. *Houston, Texas*
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- Ferguson, Arnold Dewey, Jr.. *Houston, Texas*
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Fischer, Katherine Martha. . *Houston, Texas*
Fleet, Herman Ralph *Houston, Texas*
Fleming, Charles Kenneth . . *Houston, Texas*
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Gaston, Orissa Knight. . . . *Houston, Texas*
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Higgins, Martha Anne *Houston, Texas*
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Hjersted, Norman Bernard . . . *Houston, Texas*
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Maroney, Lillyne Francis . . . *Houston, Texas*
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Miller, Helen Frances *Houston, Texas*
Mintz, Aaron *Houston, Texas*
Mitchell, Harvey Lee *Houston, Texas*
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Moore, Laurel Mary *Houston, Texas*

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- Moore, Maury Keith *Houston, Texas*
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Odeneal, Billy Clyde *Houston, Texas*
O'Donnelly, James Vincent . *Houston, Texas*
Offricht, Paula Rose *Houston, Texas*
Oliver, John Phin. *Houston, Texas*
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Penn, Martin Tepper . . . *Houston, Texas*
Phalen, Thomas Edward . . . *Houston, Texas*
Phillips, Gerry Cleveland . . . *San Angelo, Texas*
Powell, Margaret Wescott . . . *Bastrop, Texas*
Powell, Mary Inez *Houston, Texas*
Prichard, Verlan *Wichita Falls, Texas*
Pryzant, Nathan Morris . . . *Houston, Texas*
Purnell, William Bartell . . . *Houston, Texas*
Quinby, Rodney *Houston, Texas*
Quitta, Dorothy Mae *Houston, Texas*
Randall, Royal William, Jr. . . *Mobile, Alabama*
Ranson, Nell Joan *Houston, Texas*
Raub, Roy Raymond *Houston, Texas*
Reddick, Homer Edwin *Houston, Texas*
Reed, Mack Gray *Abilene, Texas*
Reistle, Bette Jean *Houston, Texas*
Rembert, Howard Tharp . . . *Houston, Texas*
Rhemann, Gordon Edward . . . *Houston, Texas*
Richey, Dorothy May *Houston, Texas*
Robertus, Carl Albert, Jr. . . . *Houston, Texas*
Robinson, Elena Joyce *Houston, Texas*
Rogers, Lyman David *Fort Worth, Texas*
Rogers, Natalie Orine *Brentwood, Maryland*
Rooke, David Lee *Houston, Texas*
Rose, Andrew, Jr. *Texarkana, Texas*
Ross, Shelby Earl *Houston, Texas*
Rowntree, Ruth *Houston, Texas*

