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ACADEMIC CALENDAR

1949

September 15–16    Registration
September 17    Matriculation Address
September 19    Opening of Courses
November 23    Beginning of Thanksgiving Recess at 6:00 P.M.
November 28    Resumption of Courses at 8:00 A.M.
December 17    Beginning of Christmas Recess at 1:00 P.M.

1950

January 3    Resumption of Courses at 8:00 A.M.
January 23–February 2    Midyear Examinations
February 6    Resumption of Courses at 8:00 A.M.
April 6    Beginning of Easter Recess at 6:00 P.M.¹
April 11    Resumption of Courses at 8:00 A.M.
April 22    Main Entrance Examination Period
May 19    Beginning of Final Examinations
June 2    Thirty-Seventh Commencement
June 17    Second Entrance Examination Period (principally for transfers)

September 14–15    Registration
September 16    Matriculation Address
September 18    Opening of Courses
November 29    Beginning of Thanksgiving Recess at 6:00 P.M.
December 4    Resumption of Courses at 8:00 A.M.
December 19    Beginning of Christmas Recess at 6:00 P.M.

1951

January 3    Resumption of Courses at 8:00 A.M.
January 22–February 1    Midyear Examinations

¹Beginning in 1948, the Friday, Saturday, and Monday of the Easter season have replaced the holidays formerly taken on February 22, March 2, and April 21.
EDGAR ODELL LOVETT, Ph.D., Sc.D., LL.D.
President Emeritus

OFFICERS OF ADMINISTRATION

WILLIAM VERMILLION HOUSTON, Ph.D.
President

HARRY BOYER WEISER, Ph.D.
Dean

HUGH SCOTT CAMERON, M.E.
Dean of Students

SAMUEL GLENN McCANN, M.A.
Registrar

JOSEPH DAVID THOMAS, A.M.
Assistant Registrar

JOHN THOMAS McCANTS, M.A.
Bursar

VERNE FRANKLIN SIMONS, A.M., C.P.A.
Assistant Bursar
TRUSTEES EMERITI
ALEXANDER SESSUMS CLEVELAND
EDGAR ODELL LOVETT
BENJAMIN BOTS RICE
JOHN THADDEUS SCOTT

BOARD OF TRUSTEES
HARRY CLAY HANSZEN: CHAIRMAN
GEORGE RUFUS BROWN: VICE-CHAIRMAN
FREDERICK RICE LUMMIS: SECRETARY-TREASURER
LAMAR FLEMING, JR.
WILLIAM ALEXANDER KIRKLAND
GUS SESSIONS WORTHAM
GRADUATE
ANNOUNCEMENTS FOR 1949-1950
THE RICE INSTITUTE

GENERAL STATEMENT

The Rice Institute bears the name of the founder, the late William Marsh Rice. Dedicated to the advancement of literature, science, and art, its educational program 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 a research institution. The Institute 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.

Since the opening in 1912, the highest ideals of scholarship have been upheld, and graduate study and research have been carried on as a principal means of advancing the several fields of learning. At the present time the degree of Doctor of Philosophy is awarded in the fields of mathematics, physics, chemistry, and biology. This degree represents the completion of at least three years of advanced study after the award of a suitable bachelor's degree, and in most cases four or more years are required. It also represents the completion of an original piece of investigation, the report of which constitutes the thesis. The thesis must be published in an accredited journal or series, and a copy must be deposited in the Institute library. As final evidence of his preparation for this degree, the candidate must pass a public oral examination.

The degree of Master of Arts is available in the foregoing and other fields of study, and the degree of Master in Architecture or Master of Science in a branch of engineering (M.S. in Ch.E., M.S. in C.E., M.S. in E.E., or M.S. in M.E.) may be obtained. Each of these degrees will be awarded upon the completion of one full year of advanced work in a special field. Such programs will generally include a piece of original work embodied in a thesis, and the candidate's preparation will be evidenced by a public examination. Students whose undergraduate preparation has not included
sufficient specialized work, or whose time is partly occupied with teaching duties, may require at least two years to complete the requirements for a master's degree.

By special arrangement with the head of the department in which he is specializing, a graduate student who is already a candidate for an advanced degree may enroll in an approved research course during the summer. Such enrollment will be for a twelve-week period starting with the end of the regular academic year. Laboratory fees only will be charged.

Graduate candidates are advised to take the Graduate Record Examination, arrangements for which may be made by writing the Graduate Record Examination, 437 West 59th Street, New York 19, N.Y. Since the Rice Institute maintains an examination center for local supervision of the examinations, applicants in the Houston area may make the necessary arrangements by applying in person at the Office of the Registrar. Preference will be given to applicants who earn high scores on examinations given by this organization. At the discretion of the Committee on Graduate Instruction, the Graduate Record Examination or other examinations may be required of individual applicants.

Application for admission to graduate study should be made to the Registrar as early as possible.
INSTRUCTIONAL STAFF

FACULTY

AGMON, SHMUEL
Docteur ès Sciences (Paris) 1949
Lecturer in Mathematics

AKERs, WILLIAM WALTER
B.S. in Ch.E. (Texas Tech.) 1943, M.S. in Ch.E. (Texas) 1944
Assistant Professor of Chemical Engineering

ALLGOOD, JAY R.
B.S. in M.E. (Rice) 1947
Instructor in Civil Engineering

ALTENBURG, EDGAR
A.B. (Columbia) 1911, A.M. (Columbia) 1912, Ph.D. (Columbia) 1916
Associate Professor of Biology

BATTISTA, JOSEPH LLOYD
Assistant Professor of Romance Languages

BONNER, TOM WILKERSON
B.S. (Southern Methodist) 1931, M.A. (Rice) 1932, Ph.D. (Rice) 1934
Professor of Physics

BOURGEOIS, ANDRÉ MARIE GEORGES
Bachelier ès Lettres (Paris) 1921, Bachelier en Droit (Paris) 1923, Certifié d'Études supérieures de lettres (Paris) 1930, M.A. (Texas) 1934, Docteur d'Université (Paris) 1945, Officier de l'Instruction Publique 1945
Assistant Professor of French

BRAY, HUBERT EVELYN
B.A. (Tufts) 1910, M.A. (Harvard) 1916, Ph.D. (Rice) 1918
Professor of Mathematics
Brunk, Hugh Daniel
A.B. (California) 1940, M.A. (Rice) 1942, Ph.D. (Rice) 1944
Assistant Professor of Mathematics

Calhoun, Harold Eugene
B.A. (Rice) 1932
Visiting Critic in Architecture

Calkin, John Williams
Associate Professor of Mathematics

Camden, Carroll
A.B. (Centre College) 1925, M.A. (Iowa) 1928, Ph.D. (Iowa) 1930
Associate Professor of English

Cameron, Hugh Scott
M.E. (Stevens) 1925
Assistant Professor of Mechanical Engineering and Dean of Students

Chandler, Asa Crawford
B.A. (Cornell) 1911, M.S. (California) 1912, Ph.D. (California) 1914
Professor of Biology

Chapman, Alan Jesse
B.S. in M.E. (Rice) 1945
Instructor in Engineering

Chillman, James, Jr.
B.S. in Arch. (Pennsylvania) 1913, M.S. in Arch. (Pennsylvania) 1914, F.A.A.R. (Am. Acad. in Rome) 1922
Professor of Architecture

Craig, Hardin, Jr.
Associate Professor of History

Daugherty, Jack Woodward
B.A., B.S. in Ed. (Southeast Missouri) 1939, M.A. (Missouri) 1940
Assistant Professor of Biology
DAVIES, JOSEPH ILOTT
B.A. (Rice) 1928, M.A. (Rice) 1929, Ph.D. (Rice) 1937
Assistant Professor of Biology

DeZurko, Edward R.
B.S. in Ed. (Illinois) 1939, B.S. in Arch. (Illinois) 1940, M.S. in Arch. (Columbia) 1942
Assistant Professor of Architecture

Dilworth, Harry Blackburn
B.A. (William and Mary) 1941
Instructor in English

Dix, William S.
B.A. (Virginia) 1931, M.A. (Virginia) 1932, Ph.D. (Chicago) 1946
Assistant Professor of English and Librarian

Doggett, John Rentz, Jr.
B.S. in M.E. (Rice) 1936
Instructor in Mechanical Engineering

Dowden, Wilfred Sellers
B.A. (Vanderbilt) 1939, M.A. (Vanderbilt) 1940
Instructor in English

Dunaway, James Karl
B.A. (Rice) 1936, B.S. in Arch. (Rice) 1937, M.A. (Rice) 1938, M.S. (Columbia) 1941
Assistant Professor of Architecture

Freund, Friedrich Ernst Max
Ph.D. (Leipzig) 1902
Professor Emeritus of German

Fulton, James Street
B.A. (Vanderbilt) 1925, M.A. (Vanderbilt) 1929, Ph.D. (Cornell) 1934
Associate Professor of Philosophy

Galleghy, Joseph S., Jr.
B.A. (Rice) 1925, M.A. (Rice) 1926
Assistant Professor of English
GARRISON, ALLEN DARNABY
B.A. (Rice) 1918, M.S. (Rice) 1920, Ph.D. (Rice) 1921
Associate Professor of Chemical Engineering

GILES, JAMES BERNARD
B.B.A. (Texas) 1936, M.A. (Texas) 1937
Assistant Professor of Economics

GIRARD, PIERRE LÉON
Assistant Professor of French

HARTSOOK, ARTHUR J.
A.B. (Nebraska Wesleyan) 1911, S.B. in Ch.E. (M.I.T.) 1920, S.M. (M.I.T.) 1921
Professor of Chemical Engineering

HEAPS, CLAUDE WILLIAM
B.S. (Northwestern) 1909, Ph.D. (Princeton) 1912
Professor of Physics

HERMANCE, GILBERT LESLIE
B.S. (Oregon) 1927, M.A. (Columbia) 1930
Associate Professor of Physical Education

HODGES, JOHN ELTON
B.B.A. (Texas) 1935, M.B.A. (Texas) 1937
Assistant Professor of Economics

HODGES, LEE
S.B. (Harvard) 1930, M.A. (Rice) 1934
Instructor in French and Spanish

HOUSTON, WILLIAM VERMILLION
B.A., B.S. in Ed. (Ohio State) 1920, S.M. (Chicago) 1922, Ph.D. (Ohio State) 1925
Professor of Physics and President of the Rice Institute

HUDSON, BRADFORD BENEDICT
A.B. (Stanford) 1930, Ph.D. (California) 1947
Assistant Professor of Psychology
INSTRUCTIONAL STAFF

Hudspeth, C. M.
B.A. (Rice) 1940, LL.B. (Texas) 1946
Instructor in Government

Kilpatrick, John Edgar
B.A. (Stephen F. Austin) 1940, A.M. (Kansas) 1942, Ph.D. (California) 1945
Assistant Professor of Chemistry

Knightley, William John
A.B. (Wichita) 1946, A.M. (Wichita) 1947
Instructor in English

Landrum, Graham Gordon
B.A. (Texas) 1943, M.A. (Texas) 1948
Instructor in English

Lear, Floyd Seyward
Professor of History

Leifeste, A. A., Jr.
A.B. (Southwestern) 1934, B.S. in Arch. (Rice) 1941
Instructor in Architecture

Lewis, Edward S.
Assistant Professor of Chemistry

Louis, Andrew
Ph.B. (Wesleyan) 1929, Ph.D. (Cornell) 1935
Assistant Professor of German

Lovett, Edgar Odell
A.B. (Bethany) 1890, M.A., Ph.D. (Virginia) 1895, Ph.D. (Leipzig) 1896, LL.D. (Drake, Tulane, Baylor, Bethany), Sc.D. (Colorado College)
President Emeritus of the Rice Institute

Lyle, C. Collis, Jr.
B.A. (Cornell) 1933, M.A. (Cornell) 1934
Assistant Professor of German
McBride, Guy T., Jr.
B.S. in Ch.E. (Texas) 1940, Sc.D. (M.I.T.) 1948
Assistant Professor of Chemical Engineering

McCann, Samuel Glenn
Ph.B. (Wooster) 1914, M.A. (Rice) 1917
Instructor in Jurisprudence and Registrar

McCants, John Thomas
B.S. (Marion Inst.) 1902, B.A. (Marion Inst.) 1905, M.A. (Virginia) 1906, M.A. (Yale) 1909
Instructor in Business Administration and Bursar

McDougale, Clyde Calvin
B.S. in Ph.Ed. (Rice) 1942, M.A. (Columbia) 1948
Assistant Professor of Physical Education

McEnany, Michael Vincent
B.S. in E.E. (Colorado College) 1929, M.A. in Physics (Dartmouth) 1931
Assistant Professor of Electrical Engineering

Mackey, William Sturges, Jr.
B.A. (Rice) 1943, C.P.A. 1948
Instructor in Business Administration

McKillop, Alan Dugald
Professor of English

MacLane, Gerald R.
B.A. (Yale) 1941, A.M. (Harvard) 1942, Ph.D. (Rice) 1946
Assistant Professor of Mathematics

MacLean, James Beattie
Instructor in German

Mandelbrojt, Szolem
B.S. (Warsaw) 1917, Docteur ès Sciences (Paris) 1923
Professor of Mathematics
Marsh, Malcolm Ray  
B.S. in C.E. (Texas) 1927  
Instructor in Engineering Drawing

Masterson, William Henry  
B.A. (Rice) 1935, M.A. (Pennsylvania) 1946  
Assistant Professor of History

Milligan, Winfred O.  
Associate Professor of Chemistry

Mills, Warner Everett, Jr.  
A.B. (Dartmouth) 1943, M.S. (Calif. Inst. of Tech.) 1944, M.A. (Yale) 1948  
Instructor in History and Government

Money, Lloyd J.  
B.S. in E.E. (Rice) 1942  
Instructor in Electrical Engineering

Moraud, Marcel  
Bachelier ès Lettres (Poitiers) 1907, Licencié ès Lettres (Paris) 1908, Diplomé d'Études supérieures (Paris) 1910, Agrégé de l'Université (Paris) 1914, Docteur ès Lettres (Paris) 1933  
Professor of French

Morehead, James Caddall, Jr.  
A.B. (Princeton) 1935, B.Arch. (Carnegie Inst. of Tech.) 1939  
Associate Professor of Architecture and Assistant to the President

Murphy, Walter D.  
B.S. in C.E. (Rice) 1948  
Instructor in Civil Engineering

Neely, Jess Claiborne  
LL.B. (Vanderbilt) 1924  
Director of Athletics and Head Coach of Football

Nicholas, Henry Oscar  
A.B. (Oberlin) 1919, Ph.D. (Yale) 1923  
Associate Professor of Chemistry
PAUW, ADRIAN  
Assistant Professor of Civil Engineering

PEQUIGNNEY, F. J.  
B.A. (Notre Dame) 1944, M.A. (Minnesota) 1947  
Instructor in English

PERRY, WILLIAM C.  
B.A. (Rice) 1938, LL.B. (Texas) 1941  
Instructor in Business Law

PFEIFFER, PAUL E.  
B.S. in E.E. (Rice) 1938, B.D. (Southern Methodist) 1943  
Instructor in Electrical Engineering

PHILLIPS, EDWARD HAKE  
A.B. (Cincinnati) 1940, A.M. (Harvard) 1946  
Instructor in History

PHILLIPS, GERALD CLEVELAND  
B.A. (Rice) 1944, M.A. (Rice) 1947  
Instructor in Physics*

PLUNKETT, ROBERT  
Assistant Professor of Mechanical Engineering

RICHTER, GEORGE HOLMES  
B.A. (Rice) 1926, M.A. (Rice) 1927, Ph.D. (Rice) 1929  
Professor of Chemistry

RISser, J. R.  
Assistant Professor of Physics

RYON, LEWIS BABCOCK  
C.E. (Lehigh) 1917  
Professor of Civil Engineering

*Humble Fellow in Physics, 1948–49.
INSTRUCTIONAL STAFF

SHELTON, FRED VERNON
B.A. (Rice) 1926, M.A. (Rice) 1928, M.A. (Univ. Nac. de Mexico) 1942
Assistant Professor of French

SIMONS, VERNE FRANKLIN
A.B. (Kansas) 1923, A.M. (Kansas) 1925, C.P.A. 1931
Assistant Professor of Economics and Assistant Bursar

SIMS, JAMES REDDING
B.S. in C.E. (Rice) 1941
Assistant Professor of Civil Engineering

SLAUGHTER, JOHN WILLIS
A.B., B.D. (Lombard) 1898, Ph.D. (Michigan) 1901
Lecturer Emeritus in Civics and Philanthropy

SMITH, JOHN TREANOR
B.S. in Ch.E. (Rice) 1942, M.S. (Michigan) 1941, Ph.D. (Michigan) 1943
Assistant Professor of Chemistry

SQUIRE, CHARLES FRANCIS
Ph.D. (Johns Hopkins) 1937
Assistant Professor of Physics

TALMAGE, ROY V.
A.B. (Maryville College) 1938, M.A. (Richmond) 1940, Ph.D. (Harvard) 1947
Assistant Professor of Biology

THIBODEAUX, MURPHY HENRY
Instructor in Civil Engineering

THOMAS, JOSEPH DAVID
Ph.B. (Chicago) 1929, A.M. (Chicago) 1930
Assistant Professor of English and Assistant Registrar

TSANOFF, RADOSLAV ANDREA
B.A. (Oberlin) 1906, Ph.D. (Cornell) 1910
Professor of Philosophy

ULRICH, FLOYD EDWARD
Associate Professor of Mathematics
WARREN, RICHARD HARDIN
B.S. (Haverford) 1943, A.M. (Harvard) 1948
Instructor in English

WASER, JÜRGEN
Ph.D. (Calif. Inst. of Tech.) 1944
Assistant Professor of Chemistry

WATERS, JAMES STEPHEN
B.S. (Rice) 1917
Professor of Electrical Engineering

WATKIN, WILLIAM WARD
B.S. in Arch. (Pennsylvania) 1908
Professor of Architecture

WEBB, DAVID AIXEN
A.B. (South Carolina) 1939, A.B.L.S. (Emory) 1940, A.M.L.S.
(Michigan) 1947
Associate Librarian

WEEKE, DONALD DEAN
B.S. in M.E. (Rice) 1948
Instructor in Mechanical Engineering

WEISER, HARRY BOYER
B.A. (Ohio State) 1911, M.A. (Ohio State) 1912, Ph.D. (Cornell)
1914
Professor of Chemistry and Dean

WELD, HARRY PORTER
Ph.B. (Ohio State) 1900, Ph.D. (Clark) 1911
Visiting Professor of Psychology

WELSH, HUGH CLAYTON
M.D. (Texas) 1923
Medical Adviser and Instructor in Biology

WHITING, GEORGE WESLEY
A.B. (West Virginia) 1908, A.M. (Harvard) 1913, Ph.D. (Chi-
cago) 1926
Associate Professor of English

WILLIAMS, GEORGE GUION
B.A. (Rice) 1923, M.A. (Rice) 1925
Assistant Professor of English
INSTRUCTIONAL STAFF

WILSON, HAROLD ALBERT
Professor Emeritus of Physics

WISCHMEYER, CARL RIEHLE
B.S. in E.E. (Rose Polytechnic) 1937, M.Eng. in E.E. (Yale) 1939, E.E. (Rose Polytechnic) 1942
Assistant Professor of Electrical Engineering

WOODBURN, JAMES
B.S. (Purdue) 1938, Dr.Eng. (Johns Hopkins) 1947
Associate Professor of Mechanical Engineering

WYATT, EDWIN MATHER
B.S. (Kansas Teachers College) 1917, M.S. (Wisconsin) 1927
Instructor in Engineering Drawing

YOUNG, HOMER HARRY
B.A. (Austin College) 1930, M.A. (Southern Methodist) 1937
Instructor in Education

ASSISTANTS AND FELLOWS

ALLENBURG, LUOLIN STOREY
B.A. (Rice) 1935
A.E.C. Fellow in Biology

ANDERSON, HERBERT CALVIN
Fellow in Architecture

BADGER, ALGERNON SIDNEY
B.S. (Rice) 1948
Fellow in Electrical Engineering

BAGGETT, LESTER MARCHANT
B.A. (Southwestern) 1943, M.S. (Georgia Tech.) 1948
Fellow in Physics

BAME, SAMUEL JARVIS, JR.
B.Sci. in Physics (North Carolina) 1947
Humble Fellow in Physics
BANEWICZ, JOHN JOSEPH
Sc.B. in Chem. (Brown) 1944
Fellow in Chemistry

BARKER, J. R.
Assistant in Physical Education

BARRETT, JOHN HAROLD
B.S. (Rice) 1948
Fellow in Chemistry

BECK, J. WALTER
B.S. (Pennsylvania State) 1936, M.S. (Emory) 1948
Fellow in Biology

BELL, ROBERT WILLIAM
B.S. in Ch.E. (Rice) 1946
Pan American Fellow in Chemical Engineering

BESDIN, DAVID JACOB
B.S. (Miami) 1946, M.A. (Rice) 1947
Fellow in Physics

BLACKSTOCK, ALBERT WILLIAM
B.S. (Texas A. and M.) 1948
Fellow in Physics

BLUNT, ROBERT FRANCIS
B.A. (Rice) 1943, M.A. (Rice) 1947
Magnolia Petroleum Fellow in Physics

BOTT, LAWRENCE L.
B.S. (Illinois) 1947
Fellow in Chemistry

BRISKEY, LOIS DAYLE
A.B. (Kentucky) 1948
Fellow in Romance Languages

BURKE, WILLIAM HENRY, JR.
B.S. (Rice) 1948
Fellow in Physics

BURR, JESSE HERNDON, JR.
B.A. (Rice) 1947
Fellow in Biology
INSTRUCTIONAL STAFF

**Butler, James Wilford**
- B.S. in Ch.E. (Georgia Tech.) 1944
- Fellow in Physics

**Carrión, Vincente**
- B.S. (Univ. Nac. de Mexico) 1943
- Assistant in Romance Languages

**Cecil, Olin B.**
- B.A. (Rice) 1948
- Fellow in Chemistry

**Chambless, Beauford**
- B.A. (Washington Univ.), 1947
- Assistant in History

**Conner, Jerry Power**
- B.A. (Rice) 1948
- Fellow in Physics

**Dean, Alice Crowell**
- B.A. (Rice) 1916, M.A. (Rice) 1919
- Librarian Emerita

**De la Garza, Rodolfo**
- B.S. in E.E. (Rice) 1947
- Fellow in Electrical Engineering

**Douglas, Jim, Jr.**
- B.S. in C.E. (Texas) 1946, M.S. in C.E. (Texas) 1947
- Fellow in Mathematics

**Draper, Arthur Lincoln, Jr.**
- B.S. (Rice) 1948
- Procter and Gamble Fellow in Chemistry

**Duller, Nelson Mark, Jr.**
- B.S. (Texas A. and M.) 1948
- Fellow in Physics

**Dvoretzky, Isaac**
- B.A. (Rice) 1948
- Fellow in Chemistry

**Eckel, John Raymond**
- B.S. in E.E. (Rice) 1944
- Fellow in Electrical Engineering
EIMERL, SAREL HENRY
B.A. (Oxford) 1948
Assistant in History