ANNOUNCEMENTS

- Rule, Naomi Victoria *Houston, Texas*
Rupley, Ralph Campbell, Jr. . *Houston, Texas*
Russ, Eleanor Ann *Houston, Texas*
Russell, Glenna Marie. . . . *Houston, Texas*
St. Clair, Doris Anne *Houston, Texas*
Sale, William Edgar. *Houston, Texas*
Sample, Thomas Earl, II . . *Houston, Texas*
Sanders, Charles E. *Houston, Texas*
Sartwelle, Helen Charlotte. . *Houston, Texas*
Sasseen, John Howard. . . . *Houston, Texas*
Saye, Hugh Alonzo *Electra, Texas*
Schlosser, Alfred Charles . . *Houston, Texas*
Schreck, Henry Ernest *Jacksonville, Florida*
Scotty, Angelo Dee, Jr. . . . *Houston, Texas*
Scotty, Clarence Bernard . . *Houston, Texas*
Scruggs, Edwin Theodore, Jr. *Houston, Texas*
Secor, Betty Lee *Houston, Texas*
Segal, Helen Sarah *Houston, Texas*
Selig, Gordon Edward. . . . *Houston, Texas*
Sellingsloh, John Sherman . . *Houston, Texas*
Sheehan, William Charles . . *Houston, Texas*
Shelton, John Presley *Port Arthur, Texas*
Shoss, Milton *Houston, Texas*
Sills, Donald Ray. *Houston, Texas*
Simmons, Ruth Marie. *Houston, Texas*
Simms, Jack, II *Dallas, Texas*
Simons, Thomas Shirley, Jr. . *Tyler, Texas*
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 Jr. *Houston, Texas*
Sinclair, Janet Isabell *Houston, Texas*
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- Skipwith, William Harvey, Jr. *Houston, Texas*
Slator, Damon Tarlton . . . *Houston, Texas*
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Smelley, Willie John *Lufkin, Texas*
Smith, Angus Harvey *Rotan, Texas*
Smith, Don Wilmoth *San Antonio, Texas*
Smith, Ennis Charles *Sugar Land, Texas*
Smith, Marion Elizabeth . . *Houston, Texas*
Smith, Maybell Parker . . . *Houston, Texas*
Smith, William Townsend . . *Houston, Texas*
Snelson, Lawrence William, Jr. *Diboll, Texas*
Sorsby, Felman Bascom . . . *Hempstead, Texas*
Speck, Norman Thomas . . . *Houston, Texas*
Stamm, Henry Edwin, III . . *Houston, Texas*
Steinman, Douglas Emmett, Jr. *Beaumont, Texas*
Stephens, Don Lowell *Houston, Texas*
Stephens, John Henry *Little Rock, Arkansas*
Strathdee, Donald Cowan . . *Fort Worth, Texas*
Sumners, Mary DeFord . . . *Houston, Texas*
Swinford, Harrie Gray, Jr.. . *Houston, Texas*
Sydow, Charles Henry *Houston, Texas*
Tamborello, Joe Frank, Jr. . *Houston, Texas*
Taylor, Harriet Virginia . . . *Houston, Texas*
Terrell, Nelson James, Jr. . . *Houston, Texas*
Thompson, Elizabeth
 Underwood *Houston, Texas*
Tillett, Wilbur Covington . . *Abilene, Texas*
Tracy, Cynthia Suzanne. . . *Houston, Texas*
Trammell, George Thomas. . *Houston, Texas*
Treadwell, Mose Allen, Jr.. . *Houston, Texas*
Tull, Henry Robertson, Jr. . . *Houston, Texas*

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- Turner, Mary Aileen *Houston, Texas*
Valcik, John Henry *Houston, Texas*
Valentine, Mary Louise . . . *Houston, Texas*
Van Eenenaam, Richard. . . *Houston, Texas*
Van Horn, Parkes *Amarillo, Texas*
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Voulgaris, James C.. . . . *Houston, Texas*
Wakefield, Katharine Louise . *Houston, Texas*
Walters, Harmon Richard . . *Livingston, Texas*
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Webb, George Duane *Dallas, Texas*
Wells, Carolyn Porter *Houston, Texas*
Whaling, Ward. *Houston, Texas*
Wheeler, Sophia *Houston, Texas*
Whitehurst, Harry Bernard . *Dallas, Texas*
Whiteley, Margaret Elizabeth *Hillsboro, Texas*
Whitmire, Joe Vernon. . . . *Aledo, Texas*
Whittington, June *Houston, Texas*
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Williams, Julian Fletcher, Jr.. *Dallas, Texas*
Williams, Sherrod Ambrose . *Paducah, Texas*
Wilson, John McGrew, Jr.. . *Houston, Texas*
Wommack, Jimmie Louise . . *Houston, Texas*
Wood, Charles Eugene *Galveston, Texas*
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Woodward, Warren Garland . *Houston, Texas*
Wooldridge, Bonnie Sue . . . *Houston, Texas*
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Allen, Elaine *Houston, Texas*
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Armsby, Anne *Houston, Texas*
Armstrong, Henry Nelson . . *Wichita Falls, Texas*
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Arterbury, Bryant Platt. . . *Houston, Texas*
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Bennett, Cleo *Houston, Texas*
Bennett, William Lee *Fort Worth, Texas*