EISENLOHR, DAVID OTTO
B.A. (Rice) 1948
Fellow in History

ELDER, LORENE CATHERINE
B.A. (Rice) 1948
Fellow in English

FAIRCHILD, WILLIAM RICHARD
Fellow in Chemical Engineering

FAMULARO, KENDALL FERRIS
Fellow in Physics

FARISS, ROBERT ELWYN
B.S. (Rice) 1942
Fellow in Chemistry

FROST, ROBERT CARLTON
B.A. (Reed) 1948
Fellow in Biology

GIESBERG, ROBERT IRVIN
B.A. (Rice) 1943
Fellow in History

GODFREY, NORMAN BELL
B.S. (California) 1946
Humble Fellow in Chemistry

GRAHAM, JOHN WAYNE
B.A. (Rice) 1948
Fellow in Mathematics

GRININGER, DONN ROBERT
B.S. in E.E. (Rice) 1948
Fellow in Electrical Engineering

HAAS, FELIX
S.B. (M.I.T.) 1948
Fellow in Mathematics
Hake, Evelyn Kuhn
  B.A. (Rice) 1930, M.A. (Rice) 1932
  Research Assistant in Biology

Hay, Wallace Simpson
  Sc.B. in Chem. (Brown) 1943
  Fellow in Chemistry

Hinds, William Henry
  B.A. (U.C.L.A.) 1944, B.A. (Rice) 1948
  Fellow in Chemistry

Hoeprich, Paul Daniel
  M.D. (Harvard) 1947
  A.E.C. Postdoctoral Research Fellow

Hoop, Mildred Claire
  B.A. (Rice) 1948
  Fellow in Romance Languages

Hummel, James Alexander
  Fellow in Mathematics

James, Jesse Clopton
  Fellow in Physics

Johnson, Burnett Hood
  B.S. (Sam Houston) 1944
  Fellow in Chemistry

Johnson, Orland Eugene
  Fellow in Physics

Kilgore, Charles Hugh
  B.S.E. (Michigan) 1948
  Shell Fellow in Chemical Engineering

Kunetka, Robert Emil
  Fellow in Chemistry

Kwei Man Wei
  B.S. in E.E. (National Sun Yat-sen) 1945
  Fellow in Electrical Engineering
LILLIE, ALAN B.
B.Sc. (Queen’s) 1946, M.Sc. (Queen’s) 1947
Fellow in Physics

LINAM, PAUL AUDREY
B.S. (Calif. Inst. of Tech.) 1947
Fellow in Chemical Engineering

LINDSAY, ROBERT
Sc.B. in Physics (Brown) 1947
Fellow in Physics

LIVINGSTON, H. RAYMOND
B.S. in E.E. (Rice) 1948
Fellow in Electrical Engineering

LOVE, WILLIAM FREEMAN
B.S. (Rice) 1945, M.A. (Rice) 1947
Fellow in Physics

MCATEE, JAMES LEE, JR.
B.S. (Texas A. and M.) 1947
Fellow in Chemistry

MELLINS, HARRY ZACHARY
A.B. (Columbia) 1941, M.D. (Long Island) 1944
A.E.C. Postdoctoral Research Fellow

MELVIN, DOROTHY MAE
A.B. (Woman’s College of U.N.C.) 1942, M.S.P.H. (North Carolina) 1945
Fellow in Biology

MERRIFIELD, PAUL E.
A.B. (Colby) 1947
Fellow in Chemistry

MERSEBURGER, MARION DORIS
B.A. (Rice) 1948
Fellow in History

MILLER, EMERY BERNLEE
B.S. (Illinois) 1947
Fellow in Chemistry
Morgan, Chester Stephen, Jr.
B.S. in Ch.E. (Rice) 1944
Humble Fellow in Chemistry

Morton, Lester Clifford
Fellow in Physics

Neil, Carleton McKenzie
A.B. (Columbia) 1938, M.D. (Cornell) 1942
A.E.C. Postdoctoral Research Fellow

Oertton, William Calvin, Jr.
B.S. (North Texas) 1941
Fellow in Physics

Palmer, Robert Fields
B.A. (California) 1943, M.D. (California) 1946
A.E.C. Postdoctoral Research Fellow

Petersen, Ramona
B.S. (Utah State) 1948
Fellow in Romance Languages

Pumbley, John A.
B.S. in Ph. Ed. (Rice) 1948
Assistant in Physical Education

Pollard, Mary Alice
B.A. (Rice) 1948
Fellow in History

Pry, Robert Henry
B.S. (Texas A. and I.) 1947
Fellow in Physics

Randall, Royal William, Jr.
B.A. (Rice) 1944
Fellow in Physics

Read, Clark P., Jr.
B.A., M.A. (Rice) 1948
A.E.C. Fellow in Biology

Reiter, Hans
B.A. (Vienna) 1939
Assistant in Mathematics
RICE, John Delbert
Fellow in Mathematics

RICHARDSON, Jasper Edgar
B.S. (Yale) 1944
Fellow in Physics

ROBERTS, Louis Reed
Fellow in Chemistry

SCHMITT, Roland Walter
B.A., B.S. in Phys. (Texas) 1947, M.A. (Texas) 1948
Magnolia Petroleum Fellow in Physics

SCHUMACHER, Mary Lou
Fellow in Romance Languages

SKOMAL, Edward Nelson
B.A. (Rice) 1947
Fellow in Physics

SMITH, James Richard
Fellow in Physics

STOUSLAND, Charles Eugene, Jr.
A.B. (William and Mary) 1941, B.Arch. (Yale) 1947
Fellow in Architecture

STRICKLER, Walter Roy
B.S. (S.L.I.) 1944
Fellow in Mathematics

TAYLOR, Howard Edward
B.A. (Rice) 1942, M.S. (Calif. Inst. of Tech.) 1943
Assistant in Mathematics

TERRELL, Nelson James, Jr.
B.A. (Rice) 1944, M.A. (Rice) 1947
A.E.C. Fellow in Physics

VERNON, Lonnie William
B.A. (Rice) 1948
Fellow in Chemistry

WHALING, Ward
B.A. (Rice) 1944, M.A. (Rice) 1947
A.E.C. Fellow in Physics
WHITE, Thomas Jefferson
B.A. (Rice) 1940
Assistant in Mathematics

Whitehurst, Harry Bernard
B.A. (Rice) 1944
Humble Fellow in Chemistry

Wojecki, Edward J.
B.S. (Louisiana Tech.) 1936
Assistant in Physical Education
FACULTY COMMITTEES

The President is a member, ex officio, of all committees.

COMMITTEE ON ADMISSIONS: Mr. McCann, chairman; Messrs. Garrison, Lear, Ryon, Squire, Thomas, and Ulrich.

COMMITTEE ON GRADUATE INSTRUCTION: Mr. Houston, chairman; Messrs. Bonner, Bray, Chandler, Richter, Tsanoff, Weiser, and Wischmeyer.

COMMITTEE ON EXAMINATIONS AND STANDING: Mr. McEnany, chairman; Messrs. Akers, Craig, Morehead, and J. T. Smith.

COMMITTEE ON SCHEDULES: Mr. McCann, chairman; Messrs. Calkin, Hartsook, J. Hodges, Nicholas, Risser, and Ryon.

COMMITTEE ON STUDENT ACTIVITIES: The Dean of Students, ex officio, chairman; Messrs. Brunk, Davies, Dunaway, Gallegly, Hermance, Louis, and Shelton; the Adviser to Women; the Chairman of the Hall Committee; the Chairman of the Honor Council; the President of the Student Association; the President of the Women’s Council.

COMMITTEE ON THE LIBRARY: Mr. Heaps, chairman; Messrs. Chillman, Dix, McKillop, Tsanoff, and Woodburn.

COMMITTEE ON GROUNDS AND BUILDINGS: Mr. Waters, chairman; Messrs. Milligan, Simons, Sims, and Watkin.

COMMITTEE ON PUBLICATIONS: Mr. Thomas, chairman; Messrs. Camden, Giles, Moraud, Talmage, Whiting, and Williams.

COMMITTEE ON PUBLIC LECTURES: Mr. Fulton, chairman; Messrs. Altenburg, Bonner, Bourgeois, and Milligan.

COMMITTEE ON OUTDOOR SPORTS: Mr. Bray, chairman; Messrs. Hermance and Nicholas; representatives of the R Association: Messrs. Herbert Allen and J. Eric Beall.

NAVY COMMITTEE: Mr. Craig, chairman; the Professor of Naval Science; Messrs. Hermance, Lyle, McCann, Shelton, and Weiser.
COMMITTEE ON STUDENT HEALTH SERVICE: Mr. Hermance, chairman; Dr. Welsh; Messrs. Cameron, Chandler, McCann, and McCants; the Adviser to Women; the Manager of the Residential Halls.

COMMITTEE ON THE FRESHMAN COURSE: Mr. Heaps, chairman; Messrs. Bray, Louis, Masterson, Shelton, Waser, Williams, and Wyatt.

EXECUTIVE COMMITTEE: The President, ex officio, chairman; the Dean; Messrs. Heaps, Lear, and Waters.
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 textbooks, drafting instruments, notebooks, examination papers, and certificates and diplomas. Laboratory expenses in the experimental courses in pure and applied science are met by laboratory fees. Extra charges will be made for excessive use of material, for excessive and unusual breakage, and for other damage to equipment.

FEES

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<tr>
<th>Description</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Registration fee</td>
<td>$25.00</td>
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<tr>
<td>(An annual fee required of all students.)</td>
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<tr>
<td>Library fee</td>
<td>25.00</td>
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<tr>
<td>(An annual fee required of all students.)</td>
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<tr>
<td>Late registration fee</td>
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<tr>
<td>Examination fee</td>
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<tr>
<td>(A fee to cover the cost of examinations and transcripts.)</td>
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<tr>
<td>Late examination fee (Each course)</td>
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<tr>
<td>Diploma fee</td>
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<td>(A fee required of all candidates for degrees.)</td>
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<tr>
<td>Blanket-tax</td>
<td>9.60</td>
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<tr>
<td>(An annual charge for student activities.)</td>
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<td>Health Service fee</td>
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<tr>
<td>Dormitory residents</td>
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<td>Town students</td>
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<tr>
<td>Gymnasium fee</td>
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<tr>
<td>Every male student pays this fee for the use of gymnasium equipment during his undergraduate residence. The fee is paid once only by a student entering as a Freshman.</td>
<td>16.00</td>
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## EXPENSES

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<th>Class</th>
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<tr>
<td>Sophomore</td>
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<td>Junior</td>
<td>8.00</td>
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<tr>
<td>Senior</td>
<td>4.00</td>
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<tr>
<td>Graduates (Annual charge, optional)</td>
<td>4.00</td>
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</tbody>
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### Laboratory fees

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<th>Subject</th>
<th>Amount</th>
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<td>Biology 100, 220, 340, 380, 440, 450, 470, 480, 510, 520, 530, 540a, 540b, 560, 610, 630, 660, 710, 730, 760</td>
<td>30.00</td>
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<td>Biology 360, 410</td>
<td>12.50</td>
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<tr>
<td>Biology 550a, 550b, 650a, 650b, 750a, 750b</td>
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<tr>
<td>Chemistry 100, 120, 200, 310</td>
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<td>Chemistry 230</td>
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<td>Chemistry 220, 300</td>
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<td>Chemistry 400, 410, 440</td>
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<td>Chemistry 470a, 470b</td>
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<td>Chemistry 500, 600</td>
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<td>History 100, 110</td>
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<td>Physics 100, 200</td>
<td>30.00</td>
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<td>Psychology 300, 420</td>
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<td>Psychology 400, 410</td>
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<td>Physical Education 400</td>
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<td>Chemical Engineering 305</td>
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<td>Chemical Engineering 405</td>
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<td>Chemical Engineering 575</td>
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Civil Engineering 320b ........................................ $ 5.00
300b, 320a, 330, 420, 460.......................... 15.00
300a.................................................. 20.00
440.................................................. 40.00
465.................................................. 25.00
500, 530.............................................. 50.00

Electrical Engineering 300, 330, 340.......................... 20.00
440, 450, 500, 530, 540.......................... 50.00
510, 520.............................................. 25.00

Mechanical Engineering 300.......................... 20.00
330, 410.............................................. 10.00
310.................................................. 40.00
420.................................................. 30.00
440, 510, 520, 530.......................... 25.00
500, 550.............................................. 50.00

Architecture (Every student enrolled in the department). 40.00
Architecture 210, 310, 410, or 450, if taken alone...... 15.00

If a student withdraws during the two weeks following the opening day of classes, all fees will be refunded. When withdrawal occurs within the third or fourth week after the opening of classes, 50 per cent of laboratory fees (only) will be refunded. No refund will be given if withdrawal is made more than four weeks after the opening of classes.

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.

RESIDENTIAL ACCOMMODATIONS

Rooms, completely furnished exclusive of linen, may be rented in the residential halls for men, twenty-five dollars of the rental being paid when the lease is signed. The amount of rental charges will be announced by the Office of the Bursar in advance of the offering of any leases. As the charge for table board will be made at actual cost, the monthly price, payable in advance, will probably vary during the year. Rooms in the halls will be let in the order of ap-
Applications received. Such applications should be addressed to the Office of the Bursar. The residential halls are governed by a student Hall Committee, under the general supervision of the Dean of Students.

Accommodations for the residence of young women on the university grounds are not available at present, but there is access to rooms for rest and study, 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 from Miss Lane.

**HEALTH SERVICE**

A Health Service located in West Hall is maintained for students. This service includes dispensary and infirmary care. The school physician makes scheduled sick calls and can be called in case of an emergency. A registered nurse is on duty during school hours; a qualified attendant is available at all hours. Information regarding the facilities and care can be secured at the Office of the Health Service (reached by the east entrance of West Hall).
STIPENDS AND FUNDS

FELLOWSHIPS

Provision is made for a variety of fellowships available to graduates of this and other institutions. There are several memorial fellowships that have been founded and endowed by gift or bequest on the part of friends of the Rice Institute. These provide a stipend designed to enable the holder to devote his time to study and research in his chosen field. There are also several industrial fellowships maintained by companies interested in the development of technical fields and the training of competent scientists and engineers. In addition, a number of teaching fellowships are available.

Persons desiring to be considered for appointment as fellows should consult with the department in which they desire to work and should make application to the Registrar as early as possible.

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

In memory of her husband, 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 to geological research, with special reference to petroleum and allied products. 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 Institute. The first Walter B. Sharp Fellow was appointed for the academic year 1931–32.

THE SAMUEL FAIN CARTER FELLOWSHIP

The late Mrs. Carrie B. Carter established at the Rice Institute in 1932 the Samuel Fain Carter Fellowship in memory of her hus-
band, one of the first promoters of the lumber industry in Texas and the founder of the Second National Bank of Houston. In accordance with the terms of the gift, the endowment of $20,000 is 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 postgraduate 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 in 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 ORA N. ARNOLD FELLOWSHIP FUND

Under the will of Mrs. Ora Nixon Arnold there was established in 1936 a fund to assist in securing a better understanding between the people and governments of Mexico, the South American States, the West Indies, and the Philippine Islands. The income is to be used in financing traveling fellowships to be allotted to graduates of the Rice Institute of outstanding ability and character, or to a graduate of the University of Mexico of equal distinction.

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.

THE JAMES A. BAKER AND ALICE GRAHAM BAKER BEQUEST

By the last will and testament of Captain James A. Baker, for more than fifty years Chairman of the Board of Trustees of the Institute, the trustees 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 CATHARINE WITHERS ROPER AND BENJAMIN E. ROPER MEMORIAL FUND

Miss Mary Withers Roper 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 she had spent an active life of sixty years in teaching in the schools of this vicinity.

THE EASTMAN KODAK COMPANY FELLOWSHIP

The Eastman Kodak Company maintains on a year-to-year basis a fellowship for predoctoral study in physical chemistry. The present amount of the stipend is $1200.

THE DOW CHEMICAL COMPANY FELLOWSHIP OR SCHOLARSHIP

On the initiative of Dr. Willard H. Dow, President of the Dow Chemical Company, a scholarship or fellowship was established by
the Company in September, 1943, on a year-to-year basis, to be awarded to a Rice student in chemistry, chemical engineering, or physics. A Senior student receiving the award will be the Dow Chemical Company Scholar; a graduate student receiving this award will be the Dow Chemical Company Fellow. The present amount of the stipend is $750.

THE HUMBLE OIL AND REFINING COMPANY FELLOWSHIPS

In September, 1945, the Humble Oil and Refining Company established at the Rice Institute two fellowships for X-ray diffraction research. The amount of the stipend will be based in each case on the previous training of the fellow. Effective in September, 1947, the Humble Company also established one fellowship in chemistry and one in physics carrying stipends of $1250. No limitation is placed on the nature of the research carried on by these two fellows.

THE MAGNOLIA PETROLEUM COMPANY FELLOWSHIP

The Magnolia Petroleum Company has established at the Rice Institute a fellowship for research work in the general field of physics of the liquid and solid state. This fellowship carries a stipend of $1500 per year, and is awarded to a graduate student who has completed one or more years of graduate work in physics.

THE PROCTOR AND GAMBLE FELLOWSHIP IN CHEMISTRY

The Procter and Gamble Company has established a fellowship in chemistry, the stipend of which will be based on the previous training of the fellow.

THE SHELL FELLOWSHIP IN CHEMICAL ENGINEERING

The Shell Fellowship Committee has established at the Rice Institute a Shell Fellowship in Chemical Engineering. The stipend of this fellowship is $1200 and its award is subject to the final approval of the Shell Fellowship Committee.

THE PAN AMERICAN FELLOWSHIP IN CHEMICAL ENGINEERING

The Pan American Refining Corporation has established at the Rice Institute a Pan American Fellowship in Chemical Engineer-
ing. The stipend of this fellowship is $1250 and its award is subject to the approval of the Pan American Refining Corporation.

THE H. A. WILSON MEMORIAL AWARD

A substantial prize is being provided for the best research in physics done by a graduate student each year. The funds are being contributed by former graduate students of Professor Emeritus H. A. Wilson, who retired as head of the physics department in 1947.

THE RICE INSTITUTE FELLOWSHIPS

The Rice Institute provides a number of fellowships for graduate students which carry stipends up to $1000 per year and exemption from all fees. A graduate fellow is expected to do a small amount of teaching, which provides him valuable training both in the subject matter of his specialty and in preparation for an academic career. Students holding fellowships ordinarily plan to spend a minimum of four years preparing for the degree of Doctor of Philosophy.

ASSISTANTSHIPS

A certain number of persons with outstanding qualifications may be appointed as assistants in the various departments of the Rice Institute. These assistants will be expected to carry a teaching load comparable with and, in general, somewhat less than that carried by instructors, but they will be permitted to work toward an advanced degree. In general, assistants will be able to do only about half-time graduate study.

Persons interested in being considered for appointment as assistants should communicate with one of the professors in the department concerned.
GRADUATE WORK IN
MATHEMATICS

Professors: H. E. Bray, S. Mandelbrojt
Associate Professors: J. W. Calkin, F. E. Ulrich
Assistant Professors: H. D. Brunk, G. R. MacLane
Lecturer: S. Agmon

The Rice Institute has always placed great emphasis on the study of mathematics, and has acquired a very complete mathematical library including all the important mathematical journals.

Admission to graduate study in mathematics will be granted to a limited number of students who have earned the bachelor’s degree from the Rice Institute, or another institution of similar standing, and whose undergraduate work in mathematics is such as to indicate the ability for advanced and original work. Those students who have completed a large amount of undergraduate mathematics and who devote full time to graduate study may earn the degree of Master of Arts in one year. The minimum time required by candidates for the degree of Doctor of Philosophy is three years. It is to be expected that most students will require longer than the minimum time, particularly holders of fellowships that call for a small amount of teaching.

For the master’s degree, the requirements are:
(a) The completion with high standing of at least three advanced courses.
(b) The presentation of a written thesis on a subject approved by the department.
(c) The passing of an oral examination given by the faculty.

For the doctor’s degree, the requirements are:
(a) The completion with high standing of at least six advanced courses.
(b) The presentation of a written thesis on a subject approved by the department. The purpose of the doctor’s thesis is to dem-
onstrate the candidate’s ability to make an original contribution to a field of mathematics in which he has become expert. This is a more extensive and advanced type of study than that required for the master’s degree, and is expected to reveal definite originality and inventiveness, and to be suitable for publication.

(c) The passing of an oral examination given by the faculty.

In order that they may obtain adequate experience in collegiate teaching, students holding fellowships are assigned a moderate schedule of regular teaching duties in the department. These duties usually consist of the instruction of one or two small sections in courses of elementary or intermediate character, and constitute an important part of the training for a teaching career.

Courses in Mathematics

Among courses which have been offered in recent years, and which may be offered in more or less modified form from time to time in the very near future, are the following:

Mathematics 310. Advanced Calculus and Differential Equations. This course is primarily for undergraduates, especially Juniors who have considerable facility in mathematical reasoning. It may be taken by graduate students of other departments. Three lectures per week.

Mr. Calkin

Mathematics 400. Theory of Functions of a Complex Variable. This course is fundamental in analysis. Besides giving an introduction to basic concepts of analysis, it includes the study of analytic functions of a complex variable, the Cauchy-Riemann equations, Cauchy’s Integral Theorem, Taylor’s series, calculus of residues, and conformal mapping. Three lectures per week.

Mr. Ulrich

Mathematics 410. Differential Equations and Introduction to the Calculus of Variations. Three lectures per week.

Mr. Calkin or Mr. MacLane
Mathematics 420. *Infinite Processes.* Sequences, series, Stieltjes integrals, summability, and related topics. Three lectures per week. (Not offered in 1949-50)

Mathematics 430. *Modern Geometry.* Synthetic and algebraic geometry, theory of groups, invariants, etc. Three lectures per week. (Not offered in 1949-50)

Mathematics 440a. *Topology.* Postulates on open sets. Various topological structures. Continuous functions defined in a topological space and taking values in another topological space. Metric spaces. Three lectures per week during the first half-year. (Not offered in 1949-50)

Mathematics 440b. *Introduction to Modern Algebra.* Groups, rings, and fields. The theory of ideals. The real and complex number systems. Polynomials. Matrix algebra; quadratic forms. Three lectures per week during the second half-year. (Not offered in 1949-50)

Mathematics 500a. *Theory of Functions of a Complex Variable.* Normal families of functions; theorems of Montel; theorems of Stieltjes and Vitali; theorems of Picard, Schottky, Landau, and Carathéodory; theorems of Julia and Ostrowski. Three lectures per week during the first half-year. Mr. Mandelbrojt

Mathematics 500b. *Theory of Functions of a Complex Variable.* Theory of the distribution of values. Three lectures per week during the second half-year. Mr. Ulrich

Mathematics 501. *Theory of Functions of a Complex Variable.* A study of special analytic functions of importance in mathematical physics. The course is usually given as a seminar. Three hours of lecture per week. Mr. Ulrich

Mathematics 502a. *Topological Groups.* Three lectures per week during the first half-year.

Mr. Bray

Mathematics 520. Trigonometric Series and Related Topics. Series expansions in terms of orthogonal systems of functions. Trigonometric series, Fourier transforms and integrals. The course is based upon Mathematics 510. Three lectures per week.

Mr. Bray or Mr. Brunk

Mathematics 530. Laplace Transforms. Applications to the solution of differential systems. Three lectures per week.

Mr. Ulrich (Not offered in 1949-50)


Mr. Calkin (Not offered in 1949-50)


Mr. Ulrich (Not offered in 1949-50)


Mr. Mandelbrojt (Not offered in 1949-50)

Mathematics 561a. General Problem of Moments. The Stieltjes, Hausdorff, and Hamburger problems. Connections with the theory
of Stieltjes continued fractions. Connections with the theory of functions holomorphic in a half-plane. Applications. General related problems. Three lectures per week during the first half-year.