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- Bethea, Reba Vaiden *Houston, Texas*
Bills, Elizabeth. *Houston, Texas*
Black, Jeanne Willette . . . *Houston, Texas*
Black, William Marshall. . . *Houston, Texas*
Blau, Esther Mollie. *Houston, Texas*
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Boyd, John Allen. *North Hollywood, California*
Boyle, Patricia Marie *Houston, Texas*
Brace, Robert Duane *Houston, Texas*
Braden, Patrick O'Connor . . *Houston, Texas*
Brazell, William Hoyle *McAllen, Texas*
Brett, Donald Henry *Houston, Texas*
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Bridges, Ann Claire. *Houston, Texas*
Bridges, Wilson Benton *Houston, Texas*
Brockman, Harold Lee *McKinney, Texas*
Brockstein, Paul Zarroll *Houston, Texas*
Brownlee, Thomas Edward, Jr. *Abilene, Texas*
Broz, Igor Radislav. *Aruba, Netherlands*
West Indies
Bryan, William Edwin, Jr.. . . *Houston, Texas*
Buckley, Vincent Harold *Houston, Texas*
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Caraway, Newsome Brooks . *Houston, Texas*
Carmichael, William Pat . . *Houston, Texas*
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Carroll, Martha Jane *Houston, Texas*
Cary, Lindsay Edwin, Jr. . . *Houston, Texas*
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Cleaver, James Arthur Stuart *Dallas, Texas*
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Cobb, Sarah Elizabeth *Houston, Texas*
Cockrell, Daniel Park *Houston, Texas*
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Collins, Robert Wayne *Mineola, Texas*
Condon, William Joseph. . . . *Houston, Texas*
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- Crichfield, Samuel Otto . . . *Houston, Texas*
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Croucher, William Watson. . *Houston, Texas*
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 Wolfe, Jr. *Houston, Texas*
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Dolch, Stanley F. N., Jr. . . *Houston, Texas*
Draper, Carolyn Russell. . . *Houston, Texas*
Drescher, Dan Leon *Texarkana, Texas*
Dudley, Bayard Turner Gross *Houston, Texas*
Duffy, John Robert. *Houston, Texas*
Dullahan, Frances Elizabeth . *Houston, Texas*
Duller, Nelson Mark, Jr. . . *Houston, Texas*
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Frey, DeLores June. *Houston, Texas*
Frnka, Madalyn Laverne *Houston, Texas*
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INDEX

- Academic Course, 51
Administration, Officers, 8
Admission, 45
Adviser to Women, 51
Applied Mathematics, 74
Architecture
 Admission, 45
 Courses, 137
 Equipment, 163
Architecture of the Institute, 13
Assistants and Fellows, 25
Athletics, 109
Autry House, 175
Biology
 Courses, 91
 Laboratory, 162
Board and Lodging, 50
Buildings, 13, 157
Business Administration, 100
Calendar, 6
Certificate
 Admission by, 45
 Teachers, 102
Chemical Engineering
 Admission, 45
 Courses, 117, 134
 Laboratories, 15, 160
Chemistry
 Courses, 81
 Laboratories, 15, 160
Christian Associations, 173
Civil Engineering
 Admission, 45
 Courses, 117, 130
 Laboratory, 164
Classes, 196
Cohen House, Robert and Agnes, 175
Commemorative Volumes, 16, 149
Commencement, 178
Courses
 Academic, 51, 62
 Architecture, 51, 137
 Engineering, 51, 58, 114
 Graduate, 52
 Honours, 52, 56
Degrees, 51, 110, 114, 137, 179
Deposit, 49
Dormitories, 50
Economics, 98
Education, 101