Mr. Mandelbrojt (Not offered in 1949-50)


Mr. Calkin


(Not offered in 1949-50)


(Not offered in 1949-50)


Mr. Brunk

Applied Mathematics 500a. Hydrodynamics. Selected topics in the theory of incompressible fluid motion. Introduction to the problems of compressible flow. Three lectures per week during the first half-year.

Mr. Calkin (Not offered in 1949-50)
Mathematical Colloquium. The colloquium usually meets one afternoon every other week in order to allow the exposition of original investigations by its members.

Besides the courses listed above, others will be given from time to time to fit the needs of students. Reading courses are also offered in other fields of analysis in connection with research.
A minimum of one year of graduate study is required for the degree of Master of Arts and at least two more years for the degree of Doctor of Philosophy. To be recommended for the degree of Doctor of Philosophy, a student must present an original thesis describing the results of his experimental or theoretical research in form suitable for publication. He must also attend a sufficient number of courses to acquire a broad fundamental knowledge of physics in addition to his research specialization. His mastery in the field of physics will be tested by an oral examination given by the faculty.

The research done in the department has included work on the following subjects among others:

1. Nuclear disintegrations produced by high-energy protons and deuterons.
2. Energies of $\beta$ and $\gamma$ rays.
3. Scattering of neutrons and disintegrations produced by neutrons.
5. Cosmic rays.
6. Variation of $e/m$ for electrons with velocity.
7. Hall effect in metals and gases.
8. Magnetic properties of iron and other materials.

The physics laboratories contain ten rooms suitable for research, several of which are large enough for more than one man to work in. There is a well-equipped workshop in which four instrument makers are employed, and another workshop for graduate students. One of the instrument makers is a skilled glass blower.
Two small research rooms are air-conditioned and can be kept at nearly constant temperature.

The research equipment includes a high-pressure Van de Graaff generator, giving over two million volts, and a Cockcroft and Walton voltage doubler, giving two hundred thousand volts, for work on nuclear reactions. The Van de Graaff machine is in a separate air-conditioned building. Auxiliary equipment includes cloud expansion chambers, Geiger counters, proportional counters, linear amplifiers, a gamma-ray spectrograph, scaling circuits, electrosopes, and radioactive sources.

For research in low-temperature physics a modern liquid helium plant is available which supplies several liters of liquid helium an hour. Auxiliary equipment is being used for low-temperature specific heat measurements, for magnetic studies on superconductors, and for superfluidity studies on liquid helium.

The department has a large electromagnet, the current for which is supplied by a 25 kw. generator, and a large cobalt steel permanent magnet with poles 15 cms. in diameter.

The research rooms are supplied with three-phase A.C. at 110 and 220 volts, and with D.C. from two batteries, one of 300 ampere hours capacity, giving up to 120 volts, and also from two 10 kw. D.C. generators. Gas, water, and compressed air are also available.

Cathode-ray oscillographs, oscillators, amplifiers, power supplies, and klystrons and magnetrons are available for research on electronics and highfrequency electromagnetic waves.

The optical equipment includes a large Michelson echelon and several interferometers, a large quartz spectrograph, a spectrophotometer, an infrared spectrometer, an ultraviolet spectrometer, and several wave-length spectrometers. There are several darkrooms in the laboratory. Equipment for work on X-rays is also available.

A sound-level meter, a sound analyzer, and quartz plate oscillators are available for work on sound and supersonics.
The library is especially well equipped with a very complete file of periodicals.

**Courses in Physics**

Physics 500. *Electron Theory.* Conduction of electricity in gases, including ionization and recombination, motion of ions in electric and magnetic fields, the glow discharge, the arc, and the spark. Conduction of electricity in metals and semi-conductors. The dielectric constant. Dispersion. Optical properties of metals. Theories of magnetism and of galvanomagnetic phenomena. Three lectures per week.

*Mr. Heaps*

Physics 510. *Advanced Dynamics.* The general equations of analytical dynamics with emphasis on the method of Hamilton. Dynamics of a particle; rigid bodies; rotation; principles of least action; three-body problem; orbits. Three lectures per week.

Physics 520. *Principles of Quantum Mechanics.* A deductive presentation of the principles of quantum mechanics with applications to various problems in spectroscopy, collisions of atomic particles, molecular binding, etc. Three lectures per week.

*Mr. Houston*


Physics 540. *Nuclear Physics.* Radioactivity; alpha, beta, and gamma radiations and their interaction with matter; properties of nuclei; theory of nuclear structure; nuclear magnetic moments and spins; beta disintegrations; artificial disintegration of nuclei; nuclear scattering; fission; cosmic rays. Three lectures per week.

*Mr. Bonner*

Physics 550. *Special and General Theories of Relativity.* Two lectures per week.

*Mr. Wilson*

*Mr. Houston*


*Mr. Squire*

Physics 580. *Physics Colloquium*. One meeting a week at which results of researches in physics will be discussed.


Physics 700. *Summer Graduate Research*. Open only to students already admitted as candidates for an advanced degree. At least forty hours of laboratory work per week.
GRADUATE WORK IN CHEMISTRY

Professors: A. J. Hartsook, G. H. Richter, H. B. Weiser
Associate Professors: A. D. Garrison, W. O. Milligan,
H. O. Nicholas
Assistant Professors: W. W. Akers, J. E. Kilpatrick, E. S. Lewis,
G. T. McBride, J. T. Smith, J. Waser

A student who has completed a course for the degree of Bachelor of Arts may be admitted as a candidate for the degree of Master of Arts or of Doctor of Philosophy.

Preparation for the degree of Doctor of Philosophy involves at least three years of graduate work. The thesis must present a distinctly original contribution to the subject. It should be acceptable for publication in an accredited journal or series, and a copy must be deposited in the Institute library.

The following specific requirements must be met by candidates for advanced degrees taking their major work in chemistry:

For admission to full graduate standing, candidates for advanced degrees must possess a reading knowledge of scientific German; and must have completed general courses equivalent to those of the Rice Institute in Inorganic Chemistry and Qualitative Analysis, Quantitative Analysis, Organic Chemistry, and Physical Chemistry, and at least one full-year course of more advanced work equivalent to corresponding Senior work in chemistry of the Rice Institute. Preference will be given to applicants who earn high scores on the Graduate Record Examination, including the advanced test in chemistry. (See page 2.) A new graduate student who has not taken the Graduate Record Examination may be required to do so at the earliest examination time during his first semester of residence.

A candidate for the degree of Master of Arts is required to complete, in addition to a thesis, three approved full-year courses. 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 pass also a final public oral examination.

A candidate for the degree of Doctor of Philosophy must have met the course requirements for the master’s degree in chemistry; in addition he must complete three advanced full-year courses approved by the department, together with the doctoral thesis. He must satisfy the members of the staff under whom he is working that he possesses a reading knowledge of scientific French as well as scientific German. The first week in May of the last year of residence, the candidate 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 in addition he must pass a final public oral examination.

Courses in Chemistry

Chemistry 400. Advanced Organic Chemistry. Two lectures and two laboratory periods weekly during the first half-year. A course in the newer methods of organic synthesis.

Mr. Lewis

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. Prerequisites: Organic Chemistry and Physical Chemistry.

Mr. Weiser


Mr. Milligan

Chemistry 430. Theory of Valence. Three lectures weekly during the first half-year. A consideration of inter-atomic forces and their relationship to the structure and properties of matter.

Mr. Smith
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 review, by actual laboratory contact, the important reactions of the main series of organic substances. (Owing to limitations of space, enrollment will be limited to thirty-five students.)

*Mr. Richter*

Chemistry 450. Thermodynamics. Three lectures weekly during the first half-year. Relation of heat and work to chemical and physical systems. A consideration of free energy, entropy, and fugacity as applied to equilibria. Especial attention to the treatment of solutions.

*Mr. Kilpatrick*

Chemistry 460. Inorganic Chemistry. Three lectures weekly during the second half-year. A study of the chemical elements and their compounds from the standpoint of the periodic law.

*Mr. Smith*

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.

*Mr. Richter* (Not offered in 1949-50)

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 classroom and by the solution of typical problems. Among the subjects considered are: evaporation, humidification and dehumidification, air conditioning, drying, distillation and fractionation, filtration, absorption and ad-
sorption, extraction, crystallization, crushing, grinding, separation, agitation, transportation of solids, liquids, and gases, etc. The laboratory work consists of experimental studies of the various types of unit operations equipment from the standpoint of operation, testing, and theory. Prerequisite: Junior Chemical Engineering.

Mr. Hartsook

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

Mr. Garrison

Chemical Engineering 425b. Chemical Engineering Thermodynamics. Three hours of lectures weekly during the second half-year. A continuation of theoretical and applied thermodynamics. Prerequisite: Chemical Engineering 425a.

Mr. Garrison

Chemistry 500. M.A. Thesis. The program of the department permits a student to take the degree of Master of Arts after the successful completion of one or two years of graduate work. Students who elect to take the degree of Master of Arts are required to prepare a thesis, under the direction of some member of the staff of instruction.

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.

Mr. Weiser

Chemistry 520. Theory of Adsorption of Gases. Three lectures or conferences weekly during the second half-year. An advanced treatment of modern theories of adsorption of gases on solids.

Mr. Milligan
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.

Mr. Smith (Not offered in 1949-50)

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 as geometrical and optical isomerism.

Mr. Richter

Chemistry 545. Physical-organic Chemistry. Three lectures weekly. A study of the structure of organic compounds and the mechanism of organic reactions, including the application of the methods of physical chemistry to these problems.

Mr. Lewis (Not offered in 1949-50)

Chemistry 550. Reaction Kinetics. Three lectures weekly during the first half-year. A consideration of the rates of reactions with emphasis on the homogeneous kinetics as a tool in the study of reaction mechanisms.

Mr. Lewis

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.


Mr. Milligan


Mr. Waser
Chemistry 630. *Statistical Thermodynamics*. Three lectures weekly during the second half-year. A development of the principles of thermodynamics from the standpoint of statistical mechanics. The relation of the structure of molecules to their thermodynamic properties. Prerequisite: Chemistry 450.

*Mr. Kilpatrick*


*Mr. Richter (Not offered in 1949–50)*

Chemistry 650. *Quantum Mechanics*. Three lectures weekly. A study of simple mechanical systems from the point of view of wave mechanics. The application of these concepts to the chemical bond. The energy states of polyatomic molecules. Prerequisite: Advanced Calculus and Differential Equations.

*Mr. Kilpatrick (Not offered in 1949–50)*


*Mr. Waser*

Chemistry 670. *Electrochemistry*. Three lectures weekly during the second half-year. The application of thermodynamics to the study of electrolytic cells. Prerequisite: Chemistry 450.

*Mr. Kilpatrick*

Chemistry 700. *Summer Graduate Research*. Open only to students already admitted as candidates for an advanced degree. At least forty hours of laboratory work per week.
GRADUATE WORK IN BIOLOGY

Professor: A. C. Chandler
Associate Professor: E. Altenburg
Assistant Professors: J. W. Daugherty, J. I. Davies, R. V. Talmage

Graduate work in biology is offered in the special fields of interest of the faculty members, including parasitology, medical entomology, some phases of protozoology and bacteriology, immunology, genetics, and endocrinology.

The department is well equipped with the usual apparatus and supplies for work in general biology, physiology, bacteriology, microscopic technique, and radiobiology. Included are Beckman pH meters, controlled drying ovens, incubators with constant temperature and humidity, phase contrast microscope, flame photometer (for use in connection with a spectrophotometer in the chemistry department), chainomatic balance, dental X-ray machine, well-equipped photographic room, constant-temperature room, animal rooms, chemical rooms for synthesis or analysis of radioactive compounds, and radiation counter room equipped with two autoscalers and a nucleometer. Small individual research rooms are provided for graduate students engaged in experimental research. Special apparatus or material can be obtained, within reasonable limits, when needed for particular problems. The library is well supplied with books and periodicals in the subjects mentioned above, and will make efforts to obtain additional material that may be needed in connection with research problems under investigation.