INDEX

- Electrical Engineering
 - Admission, 45
 - Courses, 114, 117
 - Laboratory, 165
- Endowment, 11
- Engineering, 114, 117
- Engineering Society, 174
- English, 62
- Entrance Requirements, 45
- Ethics, 107
- Examinations
 - Entrance, 48
 - Physical, 109
 - Scholastic, 59
- Expenses, 48, 110
- Extension Lectures, 147
- Faculty, 16
- Fees and Expenses, 48, 110
- Fellows, 25
- Fellowships, 39
 - James A. Baker and Alice Graham Baker, 42
 - S. F. Carter Memorial, 41, 189
 - Eastman Kodak Co., 43
 - Catharine Withers Roper and Benjamin E. Roper Memorial, 43
 - W. B. Sharp Memorial, 40
 - Traveling, in Architecture, 42, 190
- Formal Opening, 15
- Founder, 11
- French, 66
- Freshman Class, 226
- Funds
 - Elliott Memorial Loan, 39, 190
 - Jordan Memorial, 38
 - Owen Wister Literary Society, 37
 - Richardson Memorial, 38
 - W. B. Sharp Memorial, 40
 - Sara Stratford, 38
- German, 67
- Grades, Meaning of, 60
- Graduate Courses, 52
- Graduate Students, 193
- Graduates, 179
- Historical Sketch, 11
- History, 104
- Honor System, 53
- Honours Courses, 56
- Inaugural Lectures, 15
- Italian, 68
- Junior Class, 205
- Jurisprudence, 107
- Kinematics, 123
- Laboratories
 - Architecture, 163
 - Biology, 162
 - Chemistry, 15, 160

INDEX

- Laboratories (Continued)
 Chemical Engineering,
 160
 Civil Engineering, 164
 Electrical Engineering,
 165
 Engineering Drawing,
 164
 Machine Shop, 171
 Mechanical Engineering,
 168
 Physics, 14, 157
 Psychology, 163
Lectures, Extension, 147
Lectureship,
 Godwin, 148
 On Music, 148
 Sharp, 147
Library, 149
Literary Societies, 173
Logic, 107
Machine Shop, 171
Mathematics
 Applied, 74
 Pure, 70
Mechanical Engineering
 Admission, 45
 Courses, 114, 123
 Laboratories, 168
Mechanics, 123
Name, The, 11
Naval Science and Tactics,
 145
Organizations, 173
Pamphlet, 149
Petroleum Engineering,
 116
Phi Beta Kappa, 43
Philanthropy
 Courses, 108
 Sharp Lectureship, 147
Philosophy, 107
Physical Education
 Courses, 110
Physical Training, 109
Physics
 Courses, 75
 Laboratories, 14, 157
Portuguese, 68
Premedical Course, 95
Prizes
 Lady Geddes, 37, 189
 Robert Pilcher Quin Me-
 morial, 39
Probation, 60
Psychology, 97
Publications, 16, 149, 174
Requirements for Admis-
 sion, 45
Residential Halls, 50
Residential Requirement, 50
R.O.T.C., Naval, 145

INDEX

- Scholarship, Standing in, 59
Scholarships
 American Petroleum
 Institute, 37
 Chapman-Bryan, 32, 188
 College Women's Club, 36
 Daniel Ripley, 30, 187
 Daughters of American
 Revolution, 28, 186
 Dickson, 31, 187
 Edith Ripley, 31, 187
 Elizabeth Baldwin Lit-
 erary Society, 29, 187
 Ellen Axson Wilson, 29,
 187
 Engineering Alumni, 33,
 188
 Franklin, 34, 188
 Friends of Rice, 32, 188
 Graham Baker Student-
 ship, 27, 186
 Hohenthal, 28, 186
 Junior Engineering, 30,
 187
 Katie B. Howard, 33, 188
 Lady Washington Texas
 Centennial Award, 32,
 188
 Mary Parker Gieseke, 31,
 187
 Max Autrey, 36
 Pallas Athene Literary
 Society, 29, 187
 Premedical Society, 35
 R Association, 35, 189
 Samuel S. Ashe, 33, 188
 Walsh, in Architecture, 34,
 189
Self-help, 44
Senior Class, 196
Shop Work, 124, 171
Sigma Xi, 44
Societies, 173
Sociology, 99
Sophomore Class, 213
Spanish, 68
Students Association, 174
Students Association Fees,
 49
Student Government, 174
Students, List of, 191
Subjects of Instruction, 62,
 111, 117, 138
Surveying, Plane, 122
Tau Beta Pi, 44
Teachers' Certificates, 102
Torsion Balance, 159
Trustees, 1, 12
Young Men's Christian As-
 sociation, 173
Young Women's Christian
 Association, 173