The biology department is a comprehensive one, embracing general biology, zoology, physiology, embryology, genetics, parasitology, bacteriology, immunology, and radiobiology. No botany is offered except a little that is given in the beginning course in general biology. It has been the policy of the Rice Institute to try to do a few things well, rather than to spread its efforts too thinly over too many fields of interest. Upper-class courses are given in alternate years in order to give the students a wider range of subjects.
The master's degree is not given for advanced course work in some phase of biology as a preparation for teaching, as it is in some institutions, but is a research degree requiring a thesis embodying the results of original research. It may represent a step toward the doctorate but is not required. As a rule, students who are planning to continue toward the degree of Doctor of Philosophy will be given preference over those planning to take only the degree of Master of Arts. In very exceptional cases, when the undergraduate preparation has been adequate and some research or preparation has already been started in the Senior year or has been done during one or more summers prior to acceptance as a graduate student, the M.A. degree may be earned in one academic year, but it ordinarily requires two. The work consists of a minimum of two advanced courses, passed with high credit, and original investigation, the results of which are presented as a thesis. The candidate must also pass a public oral examination, and be able to make use of at least one foreign language in connection with his subject.

For the Doctor of Philosophy degree four academic years are usually required, but in some cases it may be completed in three if research has been continued through the summers. In addition to his research, a candidate must have completed, with high credit, at least five advanced courses, one of them usually in another department; and he must have acquired a knowledge of German and one other foreign language (usually French), as approved by the Committee on Graduate Instruction. The thesis must represent an original contribution which shows originality and ability, and be acceptable for publication in a reputable scientific journal.

In addition to the graduate courses in the biological sciences listed below, special courses in a wide range of subjects are arranged for graduate students to fit their particular needs. Under the direction and supervision of members of the department, the student is given weekly assignments in library, laboratory, or field work, as the subject may require, with conferences once or twice a week to discuss the work done and to outline the work for the coming week. Such courses have been given in the past in certain phases of invertebrate zoology, ichthyology, herpetology, ornithology, genet-
The courses listed below in medical entomology, helminthology, and protozoology are of this type also, but are given in regular rotation for graduate students in parasitology. Such courses are usually based on eight semester hours a year, as in the case of regularly scheduled laboratory science courses. About three hours of laboratory or field work counts as the equivalent of one hour of lecture, recitation, or library work.

Candidates for advanced degrees who hold Rice Institute fellowships will be expected to devote about eight hours a week to assisting. In this work, as far as may be feasible, fellows are permitted to assist with different courses in different years to obtain as much teaching background as possible.

Courses in Biology

**Biology 410. Genetics and Eugenics.** This course is devoted to a study of heredity, with frequent references to human material. Prerequisites: General Biology and Junior standing. Three lectures and two hours of laboratory per week.

*Mr. Altenburg*

**Biology 420. Helminthology.** Classification, taxonomy, identification, and life cycles of parasitic worms, and a study of economic importance, treatment, and control of helminthic diseases of man and animals. For students intending to specialize in parasitology. Prerequisites: General Biology and Parasitology. One lecture and nine hours of laboratory per week.

*Mr. Chandler*

**Biology 430. Medical Entomology.** Classification, taxonomy, identification, life cycles, and control of arthropod parasites, disease vectors, and poisonous species. For students intending to specialize in parasitology. Prerequisites: General Biology and Parasitology. One lecture and nine hours of laboratory per week.

*Mr. Chandler (Not offered in 1949-50)*

**Biology 440. Protozoology.** Classification, taxonomy, identification, life cycles, and technical methods in the study of Protozoa,
with special reference to parasitic forms. For students intending to specialize in parasitology. Prerequisites: General Biology and Parasitology. One lecture and nine hours of laboratory per week.

Mr. Chandler (Not offered in 1949-50)

Biology 460. Embryology and Histology. In the first semester the development of the vertebrate type is considered. Early development and germ layer formation are compared in the frog, chick, and mammal, and the chick is studied intensively in connection with the development of the various organs, and also for the extra-embryonic membranes. Several types of placentation are also considered in connection with the later development of the mammal. In the second semester the first development of the organs, with their histological structure, is considered in detail. Throughout the course opportunity is given the student to become familiar with the paraffin and celloidin section techniques, and also with various staining techniques. Three lectures and three hours of laboratory per week.

Mr. Davies (Not offered in 1949-50)

Biology 470. General Bacteriology and Immunology. Sterilization, preparation of media, and methods of cultivation; disinfection; nature and relationships of various 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. Prerequisite: Introductory Chemistry. Three lectures and three hours of laboratory per week.

Mr. Chandler (Not offered in 1949-50)

Biology 500. Special Work. Advanced work in special fields of biology, adapted to the needs of individual graduate students. Registration permitted only with the consent of the instructor.

Mr. Allenburg, Mr. Chandler, Mr. Davies, or Mr. Talmage

Biology 510. Graduate Research in Genetics. Continuation of this work in successive years will be numbered Biology 610, 710, etc.
Biology 520. *Endocrinology.* This course presents a survey of the mammalian endocrine glands. It includes operative techniques in removing these glands under surgical conditions, and preparing the removed glands for histological study. During the first part of the course the various glands are studied separately. During the latter part problems of interrelationship are discussed. A short research problem is a part of the course. Two lectures and six hours of laboratory per week.

*Mr. Talmage (Not offered in 1949–50)*

Biology 530. *Graduate Research in Embryology or Physiology.* Continuation of this work in successive years will be numbered Biology 630, 730, etc.

Biology 540. *Radiobiology.* This is an introductory course in the use of radioactive isotopes in the fields of biology and medicine. It includes a simplified study of nuclear physics, instrumentation, an introduction to health physics, and a review of current tracer and radiation literature. Laboratory work includes familiarization with radiation equipment, techniques of safe handling of radioactive material, chemical procedures, and special biological techniques. A small research problem is a part of the course. Three lectures and three hours of laboratory per week.

*Mr. Talmage*

Biology 550. *Graduate Research in Radiobiology.* Continuation of this work in successive years will be numbered Biology 650, 750, etc.

Biology 560. *Graduate Research in Parasitology or Bacteriology.* Continuation of this work in successive years will be numbered Biology 660, 760, etc.

Biology 700. *Summer Graduate Research.* Open only to students already admitted as candidates for an advanced degree. At least forty hours of laboratory work per week.
GRADUATE WORK IN THE
HUMANITIES

Students who hold the degree of Bachelor of Arts and who give evidence of their qualifications to the satisfaction of the department concerned and the Committee on Graduate Instruction may be admitted to candidacy for the degree of Master of Arts in the following fields: English, German, history, philosophy, Romance languages. These departments, while not organized for graduate work on the doctoral level, are in a position to direct well-qualified students in the earlier stages of graduate study. Library facilities in these fields are adequate for research of considerable range and variety. A limited number of fellowships are available for students of marked promise.

A minimum of one year of graduate study is required for the degree of Master of Arts. A candidate for this degree must elect a principal subject and arrange a schedule which represents 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; (b) at least two advanced courses, one of which must be a graduate course in the principal subject. The candidate must also pass a public oral examination given by the faculty. In addition to the general requirements here outlined, other specific requirements may be imposed by the various departments.
GRADUATE WORK IN
ENGINEERING

The Rice Institute offers graduate work in engineering to its own graduates of superior standing, and to similarly qualified holders of bachelor's degrees from other recognized institutions. Possession of a degree does not automatically guarantee admission to graduate work. Applicants will be screened by the department concerned and by the Committee on Graduate Instruction, and will be required to submit evidence of suitable preparation and of ability to do work of the quality expected. Those interested should apply to the Registrar not later than July 15.

The courses outlined below indicate the general nature of the requirements for the degree of Master of Science in the several fields of engineering. In addition, a candidate may be required to pass courses which he has not previously taken, but which are required by the Rice Institute for the degree of Bachelor of Science in the field of engineering concerned. Furthermore, attention is called to the fact that completion of the courses indicated below will not automatically lead to the award of a degree. The general quality of the candidate's course work, as well as the quality of his thesis, will be carefully considered by the department concerned and by the Committee on Graduate Instruction before he is recommended to the faculty for a Master of Science degree. In exceptional cases, a student may complete the necessary work in one year, but more often he should count on a minimum of two years, particularly if he is a holder of a fellowship requiring some teaching or other service.

Requirements for the Degree of Master of Science in Chemical Engineering

(1) Advanced Topics in Chemical Engineering (Ch.E. 505)
(2) Research and Thesis (Ch.E. 575)
(3) Approved elective in mathematics, physics, chemistry, or engineering

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(4) Chemical Process Design (Ch.E. 525a) (first half-year)
Petroleum Production Engineering (Ch.E. 525b) (second half-year)
(5) Seminar (Ch.E. 485) (second half-year)

Requirements for the Degree of Master of Science
in Civil Engineering

(1) Advanced course in Structures
(2) Approved elective in engineering
(3) Approved elective in mathematics, physics, chemistry, biology,
or engineering other than civil
(4) Research and Thesis (C.E. 530)
(5) Graduate Seminar (C.E. 505)

Requirements for the Degree of Master of Science
in Electrical Engineering

(1) Advanced Circuit Analysis (E.E. 500)
(2) Research and Thesis (E.E. 530)
(3) Advanced Electrical Power Engineering (E.E. 520), or
Advanced Communications Engineering (E.E. 540), or
Servo-mechanisms (E.E. 510)
(4) Approved elective in mathematics, physics, or engineering
(5) Approved elective
(6) Graduate Seminar (E.E. 505)

Requirements for the Degree of Master of Science
in Mechanical Engineering

(1) Approved graduate course in mechanical engineering
(2) Approved course in Structures
(3–4) Two approved electives in mathematics, physics, chemistry,
or engineering
(5) Research and Thesis (M.E. 550)
(6) Graduate Seminar (M.E. 505)

Courses in Engineering

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
chemical engineers.

Messrs. Akers and McBride

Chemical Engineering 505. Advanced Topics in Chemical Engi-
eering. Three lectures weekly. An advanced study of the principles
of chemical engineering. The first half-year will include fluid flow,
heat transfer, evaporation, filtration, and sedimentation. The
second half-year will include the mass transfer operations—distil-
tillation, absorption, drying, extraction, and leaching. Special
emphasis will be placed upon the application of theoretical prin-
ciples to chemical engineering practices. Prerequisite: Chemical
Engineering 405. (See page 45.)

Mr. McBride

Chemical Engineering 525a. Chemical Process Design. Three
lectures weekly during the first half-year. The application of ther-
modynamics and unit operations to the design of chemical equip-
ment and plants. Prerequisites: Chemical Engineering 405 and
425a and b. (See pages 45-46.)

Mr. Akers

Chemical Engineering 525b. Petroleum Production Engineering.
Three lectures weekly during the second half-year. A study of the
problems encountered in the production of petroleum, including
the calculation of oil and gas reserves and the process design of
separating and cycling plants. Prerequisites: Chemical Engineering
405 and 425a and b. (See pages 45-46.)

Mr. Akers

Chemical Engineering 575. 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. Two copies of
the accepted report will be required for deposit in the Institute
library.

Chemical Engineering 700. Summer Graduate Research. Open
only to students already admitted as candidates for an advanced
degree. At least forty hours of laboratory work per week.
Civil Engineering 465. *Elementary Structural Design*. Three lectures and one laboratory period weekly.

*Mr. Murphy*

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. Three lectures and two laboratory periods weekly. Prerequisite: Steel and Timber Structures.

Civil Engineering 505. *Graduate Seminar*. One hour weekly.

*Staff*


Civil Engineering 530. *Research and Thesis*. This will consist of an original investigation along some approved line of civil engineering work, an original design, or a critical review of existing work. In every case two complete typewritten or printed reports will be required for deposit in the Institute library.

*Mr. Ryon*

**Electrical Engineering 500. Advanced Circuit Analysis.** Nonlinear circuits; three- and four-winding transformer theory; transmission networks; machine and circuit transients; transient stability. Three lectures and four hours of laboratory work weekly.

*Mr. Pfeiffer*

Electrical Engineering 505. *Graduate Seminar*. One hour weekly.

*Staff*

Electrical Engineering 520. Advanced Electrical Power Engineering. Power plants and substations; transmission and distribution systems; illumination; industrial electronics. Three lectures and four hours of laboratory work weekly.

Mr. Pfeiffer

Electrical Engineering 530. Research and Thesis. A thorough report on an electrical engineering investigation selected and carried out by the individual student. Two copies of the accepted report will be required for deposit in the Institute library. Nine hours of research weekly.

Staff

Electrical Engineering 540. Advanced Communications Engineering. Electromagnetic theory and wave propagation; microwaves; electro-acoustical systems. Three lectures and four hours of laboratory work weekly.

Mr. Wischmeyer

Mechanical Engineering 500. Advanced Engineering Mechanics. Stress and strain at a point, strength theories, and fatigue; elementary theory of elasticity applied to problems of interest to mechanical engineers. Elementary dynamics, balancing, and gyroscopes; mechanical vibration theory with application to critical speed of rotating shafts, vibration absorbers, and vibration of internal-combustion engines. Three lectures weekly.

Mr. Plunkett

Mechanical Engineering 505. Graduate Seminar. One hour weekly.

Staff

Mechanical Engineering 510. Advanced Power Engineering. Design and operation of industrial and central steam stations; heat balance studies; economic selection of boilers, turbines, condensers, and auxiliaries. Three lectures weekly for one semester.

Mr. Woodburn

Mechanical Engineering 520. Steam and Gas Turbines. Design of component parts of steam and gas turbines; governing and
control mechanisms; plant cycles and performance. Three lectures weekly for one semester.

Mr. Woodburn

**Mechanical Engineering 530.** *Advanced Internal-combustion Engines.* Study of combustion, dynamics, and performance of internal-combustion engines for stationary and vehicular applications. Three lectures weekly for one semester.

Mr. Cameron

**Mechanical Engineering 550.** *Research and Thesis.* A report on an engineering investigation carried out by the individual student under the direction of a member of the staff in mechanical engineering. Nine hours of research weekly. Two copies of the accepted report will be required for deposit in the Institute library.


Mr. Plunkett

**Mechanical Engineering 570a.** *Advanced Dynamics.* Kinematics, Hamilton’s principle, and LaGrange’s equations. Applications to advanced engineering problems. Vibration theory. Introduction to theory of relativity. Three lectures weekly during the first half-year.

Mr. Plunkett (Not offered in 1949-50)

**Mechanical Engineering 570b.** *Controls and Servo-mechanisms.* Control of continuous processes. Dynamics of governors and temperature regulators. Dynamics of tracking mechanisms and contour machines. Emphasis will be placed on design as well as analysis. Three lectures and three hours of laboratory work weekly during the second half-year.

Mr. Plunkett (Not offered in 1949-50)
Students who hold the degree of Bachelor of Science in Architecture and who give evidence of their qualifications to the satisfaction of the department of architecture and the Committee on Graduate Instruction may be admitted to candidacy for the degree of Master in Architecture. A minimum of one year of graduate study is required for the master’s degree when the candidate already has completed five years’ work in a recognized school of architecture, and has received his degree with a record of high scholarship. The candidate must have had at least two years of college work in a foreign language, preferably French. Candidates whose preparation has been limited to four years will be required to take two years of graduate work to reach their master’s degree.

The candidate for the master’s degree shall take the equivalent of four graduate courses which shall consist of (a) personal investigation, the results of which must be submitted as a thesis; (b) at least two advanced courses, one of which must be a graduate course in architecture. The candidate must pass a public oral examination given by the faculty. The candidate may elect as his major work Architecture 600, 610, or 630. Should he elect the field of history or the field of construction, there will be required in either course a minimum of fifteen hours of drawing and research.

Courses in Architecture

Architecture 600. Postgraduate Design. A course for students who have received the degree of Bachelor of Science in Architecture. Advanced study and research in architectural design or city planning. The subject of study for the thesis shall be chosen with the approval of the faculty, and a written thesis presenting the results of the study will be required. Three hours of conference, fifteen hours of drawing and research.

Messrs. DeZurko, Dunaway, and Watkin
Architecture 610. *Postgraduate Architectural History*. A course for students who have received the degree of Bachelor of Science in Architecture. An advanced course of study and research in the field of architectural history. Three hours of conference, six hours of research.

*Messrs. Chillman and DeZurko*

Architecture 630. *Postgraduate Construction*. A course for students who have received the degree of Bachelor of Science in Architecture. An advanced course of study in the field of architectural construction. Three hours of conference, nine hours of drawing and research.

*Messrs. Dunaway and Morehead*
DOCTORS OF PHILOSOPHY OF THE RICE INSTITUTE

YEAR | NAME | DEPARTMENT | TOPIC
--- | --- | --- | ---
1918 | Hubert Evelyn Bray | Mathematics | A Green’s theorem in terms of Lebesgue integrals.
1919 | Jacob Leighty Sherrick | Chemistry | Adsorption by precipitates.
1920 | Norman Hurd Ricker | Physics | The luminosity of mercury vapor distilled from the arc in vacuo.
1921 | Allen Darnaby Garrison | Chemistry | The oxidation and luminescence of phosphorus.
1922 | Andrew Bonnell Bryan | Physics | I. Dielectric losses at radio frequencies in liquid dielectrics. II. The electrical properties of flames containing salt vapors for high frequency alternating currents. III. The conductivity of flames for rapidly alternating currents.
1924 | Aristotle Michal | Mathematics | Integro-differential expressions invariant under Volterra’s group of transformations.
1925 | Gaylord Johnson | Chemistry | The preparation and chemical properties of the propinyl halides.
1926 | Charles Frederick Roos | Mathematics | I. A mathematical theory of competition. II. Generalized Lagrange problems.
1927 | Everett Ellis Porter | Chemistry | The physical chemistry of color lake formation.
1928 | Paul Edward Boucher | Physics | I. The drop of potential at the cathode in flames. II. The measurement of the resonance, radiation, and ionization potentials of several gases and vapors. III. The mobility of negative ions in gasoline, hydrogen, and hydrogen-chlorine flames.
Geoffrey Everett Cunningham | Chemistry | Adsorption of ions and the physical character of precipitates.
John Jay Gergen | Mathematics | I. Quelques théorèmes sur les séries de Taylor. II. On generalized lacune. III. On Taylor’s series admitting the circle of convergence as a singular
<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Department</th>
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<tbody>
<tr>
<td>1929</td>
<td>Nat Edmonson, Jr.</td>
<td>Mathematics</td>
</tr>
<tr>
<td></td>
<td>Poisson's integral and plurisegments on the hypersphere.</td>
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<tr>
<td></td>
<td>Deborah May Hickey</td>
<td>Mathematics</td>
</tr>
<tr>
<td></td>
<td>A three-dimensional treatment of groups of linear transformations.</td>
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<tr>
<td></td>
<td>Edward Roy Cecil Miles</td>
<td>Mathematics</td>
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<tr>
<td></td>
<td>George Holmes Richter</td>
<td>Chemistry</td>
</tr>
<tr>
<td>1930</td>
<td>Edward Josephi Durham</td>
<td>Chemistry</td>
</tr>
<tr>
<td></td>
<td>Studies in the solubilities of the soluble electrolytes.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ray Nelson Haskell</td>
<td>Mathematics</td>
</tr>
<tr>
<td></td>
<td>The mixed problem for harmonic functions with discontinuous boundary conditions.</td>
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</tr>
<tr>
<td></td>
<td>Clyde Roland Johnson</td>
<td>Chemistry</td>
</tr>
<tr>
<td></td>
<td>The atomic weights of chlorine and vanadium.</td>
<td></td>
</tr>
<tr>
<td>1931</td>
<td>Edwin Ford Beckenbach</td>
<td>Mathematics</td>
</tr>
<tr>
<td></td>
<td>Minimal surfaces in Euclidean N-space.</td>
<td></td>
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<tr>
<td></td>
<td>Charles Hewitt Dix</td>
<td>Mathematics</td>
</tr>
<tr>
<td></td>
<td>Lattice regions and their application in dynamics.</td>
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<tr>
<td></td>
<td>William Maurice Ewing</td>
<td>Physics</td>
</tr>
<tr>
<td></td>
<td>I. A new method of treating certain problems of seismic prospecting. II. Seismic propagation paths. III. Paths of seismic waves. IV. Comparison of two methods for the interpretation of seismic time-distance graphs which are smooth curves. V. Velocity of explosion-generated longitudinal waves in a nepheline syenite.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Paul Duane Harwood</td>
<td>Biology</td>
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<tr>
<td></td>
<td>The helminths parasitic in the Amphibia and Reptilia of Houston, Texas, and vicinity.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>William Monroe Rust, Jr.</td>
<td>Mathematics</td>
</tr>
<tr>
<td></td>
<td>Integral equations and the cooling problem for several media.</td>
<td></td>
</tr>
<tr>
<td>1932</td>
<td>Henry Eugene Banta</td>
<td>Physics</td>
</tr>
<tr>
<td></td>
<td>Some thermo- and galvanomagnetic properties of a bismuth crystal.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gordon Lee Locher</td>
<td>Physics</td>
</tr>
</tbody>
</table>
|      | I. The compound photoelectric effect of X-rays in light elements. II. Attempts to induce radioactivity in matter. III. A photoelectric Geiger-
<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Department</th>
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</thead>
<tbody>
<tr>
<td>1933</td>
<td>John Henry Binney</td>
<td>Mathematics</td>
</tr>
<tr>
<td></td>
<td>An elliptic system of integral equations on summable functions.</td>
<td></td>
</tr>
<tr>
<td>1933</td>
<td>Albert Grant Mallison</td>
<td>History</td>
</tr>
<tr>
<td></td>
<td>Early history of the office of the Attorney General of the United States.</td>
<td></td>
</tr>
<tr>
<td>1933</td>
<td>John Virgil Pennington</td>
<td>Physics</td>
</tr>
<tr>
<td></td>
<td>A theory of imperfect elasticity.</td>
<td></td>
</tr>
<tr>
<td>1933</td>
<td>Paul Klein Rees</td>
<td>Mathematics</td>
</tr>
<tr>
<td></td>
<td>The transforms of Fuchsian groups.</td>
<td></td>
</tr>
<tr>
<td>1934</td>
<td>Tom Wilkerson Bonner</td>
<td>Physics</td>
</tr>
<tr>
<td></td>
<td>I. Collisions of neutrons with atomic nuclei. II. The energy distribution of the neutrons from fluorine. III. The energy distribution of neutrons from boron. IV. Emission of neutrons from fluorine and beryllium. V. Ionization of gases by neutrons. VI. Dependence of the absorption of neutrons on their velocity. VII. Luminosity of a flame containing sodium vapor.</td>
<td></td>
</tr>
<tr>
<td>1934</td>
<td>George Robert Gray</td>
<td>Chemistry</td>
</tr>
<tr>
<td></td>
<td>Hydrogen ion displacement during the coagulation of arsenic trisulfide sol and sulfur sol.</td>
<td></td>
</tr>
<tr>
<td>1934</td>
<td>Homer Clarence Matthes</td>
<td>Biology</td>
</tr>
<tr>
<td></td>
<td>A study of the seasonal distribution of Anopheles in Houston, Texas.</td>
<td></td>
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<tr>
<td>1934</td>
<td>Winfred O. Milligan</td>
<td>Chemistry</td>
</tr>
<tr>
<td></td>
<td>X-ray studies on the hydrous oxides.</td>
<td></td>
</tr>
<tr>
<td>1935</td>
<td>Paul Livingston Burlingame</td>
<td>Biology</td>
</tr>
<tr>
<td></td>
<td>On the environmental nature of resistance in the albino rat to single and superimposed infestations with an acanthocephalan (Moniliformis moniliformis).</td>
<td></td>
</tr>
<tr>
<td>1935</td>
<td>George Alvin Garrett</td>
<td>Mathematics</td>
</tr>
<tr>
<td></td>
<td>Necessary and sufficient conditions for potentials of single and double layers.</td>
<td></td>
</tr>
<tr>
<td>1935</td>
<td>John Tom Hurt</td>
<td>Mathematics</td>
</tr>
<tr>
<td></td>
<td>On the uniformly bounded turning of level curves of the Green's function.</td>
<td></td>
</tr>
<tr>
<td>1935</td>
<td>William Grosvenor Pollard</td>
<td>Physics</td>
</tr>
<tr>
<td></td>
<td>I. Theory of the beta-ray type of radioactive disintegration. II. Energy distribution in cosmic rays.</td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>Name</td>
<td>Department</td>
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<tr>
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<tr>
<td></td>
<td>James Henry Sawyer, Jr.</td>
<td>Physics</td>
</tr>
<tr>
<td></td>
<td>Millard Seals Taggart</td>
<td>Chemistry</td>
</tr>
<tr>
<td>1936</td>
<td>Joseph Williams Hahn</td>
<td>Mathematics</td>
</tr>
<tr>
<td></td>
<td>Hughes Mead Zenor</td>
<td>Physics</td>
</tr>
<tr>
<td>1937</td>
<td>Joseph Ilott Davies</td>
<td>Biology</td>
</tr>
<tr>
<td></td>
<td>Frank House Hurley, Jr.</td>
<td>Chemistry</td>
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<tr>
<td></td>
<td>Ernest Carlton Kennedy</td>
<td>Mathematics</td>
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<tr>
<td>1938</td>
<td>Walter Tandy Scott</td>
<td>Mathematics</td>
</tr>
<tr>
<td>1939</td>
<td>William Joseph Coppoc</td>
<td>Chemistry</td>
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<tr>
<td></td>
<td>Julian Frank Evans</td>
<td>Physics</td>
</tr>
<tr>
<td></td>
<td>Eby Nell McElrath</td>
<td>Chemistry</td>
</tr>
<tr>
<td></td>
<td>Fred Terry Rogers, Jr.</td>
<td>Physics</td>
</tr>
</tbody>
</table>
1940

Emmett Leroy Hudspeth
Physics
I. Anomalous scattering of neutrons by helium and the d-d neutron spectrum. II. Electroscope investigation of the anomalous scattering of neutrons by helium. III. Resonances in the disintegration of carbon by deuterons. IV. Observation of $H_1$ and $H_3$ ranges from the disintegration of deuterium by deuterons. V. Low energy neutrons from the deuteron-deuteron reaction.

John Purcell Nash
Mathematics
A class of continuous functions and convergence criteria for their Fourier series.

Maxwell Ossian Reade
Mathematics
Generalizations to space of the Cauchy and Morera theorems.

Marguerite Moilliet Rogers
Physics
A determination of the masses and velocities of three radium B beta-particles.

Vernon Truett Schuhardt
Biology
Studies of the Falls Creek (Texas) strain of relapsing fever spirochetes.

John Bertram Bates
Chemistry
X-ray diffraction studies on heavy metal iron-cyanides.

James Fred Denton, Jr.
Biology
Studies on the morphology, taxonomy, and life histories of trematodes of the subfamily Dicrocoeliine Looss, 1899.

Henry Francis Dunlap
Physics
The scattering of fast neutrons by lead.

James Holmes
Chemistry
The constitution of silica gel.

James Curtiss Schiller
Chemistry
A study of the bromination of saturated organic compounds.

1941

James Douglas Bankier
Mathematics
Arithmetical continued fractions.

Price Bush Elkin
Chemistry
Adsorption studies on clays.

James Holmes
Chemistry
The constitution of silica gel.

James Curtiss Schiller
Chemistry
A study of the bromination of saturated organic compounds.

1942

Nat Huyler Marsh
Chemistry
A study of cracked gasoline and the reaction of bromine with primary aliphatic alcohols.

Donald Vincent Moore
Biology
Studies on the life history and development of certain Acanthocephala of the order Archiacanthocephala (Meyer, 1931).
Hugh Taylor Richards
Transmutations of lithium by deuterons.

1943
Robert Narvaez Little, Jr.
Neutron scattering by magnesium.
Charles Earle Mandeville, Jr.
The energies of some nuclear gamma-rays.

George Piranian
A study of the position and nature of the singularities of functions given by their Taylor series.

Wolfgang Joseph Thron
Convergence regions for continued fractions.

1944
Hugh Daniel Brunk (Feb.)
Some generalizations for Dirichlet's series of Hadamard's theorem with applications.

1944
Vincent Frederick Cowling (Oct.)
On functions defined by a Taylor series.

Charles Sedwick Matthews
A study of alumina-silica-fluorine combinations as hydrocarbon conversion catalysts.

Warren Candler Simpson
Electron diffraction studies on alumina films.

1945
Clarence John Addis, Jr. (June)
I. Factors influencing the growth of tapeworms (Hymenolepis diminuta).
II. Studies on the sandflies of Texas (Phlebotomus).

Robert Warren Long
Neutron scattering in iron.

1946
Gerald Robinson MacLane (March)
Concerning the uniformization of certain Riemann surfaces allied to the inverse cosine and inverse gamma surfaces.

1946
Bob Everett Watt (June)
I. Resonances in the disintegration of fluorine by protons. II. Protons from $^{14}\text{C} + ^{2}\text{H}$. III. The energy of the $\gamma$-rays from the disintegration of fluorine by protons and deuterons. IV. The disintegration of carbon by deuterons. V. High energy gamma-ray from $\text{Li} + ^{2}\text{D}$. VI. An integrator for small currents.

1947
John Ellis Evans
I. A study of gamma-ray resonances produced by proton bombardment of lithium and fluorine. II. The energy distribution of alpha-particles from $\text{Be}^3$ formed by the beta-decay of $\text{Li}^5$. 
<table>
<thead>
<tr>
<th>Year</th>
<th>Name</th>
<th>Department</th>
<th>Thesis Title and Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wilton Monroe Fisher</td>
<td>Biology</td>
<td>Studies on transovarial infection with <em>Borrelia recurrentis var. turicata</em> in <em>Ornithodoros turicata</em>.</td>
</tr>
<tr>
<td></td>
<td>Charles Wilson Malich</td>
<td>Physics</td>
<td>The disintegration of beryllium by deuterons.</td>
</tr>
<tr>
<td></td>
<td>Jackson Dan Webster</td>
<td>Biology</td>
<td>I. Studies on the life cycle of <em>Mesocestoides latus</em> Mueller. II. The helminth parasites of the bob-white quail.</td>
</tr>
<tr>
<td>1948</td>
<td>Henry Ernest Baumgarten</td>
<td>Chemistry</td>
<td>A study of the naphthenic acids from Aruba petroleum.</td>
</tr>
<tr>
<td></td>
<td>Gordon Lake Bushey</td>
<td>Chemistry</td>
<td>Isobaric and isothermal dehydration studies on pure soap crystals.</td>
</tr>
<tr>
<td></td>
<td>James Colwell Harris</td>
<td>Physics</td>
<td>Resonances for carbon bombarded by deuterons.</td>
</tr>
<tr>
<td></td>
<td>Neville Carter Hunsaker</td>
<td>Mathematics</td>
<td>Extremal curves for the modulus of an analytic function.</td>
</tr>
</tbody>
</table>
RECENT PUBLICATIONS*

AKERS, WILLIAM WALTER

AKERS, WILLIAM WALTER, AND R. R. WHITE
"Kinetics of Methane Synthesis," Chemical Engineering Progress, XLIV (1948), 553-566.

ALTENBURG, EDGAR
"Tumor Formation in Relation to the Origin of Viruses," American Naturalist, LXXXI (1947), 72-76.

BENNETT, W. E.

BENNETT, W. E., T. W. BONNER, H. T. RICHARDS, AND B. E. WATT

BENNETT, W. E., AND H. T. RICHARDS

BLAIR, LEON B.
"An Historical Examination of Soviet Foreign Policy," United States Naval Institute Proceedings. (Forthcoming.)

BLUNT, R. F.

BLUNT, R. F., W. F. LOVE, AND E. N. SKOMAL

BONNER, T. W.
(See also BENNETT and WHALING.)

BONNER, T. W., AND J. E. EVANS

*By present instructional staff members and graduate students, or based on work formerly done at the Rice Institute.
RECENT PUBLICATIONS

Bonner, T. W., J. E. Evans, J. C. Harris, and G. C. Phillips

Bonner, T. W., J. E. Evans, and J. E. Hill

Bonner, T. W., J. E. Evans, C. W. Malich, and J. R. Risser

De Benedetti, S., J. E. Francis, W. M. Preston, and T. W. Bonner

Bourgeois, André
“Baudelaire's Neurosis,” The Rice Institute Pamphlet, XXXV, No. 3 (July, 1948), 132-159.


“Nouvelle Conjecture sur l'Origine de Jeanne Duval,” Le Bayou, 11ème année, Cahier No. 39 (June, 1949). (Forthcoming.)

René Boylesve et le Problème de l'Amour (Geneva: 1949). (Forthcoming.)

“Réponse à la Critique du Professeur Michel Robert sur René Boylesve, l'Homme, le Peintre de la Touraine,” in Le Bayou, 9ème année, Cahier No. 34 (1947), 80-86.


BRUNK, H. D.


BUSHEY, GORDON L.

(See MILLIGAN.)

CAMDEN, CARROLL


CHANDLER, ASA C.


Introduction to Parasitology, eighth edition (New York: John Wiley & Sons). (Forthcoming.)

“New Species of the Genus Schistotenia, with a Key to the Known Species,” Transactions of the American Microscopical Society, LXVII (1948), 169–176.


CHANDLER, ASA C., AND R. RAUSCH


CHILLMAN, JAMES, JR.

“Art in Houston,” Houston, XIX (February, 1948), 9, 63.


“Giotto and Modern Art,” The Rice Institute Pamphlet, XXXV, No. 3 (July, 1948), 41–63.
CRAIG, HARDIN, JR.


DEZURKO, EDWARD R.

"Early Kansas Churches," Bulletin of the Kansas State College Experiment Station. (Forthcoming.)


DIX, WILLIAM S.

"Herman Melville and the Problem of Evil," The Rice Institute Pamphlet, XXXV, No. 3 (July, 1948), 81-107.


EVANS, J. E.

(See also BONNER and WHALING.)

EVANS, J. E., C. W. MALICH, AND J. R. RISSER

"Neutrons and Gamma-radiation from Deuteron Bombardment of Be," Physical Review, LXXV, No. 7 (1949). (Forthcoming.)

FISCHER, KATHERINE

The Burgundian Code (Leges Burgundionum), Translations and Reprints (University of Pennsylvania Press), Third Series, Vol. III. (Forthcoming.)
FULTON, JAMES STREET

"Reflections on the Freedom of Science," The Rice Institute Pamphlet, XXXV, No. 3 (July, 1948), 64-80.

Review of Sartre, Jean-Paul, The Psychology of Imagination, in Philosophical Review. (Forthcoming.)

"Truth," Collier's Encyclopedia. (Forthcoming.)

GALLEGLY, JOSEPH


GIRARD, P. L.


"Henri Ghéon, Henri Brochet et la Renaissance du Théâtre Religieux Contemporain," Marie—Catholic Magazine (Nicolet, Quebec). (Forthcoming.)


HARRIS, J. C.

(See BONNER.)

HODGES, JOHN E.


HOUSTON, WILLIAM VERNILLION

Can Engineering Be Taught in College? (Cleveland, Ohio, July 2, 1947: a lecture given at the Case Institute of Technology), pp. 13.


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